

THE ROLE OF THE AGRICULTURAL SECTOR
IN ECONOMIC DEVELOPMENT

by *GSJ*

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INTRODUCTION

Most nations of the world are extremely concerned with development and the achievement of conditions that would offer possibilities for a better and fuller life. But although the concern is universal, the diversity of conditions in different countries makes it difficult to single out any one definition of "economic development". In general we may say that economic development is a process whereby a nation's real national income and general welfare increase over a relatively long period of time. To this it may be added that if the rate of development is greater than the rate of population growth, then conditions will be good for an increment in the nation's per capita income.

The term "process", which will be used throughout, implies the operation of certain forces over the long run embodying changes in certain important variables. Details of the process, of necessity, vary under diverse conditions in time and space. Nevertheless, there are certain common features and the general result of the process is growth in an economy's national product.

Most of the developing nations of the world are essentially agrarian but the tendency has been to take a negative view of agriculture. Because of this and of the different economic, social, and political pressures and influences, agriculture has become the bottleneck in these countries' economic plans. The mistake has clearly been the failure to recognize

the potential economic contributions that the primary sector can make to the general development of the nation.

It has become clear in recent years that because of adverse effects in the international markets and also because of a lack of vision, the agriculture of developing countries is so inadequate that the growth and relative stability of the economy of these countries are in jeopardy. For want of sufficient agricultural production a serious imbalance has arisen between agriculture and the rest of the economy. This imbalance is for the most part the result of a planning which has given the priority to industrialization without seriously considering the role of the agricultural sector in economic development. In fact, only a few of the developing countries have made any real effort to modernize agriculture so as to make this sector the basis for a sound and viable development process.

In most of these countries agriculture is a sector with few modern inputs available to farmers, with serious structural imbalances notably in the field of distribution of productive resources, with high illiteracy rates among the rural population, etc. The result of this has been the total lack of increase in productivity.¹ If for fortune there has been some increase in productivity, this increase has usually resulted from increases in the farm labor force and in other traditional factors of production.

The main purpose of this report will be to consider the

¹T. W. Schultz. Economic Crisis in World Agriculture. Ann Arbor, Michigan: University of Michigan Press. 1965.

proposition that the agricultural sector is able to make valuable contributions to the general economic development of a nation, especially in nations where the primary sector comprises anywhere from 60 to 80 per cent of the active labor force.

Basically agrarian countries cannot afford to disregard the primary sector if they are going to develop at all. In view of the conditions that exist in these countries the only significant contribution to development can in fact be had from the agricultural sector. In conclusion it follows that in order to develop these countries must develop their agriculture before, or at least at the same time, that they work toward the development of an industrial structure.

In Chapter I the transformation process is considered; the process by which a traditionally agrarian structure is transformed into a modern, industrial one. It is emphasized that the process will have to be based on the transformation of the agricultural sector. The transformation of this sector requires fundamental structural changes and elimination of bottlenecks which have for long stood in the road of economic development.

Chapter II considers in particular the tenure conditions in Latin American countries and tries to show that without a fundamental structural reform in the ownership and distribution of the productive resources, the development process will not follow a successful road. The case of Mexico is examined as a relevant one in Latin America.

Finally, Chapter III deals with the other important measure for development; namely, education. Education is considered as a complementary but necessary measure for development and suggests what the role of the educational process is or should be in the action to achieve better conditions for the peoples of the developing nations of the world.

CHAPTER I

THE ECONOMIC TRANSFORMATION

1. Agriculture and a Growing Population

In the ever growing literature on economic development it is common to find certain accepted assumptions regarding the nature of developed economies. The structure of such economies, at the same time, is set as the goal to be achieved by those other countries which have either embarked in the process of development, or are currently striving to do so.

Among those assumptions with respect to the economic nature of developed nations, the following are generally recognized:

a. that these more advanced countries' economic structure is one in which only a small proportion of their populations is engaged in agriculture;

b. that in such countries there exists a relatively low demand elasticity of most food stuffs;

c. that there are, in these countries, clear advantages of specialization.

Therefore, it is regarded as self-evident that a most important condition for attaining a viable economic development is a considerable increase in per capita product of the agricultural sector and an expansion of the other sectors of the economy.

Given these assumptions and the general acceptance of the

kind of structural framework that provides a basis for economic development, it becomes of interest to discuss what are the circumstances that must be present if a speedy shift from an agricultural to an industrial structure is to take place.

Development economists seem to be convinced that a reduction in a country's absolute agricultural population is one of the most, if not 'the' most, important prerequisites for developing a country. In this proposition important elements are worth considering; the first one is that the reduction of the relative magnitude in a country's occupational structure is a direct corollary of expanding other industries faster than population growth which, in turn, is a direct consequence of specialization within the economy. The second element is one related to an effort to achieve a reduction in the absolute numbers working in agriculture, as an indispensable condition for raising the productivity of those who stay in farming, as well as that of the community at large.

In this respect it is important to note that the population is by no means stagnant but rather growing, and very rapidly, in most developing countries. Therefore, an expansion of nonagricultural activities does not imply in itself any reduction of the absolute agricultural population. Obviously, then, the amount of change in the proportions between the main sectors of the economy depends on the existing or attainable relation between the rate of expansion of nonagricultural activities and the rate of population growth. In other words, when the nonagricultural employment grows faster than the total

labor force, its percentage share in total labor force will increase at a rate which would represent the difference between the rates of growth of the nonagricultural and the total labor force. Assuming (unrealistically) that the agricultural population remains stable, then, if there is no increase in absolute numbers, the population engaged in the nonagricultural sector should increase at a rate equal to the rate of population growth multiplied by the denominator in the fractional number for nonagricultural . The implication of what has been said is total population that, on the whole, a reduction in the absolute numbers working in and living from agriculture (one of the development goals) is extremely difficult to achieve in most developing countries where the agricultural population is a large majority and where industry cannot absorb the population increase. At the same time, it can be said that once the share of other industries has become larger, it becomes increasingly easier to reach the sought adjustment.

The historical experience of economic development shows some common features with regard to the tempo of change. The experience of now developed countries tells us that in the early stages of industrialization there has normally been an increase in the absolute numbers living from agriculture. Furthermore, in most countries, the agricultural population has remained relatively stable over a long period of time and has tended to decline in absolute numbers only recently, long after the countries concerned had achieved a definitely industrial structure. If nothing else, this experience should point to the fact that

development cannot be achieved by relegating the agricultural sector to a second order position. Therefore, agriculture must be considered a very important element in the complex process of development.

Considering developing countries in particular, it is found that these countries are characterized by the existence of a large agricultural population which in most countries constitutes a majority. Consequently, it seems obvious that it would take extremely rapid rates of industrialization to permit the country to absorb all of the annual increment of population into other industries, and even more so to reduce the existing surplus in agriculture. In conclusion, the problem faced by developing countries which experience rapid population increases is one of time and speed; how quickly will these countries be able to catch up economically with their own numerical growth and, subsequently, be able to build an industrial structure where food production is the task of the minority?

2. The Structural Transformation

Societies which are the end result of a modernization process are characterized by a comparatively high per capita income complemented by a high degree of literacy and access to education, considerable spacial and social mobility, a well developed transportation and communications network, and widespread participation of capital equipment and inanimate energy.²

²James C. Coleman. "Conclusion: The Political System of the Developing Areas," in G. A. Almond and J. S. Coleman, eds., The Politics of the Developing Areas (Princeton University Press, 1960), p. 532.

The structural transformation whereby an increasing proportion of the active population becomes engaged in the production of a wide array of goods and services other than foodstuffs is a necessary condition for the modernization process. This being the case, then, it becomes essential to treat this structural transformation in terms of the interrelationships that exist between agriculture and other sectors, interrelationships which condition the structural transformation of an economy.

It is broadly recognized by development economists that the real problem in the economic development of countries is one of attaining a proper balance between agricultural and industrial development. In this context, the problem of interdependence as emphasized by Professor Ohkawa³ becomes of great help in throwing light on this difficult problem. The question that comes to mind is: "Why focus attention on the agricultural versus nonagricultural dichotomy?" The reasons are rather straightforward. Firstly, the process of development starts from a situation in which the great majority of a country's population and economic activity is in agriculture. This fact is a historical reality characterizing the nation's economy at early stages of development. Secondly, the production processes in the agricultural sector are generally characterized by relatively primitive, traditional techniques, very limited use of capital and capital equipment, and, as a consequence, by very

³Kazutshi Ohkawa. "Balanced Growth and the Problem of Agriculture--With Special Reference to Asian Peasant Economy," Histotsubashi Journal of Economics, II (September, 1961), 13-25.

low productivity. Thirdly, as a result of the institutional setup, agriculture has a character, as suggested by Professor Ohkawa, of the "self-employment sector" meaning, of course, that within the institutional pattern, the population is at least able to subsist in agriculture even though the marginal product of some members of the farm labor force may be less than the average product that they consume.⁴ On the other hand, and in marked contrast, opportunity for employment outside of agriculture are strictly limited. In a capitalist economy production in the nonagricultural sectors tend to be based upon concentrated ownership of capital equipment and the hiring of wage labor for profit making purposes. Employment, in other words, contrary to what happens in agriculture, tends to be offered only up to the point where the product of the last worker is equal to the prevailing wage rate. It is safe to say that the reality found in most developing countries is one which approaches this dichotomy. It is clear, therefore, that an understanding of the process of economic development, and the role of agriculture within this process, requires a realization of this dual character of the economies of developing countries.

In time, and as a result of the structural transformation which is an integral part of the development process, the agrarian character of the economy is changed. There occurs a transformation in the occupational composition of the labor force;

⁴This point has been emphasized by at least two well known works: W. Arthur Lewis, "Economic Development with Unlimited Supplies of Labor," The Manchester School, Vol. XXII, No. 2 (May, 1954), and J. C. Fei and G. Ranis, Development of the Labor Surplus Economy. Homewood, Ill.: Richard D. Irwing, 1964.

there is an increase in the degree of technical capabilities in the sense that plant and equipment are being accumulated, and insofar as there is an expansion in the necessary entrepreneurial and labor skills required to produce a widening range of goods and services.

Returning to consider the basic interrelationships between the two sectors it can be said that one of the most basic of these interrelationships arises from the role that the agricultural sector plays as a supplier to the nonfarm population. Setting aside the possibility for food imports, the terms of trade on which the urban population is able to obtain its food supplies clearly depends on the rate of increase of the agricultural surplus of any given country with relation to the growth of demand for food.⁵ Disregarding this important role that the agricultural sector can play in the development process would obviously mean that a failure to follow the right strategy will result in a shortage of food supplies, a shortage that will put a brake on industrial expansion. This vitally important contribution of agriculture to general economic development is emphasized throughout the literature.⁶ It should be noted, therefore, that apart from changes in consumer preferences, the overall rate of demand for food depends on the rate of increase in population, the income elasticity of demand, and the rate of increase in per capita incomes. In the case of a predominantly

⁵William Nicholls, "An Agricultural 'Surplus' as a Factor in Economic Development." Journal of Political Economy, LXXI (February, 1963), 1-29.

