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AGRARIAN REFORM & ECONOMIC GROWTH IN DEVELOPING COUNTRIES

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AGRARIAN REFORMS AS A CONDITIONING INFLUENCE IN ECONOMIC GROWTH

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The main purpose of this paper is to try to relate agrarian reforms to the process of economic development. The standpoint which is taken in this paper is that of the economist interested in determining the role which changes and reforms in the agricultural sector can perform as a means to the attainment of the end of economic growth.

The argument is developed in the following parts. First, the concepts of agrarian reforms and economic growth are examined and defined. The second part is devoted to the formulation of a conceptual framework borrowed from the theory of economic policy, which, it is hoped, clarifies the relationship between agrarian reforms as instrument variables and overall growth as a target variable. Third, the role and contribution of agriculture in economic growth is analyzed along theoretical lines with special emphasis on the interaction between the agricultural and the industrial sectors of a developing economy. It will be seen that at least three distinctive phases can be denoted in the adaptation of agriculture to the process of growth. The agricultural reforms most appropriate to each phase are discussed and analyzed and their contribution to economic growth assessed.

I. It is essential at the outset to define the main terms used in this paper. Following the suggestion of the NCLTRC seminar committee, agrarian reform is defined as: "Changes in rural institutions with the objective of improving rural levels of living. These institutions include those of holding and transmitting rights in land, allocating returns to land between owners and tenants, extending credit for land purchase, farm operation and improvements, taxing land values and land income, conserving and developing agricultural and other resources, marketing of farm and other products, broadening opportunities for educating and training rural people, and promoting rural health and welfare services."

In one sense, this definition is very broad, incorporating as it does a variety of means through which the goal of improving the rural levels of living can be furthered. In another sense, it is relatively narrow since agrarian reform in the above context is supposed to lead to the attainment of only one objective or end. In view of the various objectives for which agrarian reforms have been either proposed or implemented throughout history, it might appear that the postulation of only one objective--however broad--would tend to oversimplify the analysis.

The various means that are explicitly stated as constituting agrarian reforms are not all institutional in character, as the above quotation implies. Certain means such as public investment in fertilizer plants and irrigation schemes--which would presumably come under conservation and development of agricultural resources--are not structural or institutional changes in the same way as changes in land tenure. The term "reform" connotes changes in the foundations or institutions of an economy and is therefore exclusive of changes in quantitative means, or instrument variables, which are under the control of the policymaker and which do not necessitate changes in either the structure or the institutions of the economy.

In the conceptual framework presented in the second part of this essay, the distinction between agrarian changes within the structure of the economy and agrarian reforms implying an alteration in the structure will be elaborated upon. Similarly, the major ends of agrarian reforms will be examined and the consistency of the ends inter se analyzed. Given the subject of this paper--the influence of agrarian reform on growth--it proved essential to take some liberty with the definition recommended for the purpose of this seminar in order: 1) to distinguish clearly between the various types of agrarian means, 2) to determine the extent to which these means can lead to the attainment of predetermined ends, 3) to determine the extent to which the given objectives are mutually compatible, and 4) to relate more specifically, agrarian changes as means to economic growth as an end.

Economic growth is a very difficult concept to define if all its various dimensions are to be considered. It is possible, and it has become customary to agree, albeit arbitrarily, upon what constitutes an aggregate index of economic growth but clearly, the latter would only be a comparative static measure of the state of certain key variables in the economy at different points in time. What such an index does not reflect are the structural and institutional changes that interact to create a dynamic process.

Aggregate indices, such as aggregate real income or real per capita income or consumption, indicate at best whether growth has taken place; they do not in and of themselves tell us the changes in the structure of the economy (or the input-output matrix) that were both the cause and the effect of the growth process. A truly dynamic definition of economic growth as a process would necessitate the formulation of a theoretical framework which would permit the scientist to follow the paths of a large number of variables, reflecting the state of the economy over time. In the same sense as in the case of an ecological system, one might think of an ecosystem with a built-in tendency toward equilibrium once certain endogenous or exogenous forces have upset the natural balance. Economic growth would consist of the study of the impact of these exogenous and endogenous forces on the increased capacity of the economy to satisfy human wants. Some of the exogenous forces are under the control of the policymaker and can be used to set up a stimulus conducive to economic development.

At present, it is widely believed that at an early stage of development great reliance needs to be placed on the use of exogenous forces under the control of the government, such as public investment and agrarian reforms, to generate growth. It is only after a certain equilibrium position of the ecosystem has been achieved that growth becomes self-sustained and cumulative and that reliance on exogenous impetuses through central planning, for instance, can be reduced.

It would appear that the area of development planning is a first step in the integration of growth theory and the theory of economic policy. One of the purposes of this paper, as may be seen in what follows, is to push this integration further and make it explicit (at least methodologically), specifically with regard to agrarian reforms.

For the purpose of this inquiry, economic growth is defined very broadly as the changes in the economy that permit the creation of an increased capacity to satisfy the physical wants of individuals. As an index or measure of economic growth, aggregate output will be used, keeping in mind the following qualifications: (1) the rate of increase in aggregate output should be higher than the rate of population growth, so as to negate the possibility of a lower per capita output figure associated with a higher aggregate output 1/ and (2) the increase in aggregate output should not be accompanied by more than a specified worsening of the income distribution. 2/

II. The purpose of this section is to formulate a conceptual and operational framework within which agrarian reforms are viewed as means toward the attainment of certain given ends, and in particular, the objective of economic growth.

The rigorous analytical structure which Tinbergen designed in the area of the theory of economic policy will form the starting point of this attempt. The essence of Tinbergen's approach to the theory of economic policy can be summarized in terms of three basic elements:

1/ Under this definition, a decline in aggregate output, compensated by a larger decline in the size of the population (and thus leading to an increase in per capita output) is not considered as evidence of economic growth. The validity of this assertion could be debated. In any case, it is clear that the same assertion would not hold with respect to a sector (agricultural, for instance) of an economy.

