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REGIONAL DISPARITIES AND STRUCTURAL CHANGE  
IN AN  
UNDERDEVELOPED ECONOMY:  
A CASE STUDY OF INDIA.

Mrs. Madhavi Majmudar.

Ph.D. Thesis submitted  
to the Faculty of Arts,  
University of Glasgow.

30th May, 1974.

Volume I



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Summary

The importance of the study of regional disparities in an underdeveloped economy like India undergoing structural change can be emphasized from the three main aspects. 1) The regional income data and the estimates of regional disparities in the underdeveloped economies are available for very few countries. Hence, a study of regional disparities in India can throw light on the process of regional inequality during the development process. 2) In the context of the Indian national development itself, the importance of the study of regional disparities is crucial because in a large country the national aggregate averages make little sense without understanding the regional averages from which it is aggregated. 3) An examination of regional disparities has also policy implications. The nature and scope of regional policy in India needs to be assessed in relation to the empirical study of regional disparities. Whether or not the plan documents specify the regional goals, actual regional allocation of resources is implicit in the national planning process as more than half of the total government expenditure is incurred through States and as the central assistance is an important source of financing the State plans. An empirical evaluation of the regional allocation of resources through State plans under planning is essential in understanding the framework of regional policy and planning in India. An examination of this framework can provide some guidelines on the directions in which future regional policy must evolve, especially in the context of political and economic changes. In accordance with the importance of the subject the study is broadly divided into three parts. Chapters I to IV analyse the available state income data to establish the structure of regional inequality in an underdeveloped economy. It attempts to throw additional light on the factors that are different in the context of national and regional development of the underdeveloped economy from

those that characterized the industrialized economies in their early stage of development. An analysis of income data is followed by a disaggregated analysis of regional disparities in the two major sectors of manufacturing and agriculture in Chapters V, VI and VII. Such analysis is essential because the regional income data at sectoral level reflect the regional differences in the industry (or crop-mix) mix and the productivity differences in the various sub-sectors. Secondly, the importance of the two major sectors in national and regional development differs. Chapters VIII and IX examine the issues of regional policy in India and then empirically evaluate the role of State development expenditure in regional income change and the sectoral allocation of government expenditure in regions. It also attempts to give a few guidelines on the regional policy in India. We must point out some of the limitations of the study. Since the subject of study covers a wide area, it has not been possible to analyse all the aspects in a specific area such as agriculture, which can be a separate subject of the study by itself. Limitations also arise as the regional income data are available for a few years only. Because of the nature of the study, it also became necessary to compile and use data from various official sources as well as the data published by the research institutions and individual scholars in the field.

Regional Disparities and Structural Change  
In An Underdeveloped EconomyA General Hypothesis.

We shall examine in this chapter the general theoretical hypothesis regarding the regional disparities and structural change. In Section I, we analyse some of the economic literature on the subject. In Section II, we discuss the importance of study of regional disparities in a large country such as India and discuss the choice of relevant regional units for such a study. Section ~~Section~~ Section III gives a brief outline of the chapters.

Section I: Regional Disparities and Structural change:  
A general Hypothesis

There is considerable economic literature in which a hypothesis about the regional disparities during the development process is to be found. We shall review here some of the literature which has direct bearing on the subject of our enquiry. The location theory<sup>I</sup> which deals with the optimum location of firm and the general location theories<sup>2</sup> that analyse the spatial distribution of economic activity analyse the regional problem in a different context. Hence we shall not discuss them here.

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I. The following important works may be mentioned here:

- a) Weber, Alfred, "Theory of the Location of Industries", Chicago, 1929.
- b) Hoover, E.M., "The location of Economic Activity", McGraw Hill, 1948
- c) Isard Walter, "Location and Space Economy", MIT Press, 1956

2.

- a) Christaller, Walter, "Die Zentrale Orte in Sueddeutschland", 1933 (Translated by C.W. Baskin as "Central Places in Southern Germany")
- b) Losch August, "Die Raumlische Ordnung der Wirtschaft", 1940, (Translated in English as "Economics of Location") Yale University Press, 1954.

We may start with a brief discussion of the regional theory which basically applies international trade theory to regions. It is argued that regions, after all, are subject to the same sort of trade flows as nations. The main difference is that, being generally smaller than independent nations, and unprotected by tariffs, they are all the more dependent on the trade. Ohlin<sup>1</sup> considered inter-regional and international trade as essentially the same, the latter being only a special case of the former. The regions will then specialise in the form of economic activity to which they are best suited according to the principle of comparative advantage. Two economies should be able to gain from trade, even in conditions in which one economy is technically superior in the production of all commodities. All that is necessary is for prices, when translated into each other's currency, to give each country the ability to sell the product in which it has a comparative advantage, and for the factor earnings in each country to reflect the differences in productivity. When applied to inter-regional trade, difficulties arise due to the fact that regions do not have an exchange rate adjustment and secondly, the costs and prices that prevail may not reflect properly the regional differences in productivity. In this respect, then, the question of factor mobility<sup>2</sup> is of greatest importance. If inter-regional equality in factor earnings is assumed, then trade will take place on the basis of absolute advantage. A region which is less efficient than the others in all forms of production will be unable to establish prices at which it can sell its products to other regions. In consequence, its economy must contract and factors of production move to other regions; but since complete factor mobility is assumed, this need not lead to unemployment or depressed earnings. Thus, when applied to inter-regional trade, application of the above theorem with complete factor mobility and equality of factor earnings

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1. Ohlin, Bertil, "Inter-regional and International Trade", Cambridge, Mass. 1933.
  2. (i) See Richardson, H.W., "Regional Economics", 1969. Chapter 12, 'Factor Mobility'. (ii) See also McCrone, Gavin, "Regional Policy in Great Britain", George Allen and Unwin Ltd. 1969, Ch. II, 'Economic Theory and Regional Problem'.

means trade on the basis of absolute advantage, with the tendency for regions with below average efficiency to decline while others expand. In the real economic world, we recognise that inter-regional mobility is less than perfect among various factors of production. Distance may limit the movement of labour as a factor of production and workers may be immobile because of their preferences for particular places. The ignorance of income earning opportunities in other areas, migration costs and other non-economic considerations such as barriers arising out of language and cultural differences, as well as administrative barriers, can play an important part in the decisions of workers to move out of particular places. Capital may not move freely because of the rigidities in the capital market and the regional differences in tax structures. Entrepreneurship is also usually concentrated in particular areas, or particular groups of people who have specific space preferences. In addition, transport costs themselves act as a factor that limits the movement of goods and factors of production. Land and natural resources are totally immobile and regional endowments differ considerably.

Thus, we find in economic theory the disequilibrium hypothesis regarding the regional disparities and the process of development that takes into consideration the factors outlined above. The disequilibrium hypothesis emphasises an internal factor flow which tends to increase regional inequality.<sup>1</sup> In its simplest form it amounts to stating that, for national economic growth to take place, strong centres of growth are needed at which growth is centralised, and it is these centres which will eventually spread development to other less developed regions.

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1, See Williamson, J.G., "Regional Inequality and the Process of National Development: A Description of Patterns", Economic Development and Cultural Change, Vol. 13, 1965. He points out that the term disequilibrium can also be used to describe factor movements which do not respond correctly to inter-regional price differentials. The two concepts need not coincide.

The disequilibrium hypothesis in its various forms is to be found in the writings of Hirschman,<sup>1</sup> Myrdal,<sup>2</sup> Perroux<sup>3</sup> and Williamson.<sup>4</sup> We shall summarise below the main arguments of Hirschman and Myrdal and then discuss in detail the generalised Williamson hypothesis of the inverted "U" curve of regional inequality or the divergence-convergence thesis. Hirschman's main line of arguments may be briefly summed up as follows: "Economic progress does not appear everywhere and at the same time, and once it has appeared there are powerful forces that move for spatial concentration of economic growth around starting points." He further adds that "for the economy to lift itself to higher levels it must and will develop centres of economic strength. This need for the emergence of 'growing points' or 'growth poles' in course of the development process means that international and inter-regional inequality is an inevitable concomitant and condition of growth itself." Given this initial stage in which centres of high growth are developed, these centres are further strengthened over a period of time as investment tends to agglomerate around these growth points. This gives rise to further factor movements which tend to increase regional inequality.<sup>5</sup>

Myrdal argues that the play of market forces is likely to increase rather than decrease the inequality between regions. These forces lead to activities yielding more than

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1. Hirschman, A.O., "The Strategy for Economic Development", New Haven, Yale University Press, 1958.
  2. Myrdal, Gunnar, "Economic Theory and Underdeveloped Areas", London, Duckworth, 1957.
  3. Perroux, Francois, Note Our La Notron de "Poles de Croissance", Economic Appliquee, 1955.
  4. Williamson, J.G., op.cit.
  5. Most important among these are (i) movement of labour from the backward to the advanced region; (ii) transfer of savings to advanced region; (iii) concentration of entrepreneurship in advanced region; (iv) public investment is likely to be biased in favour of advanced region. For more discussion, see Hirschman, op.cit. p.186.

average returns in some localities and regions at the expense of others. Backward regions in a country fail to attract new lines of activity because their limited advantage, say cheap labour, is not a sufficient force to outweigh the external economies found at the centres of agglomeration. The main influence on their economic progress will be induced effects of expansion in prosperous regions. However, these beneficial 'spread effects' are likely to be outweighed by the adverse 'backwash' effects. Thus, the movements of capital, labour, goods and services are regarded as disequilibrating forces that favour rich at the expense of poor regions.

However, Myrdal argues that the spread effects come to dominate the backwash effects eventually, leading to a progressive reduction of inequalities. Firstly, there will be a repatriation of income by migrants. This flow of funds to the backward region raises the resources and the market in the backward region. Secondly, the growth of the market creates opportunities of investment mainly in non-transferable activities. Thirdly, the growth of the manufacturing sector in the advanced region will increase the demand for food and raw materials in the backward region. If the agricultural output is price-elastic then the volume of agricultural output will rise, increasing the income of the backward region. If the supply of agricultural products is inelastic, the terms of trade will move in favour of agricultural products and this would have a redistributive effect. However, if the advanced region can import the goods, the growth of its economy will not lead to trickling down effects through trade to the backward region. Lastly, political pressures will mount to increase public expenditure in the backward region. Williamson<sup>1</sup> puts the sequence of regional inequality as follows: "the early stages of national development generate increasingly large North-South income differentials. Somewhere during the course of development some or all of the

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1. Williamson, J.G., op.cit.

disequilibrating tendencies diminish, causing a reversal in the pattern of regional inequality. From then on, instead of divergence in the inter-regional levels of development, convergence becomes the rule, with backward regions closing the development gap between themselves and the already industrialised areas. The expected result is that a statistic describing regional inequality which will trace out an inverted "U" shape against the national growth path."

We shall examine below Williamson's findings on the hypothesis of inverted "U" from his sample of countries at different stages of development. An empirical testing of the inverted "U" hypothesis is pursued in various ways. First, an international cross-section analysis is applied to twenty-four countries during the decades of the 1950's. The twenty-four countries represent a cross-section of countries at different stages of development. The classification of stage of development is adopted from Kuznet's classification of countries, by per capita income. Secondly, the cross-section analysis is applied to U.S. census data (1950 and 1960) where counties are treated as a regional unit and states as nations. Thirdly, the national time-series data are applied to those few countries for which time-series data are available. Finally, an attempt is also made to answer the following related questions:

- (i) What is the relative importance of income growth versus population redistribution in contributing to the time-series patterns of regional inequality?
- (ii) What role does the labour participation rate play in producing differences in per capita income levels?
- (iii) Does the regional inequality differ sharply among the various industrial sectors?

Williamson's regional inequality index VW is expressed as follows:

$$VW = \frac{\sqrt{\sum_i (y_i - \bar{y})^2 f_i / n}}{\bar{y}}$$

where  $y_i$  is regional per capita income  
 $\bar{y}$  is national per capita income  
 $f_i/n$  is the regional population share in  
national population

Thus, each regional observation is weighed by its population share and it then becomes unnecessary to divide it by the number of regions, as long as the number of regions remains the same. A divergence in regional incomes would mean an increase in VW and a convergence pattern would mean a decline in VW.

Williamson's cross-section analysis of twenty-four countries has the following distribution of sample in each stage of development.

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	<u>NUMBER OF COUNTRIES</u>
GROUP I	6
GROUP II	5
GROUP III	4
GROUP IV	5
GROUP V	2
GROUP VI	1
GROUP VII	1

---

As can be seen, the whole sample is biased heavily in favour of the first four groups of countries for which data are more readily available. These computations thus indicate VW to be highest in the group of middle income countries. The countries in this group include Brazil, Italy, Greece and Spain with well-known North-South dualism. However, the sample for the countries in Groups V, VI and VII is so small that it cannot be regarded as an adequate testing of the hypothesis at the lower end.

Time-series data on the more industrialised countries do suggest convergence of regional per capita incomes in more

recent decades. Individual country studies on the U.S.A.<sup>1</sup> and Canada<sup>2</sup> give insight into the historical pattern of regional income and the factors that may be regarded as important behind the trends in the various time-periods.

The discussion of the disequilibrium hypothesis and the "historical pattern" raises a number of points regarding its relevance for the underdeveloped countries undergoing a structural transformation. Williamson's hypothesis emerges and is tested in relation to the experience of the industrialised countries. Above all, it is a description of pattern rather than analysis of factors that gives rise to the "U" shape over national growth path. The theorising is weak in explaining what causes a reversal in the pattern of regional inequality. This applies to the Hirschman-Myrdal type of reasoning as well, in which the peak is left vague, to be determined by the endogenous factors. In this respect, Williamson's hypothesis can be compared with the other hypotheses regarding the historical stages of development such as Rostow's "take-off" into "self-sustained growth." Here, also, the basic framework is obtained from the "historical pattern" of the developed countries. Thus, one objection to Williamson's thesis arises from its historical generalisation.

Before we turn to the factors that are different in the presently developing countries and examine their role in the creation of regional inequality, we can point out a number of general factors underlying the inverted "U" pattern of regional inequality in the developed countries. We realise,

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1. On U.S. regional income studies, the following works may be cited:
    - (a) Hanna, F.A., "State Income Differentials", 1919-1954, Duke University Press, 1959.
    - (b) Easterlin, R.A., "Regional Income Trends, 1840-1956", S. Harris, Ed., American Economic History, McGraw Hill, 1961.
  2. On Canadian regional income studies, the following works may be cited:
    - (a) Green, Alan, "Regional Inequality, Structural Change and Economic Growth in Canada, 1890-1956", Economic Development and Cultural Change, Vol. I, 17, No. 4. Also a Ph.D. thesis submitted to Harvard University.
    - (b) Chernik, "Inter-regional Disparities in Income", Ottawa Queen's Press, 1966.

however, that the precise importance of each factor and the time sequence would have differed among individual countries.

- 1) One of the important features of economic transformation in the industrialised countries was a rapid shift of the labour force away from agriculture. Thus, both the absolute and the percentage of total labour force engaged in agriculture declined in all the industrialised countries. This had a twofold effect. Firstly, depending upon the rate of decline of the agricultural labour force, the productivity in agriculture could increase merely as a result of the reduction of the labour force. This, then, paved the way for further increases in agricultural productivity through reorganisation and introduction of capital intensive methods of production. Secondly, this meant that inter-sectoral and inter-regional transfer of labour was implicit in such a process.
- 2) With industry being initially concentrated in a few regions and with given inter-sectoral differences in productivity between agriculture and industry, this meant divergence due to two factors, (i) divergence due to the regional differences in the industrial composition,; (ii) divergence due to the regional differences within each major economic sector.
- 3) The changes in the pattern of consumer demand internally and internationally, and technological change altered the leading industries at different stages of industrialisation and led to a creation of new growth poles resulting in the changes in the pattern of location of industrial activity. This can be regarded as an important long term factor in the creation of the convergence trends in a number of countries. While the precise importance of these factors differed in various developed countries, one can note from Williamson's own estimates that, in the periods of convergence that he noted for a number of industrialised countries, his own calculations of sectoral values of regional inequality index show that regional inequality was higher in agriculture than in

manufacturing. Thus, by this time, industrial activity was considerably diffused.

- 4) The period of late nineteenth century and early twentieth century can be regarded as a period of laissez faire development for a number of the industrialised countries. The post-war period, on the other hand, can be considered as one of increasing government intervention in the operation of the free market mechanism. The question of how far trends in the last few decades can be said to be influenced by the active government economic policies cannot be adequately answered here.

Given these general features of regional inequality trends in the developed countries, we can now briefly state the factors that are likely to differ in the context of presently underdeveloped countries, such as India. Differences in the initial levels of industrial development, the population pressures and a totally different international and technological scene are some of the pertinent factors that will affect the course of both national and regional development. An important feature of national economic development in an economy like that of India is that the national rate of growth of the economy and the rate of investment under planning is lower than the required rate of growth either to absorb new additions to the labour force in non-agricultural employment or to reduce the dependence on agriculture. Thus, inter-sectoral and inter-regional migration of the labour force that we noted above in the context of Western industrial development cannot be envisaged to operate in the case of India, or countries in a similar stage of development. Hence, a simultaneous increase in productivity in agriculture and manufacturing as a result of the movement of labour from a low productivity sector to a high productivity sector has to be ruled out, and the agricultural modernisation has to be attained along with an increase in the size of the agricultural labour force. In so far as the predominance of agriculture in total output

and employment, together with the low investments in the basic modern inputs, are shared by the regions, the relative regional deviations in the productivity from the low national average can be expected to be small, and one can expect a lower regional inequality index in agriculture as compared to a similar index both in manufacturing and in agriculture in the more developed countries. Williamson's weighted coefficient of variation takes the weights of regional labour force share for computing the index of productivity differentials in the various economic sectors. We feel that, in the context of lack of movement of the labour force away from agriculture, and because of the difficulties of estimating the working force in agriculture in a country like India, a land-based weighted coefficient of variation also may be used. Here it is possible to expect a higher index of inequality than that for a similar labour-based index due to greater divergence in regional area shares. However, it needs to be stressed that, in computing a value based index that covers the income originating in the whole of the agricultural sector, we are looking at the values that also reflect the regional differences in crop-mix. Thus, in the international and inter-regional comparisons, the use of income per worker index of regional inequality has limitations due to the fact that, in the overall value based index, we cannot isolate the effect on regional income of the regional differences in the cropping pattern. We feel that a value based index may be used, keeping these limitations in mind, for estimating the regional disparity in the given country. However, in addition, it is necessary to pursue a disaggregated analysis of regional differences in productivity within each of the major economic sectors of agriculture and manufacturing before we can conclude which of the two sectors has higher regional dualism.

Williamson's computations on the regional inequality index as between per capita income and per worker income show that, for the countries in his sample, the inequality index is lower when measured in per worker income. He then advances his general hypothesis that we can reasonably expect a positive income-participation relationship inter-regionally.

We feel that such a hypothesis may need modifications when applied to a primarily agricultural economy. In such an economy, although regional differences in economic participation are of great importance, we may not find an easy link between income and participation. In fact, in analysing regional differences in participation, we need to take into consideration several social and economic factors. We shall not elaborate here on the various factors that can be regarded as important in this connection, but we may state that the influence of these forces may be such that a possibility of negative income-participation relations also cannot be ruled out.

To conclude, we may say that we consider the disequilibrium hypothesis a more suitable basis for understanding the process of regional inequality during the early stages of development. We also agree with the disequilibrium hypothesis in its emphasis on the internal factor flows that increase rather than decrease regional inequality. Important issues arise, however, when it is generalised in the form of an inverted "U" statistic of regional inequality curve against national growth path. In the context of the development process in an economy like that of India, we find at least one important long term equilibrating factor not operative for a considerable time to come, viz. large scale intersectoral and inter-regional migration of the labour force. When we consider that the prospects of capital movements from high to low income regions are still weaker,<sup>1</sup> we need to reformulate

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I. The following quotation may be given from Richardson, H.W., op.cit., p. 329-330. "whether, in fact, the flows of factors are equilibrating or not is really a matter for empirical substantiation since there is no clear theoretical indication. On a priori grounds, we should expect labour flows to be more likely to be equilibrating than capital flows. This is because labour will tend to move from low to high income regions because the latter will be able to offer higher money wages and, more important, greater employment opportunities." He further adds that "There is no strong case for believing that capital will flow in the right direction i.e. from high to low income regions. As we shall see, in neoclassical framework this might follow from the fact that the relative productivities of capital may change in favour of capital in the low income region, since the faster rate of expansion in labour supply than in capital stock in this region should lower the marginal product of labour relative to capital."

Further, "There are other arguments used to support the hypothesis of capital flows from high to low income regions, but they are not strong. In fact, unless investment opportunities are abundant in low income regions and are near exhaustion in high income regions, then capital will not flow in the opposite direction since investment opportunities will be greater in the high income region. In this case, capital flows will be disequilibrating, accelerating the growth of the richer region and slowing it down in the poorer one."

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Williamson's generalised hypothesis in the light of the development process of underdeveloped economies like that of India. It would be our aim in this study to empirically substantiate and throw as much light as possible on the nature of factor flows during the development process in India.

We also raised a number of points regarding Williamson's other conclusions, viz. the role of labour participation and the intersectoral differences in the regional inequality index as between agriculture and manufacturing.

## SECTION II: IMPORTANCE OF STUDY OF REGIONAL DISPARITIES IN A LARGE COUNTRY

Having established the general theoretical framework for the study of regional disparities in an economy undergoing structural change, we may further emphasise the importance of study of regional disparities in a large country, and also give some reasons for choosing states as regions in the present study.

As expressed by Toynbee,<sup>1</sup> "India is a large country; a society of the same magnitude as our Western civilisation... a whole world in herself." India has a population of nearly 550 million, as estimated by the census of 1971, with an area of about 1.7 million square miles. Roughly two-fifths the size of the United States, India has a population more than twice as large. Hence, one can say that the states of the Indian Union are as large as, or even larger than, many

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1. Toynbee, Arnold, "The World and West", New York, 1953.

independent nations.

Great variations in the climate exist over different regions of the country. During the summer, daytime temperatures reach above 110°F in the northern parts where conditions in both summer and winter are more extreme than in other regions. Annual rainfall registers extreme variations from one part of the country to the other; it is heavy on the western coast (109 inches) and at the foot of the Himalayas (96 inches), but quite scanty in some interior arid northern parts (as in Rajasthan, 12 inches and Punjab, 24 inches). There are three types of soil in the country - black soil suitable for growing cotton in mid-western parts, rocky soil in the Deccan covering central and southern areas of the country and rich alluvial soil in the Gangetic plains in the north eastern part of the country. Natural resources of the country in terms of mineral wealth are also unequally distributed. Whatever mineral resources are available are mainly localised in the Eastern and Central States - Bihar, West Bengal, Madhya Pradesh and Orissa.

Nearly three-fourths of the population derives its livelihood from agriculture which accounts for a little less than half of the national income. Regional differences also exist in various social and economic indicators such as urbanisation, education, the population growth rates, sex ratio, land tenure systems and land ownership patterns. Thus, in a large and populous country like India with marked regional differences in climate, soil fertility, natural resources, population and other social and economic indicators, regional differences in economic progress and performance are bound to exist. In fact, one can say that the average national economic progress that we refer to in our aggregative growth analysis makes little meaning without reference to the regional averages from which it is derived. Similarly, regional progress and performance also cannot be evaluated in isolation without reference to the national structure. In this sense, both aspects of economic

development are interrelated. However, economic literature on the growth process of underdeveloped countries as well as empirical development studies on India have paid relatively less attention to the problem of regional disparities and structural change in a country like India. The factors such as lack of time series data, difficulties in classifying regions and also political sensitivity of the subject make objective analysis difficult. Neglect can also be attributed to the relatively less emphasis placed on the plan spatial implications of national growth strategies plan of documents due, perhaps, to the tacit belief that regional goals are subservient to national goals and that some increase in regional disparities is unavoidable during the early stages of economic development.

This brings us to the second related question as to the justification for using states as regions. If homogeneity were the criterion, one could say that the states of the Indian Union are most diverse heterogeneous units and are not suitable for the purposes of regional analysis. We believe that the choice of regional units ultimately depends on the object of inquiry. A classification of Indian regions can be adopted on various bases such as natural resource regions, nodal regions, programming regions and so forth. Our choice of states as regions is governed mainly by several pragmatic considerations which may be summarised as follows:

- (1) The states of the Indian Union represent identifiable political, cultural and linguistic groups of people with separate aspirations of their own. These separate regional feelings can be said to exist in spite of frequent changes in state boundaries. In fact, the history of boundary conflicts between states since independence has been in the direction of separating various linguistic and cultural groups of people which were formerly bunched together. Thus, these "regional" feelings, along with the "national" aspirations that

join various states in the Indian Union together to work for common goals, make the study of economic progress and performance of these sub-national units vital for a proper understanding of the national economic development. Thus, the study of regional differences in welfare, income, productivity and so forth is very relevant in this context.

- (2) Secondly, states are the proper regional units for study if our object is to derive some conclusions regarding policy and planning. Under the federal structure, states are an important part of the planning process, Both political and economic processes work through the centre-state mechanism of power relationship and decision making. In such conditions, to conduct a discussion of regional units either above or below the state units is to ignore the fundamental link. This is not to deny that considerable regional differences exist within each state and also that this "regionality" or "state consciousness" has at times hindered the national progress, by creating disputes between states over various economic and political issues. However, what we are emphasising is not this "regionality" feeling but the "regional" differences in economic progress and performance vis-a-vis national economic performance recognising the regional identity of groups of people.

For the purposes of administration the entire country is divided into fourteen major states and other centrally administered territories according to the States' Reorganisation Act of 1956. Linguistic considerations were mainly responsible for the redrawing of state boundaries. In 1960, the State of Bombay was divided into Maharashtra and Gujarat. In 1967-68 the Madras State was redrawn to form the new Tamil Nadu State and around the same period Punjab was divided into Punjab and Haryana. The population of various states according to the 1951, 1961 and 1971 Census

is given in Table 1. The fourteen major states of the Indian Union account for more than 90 per cent of the total population. These major states form the basis of our analysis of regional disparity and regional growth pattern. For other areas, data is scantier so that we can either group all of them as "the rest" or omit them altogether.

To summarise, in a large country the study of economic differences between states or other component sections is of great importance; for such a study can show why and how general income levels in different parts change. To quote, "In other words, effects of economic growth in different states or other political components of a modern country, particularly the conditions of economic advancement and growth of average incomes in different parts of the nation, as well as the conditions which determine the differences, are important factors which not only explain the historical determinants influencing economic growth in various sections of a large country, but also suggest what policies might be undertaken in order to support various aspects of economic growth in a given part of a nation."<sup>1</sup>

### SECTION III: OUTLINE OF THE STUDY

As we mentioned earlier in Section II, in the economic literature on the Indian economic development the study of regional disparities has received relatively little attention.

In the planning documents, a relative neglect of the issue of regional disparities or classifying the states by the levels of development can be attributed to various factors. Firstly, under the federal set-up, states are responsible for collecting and estimating data on state income and other components of regional structures. Since there are

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1. Hoselitz, Bert F., Foreword to "Regional Income Accounting in an Underdeveloped Economy; A Case Study of India", by Chaudhri Mahinder, Sterling Publishers, 1966, which was also Lis Ph.D. dissertation to the Duke University, 1964.

TABLE 1

## DISTRIBUTION OF INDIAN POPULATION BY STATES 1951-1971

(in millions)

State/Union Territory or other areas	1951 Census	1961 Census	Inter-censal Increase (Percentage)	Average Annual Growth Rate 1951-61
(1)	(2)	(3)	(4)	(5)
India	361.08	439.07	+21.5	2.15
<u>States:</u>				
Andhra Pradesh	31.11	35.98	+15.65	1.56
Assam	8.83	11.13	+34.45	3.44
Bihar	38.78	46.46	+19.77	1.97
Gujarat	16.26	20.63	+26.88	2.68
Haryana	-	7.59	-	-
Himachal Pradesh	-	2.81	-	-
Jammu & Kashmir	-	3.56	-	-
Kerala	13.54	16.90	+24.76	2.47
Madhya Pradesh	26.07	32.37	+24.17	2.41
Maharashtra	32.00	39.55	+23.60	2.36
Mysore	19.40	23.59	+21.57	2.15
Nagaland	-	0.37	-	-
Orissa	14.64	17.55	+19.82	1.98
Punjab	16.13	11.14	+25.86	2.58
Rajasthan	15.95	20.16	+26.20	2.62
Tamil Nadu	30.11	33.69	+11.85	1.18
Uttar Pradesh	63.21	73.75	+16.66	1.66
West Bengal	26.29	34.93	+32.80	3.28

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TABLE 1 (continued)

DISTRIBUTION OF INDIAN POPULATION BY STATES 1951-1971  
(in millions)

State/Union Territory or other areas	1971 Census Prov. Count April 1971	Intercensal Increase Percentage	Average Annual Growth Rate 1961-71
(1)	(2)	(3)	(4)
India	546.96	24.57	2.45
<u>States:</u>			
Andhra Pradesh	43.40	20.60	2.06
Assam	14.86	33.51	3.35
Bihar	56.39	21.38	2.13
Gujarat	26.66	29.21	2.92
Haryana	9.97	31.36	3.13
Himachal Pradesh	3.42	21.76	2.17
Jammu & Kashmir	4.62	29.60	2.96
Kerala	21.28	25.89	2.58
Madhya Pradesh	41.45	28.04	2.80
Maharashtra	50.30	27.16	2.71
Mysore	29.22	23.90	2.39
Nagaland	0.52	39.64	3.96
Orissa	21.94	24.99	2.49
Punjab	13.47	21.00	2.10
Rajasthan	25.72	27.63	2.76
Tamil Nadu	41.40	22.01	2.20
Uttar Pradesh	88.30	19.73	1.97
West Bengal	44.44	27.24	2.72

Source: Census of India, 1951, 1961. The 1971 Census figures are the provisional figures published by the Office of Registrar General, India.

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differences in methodologies and procedures that are pursued in state economic departments, it becomes difficult to quantify regional problems or to indicate trends in the planning documents. Only in recent years, the Central Statistical Organisation has published its own estimates of state income for a few years.

Neglect of regional problems also arises due to the tacit belief that, during the early stages of economic development, some increase in regional disparities is unavoidable and that, in the long run, higher economic growth will take care of regional balance. Thus, to quote the Third Plan, "Expansion of the economy and more rapid growth increase progressively the capacity to achieve a better balance between national and regional development. In striving for such a balance, certain inherent difficulties have to be met, especially in the early phases of economic development. As resources are limited, frequently advantage lies in concentrating them at those points within the economy at which returns are likely to be more favourable. As development proceeds, investments are undertaken over a wider area and resources can be applied at a larger number of points, thereby resulting in greater spread of benefits".<sup>1</sup>

One could add quite a few other quotations from various plans. However, the basic approach seems to be quite clear. In the economic literature on Indian economic development, systematic studies of regional disparities and regional growth pattern have received relatively less attention due to a number of factors such as lack of uniform time-series data on regional income, difficulties of identifying regions and so on. One group of writers on regional disparities believe that income is not a sufficient indicator of the level of economic development. Hence, they resort to multiple factor analysis for classifying Indian regions as between advanced and backward

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1. "Third Five-Year Plan of India", Government of India, Planning Commission, 1961, p.142.

regions. Among these, mention may be made of the following works: (i) A. Mitra,<sup>1</sup> (ii) Pal M.N. and Subramaniam C.,<sup>2</sup> (iii) Rao S.K.<sup>3</sup> We shall not go into a discussion of the adequacy of particular variables used in these studies. Ultimately, the choice of a particular method depends on the scope of the study. Multiple factor analysis has some advantage over income criterion in that it takes into consideration several other variables that measure the level of economic development of a nation or a region. Even here, some subjective judgment has to be applied in classifying rich and poor regions. In addition, more serious difficulties arise in indicating trends over time. Finally, if we wish to derive some policy implications from the study of disparities, income is by far the most accepted general indicator used in policy discussions. This is not to deny certain inherent limitations of regional and national income averages. For example, if the ultimate object of economic policy is to influence or maximise the "welfare" of individuals, we cannot claim this being adequately represented by average regional per capita income or national per capita income. Two identical regional averages may have been arrived at through different income distribution among various income brackets, and hence cannot be taken to represent identical welfare. What we are looking at is the quantum of economic activities originating in different regions. Hence, in this sense, the conclusions that we can derive from our study regarding regional differences in standards of living and welfare are essentially limited. However, what

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1. Mitra, A., "Levels of Regional Development in India", Census of India 1961, Part I-A (i) 1964.

2. Pal, M.N. and Subramaniam, C., "Regional Disparities in the Levels of Development in India". Indian Statistical Institute, Mimeo.

3. Rao, S.K. "Regional Disparities in India", Unpublished Ph.D. Dissertation to the University of Cambridge, U.K. 1971.

4. Some other references:

(a) Nair, K.R.G. "A note on Interstate Income Differentials in India 1950-51 to 1960-61". Journal of Development Studies, Vol. 7. July 1971, No. 4.

(b) Chaudhri, Mahinder, "Regional Income Accounting in an Underdeveloped Economy. A Case Study of India", A Ph.D. Dissertation to Duke University, 1964.

(c) Shastri, D.U. "Inter-state Variation in Industry in India. 1951-61: A Tentative Explanation". Indian Journal of Regional Science, Vol. II, 1970, No. 1. We shall not discuss the various writings on estimates of state income in Chapter II.

we can hope to pursue for further study is the quantum of productive flows generated in each region and also examine the extent and nature of regional disparities in each major economic sector. Such an analysis can help us to identify the factors that may be regarded as significant in explaining regional income and productivity differences in a developing economy.

Having established the general theoretical framework of the study, we devote Chapter II to an analysis of problems of regional accounting in India. We discuss in Chapter II the methodological problems of estimating regional income in an underdeveloped economy. We also examine various secondary sources of state income data and the methodologies adopted by them to see which of these data can be used for further analysis of regional disparities. Chapters III and IV pursue the analysis of regional disparities during the period 1950-51 to 1967-68, the period for which income data are available. We keep the general framework used in Williamson's analysis to examine the trends in regional inequality in various economic indicators such as per capita income, net output per employed person, both in total and for the various economic sectors. We also attempt an identification of factors that may be regarded as significant in explaining regional income and productivity differentials. Thus, in Chapters III and IV we establish the structure of regional inequality in Indian economy. This provides a background for further analysis of regional differences in income and productivity in the major economic sectors of manufacturing and agriculture.