⁶Johnston and Mellor, Nicholls, Ohkawa.

agrarian economy the most important element in the demand for food is the so-called reservation demand of members of farm families who rely mainly on their own production. The usual concept of income elasticity of demand for food is rather ambiguous when applied to the farm population because of the way that the increase in their food consumption depends on their level of production and their readiness to sell part of their output as well as on the factors influencing their consumption demand for food.

The character of the interdependence between agriculture and other sectors of the economy acquires particular importance as the development process goes on. With the structural transformation the nonfarm sector expands, the domestic market becomes an increasingly important component of the demand for agricultural products. Before any considerable amount of transformation takes place, it is important to consider that the agricultural sector, through exports, is the one that supplies most of the needed foreign exchange to finance the transformation process. The significance of agriculture's contribution at this stage cannot be overemphasized. The importance of agricultural exports as a source of foreign exchange is underscored by the fact that in the early stages of economic development, there are likely to be a few alternative export possibilities, unless, of course, as in the case of Venezuela and some countries in the Middle East, the developing country is richly endowed with petroleum or mineral resources of high demand in the world market.

In addition to the role played by agricultural exports in helping the country to overcome the damaging effects of a foreign exchange bottleneck, expanding export crops also represents a possibility for increasing the incomes of the farm population. Inasmuch as the production of exports is geared toward the world market, one individual country supplying only a fraction of world demand may be able to step up its output rapidly without necessarily having to face the prospect of saturating the market. (In passing it can be pointed out that achieving an increase in the income of the farm population will be significant only in relation to the land tenure system that prevails in a country. The importance of this institutional element shall be treated in the next chapter.) The expansion of production of an agricultural crop presents, in early stages of development, the possibility of designing a strategy of development which would be based mainly on a fuller and more efficient utilization of readily available resources of labor and land that have rather low opportunity costs. The required investment may easily take the form of direct, nonmonetary investment by the rural population. In other words, at the farm level, the opportunities opened up by participation in international trade often take the form of introducing a high value crop which abruptly increases the productivity of the existing land and labor resources.

It should be made clear, nevertheless, that the contribution that agriculture can make through the export of primary products is not one that should be relied upon indefinitely.

This contribution is important at earlier stages of development but, at the same time, presents serious drawbacks which ought to be carefully weighted at more advanced stages. The Projections for 1970 made by FAO and the outstanding work of Raul Prebisch and his associates in ECLA, suggest a persistent tendency for agricultural exports to increase more rapidly than the demand for imports.⁷ When considering policy decisions, therefore, it should be kept in mind this important fact. In planning a sound strategy for development in view of the rather low price and income elasticities of demand for primary products, the realistic expectation seems that ought to be one that points toward a deterioration of the terms of trade against the exporters of such products. The theory of comparative advantage, while perhaps very useful and helpful in the early stages of development, should, at the right moment, be modified so as to introduce new elements in the growth and development process of a country.

Going back to the consideration of the interrelationships that exist between the agricultural and nonagricultural sectors, we should emphasize the fact that, as development takes place, the increased output of the nonagricultural sector affects agriculture in at least two very important ways

a. The expansion of the agricultural output comes to depend increasingly on the availability and reduced cost of agricultural machinery and other inputs that must be purchased

⁷FAO, Agricultural Commodities-Projection for 1970 Special Supplement, FAO Commodity Review, E/Cn. 13/48 CCP 62/5, Rome, 1962.

from the nonagricultural sector of the economy. In relation to the demand of the agricultural sector for industrial products it should be recognized that until a rather advanced stage of development, the consumption of agricultural workers of their own production of goods and services constitutes an important factor in their economic welfare. Especially important within this framework of interdependence between the two sectors is the magnitude of agriculture's monetary receipts and the demand for inputs produced in the industrial sector. In making a policy decision it is of utmost importance to consider the opportunity cost of imported supplies such as tractors and fertilizers for which that cost is likely to be much less than the one to be incurred through local production. Within the general framework of economic development, therefore, an important consideration is the fact that rural demand will give a greater stimulus to the industrialization of the country if the policy measure implemented is geared toward an agricultural development path relying very heavily on the increased use of agricultural inputs which are within the industrial capacity of the country, and on the development of agricultural research and extension programs giving careful attention to the productivity increases obtainable by encouraging the use of inputs such as improved tools, animal-drawn implements, etc., that are able to be produced domestically at reasonable prices. The important question is not should agriculture be mechanized but, rather, how can a production process be achieved that will permit the country to maximize production at the lowest possible cost. If

the answer points to the use of inputs that can be produced domestically, then a complementary measure should be to provide assistance and training to local artisans to promote efficient production of the needed agricultural inputs. One important fact that is almost completely disregarded in the literature and in the development planning is that countries in early stages of development have a considerable proportion of local artisans not highly trained for working in a complex industrial society but who, nevertheless, can be productive and able to contribute to development by producing inputs for the agricultural sector.

b. The second way in which the nonagricultural sector affects agriculture is through the availability of consumer goods and services which provides a strong incentive and reward to the farm worker, making it more attractive to supply farm products to the urban population. When this incentive is present, the attitude of the farmer changes and a healthy environment is created. The rural population ceases to deliver food supplies as a tribute and the exchange of products becomes a genuine and mutually desirable exchange. In this context it becomes of great importance to be able to increase the income of the rural population; the transfer of capital and tax payments from the agricultural sector are of crucial importance in financing investments in infrastructure. At the same time, if nothing is done to increase the meager income and low purchasing power of the predominantly agrarian population, the expansion of the industrial sector may be seriously jeopardized. On the

other hand, an increase of monetary incomes in agriculture and an expansion in rural demand for consumer goods and farm inputs will constitute an essential stimulus to industrial expansion because agriculture bulks so large in a backward economy.

In conclusion, a viable development process does not depend on either the mechanization of agriculture or on a far-fetched industrialization strategy. The achievement of development would rather seem to depend on a policy seeking a balance between the two sectors and a sound complementarity arising from a clear and well conceived understanding of the interrelationships that exist between the agricultural and the nonagricultural sectors of a given economy.

From what has been said so far it is clear that the nature of the interrelationships between the two sectors is a dynamic one. The ever changing nature of these interrelationships should provide an important general criterion to guide the selection of measures for promoting agricultural development.

As it was pointed out, increasing agricultural output at an early stage of development is a prerequisite to achieve a viable process. This being the case, a development plan should carefully consider the adoption of technical innovations capable of producing an increase in yields. It is basic, therefore, to recognize the fact that there are very important complementary relationships between the considerable amount of land and labor committed to agriculture in developing countries' early stages of development, and technical devices capable of increasing the efficiency of these existing resources of low opportunity cost.

Expenditures on improving the existing labor intensive agriculture can result, therefore, in rather high returns. Improving the efficiency of labor intensive agriculture will not only result in higher returns, but, and most importantly, will set the stage for a sensible mechanization program when the conditions so permit and when investment in agriculture is of necessity directed to implementing a policy that must pursue a development pattern based on the use of labor-saving equipment.

A relevant question that should be asked by the government agency in charge of development planning is: If steps are being taken to raise the efficiency of the agricultural sector, to what extent is it desirable and possible, within given conditions, to pursue a labor intensive, capital saving approach in agriculture so as to permit the nation to give priority in the allocation of capital funds and foreign exchange to investments to improve the economic infrastructure and to promote industrialization? The question focuses, of course, on the familiar yet difficult problem of factor proportions that must be squarely faced by a country entering the development process. In the agricultural sector the level of productivity and output depends to a great extent on the influence of factors which are of a microeconomic nature such as the reactions, decisions, and the performance of individual farm workers. But it also depends on factors determined by the measures taken by the government that affect the nature of the production possibilities available to agricultural workers.

Although the microeconomic factors are of great importance

in development, the main concern here is with those other factors which represent the policy instruments or variables upon which the government of a nation can act to achieve a fast rise in agricultural productivity and output.

Obviously, it is extremely difficult to present a complete and highly accurate estimate of costs and returns associated with the implementation of one as against the other of many strategic measures for expanding agricultural production. The reason is clear; the increase in both, productivity and output, depends on intricate relationships between micro and macro factors and the human element (attitudes, tradition, degree of education, etc.) underlining any society. Thus, it is general criteria and judgment estimates rather than mathematical comparison of costs and returns associated with different means that generally guides decisions concerning the level of resources that should be allocated to encourage the expansion of agricultural output, and to this end the distribution of funds and human capital among agricultural research, extension programs, irrigation projects, etc. Nevertheless, intelligent decisions concerning priorities in a particular country must take account of feasible possibilities as these are determined by factors such as the nature of the soil and climate, the state of technical knowledge, and the availability and costs of various inputs. Of special importance is the existence of bottlenecks such as inadequate land tenure systems which become a critical limiting factor insofar as increasing output in the agricultural sector is concerned. An inadequate land tenure

system also hinders general economic development.

Among the policy instruments that a government can utilize in its efforts to accelerate agricultural development, agricultural research and education are of paramount importance. In passing, at this point it should be pointed out that through the strengthening of these institutions a country can create conditions that would permit a development process which relies on increased technical efficiency and a high degree of education.

A development process conceived in these terms has the advantage of permitting a fuller utilization of existing resources of labor as increased technical and entrepreneurial efficiency will improve the rate of transformation at which additional labor inputs can be converted into additional output. In this respect it will be interesting to see what are the results of the current Cuban policy which is based on an attempt to completely mechanize the agricultural sector of the economy. If it is a success, there will have to be a reconsideration of what has been proposed here and an examination on the basis of new experience of the possibilities of a development policy which, for all intents and purposes, disregards the possible contributions of a labor-using, capital-saving strategy.

To this day, however, the historical experience of many countries that have been successful in achieving a considerable increase in their agricultural productivity and output provides a good deal of reliable evidence of the soundness of a program based on low-cost technical innovation. The most relevant experience is perhaps that of Japan, a country where agriculture

has played an important role in promoting general economic development. Apparently, in Japan increases in agricultural output have exceeded by a large margin the increases in physical inputs. Many students have attributed this "unexplained increase in output" to programs in agricultural research, education, and extension.⁸

As a concluding remark, in considering a strategy for development, it is of great importance to keep in mind the potential that exists in a developing country for increasing agricultural output by fully using a more efficient but still labor-using, capital-saving production process. The real objective, therefore, is not to ignore or do away with the traditional agricultural sector as it exists in the early stage of development; the objective that ought to be sought by a developing country's government should be to follow a path leading to the achievement of the contributions of the agricultural sector in its traditional form when there is no better way to achieve the end in mind.

3. Industrialization Through an Increase in Agricultural Productivity

When by the improvement and cultivation of land. . . the labor of half the society becomes sufficient to provide food for the whole, the other half. . . can be employed . . . in satisfying the other wants and fancies of mankind.

Adam Smith.

⁸Anthony M. Tang, "Research and Education in Japanese Agricultural Development 1880-1938," Economic Studies Quarterly, XIII (February and March, 1963), 27-99; Saburo Yamada, "Long Term Changes in Agricultural Inputs and Outputs," in Kazushi Ohkawa, ed., Growth and Agriculture, Tokio.