2/ This could be done quantitatively by specifying a certain Gini-ratio on the basis of the Lorenz curve.

a welfare function, a division of economic variables in four classes, and a structural model. 3/ The first element of his framework is the postulation of an objective welfare or preference function reflecting the general interest of the people. To circumvent the difficulties inherent in any attempt at making interpersonal and intertemporal utility comparisons, as well as the possible intransitivity of the community welfare function, 4/ Tinbergen replaces the actual aggregate social welfare function of the community by that of the policymaker's preference function which normally would tend to coincide with the welfare function of the citizens. If this were not the case, the government (of the party in power) would be replaced in the next general election by a more representative slate. The objective preference function of the policymaker contains the ends of society, which are taken as given by the government. The elements entering the welfare function can appear either in the form of flexible targets (i.e., maximum output) or fixed targets (i.e., at least 97% of labor force employed).

The second element of this Tinbergen framework is the division of variables into four general classes. The exogenous variables, which are the data, are considered to influence the endogenous variables, which are the economic phenomena per se. There are two classes of data: (1) those over which the policymaker cannot exert any influence (other data); and (2) those under the control of the latter (policy means). The policy means under the control of the government can be further subdivided into (a) instrument variables, which are of a quantitative character and are used to adapt the economy to small and frequent changes in some of the other data. Examples of policy instruments would be tax rates, discount rates, and the foreign exchange rate, (b) structural changes, which are means altering the underlying structure of the economy, such as quantitative restrictions, built-in stabilizers, antitrust legislation, and allocation of public investment as between projects in a developing economy, and (c) reforms, which are changes in the foundations of the community in terms of spiritual values and the essential relations between individuals. Examples of these are voting rights, property rights, opportunity for education, and existence of some form of social security.

The next two classes of variables consisting of the endogenous variables in the theory of economic policy are: (1) the target variables, which incorporate the immediate goals of the policymaker. These target variables reflect the policymaker's welfare function. They can be either fixed or flexible. As was pointed out previously, the goal of full employment, for instance, could be stated in terms of a minimum level of employment, say 97 percent of the labor force, or in terms of maximizing the level of employment; and (2) the so-called irrelevant variables, which are the economic phenomena in which the policymaker is not primarily interested at the time of decision-making. In a sense, these variables are the side effects caused by changes in the means of economic policy.

The third major element of the Tinbergen approach consists of the specification of a system of structural relationships, reflecting the technical (i.e., production functions), behavioral and institutional relationships in the economy. The set of causal relations constitutes the "model".

If the period under consideration is relatively short (say 6 months), the structure of the economy can be assumed to remain constant and can be approximated quantitatively. The parameters (structural coefficients) of the behavioral demand, supply, and other relationships can be determined statistically (through least-square and multiple-regression analysis for instance), or on a priori grounds.

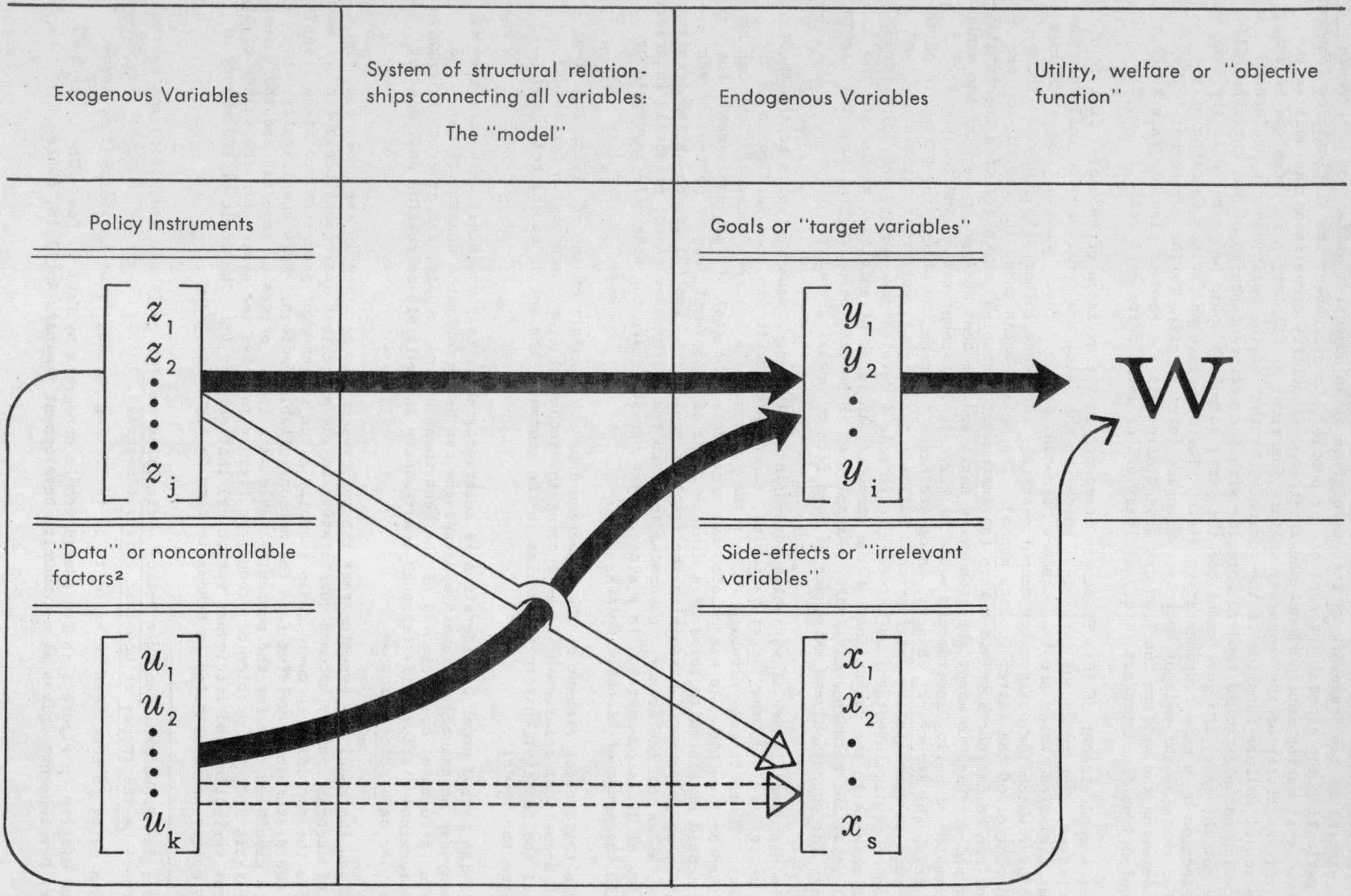
Given the model and assuming that the policymaker is operating in the short run, the problem of economic policy becomes quantitative in the sense that instrument variables are used to achieve the specified economic goals (usually given in terms of predetermined fixed targets) despite the disturbances arising from the noncontrollable factors. More specifically, once forecasts have been made for the noncontrollable data (i.e., prices of imports) and the values of the targets set, the problem of economic policy is to solve the system for the values of the instrument variables (and irrelevant variables) that satisfy it. The logic of the theory of economic policy is illustrated in schematic form in figure 1. 5/

3/ See: Jan Tinbergen, Economic Policy, Principles and Design (Amsterdam, 1956) and by the same author: On the Theory of Economic Policy (Amsterdam, 1952).

