CHAPTER II The Essence of Programming

II 1 *Nature of General Programming*

From the discussion in Chapter I it will have become clear that a policy of deliberate development, to be successful, must satisfy a number of important conditions. Any action on a large scale requires careful preparation, and this is unquestionably true in the formulation of development policy. Preparation is of course a prerequisite to the numerous practical decisions to be taken by the technicians and organizers of the separate projects, but it is likewise needed at an earlier stage. To assure consistency and to avoid large-scale waste and disorganization, care should be taken that the component parts of the program form a coherent and co-ordinated whole. It is the purpose of general programming to see to this coherence and co-ordination. General programming has to supply a bird's-eye view of the pattern of future development of the country, and to show the possible and the most desirable development of the national product and its components, i.e., imports and production of the broad industrial groups, as well as its destination: exports, consumption, investment and government use.

Certain techniques, mainly of a statistical nature, including the use of mathematics, have been developed during the last few decades to arrive at the necessary estimates. These techniques will be briefly discussed in this chapter. But it must first be made clear that programming is not an alternative to common sense; it cannot replace

common sense and it should not. It does supplement it, particularly with regard to the orders of magnitude of the phenomena involved. In the design of development all information and all methods available should be put to use. This seems the more desirable since information of the traditional type, the usual statistics, is often insufficient and inconsistent. Anything helping to supplement it should be welcomed. The general methods now under discussion sometimes make it possible also to derive new insight from figures about other more or less comparable countries. Certain patterns of reaction, both in the field of consumption and in that of production, appear to show regularities which may be of help in forecasting possible development.

One of the most typical elements which programming is able to add to factual information may be called "consistency." The figures for the development of the individual industries have to obey a number of conditions of consistency. The total resources—land, capital, skilled labor—to be employed by them together cannot exceed the available quantities of these resources. Quantities produced have to be sold; in order that they may be sold their prices have to satisfy certain conditions; and these prices are dependent on the prices of land, capital and labor. Imports are needed; but they must be paid for by exports or by the importation of capital, and so on. The activities of certain industries have to be interrelated, since one uses the products of the other, or since both supply products to a third. Taxes collected by the government, together with loans and deficit financing, will have to cover the total expenditure planned. Programming tries to establish a set of figures satisfying all these conditions. If the provisional program taken as a point of departure cannot possibly be brought into line with such requirements, it will have to be revised. Large practical errors may be avoided if such revisions are made in advance and are not forced upon the policy-maker by unexpected events. This is what programming tries to avoid.

Apart from the element of consistency, programming also tries to give some guidance as to the *completeness* of the picture. It helps to reveal which elements of information are lacking and gives hints as to where to look for these elements. More specifically, it leads to inquiries as to where the particular skills needed and where the willingness to take initiative are to be found.

11 2 *Rough Outline of General Programming*

The aim of general programming is to arrive at a framework of figures for the possible development of an economy.

The possibilities for development are dependent on certain factors such as the willingness of the government and the people to make special efforts, on foreign assistance in the field of investment or education, and on a number of short-term factors, such as crop yields, world market fluctuations, etc. In order to show what influence can be exerted by changes in such factors it is often useful to draw up a number of *alternative programs,* each of them based on specified assumptions. The existence of an alternative program will be very useful if some of the factors turn out to be less favorable, or more favorable than was originally anticipated. This procedure of using alternatives may, in addition, be applied in order to illustrate the influence of uncertainties in some of the data. Each of the alternative programs will have to be calculated with the aid of the same techniques, now to be described. These techniques are based on certain relationships between economic and other phenomena which have been tested, to a greater or lesser extent, by statistical research, and on a number of basic economic "laws," with which an equilibrated economic development must comply. Usually a first outline is derived from "macro-economic" figures; this is then refined in a second, "micro-economic" program. A macro-economic program merely projects the development of such general totals as national income and outlay (private consumption and investment

and public outlay), imports, exports and imports of capital, and total national capital. A micro-economic program fills in this framework with figures in individual industries, and, as the case may require, on regions or even specific important plants.

