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Macro Policies, the Terms of Trade and the Spatial Dimension of Balanced Growth

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CENTER DISCUSSION PAPER NO. 574

MACRO POLICIES, THE TERMS OF TRADE AND
THE SPATIAL DIMENSION OF BALANCED GROWTH

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ABSTRACT

This paper attempts to help redress a perceived recent imbalance in the literature and in the realm of policy discourse as between the open economy and domestic balanced growth ingredients of a successful development effort. It initially emphasizes the increased past compartmentalization and disarticulation as between the food producing agricultural and the export oriented non-agricultural sectors that has resulted from our undue preoccupation with the performance of the typical outward-looking enclave. It then proceeds to resurrect the "missing" balanced growth component by analyzing the role of domestic linkages, running from agriculture to non-agriculture as well as from non-agriculture to agriculture. The spatial or locational dimensions of development are subsequently analyzed utilizing the concepts of the dualistic standard market within a general equilibrium framework.

MACRO POLICIES, THE TERMS OF TRADE AND
THE SPATIAL DIMENSION OF BALANCED GROWTH*

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I. Introduction

Over the past half century both theoretical analysis and policy have focussed rather heavily on the impact of international trade in the context of individual LDC's development efforts. With most of the developing countries emphasizing a shift from a raw materials enclave to an individual enclave, the focus of theory and policy has been on the relations between the import substituting industrial enclave and the rest of the world. Inevitably, the discussion, especially in the 50's and 60's, concentrated on the promotion of that enclave in interaction with the rest of the world, while agriculture and dispersed industry and services were neglected.

In more recent years, especially since the 70's, it is fair to say that policy makers and analysts have become increasingly aware of the need to pay more attention to the agricultural sector, but mainly as a source of food or, better, as a way of substituting for the importation of food which had resulted from the earlier neglect of that important set of activities. Given a relatively stagnant agriculture, i.e. growing at less than 3 percent per

*This paper draws heavily on joint work with John Fei and Frances Stewart. I also wish to thank the FAO and UNIDO for their support of closely related research activities.

year in 42 major developing countries between 1960 and 1981, thus barely staying ahead of population growth on average, the need to fully mobilize that sector as a source of savings as well as of foreign exchange has been increasingly recognized. Included in that recognition has been the view that much of the problem resided in the price environment facing the individual farmer, i.e. the terms of trade he is facing. These relative prices, of course, refer to what the typical farmer sells, whether the produce ultimately ends up in domestic or in foreign markets, relative to the prices of what he buys, whether the source is a domestic or imported product. The terms of trade represent one of the most important signals or, if one prefers, development instruments with which the typical mixed economy government can hope to reach millions of dispersed decision makers. If, as is often the case, those signals are distorted by government macro-economic policy interventions of one kind or another a lot of damage can be done to the development effort. On the other hand, it is the contention of this paper that the terms of trade represent but one, if important, link in the chain which determines the success or failure of third world development--and that we must seek to place it in proper perspective.

It is probably fair to say that the profession, along with policy makers, has been fascinated almost exclusively by the open economy aspects of development over the last two decades as LDC's wrestled with the industrialization effort, first via import substitution and, later, either via more import substitution or via export promotion--with agriculture assigned an increasingly supportive role. What I believe is still missing is a development theory and strategy which encompasses the full recognition of the importance of domestic balanced growth, but without abandoning the important

open economy dimensions of the problem. It is in this context that this paper is directed at the issue of macro economic policies, the importance of the terms of trade and the revival of domestic balanced growth. Such balanced growth, it must be emphasized, involves domestic agriculture and non-agriculture acting in a mutually reinforcing fashion, but is very much consistent with and, in fact, requires an increasingly open economy setting. In other words, this paper hopes to provide the basis for a broader understanding of the critical linkages between industrial and agricultural activities at different stages of the transition growth effort, the factors which affect the strengths and weaknesses of these linkages, and the identification of government policies, macro as well as sectoral, to strengthen those linkages where they are weak.

As is well known, in the typical import substitution mode of development the agricultural sector is basically viewed as a milch cow providing resources to help finance industrial development activity. The effort is normally made to channel resources toward the urban industrial class for both political and economic reasons, i.e. because governments are usually most concerned with satisfying the needs of the new elite by providing them with windfall profits and low priced wage goods for their workers. The most effective way of effecting the necessary income transfers is by influencing the terms of trade facing farmers, e.g. via the maintenance of an overvalued exchange rate, import controls and the establishment of a protective tariff.

Frequently, an effort is made, in addition, to intervene directly in the domestic food crop markets by setting artificially low government procurement prices for basic cereals, by levying a "hidden tax" via high fertilizer procurement prices and/or by using food imports (including PL480 type aided

imports) to depress the price of food, at least for some urban consumers. However, given government's limited capacity to enforce price controls and prevent the spread of parallel markets, while the official terms of trade can be turned against agriculture, there are distinct limits on what can actually be accomplished. Since the typical LDC indeed has a need to transfer resources from agriculture to non-agriculture "on the table," e.g. via trade-related agricultural taxes and land taxes, such measures are likely to be much more effective in eliciting the required supply response, i.e. avoiding the danger of disincentive effects on agricultural producers.

That the burden of this tax system falls especially heavily on the spatially dispersed rural families is perhaps somewhat inevitable at the beginning of the transition growth process since agriculture is the only productive sector which is not only preponderant in size but also contains a squeezable surplus or rent, especially in the natural resource abundant LDC's. It is worthy of note, however, that the more successful developing countries, once they emerged from primary import substitution began to shift from "under the table," i.e. incentive dulling efforts generating an agricultural surplus for non-agricultural activity, to explicit "on the table" measures. At the same time the signals facing the agriculturalist in terms of both external and internal prices gradually became more closely aligned to equilibrium prices. This has certainly been the East Asian experience. Elsewhere, in contrast, in spite of an increased recognition of the importance of agriculture, it is fair to state that there has not been the same gradual reversal in the macro-economic policy setting. Most developing countries have preserved with earlier trends, if with oscillations, i.e. occasional liberalization followed by a return to import substitution

policies. The practice of indirectly squeezing the food producing agricultural sector and, as a consequence, maintaining its basically subservient relationship to a large scale urban industrial enclave focussed almost exclusively on international trade has generally been maintained.