4/ This point is sometimes referred to as the voting paradox first established by Arrow.

5/ The diagram in figure 1 is reproduced from a monograph by Karl A. Fox, "The Concept of Community Development" (given at a Community Development Seminar, April 18, 1961).

The Theory of Economic Policy [1]



[1]Classification of variables based on J. Tinbergen.

[2]Not subject to control by the policy-maker or level of government that sets the goals and uses the policy instruments in question.

Figure 1

The use of quantitative economic policy has been pushed relatively far, particularly in the Netherlands and in Norway. In the former country, the Central Planning Bureau makes use of a system of 27 simultaneous equations relating the various variables. The structural parameters are revised at regular intervals and at least once a year.

When the means of economic policy alter the prevailing structure or foundations of the economy, the nature of the problem becomes much more complex since the model itself will be affected. 6/ Economic policy becomes a much more arduous and tenuous task, taking the form of qualitative economic policy and reforms. It will be argued in the third section of this paper that the goal of economic growth at a relatively early stage of development will require the use of policy means that will alter both the foundations and the structure of the economy. It is only after an economy has reached a fairly advanced stage of economic development that economic policy can become quantitative in the above-described sense.

A further characteristic of the Tinbergen approach that should be mentioned here is that the basic methodology can be applied, first, to any level of government--from regional to international--second, to the study of any sector or industry, and third, to any time period from short-run to long-run. The extent of the spatial, sectoral, or temporal partitioning would depend exclusively upon the nature of the economic policy problem under consideration. Similarly, selection of the targets and of the means (instruments, structural changes, and reforms) is done on an ad hoc basis consistent with the problem at hand.

The framework summarized above appears to be quite relevant and applicable to the study of agrarian reforms. It has the great merit--as was pointed out previously--of providing a conceptual frame of reference within which: (1) various types of agrarian means can be distinguished; (2) the mutual compatibility and consistency of the ends of agrarian reforms can be explicitly analyzed; and (3) the causal relationships between agrarian reforms, as means, and predetermined targets, and more specifically economic growth, can be established via the model. In the present context, the model should be conceived as a set of relationships linking the various economic variables. Even though these relationships could be quite sophisticated (which might be the case in a mature economy), in the case of most underdeveloped nations, the "model" would take the form of rough empirical input-output, cost-benefit types of relationships between agrarian means and policy objectives.

The first two steps are essentially of a methodological and taxonomic nature and will be discussed in the remainder of this section. Step 3, on the other hand, requires both a theoretical knowledge of the impact of agrarian changes on economic development, efficiency, distributive justice or whatever the aims of the agrarian reforms are; and some knowledge of the empirical relationships which prevail in a developing economy. Section III of this paper deals with the theory of economic development and the role which agrarian means can play in this process. 7/

Agrarian reform as a concept is open to a large number of interpretations and no widely accepted definition of it exists. The reason for this may be that this term is essentially an institutional and not an analytical one and that historically, it was defined on the basis of its components. As one author pointed out "Every reform must be suited to the culture that it is intended to serve. The success of an agrarian reform is to a large measure dependent upon the degree it can be made to harmonize with the cultural matrix and to adapt existing social and economic institutions to promote progress toward fulfilling the necessary conditions of economic development." 8/

6/ This might take the form of new structural coefficients or a different mathematical shape for the equations entering the model, or, additional variables and equations.

7/ It was the intent of the author, at first, to have an additional part devoted to an examination of a few empirical attempts at establishing quantitative input-output relations, using India as an example, to substantiate contentions made in Section III. Time being the scarce factor it is, prevented elaborate treatment of empirical relationships. Instead, a brief summary of sources and results is given at the end of the third section.

8/ J. P. Gittinger, Economic Development Through Agrarian Reform, (Unpublished Ph. D. Dissertation, Iowa State University, 1955) p. 238.

In any case, it appears that a breakdown of agrarian reforms into types of policy means might have some operational value, as will be shown subsequently, and would not be simply an exercise in idle taxonomy. Any classificatory scheme is to a certain extent arbitrary and the present is no exception to the rule (for instance, a few means can be classified under more than one heading). The following breakdown does not claim to be exhaustive, but it does include most agrarian policy means:

A. Instruments (essentially quantitative policy parameters requiring no change in the structure of the economy).

1. Changes in tax rates and in tax incidence, e.g., for and as between tenants and landlords, the agricultural and the industrial sector.

2. Direct or indirect subsidies, such as those on fertilizers, tillage equipment, and pesticides.

B. Changes in Structure

1. The introduction of price support and credit programs (it should be noted that a change in parities or support levels within an existing program would be considered an instrument).

2. The allocation of funds and facilities for research on improved seeds, farm management, fertilizer, etc.

3. Public investment in irrigation and fertilizer plants.

4. Public investment in social overhead capital (infra-structure), e.g., the building of intra- and inter-village roads.

5. Reclamation and settlement.

6. Improvements in credit and marketing facilities (the actual institution of these facilities where none existed before should be considered as truly a reform). These changes could take the form of publicly supported rural credit banks, state cooperatives, etc.

7. Education; larger public support of education , for example, higher salaries for teachers, subsidization of teacher training, school construction. (A change in the opportunities for education resulting from a change in the compulsory school age would be more in the nature of a reform.)

8. Extension service, which would include the dissemination of new information concerning farm management, farm technology, crop diversification, and adult education.

9. Training of rural population in the acquirement of new industrial skills.

10. Promoting rural health and welfare. 9/

C. Reforms (changes in the foundations of the economy)

1. Changes in the tenancy arrangements, relating to distribution of the product, (as between owners and tenants) terms of the lease, security of the tenants, water rights, etc.