The *macro-economic* program is usually based on a forecast of population over the period to be studied, say ten years. Both total population and active population are estimated. An assumption is then made as to the growth of productivity, i.e., product per active person. This assumption may play one of two roles. On the one hand it may be—since productivity is decisive for income per head—an indication of the development in material well-being it is desired to attain; on the other hand, it may be an indicator of what is assumed to be possible. Here the alternatives already discussed may have to be distinguished. Statistical experience has shown that over longer periods of time this growth has been rather stable, the most common figure, taking the average for all industries of a country, being 1.5 per cent per annum. There may be special reasons, e.g., in the case of the recovery of a war-damaged economy, to assume higher figures. Higher figures may also be used where the government proposes to make a special effort. In such a case it should be made clear, however, what the usual figure has been and to what extent a special effort is being demanded. Multiplying the "active population" figure by "productivity" will give the volume of gross product or "total resources available." It is these resources that will be available under the hypotheses made—indicating either the most probable rate of development or the most desirable one, or the rate to be expected if specified events occur.

A rough estimate of the volume of *imports* may then be made, based on the average import content of the country's product—an estimate which will have to be revised as soon as some insight has been gained as to the composition of future national product. With certain further assumptions as to possible capital imports, an estimate of the necessary exports follows. The question whether these exports can be sold and at what prices is an important element of program-

ming. The value of national resources minus imports equals national income and with the aid of tax rates and a savings rate it may very roughly be estimated how tax revenue and savings are likely to develop.

One vital problem may now be considered: will savings plus estimated capital imports be sufficient to raise the national capital to the extent required to attain the assumed national income?

The relationships which are relevant to this question have been dealt with in a concise and simple way by the introduction of the so-called *"capital coefficient."* Experience shows that, at least for countries, the ratio between investments and the resulting increase in net national income varies less than was long believed. Something can be said about its order of magnitude, although the margin of uncertainty is still fairly high. Or, to put it in a different way: there appears to be a fairly constant ratio between a country's wealth and its income per annum. For economies like the United States and the United Kingdom, ratios of about three to one have been found to obtain over a remarkably long period. It is often maintained that for new investments in underdeveloped countries a higher ratio should be expected, since there must be established a number of basic facilities which are relatively "capital-intensive" in most countries. On the other hand, there are examples (e.g., Mexico) of recent developments showing an even lower capital coefficient. It would seem often safe to assume that for development programs a capital coefficient of 4 is needed, but we will also consider the consequences of lower values, even down to 2. The historical record of any given country will be the best guide, provided that it covers a sufficiently long period.

The significance and limitations of the application of capital coefficients will be discussed somewhat more thoroughly in Annex v 1. For the moment the existence of a roughly constant ratio of this kind will be taken for granted. Its meaning is that the annual percentage increase in national income to be obtained from a program of investment of, say, 8 per cent of national income amounts to 2 to 4 per

cent. From a program of 12 per cent—an ambitious one for many countries—a 3 to 6 per cent annual increase in national income will be obtained. Now, the aim of development is not simply to increase national income but also to increase national income per capita and at a fairly fast rate. If there is an annual increase of 1 per cent in population, however, an increase of 1 per cent in national income does not increase income per capita. Several countries show population increases of 2 to 3 per cent annually. It follows that a rate of investment of 2 to 12 per cent is needed merely to maintain the level of income per head: 2 per cent in the favorable case of a 1 per cent population increase with a capital coefficient of 2; 12 per cent, however, in the unfavorable case of a population increase of 3 per cent with a capital coefficient of 4. With the assumed population growth of 1 per cent per annum, and an objective of an increase of income per capita at the rate of 3 per cent, which is modest if a real change is wanted, an investment program of 8 to 16 per cent would be needed. Even with a rate of growth of 3 per cent per annum it would take two decades before the average income of South Asia is brought to the modest level of Mexico's.