For a long time now there has been disagreement as to whether industrialization causes or, on the other hand, is a result of economic development. The disagreement becomes a matter of crucial importance in countries now striving to implement meaningful development processes. The real danger arises when the disagreement is oversimplified and a policy decision is made to go on with a program of industrialization which overlooks the agricultural sector, the contributions it can make to expand industry, and bases the decision on the oversimplistic assumption that a country has to build an industrial complex in order to develop, but that in order to develop an industrial society, the nation must do away with the agricultural sector even though that sector may be the most important one within the framework of a developing country's economy.

The proposition that industrialization and a sound program of import substitution constitutes, perhaps, the best solution for developing countries which have been experiencing a deterioration in their terms of trade. However, it is difficult to accept a policy which tries to achieve industrialization by completely disregarding the potential that the agricultural sector has when it is precisely this potential that can contribute, and substantially, to the achievement of the paramount goal: an expansion of the industrial sector.

The "classical" view as expressed by Professors Nurkse and Lewis, among others, that the industrialization process has

to be the result of a nation having a surplus in agriculture⁹ capable of creating a demand for industrial products and of feeding the labor force engaged in the industrial sector is sound.¹⁰ In this respect it is important to consider what are the relationships that exist between industrialization and agriculture in both an open and a close economy.

a. Within the framework of a close economy it appears that two generally accepted conditions validate the postulate of the "classical" theory insofar as it implies that an increase in agricultural productivity will be the basis for an expansion of the industrial sector. In the first place, historical experience presents evidence that rural families do not increase consumption of their own output, if prices remain constant, by more than any increase in such output by rural families. In other words, in a close economy, a comparative increase in agricultural productivity will expand the industrial sector, assuming, of course, that the proper strategy has been chosen. Under similar conditions, however, it is not at all certain that a relative increase in industrial productivity will expand the agricultural sector. The reason is that a given percentage increase in industrial output might result in urban families increasing their consumption of industrial goods by an amount greater than the given increase in output. Secondly, attentive

⁹Agricultural surplus is understood as the physical amount by which total food production exceeds the total food consumption of the agricultural population.

¹⁰R. Nurkse, Problems of Capital Formation in Less Developed Countries (London, 1953); W. A. Lewis, The Theory of Economic Development (Homewood, Ill., 1955).

study of economic behavior points to the fact that in the case of rural families the income effects outweigh the substitution effects of a change in the price that a fixed agricultural output can command; this is to say that at higher prices for a fixed output, a rural family would normally consume more food. The implication, of course, is that the industrialization process requires an increase in agricultural productivity and not in prices paid for agricultural products.

Given these conditions and considering the fact that governments of developing countries want to industrialize as fast as possible, it should be concluded that in planning industrialization a government ought to consider the alternatives and the implications of percentage changes in either one of the two sectors. Because of the reasons previously expressed, it would obviously be to the advantage of the particular country that the government stress agricultural productivity.

This is the general case, that in developing countries industrialization comes through an increase in agricultural productivity. Furthermore, in the case of a close economy where foreign aid is not forthcoming or is insufficient, the country must rely almost exclusively on the dominant agricultural sector to finance industrialization. This being the case, some reference should be made to the fact that the contribution of the rural sector to capital formation may be achieved in a number of ways: through taxation, that is, by making agriculture to rely less on outside sources for its development; by increasing agricultural productivity so as to bring about a relative

decline in agricultural prices and to encourage, thereby, increased profits in industry with consequent favorable effects on savings and investment in that sector. Obviously, a combination of political and economic forces will dictate which of the forms or ways will be the best one for the particular case. There is considerable interaction among a multitude of factors and it is impossible to set forth a single pattern for drawing capital from agriculture. The main assumption, however, remains unchanged; namely, that the industrialization of a country must rely heavily on the contributions that the agricultural sector can make.

b. If the assumptions are related and the case of an open economy is considered, the situation is very different. In this case, the prices of both agricultural and industrial commodities are determined by the conditions that exist in the international market. Under these conditions an increase in agricultural productivity could reduce the relative importance of industry and the cities. The existence of these conditions create serious political problems and governments are forced by circumstances to follow policies which emphasize less trade and more autarchy. All that can be done here is to recognize that a serious problem exists which, in most cases, make unavoidable the confrontation between political prestige of a government and sound economic policy.

It is always simpler to raise productivity in industry than in agriculture because in the industrial sector there are fewer workers and fewer producers, both of which are less

dependent on tradition and customary ways of doing things. It has been implied all along that innovation in agriculture is a must but, at the same time, innovation means persuading people to do things differently and in backward countries one of the most limited of resources is the number of effective and available persons capable and willing to persuade the great majority of the population not only in towns but especially in the countryside. The importance of education and extension programs becomes evident as an essential part of a sound development program based on the achievement of an increase in agricultural productivity. The topic of education in development will be treated in detail in Chapter III.

CHAPTER II

LAND REFORM AND ECONOMIC DEVELOPMENT

1. Land Reform: Its Meaning and Purpose

I am not speaking as a Brazilian addressing Americans but as a man talking to other man The Alliance for Progress is dead, however much I should hope for its resurrection. The main reason for its failure seems to be the following: it was necessary to establish close co-ordination between the help from the Alliance and the basic reforms, but unfortunately the rich in Latin America talk too much about reform and label as "Communists" all those who try to enforce it. This is easy to understand: the rich in Latin America go on holding 80 per cent of the land in the continent. Often they control parliament and have the intensity of their idealism and hope in the future gauged by the bank deposits kept in their names in the United States and Europe. Unfortunately the rich in your country also create problems: President Kennedy could be a witness to that.¹¹

This chapter is dedicated to consider land reform because of the important role it plays in the development process especially in countries like my own which are predominantly agrarian and striving to break away from the limitations imposed by an archaic, unjust, and inefficient structure.

In the previous chapter it was repeatedly pointed out that industrialization is a key to economic progress, but at the same time the significant role of agriculture in all those countries which are not as yet very industrialized and where,

¹¹Dom Helder Camara, Roman Catholic Archbishop of Rio de Janeiro, from a press release issued by the Brazilian Embassy, Washington, D.C., February 27, 1963.

as a result, the majority of the population derives its living from the land was emphasized. In those countries, in other words, agriculture provides the background on which the industrialization process develops.

The conclusion was that industrialization imposes heavy demands on agriculture and that in order to be able to meet these demands there must be a substantial increase in agricultural productivity. All this leads to the necessity to consider the structure of the agricultural sector in developing countries and to conclude that without reform those countries will continue to be underdeveloped. In predominantly agricultural countries reform of the land tenure system appears to be an indispensable, integral part of any successful policy of industrialization and general progress. In this chapter the meaning and purpose of land reform, the particular relationship between land reform and employment, and, finally, the Mexican experience as a significant accomplishment in Latin America are considered. The conditions that exist in most Latin American countries will serve as a framework of reference.

Much has been written during the last two decades about economic development and the barriers to development. When one studies Latin America and realizes that economic and social progress is a function of an improved agricultural sector, it becomes apparent that one of the most important barriers to development is one centered in the land tenure structure of the countries that comprise the region. The need for land reform is generally recognized and accepted throughout Latin America

but, unfortunately, the main objective, and perhaps the nature itself, of this basic reform is confused with certain technological innovations which have proved highly successful in countries with entirely different socio-economic structures. Among the multitude of measures which are taken to be land reform there are mechanization, increased use of fertilizers, irrigation and colonization projects, creation of credit institutions, improved education and agricultural extension services, etc., etc. Undoubtedly, all these measures are variables of utmost importance but they are measures which complement land reform, not, in any case, substitute for it. It is because of this tendency to confuse essentially administrative and technological improvements with fundamental structural reforms that we are confronted, in the region, with serious problems which stand in the way of development. With this in mind, then, let us consider what is land reform.

Essentially, land reform is a revolutionary measure whose main objective is to transfer power, property, and status from one group of people to another. One important point to keep in mind when considering land reform is that land reforms have objectives and means to achieve them which are peculiarly related to the cultural heritage and the economic and social conditions of the nation where they are to be implemented. Therefore, this rather complex subject should be approached pragmatically and not ideologically, that is, by recognizing that the objectives of a rational reform and the means to carry it out are determined by a number of elusive variables, such as,

for example,

- a. the distribution of income and political power among the different groups of the community;
- b. the relative importance and development of the primary, secondary, and tertiary sectors;
- c. the particular pattern of land tenure and trade, the state of the balance of payments, and the overall future goals of the nation that contemplates reform.¹²

Without information on these subjects it is impossible to know what adjustments in allocation are needed, who must bear the cost of the reform, and what compensation and expenditure policies are required to achieve the desired goals.

Although land reforms are peculiar to different nations and to the realities, objectives, and the instrumentality applied to achieve them, it is nevertheless possible to discern certain elements which should be present in all land reforms or, at least, in land reforms of an area with similar historical, economic, and social attributes. From the economic viewpoint, for example, a land reform must be understood and implemented as a redistributive measure implying the imposition of a capital levy on a few landlords to be distributed among many peasants and the state. Clearly, the objective of this transfer is to change the existing pattern of allocation of resources in the agricultural sector by means of redistribution of land and water

¹²Flores Edmundo, Tratado de Economia Agricola (3rd ed.), Fondo de Culture Economica, Mexico, D. F., 1964.

rights and, consequently, to bring about a significant change in the distribution of income and wealth in the economy as a whole. In other words, the achievement of this objective will imply a considerable reduction of the private demand of the landlords and a release of resources that can be used to raise the level of consumption of the peasants and an increase in the rate of capital formation. This concerns most developing countries because implied here are at least two very important premises of redistributive policies; namely, that the magnitude of available income for consumption and capital formation in any given economy is itself a function of the state of distribution; and that there is a rather good possibility of increasing the size of the total income to be divided through changes in the existing state of distribution.

Consequently, land reform constitutes a measure which gives the agricultural sector a certain degree of mobility making it possible to shift savings and labor from agriculture to the development of the industrial sector. Furthermore, because of the redistribution implied in land reform, the propensities to consume and to save will be affected as well as the composition of imports and exports and the general level of employment. In turn, the effects of all these changes create favorable conditions and incentives for future growth.

In Latin America, in particular, the failure to understand land reform in these terms has led most countries that signed the Charter of Punta del Este to institute a wide variety of substitutes for land reform in a futile attempt to

gain time and popular support in order to halt authentic reform. It is of crucial importance to reverse the trend instituted by the landed elite of the region and to accept the realities that face the nations of the continent; it is urgent to understand that by trying to carry out technical and administrative improvements while postponing fundamental economic and social reforms will not help the nations concerned in the important task to halt inflation, eradicate deficits in their balance of payments, and produce enough food for their growing populations.