The same contrast, incidentally, may be noted with respect to the pattern of government expenditures, i.e. how much infrastructure goes into the agricultural sector, as opposed to the urban industrial sector, and, of course, within the agricultural sector, how infrastructure is allocated as between plantation and food crop activities. Thus, even in the best performing post World War II LDC's a combination of covert and overt interventions ranging from protection and overvalued exchange rates to hidden taxes and expenditure allocations distorted the domestic terms of trade and effected income transfers from agricultural to industrial interests. But it must also be noted that early on, i.e. at the end of "easy" import substitution, these situations and their negative impact on agriculture and rural industry were gradually eased through import duty rebate systems, export processing zones, etc. and finally virtually eliminated in the latter export orientation phase we are all familiar with. In contrast, the more typical Latin American type of LDC has continued to rely extensively on an over-valued exchange rate as well as direct interventions depressing agricultural terms of trade in order to transfer the income of primary product exporters to the urban industrial class, ameliorated only by the enhanced recognition of the importance of local and global food shortages in the early 1970's.

As developing countries in the 1960's moved into secondary import substitution, relying heavily on imported capital, this tended to further separate industrial development, urban, large scale and often foreign

dominated, from the rural agricultural development, especially from the food sub-sector. Consequently in most LDC's growth has become increasingly compartmentalized, concentrated on the modern enclave and limited in human capital participation. Externally, as is also well known, serious foreign exchange and debt problems have emerged, especially in recent years, and while this is often not placed on the front burner, it is the increasing disarticulation between the agricultural and industrial sectors, i.e. the weakness of the internal balanced growth mechanism, which is as much the culprit as the "overborrowing" of the 1970's which has been given so much of the blame for the current crisis.

This in essence is the basic thesis of this paper. The industrial sector constitutes an ever larger and the agricultural sector an ever smaller proportion of total output and employment as development proceeds. But on this road to economic maturity productivity increase in agriculture is critical not only because of its direct effects on output and incomes but also because it generates opportunities outside of agriculture, especially in the production and sale of consumer goods, agricultural implements, repair, etc. In turn, rural industrial development is much more likely to be sustainable based on increased local agricultural output as a source of market power as well as inputs.

All too often, in my view, has agricultural performance been viewed as the consequence of physical inputs plus technology, sometimes--increasingly in recent years--with the relative price environment or the terms of trade thrown in for good measure. To so-called organizational school of agricultural development has focussed on the way in which agricultural production is institutionally determined, e.g. how alternative land tenure systems operate,

but the significance of intersectoral linkages as a key factor explaining agricultural performance has rarely been reflected in the analysis. It is necessary to add the spatial or linkages dimension in determining the success or failure of a balanced growth effort. This adds, we believe, an important dimension to our usual explanatory canvas and enhances the importance of the terms of trade through what an econometrician would call the interactions effect.

Perhaps best known is the work of John Mellor and Uma Lele¹ as well as that of Johnston and Kilby.² The former focussed entirely on consumption linkages, the latter on production linkages. A further major effort in recent years was the work by Bell, Hassel and Slade³ which attempted to evaluate a given project, i.e. the Muda irrigation project in North Western Malaysia, in terms of the input and consumption demands generated by the product. This paper introduced income and substitution effects in response to price changes, while in the previous literature prices were fixed as were production and consumption coefficients. Causality in the other direction has indeed been virtually left to one side since the early work of Tang and Nicholls,⁴ i.e. the so-called contact school at Vanderbilt, which tested Ted Schultz's proposition that the proximity of urban industrial growth reduces imperfections in both factor and product markets and hence raises farm income per capita. The agricultural production function indeed should not contain only physical inputs, technology and organization but also the terms of trade and the locational dimension of economic activity.

II. A Functional Approach to Domestic Balanced Growth

Different dimensions of the interaction between agriculture and non-agriculture assume different levels of importance at different stages of the development process. First of all it must be recognized that agricultural products and non-agricultural products are different in kind and cannot substitute fully for each other, with food an essential component of consumption while the industrial sector provides inputs for both sectors, as well as final consumption goods. Secondly, we can expect agriculture to dominate the economy in the early stages of development, as has already been pointed out, thus conditioning agricultural development possibilities such as savings, foreign exchange availabilities and markets to a substantial extent early on. Foreign trade increasingly provides a mechanism whereby industrial production can be converted into agricultural consumption over time and many of the contributory functions of the agricultural sector can be performed by the industrial sector.

In addition to intersectoral commodity and financial flows, intersectoral land movement occurs, i.e. the reallocation, over time, of a portion of the agricultural labor force to the non-agricultural sector, as non-agricultural labor through the intersectoral labor market. Intersectoral linkages or interactions at the aggregate level must be concerned with the way these various economic functions are carried out.

Particularly at an early stage of development, the total agricultural surplus represents a crucial concept in that its presence is essential for the growth of the non-agricultural sector, certainly in the closed economy. In the absence of such a surplus a shortage of food would prevent the sustained reallocation of labor from agricultural to non-agricultural

activities. The surplus represents the difference between agricultural output and the consumption of agricultural output within the sector and is determined by the level of agricultural labor productivity. A sustained increase in TAX thus requires increases in agricultural labor productivity. In this context, we see the importance of the various approaches which help us understand agricultural performance.

The physical inputs school of thought emphasizes the contribution of modern inputs from the non-agricultural sector, in conjunction with modern science and technology, as embodied in the so-called Green Revolution technology. Modern inputs permit a consistent and rapid increase in agricultural productivity, in contrast to the slow growth associated with traditional technology. Hence linkages--in the form of technology and inputs from industry into agriculture--permit growth in agricultural productivity, which, in turn, generates a demand for industrial products and a supply of agricultural products for the non-agricultural labor force.