More generally, to raise income per head by 3 per cent a year requires an investment program of at least 2 and perhaps 4 times $(x+3)$ per cent of national income, where x is the rate of increase in population.

A study of actual figures for most countries discloses that the above analysis sets a lower limit to development programs which may well be, at the same time, about the maximum attainable in the short-run. For the numerous countries with a 2.5 per cent rate of population growth programs of 11 to 22 per cent would follow; for the principal countries in South Asia with population increases of 1 to 1.5 per cent, programs of 8 to 18 per cent of national income would follow, well above what has so far been possible. This underlines the urgency of the tasks ahead, not only for the governments concerned, but also for the international community as a whole. At the same time the figures presented illustrate, more eloquently

than words, the importance of checks on the increase in population. Any reduction in percentage population increase means a two- to four-fold reduction in the rate of savings needed to achieve a given rise in the standard of living.

From the examples cited, another feature of the process of development becomes apparent, namely, that small changes in the savings ratio, if it is modest, may either bring the country from a state of stagnation into one of development or the other way round. If a country's population is growing at the rate of 1.5 per cent a year, and if again the capital coefficient is taken to be 4, then a savings rate of 6 per cent means stagnation, whereas a rate of 8 per cent means an increase in income per capita of 0.5 per cent annually.

It may be necessary, even at this stage, to take account of the *time-lags* involved in the execution of larger investment projects. The relation between total product and total capital refers to capital in the form of productive equipment and stocks ready for use. Production of investment goods will have to start early enough to allow for the length of the production process. Accordingly, investment activity in a given year may be partly dictated by the capital needs in some future year. This is of particular importance when a long period of construction is involved as, e.g., in the case of large dams or mine pits. In the stage of macro-planning, it may be sufficient to adopt an average time-lag for all investment activity. Later on, in the stage of micro-planning, a more precise calculation, depending on the type of investment activity, will be needed.

The long time needed for the execution of certain investment projects is also reflected in the existence of a large volume of works in progress and commitments to finish them which considerably narrow down, in each year, the possibility of starting new projects. Only a relatively modest part of the necessary equipment and labor is released for such new projects.

A word may be added about the *statistical sources* to be used in deriving the coefficients needed in programming. Preferably as much information as possible should be taken from the historical

record of the country itself, provided that a sufficiently long period is covered. Coefficients on import content or capital coefficients should not be derived on the basis of a few years only, since there are considerable random fluctuations in annual figures. Averages over some ten years are often safer, since they also rule out possible cyclical influences. If no such figures are available, figures for comparable countries may be used; even comparability is not essential if general research has shown that there are no marked differences between countries. Certain statistical regularities are quite general indeed, such as, e.g., the distribution of expenditures over various categories or the capital coefficient. General though they may be, the coefficients are not too precisely known and their margin of uncertainty often is more important than their systematic variation from one country to another. This again stresses the desirability of working with alternative programs.

11 3 *Projection of a Country's Markets*

The next stage of programming, the "micro" stage, will then be reached, in trying to answer the question: what types of goods will have to be produced? This different question must, in principle, be considered from two angles, well known to the economist: "demand" and "supply." To begin with, we assume—for the time being that prices will not change. What then are the sales of the various classes of goods to be expected? There are two markets to be considered, home and abroad. Home demand derives from the increasing national income. We know something about how an increased income is spent: relatively fewer "necessities," more "luxuries." This tendency is international and indications can be derived, in this case, from foreign statistics. Numerous studies with respect to foreign demand are available, showing how increased foreign incomes are being spent. Of course, the "art" of such an analysis is to find figures that cover the most comparable groups of people in other

countries. And common sense, as has already been stressed, is always needed to correct any estimate.