Although it has been admitted that measures to improve efficiency in farming such as the development of hybrid seeds, the creation of extension services, etc., are necessary and important to increase agricultural productivity, they are only complementary measures which cannot by themselves, operating in a vacuum, achieve the basic purposes. In other words, measures of this kind do not basically alter or change the income distribution or the social and political structure. Producing more cotton, sugar, coffee, bananas, etc., without radically changing the structure of the land tenure system will not create new alternatives for the "hacienda" or plantation workers. The economic gains of increased productivity under these conditions will only widen the gaps that already exist and will make it more difficult for future generations to achieve a viable development.

Attempts to implement programs designed to reclaim unproductive lands or to encourage settlement of uninhabited

regions as a substitute for basic reform have also been a failure. The reason is simple; programs of this type are poor economics. These kind of programs are unadvisable because of the vast capital outlays required. In developing countries capital is one of the most scarce of resources and basic economic principles would point to the fact that capital under conditions such as these can be put to better use elsewhere in the economy. In Latin America, in general, public domain lands are of no value whatever because of their distance from markets, their poor fertility, and the prevalence of unhealthy climate. Obviously, spending scarce capital to open more land when there are vast amounts of unused land in large "haciendas" only shows the pathetic lack of imagination and flexibility of the landed aristocracy of the region. The limiting factor for development in most Latin American countries¹³ is certainly not lack of productive land but rather the monopolistic, socially damaging, technologically backward, and economically inefficient way in which the already available land is owned and utilized.

It is also common to find programs which, in their attempt to avoid radical reform, purchase land at market prices instead of expropriating the land needed to carry out the reform program. This method, of course, is no different from a mere real estate transaction. Taking land reform as a means to redistribute income, it becomes clear that when proprietors receive cash compensation, there is an income redistribution effect only to the degree to which cash compensation is inferior

¹³Refer to section two of this chapter, Table I.

to the current market price of land. If governments were to pay landlords in bonds, there would be redistribution of income, since in effect landowners are forced to lend the government an amount roughly equal to the price of the land.

To conclude this section, and in view of what has been said so far, some conditions can be mentioned which seem to be an indispensable part of a land reform program if it is to be an effective one. Thus, summarizing, the following conditions are important:

- a. As has been implied previously, land reform has to take productive land and its income (as was pointed out in reference to the conditions in Latin America, the barrier is not lack of land but rather too much unused or inefficiently used land in large "haciendas"). At the same time, productive land should be taken without compensation because, otherwise, the measure would not constitute a redistributive measure. In this respect, away from any ideological considerations, it seems that the commonly heard claim that landowners should be fully compensated is as absurd as to propose that taxpayers in an advanced country should be fully compensated either in cash or bonds in an amount equal to their taxes.
- b. It must also be suggested that it is extremely important that a land reform should take place massively and rapidly; say, within ten years. This

condition acquires importance in terms of the necessity to fulfill the necessary conditions for take-off, to use Rostow's terminology. It is clear now that time is of utmost importance in development; these countries cannot wait two centuries to achieve their objectives.

- c. Finally, land reforms must be complemented or accompanied, but never substituted, by vigorous development policies within and outside the agricultural sector. As was suggested, there must be a firm implementation of new and efficient patterns of resource allocation and, within a broader framework, it is important to promote a transfer of capital from agriculture to industry and this can only be done through a change in the existing distribution of income. In the case of developing countries, the redistribution of income must necessarily come from the land.

2. The Relationship Between Land Reform and Employment

Having presented in general terms the meaning and the purpose of fundamental land reform, it is important to consider now the relationship between land reform and employment.¹⁴

A consideration of this relationship is germane in view of the fact that in most developing countries, and in most

¹⁴I follow the C.I.D.A. Studies on Latin America and FAO's Agrarian Reform Policies, Latin America Conference on Food and Agriculture, 1965 (Doc. LARC/65/conf/3).

Latin American countries in particular, a large proportion of the active labor force is engaged in agriculture, that these countries are experiencing very rapid rates of population growth, and that under present conditions the industrial sector cannot offer expanded employment opportunities. It is therefore the agricultural sector, as was emphasized in the first chapter, the one that must provide more employment not only to the increasing number of workers but also to existing workers now underemployed or unemployed.

Under present conditions in Latin America it seems impossible that with the existing agrarian structure it will be feasible to provide suitable employment and it becomes clear that a radical structural change is a must if the agricultural sector is to offer employment until the time when the industrial sector will expand enough to absorb the growing labor force. From the practical point of view, from the point of policy making the important question to be answered is one that relates to the degree to which the primary sector can employ in an efficient way all those now engaged in agriculture and also those who according to projections will be added to the labor force, especially during the first stages of development when the absolute number of the agricultural population is bound to increase. The problem faced by most Latin American countries in this respect is a structural one. According to data available, the region's average amount of arable land per worker is roughly the same as in Europe; namely, 3 hectares per man. In

¹⁵A hectare is equivalent to 2.471054 acres.

fact, in Latin America as a whole the land/man ratio is favorable and warrants the conclusion that the ratio offers rather good possibilities for giving remunerative employment to the agricultural labor force.

If this is the case, why has the region in general been unable to employ its agricultural population in a more effective and productive manner?

The data presented in Table I helps to answer this question. It shows that land resources in most Latin American countries is adequate. It appears therefore that the major barrier to the efficient combination and utilization of resources is the existing land tenure systems. In other words, the systems that regulate the distribution and cultivation of land in Latin America prevent the creation of full and remunerative employment of the agricultural labor force. Considering first the distribution pattern, it should be noted that the important characteristic of the situation as it currently exists is the concentration of land in the hands of a few large landowners. In the region as a whole less than 10 per cent of the registered land holdings account for roughly 80 per cent of the land. According to data presented by the C.I.D.A. studies, the large farms¹⁶ represent only a small proportion of the total number of holdings but contain a disproportionately large share of the land (see Table II). But it is not only land that is distributed in such an unequal fashion; other nonhuman

¹⁶Those holdings which employ on the average 12 or more man-years of labor.

TABLE I

AGRICULTURAL LAND AND ARABLE LAND PER HEAD OF ACTIVE
AGRICULTURAL POPULATION IN SELECTED LATIN
AMERICAN AND EUROPEAN COUNTRIES

Country	Active Ag- ricultural Population 1960 (Thousands)	Land Resources (Thousands of Ha ¹)		Land per Person (Hectares)	
		Agricul. Land ²	Arable Land ³	Agricul. Land	Arable Land
<u>Latin America</u>					
Argentina	1,466	142,829	33,740	97.5	23.4
Brazil	15,522	161,039	68,376	10.4	4.4
Chile	773	12,963	2,632	16.8	3.4
Colombia	2,650	19,677	5,055 ⁴	7.4	1.9
Ecuador	776	3,336	2,081	4.3	2.7
Guatemala	779	2,058	1,475	2.6	1.9
Peru	1,556 ⁵	13,034	2,546	8.4	1.6
<u>Europe</u>					
Germany (FR)	3,537	14,208	8,503	4.0	2.4
Greece	1,955 ⁶	8,911	3,701	4.6	1.9
Hungary	1,865	7,083	5,624	3.8	3.0
Italy	5,881 ⁶	20,683	15,608	3.6	2.7
Sweden	448	4,282	3,598	9.6	8.0
Switzerland	292	2,167	422	7.4	1.4

Sources: Latin America: C.I.D.A. studies; Europe: FAO, Production Year Book, 1964.

¹For L. A. countries only that area in farms included in the census.

²Includes arable land and land in natural pasture.

³For L. A. includes lands in permanent crops, seasonal crops, improved pastures, and fallow lands.

⁴Does not include improved pasture.

⁵I.L.O., Year Book of Labor Statistics, 1964.

⁶1961.

TABLE II
RELATIVE IMPORTANCE OF LARGE HOLDINGS AND
LAND AREA THEY CONTAIN IN SELECTED
LATIN AMERICAN COUNTRIES

Country and Year of Data	Large Holdings ¹		Land Area	
	Thousands	Per Cent of all Holdings	Millions of Hectares	Per Cent
Argentina (1960)	4.0	0.8	64.1	36.9
Brazil (1950)	97.4	4.7	138.2	59.5
Chile (1955)	10.4	6.9	22.5	81.3
Colombia (1960)	15.3	1.3	13.5	49.5
Ecuador (1954)	1.4	0.4	2.7	45.1
Guatemala (1950)	0.5	0.1	1.5	40.8
Peru (1961)	9.6	1.1	15.3	82.4

Source: C.I.D.A. studies.

¹Defined as those employing 12 or more man-years of labor.

resources such as credit, machinery, water, etc., follow the same pattern. For instance, almost 100 per cent of the available credit which can be gotten on a commercial basis at normal interest rates goes either to the very large landholders or to owners of medium size farms.¹⁷

What are then the economic and social consequences of a distribution pattern such as the one prevalent in most countries of the region? Many are the adverse consequences and it will be beyond the limited scope of this paper to consider all of them. Comments will be limited to the consequences related to and affecting the pattern of agricultural employment which is of utmost importance in the development process and in the interrelationship between agricultural productivity and industrial expansion.

Within the agrarian structure characterized by the existence of few large holdings on the one hand and a vast number of "minifundios" on the other, the most obvious effect on employment is that such a structure, of necessity, forces a large portion of the labor force engaged in agriculture to rely on extremely small plots of land for their livelihood. As an average in Latin America the "minifundios" with between 5 to 10 per cent of the land "employ" almost 60 per cent of the active agricultural population. In marked contrast, the large holdings with most of the available land employ only an average of 4.2 to 5 per cent of the work force. Obviously, then, this type of concentration of land and other nonhuman resources makes the

¹⁷Holdings employing from 4 to 12 man-years of labor.

small holding to intensify its production. The small holdings use 80 to 90 per cent of their land in what is classified as arable or agricultural land; on the other hand, the large holdings are worked extensively creating inefficiency and underutilization. For example, lands suitable for cultivation are used for pasture and other lands suitable for other agricultural uses are left unused. The consequence, therefore, is that only about 15 per cent of the land in large holdings comes under cultivation and only 50 to 60 per cent of that 15 per cent is used for agriculture in one way or another.

From the data in Table III it is clear that the ratio of arable land per worker is 9 to 18 times greater on the large estates than on the "minifundios", and that the agricultural land per worker is 12 to 100 times greater. Consequently, due to this divergence, the "minifundios" count with less than one hectare of land per worker an amount, of course, which does not permit to employ one man fully and productively except perhaps in the few instances where intensive vegetable or fruit farming is possible and profitable. On the large holding, on the other hand, the available arable land per worker is from 6.9 to 12.6 hectares but, as was pointed out, most of this land is either underused or not used at all. The remedy to underemployment or unemployment in the agricultural sector, therefore, seems to be one directed toward a more equitable and efficient distribution pattern.