Our theorising in Section I suggested that we may expect the regional inequality index to differ in the two major economic sectors. Chapters V and VI take up regional differences in the manufacturing sector for further analysis. In Chapter V, we take up the regional disparity in manufacturing productivity for further analysis. The overall regional values of net output per worker in the manufacturing sector reflect the influence of two factors, viz. (i) the subsectoral (here we consider the breakdown of the whole manufacturing sector in subsectors such as the household, small and large

industry) composition of industrial output in each region; (ii) the regional differences in productivity within each subsector. Since time-series data on the household and small enterprises sector are not available, we consider first establishing the degree of regional inequality in each subsector for the year 1960-61. We then examine the regional disparity in organised or large industry sector in greater length, as more data are available for this sector and also because this is the most important component of the manufacturing industry, nationally and regionally. We also attempt to indicate trends in regional disparity in productivity in the large-scale sector for the years 1961 and 1966. An application of the Hirschman-Myrdal type of theorising indicates why industrial activity tends to be centralised at a few centres of growth in the early stages of economic development. Thus, concentration of private investment at the established points of growth would mean that, over time, the differential between the centre and periphery would increase. It is argued that the location of large public sector projects can, under certain circumstances, lead to an establishment of "new growth centres" in the periphery, and thus contribute towards a more balanced regional growth. The "growth centre" concept is widely used in the policy discussions on the underdeveloped regions in more advanced economies. In Indian planning, the location of public sector projects and a "fair" share for each state in the location of public sector projects is a politically debated issue. Regional distribution of public investment under planning is not concentrated at the established centres of growth; but whether such spatial diffusion can be identified as the "growth-centre" concept needs to be analysed in relation to Indian data. Chapter VI analyses the trends in regional public and private sector investment in manufacturing in India.

The importance of agriculture in total income and employment for the national and regional economies and overall stability of agriculture's share in total labour

force indicates the importance of analysing regional disparities in agriculture. Due to the absolute size of agricultural labour force and an increase in the number of workers in agriculture in most of the states, we can postulate that the regional deviations in income per worker from the national average may be smaller in agriculture than in manufacturing. However, in agriculture, in addition to income per worker we also need to examine the regional disparities in income per acre or hectare. A higher regional disparity in this index as compared to a labour-based index can arise if agricultural incomes are low in the states with high area shares. We may further point out that the figures of total income per worker or acre in agriculture also reflect the regional differences in cropping pattern. It is necessary to examine the degree of regional inequality in agricultural income originating in the entire agricultural sector. It is also equally essential to pursue a more disaggregated analysis in agriculture and to identify the extent and nature of productivity differences at the level of individual crop. We conduct this analysis in Chapter VII.

Our analysis of regional disparities leads us to the important issue of the need for regional policy in a developing economy. In examining the role of regional policy in India we need to distinguish between the regional framework in an underdeveloped economy from that which is applied in the more industrialised countries in the recent decades. At the same time, establishing the regional goals that are consistent with the other development goals is equally vital in the multi-region economy. Secondly, whether or not the plan documents specify these goals, actual regional allocation of resources is implicit in the execution of national plans in which nearly half of the total government expenditure is incurred through the states. In addition, the centre occupies a crucial role in determining the size of the state development plans through the allocation of central resources. Hence it is

necessary to examine empirically the size and the pattern of state development expenditure under the plans. We can then attempt to lay down a few guidelines for a national policy of regional development. We pursue this analysis in Chapters VIII and IX. Chapter X gives the summary of findings and the conclusions of the study.

PROBLEMS OF REGIONAL INCOME ACCOUNTING IN INDIA

It is necessary to examine the problems of regional income accounting in some detail for the following main reasons.

(1) Regional income accounting shares many problems of national income accounting. National income accounting in an underdeveloped economy has to tackle certain difficult conceptual and measurement problems arising out of the predominance of self-employment in the various sectors of the economy. It then also becomes necessary to see how these problems affect the regional income accounting.

(2) A careful scrutiny of the available estimates of state income is necessary before we choose a particular series for further analysis. Here, both methodological and statistical comparison is necessary before we accept any particular set of figures as more reliable. This is particularly relevant in the case of India, as comparable figures of state income are not readily available through the official agency which centrally compiles national income estimates. The state income figures published by the State Economic Departments are not comparable over time and among different states, and hence they cannot be used to determine the extent of regional disparities.

Section I discusses the concept and uses of regional income data. Section II discusses the methodology used by NCAER in its estimates of state income for 1950-51, 1955-56 and 1960-61. Section III compares the resultant figures of NDP with those compiled independently by CSO and also compares the resultant sectoral growth rates in the two series. ~~Section IV~~ compares the IIP<sup>1</sup> figures of 1967-1968 with state

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1. Indian Institute of Public Opinion.

income figures of CSO compiled for 1962-63, 1963-64 and 1964-65. Section IV gives a brief account of some of the earlier estimates on state income and also discusses some of the figures compiled from state income estimates of State Statistical Bureaux. We give some reasons for not using these figures.

## SECTION I

### CONCEPT AND USES OF REGIONAL INCOME DATA

We shall begin with a brief discussion of the problems encountered in the national income accounting, their relevance to regional income accounting, and then proceed to the concept and uses of regional income data. Wherever possible, we shall indicate whether a particular problem is applicable to all the countries at different stages of development, or whether it is specific to a particular stage of development. Net national product at factor cost has been defined as the value of net product, after deduction of provisions for the consumption of fixed capital, attributable to the factors of production supplied by the normal residents of a country. It is identical with national income, which is defined as the sum of incomes accruing to factors of production supplied by the normal residents before deduction of direct taxes.

While national income is regarded as a measure of production flow at a given time, the whole notion of production cannot satisfactorily be defined. In the daily life of individuals, various goods and services are produced, but all of them are not included in the national income estimation. In general, all goods and services produced and exchanged for money are regarded as production. But in so far as goods and services not exchanged for money are concerned, part of it is included and part is left out.<sup>1</sup> Where agricultural, mineral or other primary outputs are concerned, all unexchanged output of every producer should be included. Thus, according to this rule, one has to include the value of the cloth produced by a handloom weaver for the use of his family, but

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1. According to U.N. rule, only that part of the unexchanged output of manufacturing or services is to be included which is in the trade of the producers concerned.

exclude the value of cloth produced by an agriculturist for the same purpose. Thus, in applying certain norms for measuring the "production" a number of activities are excluded from the national product. A well known example of such exclusion are the services rendered by a housewife. In poorer countries, where the industrial activities are largely undifferentiated in household enterprises, the same household producing various goods and services for use though not for sale, a large share of output is likely to be missed out. Another example of the type of activity that is likely to be excluded is the construction of residential houses, other buildings and work relating to irrigation and land improvement undertaken by the agriculturist. These types of problems are encountered in the national income estimates of all the countries; however, the type of activities and the importance of the activities that are excluded is likely to differ among different economies. In an underdeveloped economy the proportion of the output left out as a result of the given norms may be greater, as can be seen from the above examples. Another example of problems in national income accounting is that, over time, as the economy develops many activities previously not included in measurement become included later. With the given notion of production, the growth in national income in the current period is overstated because something which is now measured in the current period was not measured previously, although goods and services were in existence then.

These limitations of national income concept apply to regional income accounting as well. Regional income accounting, however, involves readapting several concepts used in national income accounts, and hence additional problems arise in such a process of devising suitable regional concepts.

A region within a country is a geographical classification introduced, say, for a measure of geographic distribution of value added. Apart from this similarity, all the other concepts of national income need readapting at regional level. Instead of normal residents of a country, one has to define normal residents of a region, a concept which is much more

difficult to measure. These problems arise from the simple fact that a region is not a nation and, as such, there exists a free movement of factors of production as well as goods and services. Other examples of problems specific to regional income accounts are the regional allocation of income of institutions and corporations that exist nationally and do not have separate regional accounts. Examples of these are railways, airline corporations, etc.

Most of the regional income accounts are devised by viewing a state or region as an independent entity within the national economy and then attempting to measure the income either 'accruing' or 'originating' within those geographic boundaries.

The income originating concept represents the income originating from the productive system located within a geographic boundary of a state or region, and would require an estimation of net or gross value of goods and services produced within a region. It thus corresponds to the GDP or NDP at national level. Such estimates include incomes derived by the non-residents on investments or economic activities within a geographic boundary of a state, but exclude income received from outside by the residents of a state. If, however, these figures are adjusted for 'net income earned from abroad', one would have a measure of regional income corresponding to national income. The regional income can also be measured by the 'personal income' approach which gives the estimate of current income received by normal residents from all sources, inclusive of transfers from government and business but exclusive of transfer among persons where 'persons' is usually defined to include individual owners of unincorporated enterprises and non-profit institutions.

The overall accuracy of regional income data is likely to be affected by three factors - (a) in certain respects, as discussed above there is need to follow national income accounts, (b) in other respects, the accuracy depends on how

successful a given system is in readapting national concepts for regional purposes, (c) quality of the basic data itself. No matter how carefully a system is devised, it is likely to yield poor results if the available data at regional level are not reliable.

Regional income estimates are usually based on three main sources: (1) use of local data, (2) allocation of national totals, (3) a combination of both. Use of local data in compilation of state income estimates involves a thorough investigation of the economic structure of a region independently of studies at national level. This could be done if all economic data which go into the compilation of national totals were available at regional level. Even in developed economies these data are hard to come by for all the sectors and subsectors, and this is more acute in underdeveloped economies where national accounts are sometimes in their infancy. As was stated earlier, some institutions like railways, airways and other big corporations are entities spread over the entire country. Since these institutions do not maintain regional accounts, income originating in these institutions has to be allocated among participating regions according to various allocators. This applies also to the 'services sector' where regional data for various 'services' may be difficult to obtain. In practice, an investigator normally does not adopt either of the two approaches alone, but a combination of the two, the exact combination depending on the availability of data and the purposes for which the investigation is undertaken. The purposes of the investigation need to be emphasised, as it is hardly likely that universally valid and accurate estimates exist. There cannot be any a priori concept of validity. The concept will depend on the particular uses we have in mind.

#### USES OF REGIONAL INCOME DATA

In spite of these general problems, the interest in the subject has grown. The expanded flow of literature deal-

ing with the theoretical and conceptual problems involved in the developments of regional accounts is evidence of the growing importance of the subject.<sup>1</sup>

The usefulness of regional income data for economic analysis and as the basis for regional as well as national development policies may briefly be pointed out. Professor M. Mukherjee, in his work on national income in India cites two basic uses of national income statistics. First, they give a related set of measures enabling one to have a quantitative grasp of the structure of the economy at a point of time and when measures are available, over time, they furnish a panoramic view of the change in structure and thus allow a study of relations between the components of structure. Second, in view of the above, they supply tools for economic policy to the government.<sup>2</sup> These considerations

1. The following important works on the subject may be cited here.
  - (a) "Regional Income", studies in Income and Wealth; Vol. 21 National Bureau of Economic Research, 1957.
  - (b) Hirsch, Werner, ed., "Elements of Regional Accounts", Papers presented at the conference on Regional Accounts, 1962.
  - (c) Hirsch, Werner, ed., "Design of Regional Accounts", Papers presented at the conference on Regional Accounts, 1960.
  - (d) Isard, Walter and Cumberland, John, ed., "Regional Economic Planning: Techniques of Analysis", Paris, 1961.
  - (e) Isard, Walter, "Methods of Regional Analysis: An Introduction to Regional Science", New York, 1960.
  - (f) Leven, Charles, "A Theory of Regional Social Accounting", Papers and Proceedings of Regional Science Association, Vol. IV, 1958.
  - (g) Rao, V.K.R.V., ed., "Papers on National Income and Allied Topics", Indian Conference on Research in Income and Wealth, 1961.
  - (h) Chaudhry, Mahinder, "Regional Income Accounting in an Underdeveloped Economy", foreword by Bert Hosclitz, Ph.D. Thesis, Duke University, 1964, pub. by Stirling Publishers, Delhi, 1966.
  
2. Professor Mukherjee, M., "National Income of India: Trends and Structure". Indian Statistical Institute, Calcutta, Statistical Publishing Society, 1969. Foreword by Professor Simon Kuznets.

apply also to the use of regional income data. Most important among these is that regional income data can enable one to analyse the performance and growth of various regions of a national economy in relation to the national structure.

State income estimates for India need to be examined against this background. Because of the difficulties involved in the compilation of regional income accounts, long-term regional data are available only for a few countries. For the U.S.A. state income and county data are available from the middle of the last century. For Canada, provincial income data are available from the latter part of the nineteenth century. For other developed countries and some middle income countries, like Brazil, Spain and Greece, regional income data are available for more recent decades. In such circumstances it is not surprising that regional income data for the less developed countries are even more scanty.

Bert Hoselitz<sup>1</sup> comes to the following general conclusions regarding the data on Indian state income. "Even in India, systematic study in this field has not been undertaken largely because the data relating to various components of state income have not yet been collected for quite a few states making up the Indian Union; but compared with other economically less developed countries, the quality and, within limits, the accuracy and reliability of state income data is of such a nature that a comparative estimate of state income can be made." In fact, the study and analysis of state income has been fostered by the Central Statistical Organisation of India and at various conferences on research in National Income. All state Economic Departments have published figures of state income from time to time and these clearly form one source of information.

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1. Foreword to "Regional Income Accounting in India",  
op.cit.

C.S.O. itself has prepared comparable state income figures for a few financial years. Apart from that, the efforts of the National Council of Applied Economic Research<sup>1</sup> and the Indian Institute of Public Opinion<sup>2</sup> need special mention. It will be necessary to compare these various sets of figures to understand the nature of the gaps involved.

The state income data available in India for recent years are not used intensively for economic analysis in the general belief that they are not reliable due to the fact that several estimates do not agree. This general scepticism is to be welcomed as a close scrutiny is necessary. However, the fact that figures from different sources differ is all the more reason to probe further into the causes of differences, and to see if some of these estimates are better placed than others for our purposes. As aptly put by Professor M. Mukherjee<sup>3</sup>, "In India, it is fashionable in academic circles to decry national income statistics and to assert that figures are so unreliable that it is not possible to make effective use of them. Suggestions have been made to discontinue this series. This attitude, however, is basically irrational as many of the critics do not find much difficulty in working with figures which are even less reliable." He further states that "In subsequent chapters of the book we have drawn a number of conclusions about the structure of Indian economy on the basis of available national income statistics. This implies in our view that the body of data is valid and accurate enough for certain purposes." In what follows it will be our endeavour to find out if this can be said with some confidence about some of the state income figures on India.

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1. ICAER (a) "Distribution of National Income by States, 1960-61", Delhi, 1964. (b) "Estimates of State Income; 1950-51, 1955-56 and 1960-61", Delhi, 1967.
  2. IIPO, "The Course of State Incomes":1960-1968", 1969.
  3. Professor Mukherjee, M., op.cit. p.20.

SECTION IITHE NCAER METHODOLOGY OF ESTIMATING STATE INCOME FOR 1950-51, 1955-56 and 1960-61

Among the various sources of state income data that we mentioned earlier, the NCAER is the only source which gives a systematic account of the methods used to arrive at various figures. The figures of state income published by various state economic departments are not followed by the methodology adopted, but it appears that different states have pursued different methods, especially in the sectors in which direct data are not available. Examples of these sectors are small enterprises, trade and commerce and services. Hence, we shall take up the NCAER methodology for further analysis.

We may begin with a general discussion of the methodology and then take up the methods pursued for various economic sectors separately. The NCAER estimates of state income are for the years 1950-51, 1955-56 and 1960-61, in 1960-61 prices. 1960-61 is used as the base year from which figures for other years are worked out.

The procedures followed for obtaining the value added in different sectors are different in India in national income accounting, depending on the availability of statistics regarding individual sectors.<sup>1</sup> The contributions of the net domestic product are based on the production and cost data for the following sectors: (1) agriculture, animal husbandry and ancillary activities, (2) forestry, (3) fishery, (4) mining and (5) factory establishments. Except for animal husbandry current data on output are available for all these sectors, though cost data are not so readily available for a number

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1. For further discussion, see Professor Mukherjee, M., op.cit. Chapter Five, "Net National Product by Industrial Origin", and the Appendix V, "National Income Estimates by Industrial Origin: Method of Measurement and Limitations".

of sectors. For (6) small enterprises, (7) other commerce and transport, (8) professions and liberal arts, (9) domestic service and (10) house property, the contributions to net domestic product are obtained by multiplying an estimated working force by an average earning, with modification in the case of house property, where the first term in an estimate of the number of houses. The estimate of average earning in a particular activity for which current and annual data are not available may not be based on current information, and a bench-mark may have to be carried forward in relation to data on earnings in respect of certain other activities. For the remaining sectors of (11) railways and (12) government administrative services, the contributions of net domestic product are based entirely on current operational data and accounts available annually.

This brief summary of methods used in national income accounting will serve as a useful guide, as it shows that, even in nation accounting, data for all the sectors are not readily available. In the NCAER study, the state income is estimated by the 'income originating' concept and not by the 'income accruing' concept. The difference between the two concepts, as we noted earlier, is the factor income flow across the boundaries of states. Although, theoretically, such flows can be regarded as very important, it is extremely difficult to quantify them. Measurement of state income by origin method is equivalent to NDP at national level. The sum of all state incomes should give the total national net domestic product. For measuring the value added in different sectors, the whole economy is divided into nineteen sectors. These may be summarised as follows:-

- |                     |                |
|---------------------|----------------|
| 1. Agriculture      |                |
| 2. Animal Husbandry |                |
| 3. Forestry         | Primary Sector |
| 4. Fishing          |                |

- |                             |                  |
|-----------------------------|------------------|
| 5. Extractive Industry      |                  |
| 6. Manufacturing Industry   | Secondary Sector |
| 7. Construction             |                  |
| 8. Wholesale Trade          |                  |
| 9. Retail Trade             |                  |
| 10. Other Trade             |                  |
| 11. Banking and Insurance   |                  |
| 12. Railways                | Tertiary Sector  |
| 13. Road Transport          |                  |
| 14. Other Transport         | and              |
| 15. Storage and Warehousing |                  |
| 16. Communications          |                  |
| 17. Government Services     |                  |
| 18. Miscellaneous Services  | 'Other Services' |
| 19. House Property          |                  |

A combination of 'product' and 'income' method is used in the NCAER study as in national income accounting. As we noted earlier, the 'product' method involves estimating net value added of the sector concerned directly from the data on production and cost, while in the 'income' method the contribution of the sector to the net domestic product is obtained by multiplying the working force figures by average earnings.

We need to note two additional points regarding the general approach in the NCAER study before we proceed to sector by sector examination of methodology.

(1) Since 1960-61 is used as the base year, the general procedures adopted for estimating 1950-51 and 1955-56 figures in 1960-61 prices need to be noted. For the years 1950-51 and 1955-56, the state income estimates at constant prices are obtained directly for most of the commodity producing sectors.<sup>1</sup> For the other sectors, estimates are derived from

1. The basic method followed is to evaluate aggregate value in the current period by making use of current period quantities and base period prices, and then apply the base period cost ratio to arrive at the figure of net output in constant prices. A variant of this method in which the value added in the base

period is carried from one year to another by an index number of physical production is also sometimes used, where p and q respectively stand for price and quantity and suffixes 0 and 1 denote the base and the current period. The base period value multiplied by an index number of physical production can be expressed as follows:

$$P_0 q_0 \times \frac{q_1}{q_0} = P_0 q_1.$$

This is also equivalent to current period quantities multiplied by base period prices.

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those of 1960-61.

(2) The all-India net outputs originating in different sectors of the economy for 1950-51 and 1955-56 are arrived at in the following way. First, the rates of change of net outputs of a particular sector aggregated for the fourteen states in 1950-51 and 1955-56 over 1960-61 are worked out. These rates are then applied on the all-India 1960-61 estimates to obtain all-India sectoral estimates for the years 1950-51 and 1955-56. In respect of 'other states', the net output of each sector for the relevant years is obtained as residuals between the aggregate figure for the fourteen states and the all-India figure.

With these general observations, we shall proceed to a further examination of methods used in each of the following major sectors, (i) Primary Sector, (ii) Secondary Sector, (iii) Tertiary Sector, (iv) Other Services Sector. Our main objective here would be to find out the problems of measurement in each sector and to point out also a number of problems that remain less satisfactorily solved.

AGRICULTURE AND ALLIED ACTIVITIES: This sector contributes about 45 percent of the national income and is thus the most important sector of the economy. The contribution to state income from this sector is estimated by the value added method.

The following principal sources of information are used:

(1) land utilisation statistics and estimates of area and turnout of forecast crops of the Directorate of Economics and Statistics of the Union Ministry of Food and Agriculture; (2) various marketing reports on agricultural commodities issued by the Directorate of Marketing and Inspection of the Union Ministry of Food and Agriculture; (3) NSS (National Sample Surveys) Reports, Nos. 32, 35 and 65.

For estimating purposes, all agricultural commodities are classified into five groups, viz. forecast crops, minor crops, plantation crops, miscellaneous crops and by-products.

FORECAST CROPS. Estimates of out-turn of a crop are prepared by multiplying the area under it by its average yield per acre. Till 1947-48, yield rates of crops were determined by a traditional method which involved direct estimation by the reporting authority or estimation on the basis of (i) predetermined "normal" yields and (ii) the condition factor expressing the relation between normal yield and expected yield in the year under review. This method was very unsatisfactory and hence was gradually replaced by the 'crop-cutting method', according to which objective estimates of average yield per acre are prepared on the basis of actual harvesting of a number of randomly selected plots.

The gradual changeover from the traditional to the crop-cutting method has introduced in its wake elements of non-comparability in the estimates of average yield per acre and the total production of different crops. The Department of Economics and Statistics have constructed the 'production-relative' of various crops of different states using either of chain base method to overcome this problem.<sup>1</sup>

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1. These are published in the following two volumes.  
 (a) Index Number of Agricultural Production (All India & States).  
 (b) Growth Rates in Agriculture.

The Production Relatives are calculated on the following two assumptions, (i) the variation in production in a non-reporting area is the same as that in reporting areas in the aggregate and (ii) relative variation in the figures of production based on crop-cutting surveys is the same as that based on traditional method of crop-estimation.

Tables 1 and 2 below summarise the progress in the coverage of random crop-cutting surveys and improvement in the area reporting at national level.

TABLE 1

PROGRESS IN COVERAGE OF RANDOM CROP-CUTTING SURVEYS  
PERCENTAGE OF PRODUCTION COVERED BY CROP-CUTTING SURVEYS

Crops	1951-1952	1958-1959
Rice	60	90
Wheat	68	99
Jowar	57	100
Bajra	54	99
Barley	86	99
Maize	39	99

Source: Mukherjee, M. op.cit., p. 198.

TABLE 2

IMPROVEMENT IN AREA REPORTING AS PERCENTAGE OF TOTAL AREA

As percentage of Total Area	Surveyed		Unsurveyed		All	
	48-49	55-56	48-49	55-56	48-49	55-56
Reporting	57	72	13	20	70	92
Non-reporting	8	3	22	5	30	8
All	65	75	35	25	100	100

Source: Mukherjee, M., op.cit.

The production estimates for the other groups of crops are more readily available for 1960-61 than for the other two years. For the earlier years, regional data are not available for minor crops and miscellaneous crops.<sup>1</sup> The valuation of agricultural crops is done at the average wholesale price of the state for a particular crop, during the harvest period of 1960-61. A simple arithmetic average of wholesale prices of different centres in a state for a given crop is used to represent average price for the state for a particular crop. The quantities for 1950-51 and 1955-56 for each crop are valued in their base year prices, to arrive at the gross value of agricultural output for various years.<sup>2</sup> From the gross value of agricultural output, the following deductions are made to arrive at net output: (1) cost of seed, (2) cost of manure, (3) cost of repairs and maintenance of implements and other operational costs, (4) water charges, (5) depreciation of implements and fixed assets used up in the process of production, (6) imputed bank charges. The estimates of cost of cultivation on these various items are published in a number of reports of NSS, Bench Mark Surveys and other surveys. At national level, also, information on various items of cost is not regarded as satisfactory. The NCAER takes the 1960-61 cost structure and applies the same ratios (between the gross and net output) for 1950-51 and 1955-56.

#### ANIMAL HUSBANDRY

This sector includes all livestock and poultry products. A product approach is followed for estimating the

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1. For more detailed discussion see (i) "Distribution of National Income by States: 1960-61", NCAER 1965, also (ii) "Agricultural Incomes by States, 1960-61", NCAER 1965.
  2. A different procedure is adopted for the number of crops for which direct quantities for 1950-51 and 1955-56 are not available. These are then divided into the following groups:
    - (a) crops for which production relatives are available,
    - (b) crops for which only area statistics are available,
    - (c) a few minor commodities for which only base year estimates are available.

contribution of poultry and livestock and an income approach is followed for hunting and miscellaneous activities.

In the absence of direct estimates of production of different livestock and poultry products, various indicators such as 'yield rates', 'utilisation ratios', etc. are used. Livestock censuses of 1956 and 1961 give data on the number of livestock in the state. The average state price for each category is arrived at by taking a simple average of prices of different centres. For estimating the figures for 1960-61 and 1956-57, the 'yield rates' and 'utilisation ratios' of 1960-61 are applied to the corresponding figures of earlier years, which are then multiplied by their base year price to obtain the value of the particular group. While some data on the cost of feed and other cost items are available for 1960-61, by distributing national totals to states, the corresponding figures for earlier years are not available, and hence 1960-61 ratios of net output to gross output had to be used.<sup>I</sup>

#### FORESTRY

Net output of the forestry sector is estimated by obtaining the gross value of all forest products at constant prices and then deducting the cost of different inputs. The Indian forests statistics give data on major and minor forest products since 1956-57, but such data prior to 1956-57 are not available.

#### FISHERY

For the 1960-61 net output of the production of fish by fishing in sea and inland water, the 'product' approach is followed. For estimating the net output of the production of pearl, conch shells, etc. the 'income approach' is

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I. See distribution of National Income by States, op.cit. pp. 38, 39, 40.

adopted. The availability of data on these items for earlier years is scanty.

The following conclusions can be reached from the discussion of the methods adopted in the agricultural sector.

(1) In agriculture proper, the data situation at state level is more satisfactory for the 'forecast' crops. This group accounts for a substantial proportion of the total crop output in most of the states. The regional data on the various minor crops, plantation crops and miscellaneous crops are less readily available for the earlier years. For estimating the net output of different sub-sectors, the data on the cost ratios are also not available for the years before 1960-61. The regional data on the other sub-sectors of agriculture such as animal husbandry, forestry and fishery are more scanty for 1950-51 and 1955-56. For these sub-sectors, too, in the absence of other data on cost items, the 1960-61 ratios had to be used for earlier years.

(2) These limitations regarding agricultural statistics do not create problems of serious adjustment. The NCAER has followed methods close to those used in national income accounting for the agricultural sector. In addition, where a different method had to be used, this is applied to all the fourteen states so that the comparability of resultant figures is not affected. However, we need to check the acceptability of the NCAER figures by comparing the aggregate of net output originating in the agricultural sector of the states with independent estimates of C.S.O. We shall attempt this later on.

### SECONDARY SECTOR

The coverage of this sector is the same as the combined coverage of the factory establishments, mining and small enterprises sector of the National Income Accounting. We shall discuss here the methodology adopted in estimating

the net output of factory establishments and small enterprises.<sup>I</sup> The small enterprises sub-sector covers all the manufacturing establishments not covered in the Factories Act of 1948. It includes the household and non-household establishments engaged in manufacturing and processing activity but employing on any day less than ten workers if using power and less than twenty workers if not using power.

#### FACTORY ESTABLISHMENTS

The industrial statistics for the factory sector are available through the following main sources: (1) Industrial and Statistical Wing of the CSO, (2) the National Sample Survey, (3) the labour bureau, (4) the Development Wing of the Ministry of Commerce and Industry. The collection of data on industrial statistics from 1959 is conducted through the Annual Survey of Industries, which covers all states except Jammu and Kashmir. The NSS in its major publication of Sample Survey of Manufacturing Industries (SSMI) gives the data on net output for earlier years. However, these data are at all India level and hence data on regional cost structure for 1950-51 and 1955-56 cannot be obtained directly. In the NCAER, the estimates of net output of 'factory establishments' are based on 'product approach'. The regional estimates of the net output of the factory sector for 1950-51 and 1955-56 are made by using the regional index numbers. Use of such a method is justifiable in the absence of other direct data at regional level.

#### SMALL ENTERPRISES

The methodology used in this sub-sector can be discussed for household and non-household establishments separately.

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I. NCAER, op. cit., for methodology on mining and construction.

### HOUSEHOLD MANUFACTURING ESTABLISHMENTS

This group covers all household establishments engaged in manufacturing industry for which employment statistics have been collected for rural and urban areas separately from the 1961 Census economic data. From the National Sample Survey Report No. 94, estimates of net output per person engaged in household manufacture have been prepared separately for rural and urban areas of different states for 1958-59. Both these estimates are then brought forward to 1960-61 level by using index of wages of rural skilled workers in the absence of any other suitable indicator.<sup>1</sup>

The estimates of net output per person for rural and urban areas, thus obtained, are then multiplied by the corresponding number of persons obtained from the 1961 census economic data to arrive at the net output of rural and urban household manufacturing which are then added up to give the regional net output of the household manufacturing group.

### NON-HOUSEHOLD MANUFACTURING ESTABLISHMENTS

To arrive at the estimated number of persons engaged in this group for each state, the estimated number of persons engaged in large and medium manufacturing establishments in each state is subtracted from the corresponding total number of persons engaged in all non-household manufacturing establishments. The regional statistics on the working force in non-household industry is obtained from the 1961 census economic data while the corresponding data on regional figures of the number of persons engaged in large and medium establishments are obtained from the NCAER's 1960-61 earlier publication.<sup>2</sup> In order to estimate the net output

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1. It was felt that, due to the organised nature of the large-scale manufacturing, the rate of change in factory earnings would be different from its counterpart in unorganised sectors in urban areas. Therefore, index of earnings of rural skilled workers was used for the household manufacturing in urban areas also.

2. For more discussion, see NCAER, "Estimates of State Income, 1950-51, 1955-56 and 1960-61", op.cit.pp.27, 28, 29.

per person engaged in this group, it was assumed that a simple average of net output per person in medium establishments and household establishments can be taken as the average regional net output in the whole non-household establishments sector. This average is then multiplied by the number of persons employed to arrive at the regional estimates of net output of this sector.

We must stress here that the estimates of net output originating in the 'small enterprises' sector create difficult problems in national income accounting as well. In the regional estimates additional problems arise as the relevant regional figures are not available and hence indirect methods have to be used. As a result, the various estimates of income originating in this sector and the average net output per person are likely to differ in the different estimates. Mention may be made of some discrepancies in the NCAER estimates of 1960-61 as compared to Chaudhry's for 1955-56.<sup>1</sup>

1. We cannot compare both estimates for 1955-56 as the NCAER's estimates for 1955-56 are not available separately for small enterprises sector. The table below gives these figures for 1960-61.

TABLE 3  
ESTIMATES OF STATEWISE PER CAPITA OUTPUT  
IN SMALL ENTERPRISES: 1955-56, 1960-61

State (1)	1955-56	1960-61
	Small Enterprises (2) Chaudhry	Small Enterprises (3) NCAER
1. Andhra Pradesh	18.56	11.97
2. Assam	5.76	12.84
3. Bihar	2.97	11.59
4. Bombay	16.20	29.00
5. Kerala	19.75	30.46
6. Madhya Pradesh	16.63	12.92
7. Madras	19.74	25.81
8. Mysore	19.21	20.01
9. Orissa	9.86	8.98
10. Punjab	11.21	45.37
11. Rajasthan	19.44	7.92
12. Uttar Pradesh	20.19	12.55
13. West Bengal	20.22	37.46
14. Delhi	33.44	93.04

Source: Rao, S.K., op.cit., p.68-69. Notes<sup>1</sup>) 1955-56 from Chaudhry op.cit. 2) 1960-61 from NCAER, op.cit.

An explanation for such a difference in the two sets of figures lies in the differences in methodologies of the two sources. Chaudhry in his estimates uses the national average value added per rural and urban worker in small enterprises and applies this to all the states. In the NCAER as we discussed above a different method is used for household and non-household establishments, attempting to use some regional figures of per capita average earnings: Thus, the resultant averages of per capita output for the whole sector in the two sets are bound to differ. Such differences do not affect the acceptability of the NCAER figures for 1960-61.

The difficulties of estimating the net output generated in household and small-scale sector are not completely resolved by the NCAER in its estimates of income originating from this sector in 1950-51 and 1955-56. The 1951 census does not give separate data on manufacturing employment in these two sectors. The regional estimates of employment in small enterprises for 1950-51 were arrived at as a residual between the factory employment for that year and the total manufacturing employment as given by the 1951 census data. In the case of the intercensal year, employment in small enterprises has been estimated by geometric interpolation of 1951 and 1961 data. Since census classification of 1951 differs from 1961, it was assumed that the total of 'self-supporting persons and 'earning dependants' engaged in manufacturing industry constitute the manufacturing employment.<sup>1</sup> These difficulties of estimating employment in the small enterprises sector and some differences in the methodology between 1951 and 1961 resulted in figures for some states which appeared to be out of line when compared to similar

1. (a) Livelihood Class V of 1951 Census includes not only employment in manufacturing but also extractive industry. This had thus to be separated.

(b) Livelihood Class V is further classified into (i) employers, (ii) employees and (iii) independent workers. The difficulties arise here in the distribution of 'earning dependants'. This had then to be distributed according to distribution of independent workers.

1960-61 figures. To quote, "It was found that in certain groups of industries in the states of Madras, Andhra, Mysore, etc., the rate of increase in the number of female workers was two or three times greater than the corresponding rate of increase of male workers, which was unacceptable. In such cases, it was assumed that female workers also increased by the same rate as male workers. The manufacturing employment for 1951 thus estimated could not be accepted for the states of Rajasthan and Bihar for slightly different reasons. The manufacturing employment figures for Rajasthan as estimated from the 1951 census were found to be 10 per cent more than the corresponding 1961 figures, which was unrealistic. Therefore, the volume of employment in the small enterprises sub-sector for this state has been estimated from the corresponding 1961 estimate by assuming that the volume of employment during 1951-61 increased at the same rate as that of Uttar Pradesh. In the case of Bihar, it was found that manufacturing employment in 1961 was 200 per cent more than in 1951. This is not possible with a larger base. Therefore, the volume of employment in the small enterprises sub-sector in 1951 was estimated from the corresponding figure of 1961 by assuming that, during the decade 1951-61, it increased by the same rate as West Bengal."<sup>1</sup> Some disagreements can arise with this particular method of adjusting the figures. Taking the employment growth of Rajasthan and Bihar as being the same as that in their neighbouring states of Uttar Pradesh and West Bengal seems less than acceptable, but as no other sources are available, it may be justified with due caution.

#### THE TERTIARY SECTOR AND 'OTHER SERVICES' SECTOR

This sector includes the following: (a) trade and commerce, (b) transport and communications, (c) construction, (d) government services, (e) miscellaneous services,

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1. NCAER, op.cit. pp.29-30.