Generally speaking, there are three sources of data on demand for final consumer goods. The first source is *family budget* statistics. These data are obtained from a relatively small number of families, which may mean a large margin of error; in addition, there will be a bias, to the extent that families willing to provide this information may have a spending pattern different from other families. Usually family budget statistics give a detailed list of the goods bought, and in this respect they are, in principle, complete. In addition, they give quantities bought or amounts spent for different income classes, showing the influence of income on demand. It must also be kept in mind that total demand for a certain commodity is exerted not only by "families in existence" but also by "families in preparation," i.e., engaged couples buying furniture, etc. Finally, there may be industrial demand and institutional demand (schools, hotels, shipping companies, etc.).

The second source for final demand data may be direct observation of *retail trade*. From this source, total demand for a country may be derived, without data on its distribution over different income groups.

The same is true for the third source of demand data, that calculated from *production, imports* and *exports* and, where appropriate, changes in *stocks*. In this case, the influence exerted by changes in income can be ascertained only by comparisons for different years (if national income is known year by year) or as between countries (if national income is known country by country).[1] The advantage of the figures of the second and third sources is their completeness: neither, and particularly not the third source, is based on samples, but each covers the whole of consumption.

[1] A continuous flow of new investigations is gradually narrowing down the uncertainties in our knowledge on the spending of income and also attempting to discover the similarities and dissimilarities between countries. An example is Colin Clark, *Conditions of Economic Progress,* 2nd Edition, London 1951.

The relation between income and expenditure over a period does not necessarily correspond to that revealed by family budget statistics. It may vary with time. Demand changes from year to year may be called short-term changes. If incomes fall there will, e.g., be a tendency to maintain demand for necessities and to reduce demand for luxuries and durables, which might be called postponable demand. Long-term adaptations of demand to a changed income will, however, also have to reserve some income for durables. It may be assumed that comparisons between demand of different income classes as found in family budget statistics, will reveal something about such long-term adaptations.

Market projections have some particular importance for arriving at a reasonable estimate of what is possible in the field of *import substitution*. In a growing economy, an increasing number of products, formerly imported, may be produced at home as soon as a sufficient volume of sales are reached by a plant of optimum size. This process of import substitution should, however, not diverge too much from what a reasonable international division of labor suggests, a point to be discussed subsequently. Substitution may take place gradually, as resources become available. For example, if wire is being imported, efforts may first be made to produce wire locally from imported rods; only at a later stage, when sufficient new capital is available, will it be possible for the rods themselves to be produced at home.

The most difficult part of the analysis comes with consideration of international competition. Thus far it has been assumed that prices do not change. This implies that the quantities demanded can be supplied at unchanged prices. Probably this is not true. Every country has particular industries in which production is relatively cheap, others in which it is expensive. This brings us to the cost side of the problem. At what prices can increased quantities be supplied? In principle, the individual industrial projects known to the administration have to supply the answer. To the extent that such projects are known, some provisional answer will be possible.

If the price at which a product can be supplied in future is higher than the existing level, demand will be less; if the price is lower, demand will be greater than was initially estimated. We have to know demand elasticities in order to tell by how much the initial estimates will have to be corrected. Sometimes we know these elasticities. Here again, international comparisons will be a useful source of knowledge.

Our knowledge both of possible future production costs and demand elasticity is very incomplete, however. The set of individual industrial projects available will, as a rule, not cover all industries and products. Some sectors may be fairly completely covered by the projects available, others only partly so or not at all. It may be wise to consider each type of sector separately. We shall have to supplement the limited knowledge derived from the projects by reasonable guesses, which will no doubt turn out to be to some extent erroneous. This state of affairs is not new at all, but merely confronts the programmer with the fact of "incomplete information" so familiar to employers. The production pattern must then be estimated; it should include all practicable possibilities for producing relatively cheaply and, in fields for which no cost figures are available, should assume expanded production in proportion to demand increases, as far as production factors are available.

The principle upon which the selection of the goods to be supplied rests is the well-known principle of comparative cost. Each country should produce the goods in which it has the greatest comparative advantages in costs. This will maximize national as well as international production, under certain conditions, to be sure. These conditions are discussed in Section IV 4, where commercial policy is considered. For the most appropriate choice of goods we may then rely on this aim of maximum contribution to national product. The resulting "tests" are discussed in Chapter III.