Passing to consider briefly the effect of the existing tenure structure on output per worker and per unit of land, the

TABLE III

ARABLE AND AGRICULTURAL LAND PER ACTIVE AGRICULTURAL
WORKER, BY SIZE OF HOLDING IN SELECTED
COUNTRIES IN LATIN AMERICA (HECTARES)

Type of Land and Farm Size	Brazil	Chile	Colombia	Guatemala
<u>Arable Land</u>				
Subfamily	0.7	0.5	0.6	1.0
Family	2.5	1.7	2.8	2.9
Medium	5.5	3.8	5.4	5.7
Large	12.6	6.9	7.6	8.9
National average	5.4	4.0	1.9	2.4
<u>Agricultural Land</u>				
Subfamily	0.8	0.8	0.6	1.1
Family	3.3	6.4	5.6	4.0
Medium	11.2	13.9	21.8	9.3
Large	33.8	38.2	88.2	13.9
National average	12.8	19.2	7.4	3.3

Source: C.I.D.A. studies.

data shown in Table IV which presents an indication of the relative value of output per unit of agricultural land and of arable land, and per worker in the farm size classes of holdings which were studied by the C.I.D.A. As can be expected, the data corroborates two conclusions:

- a. that the value of output per unit of land generally falls as farm size increases;
- b. that, in contrast, the value of the output per agricultural worker generally rises as the size of the holding increases.

This is not surprising because, as the size of the holding varies, changes in factor proportions occur. The important thing, however, is the fact that land appears to be underutilized in large holdings while the opposite occurs to labor in very small ones.

If it is true as it has been assumed here--and it appears to be true--that the natural endowments are suitable for the primary sector to productively absorb greater labor inputs, the realities that exist in the region would seem to imply that there are restraints which have so far prevented a fuller realization of the potentials. It has already been suggested that one of the principal restraints is lack of land due to the existing pattern of distribution, but this reason alone does not seem to be a sufficient reason by itself to explain either the actual underemployment existing in large holdings or why employment opportunities on such holdings are not expanded. Other institutional factors are also important and among them the tenure

TABLE IV

RELATIVE VALUE OF OUTPUT PER HECTARE OF AGRICULTURAL
LAND, AND PER AGRICULTURAL WORKER, BY FARM SIZE
CLASS, IN SELECTED LATIN AMERICAN COUNTRIES

Relative Value of Output ¹	Farm Size Class				All Farms
	Sub- family	Family	Medium	Large	
<u>Per Agricultural Hectare</u>					
Argentina	100	30	50	12	30
Brazil	100	59	24	11	19
Colombia	100	48	19	9	26
Chile	100	14	12	5	7
Guatemala	100	56	54	25	48
<u>Per Arable Hectare</u>					
Argentina	100	50	62	49	57
Brazil	100	80	53	42	52
Colombia	100	90	84	80	90
Chile	100	47	39	30	35
Guatemala	100	80	122	83	98
<u>Per Worker</u>					
Argentina	100	250	470	620	260
Brazil	100	290	420	690	410
Colombia	100	418	753	995	281
Chile	100	170	310	440	290
Guatemala	100	220	670	710	220

Source: C.I.D.A. studies.

¹Based on gross value of total output (crops, live-stock, etc.) in all countries except Argentina, where estimates are of value added.

system found in Latin America is worth considering. Latin America's tenure structure is one characterized by the coexistence of very large holdings and small subfamily farms. It has been this type of institutional setting, which links the small holding to the large one, that has played an important role in preventing the efficient employment of the active agricultural population on existing units. Tenure institutions as they exist today in most Latin American countries have failed to provide incentives for better utilization of resources to those who hold underutilized productive resources merely as a sign of prestige and social status. These institutions have also created a serious disparity between individual and national goals. Finally, such a system has made it impossible for the vast majority of the agricultural population to gain access to land and other productive resources.

This is why the tenure structure has not only fostered concentration and its adverse consequences, but it has also perpetuated and extended them. All available data indicates that during the last few decades the number of "minifundios" in Latin America has markedly increased while large holdings have been but slowly divided, the result being an increase in the relative amount of concentration. This concentration of resources and the general tenure systems therefore create the widespread underemployment and unemployment among the agricultural labor force in the primary sector and also affect the urban areas by encouraging migration to the cities and transferring unemployment to the latter, creating serious social and economic problems.

But although agrarian reform can change the present inefficient structure, it is obvious that the problems will not automatically disappear. For agrarian reform, therefore, to be successful in fulfilling its objectives, and in particular the one relating to employment, it is imperative to develop tenure systems capable of providing the motivation that will help bring the great proportion of underutilized land in large holdings under more intensive utilization. It is clear that all major tools of agrarian reform--land distribution, legal regulation of tenure forms, income redistribution, etc.--and all the complementary measures must be brought into play if the goals are to be achieved. The key to the solution of agrarian problems, and as a consequence the creation of a sound basis for a viable development process in general, is to be found on the large holdings which control most of the available resources now underutilized or unutilized under the present structure.

The way in which these holdings are transformed will determine the success of any program of agrarian reform. Of course, the particular measure or combination of measures must vary in accordance with the nature of the existing tenure system and the economic, political, and social conditions that exist in the different countries. The solution may well be owner operated family size units, tenant farms, or perhaps collective or cooperative ventures. It would be presumptuous, of course, to prescribe any particular form. The main concern expressed here is that there is an urgent need for reform if we are going to be able to cope with problems that create a serious barrier to development.

Nevertheless, it should be pointed out, at least briefly, that reform must be complemented by technological and administrative measures, and among these special reference deserve the following:

a. The creation of rational patterns of farming which would provide for an efficient utilization of the ample nonhuman resources that exist in most countries in the continent. This, of course, implies the introduction of improved farming practices, the adaptation of technology to the needs of the newly created units, and the provision of the necessary financial and physical inputs on the one hand, and the creation of outlets--marketing and storage facilities--for the agricultural products on the other. In this respect, as was expressed in Chapter I, the technology used should be geared toward the development of inputs which complement rather than compete with labor.¹⁸

b. The new units must also be provided with credit for the purchase of seeds, fertilizers, etc. A complementary measure to supplement these purchases must also be an integral part; namely, education and extension services to teach the farmer the best way to use the inputs he can now purchase with the help of the expanded credit available to him.

c. Finally, in particular relation to employment, and assuming that the new conditions will eventually shift the demand for labor to the left in the primary sector, it appears to

¹⁸For a discussion on this see United Nations, FAO, and International Labor Organization, Progress in Land Reform, Fourth Report. (New York: United Nations Dept. of Economic and Social Affairs, 1966.)

be of great necessity to plan the development of employment opportunities in the industrial sector. In other words, an examination of the para-agricultural and nonagricultural employment possibilities should be made to complement the agrarian reform program that is to be implemented in the particular country.

An agrarian reform conceived and executed in this manner, it is significant to note, will require an expansion in the activities of government agencies, banking institutions, extension services, and other technical, financial, and administrative bodies. An important part of the reform, therefore, appears to be the creation of a spirit of common purpose and common dedication so as to give the people and the different institutions the incentive to fulfill their particular role be it economic, educational or social in a complete way to make a success the introduction of the reform program.

3. The Mexican Experience

Keeping in mind what has been said about land reform, namely, that it must be a measure consistent with a nation's economic, social, and political conditions, let us now consider the Mexican experience with fundamental land reform not because it should or could be taken as a blueprint to be followed by other nations in the continent, but rather because it constitutes the only Latin American experience which can be seen in a proper perspective.

It has been argued that land reform is a fundamental element to open the road for economic development; this idea is

better expressed by Professors Johnston and Mellor:

Among the most important preconditions (for the development of agriculture) may well be land reform, especially if it takes land away from the feudal class, who own land for status or as a hedge against inflation but are not concerned to produce goods for the market or to get it into the hands of people who are eager to produce.¹⁹

Mexico was the first Latin American country to fulfill this important precondition and to carry through a far-reaching land reform. Here some of the economic consequences of the land reform in Mexico shall be examined.

Up to date, to the best of my knowledge, the significant economic growth experienced by Mexico has not received enough attention. Due to the lack of detailed studies, the economic basis of Mexico's growth is not established yet. Many Mexican economists, especially Edmundo Flores,²⁰ attribute much of the success to the land reform or the agrarian revolution. It is clear to me that this initial step was essential in setting the political and social stage to permit the type of economic progress that has taken place in Mexico.

Statistics of agricultural income are rather scanty and it is difficult to prove that the agrarian revolution has been an essential step in the process of economic growth in Mexico. However, one fact is clear from looking at Latin America; the area presents two completely different pictures: on the one hand, there is Mexico, a nation that has implemented a radical

¹⁹B. F. Johnston and J. W. Mellor, "The Role of Agriculture in Economic Development," American Economic Review, September, 1961, pp. 566-93.

²⁰Edmundo Flores, Op. Cit.

land reform. On the other, the rest of the Latin American countries (with the exception of Cuba) which have not gone far enough in solving their agrarian problems. According to data provided by F.A.O.,²¹ Mexico's agricultural productivity has been increasing at the very high rate of 7.1 per cent per year. This represents a rate of growth far greater than any one achieved by other Latin American countries which still maintain a semifeudal, archaic land tenure system.

This observation alone, of course, is not enough evidence to proclaim that Mexico's economic growth has been the result of the agrarian revolution. It can be said, nevertheless, that there appears to be a close relationship between increased productivity and land reform. In fact, within the framework of an agrarian country, land reform constitutes a necessary, if not sufficient, precondition for economic development.

After 1917, and especially in recent decades, Mexico has achieved a high rate of growth in general but the rate of increase in agricultural production has exceeded that of the economy as a whole. The important implication of this increase is that agriculture has fulfilled its role in the development process. First, agriculture has been able to meet the increased demand for food and other primary products created by a growing urban population. Second, Mexico's agricultural sector has helped to increase the quantum of foreign exchange

²¹F.A.O., Agricultural Commodities Projections for 1970, Table M18, for the years 1952-59.

needed to pay for imports by providing a significant increase in exports of primary products, especially cotton. Third, and this can be seen from Tables V and VI, agriculture has released the needed manpower for the industrial sector.

These tables represent two of the most important aspects of the transformation of Mexico's economic structure since 1917 when the land reform was legally implemented. Between 1910 and 1960 the population increased from 15.1 million to 34.6 million, representing an increase of 19.4 million. Another important consideration related to population growth is that while in 1910, 77.7 per cent of the population was rural, in 1960 the percentage of the rural population was reduced to 54.5 per cent at the same time that the urban population increased from 22.3 per cent in 1910 to 45.5 per cent in 1960.

Table VI shows the changes that have taken place in the occupational structure of Mexico's population. While in 1930 the population economically active was 5.1 million out of which 3.6 million, or 70.5 per cent, was engaged in primary activities, in 1960 the amount of the population economically active increased some 117 per cent and reached a mark above 11 million. It is important to realize that the percentage of the population in agriculture in 1960 was only 52 per cent of the total population economically active.