2. Land redistribution; change in the property rights of various groups and individuals.

3. Land consolidation; reduction in fragmented and noncontiguous tracts.

4. Nationalization of agriculture; collective farming.

9/ Here again it should be noted that the actual institution of such programs--as opposed to changes within--alters the institutional setting of a country and is therefore a reform.

It is self-evident--but bears repeating--that the selection of agrarian means 10/ depends upon the objectives to be achieved. Therefore, an examination of the most important objectives (ends) which a society or a government may have in mind is relevant at this stage. An answer to this question involves specifying the elements entering the social welfare function of the community or the objective preference function of the policymaker. Tinbergen gives the following list of the major aims of economic policy in modern times:

(a) Maintenance of international peace.

(b) Maximum real expenditure per capita with "full" employment and monetary equilibrium.

(c) Improvement of distribution of real income or expenditure over social groups and countries.

(d) Emancipation of certain underprivileged groups.

(e) As much personal freedom as is compatible with the other aims. 11/

These, of course, are the broadest aims. For purposes of this discussion, it seems desirable to specify the principal objectives of agrarian reforms per se. A review of a number of reform acts indicates four major objectives: (a) productive efficiency, (b) economic growth, (c) greater equality in the opportunity to have access to and ownership of resources, in income distribution, and in status and security, and (d) justice, the rule of law, the elimination of exploitation. 12/ It is clear that the simultaneous attainment of all four objectives is only possible in a very limited way. Means designed to enhance the achievement of one objective may affect other objectives negatively. For instance, if some form of progressive taxation is used to equalize the income distribution, beyond a certain point the use of this instrument will affect growth negatively by reducing total private savings and ultimately capital formation in the economy. Another example may suffice to indicate the kind of conflict that may exist in the goals. The choice of investment programs in a densely populated, underdeveloped economy is a difficult one. The highest rate of growth will be achieved if the available resources are allocated to the investment program which leads to the largest increase in national income. Now the choice of the process will depend on the prices of the factors. If the actual market prices are taken as the relevant parameters, the choice of project will tend to be more capital-intensive than is warranted on the basis of the opportunity costs of factors. The reason for this is that the institutional wage rate (often akin to the subsistence wage rate) is higher than the equilibrium wage rate--which in a number of underdeveloped countries would approximate zero. On the other hand, the scarcity of capital and entrepreneurial ability is such that the prevailing profit and interest rates are often below their equilibrium levels (marginal value product). Consequently, the use of accounting or shadow prices reflecting the opportunity costs (equilibrium prices) of these factors provides a better criterion for the choice of investment projects and programs for economic growth than if market prices were used. At the same time, it might violate the static conditions of productive efficiency, which are determined on the basis of the market prices.

Therefore, whenever the ends are not mutually consistent or compatible, it is essential that relative weights be attached to the ends and that all substitution rates as between ends be stated (i.e., indifference for the policymaker as between an increase of one percent in the annual rate of growth and a 2-percent change in the Gini income-distribution ratio). 13/

In the absence of such quantitative (or even ordinal) weighting of the ends, it is difficult to formulate policies when at least some of the ends are competitive. 14/ Admittedly,

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10/ This term refers to the above list and is used instead of agrarian reforms to indicate that according to the taxonomic scheme used here, not all agrarian means are reforms.

11/ Tinbergen, Economic Policy, op. cit., p. 15-17.

12/ For an interesting discussion and interpretation of the objectives of agrarian reforms applied to a specific act (The Bombay Tenancy and Agricultural Lands Act) see Gene L. Wunderlich, The Bombay Tenancy and Agricultural Lands Act as a Means of Agrarian Reform (Ph. D. dissertation, Iowa State University, 1955) p. 83-96.

13/ Attempts that have been made to specify explicitly and quantitatively the elements, as well as the so-called barter terms as between elements, of the objective welfare function are few in number. For an interesting example applied to the Netherlands, see C. T. Van Eijk and J. Sandee, "Quantitative Determination of an Optimum Economic Policy," Econometrica, January 1959.

14/ If all the targets were complementary and the barter terms constant (thus independent of the level of goal achievement), the maximization of one of the ends would be equivalent to maximizing the objective welfare function.

some of the ends are essentially of a qualitative nature (i.e., justice) and thus not subject to quantification. Nevertheless, it is almost always possible to state whether a competing or complementary relationship exists between targets and to offer estimates--sometimes very rough--of the degree of substitutability between them. The least that a policymaker should be expected to state is a priority as between the aims, which in turn can be translated into the welfare function. Besides making possible a more rational choice of the means of economic policy, the specification of the welfare function in the above sense has the added advantage of forcing the policymaker to state his ends in such terms that the electorate can compare campaign promises (contained in the party platforms) to the actual goals pursued once he is in office.

It should be mentioned in passim that governments in power are not necessarily motivated by their own image of the welfare function of the community. Their main purpose may be to maximize the chance of being reelected and they will therefore behave according to some sort of "vote-fare" function. This vote-maximization function would entail a strategy by which policy means would be used as long as the total votes gained from this action were larger than the total votes lost. 15/ It would seem that this behavior pattern fits a number of land reform acts undertaken by newly independent countries, and it may help to explain the heavy emphasis which these reforms placed on distributive justice and equality as opposed to economic growth. At the same time, it does not appear that the welfare function and the "vote-fare" function would need to be too different. It is true that the latter would need to take into consideration the strategies of the opposition party, which could lead to short-run, essentially transitory, factors entering this function.

After this examination and classification of the policy means and major objectives of agrarian reforms, the remainder of this paper is devoted to analysis of the contributions that agrarian means can make to the end of economic growth. It is thus assumed that the other ends are of a subsidiary nature, unless otherwise stated.

III. The postwar period saw a resurgence of interest in the theory of economic growth that had been almost entirely ignored during the interwar period. With the advent of Keynesian economics, the change in the world conjuncture from that of stagnation and depression to growth and inflation, as well as the emergence of many newly independent nations, a number of theories of economic development appeared in the 1950's. The "big-push," "takeoff into sustained growth," "critical minimum effort," "balanced and unbalanced growth" were among many of the theoretical attempts at explaining the process of development and at constructing frameworks within which developmental policies could be prescribed. A complete synthesis of these attempts in the form of a general theory of economic development has not yet been produced. Nevertheless, there is a tendency in that direction, as comes out clearly from a study of the more recent literature. It is being shown increasingly that theories and theses which, at first glance, appear irreconcilable are in fact special cases (sometimes partial equilibrium) which can be fitted into a more general theoretical mold.