(f) house property. The procedure adopted for these sectors need to be discussed under two heads: (i) the procedures adopted for the base year, i.e. 1960-61 and (ii) the ones followed for 1955-56 and 1950-51. Chapters II to IV in the NCAER publication "Distribution of National Income by States" describe the details of methodology adopted for 1960-61. The data position for the services sector is not satisfactory and several allocators had to be used. Scanty as these data are, they are more readily available for 1960-61 than for earlier years. Hence one may say that if we have to make judgement regarding the reliability of particular estimates for the tertiary sector in 1950-51, 1955-56, and 1960-61, the 1960-61 estimate ought to be considered as being in a much better position than the rest. For 'Transport, Storage and Communication', separate estimates are made for (i) railways, (ii) road transport and (iii) other transport and communications. Several allocators were used in order to distribute the all India figures to the respective states. For 'banking and insurance' state income originating in this sub-sector is arrived at by allocating the all India figure to various states.

#### MISCELLANEOUS SERVICES

This sub-sector includes the following: (1) education and scientific services, (2) medical and health services, (3) personal services, (4) all other services and (5) house property. The general data position for this sector is far from satisfactory. The earnings data on the various groups and sub-groups of services sector are not easy to obtain and in several cases averages are used. Here, again, grouping of various services ranging from highly skilled to unskilled under one sector raises some important issues.

In order to estimate the income originating in this

sector for 1950-51 and 1955-56, certain additional procedures had to be followed. These may be summed up as follows:

(1) For deriving the estimates of income originating at constant prices in almost all tertiary sectors and a few secondary sectors, reliance had to be placed on trend in employment as an indicator rather than the use of a physical indicator. To quote the NCAER<sup>1</sup>, "In short, it may be summed up that it is comparatively easy to find suitable indicators to move bench mark estimates of income generated in tertiary sectors at all India level, or if it is a question of a particular state. But when it is a matter of adopting such indicators in the case of many states, and over a period of time, one faces almost insurmountable difficulty. For this reason, the choice falls back on employment".

(2) In the case of the trade and commerce sector, the net output of these earlier years has been estimated from the corresponding estimates of 1960-61 by assuming that, during the last decade, the volume of trade and commerce in a particular state had increased by the same rate as the volume of commodity production of the state. We feel that it is acceptable that the growth of the tertiary sector should likely to be linked with the growth of commodity production. However, in certain circumstances, such as with a large industrial base and rapid industrialisation, growth in services could be greater than that in the commodity sector. For other less industrialised states with a small percentage of income originating in the tertiary sector, the income growth there may be less than commodity production. The NCAER seems to have taken a middle position, perhaps with the consideration that any attempt to adjust for the growth of the tertiary sector in these two groups of states would entail additional assumptions. Keeping these limitations of basic data in mind, a 1:1 ratio appears less objectionable. Rao, S.K.<sup>2</sup> concludes from these problems associated with regional income estimates of the NCAER and the differences in figures that we noted between Chaudhry and the NCAER that state income data for these various years cannot indicate trend, and hence use of state income data for the study of

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1. NCAER, op.cit., p.32.

2. Rao, S.K., op.cit., p.70.

regional disparities is not possible.

Our discussion of the various theoretical problems and the particular methodology used by the NCAER leads us to the following conclusions:

(i) In agriculture, due to larger coverage and improvement in method of yield estimation, the data for major crops are more satisfactory. Some problems exist in estimating cost structure and use of price average. However, by and large, methodology used for agriculture appears to be acceptable.

(ii) In manufacturing, difficult problems arise in estimating income originating in the household and small enterprises sector, especially for 1950-51 and 1955-56. Use of the 1951 census data does not resolve all the problems satisfactorily. This limitation of the NCAER figures has to be borne in mind in using these figures. By and large, however, discrepancies are not likely to be so great as to affect the individual state's ranking position vis-a-vis other states.

(iii) The overall data position for the 'tertiary sector' is less satisfactory. Here also more difficult problems arise in estimating figures for 1950-51 and 1955-56. We can say that the use of 1950-51 and 1955-56 figures can be justified on the grounds that the NCAER has made use of the only available data, and its assumptions regarding use of employment indicators and the growth of 'trade and commerce' being the same as that of commodity production seem less objectionable, as the same method is applied for all the states, which does not seem to be the case for some other state income figures.<sup>1</sup> One way of checking the consistency and the accuracy of the NCAER figures is to compare the national NDP figures arrived at by summing up all state incomes with those independently published by CSO.

### SECTION III"

#### A COMPARISON OF NATIONAL NET DOMESTIC PRODUCT OF NCAER AND CSO

In this section we shall compare the national NDP figures arrived at by summing up all state incomes of the

1. Particularly those published by State Statistical Bureaux.

NCAER with those independently published by CSO, both in current and constant prices. Our purpose here is to check the consistency and reliability of regional income aggregates at the sectoral level and then also to compare the total national NDP figures. We need to pay special attention to the sectoral estimates of net output as over and under estimations in various sectors may tend to cancel out and thus give small deviations in aggregate NDP figures. In such a comparison, we are not necessarily looking for identical absolute figures. However, we need to pay special attention to the figures for 1950-51 and 1955-56 as the methodologies adopted for various sub-sectors for these years differed from those for 1960-61. Secondly, regional income figures for these years in 1960-61 prices are not available from any other sources and hence acceptability of these figures needs to be established by comparing the national aggregates.

We shall compare here the CSO estimate of NDP in current prices in 1960-61 with the NCAER estimate for the same year. For the earlier years, we can compare Tiwari's<sup>1</sup> estimates of national income as these are in 1960-61 prices. The following conclusions can be reached from Table 4.

(1) A comparison of various estimates for 1960-61 shows that the NCAER's sectoral estimates for this year are in close agreement with both CSO and Tiwari. In agriculture, the NCAER's absolute figures are higher. In the secondary sector, Tiwari's and CSO's figures are higher than the NCAER's, which shows that there is some underestimation in this sector due to the difficulties of estimating regional net output in the 'small enterprises' sector. For the tertiary sector, CSO and NCAER's figures are higher than Tiwari's. We cannot adequately answer here whether the actual CSO figures involve under or over estimation in the tertiary sector.<sup>2</sup>

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1. See "Economic Development of South Asia", Proceedings of a Conference held by International Economic Association. Ed. Robinson, E.A.G., and Kidron, Michael, 1970, Part II. See Ashok Rudra, in "The Rate of Growth of Indian Economy". He cites Mr Tiwari, S.G.'s (Director of National Income Unit, CSO) personal estimates to demonstrate underestimation involved in official series.

TABLE 4

A COMPARISON OF NET DOMESTIC PRODUCT OF INDIA: 1950-51, 1955-56, 1960-61 (in 1960-61 prices & Rs 100 Crores)

Sector	1950-51		Difference between col. (1) and (2) Absolute	1955-56		Difference between Col. (4) and (5) Absolute
	Tiwari	NCAER		Tiwari	NCAER	
	(1)	(2)	(3)	(4)	(5)	(6)
Agriculture & Allied	53.96	58.03	-4.07	61.93	65.75	- 3.82
Secondary Sector	16.32	14.56	+1.76	21.11	17.44	+ 3.67
Tertiary Sector	27.59	32.74	-5.15	23.52	38.02	-15.54
Total NDP	97.87	106.38	-8.51	116.56	122.21	- 5.65

(continued)

Table - 4

	Differences between				
	<u>▼ I960-6I</u>			(6) and (7)	(7) and (g)
	(6) <u>Tiwari</u>	(7) <u>NCAER</u>	(8) <u>(SO current)</u>	(I9)	(ID)
Agriculture and Allied	7I.43	77.I8	68.90	-5.75	+8.28
Secondary Sector	28.76	23.07	28.80	+5.69	-5.87
Tertiary Sector	4I.42	47.23	46.50	-5.8I	+I.73
Total NDP	I42.6I	I47.48	I4I.90	-4.87	+5.58

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Sources: Compiled from CSO? Indian Official National Income Statistics,  
NCAER, op. cit. and Tiwari, op<sub>1</sub> cit.

the tertiary sector.

(2) A comparison of the figures for 1950-51 and 1955-56 shows that for 1955-56 the divergence in NCAER sectoral figures from those of Tiwari is greater. However, the absolute differences in agriculture and manufacturing are much smaller than those in the tertiary sector. The NCAER's figures for the manufacturing sector are lower for both years than Tiwari's. In the tertiary sector, the NCAER figures are higher than Tiwari's. This is particularly so for 1955-56. We discussed the methodological problems involved in estimating net output generated in the tertiary sector for these years. In the absence of more information for these years it is not possible to work out the extent of overestimation in the NCAER figures. In 1955-56 comes out worst as it is an intercensal year and hence it involved additional assumptions regarding the sectoral working force.

(3) We may justify the use of 1950-51 and 1955-56 figures on the following grounds. Firstly, the NCAER estimates for the other major sectors for these years do not substantially diverge from Tiwari's. As a result the difference in the NDP estimates is small. Secondly, the tertiary sector's share in total NDP is around 32 per cent nationally and this share is much smaller for the less industrialised states so that the overall ranking of the states is not likely to be affected by such overestimation. Thirdly, since the estimates for 1950-51 are relatively better placed than those for 1955-56, it would enable us to measure regional disparities between these two years. Finally, these estimates have to be used bearing these limitations in mind on the grounds that the estimates from other sources, as we shall see later, are less firm and

result in larger differences from the national totals.

(4) The growth rates in agriculture in Tiwari and NCAER are in close agreement. However, in the tertiary sector, due to the differences in absolute figures NCAER gives a lower sectoral growth of tertiary income than Tiwari, resulting in much lower NDP growth in NCAER as compared to Tiwari. Table 5 gives the resultant structure of NDP by economic sectors in CSO, NCAER and Tiwari.

TABLE 5

PERCENTAGE DISTRIBUTION OF NET DOMESTIC PRODUCT BY SECTOR  
IN INDIA, 1950-51 to 1960-61

	1950-51			1955-56			1960-61		
	NCAER	Tiwari	CSO	NCAER	Tiwari	CSO	NCAER	Tiwari	CSO
	(Constant)			(Constant)			(Constant)		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Agriculture and Allied	54.4	55.0	49.0	53.7	NA	47.9	52.3	49.6	46.4
Mining, Manufacturing, Small Enterprises	13.7	15.4	16.7	14.3	NA	16.8	15.7	20.2	16.6
Tertiary	31.9	29.6	34.3	32.0	NA	35.3	32.0	30.2	37.0
Total	100.0	100.0	100.0	100.0	NA	100.0	100.0	100.0	100.0

Source: Compiled from NCAER, Tiwari and CSO, op.cit.

The following points can be noted from Table 5.

(i) Percentage share of agriculture in NDP declines at a different rate in all the series. NCAER shows a very small decline. (ii) In manufacturing, the CSO constant gives almost no increase in share of manufacturing, Tiwari gives a 5 per cent increase and NCAER gives 1 per cent. (iii) In the Tertiary Sector, NCAER gives an increase in share of the tertiary sector by 2 per cent, Tiwari 1 per cent and CSO 3 per cent. (iv) There is closer agreement in the structure of net domestic product if we compare the percentage shares

of sectors for single years separately. However, NCAER's share of agriculture in total NDP is higher than that of Tiwari for 1960-61. Similarly for 1960-61, Tiwari's share of manufacturing is higher than that of the CSO constant and NCAER. These differences, although relevant, are not so great as to make any particular series out of line with the others. To a certain extent some differences are unavoidable and one would be more suspicious if identical figures were in existence for all the sectors in spite of the paucity of data and information at the regional level. However, to establish the relative accuracy of the NCAER set of figures we shall make a further comparison of 1960-61 state income figures with those estimated by CSO for 1962-63, in current prices.<sup>1</sup> We shall also compare the NCAER and CSO figures with the IIPO<sup>2</sup> state income figures of 1967-68. Table 6 gives the CSO state income figures for 1962-63, 1963-64 and 1964-65. A comparison of 1962-63 CSO figures with those of NCAER shows that the state income figures of Maharashtra, West Bengal, Uttar Pradesh and Punjab (including Haryana) are higher in NCAER for 1960-61. Since we cannot expect a fall in the state income of these states, we can take this as an indication that there is some overestimation of state income of the more industrialised states. However, this does not appear to be substantial and affects only a few states.

The IIPO figures of state income may now be discussed. They appear to have followed a methodology close to NCAER's. Hence we may first compare these figures with NCAER's. Table 7 gives these figures. It can be seen that these figures are not inconsistent in terms of the resultant growth rates. The percentage growth of agricultural is much lower, which is a result of inclusion of two bad years of 1965-66 and 1966-67.

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1. These estimates were obtained through personal correspondence, but are not yet officially published according to our knowledge.

2. IIPO, op.cit.

TABLE 6

## ESTIMATE OF REGIONAL DOMESTIC PRODUCT - ALL INDUSTRIES\* (at current prices)

States	Total (Rs. crores)				Per Capita (Rs.)			
	NCAER	CSO	1963-64	1964-65	CSO	NCAER	CSO	CSO
	1960-61	1962-63			1962-63	1960-61	1963-64	1964-65
1. Andhra Pradesh	1040.4	1252	1439	1690	338	289	381	438
2. Assam	389.9	433	496	580	349	328	388	441
3. Bihar	1031.3	1116	1302	1505	232	222	265	299
4. Gujarat	831.0	889	997	1189	413	403	451	523
5. Haryana	-	303	370	427	381	-	451	504
6. Jammu & Kashmir	-	97	110	127	267	-	298	341
7. Kerala	551.3	533	590	725	303	326	328	393
8. Madhya Pradesh	949.7	943	1114	1320	280	293	323	373
9. Madras	1158.1	1262	1409	1552	365	344	401	434
10. Maharashtra	1396.1	1764	2017	2277	429	479	478	526
11. Mysore	738.8	800	932	1075	327	313	372	420
12. Orissa	470.1	473	674	658	261	268	309	347
13. Punjab	896.0	492	578	714	421	441	480	575
14. Rajasthan	548	610	645	795	289	272	297	356
15. Uttar Pradesh	2151.4	1968	2240	2985	258	292	287	374
16. West Bengal	1613.0	1531	1780	1916	420	462	476	498
All India	14743.7	14891	17132	20810	327	336	367	422

\*Excluding defence, Government of India embassies and other establishments abroad and business outside India of Indian insurers, which are unallocable among States. For this reason, the 'All-India' figure of per capita income is not the same as per capita national income.

Source: NCAER, op.cit.

CSO estimates are those which are not yet published but available for private circulation, and were obtained through correspondence.

TABLE 7

NATIONAL NET DOMESTIC PRODUCT IN INDIA, 1960-61 and 1967-68

(In Rs. 100 Crores. In 1960-61 Prices)

(a)	NCAER	IIPO
	1960-61	1967-68
Agricultural Income	77.18	85.16
Industrial Income	23.07	32.39
Tertiary Income	47.19	68.44
Total NDP	147.43	185.98

(b) Percentage Increase in Sectoral Income in 1967-68 over 1960-61

A	10.34
M	39.43
T	45.03
Total	26.15

(c) Distribution of NDP by Industrial Origin - Percentage

	1960-61	1967-68
A	52.3	45.79
M	15.7	17.41
T	32.0	36.80
Total	100.0	100.00

Sources: Compiled from NCAER, "Estimates of State Income" op.cit. and IIPO, op.cit.

Another way of comparing these figures is to compare the ranks. This is given in Table 8. Rank correlations between NCAER and CSO 1962-63 and between CSO 1964-65 and IIPO are 0.912 and 0.914. We take these broad comparisons of national aggregates and rank orders to be sufficient to justify the use of IIPO figures in our study. Since these are the only checks that are possible in the given information, we have to accept them with due caution.

#### SECTION IV

#### A REVIEW OF ~~OTHER~~ ESTIMATES OF STATE INCOME

We will briefly discuss here some examples of the discrepancies in the state income data as compiled by the various state statistical bureaux. In addition, we will also examine a few individual writers' estimates on state income mainly in 1948-49 prices. Lastly, although it is very difficult to suggest particular steps that may be taken to have time-series estimates of state income, we shall indicate the directions in which some changes can be made so as to make it possible to have reliable state income data from official sources.

#### THE STATE INCOME ESTIMATES OF STATE STATISTICAL BUREAUX:

We have not attempted personally to compare the state income figures of various state statistical bureaux for two main reasons. (1) The comparisons made by some other writers in the field establish clearly the nature of discrepancies in various state income figures. (2) In personal correspondence, to the CSO, National Income Unit, it was pointed out that, to date, state income figures are not comparable among states and should not be used in a study of disparities.

We may first quote the opinions of a few writers in the field on the reliability of state departments' figures. Mahinder Chaudhry,<sup>1</sup> comes to the following conclusion in this

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1. Chaudhry, Mahinder, *op.cit.*, p. 92.

TABLE BC

## RANKING OF STATES BY PER CAPITA INCOMES

NCAER (1960-61), CSO (1962-63), IIPO (1967-68), CSO (1964-65)

State	NCAER (1960-61) (1)	CSO (1962-63) (2)	IIPO (1967-68) (3)	CSO (1964-65) (4)
Andhra	11	8	8	7
Assam	6	7	10	6
Bihar	14	15	15	15
Gujarat	4	4	3	3
Haryana		5*	2*	4*
Kerala	7	10	9	10
Madhya-Pradesh	9	12	12	12
Madras	5	6	6	8
Maharashtra	1	1	4	2
Mysore	8	9	7	9
Orissa	13	13	13	14
Punjab	3	2	1	1
Rajasthan	12	11	11	14
Uttar Pradesh	10	14	14	11
West Bengal	2	3	5	5

Sources: NCAER, CSO and IIPO, op.cit.

\*Punjab was split into Punjab and Haryana. Hence, the CSO and IIPO figures are in terms of New Punjab and Haryana. While NCAER figures of 1960-61 are in terms of Old Punjab.

Rank Correlation - 0.9121 (1) and (2)

0.9143 (3) and (4)

regard. "The general impression gained from the reports available is that the main objective of most studies is determination of a single figure of total state income. The details of how this total estimate is reached appear to be lost sight of in many cases." Professor M. Mukherjee<sup>1</sup> also comes to a similar conclusion. To quote, "As procedures followed by different states remain different, the figures are not strictly comparable and not too much should be read at this stage from these figures."

We may now briefly give a few examples of the nature of discrepancies in state income figures. As we pointed out earlier, one way of checking overall accuracy is to aggregate state income or net product originating in each sector and thus arrive at the national values of net domestic product for various sectors and for the economy as a whole. Table 9<sup>1</sup> gives an example of such aggregation for 1955-56 as compiled by Chaudhry. We can note from this table that there are substantial deviations in official national income estimates and those aggregated from state income figures for various sectors and sub-sectors. Most important among these are (i) animal husbandry, factory establishments, small enterprises, the whole sector of commercial transport and communications and other services. In spite of such substantial differences at the sectoral level, the total national domestic figures deviate only by 4 percent. This therefore points to the need to establish accuracy first at sectoral level and then compare the resultant national figures. A second way of checking the general reliability is to compare state income figures from state departments with those from other sources. Table 10<sup>1</sup> gives such a comparison. We cannot compare NCAER figures directly with those of state reports and Chaudhry, as these are in different prices. However, a comparison of state reports figures with those of Chaudhry shows that figures for various states appear out of line. The figures for the following states are higher in state reports:

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1. Professor Mukherjee, M., op.cit., p. 497.

TABLE 9.

## COMPARISON OF NATIONAL INCOME ESTIMATES AND AGGREGATE OF STATE INCOME ESTIMATES

BASED ON LOCAL DATA, 1955-56

(Money amounts in millions of rupees)

Economic Sectors and Subsectors	Initial	Revised	Aggregate of state estimates	Col. 1	and Col. 3	Col. 2	and Col. 3
	national income estimates	national income estimates		Amount	per cent	Amount	per cent
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1. Agricultural and allied products	45,173	44,733	44,746	+ 427	+ .9	- 13	= -
2. Agricultural crops	36,860	34,730	34,471	+2,389	+ 6.5	+259	+ .7
3. Animal husbandry	7,040	8,132	9,117	-2,077	-29.5	-985	-12.1
4. Forestry	725	1,338	614	+ 111	+15.3	+724	+54.1
5. Fishery	548	533	544	+ 4	+ .7	- 11	- 2.1
6. Mining, manufacture, and small enterprises	18,500	16,257	16,267	+2,233	+12.1	- 10	-
7. Mining	1,000	777	869	+ 131	+13.1	- 92	-11.8
8. Factory establishments	7,800	6,440	7,119	+ 681	+ 8.7	-679	-10.5
9. Small enterprises	9,700	6,350	8,279	+1,421	+14.6	+761	- 8.4
10. Construction	a	2,690	a	a	a	a	a

TABLE 91 (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
11. Commerce, transportation and communications	18,800	15,600	17,211	+1,589	+ 8.4	-1,611	-10.3
12. Communication services	500	500	465	+ 35	+ 7.0	+ 35	+ 7.0
13. Railways	2,500	2,200	1,917	+ 583	+23.3	+ 283	+12.9
14. Banking and insurance	900	730	1,000	- 103	-11.4	- 273	-37.4
15. Other commerce and transportation	14,900	12,170	13,826	+1,074	+ 7.2	-1,656	-13.6
16. Other Services	17,300	15,481	17,022	+ 278	+ 1.5	-1,541	-10.0
17. Professions and liberal arts	5,600	4,600	6,619	-1,019	-18.4	-2,019	-44.1
18. Domestic services	1,400	1,680	1,108	+ 392	+28.0	+ 572	+34.0
19. Government services	5,700	5,500	5,041	+ 659	+11.6	+ 459	+ 8.3
20. Residential property	4,600	3,701	4,254	+ 346	+ 7.5	- 533	-14.9
21. Total (lines 1+6+11+16)	99,773	92,071	95,246	+4,527	+ 4.5	-3,175	- 3.5

a. Included in line 9.

Sources: Column (1) Government of India, Central Statistical Organisation, Estimates of National Income 1948-49 to 1960-61 (Delhi, 1962), Table 2, p. 2; Column (2) National Income Statistics, Table 16, p. 175;

Source: Chaudhry Mahinder, op.cit. p. 59,60.

TABLE 10

COMPARISON OF STATE INCOME ESTIMATES IN INDIA, 1955-56  
(in Rs crores)

	Allocated Shares (Chaudhry) (1)	State Report Estimates (2)	NCAER (1960-61 prices) (3)	Diff. between 1 - 2	
				Absolute (4)	Percentage (5)
1. Andhra	733.5	746.4	931.7	- 12.9	- 1.7
2. Assam	247.4	266.7	344.5	- 19.3	- 7.8
3. Bihar	611.6	811.6	819.6	-200.0	-32.7
4. Bombay	1551.3	1507.5	2127.5	+ 43.8	+ 2.8
5. Kerala	324.7	332.2	472.6	- 7.5	- 2.3
6. Madhya-Pradesh	666.1	643.5	808.1	+ 22.6	+ 3.4
7. Madras	740.9	815.5	929.0	- 74.6	-10.1
8. Mysore	499.7	531.1	659.5	- 31.4	- 6.3
9. Orissa	249.9	370.9	398.7	-121.0	-48.4
10. Punjab	511.7	591.8	704.0	- 80.1	-15.6
11. Rajasthan	435.3	450.6	494.4	- 15.3	- 3.5
12. Uttar Pradesh	1433.1	1438.9	1790.3	- 5.8	- 0.4
13. West Bengal	968.0	748.9	1363.4	+219.1	+22.9
14. Others <sup>1</sup>	233.9	214.2	-		
All India	9207.1	9524.6	12237.5	-317.5	- 3.5

Notes. Others include Delhi, Himachal Pradesh, Kashmir and other Union Territories.

Sources: 1. Chaudhry, op.cit., p. 67.

2. State Reports figures as compiled by Chaudhry

3. NCAER, op.cit.

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(i) Bihar (32.7%); (ii) Madras (10%); (iii) Orissa (48.4%); (iv) Punjab (15.6%); (v) West Bengal (22.9%); (vi) All India (3.5%). We shall not go into more detailed examination of the sources of these discrepancies in these individual states. However, we feel that the above account of state departments' estimates is sufficient to justify our choice of using figures from other sources.

Among the earlier estimates of state income, for 1958-59, the following main works may be mentioned, viz. Raj<sup>1</sup>, Varma<sup>2</sup>, Ojha<sup>3</sup>, CSO<sup>4</sup>. These estimates are based mainly on the allocation method in which national income figures are distributed regionally by use of various allocators. These are given in Table 14. It can be seen that as compared to CSO, whose figures we may take as the basis of comparison, there are considerable variations in the absolute value of state per capita incomes and the rank orders. Among these estimates Raj's figures are closest to CSO, both in absolute amount and rank orders. In Varma's figures, Assam ranks 1 as compared to 4 in CSO, Punjab 4 with 1 in CSO, and Uttar Pradesh 8 with 11 in CSO. Ojha's figures for non-agricultural incomes are derived on the basis of allocations depending on income tax data. Hence, some differences are to be expected. However, except for Punjab and Uttar Pradesh, rank orders do

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1. Raj, K.N., "Some Features of the Economic Growth of Last Decade in India", Economic Weekly, Annual No. , Vol. XXIII, Nos. 4, 5 and 6, Feb. 1961.

2. Varma, Ravi, "Estimation of State Income by Allocation Method," 3rd ICRNI (Indian Conference on Research on National Income), Mimeo.

3. Ojha, P.D., "Estimation of State Income in India", Indian Economic Journal, Vol. XI, No. 1, Jul.-Sep. 1963.

4. CSO, Tiwari, S.G., and others, "On the Sectorwise Estimates of the net value of output in certain sectors of the economy", Seminar on State Income, ICRNI, 1962 (Mimeo). CSO unit adopts mainly the procedure of obtaining the value of output and some idea of cost at the state level for as many industrial sectors as possible, and to depend on a procedure of allocation for the remaining sectors. Among the other writers, two more may be cited: (a) Pillai, K.N.C., and Grace, T.V., "Estimates of Personal Income by States", Monthly Abstract of Statistics, CSO, Nov. 1961.

(b) Dasgupta, B.S., "Comparable Estimates of Income Accruing to Different States of India during 1957-58 to 1958-59, Staff Paper, CSO, Mimeo.

TABLE 17

COMPARISON OF PER CAPITA INCOME OF STATES ACCORDING TO  
DIFFERENT SOURCES: 1958-59 (At 1948-49 prices)

	Raj		Varma		Ojha		CSO		SSB	
	Rs	Rank	Rs	Rank	Rs	Rank	Rs	Rank	Rs	Rank
Andhra	267	8	255	6	217	8	263	7.5	254	8
Assam	305	4	446	1	273	4	303	4	291	3
Bihar	228	11	220	10	161	11	186	12	186	13
Bombay	340	3	340	3	491	1	343	2	337	1
Kerala	244	9	210	11	156	12	235	10	225	12
Madhya Pradesh	297	5	261	5	233	6	265	6	288	5
Madras	283	7	239	7	239	5	267	5	279	6
Mysore	198	12	231	9	197	9	263	7.5	267	7
Orissa	188	13	197	12	134	13	172	13	249	9
Punjab	396	1	289	4	363	3	355	1	323	2
Rajasthan	232	10	145	13	194	10	249	9	290	4
Uttar Pradesh	288	6	233	8	219	7	220	11	235	11
West Bengal	346	2	430	2	481	2	318	3	241	10

Source: Mukherjee, M., op.cit. p. 501

not deviate substantially. The state department's figures and ranks come out worst in comparisons, as there are large absolute and rank order differences. According to it, West Bengal has 10th rank, Kerala 12, Rajasthan 4 and Madhya Pradesh 5.

We shall not attempt to compare these estimates for 1958-59 with those of NCAER, as those for 1958-59 are in 1948-49 prices. We may briefly indicate some of the directions by which more reliable state income figures can be obtained from the official source. The present state of arrangements in which states are responsible for publishing state income figures has proved very unsatisfactory in several respects. Firstly, CSO has attempted to encourage the adoption of standard procedures by all states. Various conferences on research on state income and national income have attempted to promote research at state level in the right directions. However, the wide differences that exist show that these have not resulted in more comparable figures. Secondly, we may be justified in our scepticism of state department figures, as the figures are also likely to be influenced to some extent by the desire of every state to show a high growth of income; or, in some cases, (especially for low income regions) lower figures may work out to the particular advantage of states concerned in getting higher central aid or larger development expenditure, or location of public sector projects. Thus, the influence of subjective motivation at state level cannot be ruled out. Thirdly, since nationally regional patterns of development and the policy for regional development can be regarded as the centre's responsibility, the need arises for some figures to be regularly worked out centrally. We agree with Professor Mukherjee in his conclusion that "since regional pattern of development will remain largely a central responsibility, a comprehensive study of regional levels of economic activity may be undertaken by the centre, in collaboration, of course, with states."<sup>1</sup>

L. Mukherjee, M., op.cit., "A Review of Statewise Estimates of National Income and Allied Aggregates", Appendix XIV, p.510. He further adds that "Until this is done, it will be fruitful to assemble all production and other economic statistics by states and work out comparable series and see what kind of story all these disjoint indicators tell about levels and changes", p.510.

## CONCLUSIONS

The main conclusions of this chapter may be briefly summarised. We started with the concept and the problems arising in general in regional income accounting. It was pointed out that regional income can be regarded as the study of the geographic distribution of value added of a national economy and in this sense concepts applied in national accounting can also be used in regional income accounting. However, important problems arise due to the fact that a region, however defined, is not a nation, and thus defining residents is more difficult. Apart from this, additional problems arise in measuring or allocating the income of corporations and concerns which are spread all over the country. In an underdeveloped economy, due to the predominance of agriculture, measurement of production poses some difficult problems in national accounting. These are likely to be shared by regional accounting as well. In addition, the regional estimation of value added in 'Small-scale Manufacturing' and the 'Tertiary Sector' have to encounter difficult data problems. It was pointed out that it is hardly likely that universally agreeable estimates exist. The accuracy and validity of any estimates need to be judged against particular uses we have in mind.

Section II analysed NCAER methodology. The main conclusions were that 'Agriculture and Allied Sectors', which account for more than 45 per cent of national income, seem to be more firmly established in methodology and primary data than sectors like the 'Small Enterprises' sector and the 'Other Services' sector. The Organised Manufacturing, Transport, Communications, also do not seem to be suffering from severe methodological drawbacks, although primary data for these sectors are less comprehensive than in agriculture.

In general, the figures for 1950-51 and 1955-56 are less firmly placed than those for 1960-61. However, the extent of problems for these years differs among various sectors. In particular, some of the procedures for 'Small Enterprises' sector, 'Trade and Commerce' and 'Other Services' sectors are methodologically less firm. But they have to

be accepted in the light of the situation that better indicators cannot be used, given the limitations of primary data. In this sense, NCAER's estimates for these earlier years can be regarded as serious efforts to fill in gaps in this vital field. In Section III, a comparison of national aggregates arrived at by summing state incomes with those of CSO and Tiwari showed that the NCAER figures agree with independent figures from these sources in agriculture and manufacturing. In the 'Tertiary Sector', there is some disagreement between the NCAER and Tiwari's figures. This is also reflected in the sectoral growth figures from various sources. In Section IV, we made a comparison of state income figures of CSO for 1961-62, 1962-63, 1964-65, which indicated general agreement between the state and per capita income figures of CSO and NCAER. Besides CSO, the state income figures of IIP0 for 1967-68 are based on methodology close to NCAER. A comparison of rank orders in all these estimates showed a close agreement in rank in all series. Hence, we conclude that we can take up the NCAER figures of 1950-51, 1955-56 and 1960-61 and the IIP0 figures of 1967-68 for further analysis. We cannot make sufficient use of the CSO figures as they are in current prices. We shall not repeat our discussion of SSB and other sources in Section IV. We can only point out that this discussion clearly established the deficiencies in SSB's figures. We can now proceed in Chapters III and IV to an analysis of regional disparities in India, using these data.

CHAPTER IIIREGIONAL INEQUALITY AND NATIONAL ECONOMIC DEVELOPMENT

Having established in Chapter II the acceptability of state income figures of the INCAER, etc., we can now proceed to examine the structure of regional inequality in the Indian economy and indicate some trends in the inequality over a period of time. The theoretical framework for measuring regional inequality was stated in Chapter I.

In this chapter, we shall analyse the regional inequality index for the Indian economy in per capita incomes. Section I mainly summarises the growth pattern of Indian states. Section II measures the regional inequality in per capita income for the years 1950-1951, 1955-1956, 1960-1961 and 1967-1968. The weighted coefficient of variation is used for these purposes. The findings on India are compared with those of several other studies in this field. Section III uses variance analysis on per capita income growth in order to decompose the changes in weighted variance of regional per capita incomes about the national mean into three separate components, viz. changes in variance due to shifts in population weights, changes in variance due to divergent regional per capita income growth and the residual component. Here, in the statistical index, we treat population redistribution and income growth independently of each other. In reality, however, they both influence each other. Section IV analyses some trends in migration patterns in 1951-61 in India, and their relation to income differentials. Since the period on which data are available is limited and short-term, we cannot make firm conclusions regarding the long-term movements in these factors.

SECTION ITHE GROWTH PATTERN IN PER CAPITA INCOME OF INDIAN STATES:  
1950-51 TO 1967-68

Table 1 gives the per capita incomes of Indian states

TABLE 1

PER CAPITA INCOMES OF INDIAN STATES (IN Rs.)  
(in constant prices)

State (1)	1950-51 (2)	Rank (3)	1955-56 (4)	Rank (5)	1960-61 (6)	Rank (7)	1967-68 (8)	Rank (9)
Andhra	257	9	278	10	289	11	337	7
Assam	334	5	337	5	328	6	319	9
Bihar	181	14	193	14	222	14	232	14
Gujarat	381	3	379	4	403	4	483	2
Kerala	304	6	313	6	326	7	391	5
Madhya-Pradesh	236	13	278	9	293	9	335	8
Madras	245	12	293	8	344	5	306	11
Maharashtra	373	4	404	2	479	1	474	3
Mysore	287	7	308	7	313	8	372	6
Orissa	252	11	249	13	268	13	295	12
Punjab	405	2	389	3	441	3	609	1
Rajasthan	256	10	275	11	272	12	314	10
Uttar Pradesh	270	8	262	12	292	10	291	13
West Bengal	471	1	449	1	462	2	450	4
All India	296		308		336		361	

Spearman Rank Correlations:

Col. (3) and (5) 0.869

Col. (5) and (7) 0.957

Col. (3) and (7) 0.790

Col. (7) and (9) 0.781

Col. (3) and (9) 0.811

Sources: Compiled from NCAER and  
IIPO, op.cit.