The elements so far presented lead to a fairly complicated mechanism of interdependencies, but do not give a complete picture of the complications. Two other important phenomena should be

mentioned. As already observed, export commodities must satisfy two conditions: they should be sufficient to meet import needs, (apart from imports of capital, etc.) and they should actually be saleable. Each new addition to production facilities itself requires production of the investment goods involved. If additional shoe production is needed, it must be preceded by construction of the shoe factory. This itself requires activity by the building trade and by say, toolmakers, and these activities must be inserted in the program. In addition, some time will elapse between the start of construction and completion of the factory. Such "time-lags" must also be taken into account, as emphasized in Section II 2.

The methods that may be employed to make up a program satisfying all the conditions of an economic and a technical character summarized thus far range from primitive trial-and-error to highly sophisticated mathematical techniques. Choice of methods depends upon experts and the nature of the data available. The annual programming of the British economy has been done with the aid of trial-and-error methods rather than mathematical procedures, whereas the latter have been more to the foreground in the Netherlands. Recently, Professor Frisch made use of some of the most modern techniques in advising on Indian development programs. Among the scientific tools he uses is the so-called "linear programming," a technique increasingly applied in private business. It is designed to establish production programs consistent with the requirements of inter-industry supplies. If a need develops for applying this technique, experts should be called in.

II 4 *The Role to be Played by Individual Projects*

As is self-evident, any pattern of future production must ultimately materialize as a set of individual projects, largely in the private sphere. Here we arrive at the very essence of the development phenomenon. One of the reasons why development has not been

achieved in a number of countries is the absence of sufficient spontaneous projects of the requisite kind. Development policy should aim at inducing private producers and investors to undertake them. The methods that may be used to bring this about are discussed in Chapter IV.

The role to be played by individual projects in making up the general pattern of development is to provide information, even if only scattered, on the costs of production of specified commodities. Two main difficulties are encountered by the programming agency. First, for the projects to be helpful at all, they must be sound. Their soundness will have to be tested. Secondly, they are too few and the question therefore arises whether they can be "constructed" with the help of general information of the type available to the programming agencies. The two questions are related. Part of the testing will consist of finding out whether a program "fits" in the general picture of the country's development. This requires consideration of the development of markets and the testing of cost estimates with the help of general information.

What has been said on *market projections* therefore also applies here. The possibilities and usefulness of this device may now be examined more closely.

The knowledge of demand and its probable development is of relatively little importance for the single small producer. To him market prices will be the most important indicator; if they imply a profit he will produce; if they do not, he will have to stop production sooner or later. The quantity of his own production hardly influences the market.

It is otherwise for a larger producer. His supply may very well influence the market and for his investment plans to be well-devised he will want some knowledge about future demand. Accordingly the number of large firms undertaking demand studies of their markets is already considerable and is increasing.

The same is true of production programs of countries as a whole. Even if production is in the hands of relatively small individual pro-

ducers the total of their product will often be important in relation to the market as a whole, and expansion beyond what the market can take would mean waste. On the other hand, the extent of the market will depend on the rise in income generally and hence it will be related to the program. As far as internal demand is concerned, it may even be argued that investments should be distributed among the various industries exactly as the increased income is distributed among the various goods demanded. Such an investment program for the home market might be called a *harmonious program*. Demand analysis can make a considerable contribution toward making a program harmonious. It may also help to strengthen confidence in a sustained growth of markets.

Although the international market is less influenced by production increases in any one country, there have nevertheless been numerous instances in which this influence has been marked. This is true particularly of raw materials which are produced in a small number of countries, such as jute, cotton, rubber, coffee, etc. Here, too demand analysis is very useful to the programming country.