The technological focus of this physical inputs approach often means neglecting the question as to why in many country situations this process of the infusion of modern inputs does not, in fact, occur on a sustained basis. Such failure may be related to adverse organizational or tenure arrangements or to terms of trade which discriminate against agricultural production. This has been increasingly recognized of late. But what remains a neglected issue is the fact that appropriate or inappropriate terms of trade, for example, will have a very different impact depending on the locational dimension of non-agricultural activity. This has to do with the proximity or ready availability of industrial incentive goods to the agricultural household as well as the terms on which they can be acquired. This dimension is

crucial in determining the extension of rural people's economic horizons and their motivation for taking the inevitable risks involved in experimenting with new technology in the effort to increase agricultural productivity at its source.

A virtuous pattern of rural balanced growth depends on consumption patterns, associated technology choice and the distribution of income. But it also depends on environmental conditions such as the terms of trade and on supply conditions such as the transportation infrastructure which may prevent any such sustained interaction from occurring.

While a closed economy requires balanced growth, in the open economy international trade permits imbalances in internal development to be offset by trade. Economies at an early stage of development are unavoidably more "closed" in the relevant sense because, while they do export and import, their flexibility in using trade is more limited. Large economies also more closely approximate the closed economy assumption than small ones. But even in the relatively small economy case, e.g. historical Japan or contemporary Taiwan, the agricultural sector's surplus remains of critical importance for non-agricultural development. In the early stages of development, the industrial sector is generally a heavy net user of foreign exchange, relying on imported capital goods and having little export potential. Hence the agricultural sector normally has to provide the foreign exchange as well as the food for workers in the non-agricultural sector. While export income may be supplemented by foreign savings, the latter rarely provides more than a modest portion of foreign exchange needs. As industrialization proceeds, the industrial sector may develop its own export capacity and can begin to finance its own imports but it generally remains dependent on domestic

agriculture for the bulk of its food requirements.

In the early stages of development, there may exist only limited strategic options. All countries have to rely largely on their agricultural (or mineral) sectors for foreign exchange to finance the early stages of import substituting industrialization. But later a wider choice emerges. Countries have options with respect to trade, and options with respect to internal development. Moreover, there are connections between the two.

The trade options have been thoroughly explored in the literature; in particular, the distinction has been drawn between an industrial strategy of secondary import substitution, and one of emphasis on labor intensive exports. Secondary import substitution involves expansion of industrial production into capital and intermediate goods production and into 'elite' consumption tending to involve rather capital-intensive methods. Because of the continued protection required this option often means continued (or worsening) terms of trade for the agricultural sector. In contrast, a labor intensive export strategy is more likely to be associated with improved terms of trade for agriculture, and, because of the greater employment generated, a stronger demand for agricultural products.

On the internal side, the major options consist of a balanced growth strategy in which agricultural and non-agricultural growth are mutually supportive and a more lopsided development pace in which industrialization becomes self-supporting with limited links to the agricultural sector. The first option has been described earlier by the 'virtuous circle,' with increased agricultural output associated with patterns of consumption for non-agriculture involving labor intensive technologies in both urban and rural areas, thus leading to a mutually reinforcing growth in employment, incomes

and consumption in both sectors. By contrast, industrialization involving early expansion of capital intensive production of capital goods and elite consumption goods may occur with little interaction with the agricultural sector and little regional dispersion of industry.

There are some natural links between the trade options and the internal options. The secondary import substitution strategy involves reduced links between industry and agriculture. It tends, in the long run, to lead to problems, both internally and externally. Internally, it is generally associated with continued--usually enhanced--discrimination against food producing agriculture--prominently via terms of trade distortions. It leads to the perpetuation of enclaves concentrating the benefits of development rather narrowly and causing problems of unemployment and maldistribution of income. Externally, it tends to require heavy borrowing with the subsequent emergence of debt problems. A balanced growth strategy is designed to avoid the internal "enclave" phenomenon by spreading participation in development more widely geographically and across classes. Balanced growth is liable to generate a more self-reliant form of development, with internal sources of savings and markets. However, to maximize its benefits, the strategy emphatically also requires openness to the rest of the world to make efficient use of all available opportunities. The exportation of labor intensive commodities and of processed primary products represent natural adjuncts to a balanced growth strategy since the linkages involved reinforce the domestic linkages.

In short, our past overemphasis on foreign trade as a leading sector or as at least a formidable hand-maiden of development has tended to lead us to neglect some essential internal dimensions of development. Here we have

identified how a strategy of balanced growth, in the context of an open economy, can permit a broader participation in the growth process, while making efficient use of the international trading system and avoiding the external problems that have brought so many transition growth efforts to a halt. It remains for us to further explore the spatial dimensions of a domestic balanced growth process.

III. Spatial Dimensions of Transition Growth

The issue of agricultural/non-agricultural linkages has an intrinsic spatial aspect because, by its nature, the agricultural sector is geographically dispersed. This section focuses on this spatial dimension, indicating the mutually positive effects that the agricultural and non-agricultural sectors may have on each other where there is close physical proximity between the two activities.

Most less developed countries inherited a colonial system (political and/or economic) which involved certain spatial aspects. A colonial economic system includes two distinct types of economic regions (see Diagram 1a), with an enclave region and a hinterland. The enclave region is formed by the linking of a hierarchy of urban centers (represented as squares) by rail, roads, and/or rivers. As a rule, these enclaves represent those regions of the system which were initially most affluent because of their well developed irrigation and transport networks. Typically, a major harbor, linking the system with that of the rest of the world, constitutes the urban center of the highest hierarchy. Two aspects of the colonial economic system need to be emphasized, namely, the external sensitivity of the enclave and the internal compartmentalization of growth. Both are relevant to the prospects

for successful transition.