In analyzing the growth process of underdeveloped areas, it is customary to use a 2-sector model (agriculture and industry). It can be said--very succinctly--that the path of development consists of a general transformation from an economy characterized by abundance of labor and extreme scarcity of capital, and a very small modern industrial sector superimposed upon, and not integrated to, a large native agricultural sector (economic dualism), to an economy in which the proportion of the labor force employed in agriculture has become small (say one-fourth or less) and the two sectors have become integrated.

The Lewis treatment of development in terms of two sectors 16/ opened up a meaningful new theoretical framework that is most useful in assessing the role of agriculture in growth. Two recent attempts built upon Lewis's model performed the type of synthesis described above. 17/

15/ See A. Downs, An Economic Theory of Democracy, New York, 1957.

16/ See W. A. Lewis, "Development with Unlimited Supplies of Labour," The Manchester School, May 1954.

17/ See: 1) G. Ranis and J.C.H. Fei, "A Theory of Economic Development," American Economic Review, Sept. 1961 and 2) B. F. Johnston and J. W. Mellor, "The Role of Agriculture in Economic Development," American Economic Review, Sept. 1961. It is interesting and curious to note that both of these articles (appearing in the same issue of the AER) arrived at similar general conclusions after following quite different approaches.

Of particular interest in the present context is the fact that the general transformation from a rural underdeveloped economy to a developed industrial economy is analyzed by both sets of authors in terms of three distinctive phases which--although not coincidental--appear to overlap greatly. The characteristics inherent in each phase--corresponding to a certain stage of development--will be discussed briefly first. Next, the agrarian policy means most appropriate to each phase and most conducive to the general transformation will be analyzed.

If each phase is looked at from the standpoint of agriculture, the first phase would be called the stationary or stagnation stage, the second phase would be the takeoff stage, and the third phase that of commercial agriculture. Phase I is characterized by labor redundancy; it will exist as long as part of the labor force has a marginal physical productivity of zero. The institutional wage rate can be thought to be determined by the average product of the total labor force (including the redundant part) and can thus be assumed to be equal to the total agricultural output per capita. 18/ (At the beginning of phase I, the total population is assumed to be employed in agriculture.) Throughout phase I, the supply curve for labor in the industrial sector is infinitely elastic at the institutional wage rate since the opportunity cost of labor is zero. As agricultural workers are withdrawn and added to the industrial sector, a surplus of agricultural goods begins to appear. The reason for this is that since some labor is redundant, throughout phase I at least, total agricultural output remains unchanged as the redundant workers move to the industrial sector. At the same time, the total consumption of the remaining workers (the institutional wage rate x number of remaining workers) declines, since by definition their wage rate (= consumption) is assumed to be constant. The difference between the total agricultural output and the total agricultural consumption is the total agricultural surplus. This surplus can be viewed as agricultural resources released to the market through the reallocation of agricultural workers. Conceptually, the agricultural worker moving to the industrial sector during this first stage can be thought of as carrying over his own bundle of food (and consumption needs). Thus the transfer of workers from the rural to the industrial sector during this first phase, provides a potentially important source of domestic capital formation. In order for capital formation, as such, to be realized, the released (free) resources making up the agricultural surplus need to be embodied in the creation of capital or social-overhead capital goods in the industrial sector. This question is subsequently examined in some detail.

Phase II begins as soon as all of the redundant agricultural labor force has been absorbed in industry. The marginal physical product of labor in agriculture is positive and increases as additional workers leave the land. Throughout this phase, however, the MPP is less than the institutional wage rate. Thus, both phase I and phase II show evidence of disguised unemployment (MPP $<$ wage rate). The supply curve of labor in the industrial sector turns upward at the outset of this second period since the marginal agricultural surplus is declining, whereas it was constant before. The farmworker can now be imagined as carrying over to the industrial sector his own wage rate from which is deducted his foregone contribution to total agricultural output (his MPP). It is this increasing opportunity cost that turns the industrial labor supply curve upward. This phase continues until the MPP has reached the level of the institutional wage rate.

Phase III is truly the commercialization stage. The MPP of labor in agriculture is equal to or above the institutional wage rate, and the supply curve of labor in agriculture, which during the earlier phases had been infinitely elastic at the going institutional wage rate, slopes upward, indicating for each level of real wage rate the amount of labor that may be released from the agricultural sector. Since disguised unemployment has disappeared, the two sectors are fully integrated (economic dualism no longer exists), and market forces are allowed to operate. More specifically, market prices reflect opportunity costs and the allocation process can be made on the basis of these prices. The agricultural surplus--in the sense defined above--has vanished, and the wage rate in the industrial sector is determined on the supply side by the MPP of labor (the opportunity cost) in the agricultural sector.

The first phase is one in which the preconditions for takeoff--to use Rostow's terminology--have not been met. The concept of progress and the acceptance of the desirability of change are often foreign to the majority of the peasants at the outset of this period. Even when the goal of progress is desired, the great reluctance of changing traditional farming methods, indicating a high-risk aversion, provides an effective obstacle to the implementation

18/ The maintenance of this wage level is possible only under institutional or nonmarket forces since under competitive condition, the wage rate would be zero and starvation would result.

of change. In many respects, this high-risk aversion to new farm management methods is perfectly rational from the standpoint of the individual farmer, given the environment within which he operates. He must weigh the cost of a new method against the future net benefits resulting from it. In evaluating and estimating those future benefits, the farmer is greatly handicapped by his lack of knowledge and even when he is convinced that the expected value of the net benefits is substantially larger than their immediate costs, the distribution of outcomes around the mean is of great importance. It is sufficient to discourage him from the application of chemical fertilizer, for instance, to know that in, say, one percent of the cases the application of this fertilizer results in losses. The fact that this farmer is living on a subsistence wage prevents him from taking any risk (in terms of a new technology) that could lead to starvation (the marginal utility of a rupee lost is substantially higher than that of a rupee gained at the subsistence level). The position of the farmer during this phase can be compared to that of the gambler who knows that the odds are heavily in his favor but who is prevented from betting because of lack of funds.