TABLE 2 - PER CAPITA INCOME CHANGE OF THE INDIAN STATES

(Percentage Increase (+) or Decrease (-) of Per Capita Incomes)

STATE	PERCENTAGE 1955-56 OVER 1950-51 (1)	AVERAGE ANNUAL GROWTH RATE (2)	PERCENTAGE 1960-61 OVER 1955-56 (3)	AVERAGE ANNUAL GROWTH RATE (4)	PERCENTAGE 1960-61 OVER 1950-51 (5)	AVERAGE ANNUAL GROWTH RATE (6)	PERCENTAGE 1967-68 OVER 1960-61 (7)	AVERAGE ANNUAL GROWTH RATE (8)
Andhra	+7.9	+1.58	+4.0	+0.80	+12.3	+1.23	+16.7	+2.23
Assam	+0.6	+0.012	-2.4	fall	-1.8	fall	-2.80	fall
Bihar	+7.0	+1.4	+14.9	+2.9	+22.9	+2.29	+4.37	+0.62
Gujarat	-0.6	fall	+6.3	+1.26	+5.	+0.57	+20.03	+2.64
Kerala	+3.0	+0.60	+4.2	+0.84	+7.3	+0.73	+2.79	+0.40
Madhya Pradesh	+17.9	+3.58	+5.5	+1.1	+24.4	+2.44	+4.26	+0.60
Madras	+19.3	+3.86	+17.7	+3.54	+40.5	+4.05	-3.67	fall
Maharashstra	+8.2	+1.64	+18.7	+3.74	+28.4	+2.84	-1.02	fall
Mysore	+7.3	+1.46	+1.7	+0.34	+9.2	+0.92	+18.90	2.50
Orissa	-1.1	fall	+7.6	+1.52	+6.4	+0.64	+10.04	1.38
Punjab	-3.7	fall	+13.3	+2.66	+5.1	+0.51	40.49	4.95
Rajasthan	+7.3	+1.46	-1.1	fall	+8.1	+0.61	15.40	2.17
Uttar Pradesh	-3.3	fall	+11.5	+2.3	+7.8	+0.78	-0.34	fall
West Bengal	-4.7	fall	+2.8	+0.56	-2.0	fall	-2.53	fall
All India	+4.0	0.90	+9.3	1.86	+13.7	1.37	+7.49	+1.04

Compiled from N.C.A.E.R. "Estimates of State Income" and "Indian Institute of Public Opinion", Op.Cit.

in the years 1950-51, 1955-56, 1960-61 and 1967-68. The rank correlations for the various years give high significant values for all the years. However, the exact values of coefficient differ, and are highest ~~before~~ 1955-56 and 1960-61. The value of the coefficient declines for both 1950-51 and 1960-61, and between 1960-61 and 1967-68. Thus, for these periods, there is some evidence of shifts in the ranks. Table 2 gives the per capita income change of the Indian states. Columns (2), (4), (6) and (8) give the average annual growth rates of per capita incomes for the various time periods. The following points may be noted from the table:-

1. In each period, against the average national per capita income growth, which is positive for all three time periods, there are a number of states with a fall or negative income change. The number of these states has differed for each period.

2. Against this, there are a number of states in each period which have an average annual growth rate far exceeding the national average. The number of these states in each period has also differed for different time periods.

Tables 1 and 2 thus show that, starting with an unequal distribution of levels of per capita incomes in 1950-51, the per capita income change of Indian states is very unevenly distributed over the various time periods under consideration. It is with this uneven performance of states that we are concerned in our overall index of regional inequality for the whole economy.

Per capita income is regarded as an important indicator in the international and inter-regional classification of countries and regions with different levels of development. We stated in Chapter I that estimates of 'income by origin' are not adequate measures for quantifying regional differences in the 'welfare', however defined, or the standard of living.

Per capita income measured in this way, however, is an important indicator because it reflects the regional differences in economic structures and the productivity of differences within the economic sector. Hence, in this sense, estimates of per capita value added are immensely useful and provide one basis of classifying states. In analysing the regional differences in the levels of development, classification of regions on the basis of per capita income is useful as it enables us to classify the states in relation to their economic structures. It also enables us to investigate if such a classification corresponds to or differs from the other classifications based on the various other social and economic indicators of the regional levels of development. In classifying the regions by per capita income, we shall merely refer to them as "high income" and "low income" regions. We can take 1960-61 as the basis of classification as this year represents the end of the first decade of planning in India and also, as we discussed in Chapter II, the data for this year are most comprehensive. The following classification emerges from the data in Table I.

<u>High Income States</u>	<u>Low Income States</u>	<u>The Rest</u>
West Bengal	Andhra	Assam
Maharashtra	Madhya Pradesh	Kerala
Punjab	Bihar	Mysore
Gujarat	Rajasthan	
Madras	Orissa	
	Uttar Pradesh	

In the classification here we have taken the first five ranks in per capita incomes, which also have higher than national per capita income as the high income regions. The next three states of Assam, Kerala and Mysore have the per capita income around the national average. Assam can be classified as underdeveloped if some other social and economic indicators are chosen as the basis of classification. The states will rank on and below are all states with lower than national per capital income. There is

a certain arbitrariness <sup>75</sup>involved in such groupings, especially where the borderline ranks are to be classified. Such limitations also arise in the international classification of countries at various stages of development. We accept these limitations of the classification. Our emphasis in this study is not so much a rigid classification of regions as that of furthering our understanding of the process of regional inequality in an underdeveloped economy. Table 3 gives the classification of states with more than national change in per capita income and less than national change in per capita income over the relevant time periods.

It can be observed that, during the first period, from among the top five states only Maharashtra and Madras had a favourable change of per capita income, while from the low income states Bihar and Rajasthan had a growth rate higher than the national average. During 1955-56 - 1960-61, four of the top five states along with Bihar, Orissa and Madhya Pradesh had a more than national average growth rate. However, for the whole decade, only Madhya Pradesh and Bihar from the low income group had a growth rate higher than the national average. For the period 1960-61 - 1967-68, while there are some low income states with higher than average per capita income growth the rest, especially Bihar, Madhya Pradesh, Uttar Pradesh, had a less than average growth rate.

(i) Thus, with regard to the top five states, initial level of per capita income rather than a steady favourable per capita income growth seems to be more important.

(ii) With regard to the low income states, the initial level of per capita income, together with a lack of steady favourable income change, seems to maintain their overall stagnant ranking position.

The uneven position of the overall income and population shares of three groups of states is summarised

TABLE 3STATES WITH MORE THAN NATIONAL CHANGE IN PER CAPITA INCOME

1955-56 over 1950-51	1960-61 over 1955-56	1960-61 over 1950-51	1967-68 over 1960-61
Madras	Madras	Madras	Punjab
Madhya Pradesh	Maharashtra	Maharashtra	Gujarat
Maharashtra	Punjab	Madhya Pradesh	Mysore
Andhra	Uttar Pradesh	Bihar	Andhra
Mysore	Bihar		Madras
Rajasthan			Rajasthan
Bihar			Orissa

STATES WITH LESS THAN AVERAGE CHANGE IN PER CAPITA INCOME

1955-56 over 1950-51	1960-61 over 1955-56	1960-61 over 1950-51	1967-68 over 1960-61
		Andhra	
Orissa (fall)	Andhra	West Bengal (fall)	Bihar
Punjab (fall)	West Bengal	Assam (fall)	Madhya Pradesh
Gujarat (fall)	Mysore	Gujarat	Kerala
Uttar Pradesh(fall)	Rajasthan (fall)	Kerala	Assam (fall)
West Bengal (fall)	Assam (fall)	Mysore	Uttar Pradesh (fall)
Assam	Gujarat	Orissa	West Bengal (fall)
Kerala	Kerala	Punjab	Maharashtra (fall)
	Madhya Pradesh	Uttar Pradesh	
	Orissa	Rajasthan	

in Table 4. It can be seen from the table that the population share of high income states remained steady around 34 per cent, while the income share increased from 41 per cent to 44 per cent. From the low income states, both population and income shares dropped, with population share dropping from 46 to 45 per cent, while income share dropped from 38 per cent to 36 per cent. With initial uneven distribution of levels of per capita income, the rate of its change has been unevenly distributed over different years. While some of the low income states had favourable growth rates, the more populous states of Uttar Pradesh, Madhya Pradesh, etc. did not. These factors thus result in a situation in which high income states increased their income share without increasing their population share, while the low income states, which accounted for 45 per cent of the total population, dropped their income share from 38 per cent to 36 per cent. This provides one dimension of regional inequality.

TABLE 4  
POPULATION SHARE AND INCOME SHARE  
OF 'HIGH INCOME' AND 'LOW INCOME' STATES

	Population Share			Income Share		
	1950-51	1960-61	1967-68	1950-51	1960-61	1967-68
'High Income' States <sup>1</sup>	33.87	34.09	34.40	41.6	43.5	43.9
Average <sup>2</sup>	17.45	17.92	17.00	21.6	15.8	17.0
'Low Income' States <sup>3</sup>	46.13	47.09	45.00	38.6	37.5	36.1

1. 'High Income' states include the following: Gujarat, Maharashtra, Punjab, Madras and West Bengal.

2. The Rest include Assam, Kerala and Mysore.

3. 'Low Income' states include Madhya Pradesh, Orissa, Rajasthan, Bihar, Uttar Pradesh and Andhra.

Note: The total population and income shares do not add up to 100 per cent as these exclude the other states.

SECTION IIREGIONAL INEQUALITY INDEX OF PER CAPITA INCOME

It is with this uneven performance of the various states that we are concerned in our overall measure of regional inequality for the economy as a whole. In measuring the degree of regional inequality for the economy as a whole we are concerned with the following aspects:

- (i) the dispersion of regional values around the national mean, at a given point of time.
- (ii) Over time, both the national mean, as well as the dispersion changes. Hence, we would like to know whether, with the given change in the national mean, the dispersion around the mean has increased or decreased.

In the regional analysis, one of the popular indices used for these purposes is the coefficient of variation which is defined as the standard deviation as a proportion of the mean. It is a simple descriptive measure of dispersion around the mean and, by itself, tells us little about the causes behind any given dispersion. Its chief advantage lies in its ability to indicate trends through time and the simplicity of the index in evaluating the performance in relation to a given variable. In these respects, it differs from other statistical measures, such as composite index, both in its construction and uses. Composite index is a more sophisticated index used in complex multivariate analysis and is particularly useful in interdisciplinary approaches as well as in the subjects where the purpose of enquiry is delineation of regions, countries, etc. Its advantages lie in its ability to choose mutually dependent variables which are then used together to determine the various levels of classification. The very complexity of handling the vast amount of data makes it difficult to indicate movements through time. Our own conclusion here is that ultimately it is the object of the enquiry, which should determine the use of particular indices. The use of a composite index in delineating regions does

not supersede the use of income data where such data are available.

For a measure of relative dispersion around the mean, the coefficient of variation may be expressed as follows:

$$\frac{\sqrt{\sum_i (y_i - \bar{y})^2 / N}}{AM(\bar{y})}$$

or

$$\frac{\sum_i (y_i - \bar{y})}{\frac{N}{AM(\bar{y})}}$$

where  $y_i$  = per capita income of the state

$\bar{y}$  = national per capita income

$N$  = number of observations.

The main disadvantage of using such an unweighted index is that it treats all the observations equally. While evaluating regional income differentials, it amounts to saying that a given deviation from the national average has equal weight for all the regions. Thus, a large negative deviation in Rajasthan has the same weight as the deviation in Uttar Pradesh, which is the largest and most populous region. Hence, we need to differentiate the importance of each deviation according to some criterion. For per capita income, the weight that suggests itself is the regional population share in national population. If, however, disparity was measured in some other variable, the regional weights could then be changed to suit the nature of the variable.

Since we are interested in total deviations, it is usual to ignore the signs and sum up the deviations. Williamson's<sup>1</sup> two indices of VW and MW are exactly the same indices of weighted coefficient of variation.

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1. Williamson, op.cit.

These are expressed as follows:

$$(1) \quad VW = \frac{\sqrt{\sum_i (y_i - \bar{y})^2 \times fi/n}}{\bar{y}}$$

$$(2) \quad MW = \frac{\sum_i (y_i - \bar{y}) \times fi/n}{\bar{y}} \quad \text{or} \quad \frac{\sum_i (y_i - \bar{y}) \times fi/n}{\bar{y}} \times 100$$

$$(3) \quad MW_a = \sum_i (y_i - \bar{y}) \times fi/n \quad \text{or} \quad \sum_i (y_i - \bar{y}) \times fi/n \times 100$$

where  $y_i$  = per capita income in  $i$ th state

$\bar{y}$  = national percapita income

$fi$  = population of  $i$ th state

$n$  = national population.

As can be seen, it becomes unnecessary to divide the deviations by the number of observations when each observation is weighting as long as the number of regions remains the same for different years. This is so because by weighting each observation by regional share, we are accounting for total national population. The main difference between VW and MW lies in the fact that, in squaring the deviations as well as in weighting them, VW becomes very sensitive to a few extreme absolute deviations with large weights. Thus, in these cases the values of VW and MW can be expected to differ.<sup>1</sup> In other cases, values of VW and MW can be expected to move in the same direction, and with similar values.  $Mw_a$  is useful to measure absolute weighted differentials, which are also important in considering various policy implications.

In this study, wherever possible we shall compute all the three indices. In many cases, however, especially when values of VW and MW are expected to be close to each other,

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1. Thus in Williamson's sample, the values of VW and MW for Brazil are 0.700 and 53.78. Thus the extent of divergence between VW and MW shows the nature of dispersion around the mean and hence it is important to examine the values of both VW and MW and identify the sectors in which the two values differ.

computations of VW may be dropped. However, whenever a divergence between the two values is noticed, separate VW figures are presented and its implications discussed. This discussion of the limitations and uses of the coefficient of variation will also serve as a useful guide in the later chapters, as we use this index for disparity measure for various other economic indicators.

All three indices are capable of describing trends through time. An increase in the value of the index means an increase in the regional inequality, while the opposite would be the case when its value declines.

Table 5 below gives the degree of regional inequality by per capita incomes in the various planning years in the Indian economy.

TABLE 5

DEGREE AND TRENDS IN REGIONAL INEQUALITY BY  
PER CAPITA INCOMES IN INDIA

	1950-51	1955-56	1960-61	1967-68
(1)	(2)	(3)	(4)	(5)
VW	0.261	0.223	0.235	0.260
MW <sup>1</sup>	0.20	0.18	0.18	0.21
Mw <sub>a</sub> <sup>2</sup>	55.05	54.75	63.39	75.61

Notes 1 and 2. The values of MW and Mw<sub>a</sub> are without multiplying by 100.

It can be seen from the Table that movement in VW and MW is in the same direction. Both VW and MW show a decline

in 1955-56, showing some reduction in disparity,<sup>1</sup> but a rise thereafter in 1967-68. The per capita income figures of 1967-68 are also affected by the bad agricultural year although it cannot be quantified how much the regional NDP is affected. For the period 1960-61 to 1967-68, the number of regions with a negative change in per capita income is much larger than for the first decade of 1951-61 and this includes a number of low income and more populous states, thus resulting in higher (than in the earlier period) absolute and relative negative deviations. On the other hand, Punjab and Gujarat (which had a smaller than national average per capita income change in 1951-1961) have a much higher per capita income change in 1961-68, thus resulting in larger absolute and relative deviations from the national average in 1967-68. The combined effect of this pattern is an increase in the value of VW, MW and MWa for 1967-68.

We can now briefly compare our estimates on India with Williamson's international findings. Table 6 summarises these results. The figures for India in Williamson's estimates are based on the Indian Institute of Public Opinion's estimates for these years and these are different from the NCAER figures used here. It may be concluded here that, as far as the per capita income index is concerned, the degree of regional inequality in India is much less than that for countries like Brazil, Italy, Spain and others in the group of "middle-income" countries. The degree of inequality for India works out slightly higher than the value of VW in Group II - average, in Williamson's international cross-sectional findings. What it implies is that, at low national per capita income level, the regional per capita incomes do not diverge to such an extent as to give a "North-South" problem like that in Brazil or Italy. However, as will be discussed later, the degree of inequality for India, is much higher if measured in terms of either total productivity differentials or sectoral productivity differentials. Even with regard to per capita differentials, the available data does support the general

1. See K.R.G.Nair, op.cit. Using the NCAER data

2. In spite of higher regional inequality in Italy than in India values of VW and MW do not differ while in Brazil and Phillipines VW and MW differ considerably.

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TABLE 6

INTERNATIONAL CROSS SECTION ON REGIONAL INEQUALITY  
AND NATIONAL ECONOMIC DEVELOPMENT

Country and Group Classification (1)	Years covered (2)	VW (3)	VuW (4)	MW (5)	Size (sq.miles) (6)
Australia	1949-50 - 1959-60	0.058	0.078	4.77	2,974,581
New Zealand	1955	0.063	0.082	4.93	103,736
Canada	1950-61	0.192	0.259	17.30	3,845,774
U.K.	1959-60	0.141	0.156	11.39	94,279
U.S.A.	1950-61	0.182	0.189	16.56	3,002,387
Sweden	1950, '55, '61	0.200	0.168	15.52	173,378
Group I Average		0.139	0.155	11.72	
Finland	1950, '54, '58	0.331	0.276	26.64	130,165
France	1954, 55/56, '58	0.283	0.215	20.80	212,659
West Germany	1950-55, '60	0.205	0.205	16.98	94,723
Netherlands	1950, '55, '58	0.131	0.128	12.45	12,850
Norway	1952, '57, '60	0.309	0.253	23.84	125,064
Group II Average		0.252	0.215	20.14	
Ireland	1960	0.268	0.271	24.20	26,601
Chile	1958	0.327	0.440	30.65	256,397
Austria	1957	0.225	0.201	18.69	32,369
Puerto Rico	1960	0.520	0.378	42.31	3,435
Group III Average		0.335	0.323	28.96	
Brazil	1950-59	0.700	0.654	53.78	3,288,050
Italy	1951, '55, '60	0.360	0.367	30.94	117,471
Spain	1955, '57	0.415	0.356	32.32	195,504
Colombia	1953	0.541	0.561	46.70	439,617
Greece	1954	0.302	0.295	25.56	51,246
Group IV Average		0.464	0.447	38.06	
Yugoslavia	1956, '59, '60	0.340	0.444	24.54	95,558
Japan	1951-59	0.244	0.222	19.98	142,644
Group V Average		0.292	0.333	22.26	
Philippines	1957	0.556	0.627	29.59	115,600
Group VI Average		0.556	0.627	29.59	
India	1950/51, 1955/56	0.275	0.580	19.39	
Group VII Average		0.275	0.580	19.39	
Total Average		0.299	0.309	23.78	

Source: Williamson, op.cit.

disequilibrium hypothesis outlined in the beginning. The data on individual states do suggest that, while the top five states by the per capita income levels have maintained their position in ranking, the bottom five states also have been in more or less the same range, with some states falling behind even in their rankings. Thus, in this sense, the distance between rich and poor states has widened. This widening of distance between regions raises several issues, especially since some of the poorer states, like Uttar Pradesh, Bihar, Orissa and Madhya Pradesh are also some of the most populous states in the Indian Union.

### SECTION III

#### DECOMPOSITION OF VARIANCE OF PER CAPITA INCOME GROWTH INTO VARIOUS COMPONENTS

Our weighted coefficient of variation has two components. First, the index is an aggregate measure of the dispersion of regional levels of per capita incomes about the national mean. Secondly, each observation is weighted by its importance, i.e. by its population share. The question, therefore, arises of the relative contribution of changes in regional per capita incomes over time versus population redistribution producing these variations in VW.<sup>1</sup> In this section, we are not investigating the role of internal migration in the divergent or convergent pattern of growth. Our goal is more limited. We are merely asking whether changes in regional population weights over time (due either to differential natural population growth rates, internal migration or external migration), significantly affect the observed trends in VW.

What is attempted here is to decompose the changes in weighted variance of regional per capita incomes about the national mean over the given time period into three separate components; changes in variance due to shifting population weights, changes in variance due to divergent regional per capita income growth and residual component which measures changes in variance due to the interaction of both income

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1. Williamson, J.G., op.cit.

and population change.<sup>1</sup>

What exactly is done is to fix regional income differentials at levels existing in the initial period and then allow population weights to vary; similarly, for the second component population weights are fixed to that of the initial period and regional income growth is allowed to vary; finally both are allowed to vary to obtain the residual component. These three components should add up to total change in regional variation between  $t = 0$  and  $t = 1$  computed independently. Table 7 gives an estimate of these components for the period 1951-61.

TABLE 7

DECOMPOSITION OF VARIANCE: POPULATION VERSUS INCOME GROWTH

	1950-51 to 1960-61		1960-61 to 1967-68	
	Absolute	Percentage	Absolute	Percentage
(1) Variance attributable to population redistribution	158.93	51.79	-1426.56	-44.91
(2) Variance attributable to per capita income changes	228.89	74.58	+2489.82	101.05
(3) Variance attributable to both population redistribution and per capita income changes	-80.97	-26.37	+1399.58	45.95
(4) Total Variance	+306.84	100.0	+2462.84	100.0

1. The method of computation is the same as followed by Williamson (op.cit.) and is expressed as follows:

Between the time periods  $t = 0$  and  $t = 1$ , the increase or decrease in regional variance can be decomposed in the following way.

$$\sum_i (y_i^1 - \bar{y}^1)^2 f_i^1 - \sum_i (y_i^0 - \bar{y}^0)^2 f_i^0 = \sum_i (y_i^0 - \bar{y}^0)^2 (f_i^1 - f_i^0) + \sum_i f_i^0 \left[ (y_i^1 - \bar{y}^1)^2 - (y_i^0 - \bar{y}^0)^2 \right] + \sum_i (f_i^1 - f_i^0) \left[ (y_i^1 - \bar{y}^1)^2 - (y_i^0 - \bar{y}^0)^2 \right]$$

where  $y_i^1$  is the income per capita of  $i$ th region, in  $t = 1$

$y_i^0$  is the income per capita of  $i$ th region, in  $t = 0$

$\bar{y}^0$  = national per capita in  $t = 0$ ;  $\bar{y}^1$  = national per capita in  $t = 1$

$f_i^0$  } Regional Population Shares in  $t = 0, t = 1$ .  
 $f_i^1$  }

Table 7 shows a positive variance for both the periods as given by row (4). During the first period, of 1950-61, the variance attributable to population redistribution is much larger than for the period 1960-68. In fact, for the latter period there is almost a reversal in the pattern, with population redistribution being negatively associated with the total variance. For both the periods there is predominance of variance attributable to the per capita income changes. The percentage of variance accounted by this factor alone increases from 74.58% for 1950-61 to 101.05% for 1960-68. In Williamson's own sample, nine countries showed that changes in variance attributable to population redistribution acted in a fashion opposite to that in total variance. Only seven out of twenty-one cases show population redistribution playing a role. For India the pattern is mixed. For the first time period the population redistribution has acted in the same direction as that of total variance. In the second time period the variance attributable to the population redistribution is negative.

SECTION IVPATTERN OF INTERNAL MIGRATION AND INCOMEDIFFERENTIALS: SOME CONSIDERATIONS; 1951-61

In the statistical index we have isolated the two factors - the population redistribution and income growth - rather artificially, and have treated them as independent variables. In reality, we expect movements in both factors to be interrelated. We discussed in Chapter I the disequilibrium hypothesis that expects the internal factor flows to increase regional inequality. Myrdal argues that high wage areas tend to maintain high wages in spite of the movement of labour into these areas.

So far we have not attempted to bring in the role of internal migration in reducing income differentials, in the context of the Indian economy. Our data for these purposes being limited for only one decade, we cannot hope to provide any firm quantitative testing of the hypothesis. However, we can offer some arguments regarding the possible role of internal migration in India and also examine the pattern of internal migration for 1951-61.

We argued in Chapter I that internal migration has a limited role to play in an economy like India characterised by a national process of development, in which rate of growth of employment outside agriculture is lower than the required rate, either to withdraw some labour force away from agriculture or even to reduce the unemployment in urban areas and provide gainful employment outside agriculture at least to new entrants to the labour force. We shall not discuss the unemployment rates for regions or sectors as these statistics are the subject of controversy. However, we can state that, whatever the criterion of measurement, considerable open unemployment exists in urban areas, and in this larger urban centres seem to be having higher open unemployment than the small towns and cities. Thus, the role of internal migration between regions has to be viewed in this context.

Secondly, we ought to recognise that the flow of inter-regional migration cannot be considered merely in terms of economic factors. Cultural and linguistic differences between regions act as barriers which restrict the quantitative flow, as well as factors which influence the direction of flow. In addition, there are non-quantifiable factors that also affect the mobility of a given regional population. An example of high mobility of population is found in the state of Kerala. This state, with a small population base, but with one of the highest literacy rates and also with a problem of high unemployment, has a long tradition of outmigration of population to other regions. Large urban centres such as Bombay, Calcutta, Madras and Delhi have a cosmopolitan population from different regions, and this is evidence of the existence of long term movements of population across regions. What we generally maintain, as we discussed in Chapter I, is that, given the nature of the development process in India, a large scale inter-sectoral and inter-regional migration of labour force (that characterised the development process in industrialised countries), does not appear to be viable at least for some time to come.

We may now proceed to a brief analysis of the pattern of internal migration for the period 1951-61 and examine its relation to the regional differentials. The pattern of internal migration is summarised below, in Table 8.

TABLE 8 (a)

THE PATTERN OF INTERNAL MIGRATION IN INDIA, 1951-61

Intra-State Movement

Migrants	Direction of Movement	Percentage Share
41,639,671	R → R	72.7
8,565,840	R → U	15.0
2,553,381	U → R	4.5
4,480,506	U → U	7.8
<u>57,239,398</u>		<u>100.0<sup>1</sup></u>

TABLE 8 (b)Inter-State Movement

Migrants	Direction of Movement	Percentage Share
2,901,497	R → R	33.4
3,055,053	R → U	35.2
451,522	U → R	5.2
2,279,367	U → U	26.2
<hr/> 8,687,439 <hr/>		<hr/> 100.0 <sup>2</sup> <hr/>

Source: Census of India 1961, "Economic Regionalisation of India: Problems and Approaches", Monograph Series. Vol. 1, No. 8, by Dr (Miss) P. Sen Gupta and Dr (Mrs) Galina Sdasynk. Editor A. Mitra, 1969.

The following points may be noted from Table 8.

- (1) The total internal migration flow in the country within and across the state boundaries amounted to 65.9 million over the period 1951-61, which is nearly 15 percent of the population base in 1961. However, out of this, only 8 million, i.e. 12.3 percent of total migration, is accounted for by the internal migration between the states. Hence, a predominant flow of migration is within the state boundary rather than across the state boundary.
- (2) Within the state boundary a predominant share of total migration (Table 8(a)) is from rural to rural areas, i.e. within the agricultural and allied sector itself.
- (3) In the inter-state movement of population, if we combine the percentage share of movement from U→U and R→U, this group accounts for nearly 61 percent of the total migration across the state boundaries.

Table 9 gives further information on the regional pattern of interstate migration in the period 1951-61.

TABLE 9 - TRENDS IN INTERNAL MIGRATION 1951-61

State	Population (in '000s) (1961)	Net Variation in Population (in '000) (1951-61)	Immigrants Internal Migration (in '000) 1951-61	Emigration (Out migration) (In '000) 1951-61	Net Increase or Decrease by Internal Migration (in '000) <sup>2</sup>	Immigration from abroad (in '000)	Natural Increase (in '000)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
STATES WITH POSITIVE NET BALANCE OF MIGRANTS							
West Bengal	34926	8626 (32.80%)	1324	344	981 ( 3.72%)	3246	4401
Maharashtra	39559	7551 (23.60%)	1407	564	843 (2.63%)	439	6269
Madhya Pradesh	32372	6300 (24.17%)	932	413	519 (1.99%)	203	5578
Mysore	23587	4184 (21.57%)	702	450	252 (1.30%)	63	3867
Assam -	11873	3042 (34.45%)	278	86	192 (2.17%)	863	1987
Delhi	2659	914 (52.44%)	664	121	542 (31.07%)	526	154
STATES WITH NEGATIVE NET BALANCE OF MIGRANTS							
Uttar Pradesh	73746	10531 (16.66%)	571	1588	1017 (-1.60%)	546	11002
Punjab	20307	4172 (25.86%)	450	802	352 (-2.18%)	2168	2356
Bihar	46456	7669 (19.77%)	437	1162	725 (-1.87%)	246	8148

TABLE 9 - TRENDS IN INTERNAL MIGRATION 1951-61 (continued)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
STATES WITH NEGATIVE NET BALANCE OF MIGRANTS (continued)							
Madras	33687	3568 (11.85%)	370	738	367 (-1.22%)	104	3831
Andhra	35983	4868 (15.65%)	360	554	194 (-0.62%)	22	5040
Gujarat	20633	4371 (26.88%)	357	373	16 (-0.10%)	172	4215
Rajasthan	20156	4185 (26.20%)	342	629	287 (-1.80%)	341	4131
Orissa	17549	2903 (19.82%)	186	267	81 (-0.55%)	50	2934
Kerala	16904	3355 (24.76%)	149	449	300 (-2.22%)	26	3629

- Notes. 1. Percentage figures in brackets are decennial growth rate of population.  
2. Figures in brackets are the components of decennial growth of population.

Sources: Census of India, 1961, "Economic Regionalisation of India: Problems and Approaches", op.cit.

The following points may be noted from the table. Column (3) of Table 9 gives the net variation in population over the period 1951-61. This total variation is then further classified into several categories as follows: column (4) gives total immigration; column (5) gives emigration and column (6) gives the net increase or decrease by internal migration. This gives us the basis for classifying the states by those with a positive net balance of migrants and those with a negative net balance of migrants. We may note from the table that among the states with the negative balance of migrants, Kerala has the highest negative decline. We can further note from the table that, among the states that are having a negative net balance of migrants, there are a number of low income states such as Uttar Pradesh, Bihar, Rajasthan, Orissa and Andhra. However, high income states such as Punjab, Gujarat and Madras, also have a negative net balance of migrants. Among the 'high income' states, the largest receivers of population are West Bengal and Maharashtra. Delhi, the large metropolitan capital, is third in receiving population from other states.

We can now attempt to examine the relation between a given migration pattern and the regional income differentials. Table 10 gives the data on the regional income differentials in the initial year 1950-51, and the net  $\pm$  balance of migrants as a proportion of the 1961 population base. The Spearman rank order correlation between the two variables works out to be 0.4286 (significant at 0.10 level). Thus, income differentials can be regarded as one of the factors in the quantum and direction of inter-state migration.<sup>1</sup>

The second aspect of interest is the relation between the given migratory pattern and change in income differentials over a period of time. If the migratory pattern had an equilibrating effect on regional per capita incomes, this could 1. See in this connection Graham, Douglas, H., "Divergent and Convergent Economic Growth and Internal Migration in Brazil, 1940-1960", Economic Development and Cultural Change, Vol.18, No.3, April 1970. His rank correlation coefficients between the two variables for periods 1940-50 and 1950-60 work out to be +0.056 and -0.4988 respectively. He suggests the possibility of equilibrating role of internal migration in the convergence pattern of regional income differentials in Brazil during 1950-60.

TABLE 10

INTERSTATE INCOME DIFFERENTIALS  
CORRELATED WITH THE POPULATION DISPLACEMENTS  
1951-61

State	$y_i - \bar{y}$	Rank Order	$D^{\pm}/P_a$	Rank Order
(1)	(2)	(3)	(4)	(5)
Andhra	-39	9	-0.53	6
Assam	+35	5	1.61	3
Bihar	-115	14	-1.56	12
Gujarat	+85	3	-0.77	7
Kerala	+8	6	-2.00	14
Madhya Pradesh	-60	13	1.60	4
Madras	-51	12	-1.08	8
Maharashtra	+78	4	2.13	2
Mysore	-9	7	1.07	5
Orissa	-44	11	±1.68	13
Punjab	+108	2	-1.17	9
Rajasthan	-40	10	-1.42	11
Uttar Pradesh	-26	8	-1.37	10
West Bengal	+175	1	2.80	1

Notes.  $D^{\pm}$  = net balance of migrants.  $P_a$  = Base Population of 1961

$y_i - \bar{y}$ ,  $y_i$  = income of ith state,  $\bar{y}$  = national per capita income in 1951

Spearman Rank Correlation 0.4286\*, SE 0.2264

\* Significant at 0.10 level

be expected to work through its effect on wages in high income areas. In addition, the relative position of low income regions may be improved due to the possibility of capital moving into these areas or as a result of shifts in population weights. We discussed the disequilibrium hypothesis in this respect. Since our data is very limited for one decade, we cannot draw any long-term conclusions. However, in Table 11, the  $D\pm/pa$  are correlated with rank orders of  $y_i^1 - \bar{y}^1/y_i^0 - \bar{y}^0$ .

The value of the second variable indicates whether income differentials have increased, decreased or remained the same over time. A value of more than one in this ratio means that regional income differentials for that particular state have increased over the given period. The opposite would be the case when the value of  $y_i^1 - \bar{y}^1/y_i^0 - \bar{y}^0$  is less than one.

The rank correlation between the two measures works out to be  $-0.0109$ .<sup>1</sup> Thus, for India, although the relation is negative, its value is too insignificant to suggest the possibility of a reduction of regional income differentials as a result of the pattern of internal migration. We have already stated that the issue of whether large-scale internal migration is feasible or desirable is a different issue from that in which we statistically evaluate the relation between the given migration and regional differentials. We feel that, in the context of India, substantial inter-regional migration does not appear to be feasible or desirable. Since our statistical data are too limited, we cannot give firmer conclusions on the relation between internal migration and regional income differentials; but available evidence and our general theorising suggests that the flow of internal, interstate migration, limited as it is, cannot be expected to reduce regional income differentials.

Chapter IV analyses the regional inequality in several

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1. See Graham, Douglas, op.cit. His rank correlations for similar measures for Brazil work out to be  $+0.247$  for 1940-50 and  $-0.475$  for 1950-60. Thus, there seems to be evidence of internal migration having an equilibrating influence on regional income differentials in Brazil in 1950-60.