"Economic colonialism" describes a particular type of international economic relations, including international trade and international capital movements. A colonial economy is typically based on the export of a particular primary product produced in the enclave and exported through the major harbors to world markets. In return, the imports from the industrially advanced countries, consisting of manufactured consumer goods, and producer goods, enter through the same harbors, and are distributed to the country's primary producers. At later stages of colonial development, foreign capital inflows may support the establishment of foreign owned factories and service establishments.

The colonial economic system is an open economy which is extremely sensitive to any changes in the external terms of trade of the primary product. Throughout the colonial period, the fluctuation between "prosperity" and "depression" in the enclave was very much governed by the secular movement of prices in world markets. When the price trend was favorable, capital inflows occurred to further the expansion and export of the primary product. Conversely, when price trends were unfavorable, there were long periods of "colonial stagnation" accompanied by the cessation of net capital inflows or even the repatriation of capital and profits.

The major weakness of colonialism as an economic system can be traced to the fact that the economy is typically compartmentalized--i.e., divided into two spatially unintegrated parts creating a dichotomy between what we have called the enclave and the hinterland. The enclave represents the relatively modern part in many senses: first of all, modern service and processing activities characterized by economies of scale, capital intensity, and the

incorporation of modern science are located in the large urban centers. In contrast, small scale industries and specialized handicrafts are located in the smaller urban centers of the hinterland, characterized by traditional technologies in terms of labor intensity and product characteristics. There thus exists a rather sharp contrast between the enclave and the traditional hinterland from a technological perspective.

The relatively modern enclave offers a sharp contrast to the traditional hinterland as well from an organizational perspective, i.e. the relatively greater community orientation of the latter contrasts sharply with the relatively greater market orientation of the former. Such contrasts can be more easily maintained given the lack of substantial interaction between the two.

When a country with such an heritage beings to make the effort to reach modern growth government action usually concentrates overwhelmingly on the enclave. It is here that colonial-type profits continue to be made. This situation also customarily leads to an overwhelming concern with stabilization of the prices of primary products as a direct response to the problem of the external sensitivity of the colonial economic system. In more recent years, the literature on the development of the open economy, encompassing issues like imports, exports, foreign aid, commercial capital inflows, etc., has again centered on the more modern enclave portion of the economy, while issues related to the development of the traditional hinterland that may contain a very large fraction of the total population continue to be largely neglected--just as they were in the "compartmentalized" days of the colonial era. In other words, while in many cases the enclave is gradually changing its character, from largely raw materials-oriented to largely industry-oriented, the relative situation of the hinterland has not been profoundly

affected.

The notion of a linkages approach to modernization takes on a special spatial connotation in this context, i.e., the way to mobilize the mainly food producing agricultural sector and involve it in development is to break this residual compartmentalization inherited from colonialism, through fuller economic interaction with the relatively advanced enclave. The spatial spread of the forces of modernization, from both the technological and organizational standpoints, in fact amounts to such an integration between the two regions through which modern inputs, attitudes and organizational methods can be gradually transmitted from the "modern" sector of the enclave to the traditional sector.

It should be noted that a third major contributing factor to understanding agricultural stagnation is traceable to the spatially relatively more dispersed pattern of location of the rural population (see Diagram 1b), which makes it more difficult for its members to have contact with each other and/or with the urban population. The transformation of attitude and the acquisition of new knowledge become more difficult when both contacts and communication with other people are infrequent. Agricultural modernization is especially difficult, not only because the farmers are alienated by distance from the modernization core, but also because of their less frequent contacts with each other.

The locational disadvantages of the typical family farmer cannot be easily overcome because of other pervasive economic forces that determine the spatially dispersed pattern of his location in the first place. For one, agricultural production is characterized by joint inputs between population and land which forces a certain spatial spread. For another, in order to

