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REGIONAL PLANNING: SOME GEOGRAPHICAL CONSIDERATIONS OF OBJECTIVES AND PROCEDURES*

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1. Planned and Non-planned Development:

One of the implied purposes of regional planning is the imposition of man's will on the landsape, as crystallized in his decisions. Planning, therefore, aims at the formulation of co-ordinated and considered programs for regional development. It is evident that man's will is imposed on the landscape of a given area as forcefully even if his actions are not the result of prior planning. They result in non-planned development as the effect of not planned activities or non-co-ordinated planning.

In reality non-planned development occurs much more frequently than does planned development. Non-planned development is directed generally by one of the two principles: (1) Tradition—this is often a good guide for action as it represents the balance of trial and error, often over generations, as applied to a specific region. (2) Individual actions applied for convenience or gain.

Good development depends on a number of elements. (1) Definition of objectives to be achieved by regional planning. (2) Good basic data, incorporating reliable time-sequence series of the various elements involved, in order to allow the evaluation of trends. The provision of such data demands painstaking research and comprehensive work. (3) A fair range of alternative programs, each based on a correct and complete evaluation of the pertinent data. (4) Reasonable and fair decisions on development, including decisions concerning methods and proper stages of implementation. (5) Correct implementation.

Of these five elements, implementation is the decisive one. Decision making in general involves politics; it demands high professional competence and power of decision, normally under considerable pressure of time.

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*The essential part of this paper was presented as Summary of Symposium S 38, Problems of Metropolitan Growth and Planning in Developing Countries, of the 21st International Geographical Congress, at the Indian Institute of Technology at Kharagpur, West Bengal, in December, 1968.

Decisions in planning are essentially of a political nature concerning the course of action a community is to follow in a given field. These decisions must, therefore, not necessarily be guided by purely economic considerations. Sometimes political objectives will make it mandatory to follow a course of action which is not the most advantageous from an economic point of view.

2. The Influence of Regional Planning on the Geographic Environment:

There is, however, another aspect which should be considered binding on regional planners. By its very nature regional planning designs development to be enacted upon a given landscape. The ensuing development will be the interaction of man-induced activity and the geographic (or natural) environment. The design and appreciation of any program in regional planning must, therefore, be based on a correct evaluation of the mechanism of the natural environment and a very careful appreciation of the interaction between it and the plan for its development to be enacted.

No plan for regional development should be decided upon unless it has been ascertained that it will maintain a positive balance of landscape and enhance, or at least maintain, its productivity and habitability for future generations. Any regional plan the impact of which will bring about deterioration of the landscape to which it is to be applied should be disqualified as contravening one of the basic purposes of planning, i e., improving conditions in the planning region.

3. Social Frames for Regional Planning:

To the same extent that regional plans must fit the natural environment they must fit into the human and social environment to which they are to be applied. This requires different approaches to planning in different cultural and social contexts. There is, therefore, no one universally applicable set of principles for planning and no universally applicable planning procedure. Apart from the specific tasks set to a planner, or rather a planning team, all regional planning work is carried out within the double framework of a specific natural environment and a speeific social environment.

The differences of this latter frame are particularly stringent when appreciating the social and cultural habits of "western" and "eastern" societies respectively.

An important result of this is the limited transferability of Technical Assistance in developmental planning between different types of society. Development projects have to be so designed that they can be implemented by the community they are to serve. They, therefore, have either to be adapted to the existing standard of managerial and technical competence of the people who are going to operate the project, their working habits and the effort they are going to invest. Or else, performance above such standards has to be achieved by education and training *before* implementation of the project, or at the very last as project implementation proceeds. No greater error can be committed than implementing a development project beyond the competence of the population it is to serve. The many painful experiences of improper transfer of Technical Assistance should provide ample warning. This is true in particular for obvious reasons for attempts to apply aims, principles and procedures developed in "western" planning to populations who do not adhere to the western way of life or do not yet command advanced "western" techniques of technology and management.

4. Choice of Alternatives and Re-evaluation :

Planning is an applied discipline, not a theoretical branch of science. Two basic principles which apply to planning in general, do apply equally to regional planning.

A development plan is to achieve a certain objective, or one of a limited number of objectives, within a specific geographic environment inhabited by a specific population. There hardly ever is one possibitity only to design such a plan. The normal case is a number of possible alternatives to achieve the objective, none entirely satisfactory, each one with a different set of advantages and disadvantages. It should be one of the main objectives of the good planner to elaborate in detail an adequate number of alternative programs and present clearly the advantages and disadvantages of each of them. It is only full awareness of the advantages and disadvantages of each plan proposed which enables the body who has to decide on the implementation of one of the alternative plans, or a modification of it, to make their considered choice.

The second principle applies to implementation. Whilst a given regional development project is in the process of implementation—sometimes a rather lengthy stage—changes occur in the natural and specially in the human environment and, therefore, in their interrelation.

Proper implementation, therefore, requires permanent re-evalution of the project and constant adaptation of the plan to the changes occuring in the human and the natural environment, in their mutual relationship, and even in the objectives the project is going to achieve.

5. Failures in Implementation:

As stated above the criterion of planning is its applicability and implementation, not its theory. The worst possible working environment for a planner is, therefore, the one in which he can not implement his plans. This might be the result of either the lack of practical fit of the plan to the realities of the environment, or of non-co-operation or even obstruction of agencies or personalities whose co-operation is vital for implementation of the project.

Such inability to proceed with the implementation of a regional plan is fatal, not merely for the frustration it involves for the planner or the planning team, but much more important, because non-implementation of the plan does not arrest development of the project. Instead of benefiting of well-planned development it will undergo non-planned development, the result of inertia of a multitude of processes operative and of the multi-directional, uncoordinated and unconsidered particular interests of a varying number of groups and individuals. In short, the development processes will proceed unplanned, and the project will "get out of control" from the point of view of the planner. At such a stage the work of the planner becomes useless,—and with it the planner himself.

6. The Time Factor :

In every process of development time poses a decisive factor ; this applies to regional planning in full. The planner will consider it imperative that decisions concerning the plan to be implemented should not be taken before adequate data concerning the project have been assembled and a sufficient number of alternative plans for consideration been elaborated. But in actual fact the problem must be formulated exactly contrariwise, i.e., the planner has to work fast enough so that he assembles his data and based on these can present an adequate number of alternative plans for consideration of the decision making body to meet the necessities of *their* time table, not those of his own convenience.

Planning thus is always a high-speed process as it has to preceed decisions concerning the selection of plans and their implementation. There is no more difficult task than applying correctives of major extent to development in progress.

Still, in actual practice, there is but rarely time available to proceed with planning at ease, with one phase following the preceding one in an orderly fashion. Generally, planning is a high-pressure job, requiring and undergoing permanent re-evaluation and adjustment to changes in conditions and changes in objectives.

No planner should ever complain about the pressure under which he has to work or about the number of changes to which he has to adapt his plan. To do so only shows insufficient adaptibility on his part. Because in planning, as in smart business : "the customer is always right". The plan is not a theoretical objective of its own, it is to serve a specific practical purpose.

7. The Need for Good Planning :

As regional planning is to serve reality no compartmentalisation of the planning process is admissible. The elaboration of regional plans has to be comprehensive as it must give due consideration to all factors affecting the region, human and natural. This makes regional planning a rather involved affair having to consider a multitude of factors, different in their character, dynamics, reaction, adaptability, etc. To cope with all this, the planner will require a good command of methods of operational research and of management.

Irrrspective of all the difficulties involved, good planning is essential, and is becoming so increasingly. Here are some of the reasons. Modern technology has an increasingly powerful impact on the environment. This makes it mandatory that such impact should be beneficial, the result of well-considered planning, and not deleterious. With present increases of population the need for reasonable planning of land-use increases steeply. It is hard to envisage how man should be able to provide for his basic requirements unless land adequate in quality and and in area is available to provide for his needs in food, in water, in recreation, etc. Obviously, various uses require land of various quality ; the least elastic should be agricultural land-use. The best soils located in areas with the most favourable conditions of climate, water availability, drainage, etc. should be set aside ("zoned" in the planner's language) for agricultural use. The reason for so proceeding is that the higher the quality of agricultural land, as expressed by the factors mentioned above and others, the higher will be the yields. If the farmer has to contend himself with lower quality land his yields will be low and he will operate at a lower level of efficiency.

Unfortunately, in reality nearly the opposite is true. Farmland and farmers cannot compete successfully with urban land-uses, neither on an economic nor on a social basis. Wherever competition for land-use is developing, agriculture is deprived of those lands which are required for urban and industrial uses, irrespective of the agricultural quality of such lands.

8. Problems of Urban Development :

Increasing urbanization, a distinct characteristic of our time, presents us with additional reasons which make good regional planning mandatory, reasons of increasing urgency. Some items to illustrate this may be mentioned.

By 1900 there were 15 cities in the world with a population of one million and more. By 1960 their number had risen to 107 ; today a number of these approach ten million inhabitants or even exceed this figure [1].

Metropolitan life at such rates of human agglomeration is a new development and cannot rely for its function and administration on the tradition of many generations. Human concentration of millions in one city make it mandatory to develop technological and managerial system and procedures fitted to such sizes and densities,—and to abide by them. They are of a different order than the rules and procedures by which small and medium size towns functioned well. The planner, the politician and the public at large must be aware of this basic difference, or must be made aware of it.

This involves a great many practical areas, a few of which may be mentioned here without implying that they are of more importance than others. Metropolitan cities must be made to function as such if they are to operate satisfactorily ; i. e., they must be administered by one central metropolitan authority. Cases like Tel Aviv, the largest metropolitan city of Israel, which is administered by 17 municipal authorities, or Calcutta, India's largest metropolitan city, divided between 34 municipal authorities, are in fact cases of metropolitan maladministration.

The rapid growth of cities, the intricacies of real estate ownership and of conditions of tenancy, especially in residential quarters, promote conditions which create in most large cities under-used or obsolescent areas [2]. These impose an unjustified burden on the city by enlarging its

overall area without a parallel enlargement of the area in actual use. As a result part of the city's population has to travel daily over longer, unjustified distances, and transportatation and other municipal services are burdened with servicing these underused areas. Next there is the problem of increasing need for means of transportation in cities and with increasing affluence in many countries and increasing number of cars. Hardly any metropolitan city succeeds in enlarging its street area commensurate with the increase in number of vehicles. In most cities, as everyone is painfully aware, traffic congestion is getting steadily worse.

The two last items mentioned present the planner with tall order to keep cities in bounds and to spare the urban population, the burden of excessive travelling distances and conditions, however *excessive* might be defined in this context. In this connection the realistic and judicious use of taxation as a positive and directional tool to influence trends of development can be of great value, provided the metropolitan administration manages to apply it with judgement, discretion and determination.

As a last example reference may be made to a problem inversely related to urbanisation which is becoming increasingly common in rural areas. The growing rate of urbanisation in many countries is the result of migration from rural to urban areas, and to a considerable extent to metropolitan areas. Specifically, it involves a thinning out of population of villages and small towns, or at least the stagnation of these. Cities in general and metropolitan cities in particular undergo, therefore, increases in population which enable them to widen the range of services and amenities they provide. By contrast, those villages and small towns which undergo decrease in population find it increasingly difficult to maintain existing services and amenities. Less people have to provide the means for the existing area and the existing number of units and buildings, now more sparsely occupied. The result is often deterioration in services and in general regression of rural areas undergoing depopulation. Such regression is frequently absolute, not only relative as compared with the progress of active urban areas.

This is a process affecting many countries today causing serious regional imbalance. In severe cases the planner will have to consider steps for a planned withdrawal of population from areas of regression to spare them worse suffering in future. Obviously, it is much easier to plan such measures than to implement them.

9. Early Application of Planning :

Any type of regional development which by its very nature is destined to bring about improvement in the region is *inter alia* preconditioned by appropriate investment, often investment from public funds. Concerning the same object, such investment will in general be the heavier the later is the stage of development at which it is applied. The means to make a reasonable success of a regional development project if applied at its inception will be more modest than those required to apply correctives and redress a project which is in an advanced stage of development.

This principle becomes most evident in extreme cases, such as regional salinization of an irrigation project, or the need for rehabilitation of slum areas in cities.

10. Relative Advantages of Urban and Rural Environments :

Reference has been made repeatedly to the accelerating and expanding process of urbanization. This certainly has considerable advantages for the communities involved. But equally one cannot disregard the severe disadvantages involved in urbanization. Poverty and slum areas are a feature of most large cities. Social unrest, communal conflict and even rioting, as well as delinquency are becoming increasingly common in "Western" cities.

These features are by no means lacking in the social fabric of "Eastern" cities as well. It was assumed that in contrast to areas of temperate climate in the tropics, and especially in those of "Eastern" countries, urban places present a much healthier environment than rural ones [3]. The stark realities of the overgrown million cities of Asia [4] and Africa today make one wonder whether this assumption still stands up to the test of reality.

References :

1. Reference is to conurbations or metropolitan areas wherever data were available, not to municipal areas. The figures have been compiled from The *Statesman's Yearbook*, 1955, and from United Nations : *Demographic Yearbook*, 1963, (Table 6 pp. 231-259) respectively.
2. Reference is to such items as large areas of shunting yards or other areas occupied by railways in the past and no longer fully used today, to low density (often 1-2 story) housing in the interior parts of cities, or to houses but partly occupied.
3. P. Gourou : *Les pays tropicaux*. Paris, 1947, ref. p. 14.
4. T. G. McGee : *The Southeast Asian City*. London, 1967, Chapter 9.

USE OF SOCIO-ECONOMETRIC MODELS IN METROPOLITAN AND AGRICULTURAL REGIONAL PLANNING

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In the field of Regional Science, several techniques are presently available for analysing and projecting regional growth. The simplest method is the economic base theory. In this method all the activities in a region are divided into two groups namely basic or export activities and non-basic or service activities. It is assumed that the total employment in a region depends upon the employment in the basic activities. If the ratio between the total employment and the basic employment at a point of time or over a time series is known, then this ratio or the average of the ratios is used for projecting the total employment at a future date when the basic employment at that date is known exogenously. Given the estimated future population and employment, a planning program can be formulated with respect to land use, recreation facilities and other economic and civic activities. However, there are serious drawbacks of this simple base model [1].

An important direction of research in modifying the base model has been to divide the activities into three groups. The first group is called the *geographically oriented* industries whose locational factors are environmental. The second group is called *complementary* industries for which the main locational factors is the presence of other industries in the region. The third group is the *urban-oriented* industries for which the existence of the city is the main locational factor [2]. Regression relations are formulated between the population variable, total employment variable and three categories of employment and this formulation is used for projection of employment in the future. This model which was earlier applied on cross-section data for cities of different sizes of the U. S. has been later extended for lagged times-series with some modifications [3].

A method much superior to either of the two mentioned before is the regional and interregional input-output model. Here the activities are aggregated under a large number of homogenous groups and a flow

matrix is constructed to trace the source of all inputs coming to any industry in a regional from all industries in all regions. Then this matrix is used for projection purposes. Though this is an extremely efficient tool to project regional growth, it is expensive to operate and has many short-comings [4]. There are many methods such as Industrial Complex Analysis, Comparative Cost approach etc., supplementary to input-output by which some of these short-comings can be overcome and cost of operation drastically reduced [5]. In Regional Science, substantial work has been done centering base theory, input-output models and industrial complex analysis and other related fields.

But little work has been done in several potential fields. Here I shall only mention three. The first may be termed as regional history approach. In this approach, we look into the economic, social and political history of a region and identify the general pattern of its responses in the past when faced with new forces of change [6]. If exogenous changes in the future can be foreseen, then responses of the region can be predicted on the basis of past experience. It is true this method is quite subjective and qualitative but such a historical study together with a quantitative analysis can lead to more valid conclusions than the latter method alone.