TABLE 10

INDIAN POPULATION DISPLACEMENTS CORRELATED WITH THE  
CHANGE IN INCOME DIFFERENTIALS

State	$D \pm / Pa$	Rank Order	$y_i^1 - \bar{y}^1 / y_i^0 - \bar{y}^0$	Rank Order
(1)	(2)	(3)	(4)	(5)
Andhra	-0.53	6	1.20	8
Assam	1.61	3	2.05	2
Bihar	-1.56	12	0.99	9
Gujarat	-0.77	7	0.78	11
Kerala	-2.00	14	1.25	7
Madhya Pradesh	1.60	4	0.55	13
Madras	-1.08	8	0.15	14
Maharashtra	2.13	2	1.83	3
Mysore	1.07	5	2.55	11
Orissa	-1.68	13	1.54	5
Punjab	-1.17	9	0.97	10
Rajasthan	-1.42	11	1.40	6
Uttar Pradesh	-1.37	10	1.69	4
West Bengal	+2.80	1	0.72	12

Notes. D = Net Balance of Migrants, Pa = Population Base  
 $y_i$  = Income of ith state in 1961  
 $\bar{y}$  = National per capita income in 1961  
 $y_i$  = Per. capita income of ith state in 1951  
 $\bar{y}$  = National per. capita income

Spearman Rank Correlation -0.0109; S.E. 0.2773

other economic indicators such as average regional income per worker and the per worker income in the major economic sectors. We also attempt to quantify the statistical significance of various structural factors in explaining regional per capita income and income per worker differentials.

CHAPTER IVREGIONAL INEQUALITY AND NATIONAL ECONOMIC DEVELOPMENT(continued)

In Chapter III, we examined the degree of and trends in regional inequality in per capita incomes. In this chapter, we shall analyse the degrees and trends in several other economic indicators such as net output per worker and the net output per worker in the major economic sectors. This will enable us to compare the inequality indices between the sectors and thus identify the sector with high regional inequality. Secondly, where possible the trends in disparity over various years can be indicated. Since we are now using indices which divide the total net domestic product of the region by its total working force, we first need to examine how these labour force figures are arrived at. This is particularly relevant in a predominantly agricultural economy in which measurements of labour force encounter difficult theoretical and conceptual problems. In addition, we may examine the industrial distribution of the labour force to analyse the regional differences in the sectoral shares of various economic sectors and their relation to the regional per capita income. Section I analyses the industrial distribution of labour force. Section II estimates the net output per worker in the major economic sectors in 1951 and 1961. Regional disparity indices in each of the economic sectors are then worked out and analysed. Section III applies a two-way analysis of variance to the data that is classified in two ways, viz., 'sectors' and 'regions'. We thus attempt to quantify these two sources of variation in the level of state income. Section IV goes farther in an attempt to identify several structural factors that may be regarded as significant in explaining regional differentials in income and productivity in an underdeveloped economy like India.

SECTION IREGIONAL DIFFERENCES IN INDUSTRIAL COMPOSITION OF LABOUR FORCE AND NET DOMESTIC PRODUCT IN INDIA

The estimates of labour force in an underdeveloped economy present difficult problems due to the predominance of self-employment in agriculture and other sectors of the economy, and due to considerable underemployment and disguised unemployment of the labour force in these sectors. Empirically, the Indian censuses adopt definitions of a fully employed person either in terms of 'income' (1951 Census) or 'employment' (1961 Census). This amounts to fixing an arbitrary norm either in terms of income or number of hours at work in order to classify the population into those in the labour force and those not at work. Additional problems also arise in defining the 'industrial activity' of the employed persons due to the same person undertaking different industrial activities either at the same time or in different parts of the year. We discuss in Appendix 1 at the end of the chapter the 1951 and 1961 census classification of the labour force. One of the results of the differences in the definition of a gainfully employed person between 1951 and 1961 is that it resulted in a statistical difference in the number of workers, due to the possible inclusion or exclusion of 'marginal' workers in the two censuses. The 'marginal' workers by the employment norm could be quite different from those by the income norm. Appendix 1 at the end of the chapter discusses some of the problems of working force estimates of 1951 and 1961 and their implications for the estimates of regional working force figures. The second related problem arising out of the differences in concepts is that the resultant labour participation rates for 1951 and 1961 for different regions need to be interpreted with great caution regarding the change in the participation rate between the two censuses. Some aspects of regional differences in economic participation rates and the problems of comparison are

discussed in Appendix 2. Our general conclusion is that the estimates of the working force and its industrial distribution are more comparable interregionally for a given census than between the two censuses. This applies to the regional estimates of labour participation rates as well. Hence, the comparisons of trends between the two years need to be done very cautiously.<sup>1</sup>

Table 1 gives the sectoral distribution of labour force in each state. The following points may be noted from the table.

- (1) While agriculture accounts for a predominant share in total employment in all the states, its share is lower in 1951 in the 'high income' states.
- (2) Comparing the two censuses, the percentage share of agriculture in the total labour force remains the same nationally. Regionally, the percentage of the labour force engaged in agriculture declined in Punjab, Bihar, Kerala and Assam.

All the other states showed an increase in the number and the percentage share of agriculture in the total labour force. As pointed out earlier, we cannot precisely measure whether and how much the working force figures in agriculture in the 1961 census are affected due to inclusion or exclusion of 'marginal' workers. In addition, the extent of over or underestimation is likely to affect the regions differently. However, we can still conclude that for most of the regions and nationally the percentage share of agriculture in the total labour force remained unchanged.<sup>2</sup>

The absolute and the relative dispersion of the labour force in agriculture and manufacturing from their respective national averages can be measured by the same inequality indices of MW and MWa. These are given in Table 2.

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1. At the same time, we need to emphasize that these are the only data available. Many writers have justified the use of long term census figures. See Mukherjee, M., op.cit.Ch.V.  
 2. See Sharma, P.S., "A Note on Agricultural Workers in 1961 Census", Appendix III, Census of India, Final Population Totals.

**TABLE 1**  
**INDUSTRIAL DISTRIBUTION OF LABOUR FORCE**

State	Percentage of Total Labour Force in					
	Agriculture and Allied <sup>1</sup>		Manufacturing <sup>2</sup>		Services <sup>3</sup>	
	1951	1961	1951	1961	1951	1961
<u>'High Income' States</u>						
Gujarat		Mah. 72.08)		12.51	19.35	16.72
Maharashtra	68.51	Grj. 69.43)	12.24	7.95		14.41
Punjab	67.27	64.86	9.10	14.58	23.63	20.56
West Bengal	56.73	58.79	16.17	16.99	27.10	24.30
Madras	63.58	63.33	14.46	14.73	22.16	21.94
<u>'Low Income' States</u>						
Andhra	71.20	71.71	11.38	13.46	17.42	11.83
Bihar	83.22	80.23	3.65	8.27	10.23	11.50
Madhya Pradesh	81.55	82.22	7.44	7.98	10.91	9.8
Orissa	72.83	74.55	8.61	8.45	18.56	15.80
Rajasthan	75.80	79.51	9.12	9.17	15.81	11.32
Uttar Pradesh	76.51	74.79	8.09	9.76	15.40	14.45
<u>Average The Rest</u>						
Kerala	56.07	46.96	20.03	17.34	23.60	33.70
Assam	85.04	76.42	2.99	8.26	11.97	13.50
Mysore	71.83	73.68	11.64	12.31	16.63	14.01
All India	72.69	72.68	10.05	11.60		16.02

1. Agriculture includes working as (i) cultivator; (ii) agricultural labourer; (iii) working in mining, quarrying, livestock, forestry, fishing, hunting, plantations, orchard and allied activities.

2. Manufacturing includes workers in (a) household industry; (b) in manufacturing other than household industry; (c) construction.

3. 'Services' includes workers in (a) trade and commerce; (b) transport, storage and communications and (c) other services.

TABLE 2

WEIGHTED ABSOLUTE AND RELATIVE DEVIATIONS OF LABOUR FORCE  
IN AGRICULTURE AND MANUFACTURING IN INDIAN STATES:  
1951, 1961

Year	Agriculture			Manufacturing		
	MWa	MW	Nat.Av.	MWa	MW	Nat.Av.
1951	3.88	0.05	72.68	2.35	0.23	10.05
1961	5.02	0.06	72.38	2.64	0.22	10.60

Table 2 shows that both the absolute and relative regional deviations of the percentage of the labour force in agriculture from the national average are very small. In manufacturing, while the absolute deviations are small, the relative deviations are much higher. Tables 1 and 2 thus establish our argument in Chapter I that, in India, interregionally there is likely to be a lack of shift of the percentage of labour force occupied in agriculture. This pattern seems to be somewhat different from Green's<sup>1</sup> study on Canada. He found that both absolute and relative deviations of the provincial percentage of labour force in agriculture increased over the period 1880 to 1956. Absolute deviations in the manufacturing labour force were smaller than in agriculture. However, the relative deviations in manufacturing increased at a much faster rate than in agriculture, reflecting a greater tempo of industrialisation than in India. Secondly, although regional inequality in Canada in the relative industrial distribution of the labour force in manufacturing was highest, the trends in the gross value added per worker were such as to give the highest regional inequality in agriculture. Both the agriculture and manufacturing sectors showed trends towards an increase in regional inequality in productivity. As we shall see in Section II,

1. Green, Allan, op.cit.

the structure of sectoral inequality in India appears to be different from that of Canada. We discussed the trends in Canada here as Canada had an interesting pattern of regional inequality and also, as it is a large country, the trends in it can profitably be compared with those in another large country, at a different stage of development and with a development process that differs from that in a developed country such as Canada and the U.S.A.

The relations between the regional differences in the occupational and industrial structure and the per capita income are expressed in terms of the 'sector approach'.<sup>1</sup> The 'sector approach' focuses attention on the inter-relations of occupational and industrial structure with level and growth of income as also with differences in and changes in both labour productivity and demand for various sectors. The sector approach regards the rate of sectoral shifts as the main determinant of how fast the economy grows. The reasons for sectoral shifts are found on both the demand and the supply side. On the demand side, the income elasticities of demand for the manufactured goods and services are higher than those for primary products as incomes rise; on the supply side, the necessary transfers of labour and capital are achieved as a result of the differential productivity growth in these sectors. As Richardson<sup>2</sup> puts it, "As an explanatory theory of growth, the sector theory is inadequate in that it merely outlines a suggested process of growth from some sectors to others, on the assumption of the rise in per capita incomes. It offers no insights into the causes of growth itself." He further adds that "Despite these drawbacks the sector theory is a starting point for a disaggregated analysis of regional growth. The sectoral aggregates used in Primary-Secondary-Tertiary divisions are much too large to be meaningful, but something can be salvaged with more

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1. For elaboration and criticism of the broad 'sector approach', see Harvey Perloff, "Interrelations of State Income and Industrial Structure", Review of Economics and Statistics, No. 39, 1957. The rank correlations between state per capita income and percentage of labour force in agriculture for 48 states in U.S.A. in 1950 worked out to be -0.626.

2. Richardson, H.W., op.cit. p. 340-341.

disaggregation." We agree with the foregoing criticisms of the sector approach and the possibilities of using a broad sector framework as a basis of more disaggregated analysis. In fact, we shall pursue this in the analysis of regional disparity in the two sectors of agriculture and manufacturing. But before we do that, we may briefly examine the interrelation between the regional per capita income and the industrial distribution of the labour force as well as the industrial composition of the total regional NDP.

The rank correlations between the sectoral shares of employment and regional per capita income are summarised in Table 3.

TABLE 3

SPEARMAN RANK CORRELATIONS BETWEEN THE REGIONAL SECTORAL SHARES OF EMPLOYMENT AND PER CAPITA INCOME

Sector	1951	1961
Agriculture	-0.527*	-0.525*
Manufacturing	0.497*	0.525*

\* All coefficients significant at 0.05 level

We can note from the table that the regional per capita income is negatively and significantly associated with the region's percentage of labour force engaged in agriculture in both 1951 and 1961. In manufacturing, the positive association between the percentage of a region's labour force in manufacturing and regional per capita income is weaker in 1951 than in 1961.

We can now proceed to examine the sectoral distribution of state NDP and examine the output shares of various sectors in total state NDP. Table 4 gives data on the output shares of major economic sectors by regions

TABLE 4

PERCENTAGE DISTRIBUTION OF NET DOMESTIC PRODUCT OF STATES  
 BY MAJOR ECONOMIC SECTORS; 1950-51, 1955-56,  
 1960-61 and 1967-68

State		Agriculture	Manufacturing	Tertiary
Andhra	a <sup>1</sup>	59.7	8.4	30.4
	b <sup>2</sup>	56.9	9.5	33.6
	c <sup>3</sup>	48.7	10.6	40.6
	c - a	-11.0	+ 2.2	+ 9.2
Assam	a	67.5	12.7	19.8
	b	61.9	14.2	23.9
	c	59.1	13.6	27.3
	c - a	- 8.4	+ 0.9	+ 7.5
Bihar	a	61.3	16.9	21.8
	b	57.0	17.2	30.6
	c	50.9	18.4	30.8
	c - a	-10.4	+ 1.5	+ 9.0
Gujarat	a	46.7	16.5	36.8
	b	46.0	20.9	28.3
	c	42.5	20.0	37.4
	c - a	- 4.2	+ 4.5	- 0.6
Kerala	a	60.8	16.1	23.1
	b	56.0	15.8	28.2
	c	50.9	16.6	32.4
	c - a	- 9.9	+ 0.5	+ 9.3
Madhya Pradesh	a	58.1	13.3	28.6
	b	60.6	12.5	26.9
	c	51.0	16.0	33.0
	c - a	- 7.0	+ 2.7	+ 4.4

TABLE 4 (continued)

State		Agriculture	Manufacturing	Tertiary
Madras	a	48.5	16.4	85.1
	b	46.4	16.9	36.7
	c	38.8	19.3	41.8
	c - a	- 9.7	+ 2.9	+ 6.7
Maharashtra	a	34.8	19.4	45.8
	b	36.5	22.4	41.1
	c	29.9	24.2	45.8
	c - a	- 4.9	+ 4.8	0.00
Mysore	a	59.9	14.1	26.0
	b	57.3	15.2	27.5
	c	46.7	20.3	33.0
		-13.2	+ 6.2	+ 7.0
Orissa	a	72.6	6.2	21.2
	b	67.0	8.0	25.0
	c	55.1	12.5	32.3
	c - a	-17.5	+ 6.3	+10.1
Punjab	a	67.7	11.1	21.3
	b	57.0	14.1	28.9
	c	47.3	18.3	34.3
	c - a	-20.4	+ 7.2	+13.0
Rajasthan	a	72.4	7.0	21.2
	b	63.8	7.5	28.9
	c	55.8	8.6	34.3
	c - a	-17.6	+ 1.6	+13.1
Uttar Pradesh	a	66.7	8.9	24.4
	b	67.4	9.2	28.7
	c	62.1	10.3	27.5
	c - a	- 4.6	+ 1.4	+ 3.1

TABLE 4 (continued)

State		Agriculture	Manufacturing	Tertiary
West Bengal	a	42.4	18.1	39.5
	b	36.6	23.7	39.7
	c	33.1	24.5	41.8
	c - a	- 9.3	+ 6.4	+ 2.3
All India	a	54.4	13.7	30.1
	b	52.3	15.7	32.2
	c	45.7	17.4	36.8
	c - a	- 8.7	+ 3.7	+ 6.7

1. a = 1950-51

2. b = 1960-61

3. c = 1967-68

Note. Some of the figures of percentage change (c - a) do not add up to exactly 100 per cent due to rounding.

Compiled from:

Sources. 1. "Estimates of State Income", NCAER, op.cit.

2. The 1967-68 figures are computed from IIP0, 1969, op.cit.

for the three years. The following points may be noted from the table. (1) As opposed to the share of agriculture in the total labour force, which remained steady or increased for the states, in agriculture's share in the total output there is a decline nationally as well as regionally. (2) However, as against a decline of 8.7 per cent in the share of agriculture in total output between 1950-51 and 1967-68, the rate of decline is as high as 20.4, 17.5, 11.0 and 10.0 per cent in Punjab, Rajasthan, Orissa, Andhra and Bihar. These are the states which have a much higher initial (1950-51) percentage of income originating in agriculture. These trends in the shifts of the sectoral shares of labour force and output provide us with some understanding of the regional differences in the industrial composition of the states. Table 5 gives the rank correlations between the sectoral output shares and the regional per capita incomes.

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TABLE 5

RANK CORRELATIONS BETWEEN THE OUTPUT SHARES AND PER CAPITA INCOMES OF INDIAN STATES: 1950-51, 1960-61, 1967-68

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	1950-51	1960-61	1967-68
Agriculture and Allied	-0.358	-0.665*	-0.578*
Manufacturing	0.292	0.626*	0.626*
Services	0.316	0.569	0.488*

\* Significant at 0.05 level

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These coefficients indicate that, for 1960-61 and 1967-68, the rank order correlations of regional per capita income and percentage share of agriculture in total output are negative and significant, while those for manufacturing and services are significant and positive. These values are higher than those for the labour force shares. Thus,

one can say that the regional differences in industrial composition of states form one source of variation in the per capita income and further that there are regional differences in productivity levels, within each major sector, as well as between the various economic sectors. However, as we emphasised earlier, the broad 'Primary-Secondary-Tertiary' divisions need to be analysed at a disaggregated level to provide us with more insight into the regional growth.

## SECTION II

### REGIONAL INEQUALITY IN NET OUTPUT PER WORKER AND THE NET OUTPUT PER WORKER IN THE MAJOR ECONOMIC SECTORS IN INDIA: 1950-51, 1955-56, 1960-61, 1967-68.

Having discussed, in Section I, the industrial composition of the states, we can now proceed to estimate the resultant figures of total average net output per worker and the corresponding figures for each major economic sector. We divide the total NDP and labour force figures into the following four major economic sectors: (1) Agriculture and (2) Manufacturing; (3) Transport and Communications and storage (4) Other Services.<sup>1</sup> In using the 1951 labour force data, we make use of the 1951 census data classified into the 1961 census industrial categories and as published in the 1961 census.<sup>2</sup> Some problems in reclassifying the 1951 livelihood classes into 1961 industrial categories result in the working force figures for some states appearing somewhat out of line. We also need to point out again that in Chapter II we discussed how NCAER figures for 1950-51 are based on several assumptions and the use of more indirect methods in the sectors of 'small enterprises' and 'other services'. With these limitations, we give the estimates of per worker output by states and sectors in Table 6. We may note the following points from the table

1. See Chapter II for the details of sub-sectors included in each major economic sector.

2. "Census of India, 1961; Final Population Totals".

(i) Looking at the national values in each sector, we can observe that, for a given year the national average of net output per worker in each sector differs. Transport, storage and communications and the 'manufacturing' sectors rank first and second by the net output per worker. (ii) Against these averages, the regional absolute deviations differ in each sector. The range between maximum and minimum appears to be highest in manufacturing in 1961. (iii) In manufacturing figures for 1951, for Bihar, the net output per worker appears to be overestimated. The transport, storage and communications figures for Andhra and Madhya Pradesh appear to be overestimated as they are higher than those in some of the high income states. We have already discussed the possibilities of overestimation in NCAER figures in the tertiary sector. At the same time, in the absence of more information we have not attempted to adjust the figures.

The absolute and relative weighted dispersion in the sectoral net output per worker can be measured by the same indices of VW, MW and MWA,<sup>1</sup> but by taking the appropriate labour force weights in each sector.<sup>2</sup>

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1. See Chapter III, p 79 for definitions of these indices.
  2. For each sector each regional observation is multiplied by the regional share in the national labour force in that sector ( ). The -ve and tve deviations are then added up ignoring the sign.

A comparison of regional disparity indices can be useful from the following aspects:

- 1) A comparison of the disparity indices between different economic indicators at a given point of time can enable us to understand the structure of regional disparity in terms of its various components
- 2) A comparison of disparity indices for a given year, in the given sector (viz. VW, MW and MWA) can show if the value of regional disparity index (as between VW and MW) is influenced by a few extreme deviations, i.e. whether a particular sector has North-South regional problems.
- 3) Trends in the values of the indices between two years is a measure of divergence or convergence. Hence, long term data are most useful, from the limited data that covers only two years, conclusions regarding trends should be drawn with great caution.

Table 7 gives the estimates of VW, MW and MWA in various economic indicators. We can draw the following conclusions from it.

- 1) We can first compare values of the indices for 1961, the year for which the data are most comprehensive. For this year, the per capita index VW is lower than for net output per worker. This would suggest contrary to Williamson hypothesis that the regional labour participations are lower in high income regions.<sup>1</sup>

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I. See Appendix for more discussion.

Table 6

ESTIMATES OF VALUE ADDED PER WORKER BY SECTORS AND STATES (In 1960-61 prices, in Rs)

		Andhra	Assam	Bihar	Gujarat	Kerala	Madhya Pradesh	Madras
1. Agriculture and Allied Sectors	(I)	582	609	368	488	I02I	340	643
	(2)	442	599	38I	650	II66	454	559
2. Mining, Manufacturing and Construction	(I)	5I5	I270	2393 <sup>3</sup>	I293	745	844	958
	(2)	392	I309	III3	I474	798	877	867
3. Trade and Commerce and 'other services'	(I)	I208	I288	I055	I878	872	II37	I3I7
	(2)	I960	I378	II29	I835	758	I392	I226
4. Transport, Storage and Communications	(I)	205I	I082	ISI5	223I	I306	254I	I6I4
	(2)	2099	I235	I847	2I66	I648	2967	I686
5. Average Value Added per Worker	(I)	694	768	576	860	94I	477	842
	(2)	577	759	536	980	979	56I	754

(epntinued)

TABLE 6 (continued)

		Maharashtra	Mysore	Orissa	Punjab	Rajasthan	Uttar Pradesh	West Bengal	All India
1. Agriculture and Allied Sectors	(1) ---		702	671	913	435	565	1025	634
	(2) 508		535	553	1110	459	663	823	566
2. Mining, Manufacturing & Construction	(1) ---		1018	482	1296	404	713	1528	1083
	(2) 1793		848	578	1233	465	704	1953	1045
3. Trade and Commerce and 'other services'	(1) ---		1261	655	1896	913	1031	2056	1366
	(2) 2723		1284	832	<del>1689</del>	1334	1153	2347	1503
4. Transport, Storage & Communications	(1) ---		2135	340	2410	1782	1591	1640	1881
	(2) 2354		2222	387	2704	2423	1708	1864	2081
5. Average Value Added per Worker	(1) ---		841	673	1064	520	647	762	762
	(2) 1000		688	613	1263	572	745	782	782

\* See "Final Population Totals", Census of India 1961, p. 403.

Notes (1) 1950-51 (2) 1960-61 (3) The 1950-51 for Bihar appears to be overestimated. See Ch. II for further discussion. Calculated from the figures of sectoral value added by states of NCAER for 1950-51 and 1960-61 and the census working force figures of 1951 and 1961. For 1951, also 1961, Census Industrial Classification is used.

TABLE 7

## REGIONAL DISPARITIES IN NET OUTPUT PER WORKER (BY SECTORS) IN INDIA; 1950-51 TO 1967-68

Per	India 1951			India 1961			India 1967-68			Japan <sup>1</sup> (1951)	
	VW	MWa	MW	VW	MWa	MW	VW	MWa	MW	VW	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	
(i)	Per Capita Income	0.261	55.05	0.20	0.235	63.39	0.19	0.260	75.61	0.221	0.259
(ii)	Output per worker	0.227 <sup>B</sup>	174.50	0.22	0.318	173.05	0.24	0.336	-	-	0.372
(iii)	Output per worker in A	0.298	181.90	0.28	0.295	103.68	0.18	-	-	-	0.177
(iv)	Output per Worker in M	0.297	294.48	0.28	0.515	455.04	0.43	-	-	-	0.283
(v)	Output per Worker in Services	0.46	408.48	0.29	0.276	427.01	0.28	-	-	-	-
(vi)	Output per Worker in Transport, storage & Communication	0.43	470.91	0.25	0.260	348.51	0.16	-	-	-	-
(vii)	Ratio of (ii) to (i)	1.1	0.316	0.90	0.722	0.366	0.832	-	-	-	0.696
(viii)	Ratio of (iii) to (iv)	1.0	0.619	1.00	0.572	0.219	0.401	-	-	-	0.625

1. Japan's figures are taken from Williamson, op.cit. Japan's figures are reproduced here as Japan is the only country in Williamson's sample in which trends are similar to India, are to be noticed, although in terms of size and the stage of development the two countries are very different. In Japan, it can be noticed that VW is higher when measured in income per worker than in income per capita. Also, VW is higher in manufacturing than in agriculture.

In addition, a comparison of sectoral inequality indices for 1961 shows that the VW index is highest in manufacturing sector. The ratios of per capita index to per worker index and that of agriculture to manufacturing work out to be less than one for 1961. This also is in some contrast to Williamson's findings on his sample of countries. For 1961, the values of VW and MW diverge most in case of manufacturing sector so that in case of India manufacturing sector has the North-South problems.

2) The structure of regional inequality in 1951 differs from that in 1961 in two respects. Firstly, the values of VW in the first four indicators show that the ratios between these variables as given by (vii) and (viii) rows are higher than those for 1961. Thus for this year, the degree of disparity in various economic indicators differs less than in 1961. In 1951, the VW is highest in services and transport sector. These sectors also have a difference in the values as between VW and MW.

3) Due to the limitations of the data discussed earlier, interpretations regarding the trends in disparity in each indicator need to be made cautiously. However, as compared to 1951, regional disparity increased in net output per worker and in net output per worker in the manufacturing sector. For the services and transport sector we can not indicate how far the higher values for 1951 are due to some over-estimation, giving larger deviations from the national average as compared to 1961.

The above computations on the structure of regional disparity as between agriculture and manufacturing show the need to analyse the importance and nature of regional disparities in these sectors at a disaggregated level. Due to the different importance of these sectors in national and regional structures and also due to the different roles assigned to them in national planning. We need to examine the regional disparities in these sectors at a sectoral level, as well, before we reach conclusions in this regard.

SECTION IIISOURCES OF VARIATIONS IN THE LEVELS OF STATE INCOME

Our analysis so far brings us to an important conclusion, viz. that sectoral distribution of net output and labour force must be regarded as an important source of variation in the level of state income. In addition, we observed that, within each sector, there are regional differences in productivity. In agriculture, regional values of agricultural income per worker reflect both the crop-mix as well as the regional differences in physical productivity of various crops. The natural resource factors such as sunshine, rainfall, soil humidity, etc., are important factors that affect the crop-mix as well as the yields of the various crops. Thus, the importance and nature of regional differences in agriculture needs to be studied at a more disaggregated level.

In the manufacturing sector itself, *as we shall see later* ~~we noted that~~ regional disparity index for various sub-sectors differs, and there are regional differences in manufacturing productivity in all the sub-sectors. In addition, there are qualitative and non-quantifiable factors that vary among regions and which can influence the level of state income. We group all these factors which represent all the influences on income levels that

vary between states and are not traceable in the industrial composition effect or 'sector effect' - and call it 'state effect'. Thus, we have a two-way classification of data in 'sectors' and 'states' and we can now proceed to analyse the sources of variations in levels of state income, at these two levels. Taking this two-way classification into consideration, the usual techniques of analysis of variance may be applied. The model used is as follows:

$$Y_{ij} = U + \alpha_i + B_j + C_{ij}.$$

$Y_{ij}$  is the observed income in the  $i$ th state in the  $j$ th sector,  $U$  denotes the average value of average income in the country,  $\alpha_i$  denotes the effect on income due to the  $i$ th state ( $i = 1, 2, 3 \dots 14$ ),  $B_j$  the effect on income due to  $j$ th sector ( $j = 1, 2, 3$  and  $4$ ) and  $C_{ij}$  random error due to uncontrollable factors. The  $C_{ij}$  are assumed to be independent, normally distributed with zero expected value and finite variance. Table 8 below summarises the findings on the distribution of variance for 1951 and 1961.

TABLE 8

SOURCES OF VARIATIONS IN LEVELS OF STATE INCOME IN INDIA

1951			
Distribution of Variance <sup>1</sup> - A			
Variation due to	Degrees of Freedom	Sum of Squares	Mean Squares
1. 'States' (cols)	13	3942293	281592
2. 'Sectors' (rows)	3	20569123	5142280
3. Error	39	10507039	187625
4. Total	55	35018456	-

$$FC = \frac{281592}{187625} = \frac{CMS}{EMS} \quad (\text{Columns are States}) \\ (i = 1 \dots 14)$$

$$FR = \frac{5142280}{187625} = \frac{RMS}{EMS} \quad (j = 1 \dots 4)$$

$$FC = 1.50$$

$$FR = 27.40^* \quad (* \text{ Significant at } 0.05 \text{ level})$$

1. For similar computations on state income data of 1955-56, see Chaudhry, Mahinder, op.cit. p. 52-53. He uses the same model, only his computations of 1955-56 are based on the 1951 census classification of livelihood classes. He also found 'sector effect' to be stronger than 'state effect'. Distribution of variance in his model worked out as follows:

$$FC = \frac{69491}{5977} = 11.63, F_{.99} (16,48) = 2.04$$

$$FR = \frac{1764262}{5977} \quad F_{.99} (3,48) = 26.83$$

Distribution of Variance - B 1961<sup>1</sup>

Variation due to	Degrees of Freedom	Sum of Squares	Mean Squares
1. States	13	5942928	424494
2. Industrial Sectors	3	15264282	5942928
3. Error	39	7539059	134626
4. Total	55	28746269	

$$FR = 28.34^*$$

$$FC = 3.15^*$$

\* Significant at 0.05 level

From the above analysis of variance, we come to the following conclusions. FR is significant for both the years and hence we reject the hypothesis of no difference among means of different 'sectors' independent of difference in 'states'. The FC is significant for 1961 but not so for 1951. Thus, we are not in the position of either accepting or rejecting the hypothesis firmly from the above analysis regarding 'states' effect. However, our intuitive judgement offers that 'states' effects ought to be significant and that they are in fact for our 1961 data. The states effect is weaker for 1951.

1. (a) Income data by states NCAER op. cit.

(b) Population data, for 1951, 1961, based on 1961 census population final totals. Industrial distribution for 1951 census in terms of 1961 census classification.

However, this in no way establishes that there are no significant differences among the states, independent of sector effect. A proper examination of productivity differences in each sector requires a more disaggregated approach and is pursued in Chapters V and VII.

SECTION IV . DETERMINANTS OF REGIONAL DIFFERENCES IN INCOME AND PRODUCTIVITY IN INDIA: A TENTATIVE HYPOTHESIS

We now come to the final Section of our analysis, viz. what can we say regarding the determinants of regional differentials in an underdeveloped economy like India's? We have already analysed some of the factors such as the sectoral differences; the role of migration, labour participation rate and the differences between states that we categorised in our variance analysis of Section III as the 'states' effect.

We can now attempt an explanation of interstate per capita income and productivity differentials. Our total pooled observations are 56, in which there are 14 observations for each of the following years, viz. 1950-51, 1955-56, 1960-61 and 1967-68. The dependent variables are  $Y_i - \bar{Y}$  and  $P_i - P$ , where  $Y_i$  is the per capita income of  $i$ th state,  $\bar{Y}$  = national average per capita income,  $P_i$  is the output per worker in the  $i$ th state;  $P$  = national average output per worker. We have taken unweighted differentials here, as the weighted differentials would increase the problem of multi-collinearity and also it is less necessary to weight them here than it was for our overall inequality index. An OLS method is used to explain these differentials. The independent variables selected in explaining the regional differentials follow to a certain extent from our discussion so far. The main hypothesis regarding this may be briefly summarised as follows: Deviations in regional per capita income from the national average and the productivity deviations in an underdeveloped economy like India's are likely to be influenced by several characteristics of the agricultural sector. In the absence of an outward shift of the agricultural labour force, we can expect the pressure of labour on land to affect the value of

agricultural income per worker.

Two independent variables are selected to measure the pressure of labour on land: (i) the number of cultivators per 100 acres of net area<sup>1</sup> sown; (ii) the number of agricultural labourers per 100 acres of net area sown. However, it was found that the number of agricultural labourers is highly correlated with one of the regional dummy variables (Southern Region). The simple correlation coefficient between the two variables works out at 0.700. Since inclusion of the agricultural labour variable would affect the slopes of the regionality variables, it was decided to take out the 'number of agricultural labourers per 100 acres of net area sown'. However, economically it is still regarded as a significant variable.

Another variable regarded as important in explaining regional differentials is the extent of manufacturing activity in each state. However, what is regarded as more significant is not merely the importance of manufacturing in total state income, but the concentration of manufacturing activity from a national point of view. Thus, the deviations occur not merely because of regional differences in importance of manufacturing as compared to agriculture, but even more so with the importance of regional manufacturing activity from the national point of view. For these purposes, we have selected the variable of the regional manufacturing share in the national manufacturing output.

The importance of human resource development is being increasingly recognised in national growth theories. An important indicator of the level of human resource development is the literacy rate. The other indicators can be population in each state with different levels of education - especially the skilled labour force. Here, however, we have taken crude literacy rate per 1000 of population - literacy is defined in

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1. See A. Mitra, "Levels of Regional Development", Census of India 1967. He has the same variables in his composite index as a measure of pressure of labour on land.

the Indian census as ability to read and write. There can be considerable statistical errors in the literacy estimates. However, an important point to note here is that for a national economy with overall low literacy rate, there are considerable interstate variations in the literacy rate and these can be one of the sources of regional income and productivity differentials. The data for the various census variables<sup>1</sup> are available only for 1951 and 1961. For 1955-56 and 1967-68, we have used the figures of 1951 and 1961 respectively. The data on regional manufacturing share is available for all the four years. The other variable which is expected to be significant in explaining the productivity differentials is the labour participation rate. The role of the labour participation rate in relation to regional differentials was discussed earlier, and hence will not be repeated here.

While the above-mentioned factors are regarded as important factors in explaining the interstate differences in productivity and per capita incomes, they do not include the effect of being in one particular region, i.e. regionality. The regionality factor<sup>2</sup> assumes importance because of geographic differences between states discussed earlier (Section III). Such geographic differences affect the overall specialisation of the state or group of states and thus the effect of being in one region when all other regions' effect is zero can be an important source of differentials.<sup>3</sup> In order to take into account this effect, we have included regional 'dummy variables' in our formulation. By omitting one region, which forms the basis of our comparison, we can isolate the regionality effect of being in other four regions.

The region omitted is Central India with the two states of Uttar Pradesh and Madhya Pradesh. The other four regions

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1. The census variables are the number of cultivators per 100 acres of net area sown and the literacy rate and labour participation rate.

2. Regionality factor also includes regional differences in qualitative and non-quantifiable factors.

3. See, for example, R.A. Holmes and J.A. Munro, 'Regional Non-Farm Income Differences in Canada: An Econometric Study', Journal of Regional Science, Vol. IV, April 1970. The regionality effect in their study is significant for Quebec and Maritimes, as compared to the base Ontario.

are as follows:

1. Northern Region - Punjab, Rajasthan.
2. Eastern Region - West Bengal, Bihar, Assam, Orissa.
3. Western Region - Gujarat, Maharashtra, Mysore.
4. Southern Region - Kerala, Madras, Andhra.

Model and Estimating Equations. Our simple model is intended to explain the following dependent variables:

- (1)  $P_i - P$  =  $P_i$  - Output per employed person in  $i$ th state  
 $P$  - National average output per employed person
- (2)  $Y_i - Y$  =  $Y_i$  - Per capita income of  $i$ th state  
 $Y$  - National average per capita income

The following are the independent variables discussed above.