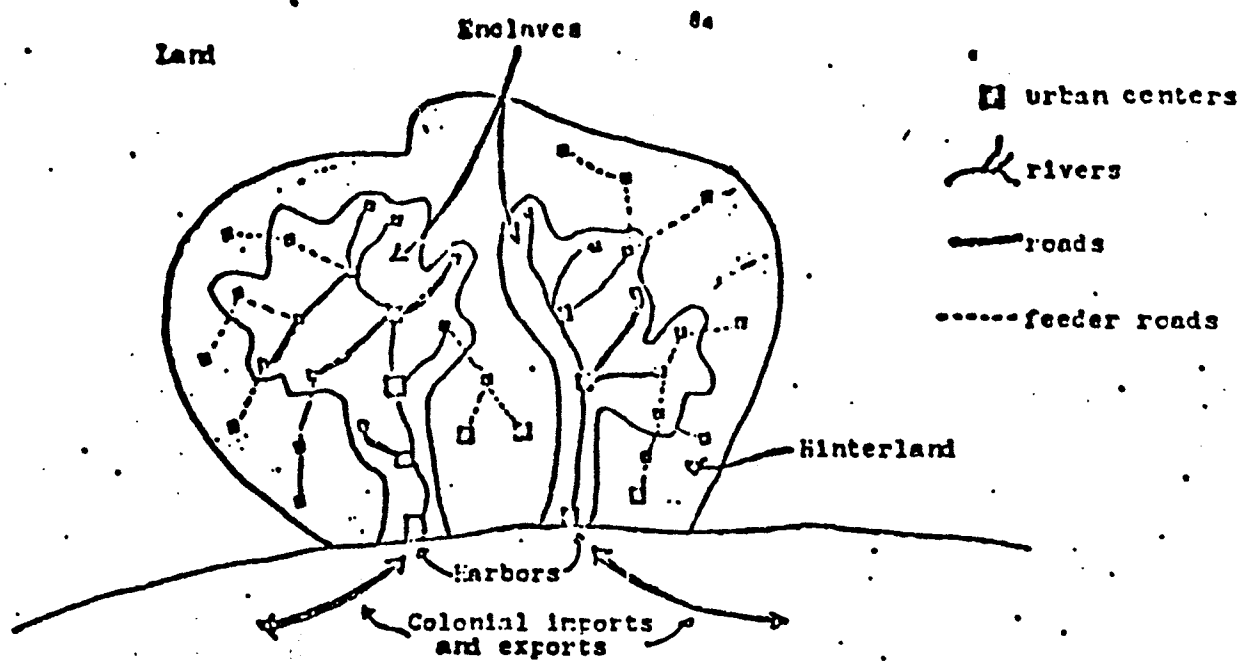


Diagram 1a Spatial Perspective of Economic Colonialism

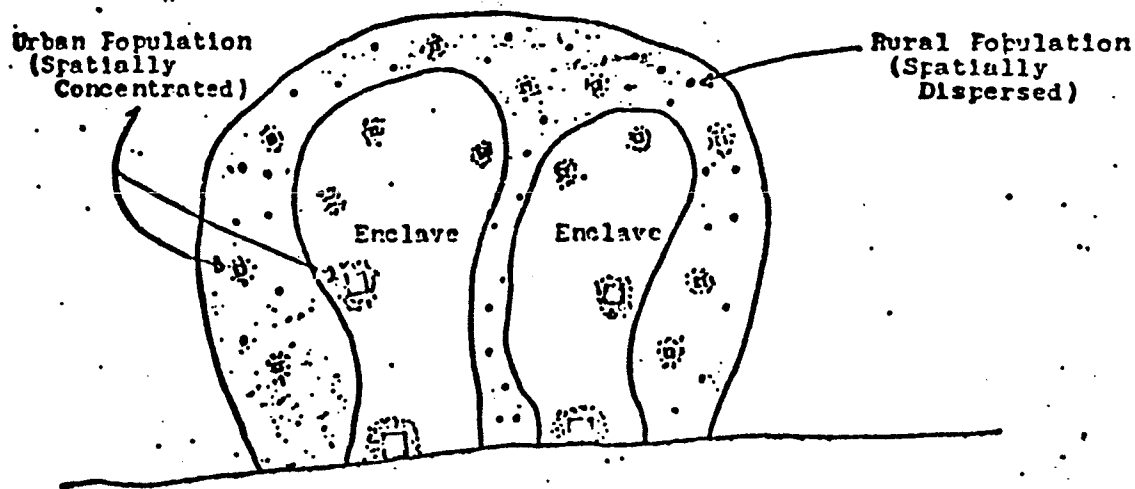


Diagram 1b Location of Population in a Dualistic Economy

$(\Omega_1 \Omega_2 \dots \Omega_n)$

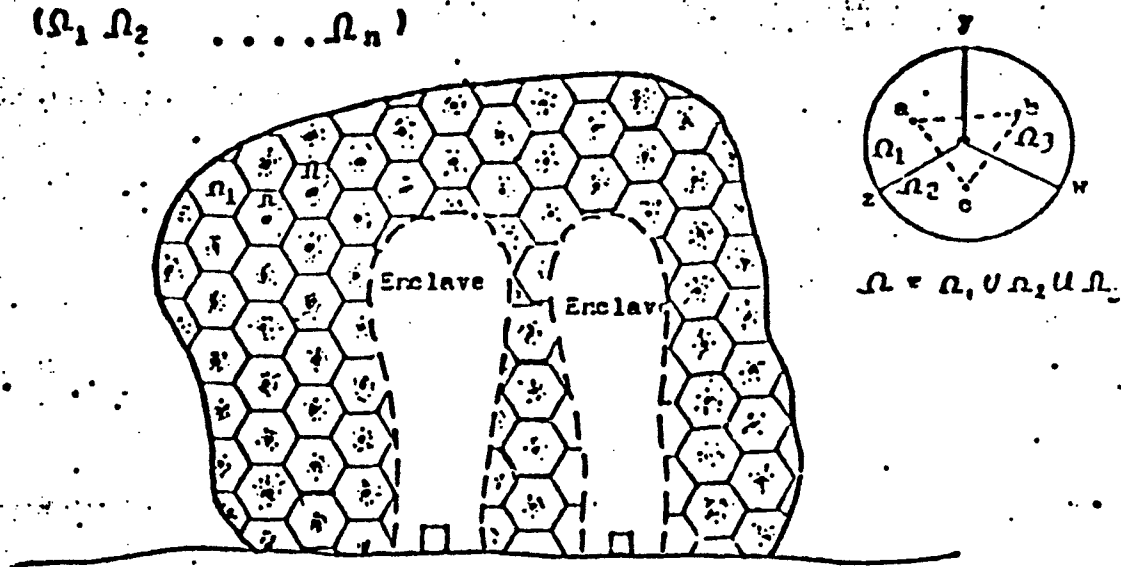


Diagram 1c

Standard Market Areas

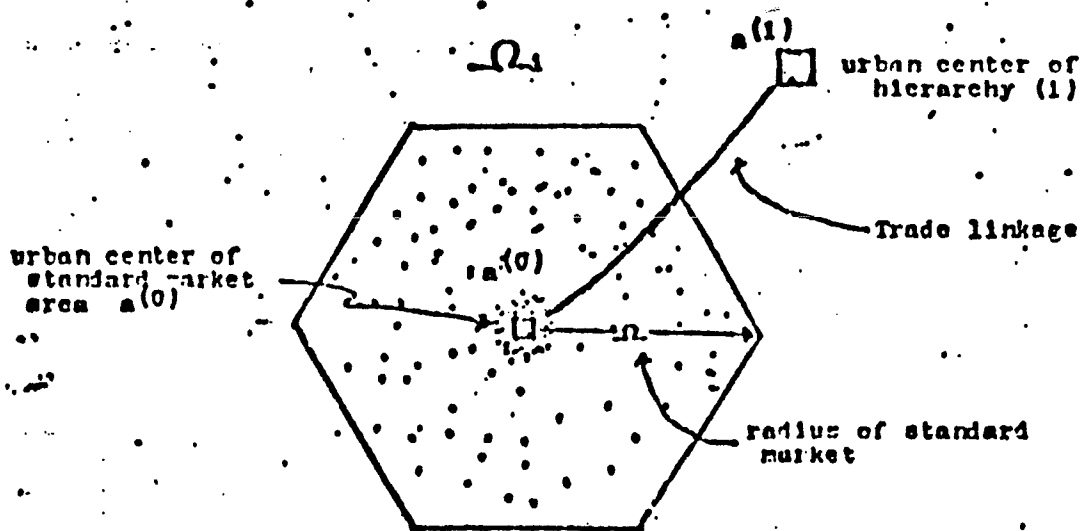


Diagram 1d

Standard Market and Dualistic Community

minimize their total daily cost of transport, as producers and households, farmers usually live in villages or, if separately, close to the fields they cultivate. Finally, since agricultural production is usually characterized by constant returns to scale, there exists no strong economic reason from the agricultural production side for higher population densities. This contrasts very sharply with non-agricultural production which is likely to be characterized by (i) the existence of economies of scale and (ii) the existence of conspicuous external economies, both tending to a spatially more centralized pattern of non-agricultural production at the urban centers.

The fact that the rural population is spatially dispersed also makes it more difficult to modernize agricultural production via a "centrally coordinated command system" as experimented with in socialist societies. It is basically more difficult to gather 1,000 farmers in one place for a combination of political indoctrination and economic instruction than to gather 5,000 urban industrial workers. It is also more difficult to monitor peasants and to determine individual contributions to productive effort according to which an incentive system could be centrally enforced. This is one of the basic reasons that collectivist organizational systems have encountered problems in the performance of their agricultural sectors and frequently been forced to experiment with different forms of incentives and organizations.

In the analysis which follows, a dual standard market is used to define such a rural community. In Diagram 1c, the urban and rural populations of Diagram 1b are partitioned into a number of localized "market areas" $(\Omega_1, \Omega_2, \dots, \Omega_n)$ each of which contains a single urban center (with its urban population) and its share of the rural population.

Diagram 1d presents a microscopic view of a typical standard market area. At the center of Ω_1 we find the urban center with its spatially concentrated pattern of urban population and its share of the spatially dispersed rural population. The urban population engages in non-agricultural production (e.g., rural handicrafts, food processing, Z goods, retail trade), while this urban core also serves as the center of educational and spiritual life (schools, recreation, religion) as well as of political administration (justice, police, tax collection, and government services). The urban center is the focal point for contact among all the economic