At least tentatively, it may be concluded that without the agrarian revolution Mexico would probably be in a similar position to that of Brazil, Ecuador, or Peru, to mention a few. A condition characterized by relative progress in some areas

TABLE V
URBAN AND RURAL POPULATION (IN THOUSANDS)

Absolute Increases						
Total Population		Rural Population		Urban Population		
1960	34,600	1960	18,857	1960	15,743	
1910	15,160	1910	11,775	1910	3,385	
	19,440		7,082		12,358	
Relative Increases						
Population	1910	Per Cent	1930	Per Cent	1960	Per Cent
Urban	3,385	22.3	5,541	33.5	15,740	45.5
Rural	11,775	77.7	11,012	66.5	18,857	54.5
Total	15,160		16,553		34,597	

Source: Estimations based on data provided by the Nacional Financiera. Cited in Edmundo Flores, Op. Cit., p. 365.

TABLE VI
OCCUPATIONAL STRUCTURE OF MEXICO
(1930-1960)

	1930	1940	1950	1960
Total Population (1)	16,553	19,654	25,791	34,600
Economically active (2)	5,151	5,858	8,354	11,394
Economically active, primary (3)	3,606	3,831	4,864	5,995
Relationship between (3) and (2)	70.5	65.4	58.3	52.6
	Absolute changes		Relative changes	
	+18,047		+109.0	
	+ 6,243		+121.2	
	+ 2,389		+ 66.3	
	- 17		- 25.4	

Source: Ibid., p. 366.

but a relative progress devoid of the social mobility that has always been part of the growth of developed nations.

Again, to use Rostow's words, it seems that the "stage of self-sustained growth" was entered by Mexico around 1934. This year witnessed the granting of large amounts of land to "ejidos". It appears that land distribution of this sort had this effect because in economies strongly dependent on agriculture, agricultural income is the basic source of wealth and the distribution of land sets the stage for the distribution of income. Agrarian reform, thus, as the experience of Mexico seems to show, creates and develops a new and economically more efficient pattern of income distribution.

Mexico's experience corroborates the assertion that agrarian reform should be considered not merely as an administrative measure to direct and regulate the redistribution of land but rather as a strategic development factor: a motor force which speeds the changes of income distribution and a more efficient use of resources. The rate of growth of agricultural productivity, 7.1 per cent per year, lifts the cloud of doubts so commonly expressed, that agrarian reform may bring a decrease of productivity because of the disintegration of the existing agricultural unit. While this may very well be the case during the first years immediately following a sweeping reform, it appears that in the longer run the results prove to be very different indeed once the structure has been changed.

It is also clear that the agrarian reform was an important factor in the achievement of conditions favorable

for the peaceful transfer of power in Mexico, the only Latin American country that has enjoyed political stability during the last three decades. Finally, in the social front, agrarian reform helped to end the caste system which had placed the rural classes of Mexico ("Indian") under a condition of serfdom. The fact that an ever growing number of peasants, until 1917 without purchasing power, has been incorporated to the market has been important in creating a growing demand for consumer goods, and consequently has made it possible to adopt modern technology which could not have been effective under the conditions that existed within the framework of a feudal, archaic agrarian structure.

CHAPTER III

EDUCATION AND EXTENSION IN ECONOMIC DEVELOPMENT

1. Human Capital

For a long time now it has been recognized that human capital plays an important role in economics. Reference to human capital can be found in A. Smith who considers a man's skill as a machine and assigns to it costs, returns, and profits.²² Say, Bagehot, Senior, and List also consider the skills and abilities of man as capital. But throughout the literature of the period there is a certain reluctance to treat human capital because human beings were not considered marketable. This is one of the reasons why the classical economists' treatment of the subject was limited to studies related to the demonstration of the profitability of human migration, health investment, and other related topics.²³

It has been only very recently that the investment in human capital--and its contributions to development--has received more careful consideration and has been recognized as one of the most profitable investments in the development

²²The Wealth of Nations. New York: Modern Library, 1937, pp. 101, 259-66.

²³B. F. Kiker, "The Historical Roots of the Concept of Human Capital." Journal of Political Economy, Vol. LXXIV, No. 5, 1966.

process. The tendency to bring the consideration of this type of investment to the forefront is clear in the work of economists such as Machlup, Mosher, Solow, and especially Schultz who has published a number of studies related to the importance of human capital in economic growth and development.²⁴ He concludes that this type of investment is the major explanation for the difference between increases in national output and increases in land, man-hours, and physical reproducible capital. Schultz also emphasizes the fact that much of what is so often considered as consumption is rather investment in human capital; investment, it is true, which may require a relatively long time to produce tangible returns. Clear examples constitute such things as direct expenditures on education, health, and internal migration to take advantage of better job opportunities.

It is also pointed out that both domestically and with reference to assistance to developing countries to help them achieve economic growth, investment in human capital has been underrated and neglected. Usually the emphasis is on the export of nonhuman capital because steel mills, factories, tractors, etc., are for many the real symbol of industrialization and progress. It has also been difficult to overcome England's experience; after all, the early industrialization of this nation did not depend on the investment in the labor force.

The fact, however, is that the knowledge and skills

²⁴Theodore W. Schultz, "Investment in Human Capital," American Economic Review, March, 1961.

required to take on and use efficiently the superior techniques of production now available is the most valuable resource and precisely the one that is in very short supply in developing countries. It is true that some growth is always possible through the increase in more conventional capital even under conditions where the available labor force lacks both skill and knowledge. But in this case, the rate of growth will be seriously limited because it is not possible to achieve the fruits of a modern agriculture and the abundance of modern industry without making large investments in human beings, who, in the last instance, are the real promoters and beneficiaries of those fruits and abundance.

2. The Role of Education in Economic Development

It has been stated, rather categorically, that in agrarian countries the basis for a viable economic development is the creation of a sound and efficient agricultural sector. But once structural bottlenecks have been overcome, the next important step in developing an efficient primary sector is to satisfy the increased need for an agricultural labor force endowed with the capabilities to perform in a new environment that will demand relatively high degrees of technical efficiency.

Therefore, among the policy instruments that a government must utilize to accelerate economic development special attention ought to be given to education or the investment in human capital. It is suggested here that it is through the strengthening of this complementary measure that a nation can

create the necessary conditions that would permit the functioning of a development process which has to rely on an increased agricultural productivity and, at the same time, is able to save capital and foreign exchange resources that can be used to develop the infrastructure and promote the expansion of the industrial sector since it is apparent that the terms of trade of primary products deteriorate and the nation's objective must be to rely less on the production of these products.

Thus, even though education has been considered as a complementary measure, it should also be recognized as a necessary measure for the development of agriculture and, consequently, for the general development of a country's economy. The critical role of education becomes evident when we realize the fact that the nature of the development process is such that it requires the creation and efficient operation of large quantities of trained manpower.

In Chapter II it was suggested that fundamental structural changes create a new set of institutions and relationships in a nation that has implemented those changes. It is the mission or role of education to prepare people to deal efficiently with these new institutions and conditions. Education, then, should be considered mainly as a process that helps to bring about fundamental changes in attitudes and in the ability to respond to new conditions which demand new solutions and new ways of doing things. In other words, education must fill the vacuum created by structural transformations by giving the labor force not only specific but also general

skills so as to coordinate mental and material development. The urgent need for creating an attitude to adapt to change is a direct result of the very nature of growth which is a process that relies on flexibility and accommodation to change. The nature of growth, therefore, requires that the human being be ready to understand and respond to the changing tempo and content of economic growth.

With special reference to the conditions that exist in a basically agrarian country with a large peasant population attached to traditional ways, education envisioned as a catalyst for change becomes more important the more traditional a country is. Under these conditions the role of education must clearly be one of creating new attitudes and of discarding obsolete methods which can no longer cope with new problems. Education in these countries has to fulfill a double objective, it must create new values to replace the old ones, and must provide the skills to adopt the new methods required for the realization of the new values.

Within the framework of an agrarian country with 60 to 80 per cent of its population engaged in agriculture it is important to consider what should be the role of education in the training and preparation of the rural family. Professor Mellor has suggested two objectives:²⁵

a. Education must be geared toward the preparation of

²⁵John W. Mellor, The Economics of Agricultural Development. Ithaca, New York: Cornell University Press, 1966, Chapter 19, pp. 345-360.

farmers and prospective farmers to enable them to work in an environment requiring improved farming methods.

- b. It must also educate the children in the rural areas so as to give them the necessary preparation to leave the primary sector and take jobs in the para-agricultural or nonagricultural sectors.

Although during the first stages of development the most urgent needs will be related primarily to the first of these objectives because of the high rate of population growth, and because, as it has been suggested in Chapter II, the new agrarian structure will in the beginning stages tend to increase employment opportunities in the primary sector. In a development plan, nevertheless, it is also essential to provide for the longer run needs and to consider that the time will come when the demand for labor in the agricultural sector will decrease and the demand for trained manpower will increase in the non-farm sectors of the economy. Education must, then, be also directed to giving the potential labor force leaving agriculture the necessary preparation to migrate to the urban centers and the necessary skills to satisfy efficiently the increased demand in other sectors of the economy.

Because of the rather fragmentary knowledge about the educational process in developing countries and because of the diversity of conditions in different nations, it is difficult to present clear-cut solutions to the problems of education and training in these countries.

In the literature it is common to find suggestions and recommendations stressing the importance of either formal education (and within this emphasis is placed on primary, secondary, vocational, or higher education) or stress is placed by other authors on extension services and the training of skilled personnel. Here an attempt to discuss all of these different yet related levels of the educational process will be made and, of course, it is not the intention to present solutions or final recommendations.

Formal education may and should play an important role in giving people the motivation to change and to recognize the ample possibilities that exist for changes in the patterns of production and consumption. In this respect, the role of formal education would consist in providing the necessary means to change. Little is really known as to how to organize and administer formal education so as to achieve an optimum balance. One thing, however, is clear; namely, that a broad range of educational requirements demands an equally broad range of institutions. Briefly, the following ones are important: primary, secondary and vocational, and higher education.

a. Primary education is mainly concerned with the most basic skills such as reading, writing, and numerical calculation. For many authors the objective of eradicating illiteracy constitutes the main concern.

People are the common denominator of progress. So, paucis verbis, no improvement is possible with unimproved people, and advance is certain when people are liberated and educated. It would be wrong to disregard the importance of roads, railroads, power plants, mills, and the other

familiar furniture of economic development. At some stages of development--the stage that India and Pakistan have now reached, for example--they are central to the strategy of development. But we are coming to realize I think, that there is a certain sterility in economic movements that stand alone in a sea of illiteracy. Conquest of illiteracy comes first.²⁶

William I. Myers states:

. . . it is extremely difficult if not impossible to achieve continuing agricultural development with illiterate farmers. More and better education of rural people is necessary to remove inhibitions of tradition and ignorance, to increase the acceptance of desirable changes, to facilitate communication and to ensure continuing progress.²⁷

It is true that without a high degree of literacy the other tangible and intangible skills that can be achieved from an enlarged primary education would be impossible to achieve. Nevertheless, the experience of many nations shows that overcoming illiteracy is not an unsurmountable obstacle nor a terribly expensive task. With courage and dedication nations can eradicate illiteracy in a relatively short time, say, 6 to 10 years, by implementing programs that require the rest of the population, especially high school and university students, to serve the nation for a period of six months or a year teaching the essential skills of reading and writing to urban and rural illiterates. This, of course, is an additional but important measure since in many countries a great proportion of their illiterate population has passed the age for formal schooling.