$X_1$  = number of cultivators per 100 acres of net area sown.

$X_2$  = regional labour participation rate

$X_3$  = regional manufacturing share in national manufacturing output

$X_4$  = literacy rate per 1000 of population

$X_5$  = 1, if region is Northern Zone, 0 otherwise

$X_6$  = 1, if region is Eastern Zone, 0 otherwise

$X_7$  = 1, if region is Western Zone, 0 otherwise

$X_8$  = 1, if region is Southern Zone, 0 otherwise

Central Zone forms the base and is omitted.

#### Estimating Equations

$$(1) P_i - P = a + b_1 x_1 + b_2 x_2 + b_3 x_3 + b_4 + b_5 x_5 + b_6 x_6 + b_7 x_7 + b_8 x_8$$

$$(2) Y_i - Y = a + b_1 x_1 + b_2 x_3 + b_3 x_4 + b_4 x_5 + b_5 x_6 + b_6 x_7 + b_7 x_8$$

Empirical results of our test are summarised below.

N = 56

$$(1) P_i - P = -12,706 - 5.243x_1 - 10.062x_2 + 22.369x_3 + 2.039x_4$$

$$(2.23^*) \quad (2.69^*) \quad (4.77^*) \quad (6.25^*)$$

$$+ 299.754x_5 + 48.482x_6 - 161.869x_7 - 149.11x_8$$

$$(3.54^*) \quad (0.666) \quad (1.76) \quad (1.63)$$

$$R^2 = 0.7137$$

$$\bar{R}^2 = 0.664$$

\*Significant at 0.05 level

$$(2) Y_i - Y = -97.557 - 1.636x_1 + 7.107x_3$$

$$(-2.22)^* \quad (4.67)^*$$

$$+ 0.459x_4 + 77.344x_5 + 1.361x_6$$

$$(4.44)^* \quad (2.81)^* \quad (0.058)$$

$$- 12.037x_7 - 42.313x_8$$

$$(-0.407) \quad (-1.43)$$

$$R^2 = 0.622$$

$$\bar{R}^2 = 0.567$$

\*Significant at 0.05 level

(Figures in the brackets in both equations are t-ratios)

Equation 1 shows that regional productivity differentials are inversely related with the number of cultivators per 100 acres of net area sown as well as labour participation rate. Both are significant factors in explaining the productivity differentials. The other highly significant variables in explaining the productivity differentials are the literacy rate and regional manufacturing share in national manufacturing output. Both factors were regarded as important in earlier discussions.

The literacy rate is positively correlated with the per capita and per worker income differentials. The importance of education in economic growth is increasingly recognised in the national growth theories. Regional differences in the levels of literacy are influenced by the complex social and economic indicators as well as by the government expenditure.<sup>1</sup> We have taken here the literacy per 1000 population. Literacy in Indian Census is defined as the ability to read and write. Although this is an imperfect measure of the level of human resource development, it is important measure in an economy in which national literacy level itself is low and also because spreading the literacy is one of the social goals of planning.<sup>2</sup>

The regional manufacturing share in national manufacturing output is another significant variable and is positively correlated to the regional per capita and per worker income differentials. The general fit of the equation could be improved by inclusion of the agricultural wage labourers per 100 acres of net area sown but on account of the

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1 We may note here that although literacy is significant in the above analysis, the position of several individual states is noteworthy. Kerala classified as 'average income state' has the highest literacy. Mysore from the same group also had higher literacy in 1951 as compared to national average. This only highlights the role of historical factors.

2 See Harbison, Frederick Harris and Myers, Charles A. Ed. "Manpower, Education and Economic Growth", strategies of Human Resource Development", London McGraw Hill Book Co. 1964.

problem of multi-collinearity, this particular variable had to be dropped. On the other hand, it was found necessary to introduce four dummy variables representing the regionality effect. Regionality variables measure the effect of the natural resource factor and geographic differences between regions as opposed to the economic variables specified above. Only two of the regionality variables are significant in our formulation. These are the Northern Zone and the Western Zone. The coefficient of multiple determination  $R^{-2}$  is 0.66 and is accepted here.

The equation (2) shows that per capita income differentials are also inversely related to the number of cultivators per 100 acres of net area sown. The literacy rate and regional manufacturing share are significant variables. However, regionality variables do not seem to emerge very significant except in the Northern Zone. The overall fit is less satisfactory, as  $R^{-2}$  is 0.56. Exclusion of agricultural labourers is partly responsible for comparatively lower  $R^2$ . However, it can be established that pressure of labour on land, regional manufacturing share and literacy rate are important variables in explaining per capita income differentials. Several other variables such as sex ratio and other socio-economic variables were tried out, but most of these create a problem of multi-collinearity. The labour participation rate was found to be negatively but insignificantly related to the per capita income.

The overall conclusions of this chapter may be briefly summarised now. We started our discussion by stating that there are theoretical as well as empirical difficulties in defining the working force in an underdeveloped economy like India. However, in spite of that, output per employed person is an important indicator for the purposes of economic analysis. In addition, it also must be remembered that the state income figures are based on 'income by origin' method and not 'accrual' and these are very imperfect measures for welfare purposes. However, these are the only data available and hence we have to use them with due caution.

We found in Section I that, while the absolute differential (Mwa) of the employment share of agriculture was found to be higher than in manufacturing, the relative deviations are found to be much higher for manufacturing. On the whole, the employment pattern of states shares the characteristics of the national economy in the predominance of agriculture in total employment, and the relative stability of this share over time. However, the employment share of agriculture in the top five states is much lower than the national average and, conversely, the employment share of agriculture is much higher than the national average in some of the low income states. This relationship is expressed in the rank correlations between ~~the~~ employment shares of three sectors and per capita income. These correlations were found to be significant for all the three sectors, viz. a significant negative correlation between employment share in A and per capita income ranking and positive significant coefficient between M and Y and S and Y. An examination of output shares of these three sectors indicated a decline in the output shares over time in all states. With the output share of agriculture dropping ~~for~~ nearly all the states, it was found also that, except for 1951, the rank correlations between output shares and per capita income were ~~found to be~~ higher than those for employment shares. Thus, with these differences in output and employment patterns of states, it can be expected that considerable differences in productivity must exist.

The regional inequality indices of MW, Mwa and VW were applied to the productivity data for the sectors. It was found that regional inequality was higher when measured in terms of output per employed person than the per capita income index. In addition, the regional inequality per employed person also was found to be increasing. Secondly, the regional inequality was highest in the manufacturing sector and was also found to have increased. On the other hand, some decline in inequality was noticed in the other sectors. It was pointed out that both these features which are also not in agreement with Williamson's findings have some logical explanation.

These two factors, viz. the intersectoral differences in productivity and intrasectoral differences in productivity suggest two important sources of variation in the level of state income, viz. 'Sectors' and 'States'. The usual analysis of variance was applied to the income data as classified by 'States' and 'Sectors'. When applied to the income data of 1951 and 1961, it showed a significant t ratio for the 'sectors' for both 1951 and 1961, on the basis of which we can reject the hypothesis, that there is no difference between 'sectors' independent of 'states'. On the other hand, the t ratio for 'states' was not found to be statistically significant for 1951. However, this was not regarded as sufficient evidence for rejecting that 'states' effect is not an important source of variation in the level of state income.

Finally, an attempt was made to explain the per capita income differentials and productivity differentials through multiple regression analysis. We shall not repeat the conclusions of this analysis as they were summarised above. But the main findings of the empirical test on Indian data are that the pressure of labour on land, the literacy rate, regionality variables and the regional manufacturing share in the national manufacturing output are important factors in explaining both per capita income differentials and productivity differentials. In addition to these factors, the regional labour participation rate also is found to be significant in explaining productivity differentials.

The overall pattern that emerges from the analysis of both Chapters (III and IV) is briefly summarised below. India, which is classified under the category of the 'less developed nations' by Kuznets' seven levels of development classification has regional inequality lower than that in some of the 'middle' income countries like Brazil and Italy. These are some of the countries with extreme North-South problems. However, the very size of the country puts India on a different scale from the small countries. Regions or some of the States in India are larger than many individual countries. Thus, the very size of the country

in terms of area and population suggests why important differences must exist in incomes of states and why a study of differentials is so important in understanding the national process of development as well. The national process of development can be understood better in relation to growth of its various components.

Although there is no 'North-South' problem in per capita income differences, there is severe disparity in the sense that a mere 33 per cent of the total population has a total income share of 46 per cent and further, only in this group of states does the income share seem to be growing. These states are the industrially advanced states. Thus, industrialisation and concentration of manufacturing activity appear as significant factors in our overall discussion of regional inequality. It is this sector which can be said to have 'North-South' problems with extreme differences in productivity. The nature of regional dualism in the manufacturing sector needs to be analysed separately. We shall pursue this in the next two chapters. Chapter V analyses the regional disparity in manufacturing productivity at a more disaggregated level. Chapter VI utilises the available data on the trends in the regional distribution of private and public sector investment in manufacturing in India, and attempts to draw some conclusions from these data regarding the factors that influence the locational pattern of private and public investment.

Chapter IV  
APPENDIX

ESTIMATES OF WORKING FORCE AND ECONOMIC PARTICIPATION  
IN THE CENSUS OF INDIA: 1951 AND 1961

We shall discuss here the definitions of gainfully employed persons used in the Indian Census of 1951 and 1961 and the problems of comparisons arising due to the change of definitions as compared between 1951 and 1961. We shall then examine the resultant figures of economic participation and analyse the inter-regional differences in economic participation.

We pointed out in Chapter IV that the estimation of working force in an underdeveloped economy presents several difficult conceptual and measurement problems due to the predominance of self-employment in agriculture and other sectors of economy, and due to the existence of disguised employment and underemployment. The census definition of a gainfully employed person involves fixing an arbitrary norm of 'minimum' employment or income which forms the basis of classifying population in those at work and those not at work. We shall compare below the working force definitions adopted in 1951 and 1961 Population Census of India.

Workers in 1951 comprised of the following categories:-

- (1) All self-supporting persons with productive principal means of livelihood, i.e. all self-supporting persons other than (a) agricultural rent receivers belonging to livelihood class IV and (b) self-supporting persons deriving their means of livelihood from non-agricultural, non-productive occupations like beggars, pensioners, etc. belong to livelihood class VIII.
- (2) Self-supporting persons belonging to livelihood class IV (agricultural rent receivers) but deriving a secondary means of livelihood from productive occupations.
- (3) All earning dependants in respect of their own means of livelihood, other than those who derived their secondary

means of livelihood from:

- (a) receipt of agricultural rent under class IV
- (b) non-agricultural non-productive occupations.

Non-workers of 1951 were equal to:

- (i) All non-earning dependants.
- (ii) Self-supporting persons whose principal means of livelihood was agricultural rent.
- (iii) The following groups of self-supporting persons included in non-agricultural class VIII:
  - (a) Persons living principally on income from non-agricultural property; (b) pensioners and remittance holders; (c) Inmates (jails, asylums, etc.); (d) other persons living principally on income derived from non-productive activity.
- (iv) Earning dependants whose own means of livelihood was agricultural rent receiving and/or livelihood class IV.
- (v) Earning dependants whose own means of livelihood was non-agricultural, non-productive.

As opposed to this 1951 definition of persons at work which has as its base 'income' as criterion and thus classified population in terms of self-supporting persons, earning dependants and non-earning dependants, the 1961 Census definition of persons at work was much simpler, and related to 'employment' as the criterion of being at work or not at work. For persons working on a seasonal basis, a person was classified as a 'worker' if he had some regular work of more than one hour a day throughout a greater part of the working season. In the case of regular employment, in any trade, business or commerce a person was classified as a worker if he was employed during any of the fifteen days preceding the day on which the household was visited by the census authorities. An adult woman who was engaged in household duties, but who was not doing any other productive work, was not considered as working. If, however, in addition to her household work she engaged herself in work such as

pounding of rice for wages or minding the cattle or selling firewood, etc., she was treated as working. Persons such as beggars, rent receivers, agricultural or non-agricultural royalty, who receive income but do not participate in productive work were considered in 'those not at work'.

Problems of comparison of the resultant working force figures in 1951 and 1961 arise basically due to two factors. Firstly, the difference in the basis of work in the two censuses can result in a higher working force figure for 1961 merely due to a more liberal definition of 'work' in 1961, which results in the inclusion of a larger number of persons as workers compared to the 1951 census. Secondly, the problems of comparison arise due, also, to the differences in industrial classification of workers in the two censuses. To take the second problem first, the problems arising from the differences in the industrial classification between the two censuses can be resolved by adopting the 1961 census industrial classification for the working force in 1951 and as estimated by the 1961 census.<sup>1</sup>

The problems of comparison in the two census working force figures arising from the change in the concept are not easy to resolve and to quantify. In addition to the national figures of the working force and economic participation being affected by it, we can also expect that some regions were more susceptible to the change in definition than others, due to inter-regional differences in the number of 'marginal' workers in each region. Table 1 gives the percentage of total population classified as cultivator and agricultural labourer in each state in the two censuses. The following points may be noted from the table:

(1) The percentage change in the percentage of total population classified as cultivator works out to be much

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1. See "Final Population Totals", Census of India 1961, pp.402-407. See also Mukherjee, M., Chapter V.

TABLE 1

PERCENTAGE DISTRIBUTION OF AGRICULTURAL WORKERS IN 1951 and 1961 CENSUS

Percentage of Total Population Classified As:

Statw (1)	<u>Cultivator - 1951</u>			<u>Cultivator - 1961</u>			<u>Percentage Change between 1951 and 1961</u>		
	P (2)	M (3)	F (4)	P (5)	M (6)	F (7)	P (8)	M (9)	F (10)
Andhra	12.95	21.64	4.14	20.81	25.63	15.83	+ 7.96	+ 3.99	+11.69
Assam	26.09	34.40	16.65	27.99	34.61	20.45	+ 7.76	+ 3.99	+ 3.80
Bihar	21.00	29.65	12.28	22.31	29.72	14.84	+ 0.41	+ 0.07	+ 1.56
Gujarat-Maharashtra	17.16	22.61	11.38	21.90	26.49	17.02	+ 3.74	+ 3.68	+ 5.64
Kerala	7.47	11.85	3.11	6.97	10.82	3.20	- 0.50	- 1.03	+ 0.09
Madhya Pradesh	22.41	32.62	11.84	32.78	35.79	29.62	+10.37	+ 3.17	+17.78
Madras	11.07	18.78	3.43	19.17	25.01	13.28	+ 8.10	+ 6.23	+10.85
Mysore	16.60	25.87	7.00	24.62	31.15	17.81	+ 8.02	+ 6.28	+10.31
Orissa	19.39	32.66	6.40	24.80	36.32	13.30	+ 5.41	+ 3.66	+ 6.90
Punjab	20.91	30.28	10.01	19.68	27.45	10.69	0.23	+ 2.83	+ 0.68
Rajasthan	32.43	38.48	25.88	35.00	39.81	29.71	+ 2.57	+ 1.33	+ 3.83
Uttar Pradesh	28.39	38.94	16.78	24.99	37.02	11.75	+ 4.40	+ 1.92	+ 5.03
West Bengal	12.24	19.70	3.60	12.77	20.92	3.47	+ 0.53	+ 0.22	+ 0.13
All India	19.56	28.05	10.59	22.70	29.41	15.59	+ 3.14	+ 3.68	+ 5.64

TABLE 1 (continued)

State (11)	Agricultural labour - 1951			Agricultural labour - 1961		
	P (12)	M (13)	F (14)	P (15)	M (16)	F (17)
Andhra	12.32	12.60	12.03	14.83	13.52	16.17
Assam	7.40	1.65	1.11	1.58	2.50	0.53
Bihar	8.35	11.0	5.67	9.51	11.05	7.97
Gujarat- Maharashtra	11.92	9.84	14.12	6.07	6.39	5.73
Kerala	8.23	10.62	5.90	5.79	6.18	5.40
Madhya Pradesh	16.59	13.15	20.14	8.70	8.43	8.98
Madras	6.51	8.12	4.91	8.40	8.55	8.25
Mysore	6.91	7.20	6.62	7.47	7.36	7.58
Orissa	6.90	9.12	4.72	7.48	9.18	5.68
Punjab	4.35	5.44	3.09	2.68	4.43	0.63
Rajasthan	3.74	2.94	4.60	1.95	2.18	1.70
Uttar Pradesh	3.19	3.77	2.56	4.42	5.27	3.49
West Bengal	5.28	7.98	2.16	5.07	7.78	1.99;
All India	7.71	8.08	7.31	7.38	7.67	6.67

Compiled from

Source : Census of India, 1961, "Final Population Totals"

higher than the national average in the states of Andhra, Madhya Pradesh, Madras, Mysore and Orissa. In Madras and Mysore the percentage increase in male cultivators is nearly twice as high as the national average. In all these states, however, the percentage increase of female cultivators is highest.

(2) The percentage change of population classified as agricultural labourer in the regions is more stable around the national mean. Although the above figures show that the working force figures, especially in Southern States, are inflated due to the 1961 definition, we cannot precisely quantify its extent.

The resultant figures of percentage of total population classified as 'working' also indicate similar trends. Table 2 gives the figures of the economic participation rates for male, female and total for each state in the two censuses. We can note the following points from the table.

(1) In the four states of Andhra, Madras, Mysore and Orissa, the percentage change in the male and female participation works out to be the highest. Here, also, the percentage change in female participation is higher than that in male participation.

(2) The participation rates for the other states and the national average do not show marked changes and for some states there is a decline in the male and female participation.

We conclude that, due to the problems discussed above, the trends in the economic participation for regions and the national average are very difficult to establish and firm conclusions regarding these cannot be realised, although it appears that the figures are most markedly affected only for a few states. On the other hand, there are considerable inter-regional variations in economic participation for a given census and they offer an interesting pattern. We can compare the overall average level of male, female and total participation and attempt to draw

TABLE 1

## PARTICIPATION RATES IN MAJOR INDIAN STATES: 1951

State	Crude Participation Rate 1951	Rank	Male 1951	Rank	Female 1951	Rank
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Andhra	36.90	7	52.43	9	21.13	8
Assam	42.53	4	53.57	8	29.98	4
Bihar	34.96	9	49.12	11	20.66	7
Gujarat	43.69	3	55.10	6	31.60	3
Kerala	32.28	12	46.66	12	18.28	9
Madhya Pradesh	49.31	2	60.40	1	37.83	2
Madras	29.18	13	45.81	13	12.67	12
Mysore	34.08	19	49.54	10	18.08	11
Orissa	37.37	8	56.40	4	18.76	8
Punjab	37.99	6	55.57	5	17.54	10
Rajasthan	49.35	1	59.59	2	38.24	1
Uttar Pradesh	41.76	5	58.25	3	23.63	5
West Bengal	34.47	10	54.23	7	11.63	13
All India	39.10		54.05		23.30	

Rank correlation, (5) and (7)  
0.604

TABLE 2 (continued)

## PARTICIPATION RATES IN MAJOR INDIAN STATES: 1961

State (1)	Crude Participation Rate	Male		Female		Percentage Change between 1951 and 1961			
	1961 (2)	Rank (3)	1961 (4)	Rank (5)	1961 (6)	Rank (7)	1961 (8)	M (9)	F (10)
Andhra	51.87	2	62.22	1	41.32	1	+14.97	+ 9.79	+20.19
Assam	43.28	7	54.10	9	39.91	3	+ 0.75	+ 0.53	+ 9.93
Bihar	41.40	8	55.60	8	27.12	8	+ 6.44	+ 6.48	+ 6.46
Gujarat-Maharashtra	41.07	9	53.47	11	27.89	7	+ 1.03	+ 1.63	+ 3.81
Kerala	33.31	12	47.20	13	19.71	10	+ 1.03	+ 1.44	+ 1.43
Madhya Pradesh	52.30	1	60.21	3	43.99	62	+ 2.99	+ 0.19	+ 6.16
Madras	45.57	4	59.74	4	31.29	5	+16.39	+13.93	+19.62
Mysore	45.48	5	58.38	5	32.02	5	+11.40	+ 8.84	+14.04
Orissa	43.66	6	60.75	2	26.58	9	+ 6.29	+ 4.35	+ 7.82
Punjab	34.97	1	52.92	12	14.20	11	- 3.02	- 2.75	- 3.34
Rajasthan	97.55	3	58.14	6	35.89	4	- 1.80	- 0.45	- 2.35
Uttar Pradesh	39.12	10	58.19	7	18.14	12	- 2.64	- 0.06	- 2.20
West Bengal	33.16	13	53.98	10	9.43	13	- 1.31	- 0.25	+ 4.66
All India	42.98		57.12		27.96		+ 3.88	+ 2.07	

Notes: 1. Participation rate gives percentage of total population in working force.

2. Rank correlations between regional per capita incomes and the crude participation rates for 1951 and 1961 are -0.356 and -0.530.

3. The rank correlations between 1951 Male and Female percentages works out at 0.604 and that for 1961 is 0.585.

Source: Compiled from Census of India, 1961.

some conclusions from it. Williamson generalises on the role of labour participation rates in regional dualism as follows: To quote, "Given significant geographic income per capita differentials, one would anticipate high rates of participation in the rich North and low rates in the South for much the same reason that labour participation rates tend to be relatively low in low-income countries. The question then arises how much of these observed regional inequalities are explained by productivity differentials and how much by participation rates?" Table 3 gives his findings on the international cross-section for which data are available. He concludes from these data that "At a variety of national development levels and in all cases but two, (Japan and the United States c. 1900), the inequality index is lower when computed from regional productivity data. Labour participation rates appear to play a significant role in explaining regional dualism at all levels of national development. We might interject the remark that the positive correlation between income levels and labour participation rates tends to be stronger between regions within national boundaries than between nations themselves." We pointed out in Chapter IV that, along with Japan and the United States, India also has a pattern in which the regional inequality index is higher when measured in per worker differentials. The multiple regression analysis showed a negative correlation<sup>1</sup> between the per capita income differentials and the regional labour participation rate. We may further examine the inter-regional variations in the levels of economic participation and indicate some reasons for a negative relationship found in the Indian data.

An examination of data in Table 2 shows the following characteristics of the levels of economic participation:

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1. The rank correlations between regional per capita income and labour participation rates are -0.356 for 1951 and -0.530 for 1961.

**TABLE 3**  
*Inequality*  
**LABOUR PARTICIPATION AND SECTORAL INEQUALITY BY REGIONS**

Country (1)	Year (2)	Income/ Capita (VW) (3)	Income or Productivity Worker (VW) (4)	Agricultural Product, Agri- cultural labour IVW (5)	Industrial Product, Industrial Labour(VW) (6)	(3) (7)	(4) (8)	(5) (9)	(6) (10)
Australia	1954/55	0.055	0.029			2.292			
Spain	1957	0.387	0.304	0.373	0.148	1.273	2.520	3.949	
Brazil	1950	0.732	0.571	0.578	0.297	1.282	1.946	2.424	
Italy	1951	0.363	0.321			1.131			
	1960	0.372	0.303	0.357	0.227	1.228	1.573	1.334	
Japan	1959	0.259	0.372	0.177	0.283	0.696	0.625	0.573	
Finland	1959	0.313	0.228	0.147	0.141	1.373	1.043	0.994	
Sweden	1944	0.311	0.213			1.460			
	1960	0.192	0.133			1.444			
Yugoslavia	1959	0.332	0.103	0.470	0.160	3.233	2.938	2.573	
United States	1960	0.322	0.384	0.461	0.160	0.839	2.881	1.941	
France	1951	0.327	0.265	0.331	0.251	1.147	1.303	1.398	
Canada	1931	0.272	0.272			1.000			
	1951	0.206	0.179			1.151			
Columbia	1951	0.604	0.568			1.063			
Austria	1957	0.225	0.194			1.160			

Source: Williamson, op.cit.

(1) For each census, the male participation rate is more stable than the female. However, the regions with lower than the national participation rate have lower averages for both male and female (Kerala, Punjab, West Bengal and Bihar). The rank correlation between the male and female ranks works out as significant for both years.

(2) In addition, the range of inter-regional variation is much higher in the case of female participation for both years.

We feel that the regional level of economic participation in a predominantly agricultural economy is influenced by the complex social and economic factors such as land tenancy system, the land ownership pattern, regional differences in caste and the social structures of regions. Female participation, particularly, is more powerfully influenced by the social structures and attitudes. We cannot answer here how much lower (than the average national) participation of females in West BĀngal, Uttar Pradesh, Bihar, Kerala and Punjab can be attributed to the differences in social structures of these states compared to Andhra, Madhya Pradesh, Rajasthan and Assam. In addition, we must also note that under or over estimation of female working force can arise due to the prevalence of the social attitude that high caste women do not work. Therefore one reason for very low participation in the above-mentioned states can also be due to the under-reporting of work. In such circumstances, we cannot expect a single hypothesis such as 'income-participation' to be empirically sustainable in the case of India. The complex and interesting issues of inter-regional variations in the levels of economic participation must be analysed for each census separately and in relation to the complex social and economic factors that affect these rates.

BACKGROUND TABLESCHAPTER IVTABLE 1

THE REGIONAL DIFFERENTIALS IN INCOME PER CAPITA AND PER WORKER IN INDIAN STATES, 1950-51, 1955-56, 1960-61 and 1967-68 (in 1960-61 prices and in Rs)

State	1950-51		1955-56	
	$y_i - \bar{y}^1$	$P_i - \bar{p}^2$	$y_i - \bar{y}$	$P_i - \bar{p}$
Punjab	+108	+302	+ 81	+274
Rajasthan	- 40	-242	- 13	-270
Uttar Pradesh	- 60	-285	- 30	+ 98
Madhya Pradesh	- 26	-115	- 46	-143
Assam	+ 39	- 1	+ 29	- 1
Bihar	-115	-386	-105	-271
Orissa	- 44	- 89	- 59	-115
West Bengal	+175	+605	+141	+392
Gujarat	+ 85	+ 98	+ 71	+ 83
Maharashtra	+ 78	+ 98	+ 96	+ 65
Mysore	- 9	- 79	- 1	+ 57
Andhra	- 39	- 68	- 30	- 93
Kerala	+ 8	+179	+ 5	+154
Madras	- 51	+ 80	- 15	+ 50

(continued)

TABLE 1 (continued)

State	1960-61		1967-68	
	$y_i - \bar{y}$	$p_i - \bar{p}$	$y_i - \bar{y}$	$p_i - \bar{p}$
Punjab	+105	+481	+ 8	- 28
Rajasthan	- 64	-210	+200	+892
Uttar Pradesh	- 33	-221	- 48	- 77
Madhya Pradesh	- 44	- 37	+ 27	-232
Assam	- 8	- 23	- 71	-114
Bihar	-114	-246	- 43	-137
Orissa	- 68	-169	-130	-313
West Bengal	+126	+610		
Gujarat	+ 67	+192	+ 88	+699
Maharashtra	+143	218	+121	+315
Mysore	- 23	- 94	+112	+108
Andhra	- 47	-205	+ 10	- 53
Kerala	- 10	+197	- 25	-157
Madras	+ 8	- 28	+ 29	+309
			+ 56	+ 19

- Notes: (1)  $y_i$  is regional per capita income  
 $\bar{y}$  is national per capita income  
(2)  $p_i$  is regional income per worker  
 $\bar{p}$  is national average income per worker

Sources: NCAER, op.cit. and IIP0, op.cit.

TABLE 2

DATA ON THE CENSUS VARIABLES USED IN THE REGRESSION  
ANALYSIS OF CHAPTER IV

State	Cultivators per 100 acres		Agricultural Labourers per 100 acres		Literacy per 1000 population		Labour Participation Rate	
	1951	1961	1951	1961	1951	1961	1951	1961
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Punjab	21	22	4	3	152	242	37.99	35.00
Rajasthan	31	23	4	1	89	152	49.35	47.91
Uttar Pradesh	17	28	13	7	98	171	37.37	52.30
Madhya Pradesh	45	45	5	14	108	176	41.75	39.12
Assam	42	65	2	4	183	274	42.53	43.00
Bihar	43	53	15	22	122	184	34.96	41.40
Orissa	23	32	8	9	158	217	34.47	43.66
West Bengal	25	34	11	14	240	293	49.30	33.16
Gujarat	15	20	10	9	231	305	43.68	41.07
Maharashtra	15	20	10	9	209	298	43.68	48.00
Mysore	14	23	6	7	193	254	33.90	45.48
Andhra	17	27	16	20	131	212	36.89	51.87
Kerala	24	36	26	21	407	468	32.27	33.31
Madras	26	45	15	20	246	314	29.17	45.57

Sources: Census of India, 1951 and 1961.

TABLE 3

REGIONAL DISTRIBUTION OF NATIONAL VALUE ADDED IN THE  
MANUFACTURING SECTOR IN INDIA 1950-51, 1955-56, 1960-61,  
1967-68<sup>0</sup>

State	1950-51	1955-56	1960-61	1967-68
(1)	(2)	(3)	(4)	(5)
Punjab	6.13	4.96	5.49	7.76
Rajasthan	1.43	1.00	1.70	2.08
Madhya Pradesh	6.95	5.64	5.76	5.76
Uttar Pradesh	8.46	9.59	8.59	7.92
Assam	3.19	2.58	2.39	1.92
Bihar	8.12	7.50	7.37	7.13
Orissa	1.92	1.61	1.62	2.32
West Bengal	19.00	21.89	16.55	14.23
Gujarat	8.00	8.52	7.52	7.37
Maharashtra	18.60	19.00	18.42	16.58
Mysore	6.64	5.42	5.92	6.41
Andhra	4.73	4.46	4.26	4.53
Kerala	5.61	4.98	3.76	3.43
Madras	8.27	8.80	8.80	8.80

Note: The sum total of regional percentages do not add up to 100% as other states are not included.

Sources: NCAER and IIP0, op.cit.

CHAPTER VA DISAGGREGATED ANALYSIS OF REGIONAL DISPARITIES IN THE  
MANUFACTURING SECTOR IN INDIAINTRODUCTION

We found in Chapter IV that the value of VW is highest in the manufacturing sector for 1960-61. We also pointed out that a difference in the values of VW and MW in manufacturing for 1961 shows that the value of VW is affected by a few extreme deviations from the national average. A priori we can say that high regional inequality in the average value added per worker reflects the regional differences in the industrial structure within the manufacturing sector in terms of the percentage of a region's manufacturing output accounted for by the large industry vis-a-vis household and small enterprises. Since large industry is concentrated in a few states, regional disparities are likely to exist in the regional productivity levels at the industry level. Thus, an attempt can be made to measure the degree of regional disparity at the industry level and to assess the significance of various explanatory factors for the individual industries. Since India presents a different structure of regional inequality at the sectoral level from Williamson's findings, it is extremely relevant to pursue a disaggregated analysis to throw additional light on the regional disparities in the manufacturing sector.

In addition, the role of the manufacturing sector in national and regional development may be further emphasised from the following aspects: (i) in relation to national growth objectives which emphasise the rapid industrialisation of the national economy; (ii) from the point of regional growth and "balance", in which regional industrialisation can be considered one way of inducing higher income growth

in low income regions.

In light of the importance of the manufacturing sector in regional inequality as well as from the points of national and regional development, we devote Chapters V and VI to an analysis of regional dualism in the manufacturing sector in India. For these purposes, in Chapter V we pursue a disaggregated analysis of regional productivity differentials in the manufacturing sector in India. The emphasis here is on cross-sectional analysis rather than time-series. Having established the pattern of regional differentials at sub-sector and at industry level, we shall analyse the trends in regional distribution of private and public sector investment in manufacturing. Here we present some of the available data on the trends in the private sector's manufacturing investment and the regional distribution of public sector investment to consider their implications in terms of the industrialisation of low income regions. We pursue this in Chapter VI.

The outline of Chapter V is as follows:

Section I examines the regional differences in industrial structures within the manufacturing sector. It then gives the regional disparity indices within each sub-sector and also attempts to quantify the importance of regional differences in industrial structures vis-a-vis subsectoral differences in the productivity in manufacturing.

Section II takes up the large-scale industry sector for a further cross-sectional analysis of regional productivity differences. In the analysis of regional disparity of large industry we have measured the degree in industry group, and attempted to analyse the importance of factors such as the capital intensity and the concentration of a given industry in specific regions in giving rise to the observed regional productivity differences within a

given industry. We have pursued a similar analysis on the regional average earnings data. In Section III, we examine the trends in the regional disparity between 1961 and 1966, in the selected industries. In these industries we analyse the trends in the disparity indices, the productivity levels in both years and the value added shares of different regions.

## SECTION I

### REGIONAL DIFFERENCES IN THE INDUSTRIAL STRUCTURES AND THE REGIONAL DISPARITIES IN THE VALUE ADDED PER WORKER IN THE VARIOUS SUB-SECTORS OF MANUFACTURING INDUSTRY IN INDIA: 1960-61

We can begin our analysis of regional disparities in the manufacturing sector by giving first the spatial distribution of industrial activity in 1948, the year for which the first estimates are available by states. Table I gives the spatial distribution of manufacturing industry. As can be seen from the table, West Bengal, Maharashtra-Gujarat and Madras-Andhra Pradesh industrial nodes accounted for 75 per cent of the industrial employment and 77 per cent of value added in manufacturing. In terms of industrial concentration, Maharashtra-Gujarat accounted for 71, 9, 32, and 39 per cent of value added in Textiles, Sugar, Electrical Engineering Goods and Chemicals. The corresponding shares of West Bengal were 3% in Textiles and 44% and 41% in Engineering and chemicals.

TABLE 1

THE SPATIAL DISTRIBUTION OF MANUFACTURING SECTOR IN INDIA  
IN 1948

State	Industrial Workers	Value of net Industrial Product	Textiles	Sugar	Engineering, Electrical Goods	Chemicals
(1)	(2)	(3)	(4)	(5)	(6)	(7)
West Bengal	31.7	23.5	33.7	-	43.8	41.0
Bihar	7.1	6.9	-	14.3	9.7	4.2
Orissa	0.5	0.3	-	1.1	-	-
Maharashtra & Gujarat	36.7	44.8	68.7	8.6	34.3	39.6
Madras, Andhra Pradesh	10.3	8.5	10.2	18.6	6.8	6.6
Uttar Pradesh	9.7	7.5	7.6	55.6	1.9	7.3
Punjab	1.3	5.9	6.0	-	2.5	-
Delhi	1.2	1.6	2.6	-	1.3	-
Other States & Union Territories	1.5	1.0	1.2	1.7	0.7	0.9
All India	100.0	100.0	100.0	100.0	100.0	100.0

Source:— Census of India, 1961, "Economic Regionalization of India; Problems and Approaches", Monograph series, Vol. 1, No. 8, by Dr (Miss) P. Sen Gupta and Dr (Mrs) Galina Sdasynk, Ed. A. Mitra, 1969.