A more quantitative form of the historical study may be termed as the regional economic development approach. Here we place emphasis on such concepts as Capital-output ratio, Saving-income ratio, population growth, resource and factor availability, levels of investment, allocation of resources, productivity changes and other economic and demographic indices pertaining to economic development of a region. Mathematical formulations involving these indices can be developed and conditions for optimum growth path can be determined [7]. Such models are appearing in increasing numbers in the literature, but most of them are on the national level. There are a few attempts to develop what can be termed as regional and interregional growth models. The best of such models to my knowledge is by Rahman [8]. Sakashita's [9] effort in this respect can also be mentioned. If such a regional and interregional growth theory can be developed, it can be integrated with input-output analysis. This will be a major contribution in regional science theory. Without such integration and synthesis, such growth models will remain as theories rather than as tools of developmental planning in spite of their mathematical elegance and sophistication.

Another potentially significant avenue of research in which there has been little work is the regional econometric model. An econometric model tries to relate several variables of an economy such as gross national product, consumption, investment, export, import etc., by means of a system of regression equations. The variables are classified into two types, namely endogenous and exogenous. An endogenous variable is one whose change can affect the whole system and which in turn is affected itself. For example, consumption is an endogenous variable which can affect Gross National Product (GNP) and other variables in an economic system and then in turn it is affected. On the other hand, the exogenous variable can affect the system without being affected itself. An example of an exogenous variable may be the investment variable. Although the regression relationships are formulated on the basis of microeconomic theory, the "usual procedure is to develop an aggregative model from a more global and less closely reasoned argument" [10]. The coefficients of the regressions equations are estimated from time series data using such models as single stage least square, two-stage least square, limited information and maximum liklihood methods. In recent years national econometric models are being increasingly available after the publication of Klein-Goldberger model [11]. In the field of Regional Science such econometric models are few. The work of Maki and Tu [12] cannot be termed as an econometric model although their growth model for rural areas development is an important contribution in Regional Science. It is just like a national model but a smaller area has been substituted for a nation. The same is true for Niedercorn and Kains' model. The model is "used first in an attempt to describe the structure of metropolitan development, and later it is used to evalute changes in spatial structure of large urban complexes" [13]. This model is definitely an outstanding contribution in the field of urban complex analysis but as mentioned before, this model does not have many spatial characteristics. The article by Ichimura seems to me is a significant contribution in this field [14].

All the above mentioned models can be improved in several respects. A regional growth model, unlike national models, should take into account sociological and political variables such as the age structure, sex ratios, migration characteristics, political opinions, and so on ; since these are very important factors on the regional level. The model can be made an *intraregional* one which will predict economic activity in subareas of a region as well. It is generally found that areas within a region (for

example, the towns in Calcutta's metropolitan region) are not uniform with respect to economic and other activities. Some areas are "sleeping areas" where people just live and not places of work, some are industrial areas specializing in some industries, some areas are business districts and so on. In some areas a typical group of people live whose demographic, cultural and political outlook may be quite different than those in other areas. The central city exerts its influence with varying degrees of intensity on these subareas through different types of transportation, social and political interactions. In short, a dichotomy is suggested with the central city and the rest of the metropolitan district as distinct units. Then an *intraregional* model may be constructed taking into consideration the influence of central city on meaningful subareas in the metropolitan districts. This model can be used for projection purposes of these subareas, the center city, and, consequently, of the whole region.

This will take into account the fact that the growth in any area is dependent upon the location of that area with respect to the center city, the type of people living in that area, the type of activities pursued, history of development of that area, and many other characteristics dependent on the distance of the subarea from the center city. Again, most growth models are based either on time series or cross-section data. There has been few efforts in combining the two to obtain more reliable estimates. This can be done without much trouble. For example, in the case of the primate city (say, Calcutta) a time series procedure can be used whereas the cross-sectional data (for this case, of towns) may be utilized for the estimation of growth of the sub-areas. Then they can be combined to get better estimates for the region as a whole. This will also avoid the difficulty due to the absence of data of the subareas on time-series basis.

In this paper, I shall outline four models which will bring out some of the points I am trying to make. The four situations considered are :

(I) Industrial Region in a Developing Country,
(II) Highly Urbanized Area in a Developed Country,
(III) Depressed Area in a Developed Country,
(IV) Agricultural Region in a Developed Country.

Case I : Industrial Region in a Developing Country —Calcutta Industrial Region.

This region, termed as the Calcutta Industrial Region (CIR) consists of Calcutta City and thirty-four towns. The importance of this

region for the economy of West Bengal and India as well need not be emphasized. The problems from which this region is suffering are also dealt elsewhere [15], and I do not want to repeat them. There is one point where there can be no disagreement. It is the need of comprehensive regional planning for this area.

In the planning problems of Calcutta, Demographic, Social, Political, Economic, and other factors are interrelated therein in a complex fashion. It is not intended to imply that the solution of these problems can be made only with the development of models of the types suggested earlier. But I do believe that these models embodying the diverse factors at work can help us to do the job better when accompanied by practical policies such as zoning regulations, transportation planning, housing policy, and so on.

The situation in Calcutta can be viewed from four angles which are nevertheless not independent. First, there is the question of Calcutta City itself. The prolems are of housing, transportation, health, employment, etc. etc. Next is the relationship between the towns in the metropolitan region and Calcutta city. Calcutta's problems are very much influenced by what is happening in these towns. For example, when we are considering the transportation problem, the scheduling of trains and buses from these areas to Calcutta greatly contribute to the overcrowding in buses and trains in Calcutta. Anyone who lives in the area knows the nature and intensity of this correlation.

The third level of analysis will be to relate other regions of West Bengal with Calcutta. Consider for example, the agricultural sector in West Bengal, Durgapur-Asansol region, Jalpaiguri area, and Calcutta industrial region, i.e., areas which determine what basically is going to happen in West Bengal. For each of these regions, we define a set of variables and collect data on them on time series or cross section basis. These variables need not be always economic. Social, political variables such as age structure, sex ratio, death rate, birth rate, social mobility, community participation, political opinion etc., should also be considered. I know it will be extremely difficult to find data. In that event, what we need is to collect data for a basic commodity say rice in the agricultural sector, coal and steel in Ansansol Durgapur area, tea in Jalpaiguri and jute goods in Calcutta. For each of these regions, an econometric model with several production functions, supply functions and consumption functions can be constructed and these sub-models are linked through transportation or some other variable. For example, the total amount

of cargo handled at Calcutta port will depend on the production of jute goods in Calcutta Industrial Region and tea in Jalpaiguri area. The number of wagons cleared at the Howrah yard is also an important factor in the production of coal in Asansol-Durgapur area. At this stage, the fourth level of analysis is called for ; namely, the relationship between the rest of the world (particularly rest of India) and Calcutta Industrial Region. Such an interregional socio-econometric model can be linked with an *intraregional* model of Calcutta involving such items as municipal income and expenditures of different types, community participation, intracity transportation planning, housing and so on.

I fully realize the model outlined above is overly ambitious. But that should not discourage us. We can always proceed through stages which our limited time and resources permit. I do not believe that the situation in Calcutta is hopeless as some would like to think. Sure, we are going to require a lot of money and it is scare. But even with the limited amount we can do better. What is needed is immediate attention to comprehensive socio-economic planning.

Case II : Highly Urbanized Area in a Developing Country —Philadelphia Standard Metropolitan Area.

The Philadelphia Standard Metropolitan Statistical Area (henceforth to be termed as Phila SMSA) consists of eight counties or districts. Five of these counties, namely, Philadelphia, Chester, Montgomery, Delaware, and Bucks, are in the state of Pennsylvania and the remaining three counties, namely, Gloucester, Burlington and Camden, are in the state of New Jersey. Each one of these counties consists of a number of townships or municipalities. These townships are the lowest levels of administrative area in Phila SMSA. These sub-regional areal units have a unique structure of its economy and its spatial interrelationships. This intra-areal differentiation grew out for different social, economic and political reasons. The forces of regional economic history also played an important part. The importance of political factors can be realized from the fact that Gloucester, Burlington and Camden counties are within the boudary of New Jersey state and as such governed by different tax laws and other public policies. The pattern of public expenditure and the planning objectives in these areas may be quite different despite their linkage with Philadelphia through spatial interaction. There are other areas in Phila SMSA which are favorably located in the eastern Megalopolis of U. S. and consequently are better

capable to share the growth of this highly industrialized region. On the other hand, Western countries have easier access to the resource areas of Pennsylvania and the rest of the U. S., and have definite comparative advantage for transport cost oriented industries. Other areas are located in such a way that good transportation network through highways and waterways are available so that movements from and to Philadelphia city can be realized quickly and economically. Some areas are specifically reserved for residential purposes with severe zoning restrictions. The people in these areas work in Philadelphia and it is extremely important to them what is happening in Philabelphia. There are areas in Phila SMSA which are dependent to a large extent on the defense and space contracts. So any cut by Federal Government in these expenditures is bound to affect the economy of these areas. When we consider Philadelphia city in particular the problem becomes more complicated and such factors as intracity transportation, housing conditions, distribution of population by different ethnic and economic classes, demographic features, zoning restrictions, labor force participation, availability of social and health benefits etc , become important variables to be considered in our model. The above statements were made to emphasize that in Phila SMSA, intraregional differences are important and any effort to construct a global growth model (such as input-output model) ignoring these differences is sure to lead to inconsistent and inaccurate projection. Besides, a micro approach of projection will be extremely useful for planning purposes with respect to such civic amenities as water supply, drainage etc. in a township or a county. Of course, two approaches can be integrated for testing consistency and also for the choice of efficient public policy.

As mentioned before, the most important macro model available for the projection of economic activities is the input-output model. Here the activities are aggregated under a large number of homogenous groups and a flow matrix A_t is constructed to trace the source of inputs coming from all industries to every industry. This matrix A_t is used to find activity level X_t as follows :

$$X_t = (I-A_t)^{-1}(C_t+G_t+E_t+I_t) \qquad \ldots (1)$$

where

X_t = vector of output levels by sector in year t
I = identity matrix
A_t = matrix of input-output coefficients, year t
C_t = consumer expenditure

G_t = vector of exogenously determined expenditure by federal, state and local governments

E_t = net exports (or exports minus imports) by sector in year t

I_t = vector of investment outlays

If for a future date say 1985, the goals of final demand, i. e., of consumption, investment, and government expenditures are stipulated then from equation (1), we can find the required levels of activities necessary for the achievement of the final demand goals. As is clearly seen, this method (besides having other limitations peculiar to input-output) assumes away all intraregional differences.

An alternative method of approach will be to divide Phila SMSA in smaller areas, say counties or townships and write down the names of each economic activity for every areal unit. Then the industries are aggregated under following groups :

(1) Local industries where level of activity is completely determined by local factors only. These activities exist only because people are there. Activities such as retail trade, repair services, etc., are included in this category. The symbol for this group is E_L. (2) National industries whose level of activity is determined by such national variables as gross national product, gross business receipts, steel production, automobile production, federal income tax, investment, effective demand, etc. The symbol for this group is (E_N). (3) Defense and space industries whose level of activity is determined by the defense and space spendings of federal government ; (E_D) is the symbol for this group. (4) Philadelphia-Oriented manufacturing. This employment exists in any subarea only for the existence of Philadelphia city. Then symbol for this group is (E_{PM}) mainly olive-collared jobs. (5) Philadelphia-oriented non-manufacturing employment (mainly office employment, white collared jobs). The symbol for this is (E_{PNM}).

The Model :

For the local industries, we have the following equation :

$$E_L^S = f(p^S, A^S) \qquad (2)$$

where

E_L^S=local employment in S-th subarea

S=1, 2, ... n. In our case n=8

p^S=the population of S-th subarea

A^S=an index of accessibility of S-th subarea to Philadelphia city

where

$$A^S=\sum_{j=1}^{k}\frac{w_j(m_j^S)^a}{{}^dS_p^b} \tag{3}$$

where m_j is the magnitude of local service facilities in S-th subarea for j-th service, ${}^dS_p$ is the time-distance between Philadelphia and S-th area, w_j is a weight for j-th service, a, b are the parameters; w_j, a, b are to be derived from other information. The value of these parameters will change for different SMSA. Similarly the sum

$$I^j=\sum_{S=1}^{n}\frac{w_j(m_j^S)^a}{{}^dS_p^b} \tag{4}$$

can be taken as our index of accessibility of j-th activity to Philadelphia for all the subareas in Phila SMSA. And finally the sum

$$I=\sum_{j=1}^{k}\sum_{S=1}^{n}\frac{w_j(m_j^S)^a}{{}^dS_p^b} \tag{5}$$

can be taken as an index of accessibility for Phila SMSA. We can calculate the same thing for other cities and make a comparison.

The accessibility factor A^s will change over time. Since intra-metropolitan highway construction will change ${}^dS_p$ and diseconomies of scale in Philadelphia city, its high land values, zoning regulations, etc. will also change m_j^s. In the equation (2) instead of taking the population p^s as the only demographic variable, we can take rate of growth of population, migration, age structure, etc. Another important variable will be the per capita income for which data are not available on smaller areal units.

The equation for national industries can be written as

$$E_N^S(t)=f\{E_N^{US}(t),\ E_I^{US}(t),\ E_A^{US}(t),\ H_T^{PH}(t)\} \tag{6}$$

where $E_N^S(t)$=employment of the S-th subarea in national industries in the time period t

$E_I^{US}(t)$=U.S. employment in iron and steel industries in time period t

$E_A^{US}(t)$=the employment in the automobile industry in the U.S. for the time period t

$H_T^{PH}(t)$=the share of Philadelphia SMSA's employment to U.S. total

in the time period t. If from some other services the values of the variables on the right-hand side of equation (6) can be predicted, projection for $E_N^S(t)$ can be made for say 1985.

Instead of taking such a gross variable on national industries we can break them into the following groups :

(*a*) industries whose locational factors are such that they can be dealt with comparative cost approach.

(*b*) industries which can be dealt with industrial complex approach.

(*c*) complementary and ancillary industries.

Each of these groups of industries can be treated via regression or other methods and then a combined estimate of E_N^S for each area in the future can be obtained.

The defense and space industries can be treated as

$$E_D^S(t) = f[D^{US}(t),\ D_p^{US}(t),\ Q_D^S(t)] \tag{7}$$

where $E_D^S(t)$ is the employment in space and defense industries in S-th subarea in the time period t. $D^{US}(t)$ is the U.S. defense spending in the time period t. D_P^{US} is U.S. defense contract to Philadelphia in the time period t. $Q_D^S(t)$ the location quotient of S-th subarea and t-th time period. If from other sources, the values of the variables on the R. H. S. of (7) can be predicted then the projection for $E_D^S(t)$ for a future period say 1985 can be made.

For the Philadelphia-oriented manufacturing employment we have

$$E_{PM}^S(t) = f[E_M^P(t),\ \ C_p(t),\ \vec{F_M^{US}(t)^p}] \tag{8}$$

where $E_{PM}^S(t)$ is the employment in the Phila-oriented manufacturing employment in the S-th area at the time period t, $E_M^P(t)$ is the manufacturing employment in Philadelphia city for the time period t, $C_p(t)$ is the consumption expenditure in Phila in the time period t and $\vec{F_M^{US}(t)^p}$ is the flow of manufactured goods from the rest of U.S. to Philadelphia in the time period t. If from other sources the nature of functional relationship is known, then for given values of the variables in the R.H.S. of (8), the employment for Phila-oriented manufacturing industries can be found from (8).