Recently considerable progress has been made in the field of econometric demand analysis. Programming agencies may advantageously make use of the results. This type of analysis requires the recruitment of experts or subcontracting with institutes specializing in this field. These are to be found in a number of developed, as well as in underdeveloped, countries. Significant results can, however, now be obtained with the aid of more pedestrian methods. And common sense should, of course, always have the final word.

The *testing of cost estimates* is the most important aspect of the testing of individual projects. Costs vary a good deal more among countries and individual plants than do market developments. A distinction should be made between processes that are more or less the same everywhere and processes very much dependent on the particular factor endowments of the country. For the first category, a number of standard figures are available, such as the investment costs per ton of steel, or per ton of cement, the quantities of coke

per ton of pig iron, or of power per ton of aluminum. Still it should not be overlooked that alternative methods are often available, and that the choice to be made in an underdeveloped country does not necessarily coincide with the choice to be made elsewhere.

It is the second category of processes, those depending on factor endowment, that is much more variable. The essential problem for each country is to find out in which fields its comparative advantages lie. As a rule they will be related to geographical factors such as mineral deposits, quality of the soil, climate and transportation facilities. Particular comparative advantages will then show themselves in low costs of certain raw materials and of transportation. In certain cases a particular skill of the population may add to the advantages.

The only really satisfactory method of exploring a country's potentialities would be a systematic collection of the cost figures; this will as a rule not be possible in the short run, but might be kept in mind as a useful piece of research. Any such systematic ascertainment of cost figures implies a thorough technical exploration of production facilities and the collaboration of numerous technical experts. This aspect of the problem falls outside the scope of this report. In this field the role of the politician, the administrator and the general economist is a limited one. The importance of having accurate and many-sided information of this kind should, however, be recognized; to acquire it requires scientific and technical surveying and research in which the government would have to participate financially to a considerable extent.

The data needed on the cost side of an economic analysis relate, first of all, to the cost of producing a unit of the product or groups of products in question. To the extent that there may be differences between the costs of existing plants and of new plants, these differences or, more generally, the distribution of costs among the various enterprises involved should be ascertained. It should also be determined how costs vary with prices of the raw materials, labor and other means of production. This assumes knowledge of the quan-

tities of these means of production used, per unit of product. The degree of detail needed would depend on the degree of detail of the program: if say, only ten industrial groups were singled out, a sub-division of costs for each of these groups would of course be sufficient. A very important further datum would be the capital investment per person employed (cf. Annex v 1).

To the extent possible, data on alternative methods of production should be acquired, provided, of course, that such alternatives exist. This is not easily done. The importance of this knowledge will be further explained in Section IV 3.

II 5 *Avoidance of International Duplication*

The essence of programming is the avoidance of inconsistencies. One evidence of this, already noted, is the devising of a harmonious program as far as home markets are concerned. Expansion of exports should likewise be based on demand analysis, in this case for foreign markets. There might be still a danger of inconsistencies if two or more countries independently planned to expand the same line of production. Such unco-ordinated programs might result in over-production. Therefore it is desirable that duplication be avoided.

Sometimes bilateral contacts will be sufficient to avoid duplication in its most pronounced form. Although in principle it is a time-consuming procedure and rather haphazard, often it will be the most practical course to take. The arguments given in favor of programming do not end at national borders. Programming ought to be coordinated internationally. Without such coordination other types of duplication also occur, as for example, duplication in analysis. It is not very efficient for sixty countries all to be studying world market development to some extent. They had much better use as their basic data the results of a few centralized studies. These studies should bear on the probable development of world markets and some

of their determinants. The estimates should be based on a number of explicit assumptions as to population, productivity, weather conditions, general policy, etc., and possibly certain alternatives should also be presented. The studies might be undertaken by existing international agencies; in fact, they are already being made in some fields.

There should not be a monopoly in this field; much benefit may be derived from sound criticism and discussion.

II 6 *Types of Programming to be Applied Under Varying Circumstances*

The question may now be put to what extent the programming techniques to be applied must depend on the particular circumstances of each case. Although there is probably less need for differences in approach than is sometimes believed, it cannot be denied that the emphasis must sometimes be shifted from one element of programming to another, and that the outcome of the planning process is necessarily dependent on the characteristics of the given situation.