It is probably during this stage that the most important changes in the foundations and the structure of the economy will need to take place since no endogenous forces appear to be at work in the direction of growth. In this sense, economic backwardness can be considered a quasi-stable equilibrium system and growth a disequilibrium system, as Leibenstein has pointed out. What is needed is to introduce exogenous stimuli that will provide a framework which will be conducive to growth.

During phase I, agrarian policy means can play an important role as a conditioning influence to growth. More particularly, a number of land reforms seem desirable. First, under most circumstances, a land-redistribution scheme from tenants to owners (C.2. in the list of policy means above) 19/ would improve the accretionary process, besides improving the efficiency of resources. 20/ It would give the actual cultivators the full exercise of managerial and operational powers. As Raup argued convincingly: "Agricultural policy for maximum growth in this phase of development would seem to call for the creation of patterns of production, consumption, and investment that will maximize the accretionary (capital formation) process." 21/ At the same time, a conversion from tenant-occupiership to owner-occupiership would improve the tax-collection problem since the link between the payments of taxes and public services received would become more direct under the latter system. (Raup points out that the landlords might be reluctant to pay taxes in order to contribute to the education of their tenants' children.)

It is clear that a number of complementary means should be provided in order to facilitate the accretionary capital formation of the individual owners and make use of the existing agricultural surplus during this phase. These means will be discussed subsequently.

An alternative reform to a redistribution of land consists of changes in the tenancy arrangements themselves (C.1.). Changes that would be conducive to growth would be a shift from share rents to cash rents for the tenants and a considerable lengthening of the terms of the leases, which would increase the security of the tenants and make the planning period longer.

This alternative would not in general be as effective an inducement to growth and efficiency of production as would the promotion of owner-occupiership, although it might have a greater positive impact on some ends of the welfare function. This would be true, for instance, if, under the end of justice the inalienable right of private property was deemed important. It is interesting to note that, as long as agricultural production takes place under conditions of constant returns to scale, a change in the size of the farm unit will not improve productive efficiency. Somewhat differently expressed, this means that a process of land consolidation and subdivision, i.e., through the breaking up of absentee landlords' estates, would not affect total agricultural output. Thus, here is an example of one agrarian mean (land subdivision) that would enhance the end of equality and leave the goal of productive efficiency unaffected. In the case of decreasing returns to scale, the reorganization of agriculture to include more

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19/ Letters and numbers next to agrarian means refer to the list given previously.

20/ For a theoretical discussion of the impact of different types of land reforms on the production function (and the efficiency of resources), see E. O. Heady, "Techniques of Production, Size of Productive Units and Factor Supply Conditions" (SSRC Conference, Stanford, Nov. 1960).

21/ P. M. Raup, "The Contribution of Land Reforms to Agricultural Development: An Analytical Framework" (SSRC Conference, Stanford, Nov. 1960), p. 16. This paper makes a strong case for land reforms at an early stage of development without specifying exactly at what stage. It seems that phase I in the present analysis would correspond to that stage.

and smaller farms would over a range permit the simultaneous attainment of the goals of equality, productive efficiency, and, indirectly, growth. It is only under conditions of increasing returns to scale that the strictly economic objectives of agrarian reforms are clearly competitive with the distributive ends. 22/

The evidence suggests that it is only in highly developed countries where agriculture is commercialized (U.S., Canada) that increasing returns to scale exist. The present meager empirical evidence in underdeveloped areas would suggest that production is taking place pretty much under conditions of constant returns to scale. 23/

To come back to the two land reforms suggested earlier as appropriate to phase I, it should be clear that the efficiency of each would be a function of its impact on the welfare function and specifically on growth, and its cost in monetary and nonmonetary terms. A program of land redistribution, to encourage cultivation by owners, would be more conducive to economic growth than a change in land tenancy. On the other hand, the cost of the former in terms of material and nonmaterial resources would appear to be larger. 24/ In view of the relatively scarce administrative resources available to governments of most underdeveloped areas, it would seem that a reform altering the tenancy arrangements would be more feasible. At the same time, the administrative costs of enforcing these tenancy arrangements would prevail over time, whereas in the case of land redistribution from tenants to owners, the costs of administering and implementing the reform (abstracting from the payments of compensation which can be considered to be direct costs) would not be spread over the long run. Thus, besides the total costs of these alternative programs, another element entering into the decision-making process is the distribution of costs over time.

It was mentioned earlier that the success of a land redistribution scheme was dependent on the implementation of complementary measures. This is equally true for a change in land tenancy arrangements. The most important of these measures in this first phase would seem to be the institution of an agricultural extension service (B.8.), which could take the form of a community development program. The aims of this extension service during this first period could be relatively modest, and consist essentially of the dissemination of simple information with the view of improving farm management on the assumption of only very slight increases in the resources available. The additional inputs could be fertilizer, tillage tools and equipment, seeds and pesticides made available to the cultivators at subsidized prices (A.2.). 25 / There is a strong presumption--supported by firsthand investigations--that improvements in productivity are possible with only slight changes in the input mix.

It was pointed out that as the redundant labor force moves to the capitalist sector during this phase an agricultural surplus is released. Potentially, this agricultural surplus is an important source of capital. In order to realize this surplus, the government should proceed on two fronts; first, it needs to provide or induce alternative employment opportunities in the nonagricultural sector to make the actual transfer possible, and second, it needs to siphon off the actual surplus (or part of it) by means of taxation to prevent increased per capita consumption (and thus a higher wage rate in agriculture). These measures--like the blades of a pair of scissors--can be successful only if they are undertaken jointly and in the sequential order stated above. The undertaking of public projects in social-overhead-capital areas (B.4.) mainly in irrigation schemes, rural roads, and schools would provide the necessary employment opportunities for the redundant workers, and direct taxation (A.1.) could be used to finance at least a part of the capital cost of these projects and more specifically the food needs of the transferred workers. The remaining capital needs could, to some extent, be met through foreign investment grants and aid (including U.S. surplus-disposal programs) from international agencies and public sources in the developed countries. The magnitude of these social-overhead capital

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22/ See Heady, op. cit., p. 16-21, for an interesting analysis of the relationship between "food production" and "other goals of reform" under various returns conditions.

23/ See 1) Heady, op. cit., and 2) E.O. Heady and J.L. Dillon, Agricultural Production Functions (Ames, 1961), Chapter 17.