In the case of non-manufacturing employment, we have

$$E_{PNM}^S(t) = f[E_M^P(t),\ T^{S\to P}\ P(t),\ E_W^{US}] \tag{9}$$

where E^S_{PNM} (5) employment in non-manufacturing Phila-oriented industries in S-th area at time period t, $E^P_M(t)$ is the employment in the manufacturing industries of Philadelphia in the time period t. $T^{S \to P}$ is the time-distance from S-th area to Philadelphia, $P^P(t)$ is the population of Philadelphia at the time period t and $E^{US}_W(t)$ is the U.S. employment in white collared jobs in the time period t. If the nature of the relationship and also values of the variables on the R.H.S. of (9) can be known, $E^S_{PNM}(t)$ can be predicted from (9).

When the employment figures for each one of the categories is known for a future date, the total employment

$$E^S(t) = E^S_L(t)+E^S_N(t)+E^S_{PM}(t)+E^S_D(t)+E^S_{PNM}(t) \tag{10}$$

Summing $E^S(t)$ for all S, we can find out the total employment figure of Philadelphia SMSA. We can compare the employment figures with those obtained from (1) using employment-output ratio for the economy as a whole.

If there is any discrepancy between these two figures, we have to adjust the final demand figures such that there is a balance between what is required as final demand and what the region can produce. Then following Isard and Czamanski's [16] paper, the investment figures in each of the sectors (i.e., I_{cc}, I_t, I_a, I_w, I_h) can be obtained.

When the employment figures for each of the subareas have been obtained the population figures can be obtained from

$$P^S = f(E^S) \tag{11}$$

when the population figures are known, the required demand for housing units can be obtained from

$$H^S = f(P^S) \tag{12}$$

Similarly we can find out the requirement of water resources, open space, hospital facilities, school enrollment, etc., for each of the subareas in the future, via suitable regression relations.

The above discussion is just a sketch. Each equation may include other variables which may be thought appropriate at the time of operation of the model and for which the data are available. An important distinction between this model and Isard and Czamanski's model may be noted. Their model contains many variables such as regional income, investment in different sectors, number of households, average construction

costs, etc., for which the data for smaller areas are practically impossible to get. In that sense, our model is more operational than their model.

Case III : Depressed Area in a Developed Country —Nova Scotia, Canada [17].

In recent years, there has emerged a new kind of underdevelopment in the midst of affluence of highly industrial countries—baskets of poverty which could not compete against other areas due to locational or other disadvantages.

The Province of Nova Scotia in Canada is a good example. It was once a prosperous area, but now it can definitely be termed as a declining region where the per capita income is much below the national average. Much of the income generated in the region is the result of central and provincial subsidies. The problem is to identify a set of policy variables and determine their levels so that the values of some target variables can be achieved. This has to be done taking into consideration, the rate of growth of the economy in Nova Scotia, its inter-industry connection, its relation to the rest of the world.

This model [17] should be a bit different from the normal econometric type model where short run cyclical functions are of prime importance. In contrast, this can be termed as planning model where the objective is to find the values of instrument variables which would maximize the welfare function or attain some targets.* For this purpose, given the dimension of some target variables, the requireded value of the instrument variables and intermediate variables through which the instrument variables will act to achieve the targets will have to be found out.

Case IV : Agricultural Region in a Developed Country —North Altantic Region in the United States.

Most of the techniques in Regional Science have been devised to attack problems of an industrial region particularly for a western country. If we want to apply them for agricultural countries or for agricultural regions, they should be properly modified. New techniques for agricultural regional planning can be developed. Such factors as quality of the

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[For a Clear understanding of the Problem Involved, Please see J. Tinbergen : Economic Policy, Principles and Design].

soil, pattern of ownership, fertilizers, irrigation facilities, market size, transportation network, weather conditions etc., become quite important. Here is a field where Indian Regional Scientists can contribute to a large extent.

The case for an agricultural region in the midst of a highly urbanized region as in the North Atlantic Region of the U. S. presents an interesting problem. The North Atlantic Region in the U. S. is unique in at least one sense. Agriculture is becoming less important in this area and there is a tendency for sub-regional specialization, namely, dairy products in New England ; poultry in Delware and Maryland, etc. On the other hand, the region is becoming more and more urbanized. Although agriculture still occupies a considerable amount of land, it is competing with the ever growing demand of the exploding urban centers for new housing, industry, highways, roads, recreational facilities and other urban amenities. To the farmer, the spreading urban centers present a vast market with immense purchasing power. He is in a dilemma whether to sell the land as real estate or use it for agricultural purposes. The growth of urbanization not only poses a serious problem to the agriculturists but also to the urbanized areas themselves. When the empty spaces between cities are filled, the problems of housing, transportation and other urban amenities will be greatly increased. The problem here is to project agricultural economic activity and land use in the face of increasing urbanization and competition against highly efficient agricultural regions in other parts of the country [18]. A model is proposed for such purpose. It is very tentative at this stage. The North Atlantic Region includes the following states :

1. Maine
2. Vermont
3. New Hampshire
4. Massachusetts
5. Rhode Island
6. Connecticut
7. New York
8. Pennsylvania
9. New Jersey
10. Delaware
11. Maryland (including Washington D. C.)
12. Virginia
13. West Virginia

For this region, time series data during the period 1950-65 have been collected. The region is also divided in 21 river basin areas for which data for some variables have been collected. When the model is complete, it will be estimated on the basis of both time series and cross section data.

As can be seen from the above models, they are just sketches. For Nova Scotio model, the estimation procedure is in progress [19]. For others data are now being collected and it is expected that the parameters of the models will be estimated in the near future and predictability of the model will be tested.

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LEVEL OF LIVING INDICATORS IN MAHARASHTRA DURING 1963 - 64, AND A COMPARISON WITH 1957 - 58 POSITION

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1. A study of district-level of living indicators for Maharashtra for 1957-58 was carried out earlier [1]. A similar study for 1963-64 parallel to the 1957-58 study is made here for comparison purposes.

2. As in the 1957-58 study, six agricultural indicators, three industrial indicators, and three social amenities (along with the urbanisation-index) indicators have been worked out. The list of indicators is given below :—

List of Indicators 1963 - 64

Symbol	*Indicator*
Z_1'	Per capita* agricultural output (in Rs.)
Z_1	Cash crop area/food crop area
Z_2	Irrigated area/unirrigated area
Z_3	Per hectare agricultural output (in Rs.)
Z_4	Total electricity consumption/population (000 Kw.)
Z_5	Average No. of factory workers attending daily/population
Z_6	Fixed capital in indusiries/population
Z_7	No. of hospital beds/population
Z_8	No. of children in primary and secondary schools/ population
Z_8'	No. of children in secondary schools/population
Z_9	Extra municipal road milage (in Km.)/area in Sq. Km.
Z_9'	Weighted sum of road and railway mileage (in Km.)/ Area in Sq. Km.

Z_{10}	Urban population/Rural population
Z_{11}	No. of breeding cattle/population
Z_{12}	Net sown area/(Total area—Not sown area)
Z_1''	Rural per capita agricultural output.

3. These have been ranked and their ranks compared with the ranks for 1957-58. Product-moment and rank correlations of these indicators have been worked out. The pattern of the product-moment correlations is similar to that of the rank correlations. Much of the analysis in the study is, however, based on ranks only. Hence only the rank-correlation-matrix is produced here. (Table 1). The sub-aggregated ranks for the agricultural component of the level of living, its industrial component, its social amenities component and the aggregate or overall ranks for level of living have been worked out. For the two agricultural component rank scales (i) the ranks of some agricultural indicators Z_1', Z_1, Z_2, Z_3, Z_{11}, Z_{12} have been summed and the districts are ranked according to this sum. For the industrial indicators Z_4, Z_5, Z_6 have been summed and the districts are ranked according to this sum.

4. For the two social amenities rank scale (1) the ranks of Z_7, Z_8', Z_9' and Z_{10} have been summed and the districts ranked according to the sum, and (2) the districts have been ranked according to the sum of the ranks of Z_7, Z_8', Z_9'. For an overall level of living rank scale (i) the ranks of the 12 indicators Z_1', Z_1, Z_2, Z_3, Z_{11}, Z_{12}, Z_4, Z_5, Z_6, Z_7, Z_8', Z_9' have been summed and the districts ranked according to this sum, and (ii) the first six of the above twelve indicators have been given weight two, and the last six weight one, and the districts have been ranked according to this weighted sum. To compare how the districts fare in 1963-64 and 1957-58, the rank correlations between two sets of corresponding ranks have been obtained (Tables 2 and 3).

5. To see how the four divisions of Maharashtra fare in the two years the ranks of the districts in each of the divisions are summed and the four regions are ranked according to this sum. These are given in Table 4. To see if population density is correlated with any of the individual and aggregate indicators, rank correlations between the indicators and the population density have been worked out (Table 5). In the following sections an attempt to sort out the picture depicted by these tables is made.

TABLE 1 : *Rank Correlation Between Economic Indicators*

	Z'_1	Z_1	Z_2	Z_3	Z_4	Z_5	Z_6	Z_7	Z_8	Z'_8	Z_9	Z'_9	Z_{10}	Z''_{11}	Z''_1	Z_{12}
Z'_1	1.00	−.24	.49	.37	−.38	−.30	−.24	−.50	−.19	−.54	−.02	−.08	−.60	.01	.91	.01
Z_1		1.00	−.74	−.22	.08	.01	−.30	.23	.11	.51	.06	−.01	.35	.08	−.16	.20
Z_2			1.00	.36	.00	.13	.36	−.12	.21	−.31	.13	.19	−.30	−.35	.46	−.19
Z_3				1.00	.10	.00	.40	−.07	.33	−.40	.56	.46	−.40	−.49	.33	−.64
Z_4					1.00	.61	.63	.52	.50	.57	.32	.32	.59	−.27	−.22	−.18
Z_5						1.00	.67	.23	.57	.49	.38	.34	.72	−.41	−.01	−.10
Z_6							1.00	.35	.68	.19	.62	.63	.35	−.56	−.16	−.35
Z_7								1.00	.43	.49	.27	.32	.43	−.19	−.44	−.10
Z_8									1.00	.27	.81	.82	.30	−.66	−.07	−.16
Z'_8										1.00	−.02	.07	.73	.04	−.37	.22
Z_9											1.00	.79	.08	−.66	.06	−.23
Z'_9												1.00	.13	−.72	−.04	−.10
Z_{10}													1.00	−.29	−.31	.31
Z_{11}														1.00	−.11	−.04
Z''_1															1.00	.00
Z_{12}																1.00

6. The indicators Z_1', Z_1 and Z_3 worked out for 1963-64 are not fully the same as the indicators worked out for 1957-58. The area under fodder crops was not available for 1963-64 and hence the fodder crop area which was left out from the gross-cropped area in the correction factor while working out the total value of agricultural output for 1957-58 could not be left out when the indicator Z_1' was being worked out for 1963-64. Similarly in the indicator Z_1, area under fodder crop was not included in the cash crop area for 1957-58 while for 1963-64, it could not be deducted from non-food crop acreage. This would evidently raise the value of Z_1 for 1963-64. Part of the increase in the mean of values of Z_1 may be due to this factor alone. Similarly a part of the increase in the mean value of Z_1 per capita output may be due to the same factor. The average under fodder crops form a small proportion of the net sown area and the acreage under food crops, and hence one may expect that it may not distort the comparison excessively.

TABLE 2.

Rank Correlation of 1957-58 Economic Indicators with the Corresponding 1963-64 Indicators.

Z'_1	Z_1	Z_2	Z_3	Z_4	Z_5
.57	.73	.94	.84	.72	.88
Z_6	Z_7	Z_8	Z'_8	Z_9	Z'_9
.63	.84	.85	.78	.93	.83
Z_{10}	Z_{11}	Z_{12}	$(Z'_1+Z_1+Z_2+Z_3)$	$(Z'_1+Z_1+Z_2+Z_{12})$	$(Z_4+Z_5+Z_6)$
.94	.95	.79	.63	.54	.86
$(Z_7+Z'_8+Z'_9)$			$(Z_7+Z'_8+Z'_9+Z_{10})$	R_3	R_4	Z''_1
.79			.89	.74	.58	.51

7. Allowing for this factor one may be justified in saying that on the average there has been no substantial increase in the district-level per capita agricultural output, noting that 1957-58 farm havest prices have been used for working out the value of agricultural output for both the years. The indicators Z_3 the per capita output for the two years are quite comparable. From the indicators Z_1' and Z_3 one can perhaps say that the average district-level per acre productivity has

TABLE 3 : *Rank Correlations*

(1963-64)

Indicator	$Z'_1+Z_1+Z_2+Z_3$	$Z_4+Z_5+Z_6$	$Z'_1+Z_1+\cdots+Z_{12}$	$Z_7+Z'_8+Z'_9$	$Z_7+Z'_8+Z'_9+Z_{10}$
$Z'_1+Z_1+Z_2+Z_3$	—	−.06	.74	−.20	−.39
$Z_4+Z_5+Z_6$	−.06	—	−.37	.57	.64
$Z'_1+Z_1+Z_2+Z_3+Z_{11}+Z_{12}$	.74	−.37	—	−.35	.50
$Z_7+Z'_8+Z'_9$	−.20	.57	−.35	—	.91
$Z_7+Z'_8+Z'_9+Z_{10}$	−.39	.64	−.52	.91	—
R_3	.12	.83	−.10	.82	.78
R_4	.39	.64	.29	.60	.50

Rank Correlation Between R_3 and R_4 = .91

slightly increased while per capita output has more or less remained the same. It should be remembered that only the traditional crops have

TABLE 4.

Rank Correlation of Population-Density With Indicator

Indicator	Rank Correlation with Population density 1963-64
Z'_1	−.21
Z_1	−.01
Z''_1	−.18
Z_2	.21
Z_3	.46
Z_4	.40
Z_5	.49
Z_6	.71
Z_7	.37
Z_8	.73
Z'_8	.18
Z_9	.63
Z'_9	.78
Z_{10}	.36
Z_{11}	−.84
Z_{12}	−.14
$Z'_1 + Z_1 + Z_2 + Z_3$	.12
$Z'_1 + Z_1 + Z_2 + Z_3 + Z_{11} + Z_{12}$	−.28
$Z_4 + Z_5 + Z_6$	.58
$Z_7 + Z'_8 + Z'_9$	.57
$Z_7 + Z'_8 + Z'_9 + Z_{10}$	.56
R_3	.66
R_4	.39

been taken into account here. The average district level cash-crops/food-crops ratio also has increased. The irrigation index (irrigated area/

unirrigated area) has increased over the years from .066 to .077. The net sown area index has not changed. The per capita electricity index has not changed while the per capita average daily factory employment has rightly gone up. The indices Z_6 are not comparable for 1963-64 since districtwise figures on joint stock companies were not available. The fixed industrial capital per capita for 1961, the latest year for which the figures were available has been used, The number of hospital beds index has registered almost a cent per cent increase. The indices Z_8 and Z_8' per capita primary and secondary school children and per capita secondary school children respectively have increased substantially, the former by about 40% and the latter by almost 100%.

8. The road indices Z_9 and Z_9', the road mileage and weighted road and railway indices respectively have also increased, the former by about 30% and the latter by about 25%. If on the basis of these few indicators only a broad statement on the change over the period under consideration is to be made then one could say that per capita social amenities have witnessed increases, and that there has been improvement in agriculture while the per capita agricultural output has more or less remained the same. In industry there has been improvement both on the per capita and the total basis.