agents living within the standard market area, including the more dispersed farmers. Given the relatively primitive means of transport and communication, the only way farmers can communicate with members other than their own immediate family and neighbors is by their temporary physical presence in these urban centers. For personal contacts, it is necessary for the farmers to make occasional visits to the center while engaging in both economic and non-economic activities.

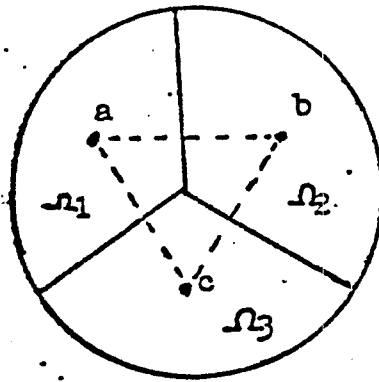
We are now in a position to add a spatial dimension to our earlier account of intersectoral linkages. While agricultural production is carried out by spatially dispersed farmers, non-agricultural activities are partly carried out in the household and partly in urban centers at different levels of the hierarchy. Dualistic exchange, i.e., the exchange of agricultural for non-agricultural goods, takes place; farmers carry their produce for sale to the market place at the urban centers and buy most of their non-agricultural requirements in the same centers. While carrying out these economic functions the farmers, however, also have other contacts which permit them to acquire modern products and ideas: they learn about incentive goods, like

bicycles, sewing machines, and factory printed cloth, as well as about modern producer goods such as chemical fertilizers, agricultural machinery and new seeds. While formal education may help, it is more through these informal contacts that farmers learn about the world of the enclave and beyond, i.e., mainly by contact with the urban population within the local marketing centers.⁵

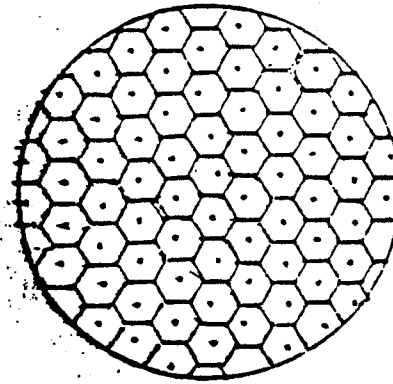
The existence of these standard markets arises from the need to minimize transport time and costs. Where means of transport and communications are still linked the main way people communicate with each other is through personal contact. This sets a limit on the size of the standard market in an agrarian community. The maximum value of the radius of the standard market is such that it allows the least advantageously located farmer to make a round trip in a reasonable period of time (e.g., less than half a day) leaving some time for him to carry out the dualistic exchange in the urban centers.

A given region may thus be partitioned either into a large number of small market areas or a small number of large market areas (see Diagrams 1e, cases (i) and (ii)). In addition to transport cost, two other factors help determine the optimal size of the typical standard market, namely, population density and the extent of scale economies in non-agricultural production. The size of the urban population at each urban center is roughly inversely related to the number of standard markets. Thus, if urban industries are characterized by pronounced economies of scale and externalities the standard market areas would tend to be larger.