In what follows, some of these characteristics together with consequences for the program are illustrated.

1. Probably the most important factor is the *stage of development* a country has reached. In the earlier stages of development, the historical record will not provide much of a glimpse of future possibilities; the most important lines of production may still have to be determined and established and probably there is need, first of all, for some general facilities for which public investment is required. Detailed programming at this stage would hardly be appropriate, but a rough idea of the rate of development and the most characteristic comparative cost advantages of the country will be necessary. In the later stages, on the other hand, the probable course of development will be more clearly discernible and more diversified action

will be called for, distributed over more sectors and based on a more detailed type of programming. Accordingly, the content of the program will be different. In the early stages data on the costs and external markets of potential products will be important and those on the development of the internal market and its compartments of less significance. In the later stages a more precise study of internal demand becomes useful. The appraisal of some public investment projects will be very important in the early stages, while an effort to stimulate private projects in manufacturing industry should be postponed to a later period. It may even be simpler, in making the programming estimates, to start with the cost side, rather than with the demand side.

2. Another important feature of the economy is the degree of activity and initiative in the private sector. Where the private sector is rather passive, either more initiative must originate in the public sector, or other types of stimulation must be provided.

3. The type of programming needed will also depend to some extent on the particular *bottlenecks* with which the country is faced. They may either be general or specific in nature. The most important examples of the former are capital scarcity and scarcity of foreign currency. If *capital* is the bottleneck, every care must be taken to assure its most effective use. The supply of capital will be decisive for the rate of development found to be possible; preference will have to be given to labor-intensive activities and measures will have to be taken to induce investors to follow this preference. Such a situation contrasts with that prevailing in a country like Iraq, where there is now a surplus of capital and where other factors will therefore be decisive.

Another general bottle neck may be *foreign exchange*, and here exports take the key position. A distinction may again be made between situations in which exports are limited in variety and those in which they are diversified. If only one or a few products are decisive, the furtherance of these products ranks high in policy deter-

mination, and accordingly a correct analysis of the prospects for these products is of primary importance in programming.

Bottle necks of a more specific character are exemplified by a *transportation* bottle neck. In such cases, a road building program or the construction of harbor facilities would seem to be among the more urgent projects. Other examples are a scarcity of certain types of *skilled labor,* calling for training measures, or local scarcities of *dwellings,* requiring a building program.

4. A fourth important influence on the character of programming is to be found in the *general attitude of the people* with regard to government measures: the degree of public spiritedness and the willingness to cooperate, and in the quality of administration. Under favorable conditions more elaborate measures may be taken to further development in the private sector. Accordingly, more detailed research may perhaps then be appropriate. Thus it is conceivable that subsidies might be paid for employing workers in order to stimulate labor-intensive activities. This is possible only if the purpose of such a measure is understood and if the management of the enterprises and the administration of taxes is sufficiently reliable to permit this rather subtle type of regulation.

5. Finally, another factor which will necessarily influence the programming technique is the *quality and nature of the data available.* This will not usually be completely independent of the stage of development or the general level of education, but nevertheless it may vary as between countries otherwise comparable. Clearly there is less scope for the making of refined calculations if the data available are poor than if they are reliable and abundant. Nevertheless, there is a tendency to over-emphasize the influence of the quality of data on the type of programming required. More guesswork is needed if the data are poor, but the logic of programming is not necessarily different.

The same statement applies to the influence of circumstances as a whole on programming. While it is true, that as just indicated,

there is some such influence, it should not be forgotten that the basic logic of the development process is not different. It is the relative size of the sectors and their increase in time, and the relative importance of the instruments of policy, which vary and thereby change the practical appearance of the problems, but the core of programming, the attempt to arrive at a consistent picture of potentialities and desirabilities, does not change; neither do the fundamental relations between the main economic phenomena.