Notes: Some of the figures do not add up to 100 per cent, due to the rounding.

Chemical The nation's industrial base in 1948 consisted mainly of these above industries, and some industries related to these industries in terms of forward and backward linkages.<sup>1</sup>

One of the aims of planning in India, through rapid industrialisation at national level, has been to change the national industrial base which was dependent on a few traditional industries such as jute and cotton, and in such a process to create new spatial centres of growth away from the established centres of growth both by location of the public sector investment and by channeling the direction of private sector investment. Thus, an examination of regional differences in the industrial structures is relevant since we anticipate some spatial dispersion between 1948 and 1961. Since 1960-61 is the only year for which we were able to obtain the regional estimates on employment and value added in household and small enterprises sectors, we have taken this year for our cross-sectional analysis. For the sub-sector estimates of value added per worker we have drawn on the NCAER publication of "Income and Structure of Manufacturing Industry in India: 1960-61". We have already discussed in Chapter II how the estimates of value added in the various sub-sectors for 1960-61 are arrived at. NCAER applies the same basic data for computing average figures of net output per worker by states.

The entire manufacturing sector is divided into the following sub-sectors: 'Factory Establishments' and 'Small Enterprises'. The former includes all establishments which are covered by the Indian Factories Act, 1948. According

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1. We cannot go here adequately into the question of the long term factors giving rise to the above pattern of concentration of industrial activity. Historically, commercialisation of Indian agriculture in the 19th century led to the development of raw material and plantation based industries such as jute and cotton textiles. Location of these industries in the proximity of the raw material producing areas of West Bengal and Bombay, which were also the international ports, thus led to a rapid growth of industrial clusters around the metropolitan cities of Bombay and Calcutta, and also that of Madras; the industrial base of Madras was smaller and it specialised in industries such as sugar, machinery and chemicals.

See bibliography for references on the location of Indian industries that take these historical factors into account.

to this Act, a factory is defined as any premises with employment of ten or more workers with the aid of power or twenty or more workers without the aid of power. The 'Small Enterprises' sub-sector covers all the manufacturing establishments not covered in the Factories Act. In other words, it includes all household and non-household establishments engaged in manufacturing and processing activity but employing on any one day less than ten workers if using power and less than twenty workers if not using power. Factory establishments may also be further divided into two sub-sectors as follows: (a) medium establishments which employ more than 9 workers but less than 50 workers while using power, or more than 19 workers but less than 100 workers without the aid of power; (b) large establishments which employ 50 or more workers with power or 100 or more without power. Table 2 gives the distribution of manufacturing output and employment (columns 2 and 3) by states and the contribution of manufacturing output to total state income (column 5). It can be seen from the table that the combined share of Maharashtra, West Bengal, Gujarat and Madras in total employment and output works out to be 37.6 and 55.0 per cent - which is considerably lower than that observed for 1948 in Table 1. Column 5 shows that the percentage of total state income originating in the manufacturing sector varies inter-regionally, being as high as 30 per cent in West Bengal and as low as 12 per cent in Rajasthan.

We may now proceed to examine the importance of various sub-sectors of the manufacturing industry in accounting for total regional net output. Table 3 gives data on the importance of various sub-sectors in each state. The household industry represents the unorganised and most labour intensive or traditional sector of the manufacturing industry. It can be seen that, in a number of states, the percentage of manufacturing output accounted for by the household sector is as high as 34.8 per cent in Andhra, 39.5 per cent in Orissa and 32.5 per cent in Madhya Pradesh. Similarly, the importance of large industry in total

TABLE 2

DISTRIBUTION OF NATIONAL EMPLOYMENT AND NET OUTPUT  
OF MANUFACTURING SECTOR IN 1960-61 BY STATES

States	Percentage Distribution		Net Output Rs'000	Percentage of state income originating in manufactur- ing
	Employment	Output		
(1)	(2)	(3)	(4)	(5)
Andhra Pradesh	10.8	3.8	7,17,486	13.6
Assam	2.2	2.4	4,44,859	19.0
Bihar	7.5	6.3	11,89,576	15.0
Gujarat	4.8	8.2	15,54,800	21.2
Kerala	5.1	3.9	7,44,959	15.7
Madhya Pradesh	6.4	3.9	7,37,920	18.1
Madras	11.3	9.0	17,07,372	19.8
Maharashtra	11.6	20.3	38,27,761	24.0
Mysore	5.4	4.5	8,40,801	18.7
Orissa	3.1	1.3	2,42,756	12.6
Punjab	4.3	6.1	11,59,758	14.2
Rajasthan	2.9	1.4	2,55,891	12.1
Uttar Pradesh	12.7	8.7	16,46,450	13.0
West Bengal	9.9	17.2	32,37,278	30.6
Delhi	1.1	2.3	4,23,537	N.A.
All States	100.0	100.0	188,51,585	18.9

Source: Compiled from NCAER "Income & Structure of Manufacturing Industry in India", op.cit., p. 40

TABLE 3

PERCENTAGE DISTRIBUTION OF TOTAL NET OUTPUT ACCORDING TO DIFFERENT TYPES OF MANUFACTURING INDUSTRY FOR VARIOUS STATES FOR 1960-61.

States	Household Manufacturing Industry	Small	Medium	Large	Total of (3), (4) and (5)	All manufacturing Industries
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Andhra Pradesh	34.8	20.9	10.9	33.4	65.2	100.0
Assam	24.2	5.3	10.4	60.1	75.8	100.0
Bihar	18.8	22.5	3.5	55.2	81.2	100.0
Gujarat	12.2	18.6	11.2	58.0	87.8	100.0
Kerala	9.2	52.6	8.3	29.9	90.8	100.0
Madhya Pradesh	32.5	18.3	4.5	44.7	67.5	100.0
Madras	13.2	34.9	10.6	41.3	86.8	100.0
Maharashtra	11.7	16.5	7.8	64.0	88.3	100.0
Mysore	14.4	36.5	6.8	42.3	85.6	100.0
Orissa	39.5	19.7	4.2	36.6	60.5	100.0
Punjab	33.8	36.9	11.1	18.2	66.2	100.0
Rajasthan	22.6	32.7	5.5	39.2	77.4	100.0
Uttar Pradesh	22.7	29.2	46.8	43.3	77.3	* 100.0
West Bengal	9.8	25.2	4.4	60.6	90.2	100.0
Delhi	4.0	42.3	13.4	40.3	96.0	100.0
All India	16.9	25.8	7.4	49.9	83.1	100.0

Source: Compiled from NCAER "Income & Structure of Manufacturing Industry", op.cit., p.50

regional manufacturing output also differs inter-regionally. Only Bihar, Gujarat, Maharashtra, West Bengal and Madras have a higher than national average percentage of manufacturing output accounted for by large industry. Given these differences in the industrial structures, we can say that, a priori, we can expect the productivity levels to differ among the various sub-sectors, as they represent different levels of organisation, labour intensity and technology. The estimates of value added per worker in each sub-sector are summarised in Tables 4, 5 and 6. It can be seen from the tables that the value added per worker which is our productivity index varies nationally for each of the three sub-sectors. However, the absolute dispersion around the national mean appears to be the highest in the household manufacturing sector. In both household and small industry groups, the more industrialised states have higher productivity levels, although we saw in Table 3 that these states have a much smaller percentage of total output originating in the household and small industry sector.

In underlining the factors that give rise to regional productivity differences within these two sectors, we need to remember that, we have aggregated various firms by certain size into various sectors such as household, small, medium and large, and that considerable regional differences in product-mix exist within each sub-sector. Thus, although we cannot isolate or disaggregate the importance of regional differences in product-mix within household or small industry, we have to point out that such differences exist, and these in turn are likely to affect the capital intensity and other factors that affect the efficiency levels within these sub-sectors. In addition, there are external economy effects and the advantages arising out of forward and backward linkages in more industrialised states, with the result that, although active policy to support the growth of small industry is pursued nationally, the small industry units in more industrialised states are in a better position to take advantage of the financial and other facilities offered, and thus increase their efficiency levels. The degree of regional disparity in the various sub-sections of manufacturing is given in Table 7.

TABLE 4

ESTIMATES OF VALUE ADDED PER WORKER IN HOUSEHOLD  
SECTOR IN INDIA, 1960-61 BY STATES IN Rs.

Ranks	States	Value Added Per Worker	Index (All States= 100)
(1)	(2)	(3)	(4)
1	Delhi	1,025	312
2	Punjab	970	296
3	West Bengal	720	220
4	Gujarat	612	187
5	Maharashtra	607	185
	All India	328	100
6	Madhya Pradesh	303	92
7	Uttar Pradesh	257	78
8	Bihar	248	76
9	Mysore	229	70
10	Orissa	210	64
11	Madras	198	60
12	Andhra Pradesh	175	53
13	Kerala	175	53
14	Rajasthan	172	52

Source: NCAER, op.cit., p.52

TABLE 5

STATEWISE ESTIMATES OF VALUE ADDED PER WORKER IN SMALL  
INDUSTRY IN INDIA; 1960-61 BY STATES IN Rs.

Ranks	States	Value Added Per Worker	Index (All States = 100)
(1)	(2)	(3)	(4)
1	Delhi	1,870	290
2	Punjab	1,386	215
3	West Bengal	1,161	180
4	Gujarat	1,151	178
5	Maharashtra	967	150
6	Kerala	670	104
	All India	645	100
7	Mysore	597	93
8	Assam	567	88
9	Madras	560	87
10	Uttar Pradesh	472	73
11	Bihar	456	71
12	Madhya Pradesh	407	63
13	Rajasthan	333	52
14	Orissa	295	46
15	Andhra Pradesh	270	42

Source: NCAER, op.cit., p.56

TABLE 6

ESTIMATES OF VALUE ADDED PER WORKER IN LARGE  
INDUSTRY IN INDIA; 1960-61 BY STATES (IN Rs.)

Ranks	States	Value Added Per Worker	Index (All States = 100)
(1)	(2)	(3)	(4)
1	Maharashtra	3,833	129.8
2	Assam	3,769	127.6
3	Bihar	3,707	125.5
4	Delhi	3,418	115.7
5	Orissa	3,274	110.9
6	Gujarat	3,109	105.3
7	Madras	3,004	101.7
	All India	2,953	100.0
8	West Bengal	2,902	98.3
9	Punjab	2,442	82.7
10	Madhya Pradesh	2,413	81.7
11	Uttar Pradesh	2,407	81.5
12	Mysore	2,386	80.8
13	Rajasthan	2,000	67.7
14	Andhra Pradesh	1,628	55.1
15	Kerala	1,596	54.0

Source: NCAER, op. cit., "Income and Structure of Manufacturing Industry in India", p.57

We may note from the table that there is some divergence in the value of VW and MW for household and small industry sector, which indicates that there are a few regional observations with large absolute deviations and large labour force shares. In factory establishments the values of VW and MW do not diverge. The absolute weighted deviations from the national mean are highest in the factory sector. The VW is highest in the household sector.<sup>I</sup>

Given these variations in the regional industrial structures and the productivity differences within each sub-sector, we are confronted with a problem similar to the one in Chapter IV, where we analysed sources of variations in levels of state income.<sup>2</sup> We can apply the same model of two-way analysis of variance to isolate and quantify the importance of these two effects. Thus, two sources of variation in the levels of manufacturing income are identified, viz. 'the industrial structures effect' (which is the same as the 'sector' effect in variance analysis of Chapter IV). All the other factors that vary among states and thus give rise to variations within each sector may be termed as 'region' effect. We shall not repeat the statistical model, which is the same as in Chapter IV, but we summarise the results of our variance analysis in Table 8.

We can conclude that both sources of variations in the levels of manufacturing income are significant; however, the sources of variations arising out of regional differences in industrial structures are by far the most significant. In the next section, we take up the factory sector of the manufacturing industry for a further analysis.

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- I. As can be seen from tables 4 and 5 in the household and small sector, the states such as Andhra, Orissa, Bihar, Madhya Pradesh, which have high regional share in national employment in these sectors but have large negative deviations in value added from the national average. This is then magnified when differentials are weighed and squared.
  2. See Chapter IV, Section III.

TABLE 7REGIONAL INEQUALITY IN THE VARIOUS SUB-SECTORS OF MANUFACTURING  
INDUSTRY IN INDIA, 1960-61

Sector	VW <sup>1</sup>	MW <sup>2</sup>	MW <sup>a3</sup>
Household Sector	0.661	53.65	175
Small Industry Sector	0.503	43.94	253
Factory Establishments	0.261	26.19	526

1. Weighted coefficient of variation, where each observation is weighed by the regional employment share to national employment of each sector.
2. Is same as VW without squaring the deviations.
3. Absolute weighted deviations from the national mean.

Source: Data compiled from 'Income and Structure of Manufacturing Sector in India, 1960-61', NCAER. 1965.

TABLE 8

SOURCES OF VARIATIONS IN THE LEVELS OF MANUFACTURING INCOME  
IN INDIA: TWO-WAY ANALYSIS OF VARIANCE

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TSS <sup>1</sup>	96290540.35
RSS <sup>2</sup>	77993453.70
n-1	3.0
RMS <sup>3</sup>	25997817.90
CSS <sup>4</sup>	10277127.10
m-1	13.0
CMS <sup>5</sup>	790548.23
ESS <sup>6</sup>	8019959.55
n-1 x m-1	39.00
EMS <sup>7</sup>	205639.98
FR <sup>8</sup>	126.42*
FC <sup>9</sup>	3.84*
	SE dr 320.65
	SE dc 171.39

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Notes: The 'rows' represent the 'sector' effect. The whole manufacturing industry is divided into four sub-sectors of household, small enterprises, factory establishments and large industries

\* significant at 0.05 level.

1. TSS = Total Sum of Squares.
2. RSS = Rows Sum of Squares.
3. RMS = Row Means Square.
4. CSS = Column Sum of Square.
5. CMS = Column Mean Square.
6. ESS = Error Sum of Squares.
7. EMS = Error Mean Square.
8. FR =  $\frac{RMS}{EMS}$
9. FC =  $\frac{RMS}{EMS}$

## SECTION II

### REGIONAL DISPARITIES IN THE MANUFACTURING PRODUCTIVITY IN THE FACTORY SECTOR IN INDIA: A DISAGGREGATED ANALYSIS: 1960-61

Having established the degree of regional disparity in manufacturing productivity at the sub-sector level, we now need to go further in the analysis of the productivity differences within the sub-sector at a more disaggregated level. Comprehensive regional data on the value added and employment in household and small enterprises by industries do not exist. Hence, we may pursue a disaggregated analysis of the factory sector as covered by the Annual Survey of Industries. We have chosen 1960-61 for cross-sectional analysis, so as to keep the analysis of this section comparable to the one pursued in Section I.

In this section, we shall analyse the following aspects of the regional disparities in the factory sector in 1960-61. (a) We shall select a number of industries in the factory sector and estimate the regional disparity in each industry in the value added per worker and the average regional earnings. This will enable us to examine the degree of regional differences in value added per worker and in earnings in each selected industry. (b) The regional differences in productivity and earnings may be further analysed in relation to the significance of two identifiable factors, viz. the capital intensity and the concentration of manufacturing output from the national point of view, i.e. regional share in national value added in a given industry. We expect the importance of these two factors to vary among various industries; but such an analysis can throw light on the nature of regional differentials within each group of industry.

We may briefly mention the sources and general limitations of the data used in this section. The CSO publications of 'Census of Manufactures' from 1946 to 1956 and the reorganised statistics published since 1959

as 'Annual Survey of Industries' cover all the factories coming under the purview of the Factories Act of 1948. The basic data of the Annual Survey of Industries consists of the following main items for each industry: (1) number of factories; (2) total productive capital which is further divided into fixed and working capital; (3) number of persons employed total and by various categories; (4) total man-hours worked; (5) total wages, salaries and benefits; (6) total inputs; (7) gross value of output; (8) value added by manufacture. Each industry group covers all the states and hence data on all these items for each industry are available by states. One limitation of these data arises due to the fact that although in each industry regional figures are given on all the above items on the individual states that produce the bulk of the total national output, the rest of the states in which such industry nominally exists are bunched together as 'the rest'. Hence this creates difficulty in pooling the regional figures of each industry and also it means that the number of observations differ for each industry. In addition, in comparing the regional figures in a given industry some problems also arise due to the broad industrial groupings used in the survey. For regional purposes aggregate data on industries such as cotton textiles, drugs and pharmaceuticals, jute textiles, etc. include considerable regional variations in the product, so that in analysing the regional differences within a given industry, we are not necessarily examining the regional differences in productivity of a homogeneous product. While we grant the limitations arising out of the broad industrial classification, we have to accept the classification as since a more detailed breakdown of industry figures is not available, and these are the only sources of data. The number of industries that we have selected for the quantitative analysis are selected on the basis of the following criteria: (i) national importance, i.e. rank of specific industries in national value added and employment; (ii) capital intensity. We

have attempted to select industries with varying capital intensity, nationally. We selected twenty industries which accounted for nearly 70 per cent of total manufacturing value added at national level in 1960-61. The structural ratios of these industries at national level are given in Table 9. It can be seen from the table that the industries selected here range from various food industries to cotton and jute textiles, drugs and pharmaceuticals, machinery, basic iron and steel industries and other heavy industries. Table 10 gives the regional disparity indices in earnings and value added in these selected industries. The following points may be noted from the table. (i) The average disparity index in earnings and value added covering all industries works out to be 25.88 and 22.76. (ii) Against this average the values of indices for specific industries differ. We may first note the industries in which the disparity indices of both earnings and value added are above the national average. These are edible oils, tea manufacturing, drugs and pharmaceuticals, iron and steel (metal), non-ferrous basic metal, electricity, gas and light distribution. (iii) In the following industries the regional disparity index in value added is much higher than in earnings: Electricity, gas and light distribution, iron and steel structurals, manufacture of motor cycles and bicycles, manufacture of motor vehicles, textile dyeing, art silk, drugs and pharmaceuticals, tea manufacturing, flour mills and sugar. Thus, for a number of industries, with varying capital intensity, the regional variation in value added is much higher than that in earnings. It can be seen from Table 9 that at national level average earnings are higher than the national average in the more capital intensive industries. In these industries, the scope for inter-regional variation in factor-mix may be more limited due to technological considerations. This can be one factor that reduces the range of inter-regional variation in the earnings in these industries. In Table 10, in the generation and distribution of electricity, railway rolling stock, manufacture of motor vehicles, iron and steel cast-

TABLE 9

STRUCTURAL RATIOS AT ALL INDIA LEVEL IN CAPITAL INTENSITY.  
AVERAGE EARNINGS AND VALUE ADDED PER WORKER IN SELECTED  
INDUSTRIES IN 1960-61 (in Rs)

Industry	Total capital per employed person	Average Earnings per Employed Person	Value Added per Employed Person
(1)	(2)	(3)	(4)
1. Sugar	11213	1543	3721
2. Edible Oils	7398	978	2872
3. Flour Mills	9225	1508	3500
4. Rice Mills	22902	554	1395
5. Tea Manufacturing	11314	1217	4022
6. Printing, Publishing & Allied	4435	2054	3184
7. Drugs & Pharmaceuticals	16013	2451	8841
8. Cotton Textiles	3657	1298	2951
9. Jute Textiles	3373	1281	1532
10. Art Silk	5255	1780	3107
11. Textile dyeing, bleaching, finishing and processing	4417	1649	2612
12. Textile Machinery	6053	1795	2723
13. Equipment for generation transmission and distribution of electricity	6880	1745	1714
14. Railway Rolling Stock	3507	1692	2561
15. Manufacturing of motor vehicles	12523	2563	5843
16. Manufacturing of motor cycles and bicycles	8414	2726	3503
17. Iron and steel	24237	3027	5203
18. Iron and steel (casting and forging)	3093	1360	1706
19. Iron and Steel Structural	7119	1777	2841
20. Non-ferrous Basic Metal Industries	28004	2531	7275
21. Electric Light and Power (Generation, transmission, and distribution of electric energy and gas manufacture and distribution)	52442	2420	7155

Source: Calculated from "Annual Survey of Industries", 1961, CSO, op.cit.

## REGIONAL INEQUALITY IN SELECTED INDIAN INDUSTRIES: 1961

	Earnings per Employed Person	Value Added per Employed Person
All Industries		
All India	25.88	22.76
1. Sugar	11.47	26.46
2. Edible Oils	37.29	38.86
3. Flour Mills	28.20	58.06
4. Rice Mills	32.50	45.88
5. Tea Manufacturing	42.90	64.83
6. Printing, Publishing and Allied Industries	27.23	33.25
7. Drugs and Pharmaceuticals	37.06	62.48
8. Cotton Textiles	26.40	23.46
9. Art Silk	23.90	51.53
10. Textile Dyeing	27.84	65.79
11. Textile Machinery	21.16	30.67
12. Generation and Distribution of Electricity	21.82	35.68
13. Railway Rolling Stock	23.67	29.67
14. Manufacture of Motor Vehicles	21.34	40.74
15. Manufacture of Motor Cycles and Bicycles	36.58	59.24
16. Iron and Steel (Metal)	34.59	47.54
17. Iron and Steel (casting and forging)	25.25	27.29
18. Iron and Steel Structural	24.85	41.97
19. Non-ferrous Basic Metal	43.99	44.05
20. Electricity, Gas and Light Distribution	33.53	77.47

Source: Calculated from "Annual Survey of Industries", 1961, CSO, op.cit.

Note: Jute Textiles is excluded here as the number of observations for this industry is very small.

ing and forgings, iron and steel structurals, textile manufacturing, this appears to be the case. In addition to average capital intensity of the industry, there are various other factors which may influence the inter-regional variation in earnings. Some of these are the strength of the trade unions in specific industries and also the availability of skilled manpower. Finally, the degree of industrialisation of the region is also an important factor in analysing the inter-regional dispersion of average earnings.

In analysing the regional differences in value added at industry level, we can emphasise the importance of various factors outlined above. One important factor that we have outlined above is the inter-regional variation in productivity or earnings due to inter-regional variation in the capital intensity in the same industry. The importance of this factor will vary between different industries on account of various factors considered above. These factors are the average capital intensity of the industry, the factors relating to the labour market conditions and the factors that affect the inter-regional movements of private capital.

In addition to the factors associated with inter-regional variation in capital intensity, we may also identify the other sources of inter-regional variation in productivity at the industry level. One important factor that occurs to us is the significance of the regional concentration of national output of a given industry. Thus, we can examine if the regional average value added per worker in a given industry is significantly related to the region's share in national output. The factors such as transport costs, access to market, proximity to the raw material producing areas, availability of skilled labour and the supply of entrepreneurship are important in analysing the location pattern of the industries over a period of time. In analysing the relation between the concentration and average productivity at a given point of time, we are testing the significance of the given agglomeration in industry in

explaining inter-regional differences in productivity. We can further state that the importance of this factor itself can vary among industries and over a period of time. In our quantitative analysis we can attempt to test the significance of these two identifiable factors in explaining inter-regional variation in earnings and productivity in the selected industries. Since the number of state observations for many industries is less than 10, we can confine the multiple regression analysis to the selected industries. We have chosen seven industries of national importance as well as those with varying average national capital intensity for these purposes. Secondly, for the rest of the industries for which we have calculated the disparity indices, we have to resort to the rank order correlations. Table 11 and Table 12 give the regression results for the selected industries. The explanatory variables used in the regression analysis may be expressed as follows:

Dependent Variable  $X_5$  is the log of average output per worker in  $i$ th region and in  $j$ th industry. The number of regional observations differ for each industry.

Dependent Variable  $X_6$  is the log of average earnings per worker in  $i$ th region and in  $j$ th industry.

Independent Variables are also logs of the following variables:

$X_7$  = log of total productive capital employed in Rs in  $i$ th region and in  $j$ th industry.

$X_8$  = log of percentage of total national value added in  $j$ th industry accounted by  $i$ th region.

The following conclusions can be reached from the results of the regression analysis:

(1) The significance of capital intensity factor in explaining regional differences in productivity varies among different industries. The capital intensity factor is significant in three industries, viz. chemicals, steel and textiles. However, in both steel and textiles there is multicollinearity between the capital intensity factor

TABLE 11

THE REGRESSION ANALYSIS OF REGIONAL VALUE ADDED PER WORKER IN SELECTED  
MANUFACTURING INDUSTRIES IN INDIA, 1960-61

Name of Industry	Dependent Variable	Average Productive Capital per Worker		Regional Percentage Share in National Value Added		R <sup>2</sup>	R <sup>-2</sup>	N
		Constant	X <sub>27</sub>	X <sub>8</sub>				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
1. Sugar	X <sub>5</sub>	2.162	0.331 (1.44)	0.116 (1.09)	0.48	0.31	9	
2. Sugar	X <sub>5</sub>	3.457		0.181 (1.74)*	0.30	0.20	9	
3. Flour Mills	X <sub>5</sub>	1.727	0.352 (0.98)	0.386 (3.04)*	0.59	0.47	10	
4. Flour Mills	X <sub>5</sub>	2.088	0.339 (0.66)		0.06	0.052	10	
5. Textiles	X <sub>5</sub>	2.180	0.344 (1.63)*	0.05 (1.21)	0.24	0.36	13	
6. Printing	X <sub>5</sub>	3.262		0.240 (4.91)*	0.65	0.62	15	
7. Printing	X <sub>5</sub>	2.114	0.354 (1.32)		0.11	0.05	15	

(continued)

Notes. Figures in brackets are t-ratios. \*, \*\* give significance at 0.05 and 0.10 level)

TABLE 11 (continued)

Name of Industry	Dependent Variable	Constant	$X_2$	$X_3$	$R^2$	$R^{-2}$	N
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
8. Printing	$X_5$	2.85	0.083 (0.58)	0.159 (3.82)*	0.58	0.51	15
9. Steel	$X_5$	-0.3809	0.948 (1.65)**	0.0507 (0.18)	0.42	0.28	11
10. Steel	$X_5$	3.251		0.357 (1.66)**	0.23	0.14	11
11. Steel	$X_5$	-0.656	1.022 (2.59)*		0.42	0.36	11
12. Power	$X_5$	3.090		0.247 (4.06)*	0.67	0.63	10
13. Power	$X_5$	2.042	0.273 (1.68)*		0.26	0.17	10
14. Power	$X_5$	2.756	0.077 (0.60)	0.225 (3.10)*	0.69	0.60	10
15. Chemicals	$X_5$	0.3754	0.871 (6.49)*	-0.022 (-0.24)	0.90	0.86	8
16. Chemicals	$X_5$	<b>0.4141</b>	0.858 (7.58)*		0.90	0.88	8

TABLE 12  
REGRESSION ANALYSIS OF REGIONAL AVERAGE EARNINGS PER WORKER IN SELECTED INDUSTRIES  
IN INDIA: 1960-61

Name of Industry	Dependent Variable	Average Regional Capital per Worker		Percentage Regional Share in National Value Added		R <sup>2</sup>	R <sup>-2</sup>	N
		Constant	X <sub>5</sub>	X <sub>6</sub>				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
1. Flour Mills	X <sub>6</sub>	3.022		0.121 (0.78)	-0.436	-0.72	10	
2. Flour Mills	X <sub>6</sub>	1.412	0.429 (1.01)		0.25	0.11	10	
3. Printing	X <sub>6</sub>	2.853	0.083 (0.58)	0.159 (3.82)*	0.58	0.51	15	
4. Chemicals	X <sub>6</sub>	3.28		0.106 (0.50)	0.040	0.011	15	
5. Chemicals	X <sub>6</sub>	0.594	0.686 (4.63)*		0.78	0.74	8	
6. Power	X <sub>6</sub>	3.180	0.025 (0.11)	0.473 (3.71)*	0.72	0.65	10	
7. Steel	X <sub>6</sub>	3.28		0.128 (2.46)*	0.40	0.33	11	

(continued)

TABLE 12<sup>i</sup> (continued)

Name of Industry	Dependent Variable	Constant	X <sub>7</sub>	X <sub>8</sub>	R <sup>2</sup>	R <sup>-2</sup>	N
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
8. Steel	X <sub>6</sub>	2.75	0.14		0.11	0.01	11
9. Sugar	X <sub>6</sub>	3.18		-0.01 (-0.24)	0.008	-0.13	9
10. Sugar	X <sub>6</sub>	2.80	0.090 (0.85)		0.09	-0.03	9

Notes. Figures in brackets are t-ratios.

t-ratios with \* are significant at 0.05 level.

and the concentration factor. Thus, it shows that the regions with higher capital intensity are also the regions with a higher share of the national output. In the chemical industry, however, the regional productivity differences are significantly explained by the regional differences in capital intensity. In printing and publishing, sugar and the flour mills, the regression coefficient of the capital intensity factor is not significant.

(2) From the seven industries taken here, the regression coefficients of the concentration factor are significant in sugar, flour mills, printing, steel and power. However, the general fit of the equation differs. The  $R^2$  is low in sugar, flour mills and steel. In chemicals and textiles, the regression coefficients are non-significant. Only in power and printing, and publishing do the regression coefficients of the concentration factor alone give significant  $R^2$ .

(3) Similarly, in Table 12 the significance of capital intensity in explaining the regional earnings can be established only in chemicals. In printing and publishing, power and steel the regression coefficients of the concentration factor are significant. In sugar, the coefficients of both these variables are non-significant. The above regression analysis presents a varying pattern on the significance of capital intensity versus the concentration factor in explaining the regional productivity differentials. Although there is some multicollinearity between the two variables, in many industries, one of the two factors appears to be more significant (chemicals, power). In addition, there are a few industries (textiles and sugar) in which both the factors appear to be non-significant and hence in these industries the factors not specified here may be more important. In the other industries such as flour mills, printing, publishing, the other factors not specified here may be important and inclusion of these may improve the fit. From the point of statistical fit, the equations on the value added give

better results than the average regional earnings. We may now extend our cross-sectional analysis to other industries. Table 13 gives the rank order correlations on all the twenty industries. These also include the seven industries analysed above.

The following conclusions can be drawn from the values of the rank order correlations.

(i) With regard to the rank association between the capital intensity and earnings we can conclude that, although the association is positive in all industries, it is significant only in seven industries. Except for edible oils, the industries in which it is significant are capital intensive industries. In these industries, it seems that higher earnings in particular regions are associated with higher capital intensity representing more mechanised methods of production.

(ii) The rank order correlations between the capital intensity and value added per employed person are significant and positive for eleven industries out of nineteen industries. Thus, the association between these two rank measures appears to be stronger in a larger number of industries as compared to earnings and capital intensity. The industries in which it is not significant are flour mills (neg), rice mills (neg), cotton textiles, railway rolling stock, textile bleaching, etc. The industries in which the rank correlation is significant only at 0.10 level are printing and publishing, art silk, textile machinery, generation and distribution of electricity, iron and steel (basic) and iron and steel castings and forgings (neg). The industries in which it is significant at 0.05 level are electric light and gas distribution, non-ferrous basic (metal), iron and steel structurals, manufacture of motor vehicles, edible oils and sugar.

(iii) The following conclusions can be drawn from the rank order correlations between the value added per employed person and regional manufacturing share in national manu-

TABLE 13

## RANK ORDER CORRELATIONS IN SELECTED INDIAN INDUSTRIES

Name of Industry	Average Capital per employed person and earnings per employed person	Regional Capital per employed person and value added per employed person	Value added per employed person & per- centage of net output accounted by its region	N = No. of obs.
(1)	(2)	(3)	(4)	(5)
Sugar	0.5667**	0.7000*	0.0167	9
Edible Oils	0.5990*	0.5605*	0.4891**	13
Flour Mills	0.4182	-0.2484	0.6000*	10
Rice Mills	0.2485	-0.2121	0.5394**	10
Tea Manufacturing	0.8215*	0.7500**	0.3572	7
Print, Publishing & Allied Industries	0.3518	0.4304**	0.7125*	15
Cotton Textiles	0.3658	0.3352	0.4671**	13
Art Silk	0.0477	0.5715**	-0.1607	8
Textile, Dyeing, Bleaching, etc.	0.0666	0.2334	0.8834*	9
Textile Machinery	0.6072*	0.5358**	0.8215*	7
Generation and dis- tribution of Electricity	0.5000	0.5239**	0.8572*	8
Railway Rolling Stock	0.2167	0.3334	0.6334*	9
Manufacture of motor vehicles	0.7500*	0.7858*	0.2143	8
Manufacture of motor- cycles	-0.1071	0.5358	0.9643*	8
Iron and Steel (Metal)	0.4728	0.5859*	0.4819 **	11
Iron and Steel (Castings & Forgings)	0.5239**	-0.5238**	0.6670**	8
Iron and Steel (Structurals)	0.6500*	0.7834*	0.4334	9
Non ferrous Basic (metal)	0.8858*	0.7715*	0.4858	6
Electric light and gas distribution	0.4849	0.6364*	0.6485*	9

\*Significant at 0.05 level

\*\*Significant at 0.10 level

From the 20 selected industries, jute textiles is excluded here as number of observations are too few. small.

facturing output. The rank order correlation is significant in twelve industries out of nineteen. The following industries do not have a significant association between the two measures: non-ferrous basic metals, iron and steel, manufacture of motor vehicles, art silk, tea manufacturing and sugar. The industries with 0.10 level of significance are as follows:-edible oils; rice mills; cotton textiles. The industries with 0.05 level of significance are: printing, publishing and allied industries, textile dyeing, bleaching, etc., generation and distribution of electricity, railway rolling stock, manufacture of motor cycles, iron and steel castings and forgings and electric light and gas distribution.

We may conclude as follows from the cross-sectional analysis of the extent of regional disparity at industry level and the explanatory factors in the regional inequality in earnings and productivity: Indian data presents a very interesting pattern of regional disparity at the industry level. The extent of regional disparity varies among the individual industries. However, we noted that, in a number of industries, the disparity index was found to be much higher in the value added as compared to that in regional earnings. The significance of the capital intensity factor was established only with reference to very few industries. In a larger number of industries, a stronger statistical association was found between the average regional value added and the region's manufacturing share in national value added. In addition, we also identified a number of industries in which both the above factors are statistically not significant. Most important among these are sugar and textiles. We may select a number of industries from our cross-sectional analysis, in which the concentration factor is not found to be significant and examine the disparity indices in these industries between 1961 and 1966. We shall pursue this with reference to the following industries in Section III: (1) cotton textiles; (2) art silk; (3) sugar; (4) tea manufacturing; (5) edible oils; (6) iron and steel (basic); (7) non-ferrous metal (basic); (8) machine tools.

SECTION IIITRENDS IN THE REGIONAL DISPARITY INDICES, PRODUCTIVITY LEVELS AND LOCATION PATTERN IN THE SELECTED MANUFACTURING INDUSTRIES IN INDIA, 1961 AND 1966

We examine in this section the trends in the disparity indices between 1961 and 1966 and we also examine the productivity levels and the location pattern in the selected industries.