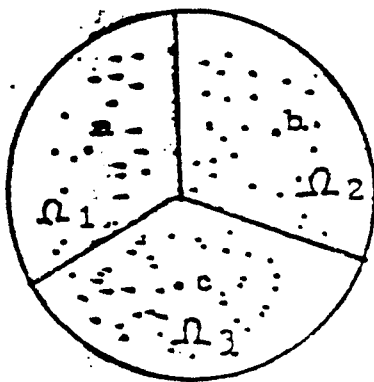
The optimum size of the standard market is thus bounded from above and below by certain economic considerations. On the one hand, its size cannot



(i)



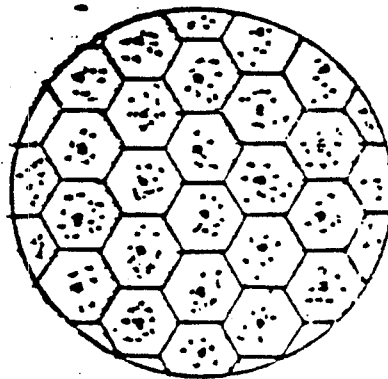
(ii)



$\Omega_1 \Omega_2 \Omega_3$

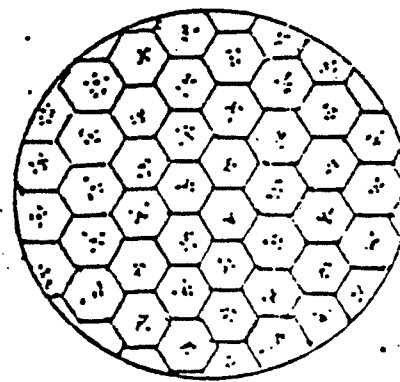
(iii)

Diagram 1e



$\Omega_1 \Omega_2 \Omega_3 \Omega_4 \Omega_5 \Omega_6$

(iv)



(v)

Size of the Standard Market

be too large in order to economize on the transport costs associated with dualistic exchange. On the other hand, its size cannot be too small in order to take advantage of economies of scale which may exist in the production of goods being demanded at current levels of income. As population density increases, the size of the individual standard market area also tends to shrink, ceteris paribus, and the number of markets to increase. This is due to the fact that, with increasing population density, the efficiency of large scale production can be realized with a smaller market area (i.e., Diagram 1e, case (iv)), so that the economy of transport cost leads to shrinkage of the standard market area.

A smaller standard market thus constitutes a favorable condition for the modernization of agriculture, other things being equal. This is due to the fact that a smaller market area involves a much more close-knit community in the sense that it is easier and cheaper for farmers, especially those located near the market boundary, to engage in frequent contact with the urban centers.

In much current discussion about population pressure a large population with a limited landscape and a high population density is often regarded as undesirable. This is because a high population density also, of course, involves productivity. But, from the viewpoint of the modernization of spatially dispersed farmers, we have come to the unorthodox conclusion that a larger population may, ceteris paribus, be helpful. For example, if we imagine the case of a very thinly populated region (e.g., one or two persons per square mile) as in Tibet, the size of the standard market would have to be reckoned in terms of hundreds of square miles with farmers having to travel a month before, they can reach an "urban center." In that case, the

thinness of the population is a barrier to human communication and thus to the adoption of new science-based inputs and techniques.⁶

A high population density is by itself of course not sufficient for the modernization of agriculture. Static diminishing returns may be seen as likely to be in conflict with dynamic linkage effects, with the outcome in doubt. For example, Taiwan, a region with one of the highest population densities in the whole world, has constituted an unusually successful case of agricultural modernization. In contrast, in Java, Indonesia, with an even higher population density, agricultural modernization has been much less satisfactory. In the case of Taiwan, it is the density of population plus the high volume of dualistic exchange that has contributed to the transformation of Taiwan's farmers into modern economic agents, along with, of course, the help of favorable "input" and "organizational" elements.

The extent of dualistic trade depends in part on the prosperity of the agricultural sector since high agricultural productivity is conducive to the development of non-agricultural activities, i.e., when agricultural labor productivity is higher the percentage of non-agricultural labor force will also be higher--a familiar phenomenon explainable by Engel's Law and the appearance of a larger agricultural surplus. Higher agricultural productivity leads to a higher percentage of urban population within a standard market area as well as a larger volume of dualistic exchange on a per capita basis. The shift of the population causes the area of the standard market to shrink further because of the change in transport costs in relation to scale economies. In the case of Taiwan, higher agricultural labor productivity helped bring about a spatially dispersed pattern of industrial location, and an increased linkage of the rural and urban population because of the high

volume of tradeables produced, i.e. a rapid increase in the agricultural surplus.

Agricultural stagnation can therefore be explained in the context of a vicious circle paradigm. For a traditional society, the fact that agricultural productivity is relatively low leads to a relatively large market area and a relatively low volume of dualistic exchange; this, in turn, reinforces agricultural stagnation because it is not conducive to rural-urban interaction. As in all vicious circle arguments, such pessimism also implies the possibility of optimism. At the same time, all vicious circle arguments suggest that it is not always easy to be sure what is the best way to "shake things loose" because everything is related within a dead-locked as well as within a dynamic system.

While we have portrayed the standard market as a locally self-sufficient economic unit as a first approximation, this is, of course, not true. The higher the level of agricultural productivity (i.e., the more affluent the rural community), the more likely that it will lose its autarkic status. The urban center of the standard market area is, in turn, linked to towns of higher hierarchy. Thus the dispersed farmers in each standard market, while trading directly via their own urban centers, also trade with other urban centers for products that enjoy more conspicuous economies of scale and external economies. The urban centers of higher hierarchy thus serve a much larger market area encompassing several standard market areas.

The notion of a hierarchy of market centers can, of course, be carried further, with industrial activities subject to even more pronounced scale economies and serving an ever larger number of standard market areas. The fact that local farmers can trade with larger urban centers located far away

is due to the fact that the economies of scale are sufficient to compensate for the higher transport costs.