9. The change in the relative positions of the districts in respect of these indicators as reflected in the rank correlations between the 1957-58 and 1963-64 ranks, suggests that the relative positions of the districts have changed but not substantially. If a district has slided down in rank vis-a-vis another district in respect of an indicator it does not of course necessarily mean that the indicator has decreased in value, but only that the absolute increase in the indicator in the first district has not been sufficient to keep it above that value of the indicator in the second district.

10. Kolhapur has moved up in respect of almost all individual indicators and in respect of the two aggregate aggricultural indicators, the aggregate industrial indicator and the two aggregate social amenities indicators and on R_3 and R_4. Both on R_3 and R_4 the overall rank scales, Kolhapur ranks first in 1963-64. One may interpret this as there being a sustained considerably balanced growth in Kolhapur district in this period. Sholapur presents an altogether different picture. It has moved down in respect of all individual and aggregate ranks. On R_3 and R_4

it has moved down from 3.5 to 9.5 and from 4.1 to 10.5 respectively. The decline on the rank scale is marked in respect of the aggregated industrial and social amenities indicators. In respect of the former the two comparable indicators Z_4 and Z_5 show a slight decline in absolute value. This is not unexpected since some textile mills were closed in Sholapur during this period. Sangli and Satara, particularly Satara, have also moved up the R_3, R_4 scales as well as on the agricultural and industrial aggregate rank scales, while on the two social amenities scales the performance is not uniform. Poona shows a mixed fare moving up on the industrial rank scale while slightly moving up on the agricultural and social amenities rank scales, while on R_3 and R_4 it has improved itself and is in the high-ranked category on both of them. Of the three coastal districts, Kolaba has moved up from the low ranked to the medium ranked category while it has moved up on the three sub-aggregate ranks and particularly so on the industrial rank scale.

11. Ratnagiri has moved up considerably on the first agricultural rank scale which excludes the breeding cattle index and the net sown area index and slightly on the others except the second social amenities rank scale which includes the urbanization index, but this all round improvement has not been spectacular enough to lift it from the low-ranked category. It is still at the botton on both the R_3, R_4 scales. Thana shows a mixed fare with some moving up on the agriculture rank scale but on the social amenities rank scales it slides down., but on the overall R_3, R_4 rank scales it improved its position slightly. Of the four districts Nasik, Dhulia, Jalgaon and Ahmednagar, all have slided down the overall rank scales R_3 and R_4 and more or less on all the sub-aggregate rank scales also. This is particularly marked in the case of Jalgaon.

12. Of the five Marathwada districts Nondod has shown considerable progress both on the overall rank scales R_3 and R_4 and moves up from the low-ranked to the medium-ranked category and on all the sub-aggregate rank scales while Aurangabad, Parbhani and Bhir present just the opposite picture except Bhir improving its very low position in respect of social amenities and still remains in the low ranked category. Osmanabad shows a mixed fare moving up on the agricultural rank-scale and moving slightly down on the social amenities rank scale. It is still in the low ranked category on R_3 and R_4. Of the Vidarbha districts, Aurumati and Wardha have moved up on all the aggregate and sub-aggregate rank scales except for Wardha's position slightly going down

TABLE 5 : *Ranks of Regions for 1957-58 and 1963-64*

Indicator	Year	Region 1 Konkan (W. Maharashtra) Average Rank	Region 1 Konkan (W. Maharashtra) Rank of the Region	Region 2 Plateau (W. Maharashtra) Average Rank	Region 2 Plateau (W. Maharashtra) Rank of the Region	Region 3 Marthawada Region Average Rank	Region 3 Marthawada Region Rank of the Region	Region 4 Vidarbha Region Average Rank	Region 4 Vidarbha Region Rank of the Region
Z'_1	1957-58	22.3	4	11.3	2	7.6	1	14.7	3
	1963-64	20.3	4	9.7	1	10.2	2	15.6	3
Z''_1	1957-58	23.3	4	9.1	1	9.8	2	15.5	3
	1963-64	22.0	4	8.5	1	12.4	2	15.0	3
Z_1	1957-58	24.0	4	15.4	3	9.6	2	8.2	1
	1963-64	14.0	3	14.7	4	13.6	2	10.2	1
Z_2	1957-58	19.0	4	7.2	1	16.0	3	15.4	2
	1963-64	17.6	4	8.0	1	15.0	2	15.6	3
Z_3	1957-58	2.6	1	9.4	2	20.6	4	16.1	3
	1963-64	3.0	2	10.4	2	19.0	4	15.8	3
Z_4	1957-58	12.3	2	8.1	1	21.0	4	13.7	3
	1963-64	11.0	2	11.7	3	22.4	4	9.2	1
Z_5	1957-58	15.6	3	10.4	1.5	20.2	4	10.4	1.5
	1963-64	14.3	3	8.2	1	21.4	4	12.6	2
Z_6	1957-58	12.0	3	9.5	1	21.6	4	11.8	2
	1963-64	5.3	1	9.0	2	21.0	4	15.4	3
Z_7	1957-58	9.3	1	11.8	3	20.8	4	10.7	2
	1963-64	10.3	2	14.2	3	18.6	4	9.1	1
Z_8	1957-58	8.6	2	6.4	1	23.0	4	15.7	3
	1963-64	9.6	2	7.8	1	22.8	4	13.9	3
Z'_8	1957-58	18.0	3	13.6	2	18.4	4	7.0	1
	1963-64	18.0	4	13.8	2	16.0	3	8.2	1

TABLE 5 : *Ranks of Regions for 1957-58 and 1963-64*

Indicator	Year	Region 1 Konkan (W. Maharashtra) Average Rank	Region 1 Konkan (W. Maharashtra) Rank of the Region	Region 2 Plateau (W. Maharashtra) Average Rank	Region 2 Plateau (W. Maharashtra) Rank of the Region	Region 3 Marthawada Region Average Rank	Region 3 Marthawada Region Rank of the Region	Region 4 Vidarbha Region Average Rank	Region 4 Vidarbha Region Rank of the Region
Z_9	1957-58	5.3	1	6.8	2	22.2	4	17.0	3
	1963-64	4.6	1	7.11	2	22.2	4	16.6	3
Z'_9	1957-58	7.6	2	7.3	1	21.0	4	16.4	3
	1963-64	7.0	1	8.3	2	21.6	4	15.1	3
Z_{10}	1957-58	17.0	3	9.3	1	17.2	4	13.0	2
	1963-64	15.6	3	11.2	1	16.4	4	11.9	2
Z_{11}	1957-58	15.3	3	19.7	4	8.0	2	7.6	1
	1963-64	17.6	3	18.9	4	6.8	1	8.4	2
Z_{12}	1957-58	23.3	4	12.5	2	4.8	1	14.7	3
	1963-64	22.3	4	12.2	2	6.4	1	14.5	3
$Z'_1 + Z_1 + Z_2 + Z_3$	1957-58	22.7	4	8.4	1	14.2	3	13.8	2
	1963-64	13.3	2	9.2	1	15.6	4	15.5	3
$Z'_1 + Z_1 + Z_2 + Z_3 + Z_4 + Z_{12}$	1957-58	24.0	4	12.7	3	7.7	1	12.5	2
	1963-64	21.6	4	10.4	2	9.6	1	14.7	3
$Z_4 + Z_5 + Z_6$	1957-58	13.5	3	8.9	1	22.0	4	11.7	2
	1963-64	10.3	3	9.0	1	22.6	4	12.5	2
$Z_7 + Z'_8 + Z'_9$	1957-58	11.5	3	10.1	1	22.3	4	11.0	2
	1963-64	12.2	3	11.8	2	20.1	4	10.2	1
$Z_7 + Z'_8 + Z'_9 + Z_{10}$	1957-58	11.3	2.5	10.1	1	21.9	4	11.3	2.5
	1963-64	13.2	3	11.5	2	19.7	4	10.4	1
R_3	1957-58	18.3	3	8.5	1	21.2	4	10.9	2
	1963-64	13.3	3	8.3	1	22.0	4	12.5	2
R_4	1957-58	21.2	4	8.0	1	19.9	3	11.2	2
	1963-64	18.7	3	8.2	1	20.4	4	11.7	2

on the agricultural scales. Buldhana and Akela present just the opposite picture except that on the social amenities scale they have improved their position.

13. Chanda and Bhandara have moved up the agricultural and industrial rank scales but slightly moved down the social amenities rank scale. On the R_3, R_4 scales Bhandara remains almost where it was, while Chanda because of its considerable improvement on the agricultural rank scale jumps up on the R_4 scale, where the individual agricultural ranks have double the weight of the others. As already mentioned, going up or down the rank scale individual or aggregate does not imply absolute states of the districts in respect of the variables or factors improving or worsening. Thus in respect of the social amenities indicators the absolute values of all these have gone up for every district. Similarly, a district being in a low-ranked category or a high-ranked category does not by itself indicate as to whether the absolute values are sufficiently high or excessively low. These levels have to be specified on other grounds. Thus a kind of desirable minimum level for the individual indicators may be specified and it may be that a district which was low ranked in respect of this indicator in 1957-58 and was below their level may be still low-ranked in 1963-64 but above this level. Of course this minimum-level itself may have changed from time to time.

14. For such a study both at the individual indicator and the aggregate indicator's level using principal component analysis or other techniques more detailed and rigorous construction of the indicators and specification of the minimum and other watershed levels may be necessary. This is not attempted here. Since these data are available from year to year, an year to year study both at the ranks level as in this report or at the absolute level could be attemted. It would also be meaningful to study how the basic variables like acreage under different crops, outturn of individual industries and school children under different categories etc., could be studied in detail. Also changes in croping patterns, educational patterns, industrial patterns and so on could also be studied. This has not been done here. One could with profit increase the number of indicators even for the rank study as in the taluka-level study by Mukerji and Khare. The present study is only aimed at providing a study for 1963-64 parallel to the 1957-58 investigation conducted earlier. One could also use more refined indicators than these.

15. For 1963-64 Kolhapur, Satara, Poona, Sangli, Wardha are among the high ranked districts on both R_3 and R_4. Kolhapur and Satara standing first and second on both the scales. The other two high ranking on R_3 are Thana and Nagpur and on R_4, Jalgaon and Ahmednagar. Parbhani, Ratnagiri, Bhir, Osmanabad, Aurangabad and and Dhulia are among the low-ranked on both R_3 and R_4 while Chanda and Yeotmal are low ranked on R_3 alone and Nasik and Kolaba are low-ranked on R_4 alone. Kolhapur, Satara, Ahmednagar and Sangli have the first ranks on both the agricultural rank scales. Chanda, Jalagaon, Dhulia are the other high-ranking districts on the rank scale based on Z_1', Z_1, Z_2 and Z_3 and Chanda, Bhir, Osmanabad on the other aggregate agricultural rank scale which covers Z_{11} and Z_{12} also. Nasik, Akola, Nagpur, Poona, are low ranked on both the scales while Thana, Kolaba, Ratnagiri are in the lower-category on the 6-indicator agricultural scale, Amarawathi being on the border line and Aurangabad, Parbhni, Wardha and Buldhuna are in the low category on the other scale. On the industrial scale Thana, Poona, Wardha, Sholapur, Kolhapur, Nasik come in the high-ranked category in that order while Bhir, Parbhani, Osmanabad, Ratnagiri, Nanded, Aurangabad Akola and Buldhana in the low-ranked category in that order, the first being the lowest ranked. Four of these districts come from Marathwada. Nagpur, Poona, Wardha, Akola and Amarawathi are in the high-ranked category on both the social amenities' rank scales, while Jalgaon is in that category on the four-indicator scale, and Satara on the three indicator scale. Dhulia, Ahmednagar, Aurangabad, Parbhani, Bhir, Osmanabad, Chanda and Yeotmal are in the low-ranked category on both the scales.

16. There is only one district which is high ranked on all the three sub-aggregate indicators ($Z_1'+Z_1+Z_2+Z_3$, $Z_4+Z_5+Z_6$, $Z_7+Z_8'+Z_9'$) and that is Kolhapur and that is also the district which is in the high ranked category on the first two scales and on the first and third scales. Poona, Nagpur, Wardha are high ranked on the last two scales. Aurangabad and Parbhani are the districts which are low ranked on all the above three scales. Buldhana is low ranked on the first and second scales. Bhir and Osmanabad are low ranked on the second and third scales. Nanded is low ranked on the industrial scale only while Dhulia, Ahmednagar, and Chanda are low-ranked on the industrial scale only while Poona, Akola, Nasik, Wardha and Nagpur are low-ranked on the agricultural scale only.

17. Here Z_{10}, Z_{11}, Z_{12} have been left out in the three scales above. On these individual scales taking Z_{11} first, Kolhapur, Sholapur, Sangli, Jalgaon, Poona, Satara, Thana Ratnagiri are in the low ranked category (in that order) while Chanda, Ratnagiri, Ahmednagar, Kolaba, Thana, Bhandara, Dhulia and Kolhapur (18) are in the low ranked category (in that order) on Z_{10} and Ratnagiri, Chanda, Bhandara, Ahmedanagar, Bhir, Osmanabad, Kolaba and Satara are in the low ranked category (in that order) on Z_{12}; in all these the first listed has the lowest rank. The other individual indicators have already been taken into account in the sub-aggregate and overall aggregates considered above but still it may be of interest to see which are the bottom in respect of some at least of the other individual indicators. Bhir, Parbhani, Osmanabad, Aurangabad, Chanda are in the lower ranked category on the road and railway mileage indicators.

18. Nanded, Bhandara and Nagpur are in low ranked category on road-index, and Yeotmal, Buldhana and Dhulia are in that category on road and rail index. Kolaba, Dhulia, Ratnagiri, Osmanabad, Ahmednagar, Bhir, Sholapur, Chada are in the low ranked category on secondary school students' index and Parbhani, Bhir, Aurangabad, Nanded, Chanda, Buldhana, Yeotmal, Bhandhara on the primary and secondary school students' index. Ahmednagar, Osmanabad, Parbhani, Dhulia, Aurangabad Sangli and Jalagaon, Chanda are in the low ranked category in respect of the hospital beds index. In respect of the fixed capital index Bhir, Osmanabad, Parbhani, Buldhana, Akola, Dhulia, Yeotmal and Nanded are in the low ranked category. In respect of the factory employment index Bhir, Osmanabad, Ratnagiri, Parbhani, Chanda, Akola, Aurangabad, Kolaba are in the low category. For the electricity index Parbhani, Bhir, Ratnagiri, Osmanabad, Nanded, Aurangabad, Ahemednagar, Dhulia are the bottom districts. For per acre productivity Aurangabad, Parbhani, Akola, Wardha, Nagpur, Poona, Buldhana, Nanded are the low ranked districts. For irrigation, Akola Yeotmal, Amarawathi, Parbhani, Wardha, Thana, Nanded, Buldhana are at the bottom. For per capita agricultural output Nagpur, Poona, Thana, Ratnagiri, Akola, Nasik, Wardha, Amarawathi are the lowest. In all these the lowest ranked district is mentioned first. All these rather crude and short analysis does give an indication of roughly locating the 'backward' pockets, backward in respect of one or more items or in overall sense. Even a quick look at the individual rank-chart indicates clustering of low ranks in the Marathwada area.

19. The regional analysis interprets this aspect of the problem and brings out this point better. Frequency tables on the basis of the 15 individual ranks (Z'' is left out) for each district has for 1957-58 and 1963-64 also been prepared (Table 12.1 12.2). In 1963-64 Kolhapur has the largest frequency 9 in the high ranked category. Poona has frequency 3 and Wardha, Nagpur, Sangli, have 7 and Thana and Ahmednagar and Satara have 6 in the high ranked category. Parbhani, Bhir, Osmanabad, Aurangabad—four districts from Marathwada have frequencies 9 and 8 (the last one) in the low ranked category while Chanda from Vidarbha has frequancy 9 in the low ranked category and Ratnagiri in Western Maharashtra has frequency 7 in the low ranked category.