24/ An index of the efficiency of a policy mean might be the ratio of the change in the objective welfare function caused by it to the cost of the policy mean in terms of material and nonmaterial resources. One of the costs of a land-redistribution scheme is the inflationary pressures that could be released by a land-bond compensation scheme. It is relatively difficult to devise a compensation scheme that would be both equitable and noninflationary.

25/ Extension services would become a much more important policy mean in phase II, as is shown subsequently.

(infrastructure) projects would depend upon the size of the redundant labor force. On the assumption that the truly redundant labor force (MPP = 0) forms only a small proportion of the population in most underdeveloped areas, the overall scope of these projects could be relatively limited. 26/

A number of agrarian policy means appropriate to phase I have been discussed and analyzed above and a final comment concerning their mutual compatibility seems in order. It was argued that a land-redistribution scheme would increase the link between benefits received and taxes paid and thereby improve the task of collecting taxes. Thus, some "external economies" exist in the use of certain policy means, the use of one improving the effectiveness and the efficiency of others.

Therefore, in conclusion, the best package of means during phase I appears to be a combination of land redistribution (with changes in land tenure as a less desirable alternative), direct taxation, investment in social-overhead capital, subsidies for simple agricultural inputs, and a modest extension service $\underline{/}\overline{C_2}$ (alternatively C_1), A_1, B_4, A_2, and $B_8\overline{/}$. (See Table 1 for a schematic representation of agrarian policy means and the process of economic development.)

The transition from the stagnation stage to the takeoff stage (phase II) is difficult--if not impossible--to discern in practice. Whereas in theory, phase II begins as soon as the MPP of agricultural workers becomes positive, turning the supply curve of labor in the industrial sector upward, "this shortage point" cannot in practice be established with any degree of precision. The implication of this is that in the formulation, execution, and timing of public policy, no absolute distinction can be made as between these phases. Certain measures might be undertaken at the end of phase I, instead of at the outset of phase II or vice versa. In general, an earlier institutional change might have some advantages since many policy means appropriate to phase I are also appropriate--usually with a greater intensity of use--to the takeoff phase.

Phase II is the crucial phase in the development process. Johnston and Mellor list what they consider the most important nonconventional inputs for increasing agricultural productivity. They are " (1) research to develop improved production possibilities; (2) extension-education programs; (3) facilities for supplying inputs of new and improved forms, particularly improved seed and fertilizers; and (4) institutional facilities for servicing agricultural production, such as credit and marketing agencies, and rural governmental bodies for fostering collective action such as building feeder roads." 27/

During this phase, the efficiency of resources in agriculture needs to be increased, with heavy reliance on new techniques (often imported from abroad) of a labor-intensive, capital-saving nature.

Historically, the impact of agricultural research (B.2.) during this period has been very great in some countries. 28/ The effect of this type of research is to move the production-possibility surfaces upward without a large change in the actual quantities of conventional inputs. Through the addition of small doses of nonconventional inputs and relatively minor changes in factor-proportion, agricultural output can be raised substantially. One major problem in agricultural research is that it cannot be imported in toto. It is true that innovations occurring in industrialized countries in terms of chemical fertilizers, improved seeds, etc., can often be used in less well-developed regions. Nevertheless, most of these innovations are made on the basis of the institutional and physical environment existing in these developed countries, where commercial agriculture prevails. There is truly no substitute for local agricultural research, starting with the existing physical-agronomic structure and developing innovations that are specifically applicable to this structure. It would appear that decreasing costs characterize research, so that the returns to research per unit of funds spent on research might increase considerably throughout this period and phase III. In any case, the absolute cost of research is small. The scarcity of trained agricultural researchers is--in the short run--an important bottleneck, but it can be overcome by an educational program.

26/ It will be subsequently argued that the scope of SOC projects will be much larger in phase II.

27/ Johnston and Mellor, op. cit., p. 584.

28/ This has been substantiated by Johnston for Japan, Taiwan, and Denmark. See B. Johnston, "Agricultural Development and Economic Transformation: Japan, Taiwan and Denmark" (SSRC Conference, Stanford, Nov. 1960).

Table 1.- Agrarian policy means and the process of economic development

Economic development phase	Characteristic features	Major objectives	Principal agrarian policy means appropriate to period and conducive to -
Phase I: Stagnation	MPP labor = 0 (Labor redundancy) Supply of labor in agriculture infinitely elastic at institutional wage rate Supply of labor in industrial sector infinitely elastic at institutional wage rate Economic dualism Preconditions to takeoff not met Existence of agricultural surplus	Distributive justice Equality of opportunity Economic development	Land redistribution (C2) Changes in land tenancy (C1) Taxation (A1) Social-overhead capital (B4) Subsidies (A2) Extension (B8) Reforms most important policy means
Phase II: Takeoff	0< MPP labor < institutional wage rate Supply of labor in agriculture infinitely elastic at institutional wage rate Supply of labor in industrial sector upward sloping	Economic development Productive efficiency Equality Justice	Research (B2) Public investment in social-overhead capital and farm implements (B4, B3) Education (B7) Extension (B8) Credit and marketing facilities (B6) Taxation (A1) Structural changes most important policy means
Phase III: Commercialized agriculture	MPP labor ≥ institutional wage rate Agricultural and industrial sectors fully integrated	Productive efficiency Economic growth	A number of instrument variables

The importance of education (B.7.) and investment in the human agent has been greatly emphasized in the literature recently, and it is not necessary to dwell on it further here. 29/ Extension services (B.8.) can be considered as a form of adult education. In a few presently underdeveloped countries, agricultural extension has taken the form of community-development programs. The attempts at setting up experimental farms, using farm management methods that differ from traditional methods might after some time trigger "demonstration effects" on the production side. It is still too early to evaluate the effectiveness of community-development programs of this kind in India 30/ and other countries, but the likelihood is that extension services can perform a major role in disseminating information and increasing the overall knowledge of the rural population. In this phase, the amounts of public funds allocated to extension services could be substantially higher than in the preceding stage. Two additional tasks under the supervision of the extension service might consist of training rural population to acquire new skills (B.9.), thus facilitating the transfer problem and promoting rural health and welfare (B.10.).