Linkage between the agricultural and non-agricultural sectors thus has an important spatial dimension traceable to scale economies of non-agricultural production and transport costs. The gradual conversion of traditional farmers into modern economic agents, aware of the potential of new agricultural technology, experiencing wider consumption horizons, and aspiring to accumulate assets, can be accomplished only through the strengthening of linkages with the urban centers. Similarly, the small-scale rural industrial entrepreneur will become increasingly aware of his opportunities via linkages to urban industry, on the one hand, and cultivating farmers, on the other. A small-town industrial producer or a peasant in the hinterland may only be aware of the possibility of exchange within the local towns of a low hierarchy; but a modern farmer or a modern industrial entrepreneur is likely to become increasingly aware of the possibilities of carrying out all kinds of exchanges with far away places--including even in world markets.

IV. Some Concluding Comments

Our spatial perspective indicates that the compartmentalization inherited from colonialism tends to restrict modernization to the export oriented enclave which usually encompasses only a small portion of the population. When the country is small, the task of transition to modern economic growth is easier because a small country really has the option of attempting development mainly through foreign trade; given a negligible hinterland, farmers can rely on exchange with far-away urban centers. Indeed, the early success

of agricultural modernization on Taiwan is partly a story of this type with her enhanced external orientation (after 1962) initially concentrated in the export of asparagus, mushrooms, and pineapples, i.e., farmers learning to take full advantage of international trade. In that sense, Taiwan's farmers were no less "entrepreneurial" than the industrial exporters of Hong Kong. But this was, of course, not the whole story. In contrast to Hong Kong, Taiwan also experienced a substantial volume of strictly domestic balanced growth exchanges during the crucial decades of the 60's and 70's.

In the case of a large country with a large agricultural sector development achieved mainly through international trade is undoubtedly not a practical option. Here it is most necessary to form linkages between spatially dispersed farmers and urban centers, mostly within the domestic economy. The recent experience of India and Mainland China has shown that it is indeed this linkage through dualistic exchange between agricultural and non-agricultural activities which is crucial to a system's chances for escaping from agrarian stagnation.

Our analysis suggests the importance of proximity between farmers and urban centers for agricultural and industrial modernization. This concept of proximity has two dimensions: first, it is a function of the average distance between the individual farmer and the relevant urban industrial center; second, of the available means and costs of transport.

The degree of such proximity has a number of effects on farmers' and rural industrialists' activities:

- i) by increased contact with modern activities and consumer goods it may change their attitudes towards a more capitalist orientation;

- ii) the more immediate proximity of the various services (e.g., technical advice, credit, fertilizer, seed supply, raw materials) may lead to greater use of modern inputs;
- iii) greater opportunities arise for farm family members to participate in non-agricultural activities for part of the year;
- iv) markets for both agricultural and non-agricultural products will be widened;
- v) the price of all consumer goods (allowing for transport costs) is likely to be reduced ceteris paribus and their availability increased, i.e. the farmer's terms of trade improved;
- vi) it enhances the visibility of incentive goods and investment opportunities.

These effects are likely to vary according to the stage of development and the size of the relevant urban center. For example, at the early stages of development the effect on farmer attitudes through contact may be of paramount importance. However, in many countries it seems that most farmers already have a capitalist orientation to incomes and accumulation similar to dispersed non-agriculturalists; here proximity may be more important in terms of its effects on supplies and markets. Similarly, these proximity effects would tend to be larger the larger the size of the urban center. Urban centers of higher hierarchies offer a wider range of services and consumer goods with greater contact with the enclave and the rest of the world.

What is required, next, is the resumption of empirical investigation attempting to explain differential inter-sectoral LDC performance by including the various specific proximity dimensions of linkage, along with the more traditional input and organizational variables, in the analysis. Such

work is currently under way for one or two specific country cases. Assuming proximity does indeed contribute to balanced growth in the ways enumerated above, certain policy conclusions follow: actions which increase the degree of proximity contribute to raising agricultural and non-agricultural productivity. Such actions would include reducing intervention with the terms of trade as a result of macro-economic policy choice. Moreover, sectoral policies relating to the improvement of transport and other infrastructural links between the agricultural and non-agricultural populations at various levels of urban hierarchy would serve to remove bottlenecks blocking the needed dynamic mutual interaction between agricultural and non-agricultural activities.

FOOTNOTES

¹"Growth Linkages of the New Food Grain Technologies," Indian Journal of Agricultural Economics, Jan. 1973.

²"Agricultural Strategy and Manufacturing," Stanford Food Research Institute Studies, 1972.

³Project Evaluation in a Regional Perspective, Baltimore: Johns Hopkins Press, 1982.

⁴Tang, A., Economic Development in the Southern Piedmont, Chapel Hill: University of North Carolina Press, and W. Nicholls, "Industrial-Urban Development as a Dynamic Force in Transforming Brazilian Agriculture, 1940-1950," in E. Thorbecke, ed., The Role of Agriculture in Economic Development, New York: NBER, 1969.

⁵The fact that an agrarian dualistic economy may be partitioned into a system of parallel localized standard market areas is basically due to the need to economize on transport costs. The principle of the delineation of the boundaries of the standard market area is demonstrated in the insert of Diagram 2c. Suppose there are three urban centers (indicated by "a," "b," and "c"). Let the triangle abc be constructed. The straight lines \underline{ab} , \underline{bc} , and \underline{ac} of the triangle may be interpreted as the roads linking the three urban centers. Let the straight lines xy , xw , and xz be the perpendicular bisectors of the sides of the triangle abc that meet at a common point x . The lines xy , xw , and xz then constitute the boundary of the three standard market areas Ω^2 , Ω_2 , Ω_3 (each containing its own urban center "a," "b," or "c"). If all

spatially dispersed farmers are to minimize their transportation time and cost in carrying out their dualistic exchanges, they will necessarily trade and affiliate with the urban center of the area to which they belong.

⁶This argument is reminiscent of Esther Boserup's but not equivalent since she emphasizes scale economies more than contact with non-agricultural activities.