20. It may be shown that Kolhapur had 6 districts in the high ranked category in 1957-58 while it has 9 in the same category in 1963-64. While Sholapur had 9 districts in the first category in 1957-58, and while in 1963-64 it has only 5. Kolaba, Ahmednagar, Satara, Sangli, Amarawathi, Nagpur, Chanda, Osmanabad are the other districts in which the number of districts in the first category have increased. Thana, Nasik, Dhulia, Jalgaon, Poona, Parbhani, Bhir, Nanded, Buldhana, Akola are the districts in which the number of districts in the first category have diminished between 1957-58 and 1963-64. The high rank frequencies in Parbhani, Bhir, Nanded, Osmanabad, Aurangabad are contributed mostly by Z_{11} and Z_{12}, the per capita breeding cattle index and the net sown area index. As far as the frequencies in the low-rank category are concerned, Nanded registers a drop from 10 to 6. Ratnagiri from 9 to 7, Kolaba from 7 to 5, Thana from 5 to 4, Amarawathi from 4 to 2, Bhandara from 6 to 5. Some districts have registered an increase in the low-rank frequency in this period and they are Dhulia from 3 to 6, Jalgaon from 1 to 2, Ahmednagar from 2 to 6 Satara from 1 to 2, Aurangabad from 7 to 8, Parbhani from 8 to 9, Akola from 1 to 5 and Wardha and Nagpur from 1 and 2 respectively to 3. Change in rank is a two-edged thing; an increase in one or more rank score of one is always accompanied by a decrease in the rank acore of one or more units and vice-versa though in absolute terms there may have been an increase in the scores of all the units. The changes in ranks as has been mentioned before relates only to the changes in the relative position of the units.

21. It may be of interest to see how these individual and aggregate indicators are related to the population density of the districts. The

rank correlations are positive except for the per capita agricultural output index and the livestock index and very negligibly negatively correlated with the not-sown area index and the cash crop index. The rank correlations with the subaggregate indices are also positive except in the case of the 6-indicator agricultural index where Z_{11} and Z_{12} are included when it is negative. As far as the rank correlations of the population-density with R_3 and R_4 the overall indices are concerned, they are positive and the latter is not very large. A more detailed analysis is necessary to see if there is a non-linear relation between population-density and the overall level of living.

22. Till now the districts have been the units of study. On the whole the districts in the Marathwada region seem to be at the bottom in respect of all indicators except Z_{11} and Z_{12} and in respect of the aggregate and subaggregate indicators while districts in Western Maharashtra (Desh) seems to be in the vanguard in respect of many indicators as well as the aggregate and subaggregate indicators. To examine this point in greater detail, average ranks of districts in each division are worked out in respect of all the individual indicators and the aggregate and subaggregate indicators, and the regions are then ranked according to these (Table 5). These rankings pertain directly to the average district level position in the region and only indirectly to the overall regional position. For examining the latter directly one has to work out these indicators at the regional level and then rank the region according these values. Here the emphasis is on the average district-level position in the regions. In respect of per capita output, probably mostly on account of its low position on population density in 1957-58, Marathwada is leading, Desh comes next, Vidarba is third and Konkan is last, while in 1963-64, Desh and Marathwada inter change position. In respect of per acre productivity both in 1957-58 and 1963-64, Konkan leads followed by Desh, Vidarbha and Marathwada in that order.

23. In respect of irrigation in 1957-58 and 1963-64, Desh leads and Konkan is at the tail end, while in 1963-64, Marathwada is second and Vidarbha third while in 1957-58 it is the other way round. In respect of many of the indicators from Z_4 to Z_{10} Marathwada is at the bottom both in 1957-58 and 1963-64 except for the secondary school students' index in 1963-64, when it is third. In respect of Z_{11} and Z_{12} it is the first in respect of Z_{12} and second in respect of Z_{11}. In respect of the electricity index, Desh and Vidarbha exchange places between 1957-58

and 1963-64. In respect of the per capita industrial fixed capital index Desh and Vidarbha share the first and second place between themselves. In respect of the factory employment index, Konkan has moved up from rank 3 to 1 and Desh and Vidarbha have moved down from rank 1 to 2 and rank 2 to 3. In respect of the hospital beds index, Konkan and Vidarbha have exchanged places in respect of the ranks, Vidarbha moving up from rank 2 to 1. In respect of the primary and secondary school students' index in both 1957-58 and 1963-64, Desh leads followed by Konkan, Vidarbha and then Marathwada comes. In respect of the secondary school students' index, Vidarbha leads in both 1957-58 and 1963-64 followed by Desh with Konkan and Marathwada exchanging their places.

24. In respect of road mileage index we see Konkan, Desh, Vidarbha and Marathwada is the order both in 1957-58 and 1963-64, while in respect of the road and railway mileage index, Desh and Konkan exchanged places, Konkan moving from rank 2 to 1. In respect of the urbanisation-index Desh and Vidarbha have ranks 1 and 2 in both 1957-58 and 1963-64, and Konkan and Marathwada have ranks 3 and 4. In respect of Z_{11} Desh is last and Konkan the next in both 1957-58 and 1963-64 with Marathwada and Vidharbha exchanging places, Marathwada moving from rank 2 to rank 1. In respect of the net sown area index, Konkan is the last and Marathwada the first with Vidarbha and Desh occupying the 3rd and 4th places in both 1957-58 and 1963-64. In respect of the overall indicators R_3 and R_4, Desh and Vidarbha are first and second in both 1957-58 with Konkan and Marathwada exchanging the 3rd and 4th places, Konkan moving up from the 4th rank to the 3rd rank. In respect of the aggregate industrial index, Desh, Vidarbha, Konkan and Marathwada is in that order in both 1957-58 and 1963-64. In respect of the aggregate agricultural index $Z'_1+Z_1+Z_2+Z_3$, Desh remains first in both the years while Konkan has moved from the fourth place to the second place, Marathwada from the third to the fourth place and Vidarbha from the second to the third. In respect of $Z_1'+Z_1+Z_2+Z_3+Z_{11}+Z_{12}$, Marathwada is first and Konkan last in both the years. On the basis of all these the overall picture presented by this analysis indicates that Desh and Vidarbha lead while Marathwada is at the fag end in respect of all the indicators except Z_1', Z_{11} and Z_{12}. Konkan comes in between. As mentioned earlier the ranks worked out directly at regional level need not necessarily be the same as these.

25. In fact they may turn out to be slightly different from these but one would hope and expect them to be not very different from these. The rank scale is insensitive to the magnitudes of the differences and a more refined study should be based on at least interval scales which are also, however, fraught with difficulties of their own in respect of construction. Interval scales were constructed using principal component analysis and other weighted averages in an earlier report [1]. Here only an analysis mostly based on ranks is attempted and even this analysis does seen to point out the "backward" and "forward" pockets at least in a relative sense in respect of the individual and the other overall indicators.

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REGIONAL DEVELOPMENT—A PRECONDITION FOR METROPOLITAN DEVELOPMENT

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1. Equality vs. Efficiency ?

1. In my previous paper [1], I tried to emphasise that a diversion of investment from an advanced to a backward area is bound to lower the overall national growth rate of income. This may be a short-run phenomenon if the backward area is an exceptionally resource rich area such that after the initial gestation lag, the rate of income generation in this once backward area will be much higher than the average so as to offset the initial loss in income. However, for all other backward areas and these constitute the overwhelming majority, there is no possibility for a subsequent off-setting of the initial income loss and this is bound to result in a permanent decline in the national growth rate. A poor country like India not only can ill afford to pay this cost for achieving a more balanced regional development, it will actually push further away the ultimate realisation of equality, and balanced regional development. An argument was advanced in that paper that the existence of huge idle capacity in the already developed metropolis may make it possible to develop the backward areas through a fuller utilisation of the already installed capacity and thus, this need not entail any lowering of the existing rate of growth. However, in this case also the realised overall rate of growth will be lower than what it could have been had the resource generated through the fuller utilisation of capacity could be invested in the developed areas (or in the backward area with rich resources) rather than in an ordinary backward area.

2. The above understanding thus could not really solve the contradiction between *efficiency* in terms of maximising the rate of growth and *equality* in terms of lowering the development differential between the advanced and the backward areas. Though that paper did suggest some way out for regional development, yet essentially the broad framework of thinking did not go beyond the traditional limits which was expressed, for example, by Prof. T. Balogh, in the following lines : "It

should be realised in this connection that policies pursued to promote what appears to be equality in this country (India) but which decrease efficiency, are at this stage really inimical to the attainment of equality"[2] ? This statement was essentially correct when it was made by Prof. Bologh, i.e. in 1961. But by the end of 1965, there has occured a basic change in the structure of West Bengal economy particularly manifested in a recession arising from lack of demand. Inability to understand and appreciate this basic change—to be discussed in detail below—was at the root of the inability to go beyond the traditional frame-work of thinking and to see that in this new stage of development equality has become the precondition for achieving efficiency.

3. What appears as a barrier to the achievement of optimal growth rate at one stage of development may appear as a tool for achieving the optimal growth rate at another stage. Maximisation of saving by minimising as far as possible direct consumption, and mobilisation of as much of this saving as possible for investment in capital goods industry for producing means of further production are the pre-condition for achieving maximum growth rate at one stage of development. This is the stage when equality which is bound to lead to an increase in the rate of consumption becomes a barrier to the maximisation of saving, investment and growth rate. However, with the maturing of this stage with a relatively sizeable growth of investment goods industry, a situation may arise when capacity to produce goods outstrips the demand for them. Then begins a period when increased consumption —both personal and productive consumption in hitherto backward sectors like agriculture rural industries etc.—leading to increased demand becomes the pre-condition for the productive utilisation of the investment already made. It is in this condition that equality—both inter-personal and inter-regional—as a tool for increasing demand becomes a necessary weapon for optimising the rate of growth of the economy.

2. Equality as a Tool for Achieving Efficiency :

4. The National Council of Applied Economic Research conducted a survey in 1965 to find out the causes of underutilisation of industrial capacity in this capital scarce country. The percentage distribution of the difficulties faced by the engineering units in 1962 presented below, clearly shows that there were then two main causes of underutilisation, viz. lack of inputs, and lack of foreign exchange [3] at that time.

Percentage Distribution of the Causes of Underutilisation of the Installed Capacity by the Nature of the Cause in the Engineering Industry, India, 1962.

Causes of underutilisation	% to the total no. of difficulties
1. Raw material difficulty	25%
2. Import restriction	20%
3. Indigenous material :	
(*a*) not available	3%
(*b*) inadequate supply	11%
(*c*) high cost	11%
(*d*) poor quality	6%
(*e*) variation in quality	6%
(*f*) uncertain delivery	16%
Total	100%

5. A similar survey was conducted by the Industrial Planning Team of the Calcutta Metropolitan Planing Organisation in 1967. The results obtained from that survey reveal that in 1967, the main cause of underutilisation was lack of demand. The new pattern may be clear from the table below :

Percentage Distribution of the Causes of Underutilisation by the Nature of the Cause in Engineering Industries, West Bengal, 1966-67.

Causes of underutilisation	% to the total no. of units
1. Lack of demand	29.5%
2 Lack of indigenous materials	18.1%
3. Lack of imported raw materials and spares	9.0%
4. High cost of materials	4.2%
5. Raw materials quota or import granted on single shift capacity only	4.8%
6. Lack of finance	10.9%
7. Labour troubles	12.7%
8. Any other reason	10.8%
Total	100.0%

It is significant to note that what appeared to be the main bottleneck in 1967 was not even mentioned as one of the many constraints in 1962. It is this change in the nature of the bottleneck that expresses the basic structural change that has occurred in the West Bengal economy.

6. The contradiction between efficiency and equality is very real and can not be eliminated under the condition of scarcity of capital resources which can not satisfy all the competitive demands for investment and consumption. But the situation becomes very different when there is excess supply relative to demand. Here the creation of new demand by backward areas, for example, will not only divert scarce capital resources productive towards a less efficient utilisation, but also it will create the condition for the use of the investment already made. And as the metropolis is the main centre of the already made investments, the pre-condition now that this huge investment does not remain idle depends on whether new demand can be generated for the products it may produce. Balanced regional development, or inter-regional equality in this context is not a constraint, not a barrier, but a positive tool for making efficient use of the investment already made in the Metropolies. This is the crux of the new situation when equality has become a tool for achieving efficiency.

3. Nature of the Structural Change :

7. At the beginning of the plan period, in 1951-52, the ratio between income generated by industry and agriculture was 0.568 in West Bengal. At the price of 1951-52, the above ratio in 1965-66 was transformed to 1.057. The domination of agricultural production in income generation in 1951-52 gave way to the domination of industrial production in 1965-66 [4]. Even the industrial recession in the subsequent years coupled with good harvest could not restore the lead agriculture enjoyed earlier. This may be clear from the table below :—

Ratio Between Industrial Income and Agricultural Income at 1950-51 Price, West Bengal

Year	1951-52	1965-66	1966-67	1967-68
Ratio	0.568	1.057	1.018	0.979

8. This apparently welcome transformation in West Bengal economy, however, reflects not development but stagnation of agriculture on the one hand, and a moderate development of industrial income in spite of a relatively huge investment on the other.

9. The backwardness of agriculture, manifested in its extreme dependence on the vagaries of nature, got expressed in a wide fluctuation in annual production. During the period 1960-61 to 1967-68 [5], income from agriculture at the constant price of 1951-52 fluctuated between Rs. 4,282 million in 1964-65 to Rs. 3,407 million in 1962-63. The average annual income from agriculture at 1951-52 price for these eight years was Rs. 3,749 million and this was less by 3% than that achieved at the beginning of the period at 1960-61 : Rs. 3,864 million, and the latter was not a peak production year. The average annual industrial income for those eight years at constant price was about 26% higher than that achieved in 1960-61. It is the stagnation in agriculture which made possible for the industry sector to assume, in spite of a moderate increase in industrial income—both relative to the need as well as to the possibility—the dominance in the structure of State income.

10. Extent of the lag between the rate of income and employment increase in industry on the one hand and the rate of creation of new capacity through investment on the other may be clear from the fact that during 1959-65, in the census sector industries [6] in West Bengal while capital investment increased at a rate of 21.1% per year (compound) the corresponding rates of increase in income and employment were only 11.7% and 4.6% respectively. And this has meant that the industries were using gradually more and more capital for producing unit income or unit employment. Capital-value added ratio in West Bengal increased from 2.01 in 1959 to 3 34 in 1965 denoting an increase by 66% (the corresponding increase in India as a whole was higher : 75%). Similarly, capital used per labour in West Bengal increased from Rs. 5,700 in 1959 to Rs. 14,000 in 1965 denoting an increase by 147% (the corresponding figure for India as a whole as 163%).

11. This substantial increase in the capital-output and capital-labour ratios could have been considered beneficial, even in this capital scarce country, had this increase been the consequence of the technological innovation of the production process. But it is known that a substantial part of this increase in rate of capital use arose from the inability to use fully the investment already made. The actual extent of idle capacity, however, remained mostly unknown to most people due to the peculiar way the production and capacity statistics are published by Government of India [7]. These data are regularly published seperately for 260 industry groups, and of these 260 groups, in as many as 216 groups capacity means single shift capacity for 300 days a year. Thus,

almost two-third of the installed capacity for 83% of the industry groups are not at all taken into consideration while presenting the official statistics on capacity and as such the estimate derived for idle capacity on the basis of these figures seriously under-estimates the level of idle capacity. Even with such a definition of capacity, it was found that in the 1959-65 period often more than a quarter of the industry groups could use only 50% or less of the installed capacity. The position has further worsened in the subsequent years.