It was indicated earlier that the characteristic feature of phase II is that the MPP of agricultural labor is positive but below the prevailing institutional wage rate. Now, on the assumption of constant technology and population size (which were the implicit assumptions made in the model presented above) the transfer of farm labor from the agricultural to the industrial sector would entail the release of a declining agricultural surplus per worker. At the outset of phase II, the agricultural surplus of the first workers to move would be almost equal to their wage rate, but as more workers transferred their positive foregone MPP in agriculture has to be subtracted from their wage rate. At the end of the takeoff phase, the MPP of agricultural labor is equal to the institutional wage rate and the marginal agricultural surplus disappears entirely. Thus, under static conditions, the potential capital formation per worker is lower in phase II as compared with phase I and furthermore, declines reaching zero at the end of this second stage.

The assumption of static conditions--constant technology and population size--is relatively valid in phase I, but certainly they cannot be maintained in the takeoff phase. More specifically, it would seem that at least two counteracting forces are likely to influence considerably the 2-sector model and more specifically the size of the marginal agricultural surplus (the potential capital formation per transferred worker).

The first force would result from the improvements in sanitation, medical knowledge, and availability of drugs which would tend to reduce the death rate, thus leading to a substantial increase not only in the size of the population but also in the rate of population growth. It is obvious that this force would tend to reduce the agricultural surplus, since it can be assumed that the institutional wage rate prevailing in phase I is very rigid downward, being presumably close to the subsistence level. In a sense, part or all of the potential capital formation (the total agricultural surplus) is used up to feed the additional population.

The second force that is likely to take place during phase II is an increase in total agricultural output resulting from the measures undertaken during this period. Increased agricultural output will also mean a larger total agricultural surplus, as long as the institutional wage rate can be prevented from rising.

The net effect of these two forces on the size of the agricultural surplus during the takeoff phase depends upon a large number of factors. It is clear, however, that the more positive the net effect is, the closer the economy will get to the commercialization point and phase III.

The increase in population is usually related to the improvements in output and resource productivity. The absolute size of the labor force in agriculture is likely to remain very high throughout the takeoff period and not to decline. 31/ A relative decline in the share of the population in agriculture will, however, take place as the migration from agriculture to the industrial sector proceeds.

29/ See T. W. Schultz, "Investment in Human Capital" (Presidential address, American Economic Review, March 1961).

30/ The Ford Foundation is presently financing an experimental development program of this sort. The Ford Foundation has selected areas where the potentials for increased productivity are high and presumably it hopes to induce changes in production methods, by showing the results that can be achieved on experimental farms.

31/ See F. Dovring, "The Share of Agriculture in a Growing Population" (FAO Monthly Bulletin of Agricultural Economics and Statistics, Aug.-Sept. 1959).

During this phase, it is essential that new employment opportunities in the nonagricultural sector open up. Here again, public investment in social-overhead capital projects (B.4.) and specifically in irrigation and fertilizer plants (B.3.) would perform this task and at the same time contribute to the supply of strategic inputs that could raise farm productivity. Taxation (A.1.) will loom more important in phase II than in the preceding one. The agricultural surplus released by the migrating workers needs to be channeled into investment activities instead of higher consumption.

Finally, the development of a number of services is crucial in the takeoff phase. Credit facilities and improvements in the marketing structure (B.6.) appear to be structural changes that are possible in phase II and that will further the transformation process to commercial agriculture.

The most appropriate agrarian means in phase II would appear to be a combination of research, public investment in social-overhead capital, including irrigation and fertilizer plants, education and extension, and new institutional credit and marketing facilities, together with taxation /B.2., B.4., B.3., B.7., B.8., B.9., B.10., B.6., and A.1./.

The integration of the two sectors is achieved, and a relatively high degree of development is attained once the economy enters the commercialization stage (phase III). The structure of the economy during phase III is much less flexible than during the takeoff period, and changes are much more gradual. Whereas at the start of the general transformation, no endogenous force inducing economic growth existed, a number of growth factors have become built into the system in the commercialization stage. Economic policy can become quantitative in the Tinbergen sense (described in section II) and predetermined targets--such as a predetermined rate of growth of national income--can be achieved with the help of instrument variables.

The major problem the policymaker faces in the first two phases is the lack of specific empirical information concerning the quantitative (and sometimes even qualitative) impact of agrarian means on economic growth. Treatment of these empirical relationships is conspicuously absent in this paper. The amount of empirical work on input-output relationships, capital-output ratios, and, in general of the structural changes in an input-output matrix conducive to economic growth is still quite limited and subject to wide margins of error. 32/ The potential social contribution of empirical research in this area is undoubtedly extremely high and should have a very high priority in development planning. It is not an unfair appraisal of the state of development planning at this date to say that the refinement of the tools and methods used is in dire contrast to the quality of the empirical relationships and data used.

IV. The conclusions that follow from the preceding analysis can be stated briefly. It was argued that the methodology developed by Tinbergen in the area of the theory of economic policy provides a valuable framework in the examination of: (1) the various types of agrarian reform--considered as means of economic policy; (2) the various objectives of agrarian reform; and (3) the relationship between agrarian means and the end of economic growth, more specifically.

It was seen that three phases could be distinguished in the general transformation from an essentially stagnant rural economy to a well-integrated economy in which commercial agriculture prevails. As a broad generalization, it was shown that the agrarian means most appropriate to growth are likely to be land reforms in the stationary phase, structural changes in the takeoff phase, and instrument variables in the commercialization period.

32/ One interesting attempt at trying to maximize the target of national income over a 10-year period (1960-1970) subject to constraints and solving the model for those measures most conducive to this maximization process is contained in J. Sandee, A Demonstration Planning Model for India (India Statistical Institute, Calcutta 1960). Sandee uses a super production function for agricultural output of the following form:

$$O = 4.0f + (2.4i + 514) + (3.7e + 520)$$

where O = increase in agricultural output between 1960 and 1970
f = increase in the application of fertilizer between 1960 and 1970
i = irrigation projects executed between 1960 and 1970
and e = expenditures on agricultural extension between 1960 and 1970

In one sense, the complexity of decision-making throughout the process of economic development is inversely related to the administrative skill of the government. This can be stated somewhat differently by saying that the effects of the policy means available at an early stage of development are much more uncertain than at a later stage, while the administrative skill of the policymaker improves over time. The convergence of interests, however, would appear to be higher at an early stage so that the specification of the welfare function, at least, is a much easier task.

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