²⁶J. K. Galbraith, "The Poverty of Nations." Atlantic Monthly, October, 1962.

²⁷William I. Myers, "The Role of Education in Agricultural Development." International Explorations of Agricultural Economics, Roger M. Dixey (ed.). Ames: Iowa State University Press, 1964, p. 179.

The importance of formal primary education is generally recognized; the problem arises in deciding how much of it should be given. The decision is a complicated one because it is based on elements which are not purely economic but require value judgments related to welfare and political considerations and objectives.

b. The requirements for development seem to put great stress on secondary and vocational education. The expanded need for highly trained workers points to the urgent need to increase and upgrade both secondary and vocational training. The serious drawback, at least in most Latin American countries, is the fact that the secondary system is outdated and that vocational training is almost unknown. The tendency to stress in a disproportionate manner the teaching of the humanities is a problem that does not allow for a more practical approach to fulfill the needs of the nation. This is not, of course, to imply that the humanities have no place in the secondary schools; on the contrary, they can fulfill a very important role. What is suggested is that changes on the stress are a must if the system of education is to be able to produce the entrepreneurs, secretaries, accountants, and technical personnel of all kinds who will make possible a viable development.

The importance of vocational education cannot be over-emphasized. The development process must be based on the existence of capable and ingenious carpenters, smiths, etc., to supply the agricultural sector with the necessary implements needed to increase productivity and yet abstain from importing

sophisticated machinery which may very well be a hindrance rather than a help to development.

c. Higher education, of course, must also be understood as being a function of the conditions and the needs that the particular nation faces. Development requires both scientists and artists but under present conditions, in the early stages of development, it seems to me that the stress should be placed on the training of scientists and technicians familiar with the conditions of their countries and able to provide the needed leadership. There is a shortage of nurses, administrators, veterinary specialists, agronomists, teachers, etc., and at the same time there is a surplus of lawyers and medical doctors who remain in the urban areas and prefer the social status that their respective professions give to the hard work that has to be done in the rural areas where the need is indeed great. It is suggested, therefore, that there is a need for technical personnel, highly trained, and, more important, willing to make the sacrifices that society requires of them.

3. The Role of Extension

Within the general framework of the educational process the extension service appears to be more directly related to the development of the agricultural sector. Considering the characteristics of a traditional agrarian economy, linked to the past by strong ties, the main function or role of an extension service should consist of the following general elements.

a. In the first place an extension service should be understood and developed as a means to promote and stimulate

change and to awaken new aspirations to make it easier for the traditional farmer to recognize the necessity for change and give him the incentive to work to achieve it. The awakening of new aspirations has, of course, tremendous effects on the economy as a whole. The rural worker and his family will be introduced into a new world and will create in them the desire to produce more and better goods for the market so as to acquire the necessary purchasing power to buy goods and services which are now known and wanted. In other words, if the extension service is effective in this respect, it will help the rural family to enter into the mainstream of the national life, to become part of a market economy as a direct participant and beneficiary both as a producer and a consumer.

b. Extension services should also fulfill the important function of carrying information to the farmers and of teaching them that new conditions require new methods of production; extension should constitute the most efficient means to help the farmers to profit from the agricultural research that is being done in the country. But the role of extension is not only the dissemination of information and the teaching of new techniques. The other function that extension must fulfill is the important one of presenting to the research organizations the problems the farmer confronts under the conditions he lives and works.

The success or failure of an extension service will very much depend on whether or not a good system of communications has been established between the farmer and the research organizations.

c. Another important aspect of extension is related to the field of farm management. Extension services should be the means to provide training and guidance to cope with decision making problems. Obviously, it is not enough to develop the appropriate technology; it is essential also to teach the farmer how he can best adapt that technology to his particular problems. Thus an extension service must help farmers recognize and understand the factors he faces and enable him to make a profitable decision.

To summarize, then, in a developing country the role of extension is not merely related to the spread of technical information. This is an important part but it must be complemented by the fulfillment of the other function: to make citizens out of rural people who have never taken real active part in the life of the nation.

As to the organization of extension services, again it will have to depend on the conditions of each individual nation, its social, political, economic, and psychological makeup. It may be directed and implemented by government agencies; by farm organizations; by advisory agencies; or by universities. It is very important to realize that the organization and functioning of extension services must reflect and be a product of the characteristics and motives peculiar to the farmers of the region or the nation. Environment, geography, and other variables must constitute the first and most important consideration. Schultz expresses this idea in the following question:

Are the economic principles taught in the West really susceptible of general application? Or are they culture-bound and relevant mainly to industrial capitalistic countries?²⁸

Nevertheless, there are certain considerations that may have a more universal validity with reference to the organization of extension services. It appears that the variability of agricultural conditions that exist even within a single country would require the strengthening of local leadership. As was previously said, technology has to be modified to cope with particular problems; it may be advisable, therefore, to organize the extension service on a local basis and to grant control of the extension program to local agencies. This, of course, is not to imply that there should be a relaxation of communication and contact with a central agency better endowed to coordinate the general function of the service.

To conclude it should be pointed out that the educational process is rather slow. The time needed to produce highly trained personnel is long and the creation of educational institutions for training is costly and demanding. One alternative may be the importation of education; this may save time by importing technicians who can be used to develop institutions, to train the needed personnel, or to take themselves the task of research and other activities.

While this is a possible alternative, it must also be considered that this alternative may prove to be inefficient

²⁸Theodore W. Schultz, Economic Value of Education. New York: Columbia University Press, 1963.

due to the fact that the imported technicians may not be at all familiar with the conditions of the country, and therefore may be unable to modify the techniques they know to cope with an entirely different set of conditions. It is not enough or wise, perhaps not even possible, to import a foreign system and try to implement it in a country essentially different than the one for which that technique was developed. Professor Montgomery's long experience with educational development in developing countries permits him to say:

No single system of extension, no transfer of an established system without adaptation will meet the requirements of an individual country. The approach to providing and improving a system of transmitting knowledge to farmers should be an analysis of the needs or requirements and then appraisals of principles, administrative structures, and procedures of systems effective in other countries.²⁹

Secondly, importing technicians may be very expensive and beyond the possibilities of a developing country and it must be carefully considered what is not only better but less expensive, to train its own technicians or to import them.

Development does not imply only technical training but also, and this is extremely important, a high level of general education to enhance the ability to penetrate the mysteries of the world and to understand the laws of social development. The objective in the last instance should really be to allow an ever increasing number of people to make, with a full

²⁹George Montgomery, "Education and Training for Agricultural Development," H. M. Southworth and B. F. Johnston, eds. Agricultural Development and Economic Growth. Ithaca, New York: Cornell University Press, 1967, pp. 166-167.

understanding of what they are doing, a searching appraisal of all that goes on in the country. No development will be meaningful unless the people participate in the political life of the nation. The creation of a new society does not admit aloofness from political activity. Finally, even though the need for changing the stress of education from the arts to the sciences has been recognized, it is nevertheless true that humanism must be at the root of education, it must create the sincere desire to work for the achievement of a society that enables the human being to develop and to achieve a place of dignity and complete realization of his potentialities.

CONCLUSION

In this report some of the problems faced by developing countries have been considered, particularly those which are a barrier to growth and development in agrarian countries where the achievement of better standards of living depends on the modernization of the agricultural sector.

Because of the complexity of the problems and the diversity of conditions it is not possible to come out with definite recommendations. In way of a conclusion, then, the following can be suggested.

It appears imperative that countries whose economies are basically agrarian should base their development on the important contributions that the agricultural sector can offer. In other words, the development process in these countries should be geared toward the realization of the potentialities for growth that exist in the primary sector. An industrialization program seems feasible only through the fulfillment of one important objective: achieving a substantial increase in productivity in agriculture to permit an expansion of the industrial sector and to be able to influence the currently adverse terms of trade. If this is accomplished, the nation will be able to use the scarce foreign exchange resources to develop its infrastructure and to finance basic structural reforms.

In relation to most Latin American countries, in particular, it has been suggested that a successful development of agriculture, and consequently of the economy as a whole, requires the reform of archaic land tenure systems which not only constitute a barrier to productivity, but also the reason for the majority of the population being kept in a condition of serfdom. It is essential for these countries to change old structures and bring their peoples into the mainstream of the political, social, cultural, and economic life of the nation.

Education is considered as one of the most important and necessary complementary measures for development. The educational process must be understood and implemented as a means to change attitudes, create incentives, awaken aspirations, and provide the necessary skills to cope with new conditions and meet new demands.

Finally, the means to develop must be found inside the developing countries themselves. Foreign aid and assistance cannot be expected to do the job which requires the complete dedication, sacrifice, and hard work which can only be supplied from within. Much is required of present generations and much will be required of future ones but it should be remembered that the achievement of progress is a demanding task which will have a meaning only insofar as it represents the collective effort of a people united by a common purpose and working toward the creation of a new society where dignity and justice can be found.

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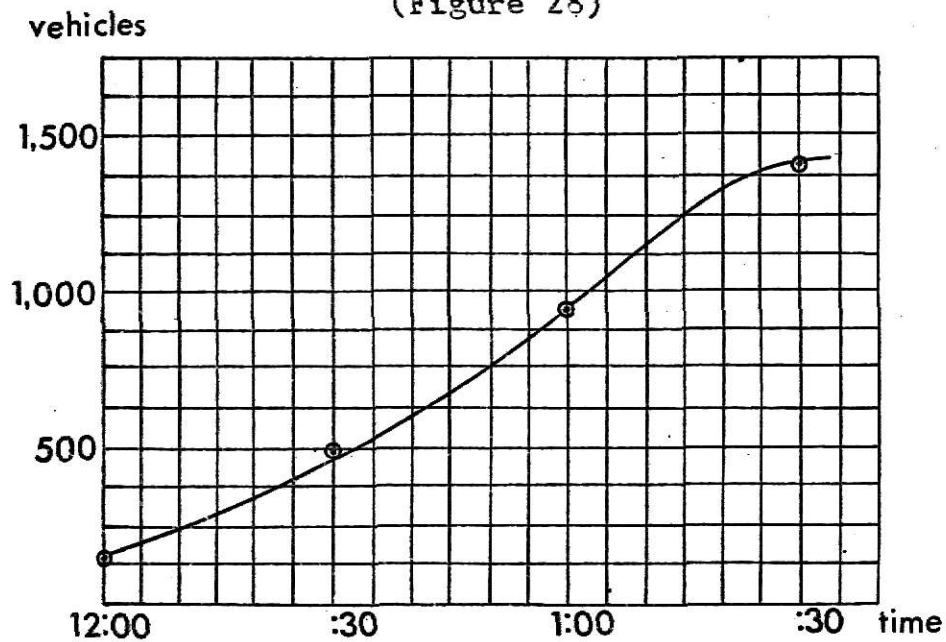
volume based on the four highest five minutes was found to be 1,267 veh/hr. The range was 923 veh/hr to 1,945 veh/hr.