12. The C. M. P. O. study, referred to earlier, estimates that while in 1965 nearly 20% of the engineering industry groups could utilise more than 40% of their estimated three-shift full capacity, in 1966 proportion of such industry groups came down to 13% and in May-June, 1967 there did not appear to be a single industry group in the engineering sector which could use more than 40% of their installed three-shift capacity. Thus, the level of income, employment and growth rate that could have been achieved on the basis of investment made could not actually be realised mainly due to lack of inputs in the pre-1965 period and lack of effective demand in the post-1965 period. More significant than this big change in the level of idle capacity is this shift of the main cause of under-utilisation from lack of inputs (raw materials or spares) to lack of effective demand.

13. Another aspect of the structural change that has occurred in West Bengal economy is the replacement of the relatively backward Jute industry by the relatively modern engineering industry as the dominating industry in the State. The emergence of the engineering

Relative Rates of Increase, 1959-65 West Bengal
(Census Sector)

Item	Rate of increase per year (compound)		
	Engineering	Non-engineering	Total
1. Productive capital	25.0%	18.7%	21.1%
2. Value added (income)	16.8%	7.9%	11.7%
3. Employment	8.3%	2.6%	4.6%
4. Value added per employee (labour productivity)	7.8%	5.2%	6.8%
5. Value added per unit of productive capital (capital productivity)	−6.5%	−9.0%	−8.2%

industry denotes the emergence of that sector in the economy that can supply the capital goods for technological modernisation of the economy. In 1965, the capital investment in engineering industry alone (Rs. 6,110 million) was more than that invested in all other industries in West Bengal (Rs. 6,080 million). The rates of growth of income and employment in the engineering industry also were substantially higher than the corresponding rates for all other industry groups. This may be clear from the table above :

4. Consequences of the Structural Change :

14. In terms of the level of industrial development, as measured by the proportion of registered factory employment to total population, West Bengal is the most developed industrial State in India : Compared to 1.06% for India as a whole and 2.38% for Maharastra, the percentage for West Bengal was 2.56% in 1961. [8] In the engineering industry sector seperately, the importance of West Bengal is more marked. The share of engineering in total industrial employment was as high as 38% in West Bengal compared to 26% both in Maharastra or remaining other parts of India. It is in this background of relative industrial pre-eminence of West Bengal that the extent of the backwardness of her rural areas is to be judged. Compared to 9% for whole of India, and 70% for Madras, the proportion of villages electrified in West Bengal came to only 3%. In terms of pumps energised, compared to more than 2.56 lakhs for Madras, and about 5.00 lakh for India as a whole, West Bengal had only 431 pumps energised by the end of the Third Plan.

15. Another reflection of this discrepancy between industrial and agricultural development particularly in West Bengal may be clear from the totally insignificant role played by the agricultural implement manufacturing industry in the totality of census sector industry complex. Of the total productive capital investment in industry (census sector) in India, agricultural implements claimed only 0.13% in 1959 and this came down to 0.08% in 1963. In the case of West Bengal not only these shares were much lower, the rate of decline during 1959-63 was also much higher : it was 0.08% in 1959 and 0.008% in 1963. [9] Utter stagnation in the agricultural implement industry in West Bengal may be clear from the fact that total employment in this sub-group belonging to registered factory sector actually declined from 363 in 1951 to 360 in 1965.

16. The relatively lower rate of income increase compared to investment and capacity creation, and the continuing backwardness of agriculture got reflected on the one hand in a fantastic increase in price level particularly of food and a very sluggish growth in the consumption level of basic necessities like cereals and cloth. Thus, though total cereal consumption per capita did increase from 284 lbs per year in 1952-53 to 295 lbs in 1959-60, yet the latter figure was much below the level reached in 1938-39 when it was 339 lbs per capita per year. Similarly, consumption of cloth increased from 14.16 yards per annum in 1952-53 to 15.46 yards in 1959-60 but the latter was less than the level reached in 1938-39 (18.15 yards). [10]

17. Another effect of price rise in agriculture was an accrual of a huge surplus in the hands of net sellers of agricultural goods through the price rise alone. In spite of the fact, already mentioned earlier, that the average level of agricultural income in West Bengal measured at 1960-61 price during the eight years, 1960-61 to 1967-68 was 3% less

Distribution of Agricultural Households and Area by the Size of Area Owned, West Bengal, 1961-62

Size class of ownership holding (in acre)	% of households	% of area owned
Upto 0.49	43.41	1.63
0.50 to 0.99	7.73	2.48
1.00 to 2.49	18.11	13.43
Sub Total upto 2.49	69.25	17.54
2.50 to 9.99	26.62	54.78
10.00 to 19.99	3.34	18.93
20.00 & above	0.79	8.75
Grand Total	100.00%	100.00%

than that achieved in 1961, the average at current price was 27% higher than the corresponding 1961 level. And the difference between the total income generated by agriculture at constant price and that generated at current price for these eight year period was Rs. 1,432 crores, and a large part of it must have accrued to a very small proportion of the agricultural population. How small this proportion is likely to be may be clear from the land ownership pattern in West Bengal presented in the table above : [11]

It may safely be assumed that households owning less than 2.5 acres are not net sellers of agricultural commodity, and thus, rising food price affects unfavourably at least 70% of the peasant households and only 30% of the households get the benefit from price rise. Thus, the bulk of the huge income in agriculture generated through price rise must have been concentrated in a small part from amongst this 30% of the households. And the continuing backwardness of agriculture is a clear testimonial that this huge surplus was not used for agricultural modernisation. The way this surplus is used rather than the mere accrual of surplus is a more meaningful datum for developmental planning.

5. Nature of Imbalance and Nature of Policy Tools :

18. The main aim of the analysis presented above is to initiate a discussion on policy tools for regional development. It pre-supposes firstly, defining the development targets, and secondly, the prescription of the "means" for achieving these targets.

19. As the situation changes, the nature of the target changes. The nature of target when equality is a barrier to maximise efficiency will be very different from that when equality is a tool for maximising efficiency. In the list of targets, the nature of emphasis given on developing backward areas, the central point of which is the development of agriculture, will be very different under the two circumstances.

20. With change in nature of imbalance in prevailing situation not only the specific targets of development change but also the nuture of means to be adopted changes. While discussing the nature of means it is better to adopt the Tinbergenian classification of means [12] : (a) *quantitative means*, such as changing tax rate, provision of incentives etc., used for the adoption of the economy to small and frequent changes in some of the other aspects of the economy ; these 'means' do not affect either the structure or the foundation of the prevailing socio-economic formation, (b) *qualitative means*, such as price control or rationing or control on the setting up of industry etc., which affect the structure (say, by affecting the market mechanism) but not the foundation of the society. Often these types of means for changing the structure is adopted actually to strengthen further the basic foundation of the existing social formation, and (c) *reforms*, such as nationalisation of banks or basic industries, land reform etc., which affect the fundamental aspects of economic organisation (say, by affecting the basic property relationship).

21. With an undeveloped industrial base which possessed very little ability to supply goods, it was but natural that the emphasis should be given to use as much as posible the existing backward technology in agriculture, and cottage and village industries—the main source of employment and income when our country embarked on the road to planned development in 1951. There could not be any rational target for modernisation of agriculture or of cottage industry in those days precisely because the then economy did not have the capacity to supply the requirements for such modernisation. And as modern rural industry can develop only on the basis of a modern, industrialised agriculture, whatever schemes were taken in those periods for developing rural industrial estates, particularly in West Bengal, were failures.

22. With a change in the basic situation when it is not only possible for the engineering industries to supply huge quantities of capital equipment that may be required for industrialising agriculture and for taking electricity to all villages, unless such a target is seriously pursued the existing industries will be forced to bear the burden of huge idle capacity thereby reducing substantially the levels of employment, income and growth rate that are possible to be achieved now.

23. This technological possibility although is a necessary condition for modernising agriculture and for achieving a more balanced inter-regional development, is not a sufficient condition that such a development will actually take place. It is in this background that the nature of means to be adopted for solving the present nature of imbalance need be discussed.

24. It has been mentioned earlier that in the field of industry the crux of the new situation is the emergence of the deficiency in effective demand as a basic imbalance superimposed on the earlier one centering on lack of inputs. Imbalance in the input-output relationship expressed in lack of supply of inputs for producing full capacity outputs is almost an inevitability arising from technological indivisibilities on the one hand, and imperfections in the market or in the central planning mechanism on the other. Its remedy may be possible through quantitative economic policy measures providing, for example, incentive for investment in the deficit sector, which may be supplemented, if necessary, by such qualitative measures as diret State investment in deficit sectors. But for remedying deficiency in effective demand, fundamental reforms may be necessary.

25. As the already skewed income distribution was getting further skewed in the prevailing process of economic development, no fundamental change in property relations were necessary to further augment saving, the main problem of the economy in the pre-1965 period. However, for removing an imbalance between the income composition or factor reward on the hand and the composition of final bill of goods (i. e. what remains of the total output including net imports after the inter-industry consumption) on the other, fundamental reform measures may have to be undertaken affecting the existing composition of demand for final goods. Behind the mathematical identity between the value of the total of factor payments, and hence total demand, and the value of the total of final goods and hence total supply may lie the complex reality of non-compatible composition of income generation and final goods supply expressed in the imbalance between sectoral demand and supply. The maximum supply possible of final goods and to large extent their composition is determined technologically. Pattern of demand for final goods, however, is basically determined by property relationship, by the nature of income earning, by the socio-economic formation of the particular society. Whenever there is a situation when a particular society is incapable of using the maximum of what is technologically possible and thereby forcing the people to live in poverty although plenty is possible the remedy may be sought either in the non-utilisation of the technological possibility by keeping the resources idle or by attempting to change the existing socio-economic formation so that the new society may be in a position to reap the full benefit of the technology already developed or are being developed. It is a situation when advancement of technology-achievements of man's struggle with nature—no longer determines the future of the society ; the determining factor then becomes the ability to change the existing socio-economic formation.

26. It has been mentioned earliar that due to increasingly more skewed distribution of income, the average consumption level has remained very low in this country. Along with the question whether in the new situation such a low consumption level is to be considered to be a boon, we must tackle a more serious question as to the nature of use of the existing savings. There is very wide gap seperating the generation of saving from its utilisation for further increase in production in the socially desired line. Given the serious market imperfections which leads to a fantastically high price for capital for rural enterprenurs

and the possibility of earning relatively much higher profit by hoarding and selling of agricultural goods in the background of gradually rising prices on the one hand and big fluctuation of prices from season to season on the other, there is very little chance of savings in the agricultural field to be used for productive investment for agricultural modernisation. There is no scope in this paper to go into the details of the discussion of the basic change in socio-economic relationship required for achieving agricultural modernisation. The sole point that is to be emphasised is that the problem of regional development is not merely a problem of the development of technology, it is simultaneously a problem of developing appropriate socio-economic formation. To day a bright possibility has arisen to make a fundamental break-through in our age old rural backwardness which may simultaneously make possible a really healthy development of the metropolis as an integral part of rural development. But to realise this technological possibility in actual life we may have to initiate far reaching reform involving the entire gamut of our socio-economic formation.

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A POLICY FRAMEWORK FOR METROPOLITAN REGIONAL DEVELOPMENT

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1. Introduction :

In the economic development plans adopted in most of the under-developed countries the preocupation of the planners has been with the question of growth in its aggregate national setting, that is, with the rapid growth of total and per capita income. This approach to national economic planning ignores a very vital aspect of development process, viz., the spatial dimension of growth, which is concerned with the question : where growth is occurring ? Regional science and its offspring regional planning is concerned with this aspect of development.

It has been observed that the process of development starts in and tends to be concentrated at certain points over space. Then through various linkage between different points in space this process gets diffused over the entire economy. Regional planning is based upon the belief that the system of linkage over space can be influenced through appropriate policy measures to achieve pre-defined goals.

2. Problem of Metropolitan Regional Development :

Rapid urbanization, both as cause and effect, has always accompanied economic development. The high rate of urban growth creates a number of socio-economic problems requiring systematic and concentrated efforts for urban planning. The urban problems arise out of two related phenomena : that of rapidly increasing urban population on the one hand and that of concentration of population in a few big metropolitan centres on the other. The high rate of natural population increase in urban centres is reinforced by the exodus of population from rural areas in face of increasing economic pressure and lack of employment opportunities in rural areas. The expansion of productive activity in the urban areas fails to keep pace with the growth of urban labour force resulting in the concentration of unemployed labourers in urban centres. Moreover, the failure of the authorities to expand public utilities and

facilities commensurate with their demand, sometimes because of lack of proper planning, but mainly because of resource constraint, has made living conditions in metropolitan centres miserable and created a host of social evils as well as political unrest. The efforts at metropolitan regional planning have to be viewed against this background.

Metropolitan Centres as Growth Poles : A most useful concept in regional planning is that of metropolitan regions. These metropolitan regions are large urban centres of industry, commerce, and administration along with their immediate region of influence called hinterland. These metropolitan centres are regarded as growth poles which transmit economic impulses originating in them to the hinterland through a web of economic transactions. From this point of view metropolitan regions become a most powerful catalytic agent in the hands of the planners to initiate and diffuse the process of development. On the other hand the extent and pattern of growth of the metropolitan centres depends upon the resource potential of the himterland. Thus neither the urban unit, whether large or small, can be visualised in isolation nor the problem of the surrounding rural regions b_e tackled independently. A programme for metropolitan and regional development requires a deep study of their relationship as a pre-requisite to action.

3. Process of Regional Development :

There is a large and growing literature on the process of regional development. The theory of regional development is largely an adaptation of international trade theory in the context of inter-regional relations. The process of regional development is sufficiently well known to be repeated here[1]. A few comments would, however, not be out of place here.

Regional studies have led to the conclusion that "there has been a discernible pattern of regional specialization, characterizcd by evolving urban sub-systems with their associated hinterlands—that vary in form and size and that represent a hierarchy of functionally interrelated activity clusters within the total economy[1]." If the economic activities over space are strongly integrated, rapid and sustained national growth should lead to the trickling down of growth impulses from the centres to their surrounding urban fields down the urban hierarchy carrying the growth process to the lagging regions.

Breakdown of the Trickling Down Process : It has been suggested that there is little trickling down effect of this kind in India[2]. Instead, it

is claimed, there is a deep-seated polarization between metropolitan centres and surrounding villages. As a result all development tends to be concentrated in a few major cities, while the village economy remains stagnant, resulting in the classic position of development dualism.

The fact is that the relationship between metropolitan and regional development is still far from clear. The question of the impact of urban society upon village life in India has been examined in detail by Lambert [3]. After an extensive survey of existing literature he concludes that "the impact of urban areas par se on villages seems from available literature to be less than that might be expected [4]."

While it may be true that the area of influence of the cities in India may be smaller in comparison to the advanced, highly urbanized economies of the West, it would be a distortion of facts to say that Indian villages are totally impervious to the urban influence. There is close town-village relationship in India, though the integration may not be as high as in other advanced countries. Moreover, the situation is changing rapidly with better transport facilities and increasing channels of communication between towns and villages.

However, the fact remains that industrial growth in India has remained highly localized and has not permeated to the periphery. The explanation is not in the absence of urban hierarchy that lies between the metropolis and the village in India, but because the growth impulses originating from the metropolitan centres have themselves been rather weak. The Indian town is par excellence a service centre—administrative, commercial or trade—rather than an industrial centre. Hence the generative functions of the city have not been powerful. Thus metropolitan growth in India, instead of expanding employment opportunities in the rural areas themselves has only resulted in attracting a huge inflow of population from these areas.

The urban-rural dichotomy is a concept illsuited to the study of socio-economic problem in India. Rather there is a continuity of social and cultural moors as we move from rural to urban areas. The larger part of the urban population retains the traditional behaviour pattern, which is regarded as distinctive of tradition bound village life. From the point of view of social amenities it can be said that there is a clear rural-urban dichotomy. Living conditions, however, in large parts of Indian cities are worse if anything than the rural conditions.

If the rural-urban dichotomy is taken as a measure of the concentration of agricultural and industrial activities in different areas, it fails to present the development problem in the correct focus. The two aspects of development process cannot be viewed in isolation.

In short the view that regards village societies as isolated, stable economies may have been justified in the past, but fails to give a realistic picture of the present.

4. A Policy Framework for Regional Planning

The programme for regional development has to be based, in our opinion, upon the study of the following aspects :

1. A study of the growth potential of the region based upon its resource endowment and locational aspects.
2. What is the optimum pattern of urban centres along with their urban fields for the development of the region ?
3. What are the most important economic relationships between the urban centres and their hinterland and how they can be strengthened ?
4. To what extent the actual settlement pattern approximates the optimum pattern and what types of changes are required and where ?
5. What is the appropriate institutional and organizational structure for regional development ?
6. An estimate of the needed financial resources and how they have to be mobilised.

Attention shall be confined in the following pages to only one aspect : What is the desirable locational pattern of new industrial activities for an underdeveloped country like India ?

The Alternatives : A major decision that the planner has to take is where the new industrial activities have to be located. The rural-urban dichotomy fails to point out the centering alternatives which are open to planners. The issue has been put in the correct perspective by Lewis who thinks of the centering alternatives open to a developing economy as a continuum that stretches from the smallest village to the largest metropolis [5]. Broadly, the locational model may assume any of the three forms : village centred growth, metropolitan centred growth and

town centred growth. While the decision will have to be taken within the framework of socio-politico-economic goals of the development plans, the implications of the alternatives in terms of the pattern and rates of growth, costs involved, and their impact on the settlement pattern and migration of population need careful consideration [6].

Concentrated Centralization: Several authors have supported a pattern of concentrated centralization for rapid development. The argument put forward is that since the resources available to the underdeveloped economies are limited they cannot be frittered away on the diffusion of activity over space but have to be concentrated at a few selected growth poles. The growth generating aspect of these metropolitan centres has been emphasized [7]. The established metropolitan centres possess certain advantages in the form of external economies that attract the private entrepreneur. Among these may be mentioned the existence of a concentrated market of an established business community, of financial, transport and other marketing facilities, power and other amenities, and of a pool of skilled and unskilled labour. The private entrepreneur cannot ignore the cost implications of locational decisions.

This policy of concentrated centralization is not suited to Indian conditions. In the first instance, the big metropolitan centres of Bombay, Calcutta, Madras and Delhi have crossed the optimum size and there is need for a policy of systematic dispersal of existing plants out of these cities. In the second place, the requirements of socio-economic overheads, especially for industrial housing, would be enormous in this process. Moreover, the grave social and political disadvantages of such a pattern cannot be ignored. Finally, such a pattern of concentrated growth would not be in consonance with the broad objectives of Indian plans which favour a policy of regional balance and widest possible sharing of the gains of development. Thus, the centralization alternative would be politically unacceptable in India.

The other extreme alternative of village centred growth also seems to be unsuitable. It does not need reiteration that the industrialization process cannot be carried to each and every village. This pattern while involving much larger cost than any other alternative, would doom India to a state of low productivity and low incomes for ever. While there may be some scope of developing village and cottage industries in the rural areas, the village or even a cluster of villages would fail to provide a market enough to make the modern enterprise, even on the

small scale, a viable unit. The village development plans have to be agriculture oriented.

Integration of Rural and Urban Development : Thus, the vital problem in regional planning is that of integrating the programmes for industrial and agricultural development, by strengthening the economic linkages between the urban and rural economies. William Bredo has suggested the lines on which this integration has to be brought about [8].

Rural development programmes have to concentrate on raising agricultural productivity. This would require an increasing supply of farm machinery, fertilizers, pesticides and similar other inputs produced in the industrial sector. The establishment of firms processing farm products would tend to make agriculture more commercial and diversified. Machine and repair shops would have to be provided close to the agricultural areas. Better transport and communication facilities would not only bring about greater integration between rural and urban economies, but also provide incentive to farmers to raise productivity by expanding markets.

This programme of creating and strengthening economic linkages would not only help raise agricultural productivity so vital for economic development, it would also open up new vistas for industrial growth by expanding markets for industrial products in the vast rural areas.

A Palicy for the Development of Intermediate Centres : In this process of creation and strengthening of economic linkages, the role of intermediate centres cannot be overemphasized. These intermediate centres would act as service centres to the surrounding villages. Thus, on the one hand they would transmit growth impulses originating from regional centres and on the other they would help exploit the resource potential of the hinterland on the other. In addition, they can be an effective means of regulating the volume and direction of out-migration from the villages. It is in this way that these intermediate towns would occupy a strategic position in the urban hierarchy in bringing about an integrated modernized economy.

These intermediate service centres or 'mandis' would have a population range of 20,000 to 50,000. Such potential centres already exist in our country in the shape of tehsil or block headquarters in the administrative hierarchy. But as they are poorly developed, they fail to perform their strategic functions. They need to be strengthened through the creation of a better infra-structure in the shape of better transport, communication, educational and power facilities.

While these intermediate centres, with a population range of 20,000 to 50,000, would be suitable for the growth of certain traditional and even modern industries of a small scale with the objective of meeting the growth requirement of surrounding villages, the new industrial enterprises, medium and large scale, would require urban centres and markets of a bigger size. Various views have been expressed regarding the critical minimum size of towns which may become centres of growth of industrial complexes. While some favour a town population of 250,000 to a million, there seems to be general agreement that these towns have to be in the range of 100,000 to 300,000 [9]. Cities of this size are expected to provide the conditions and climate for the growth of modern industries.

While studies on rural-urban relationship on a large scale would lead to the selection of an economically optimum pattern of settlement the existing spatial pattern provides a relevant frame for locational planning [10]. According to the 1951 Census, there were 107 cities in India with a population of one lakh and above, and 141 cities with a population of 50,000 to 100,000. In addition there are about 515 towns having population between 20,000 to 50,000 and 1927 small towns having population below 20,000. While new towns may have to be created in future, especially around the big project cities, there is an existing hierarchy of cities and towns in India which can form the base for a policy of urbanization and industrialization. This is a policy which commends itself on all accounts.

5. A Suggested Urban Hierarchy for India :

Thus, the most suitable locational policy for industrialization would be an urban hierarchy consisting of five stages :

(i) At the top would be the present metropolitan centres where population has crossed the million mark. While these centres would continue to be the industrial and commercial heart of India, it would be desirable to control their expansion by giving incentives to existing enterprises to migrate out of these centres.

(ii) Next in the hierarchy would come cities in the population range of 300,000 to a million. They would serve as important nuclei of industrialization. For them a policy of controlled expansion would have to be followed.

(iii) The third stage would consist of towns having between half a lakh to three lakh population. Most of the new industrial enterprises should be set up in and around these towns,

(iv) In the fourth stage would be what have been called the intermediate centres with a population between 20,000 to 50,000 which would cater for the needs of the surrounding rural areas.

(v) At the bottom would be the innumerable villages of India, where the bulk of India's population would continue to reside and which would remain largely agriculture dominated.

Considerable research on human settlement pattern and rural-urban relationship in India is required before we can adopt a plan for the optimum urban hierarchy. We have considered above only the main centering alternatives open to the Indian economy and indicated the broad lines along which development may take place in future.

Notes and References :

1. Myrdal (*Economic Theory and Under-Developed Regions*) has explained the growth mechanism through the operation of back-wash and spread effects resulting in regional inequalities. Hirschman (*The Strategy of Economic Development*) has elaborated the same mechanism in terms of polarization and trickling down effects. The entire process of regional development has been summed up by Friedmann (*Regional Development Policy : A Case Study in Venezuela*).

   Design for a Worldwide Study of Regional Development, Pp. 18-19

2. See Brian J. L. Berry, 'Policy Implications of an Urban Location Model for the Kanpur Region', Paper Presented at the Intemational Seminar on Urban and Industrial Growth of Kanpur Region, 1967, in P. B. Desai, J. M. Grossack, K. N. Sharma (edn.) *Regional Perspective of Industrial and Urban Growth : The Case of Kanpur.*

3. R. D. Lambert, 'The Impact of Urban Society Upon Village Life' *in India's Urban Future* edited by Roy Turner.

4. *Ibid.*, p. 140

5. John P. Lewis, *Quiet Crisis in India*, Ch. 7

6. The centralization vs. decentralization issue has been discussed in detail in several of the papers included in Tumer's (ed.) *India's Urban Future.* Attention is particularly drawn to the articles by Sachin Choudhury, William Bredo, Britton Harris and Tarlok Singh.

7. See the Paper by Rodwin in *Regional Economic Planning* on this point.

8. William Bredo in Roy Turner (ed.) *op. cit.*

9. For different views on this point see the articles by Bredo, Harris and Winster in *India's Urban Future, op. cit.* and John P. Lewis, *op. cit.*

10. See the paper by Brian J. L. Berry, *op. cit.*

RESOURCE FRONTIER REGION :

CONCEPT, TECHNIQUE OF DELINEATION AND STRATEGY FOR DEVELOPMENT*

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1. Concept

1.1 Regional change and differential area growth are nothing new. Regions are often extremely different both in present and potential development possibilities. Differing natural conditions such as structure, topography, climate, vegetation and minerals which are often compounded by the cultural features such as development of transport system, make a concept of regional equality impractical. In a transitional society, at the initial stage, for a variety of reasons, activities tend to concentrate in few centres. "These centres not only grow so rapidly as to create problems of an entirely new order, but they also act as "Suction pumps" pulling in the more dynamic elements from the more static regions" [1]. This static region is thus relegated to a second class peripheral region. It is placed in a quasi-colonial relationship to the centre, experiencing net out-flows of people, capital and resources to the centre where economic growth tends to be rapid sustained and cumulative resulting in wide income differentials. This simple structural form of spatial economy "centre-periphery dichotomy" in due course presents more complex picture and five so called development regions [2] may be distinguished. They are *(i)* Core regions, growth poles or metropolitan regions *(ii)* Upward transitional areas or Development axes *(iii)* Downward transitional areas or depressed areas *(iv)* Resource frontier regions and *(v)* Special problem regions.

1.2 Each of these categories are characterised by specific sets of problems. For example, in core regions, one of the main tasks is the rationing of space among competing uses which is the traditional concern of physical planning whereas, in resource frontier region, the main task is to stimulate social and economic development by activating

unused resource capabilities. They are the growing areas of the periphery and may contain the seeds of future metropolitan centres. "A variety of measures affecting transportation, electric energy, water and other services must be brought together into a viable program in order to raise the region's economic potential. This approach stands in sharp contrast to the more "adaptive" type of planning which tends to predominate in the core regions" [3], and may be termed as developmental planning [4]. A national policy of regional development must, therefore, recognise not only that the problems and methods of development will differ within each region but also that actions taken in any of these areas will have repercussions in other regions. "That is to say, it must be comprehensive by considering the national economy in its spatial dimensions and regional economies as sub-systems having internal balances and external flows" [5].

2. Technique of Regional Delineation :

2.1. These problem sets, often overlapping, are of mainly retrospective interest since they throw light only on the origin and present state of regional problems. Since regional planning and development aims at overcoming these problems within the framework of national plan at the regional level, one of the most essential tasks, therefore is to define the regional framework within which the integrated development would take place to achieve these welfare objectives. A great plethora of literature is available on the techniques of regional delineation coming from Geographers, Economists and Planners, some of them using most sophisticated statistical and econometric techniques of analysis, but no workable set of true and all-purpose planning regions have been established. Since application of these new methods meets with some very serious obstacles such as "lack of proper statistical data, difficulties in the use for research purposes of the most developed eeonomic methods aiming at the programming of economic activities and finally, the lack of properly defined concepts and theories of socio-economic spatial phenomena" [6]. In a paper on "Research frontier in urban geography" prepared for the Committee on urbanization of the Social Science Research Council in 1961, Prof. Berry, an eminent specialist and enthusiast of the new methods, in his review on the progress achieved by the use of new techniques has indicated that "although urban geography with its theoretical concepts (including among them the theory of central places) belongs to the better developed branches of human (economic) geography

and is comparatively well prepared for application of the various mathematical methods of analysis yet the results so far obtained are in most cases—when critically appreciated—tautological, trivial or negative. The greatest successes were achieved in those studies were the use of probabilistic calculus had been possible, i. e., when the assumption of scholastic background had been in fact realistic. But this clearly indicates that the whole body of our theoretical concept and conceptions is unsatisfactory indeed" [7].

2.2. The efforts aiming at the formalization of development region may be developed in several directions but the terms and criteria defining "region" depend on the accepted aims and chosen tools of specific study and will differ in different types of regions. Thus development regions simply have maximum closure in respect of a given problem set at a given time (socio-economic time-space) and their integration, and balance when well-established, *even if temporary*, define the existence of a region. In regional planning, therefore, we deal with an elusive entity whose boundaries cannot be drawn with precision or permanency as its spatial configuration will change during the phase of economic development. It is, therefore, necessary to recognise that regions for resource development must remain flexible.

2.3. Regional approach to resource development is specially significant in a large country like India where regional variations in mineral and power resources, agricultural and economic conditions and transport facilities are well marked and the economy is poorly articulated, poorly integrated and resources are inefficiently and partially used resulting in sharp disparities in regional development. "In India, the claim for a regional development is based on several considerations. Geographically, the country comprises a vast area with significant variations in its natural endowment. Climatic and soil differences are very pronounced in different parts of the country demanding different patterns of economic development. From the economic standpoint, the factors of production are not equally distributed. Capital and enterprises are available in large measures in certain provinces enabling them to steal a march over the others in exploiting the available resources. There are also glaring differences in respect of social welfare, as the total quantum of the socially necessary work is not equitably distributed over the entire country due to the unevenness of its economic development. Therefore, a regional approach seems to be the only device for redressing the

oddities as far as nature would permit" [8]. After independence, India faced the pressing need of raising the teaming millions of its people from poverty and stagnation and started all round economic development to boost up the national economic growth which implies structural changes of the economy. The Third Five Year Plan sets at length the significance of balanced regional development which in all intent and purposes should achieve the spatial structure of the economy which at any point of time, is judged to be satisfactory for promoting and sustaining an efficient process of economic growth. "Spatial organisation is thus regarded as a means for approaching the ultimate economic purposes of a society" [9]. It is with this background that integrated development plans for resource development of major resource regions are being attempted based on the resource distribution and potentialities. A close look at the map of India reveals that there is a marked concentration of the basic minerals required for the development of Iron and Steel industry in an area which extends roughly between latitudes 18°N to 25°N and longitudes 80°E to 87°E. An attempt has been made by the Town and Country Planning Organization [10] to identify this rich resource region on the map of India by the method of "boundary girdles" based on multitude of factors like Structure, Physiography, Climate, Vegetation, Soil types, the analysis of the distribution of human and natural resources—their pattern of development and potentials, cropping pattern, and "levels of economic development" [11], which has further been adjusted to the administrative boundaries, keeping in view the administrative need of the regional plan. The main characteristics by which the region has been identified based on the multitude of factors mentioned above may be summarised as follows :—

Physical Characteristics :

2.4 The area which is roughly limited by the Wainganga and Godavari rivers in the West, the Sone in the North West, the termination of the plateau and presence of the alluvial plains of the Ganges and the coastal plains of Orissa in the North and East respectively, differs from the plains stratigraphically, structurally and physiographically. The area is mainly formed of Archaean, Dharawarian and Gondwana systems rich in metalliferous, non-metalliferous minerals and coal. Practically, the whole of the area is covered by red soil beyond which black soil continues in the West and alluvial soil in the North and East. Climatically, according to Koppen entire area comes under

Tropical Savannah with monsoonal modification, the northern limit of which is marked by the line running across the root of the Peninsula beyond which Cwg. (warm, dry winter) continues which coincides very nearly with the line recognised by Narmand, K. Ahmad and Prof. Stamp as dividing "continental" from "Tropical India", [12] with heavy rainfall resulting in rice as the principal crop. "The western limit of rice growing block is more or less determined by the 140 Cm. isohyetal line", [13] which corresponds roughly to the courses of river Sone, Wainganga and Godavari. "Wainganga thus marks the transition from the agriculture of Maharashtra, with its uncertain rain but moisture retentive "regur", its wide plains and commercial bias, to the realm of paddy in the better watered but more broken North East Peninsula" [14]. Predominantly, tropical moist decidous "Sal" forest area, to the North and West of which character of vegetation changes to tropical dry decidous and to the wetter east to the typical rain forest.