The arrival periods were difficult to analyze. The limiting capacity of the streets and lot entrances caused the formation of sizeable queues. It was possible from the counts at the lot entrances and the increase in the queue length to begin to understand the true arrival demand for the facility. First the demand was on the streets east of the stadium. Nearly 1/2 hour later the demand was of equal intensity from all directions. The early demand corresponded to the general direction students would travel. This seemed to indicate the early student arrivals predicted in this study. Declarative statements on this and other assumptions made in the course of this study are of this study are difficult to prove or disprove because of the development of queues which had a clouding effect on the data collected.

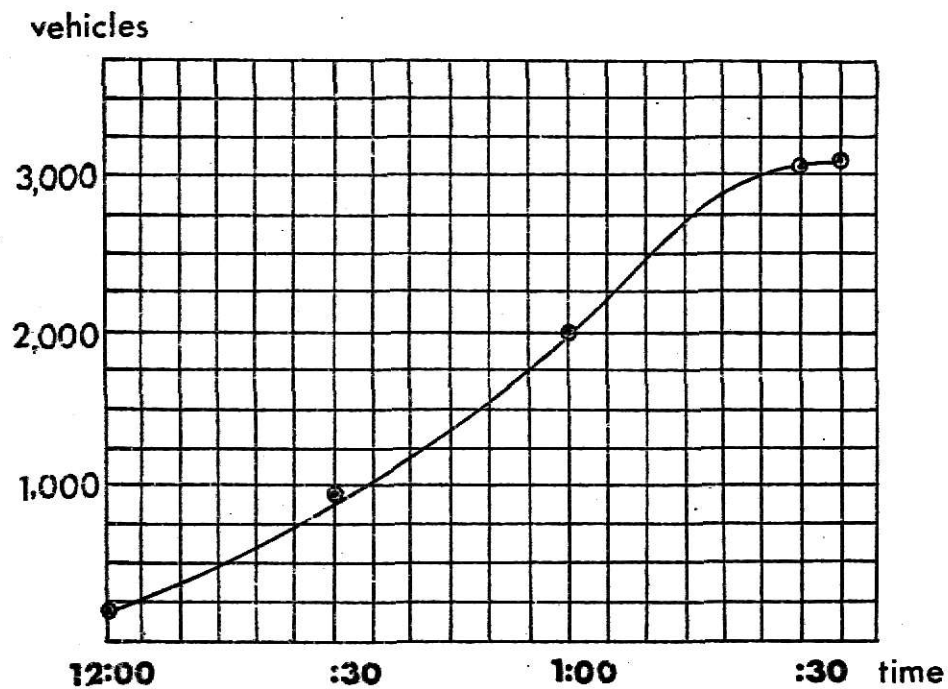
The following graphs demonstrate the cumulative arrival demand for students, non-students, and combined demand which takes into account the vehicles in queue.

(Note: The nearly straight line demand curve reflects the result of the queue buildup.)

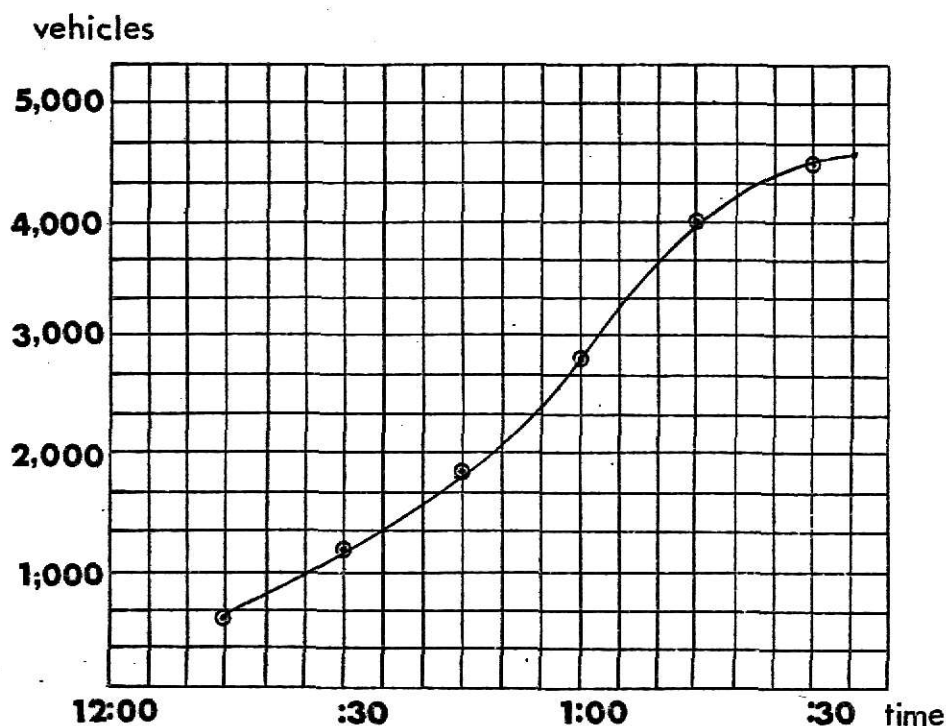
Graph of Cumulative Student Arrivals Taken
from the Lot Entrance Counts
(Figure 28)



Graph of Cumulative Non-Student Arrivals
Taken from the Lot Entrance Counts
(Figure 29)



Graph of Cumulative Combined Arrivals taken from
the Lot Entrance Counts and Queue Lengths
(Figure 30)



The data collected pointed up several problem areas. Of first importance was the use of buses. The stadium lot contained 4,500 vehicles with a capacity of handling 1,350 more vehicles. The surface street parking was utilized to some extent. Nearly 100 of the available 500 spaces were used. We had then 1,650 parking spaces that could be used with a greater crowd. With the above mentioned occupancy (3.23 occ/veh.) these extra spaces would generate 5,350 more patrons. If it can be assumed that the other modes will remain rather constant it is seen that with a crowd of 26,750 the lot would be filled and 6,600 vehicles would be using the stadium system. With a capacity crowd of 35,000 nearly 2,560

vehicles would demand access to the stadium without finding parking spaces. The point of this numerical exercise is to indicate the strong need for a bus service. Even operating under the redefined objective it is seen that good traffic movement can not be maintained without removing some passenger vehicles from the system. The best way to do this is by the promotion of the use of buses.

The low lot entrance rates plus the photos of the queue formation indicated that the manner of taking money and giving tickets was a major bottleneck in the system. It was important that this bottleneck be eliminated.

The final area of difficulty was the lack of full usage of the available facility. For instance Denison Ave. from Claflin Rd. to Kimball Ave. was not made one-way. Kimball Ave. at the intersection with College Ave. is five lanes wide yet it carried only one lane of traffic at the peak period. The result was a queue formation of 150 vehicles between College Ave. and K-113 along Kimball Ave.

This new information forms a new and sounder basis for developing alternatives. They in large measure reinforce the original recommendation.

In summary the following recommendations are made.

1. Strong emphasis on the use of buses. This includes the development of an exclusive routing system for their use.
2. Foregoing the use of tickets at lot entrances.
3. Better utilization of facilities, primarily a management problem.

SUMMARY

It is believed the foregoing study is a good although admittedly simplified example of the systems approach. However the simple principles given herein form a sound basis for approaching a more complex problem.

The importance of formalizing a system cannot be over-emphasized. In this example some of the feedback of the subsystems applied to the inquiry of other subsystems could have been carried out without a formalized process. While this is true to some extent in these examples it is not the case in studies of larger magnitude.

One of the principal reasons that the systems approach is gaining favor is that it is a natural means by which to develop designs directed at realizing planning goals and humanistic ideals. The idea of social impact as a subsystem is not often considered along with the other subsystems. It is possible, as was done in this study, to initiate the entire inquiry with an objective of design that describes the social impact of the design.

In a study of this sort it is rather hard to imagine a really "good" study that does not consider the needs of the people since it is concerned with the movement of people.

Growing out of the concept of systems approach is the idea of a systems design team. The systems design team represents possibly the first attempt ever to provide a truly

comprehensive design. The systems design team is a group of individuals with different backgrounds each lending his expertise to the design process.

The study just reviewed did not have a systems design team. It is important to note however, that an important part of the systems process is the awareness on the part of the decision makers involved as to the logic of the proposals. In this study it was important because of the large number of governmental units involved, state, county, city, and university that several meetings be held to explain the process, examine alternatives to subsystems, and make decisions.

In effect these meetings acted as a systems team. Each of the various representatives served as a perspective from the point of view of their constituency. These points of view served to broaden the scope of the design.

The ultimate guiding criteria for this study and indeed the systems approach itself is summed quite well by the following observation by Bertrand Russell.⁸

"In the welter of conflicting fanaticisms, one of the few unifying forces is scientific truthfulness, by which I mean the habit of basing our beliefs upon observations and inferences as impersonal, and as much divested of local and temperamental bias, as is possible for human beings. To have insisted upon the introduction of this virtue into philosophy, and to have invented a powerful method by which it can be rendered fruitful, are the chief merits of the philosophical school of which I am a member. The habit of

careful veracity acquired in the practice of this philosophical method can be extended to the whole sphere of human activity, producing, wherever it exists, a lessening of fanaticism with an increasing capacity of sympathy and mutual understanding. In abandoning a part of its dogmatic pretensions, philosophy does not cease to suggest and inspire a way of life."

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A SYSTEMS APPROACH TO THE STUDY OF THE TRANSPORTATION
FACILITIES SERVING KSU STADIUM

by

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It was the purpose of this work to examine the transportation facilities serving the KSU Football Stadium. This examination was directed toward providing a comprehensive transportation system to serve the stadium.

A secondary purpose of this work was to define and provide an example of the "systems approach" by which a design problem could be undertaken.

The systems approach used in this study was expanded from a problem solving process developed by the philosopher John Dewey.

It was recognized that the activities associated with KSU Stadium could be classified as special events. Special events, it was found, could take many forms; they could be political rallies, religious gatherings, various forms of entertainment. What characterized the gatherings was that they were infrequent in nature. This infrequency, plus the broad base of appeal from which they were able to draw, created massive gatherings of people. This gathering of people resulted in a crush on the transportation system surrounding the facility hosting the special event. Because of the complexity of this problem it was hoped that by using the systems process in this inquiry all variables relevant to the project under study would be examined.

The objective of the inquiry into the KSU Stadium transportation system was to develop a workable system that would provide appropriate parking and transportation facilities

Influencing the final development of the stadium system were six interlocking elements. The elements were:

1. Surface streets surrounding the stadium.
2. Modal split (i.e. the method of transportation chosen by stadium patrons).
3. The physical layout of the stadium parking lots.
4. Use of directional and traffic control signing.
5. Type and amount of information to be made available to public.
6. The management of interior lot traffic flow.

The development of these elements was constrained by the lack of time available to implement certain alternatives. Another constraining influence was the physical and social environment in which the system was to operate. Working within these elements recommendations as to the optimum course of action were made.

A survey of the more important variables was conducted during the first game. The information gathered in this survey was in turn used to re-evaluate the recommendations that were made.