2.5 These physical characteristics have led to the extra-ordinary concentration of natural resources—minerals, forests and water resources in fair proximity. The area contains 37,373 million tons (87%) of coal, 4,500 million tons (80%) of Iron ore, 70 million tons (56%) of Manganese ore, 453 million tons of Limestone and 100 million tons of Dolomite [15]. Apart from these, it contains 100% reserves of coking coal and good reserves of alloy minerals, fluxes, refractories, Bauxite and has a quasi-monopoly of mica mining. The dominance of the area is again well marked in the output of coal, iron and manganese which are 92.4%. 74% and 49% respectively. The area is marked by luxurient growth of dense forest rich in valuable timber and other forest products and is also the main producer of Indian lac. Its innumerable rivers—the Damodar and the Barakar, the Subarnarekha and the Mahanadi, to name only a few, provides a resource of an enduring nature having immense possibilities for multi-purpose development which has already received some attention under the successive five year development programmes.

Socio-economic Characteristics :

2.6 The effect of the structure, relief, climate and vegatation is well marked on the life and occupation of the people and economy of the area. Geomorphologically, there is no doubt, that the whole region would be extremely interesting if it were known well and exploited

properly "but geographically speaking it is "terra incognita", rocky, jungly isolated, backward and almost empty", [16] and stands out as an island characterised by isolated tribal and subsistence peasant economy with only a few significant pockets of industrial centres not reflecting the level of development of the surrounding areas" [17]. Shifting cultivation supplemented by forest produce is prevalent. The collection of minor forest products—bamboo, charcoal, myrobalans, lac, leaves used for covering "Bidis" and fodders are extremely important element in the regional economy.

2.7 As mentioned earlier, the area has the reserve of natural resources too multifarious to catalogue and has not unmixed blessing of structure and topography. Industries stimulated by these locational advantages started earlier and has gathered momemtum after independence when India attempted towards planned development of her economy and consequently numerous industrial pockets have sprung up making it one of the most important industrial regions of India. Besides this, if the development of heavy metallurgical industries, stimulated by the recent aggressions on Indian frontiers, is carried on in a systematic manner, the region may emerge as Monsoon Asia's leading heavy industrial complex. The expansion of existing steel plants at Jamshedpur and Kulti, the establishment of the three steel plants at Bhilai, Rourkela and Durgapur, the Heavy Machine Tools Factory and High Tension Insulator Plant at Ranchi, the Indian Explosives Factory at Gumia, the rapid growth of metal goods industries at various centres within the region and the proposed locations of the biggest steel plant at Bokaro and Aero-Engine Foctory at Koraput show the trend of future location and for all these and other industrial developments, this heavy mineralized zone, if properly exploited will serve as a source capable of triggering intensive economic growth of the nation. Thus from the point of view of resource development, it may be seen that the location and complementary character of its natural resources —minerals, forests and water have imparted a certain unity and distinctiveness to the whole area and suggest that the entire area should be developed as a single unit to promote "Industrial Symbiosis".

2.8 Keeping in view the undulating nature of the terrain, poor soil and vast mineral and forest resources, the possibility of sound agriculrural base weighs little in favour and it must, therefore, continue

to remain the principal area of major industrial developments. Consequently, the increasing impetus which this region will get, will cause radical, social and economic changes leading to the changes in agricultural practices and production, in settlement patterns, in population composition and migration where a process of "infilling" from the surrounding densely populated areas besides the rehabilitation of refugees in Dandakarnya will start.

2.9 The foregoing physio-socio-economic characteristics of the area stamp a certain unity and present minimum disparities within and maximum distinctiveness from its surroundings in respect of regional character and problem of development, marking it out as an important "macro-economic region" of the country. Its economy constitutes a "WHOLE", that is far more than the sum of its parts in respect of forestry, minerals and power and to a limited extent in agriculture in which it has a diversified resources within the region. None of these components could function as it does except as a part of the regional complex, any more than the region itself or state could function as it does without being a part of the national economy. The South East Resource Region, so delineated, has an area of approximately 1, 40,000 sq. miles with a population of 33.75 million and a density of 240 persons per sq. mile, presents a paradox—land of poverty and stagnation in the midst of plenty mainly because its resource potential has remained for the most part untapped and thereby remained backward and inaccessible, and poses a dilemma as to its relative regional standing.

The region has been by-passed in terms of any major agglomeration of industry, population or economic activity and is far less than the national average in terms of population density, per capita income and many other criteria of regional standards some of them have been indicated in Table 1. The Region is marked by low productivity per unit of labour and land resulting in very low standard of living, nutrition and health deficiencies, high rate of infant mortality, low life expectancy, high level of indebtedness, lack of means and outlook for major change in life position, sub-standard housing, increasing income imbalances and high rate of selective outward migration of the cream of population leading to long term deterioration of human resources. People are mostly simple, backward, tradition-bound with narrow outlook and mostly illiterate (82.20%).

TABLE 1

Selected Distinguishing Regional Characteristics in Relation to India

Indicators	India	Region	*Index ratio of variation
1. Density of Population per sq. mile (1961)	370.00	240.00	1 : 0.65
2. Percentage of Urban Population (1961)	18.00	9.40	1 : 0.52
3. Percentage growth of Population (1951-61)	21.50	21.80	1 : 1.10
4. Percentage growth of Rural Population (1951-61)	21.60	17.30	1 : 0.80
5. Percentage growth of Urban Population (1951-61)	26.40	92.93	1 : 3.52
6. Percentage of total workers (1961)	43.00	51.77	1 : 1.20
7. Percentage of male workers (1961)	64.40	51.80	1 : 0.81
8. Sex Ratio/1000 males (1961)	941.00	972.00	1 : 1.03
9. Percentage of Tribal Population (1961)	6.70	31.90	1 : 4.76
10. Percentage of Agricultural workers (1961)	69.52	78.00	1 : 1.12
11. Percentage of Forest land (1961)	17.29	37.78	1 : 2.18
12. Percentage of Cultivated land (1956-57)	52.70	39-60	1 : 0.75
13. Percentage of Cultivable land (1956-57)	60.15	42.28	1 : 0.70
14. Per-capita Cultivated land in acres (1956-57)	0.86	1.06	1 : 1.23
15. †Per-capita Income in Rupee (1955-56)	255.00	205.50	1 : 0.80

* National figure has been taken as a unit of individual indicators.

† Based on data given in *Inter district and inter state income differentials 1955-56*; Occasional Papers No. 6 Published by National Council of Applied Economic Research.

2.10 Besides, the low percentage (9.40%) of urban population, the regions has no big cities which would act as the pillars of national economy, where lucerative export and other domestically oriented industries may function with maximum efficiency and provide the population services, amenities and facilities of metropolitan standards. Out of 138 towns or town groups [18] 70 (50.70%) are industrial towns 57 (41.30%) are service towns and 11 (8.00%) are trade and transport towns. Out of the 70 industrial towns, only 32 (45.70%) are manufacturing towns while the rest are mining, plantation, artisan and construction towns.

Besides this, 35 i.e, 25.30% of the urban centres are marked by "high agricultural ratio". Moreover, analysis of Table 2 reveals that the predominant functions are either accentuated or highly accentuated in 80.50% of the towns, whereas, in only 19.50% function are either moderately or highly balanced. "All these figures imply that occupational distribution in an overwhelmingly large majority of cities or towns was lopsided and by inference their economic base must be weak" [19].

TABLE 2

Class of Cities/ Towns	Total No.	Functions				Predominant Function			
		Highly balanced		Moderately balanced		Accentuated		Highly accentuated	
		No.	%	No.	%	No.	%	No.	%
I	6	1	16.65	1	16.65	1	16·70	3	50.00
II	3	2	66.70	—	—	—	—	1	33.30
III	27	1	3.80	3	11.10	9	33.30	14	51.80
IV	41	3	7.40	7	17.00	9	22.00	22	53 60
V	53	4	7.50	5	9.50	10	18.90	34	64.10
VI	8	—	—	—	—	2	25.00	6	75.00
Total	138	11	8.00	16	11.50	31	20.50	80	58.00

The region is thus, marked by the preponderance of economically non-viable smaller urban communities, unable to generate sufficient income to provide essential services to their people and to maintain their sustained growth. Even few urban centres that have sprung up as industrial nuclei recently, have neither developed in size nor in function to bring in large surrounding tracts of rural areas into spatial interactions with them. This has rendered development spotty and uneven and one gets the impression that the region, as a whole, has not "grown upto its size" for historical and structural reasons. Peripheral location from the metropolitan core, there is an immense stretch of impenetrable forest interspersed here and there with small settlements, with flat topped hills, a region of abundant rain and rapid rivers, thinly peopled by high percentage (31.90%) of tribal population, a region rich in bird and scenic beauty but difficult of access and, therefore, is not considered prime land for settlement earlier.

2.11. South East Resource Region, thus serves as an exemplary case of Resource frontier development. The region has diversified and abundant reserves of complementary resources to withstand and adapt the vagaries of the national and international markets, its extensive hard wood forests, unlimited supply of fresh water, and a location which, though peripheral to the country's main centres, is readily accessible by land and sea. "Resource Frontiers are "open" regions to an unusual extent" [20]. Since the region will produce very little of what it consumes and will export to national and international markets most of its products, consequently its import and export quotient will be high. Its location in close vicinity of four major ports of India, viz., Calcutta, Vishakhapatnam, Paradeep and Haldia (proposed) with a very good rail and road connections provides an unique advantage. These locational advantages coupled with rich resources, if poperly integrated and developed in a strategic sequence would be capable of providing the basis for a major industrial complex and of making significant contribution to boost up the national economic growth.

2.12. Regional planning problems are thus characterized by the necessity to colonize and to spark the economic growth—as an intermeshed operation within the same time-span and finally how this remote but richly endowed region may be harmoniously woven into the fabric of national economy so that the goal of self-sustaining cumulative growth and a gradually high standard of living of its people can be achieved.

3. A Strategy for Regional Development :

3.1. The main elements of a strategy for regional development may be stated as follows :

(*i*) Create new "locational matrix" on the settlement frontier based on hierarchy of size and functions. The minimum critical size for each size of towns must be achieved as quickly as possible so that people start getting necessary amenities and facilities in their community life which will help in inducing industrial growth in time.

(*ii*) Diversify the economic base to impart a measure of economic viability to the existing towns and cities, to ensure their sustained growth and finally to transform the resource frontier to the permanent base of settlement.

(*iii*) Create adequate and balanced transport and communication linkages to reduce physical isolation and encourage export, which is the life-blood for resource frontier region.

(*iv*) Reduce the cost of living. High living costs are typical for resource frontier regions and immediately reflects in production costs and render the competitive position of industrial location more difficult to sustain. Since high living costs are usually the result of an insufficient local supply of basic commodities and services and, therefore, encouragement should be given to develop sources of local food supply, to provide adequate low cost public transportation and housing, etc., and to create a market for locating consumer services in the region leaving a margin for effective competition.

(*v*) Conserve the natural resources. Resource development aims at proper utilization and optimum conservation of the resources, so that maximum benefit accrues to the community. South East Resource Region presents a special problem in this respect. Its rugged terrain and torrential rainfall are conducive to rapid surface run-off and erosion of the top soil. Again, exploitation of minerals results in derelict land and if left uncared may affect agricultural production. Similarly, water resources must be protected against pollution and loss through seepage ; forests have to be protected from reckless cutting and destruction. All these call for a constant practice of the tested conservation techniques ; protection of supplies, exploration for new sources, elemination of waste, use of low grade resources, improvement of quality (up-grading) substitution and recycling or multiple use [21], which will ultimately pave the way for sustained development programme.

(*vi*) Alike South East Resource Region, the population of the Resource Frontier Region, in general, suffers from low level of education, technological advancement and skill as well as lack in their aspiration for major change in life position. Such a region, therefore, is going to lean heavily on migrant manpower and skill with the local population put into "secondary roles" at least during the initial stages of economic and industrial development. Problems of adaptation and adjustment would inevitably arise and would require to be tackled promptly so that the "sons of the soil" could be equipped in skill to shoulder the responsibility of economic development, with the outsiders.

This requires the greater part of limited resources to be allocated to "social investment" rather than to "economic investment" [22] in order to train them to fit in the fabric of new life brought by heavy industrialization and urbanization.

(*vii*) To achieve abovementioned strategies, it is imperative to establish regional authority for development, for plan preparation and implementation. Since S. E. R. Region incorporates the area of four States, creation of such an authority would involve complicated legislative and administrative problems, such a measures, it was felt would not be conductive to adopt in the present circumstances. "The future of democracy in India hinges on the ability of the different States to co-operate with each other in nation-building. Frictions do appear and will appear, particularly from the fact that different parties now administer different States. But the resolution of the problems like DVC (between West Bengal and Bihar), Bhakara (between Haryana and Punjab) etc. can be achieved by co-operative efforts through establishment of inter-regional bodies under the guidance of the Central Government" [23].

It has been decided, therefore, as an alternative to prepare the plan under the auspices of a "High Powered Co-ordinating Committee" consisting of the concerned Ministers of the concerned States under the Chairmanship of the Member, Natural Resources of the Planning Commission under whom a Joint Planning Board would function whose members would be representatives of the concerned State governments and other related agencies including the Central Government Agencies which would direct and supervise the plan prepared by the Central Town and Country Planning Organisation [24].

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* An earlier version of this paper was contributed to the Summer School in Geography, Patna, October, 1967, and has also been included for publication in its Seminar Proceedings "Studies in Indian Economic Geography"—Editor. Dr. P. Dayal.

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11. It is based on the paper "*Three approaches to the Mapping of Economic Development in India*" by J. E. Schwartzberg ; Annals of the Association of American Geographers Vol. 52, P. 455-468. He has established a set of ad hoc regions on the basis of field experience combined with the subjective assessment of a wide variety of data which has been grouped under three distinct rubrics ; (*i*) Structural indicators, (*ii*) Productivity indicators and (*iii*) Consumption and Welfare indicators for the development index approach.

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2) Membership Fee	Rs. 45.00	2) Stationery	3.75
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Sd/- B. C. Chattopadhyay

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a) Recpt. Book No. 1	Rs. 180.00	3) Stationery	24.65
b) Recpt. Book No. 2	Rs. 779.80	4) Travelling	23.10
		5) Bank charges	15.90
		6) Misc.	25.00
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Corrigendum

In Vol. I, No. 1, 1968. Page 33, Table 1. Caption should be read as "Optimum Production Pattern".

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