Table 13 gives the estimates of regional disparity indices in the selected industries in 1961 and 1966.<sup>1</sup>

TABLE 13

REGIONAL DISPARITY INDICES  
IN SELECTED INDIAN INDUSTRIES: 1961-1966

	<u>Earnings</u>		<u>Value Added</u>	
	<u>Per Worker</u>		<u>Per Worker</u>	
	1961 - 1966		1961 - 1966	
	<u>Unweighted Coefficient of Variation</u>			
1. Cotton Textiles	26.40	32.27	23.46	32.95
2. Sugar	11.47	22.71	26.46	38.61
3. Edible Oils	37.29	44.94	38.86	39.94
4. Tea manufacturing	42.90	52.26	64.83	61.26
5. <del>Art Silk</del> <i>Art Silk</i>	23.90	30.28	51.53	50.05
6. Iron and Steel (basic)	34.59	38.74	47.54	50.13
7. Non-ferrous metal	43.99	42.94	44.05	47.32

It can be seen from the table that the unweighted coefficient of variation shows an increase in value in all the industries,

1. 1966 is the latest year of publication of Annual Survey of Industries.

In value added per worker there is an increase in disparity in all the industries except tea manufacturing and art silk. Table I4 gives the data on the productivity levels and the location pattern in these industries in 1961 and 1966. We may draw the following conclusions from the table:

(1) In cotton textiles, the share of the traditional centres of production, viz. Gujarat, Maharashtra and Madras remained nearly the same as compared to 1961. However, the productivity increases work out to be highest in the states of Gujarat, Maharashtra and West Bengal. In cotton textiles, if we compare the value added shares of these states in 1948, then there is some change in the location pattern.<sup>1</sup>

(2) In sugar, an interesting pattern of location and productivity can be noticed. Uttar Pradesh and Bihar, which are the main producers of sugar and accounted for as much as 55 and 18 per cent of the national value added in 1948, have reduced their respective shares in 1961 to 38.8 and 10.9 per cent respectively. The percentage shares of Maharashtra, Andhra, Madras and Punjab have increased. The productivity levels in sugar in 1961 and 1966 are much higher in these states as compared to Uttar Pradesh and Bihar, so that in this particular industry the location pattern appears to have shifted to the more industrialised states which have established high productivity levels.

(3) In tea manufacturing, also, the value added per worker is higher in West Bengal than in Assam in 1961. There is some change in the location pattern towards the higher share of West Bengal, although in 1966, value added per worker is below national average.

(4) In iron and steel, although the number of states producing iron and steel is large, Bihar and West Bengal alone account for 43 and 41 per cent of the total value added in 1961. In 1966, the value added share of a number of other states such as Orissa, and Madhya Pradesh increased along with a decline in the share of West Bengal. The productivity levels in the raw material based states are thus much higher than those in other states where the industry may be nominally existent.<sup>2</sup> Thus, for this industry high regional disparity arises due to the high productivity in the

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1. Thus, as compared to 70 per cent of value added in textiles accounted for by Maharashtra-Gujarat in 1948, the combined share of the two states in 1961 and 1966 is 59 per cent.

2. The figures of value added per worker in Bihar for 1966 appear to be overestimated.

TABLE 14

## TRENDS IN THE PRODUCTIVITY AND LOCATION PATTERN IN SELECTED INDIAN INDUSTRIES: 1961, 1966

State	Cotton Textiles			Regional		State	Sugar			Regional	
	Rupees		% Change	Manufacturing			Rupees		% Change	Manufacturing	
	Value Added Per Worker	1961		1966	Share 1961		1966	Value Added Per Worker		1961	1966
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Total	2951	3546	+20.0	100.0	100.0	Total	3721	4557	+22.4	100.0	100.0
Andhra	2307	1621	-30.3	1.1	1.0	Andhra	5732	6566	+14.5	8.5	10.1
Gujarat	3245	4263	+31.3	25.1	25.4	Bihar	2498	3446	+37.9	10.9	9.7
Kerala	2009	2200	+ 9.5	0.8	0.9	Madhya Pradesh	2873	2600	-10.5	1.9	2.1
Madhya Pradesh	2669	2629	- 1.5	5.3	4.7	Madras	5327	5519	+ 3.6	7.7	8.1
Madras	3335	3581	+ 7.3	15.2	13.3	Maharashtra	5286	6101	+15.4	18.8	18.3
Maharashtra	3132	4077	+30.1	34.0	33.9	Mysore	5386	3852	-39.8	6.4	2.6
Mysore	2419	2892	+19.5	3.1	3.5	Punjab	4628	6298	+36.0	4.1	5.1
Punjab	3231	3228	- 0.9	1.3	0.6	Uttar Pradesh	3108	4668	+50.1	38.8	38.6
Rajasthan	1931	2689	+39.2	0.8	7.4	Assam, Gujarat	2846	3136	+10.0	2.5	1.3
Uttar Pradesh	2688	2347	-12.7	5.0	7.6	Kerala, Orissa					
West Bengal	2026	2902	+43.2	4.0	5.6	Rajasthan					
Delhi	4335	4605	+ 6.9	3.0	4.2	West Bengal					
Assam	2802	2605	- 8.6	0.4	0.9	Gujarat					
Bihar						Kerala					
Orissa						Orissa					

(continued)

TABLE 14 (continued)

<u>Edible Oils</u>						<u>Tea Manufacturing</u>					
State	Rupees Value Added Per Worker		% Change	Regional Manufacturing Share		State	Value Added Per Worker		% Change	Regional Manufacturing Share	
	<u>1961</u>	<u>1966</u>		<u>1961</u>	<u>1966</u>		<u>1961</u>	<u>1966</u>		<u>1961</u>	<u>1966</u>
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Total	2872	4494	++56.4	100.0	100.0	Total	4824	4022	-80.0	100.0	100.0
Andhra	1759	4145	+135.6	4.6	12.9	Assam	3980	3884	-14.0	56.8	48.5
Bihar	1116	2983	+167.2	1.4	0.3	Kerala	7212	4994	-69.0	5.9	17.2
Gujarat	2761	3854	+ 39.6	11.8	9.5	Madras	7212	9190	+127.0	10.8	13.2
Kerala	2301	2806	+ 21.9	0.5	2.5	Uttar Pradesh	777	1509	+194.0	3.4	1.3
Madhya Pradesh	1265	2261	+ 78.7	1.9	2.0	West Bengal	4739	3136	-66.0	16.5	27.0
Madras	4308	5827	+ 35.2	5.9	12.2	Tripura	758	1308	+159.0	2.4	0.1
Maharashtra	4373	5929	+ 35.5	41.7	27.8	Others	8951	9394	+105.0	3.8	3.2
Mysore	2990	1119	- 37.4	7.1	9.0						
Punjab	2340	4967	+113.2	2.7	5.8						
Rajasthan	2495	2191	- 12.2	0.8	0.8						
Uttar Pradesh	1533	3408	+122.3	10.7	14.0						
West Bengal	3253	5423	+ 53.9	9.0	11.7						

(continued)

Table I4

Non-Ferrous Basic Metal						Iron and Steel (Basic)					
State	Value Added Per Worker		% Change	Regional Manufacturing share		State	Value Added Per Worker		% Change	Regional Manufacturing Share	
	1961	1966		1961	1966		1961	1966		1961	1966
(I)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Bihar	7065	19244	-	18.8	11.8	Andhra	-	6257	-	-	1.9
Gujarat	-	7955	-	-	1.8	Bihar	5646	14410	155.2	45.2	39.1
Madras	5719	5924	-	1.3	14.3	Gujarat	1214	6353	423.3	0.9	4.0
Maharashtra	7918	10460	-	30.9	14.4	Kerala	2868	2062	-28.1	0.6	1.5
Rajasthan	2687	4882	-	0.6	2.7	Madhya Pradesh	2756	8606	212.2	0.6	4.5
Uttar Pradesh	-	3597	-	-	17.3	Madras	2773	3376	21.7	4.0	1.5
West Bengal	5948	16035	-	32.7	32.8	Maharashtra	4523	8240	82.1	1.1	3.8
Others	=2977	6274	-	05.4	4.9	Orissa	-	7318	-	0.7	11.9
						Punjab	5252	4586	-12.7	1.7	9.1
						Rajasthan	2679	2292	-14.5	0.7	2.5
						Uttar Pradesh	1775	3408	+92.0	1.7	1.1
						West Bengal	6350	5083	-20.0	41.9	19.0
						Delhi	2370	4662	+96.7	0.5	0.3
						Haryana	-	5080	-	-	0.5
						Others	2392	10274	+329.5	0.4	5.2
<u>ART SILK</u>											
	Value Added Rs		Regional Manufacturing share								
	1961	1966	1961	1966							
Total	3107	8267	-	-							
Gujarat	2743	4757	18.7	7.7							
Madhya Pradesh	7431	8623	6.6	4.1							
Madras	2902	6755	4.6	5.4							
Maharashtra	4752	11040	41.0	60.0							
Mysore	1013	933	0.2	0.3							
Punjab	2290	3882	3.8	1.5							
Uttar Pradesh	3191	4316	-	1.0							
West Bengal	3476	5472	11.8	10.1							
Others	-	9945	13.0	9.8							

raw material based states at which bulk of output is concentrated and others where the scale of industry is small.

(5) In edible oils, there is some shift in the value added shares of different states. In this industry, Gujarat and Maharashtra have reduced their shares of value added. Several states such as Madras, Andhra, Madhya Pradesh, Uttar Pradesh, Punjab and West Bengal increased their shares of value added. The productivity levels in 1966 are above national average in Madras, Andhra, Maharashtra, Punjab and West Bengal. In this industry Gujarat which was one of the important producers of the product appears to have lost its position both in value added share and the productivity level.

(6) The general conclusion is that the increase in the disparity index that we noted for these selected industries is accompanied by a number of factors affecting the level and change of productivity and the value added shares of various states. In a number of industries, the changes in the value added shares have occurred towards higher shares of the states with high levels or higher change in productivity. These industries are cotton textiles, sugar, iron and steel, edible oils and art silk. This meant that in a number of industries high income states had a decline in their share of value added. On the other hand, in sugar and art silk the high income states of Maharashtra and Madras have gained a positive increase in their share of value added. What we have analysed here is the observed pattern at the level of industry and region. We have not tried to identify various demand and supply factors that affect the industries differently at national level and their impact on regional dispersion of value added. In that sense, we have outlined a description of pattern in this section rather than identify causal factors behind the regional and national changes.

## CONCLUSIONS

We may now summarise the conclusions of this chapter as follows: (1) High regional disparity in the aggregate regional income per worker in manufacturing is attributable to two basic factors, viz. significant regional differences in the industrial structures and the regional differences in productivity in the various sub-sectors of the manufacturing industry. The regional productivity levels are higher than the national average in high income states in all the sub-sectors of the manufacturing industry. (2) A cross-sectional analysis of regional disparities in the selected industries in the large industry sector shows that there is considerable regional disparity in earning and productivity in different industries. The significance of capital intensity and the concentration of manufacturing in explaining the inter-regional differences in productivity and earnings varied for the selected industry groups. It is difficult to generalise here; however it is important to note that we found three types of industries: (a) The industries in which neither of the two factors were found to be significant; (b) those in which either of the two factors was more significant; (c) those in which there is a multi-collinearity between the two factors. (3) A comparison of the values of regional disparity indices as compared between 1961 and 1966 shows that while there is a small increase in the regional disparity in the overall index for the factory sector, there is a larger increase in the disparity in the selected industries. In addition, there is some shift in the location pattern of these industries. In cotton textiles and sugar there are long term changes in the location pattern. In edible oils, art silk and tea manufacturing, also, the location pattern has shifted to high productivity regions. In the iron and steel industry, the location pattern has shifted, due to emergence of new centres of production resulting from large public sector investments in Orissa and Madhya Pradesh.

We can conclude from our analysis that from the point of view of reducing regional disparities in the manufacturing sector, we need to distinguish the role of two factors. One is possibilities of increasing industrialization in the less industrialized states so as to improve their industrial structure. Secondly, within the existing large industry itself, the causes of low productivity and scope for policy measures need to be examined at the industry level.

BACKGROUND TABLE (CHAPTER V)

ESTIMATES OF AVERAGE REGIONAL CAPITAL EMPLOYED, EARNINGS, VALUE ADDED PER WORKER AND REGIONAL SHARES  
IN NATIONAL VALUE ADDED IN SELECTED INDUSTRIES IN INDIA IN 1961, IN RUPEES

<u>SUGAR, INDUSTRY NO. 207-1</u>					<u>EDIBLE OILS, INDUSTRY NO. 209-2</u>				
State	Total Pro- ductive Capital	Earnings	Value Added	% share in Value Added	State	Total Pro- ductive Capital	Earnings	Value Added	% share in Value Added
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
All India	11213	1543	3721	100.0	All India	7396	978	2872	100.0
Andhra	13257	1723	5732	8.53	Andhra	6192	582	1759	4.6
Bihar	5344	1430	2498	10.95	Bihar	3987	483	1116	1.4
Madhya Pradesh	8122	1254	3873	1.98	Gujarat	5344	644	2761	11.8
Madras	11160	1622	5327	7.77	Kerala	7796	920	2309	0.5
Maharashtra	23474	1738	5286	18.86	Madhya Pradesh	7502	700	1265	1.9
Mysore	15986	1561	5368	6.41	Madras	22124	1896	4308	5.9
Punjab	13818	1353	4628	4.14	Maharashtra	8349	1344	4373	41.7
Uttar Pradesh	88683	1541	3108	38.83	Mysore	6083	658	2990	7.1
Others	16012	1217	2846	2.49	Punjab	5384	896	2340	2.7
					Rajasthan	10193	868	2495	0.8
					Uttar Pradesh	5301	912	1533	10.7
					West Bengal	9928	997	3523	9.0
					Others	6108	1038	2901	1.5

## BACKGROUND TABLE (CHAPTER V) (continued)

FLOUR MILLS, INDUSTRY NO. 205-1					RICE MILLS, INDUSTRY NO. 205-2				
State (11)	Total Pro- ductive Capital (12)	Earnings (13)	Value Added (14)	% share in Value Added (15)	State (16)	Total Pro-ductive Capital (17)	Earnings (18)	Value Added (19)	% share in Value Added (20)
All India	9225	1506	3500	100.0	All India	2902	554	1395	100.0
Bihar	7442	912	2207	3.9	Andhra	2356	549	2474	27.8
Gujarat	9676	1270	3343	4.8	Bihar	2118	374	849	1.7
Madhya Pradesh	14467	1372	1662	1.7	Kerala	2911	525	933	0.6
Madras	16991	1510	1343	2.2	Madhya Pradesh	3944	500	1805	15.8
Maharashtra	8490	2348	7893	39.9	Madras	2588	621	1530	5.8
Punjab	8212	1337	1734	6.1	Orissa	3579	589	1330	10.9
Uttar Pradesh	4950	913	2913	15.0	Punjab	5322	617	1034	0.3
West Bengal	10623	1713	2718	15.1	Uttar Pradesh	5708	549	391	1.3
Delhi	10742	1575	2927	6.3	West Bengal	2721	563	1015	36.2
Others	10940	1172	4243	4.4	Others	3749	613	853	0.4

BACKGROUND TABLE (CHAPTER V) (continued)

TEA MANUFACTURING, INDUSTRY NO. 209-4

State (21)	Total Pro- ductive Capital (22)	Earnings (23)	Value Added (24)	% share in Value Added (25)
All India	11314	1217	4022	100.0
Assam	<del>11677</del>	1183	3884	56.8
Kerala	7184	978	4994	5.9
Madras	11695	1529	9190	10.8
Uttar Pradesh	4846	866	1509	3.4
West Bengal	9979	1244	3136	16.5
Tripura	3459	541	1308	2.4
Others	11843	2333	9394	3.8

PRINTING AND PUBLISHING, INDUSTRY NO. 280-1

State (26)	Total Pro- ductive Capital (27)	Earnings (28)	Value Added (29)	% share in Value Added (30)
All India	44366	2064	3184	100.0
Andhra	3551	1155	1967	2.6
Assam	3683	2172	3273	1.1
Bihar	3561	1824	2639	2.9
Gujarat	5974	1595	3067	3.3
Kerala	2017	1620	2136	2.1
Madhya Pradesh	4149	1253	1547	1.6
Madras	4493	2150	3742	16.5
Maharashtra	5145	2355	4147	32.2
Mysore	3563	1638	3118	1.2
Orissa	5569	1271	1426	0.5
Punjab	6284	1939	2513	3.2
Rajasthan	3074	1480	1427	0.7
Uttar Pradesh	3124	1575	1866	6.0
West Bengal	4162	2218	3155	16.1
Others	5235	3105	3975	9.2

## BACKGROUND TABLE (CHAPTER V) (continued)

COTTON TEXTILES, INDUSTRY NO. 231-1					ART SILK, INDUSTRY NO. 231-5				
State	Total Pro- ductive Capital	Earnings	Value Added	% share in Value Added	State	Total Pro- ductive Capital	Earnings	Value Added	% share in Value Added
(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)
All India	36 67	2978	2951	100.0	All India	5256	1780	8107	100.0
Andhra	4183	1631	2307	1.1	Gujarat	4698	1487	2743	18.7
Gujarat	4400	3186	3245	25.1	Madhya Pradesh	3729	2003	7431	6.6
Kerala	2879	1783	2009	0.8	Madras	7581	1396	4752	4.6
Madhya Pradesh	2541	2517	2669	5.3	Maharashtra	4667	2069	2901	41.0
Madras	4736	2731	3335	15.2	Mysore	1876	871	1013	0.2
Maharashtra	3332	3609	3132	34.0	Punjab	2039	1546	2290	3.8
Mysore	3421	1783	2419	3.1	West Bengal	5263	1310	3191	11.8
Punjab	5591	2352	3231	1.3	Others	9088	1882	3496	13.0
Rajasthan	3367	1774	1931	0.8					
Uttar Pradesh	3201	2381	2688	5.0					
West Bengal	3299	2162	2026	4.0					
Others	2018	1501	2802	3.4					

BACKGROUND TABLE (CHAPTER V) (continued)

TEXTILES, BLEACHING, DYEING, ETC.

MANUFACTURE OF MOTOR VEHICLES, INDUSTRY NO. 383

State (41)	Total Pro- ductive Capital (42)	Earnings (43)	Value Added (44)	% share in Value Added (45)	State (46)	Total Pro- ductive Capital (47)	Earnings (48)	Value Added (49)	% share in Value Added (50)
All India	4417	1649	2812	100.0	All India	12523	2563	5643	100.0
Andhra	4602	535	1247	0.6	Madras	13065	2759	6734	15.0
Gujarat	10308	1336	7232	12.6	Maharashtra	15090	2716	5748	29.3
Kerala	9056	1484	2854	4.6	Mysore	15032	2406	10682	8.5
Madras	7777	1383	2052	4.0	Punjab	8747	1619	5078	1.6
Maharashtra	3302	1856	2753	67.3	West Bengal	17531	2566	6790	15.2
Punjab	4044	1374	2339	6.2	Delhi	2930	1456	2970	0.3
Uttar Pradesh	8726	1059	1506	2.2	Others	8998	2436	3292	23.1
West Bengal	2789	1064	2083	2.3					
Others	8026	1003	1434	0.2					

BACKGROUND TABLE (CHAPTER V) (continued)

MANUFACTURE OF MOTOR CYCLES AND BICYCLES,  
INDUSTRY NO. 385

State (51)	Total Pro- ductive Capital (52)	Earnings (53)	Value Added (54)	% share in Value Added (55)
All India	8414	2726	3603	100.0
Madras	10837	2333	6732	34.3
Maharashtra	7745	2738	3046	17.0
Punjab	5414	2004	2865	14.2
Uttar Pradesh	4660	4099	1846	4.4
West Bengal	3235	2394	4387	24.5
Delhi	1348	1470	530	1.2
Others	11118	1339	2327	4.0

IRON AND STEEL (BASIC), INDUSTRY NO. 341-1

State (56)	Total Pro- ductive Capital (57)	Earnings (58)	Value Added (59)	% share in Value Added (60)
All India	24237	3027	5203	100.0
Bihar	34628	4119	5646	45.2
Gujarat	3903	1272	1214	0.9
Madhya Pradesh	18146	1139	2756	0.6
Madras	9505	2231	2773	0.6
Maharashtra	6743	2729	4523	4.0
Punjab	4996	2050	2678	1.1
Rajasthan	6295	1701	5252	0.7
Uttar Pradesh	4293	2198	1775	1.7
West Bengal	24021	2261	6350	41.9
Delhi	2727	2100	2370	0.5
Others	7959	2137	2392	0.4

BACKGROUND TABLE (CHAPTER V) (continued)

<u>TEXTILE MACHINERY</u>					<u>GENERATION AND DISTRIBUTION OF ELECTRICITY INDUSTRY NO. 511</u>				
State (61)	Total Pro- ductive Capital (62)	Earnings (63)	Value Added (64)	% share in Value Added (65)	State (66)	Total Pro- ductive Capital (67)	Earnings (68)	Value Added (69)	% share in Value Added (70)
All India	6053	1795	2723	100.0	All India	6860	1745	1714	100.0
Gujarat	4627	1309	2410	12.8	Kerala	3367	1813	3614	3.7
Madhya Pradesh	6587	1958	1514	5.2	Madras	5097	1560	2826	11.2
Madras	3369	1404	2326	13.4	Maharashtra	8100	2294	4506	31.2
Maharashtra	7214	2180	3161	33.1	Mysore	9045	1712	3079	11.0
Uttar Pradesh	826	1785	1752	0.8	Punjab	4885	962	1779	0.4
West Bengal	8773	2174	3831	26.7	Uttar Pradesh	7205	1749	1927	2.5
Others	4763	1280	1695	2.5	West Bengal	7007	1567	4449	37.2
					Others	1596	1381	1710	2.1

BACKGROUND TABLE (CHAPTER V) (continued)

RAILWAY ROLLING STOCK, INDUSTRY NO. 382-2

IRON AND STEEL (CASTING AND FORGING),  
INDUSTRY NO. 341-3

State (71)	Total Pro- ductive Capital (72)	Earnings (73)	Value Added (74)	% share in Value Added (75)	State (76)	Total Pre- ductive Capital (77)	Earnings (78)	Value Added (79)	% share in Value Added (80)
All India	3507	1962	2561	100.0	All India	3093	1360	1706	100.0
Assam	1967	1835	1835	2.0	Bihar	4514	1786	1349	10.7
Bihar	4540	1306	958	1.1	Gujarat	2941	1793	2076	4.1
Gujarat	2488	1646	2068	2.5	Madras	16901	1558	785	0.2
Maharashtra	3334	2093	2156	13.2	Maharashtra	3586	1797	2329	22.0
Punjab	1201	1599	1976	2.9	Mysore	2458	965	1624	1.7
Rajasthan	3185	1782	2069	6.9	Punjab	4173	1746	1380	0.8
Uttar Pradesh	1185	1633	1776	12.1	West Bengal	2766	1205	1662	57.5
West Bengal	4066	2285	3441	56.6	Others	2582	859	1656	3.1
Others	3184	851	1990	2.4					

BACKGROUND TABLE (CHAPTER V) (continued)

IRON AND STEEL (STRUCTURALS),  
INDUSTRY NO. 341-4

NON-FERROUS BASIC METAL, INDUSTRY NO. 342

State (81)	Total Pro- ductive Capital (82)	Earnings (83)	Value Added (84)	% share in Value Added (85)	State (86)	Total Pro- ductive Capital (87)	Earnings (88)	Value Added (89)	% share in Value Added (90)
All India	7119	1777	2841	100.0	All India	29004	2631	7276	100.0
Madras	6694	1368	3416	12.1	Bihar	18358	2820	7065	18.8
Maharashtra	7936	2424	3628	46.1	Madras	5342	1083	5710	1.3
Mysore	8823	1593	2603	4.0	Maharashtra	9651	2073	7918	30.9
Orissa	2405	1171	1165	0.5	Rajasthan	2943	1194	2687	0.6
Punjab	4307	1357	1456	3.8	West Bengal	43542	2754	5948	32.7
Uttar Pradesh	6127	1095	1189	4.4	Others	58889	4054	12977	15.4
West Bengal	6991	1646	3189	21.6					
Delhi	9541	1424	3833	1.5					

BACKGROUND TABLE (CHAPTER V) (continued)

ELECTRIC LIGHT AND GAS DISTRIBUTION  
INDUSTRY NOS. 511 and 512

DRUGS AND PHARMACEUTICALS, INDUSTRY NO. 319-5

State (91)	Total Pro- ductive Capital (92)	Earnings (93)	Value Added (94)	% share in Value Added (95)	State (96)	Total Pro- ductive Capital (97)	Earnings (98)	Value Added (99)	% share in Value Added (100)
All India	52442	2420	7155	100.0	All India	16013	2451	8841	100.0
Andhra	19695	1100	1467	0.5	Bihar	7131	1231	8450	1.2
Bihar	12030	2241	10010	9.7	Gujarat	9437	2256	10783	18.2
Gujarat	81441	2656	14149	15.1	Madras	9116	1708	4929	2.0
Madhya Pradesh	65073	1432	4611	4.9	Maharashtra	23170	3281	12258	62.3
Maharashtra	67337	2819	7778	20.3	Punjab	2672	1212	2291	0.4
Punjab	15730	1565	2611	3.6	Uttar Pradesh	2293	1357	1764	1.2
Rajasthan	20136	1391	2051	1.2	West Bengal	7406	1723	4089	10.7
Uttar Pradesh	28514	1434	4678	13.0	Others	14836	7390	7254	3.9
West Bengal	46338	3357	5936	24.0					
Others	26984	2511	2042	7.6					

Calculated from sources: "Annual Survey of Industries", 1961, Central Statistical Organization, Government of India, New Delhi, Vol. I-X.

Note: (1) Due to the rounding effect some of the percentages do not add up to 100 per cent.

(2) The industry number refers to the CSO classification of industries.

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State	Value Added Per Worker	Earnings Per Worker	Productive Capital Per Worker	% Regional Share in National value added
	(1)	(2)	(3)	(4)
Total	1532	1281	3337	-
Andhra	1340	1704	3233	3.2
Uttar Pradesh	1795	1765	3709	2.0
West Bengal	1589	1296	3270	94.7
Assam				
Bihar	0612	1097	1732	0.2
Uttar Pradesh				

CHAPTER VIREGIONAL DUALISM IN MANUFACTURING AND THE TRENDS IN PUBLIC AND PRIVATE SECTOR INVESTMENTS IN INDIA

We analysed in Chapter V the regional disparities in the value added per worker in the manufacturing sector at various levels. We also attempted to quantify the significance of the 'industrial structure' effect and 'region' effect as the two identifiable sources of regional levels of manufacturing income in India. We considered 'industrial structure' effect as the most significant source of variation in the level of manufacturing income. An analysis of regional disparities in the various sub-sectors of manufacturing and the analysis of selected industries offered some insight into the explanatory factors in regional differences in productivity at sub-sectoral and industry level. These data mainly related to the private sector manufacturing, except in a few industry groups such as iron and steel, etc. In considering the policy measures to induce industrialisation in low income regions, we need to consider the role of private and public sector investment separately for the following reasons: (1) The criteria governing the location of private and public sector investment are different. (2) In India, although the proportion of public sector investment to total manufacturing investment is smaller than that of private sector investment, the public sector investment has gone to the key sectors of the economy. Private sector investment has responded to the new opportunities created by the large public sector investment in manufacturing.

The roles of the public and private sectors in industrial planning have been succinctly put by R.K.Hazari as follows:- To quote,

"The Indian economy is an amalgam of various elements. The public sector accounts for less than 20 per cent of national income though its share in the new investments is

considerably larger. In 1950-51 the contribution of public sector to the output of (organised) industrial manufactures was less than 2 per cent; this contribution rose to about 8 per cent in 1960-61 and should have exceeded 20 per cent at the end of the Third Plan. This improvement notwithstanding, the general picture is one of an economy in which the private sector (monetised and non-monetised) accounts for the bulk of output, income and savings."

He further adds that

"In a mixed economy, with a relatively small but fast growing public sector in industrial production and a large but not so fast growing private sector subject to various administrative controls, the allocation of resources is guided by a combination of market forces and administrative directives. Since the private sector generates resources which are a common pool upon which both public and private sectors draw, and since economic activity takes place in a traditionally free environment, it is obvious that the market mechanism is, in fact, of greater importance than administrative fiat."<sup>1</sup>

The share of public and private sectors in gross fixed investments in organised industry and mining is brought out in the following table.

TABLE 1

SHARE OF PUBLIC AND PRIVATE SECTORS IN GROSS FIXED INVESTMENTS IN ORGANISED MANUFACTURING AND MINING

	Public Sector	Private Sector	Total
First Plan	13.9	86.1	100
Second Plan	49.3	50.7	100
Third Plan	47.2	52.8	100

Source: Planning Commission, The Fourth Five Year Plan, A Draft Outline, 1966.

Rao, S.K., makes the following observation regarding the role of public and private sector investment:

1. Hazari, R.K., "Industrial Planning and Licensing Policy, Final Report", Government of India Planning Commission, 1967.

"The role of the public sector in India's industrial growth is not adequately reflected in the respective quantities of investment undertaken by public and private sectors. The public sector's investments have gone to such key sectors as iron and steel, heavy engineering aeronautics, etc., which have high backward and forward linkages. As a result, private investment was considerably stimulated. The Indian market has come to be described as a seller's market - such were the opportunities for profit generated by the industrial expansion with the public sector investments playing a key role. In view of this, it is all the more surprising that the pattern of industrial growth across regions tends to conform to the Myrdal-Hirschman thesis".<sup>1</sup> V. Nath points out that the large investments in manufacturing in the public sector in the less industrialised states have failed to attract substantial private sector investments around these new growth points, and thus the objective of spearheading the private investment in these new centres had failed to materialise.<sup>2</sup>

We need to examine the specific trends in private and public sector investments and then analyse the relevance of the various factors mentioned above. Some data on the trends in the private sector investment are made available through the data before the industrial licensing committee. However, as we shall discuss presently, this covers only a part of the total private sector investment. As we saw in Chapter V, both nationally and regionally private sector's industrial activity in the small enterprises and the part of the factory sector not covered by the licensing system are important. However, we do not have regional data on the trends in these components and hence we shall analyse the data covered by the licensing committee and then indicate their relevance for the rest of the private sector investment.

The regional distribution of public sector investment is available only for a few financial years and we shall make use of these figures to indicate the spatial distribution of public sector investments.

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1. Rao, S.K., op.cit., p.246,248.
  2. See Nath, V., "Regional Development in India Planning", Economic and Political Weekly, Annual Number, Jan. 1970.

Given these limitations of the availability of data, we shall proceed in this chapter as follows: a) we shall first examine the regional distribution of public sector investment, and then analyse the locational objectives under planning and consider the various factors that would influence the regional growth effects of the given public sector investments; b) we shall then analyse the trends in the private sector investment in terms of three components, viz. the regional distribution of total private sector investment over the given time period, the industrial

and the 'linguistic' distribution of the private sector investment. We will then attempt to find a relation between the private sector investment and the public sector investment and outline some of the factors that appear to be important in this regard. Our emphasis in this chapter is to highlight various issues which have bearing on regional policy measures to the low income regions. Table 2 gives the spatial distribution of public sector investment in 1962-63, 1965-66 and 1968-69. The <sup>combined</sup> shares of six low income regions (Orissa, Bihar, Madhya Pradesh, Uttar Pradesh, Rajasthan and Andhra) in the total public sector investment for the three years amount to 64.6, 49.5 and 42.7 per cent respectively.<sup>1</sup> The high income states except West Bengal have not received a higher percentage of the public sector investment. The spatial distribution of investment can be better understood if we examine the sectoral distribution of the total investment. This is given in Table 3. The following points can be noted from the table: In 1962-63, 49, 13 and 9 per cent of total investment went to steel, engineering and chemicals. However, the percentage share of steel in total investment declined in 1968-69 from 37 per cent to 33 per cent in 1965-66. In engineering, the percentage share rose from 13 per cent to 21 and 24 per cent for the respective years. Thus, we can now see from Table 2 that Orissa and Madhya Pradesh, which received 43 per cent of total public sector investment in 1962-63, registered a decline in the later years, as these were the states in which new steel complexes were established. This applies

TABLE 2

SPATIAL DISTRIBUTION OF PUBLIC SECTOR INVESTMENT  
IN INDIA: 1962-63, 1965-66, 1968-69

S. No. Regions/States	1962-63		1965-66		1968-69	
	Gross Fixed Investment %		Gross Fixed Investment %		Gross Fixed Investment %	
NORTHERN						
1. Delhi	5.8	0.47	33.4	1.48	12.0	0.3
2. Himachdal Pradesh	0.6	0.05	0.1	0.004	1.7	-
3. Punjab	31.8	2.60	39.0	1.73	32.6	0.9
4. Haryana	-	-	-	-	7.1	0.2
EASTERN						
5. Assam	17.1	1.40	27.9	1.24	64.1	1.9
6. Bihar	177.5	14.52	324.1	14.44	621.2	18.0
7. Orissa	239.6	19.59	290.4	12.93	423.2	12.2
8. West Bengal	217.1	17.75	329.3	14.66	411.4	11.9
CENTRAL						
9. Madhya Pradesh	264.8	21.65	440.0	17.77	543.2	15.7
10. Rajasthan	1.8	0.15	4.2	0.18	27.2	0.8
11. Uttar Pradesh	2.0	0.16	49.7	2.21	137.0	4.0
SOUTHERN						
12. Andhra Pradesh	8.8	0.72	45.6	2.03	86.9	2.5
13. Kerala	2.1	0.17	38.1	1.70	101.4	2.9
14. Tamil Nadu	93.0	7.60	174.6	7.78	262.2	7.6
15. Mysore	40.1	3.28	55.5	2.47	79.6	2.3
WESTERN						
16. Gujarat	0.3	0.02	26.6	1.8	86.7	2.5
17. Maharashtra	22.7	1.86	60.1	2.70	100.9	2.9
18. Gross Block of Shipping, Aviation, Trading, etc. not identifiable to any particular region and State and Union Territories not covered above	98.0	8.01	302.4	13.50	464.7	13.4
<b>TOTAL</b>	<b>1223.1</b>	<b>100.0</b>	<b>2245.0</b>	<b>100.0</b>	<b>3463.1</b>	<b>100.0</b>

Note: Some of the figures may not add up to 100.0, due to rounding.

Source: "A Handbook of Information on Public Enterprises", Bureau of Public Enterprises, Ministry of Finance, New Delhi, 1970.

TABLE 3

SECTORAL DISTRIBUTION OF INVESTMENT (Rs in crores)

Sector	1962-63		1968-69	
	Investment	%	Investment	%
(1)	(2)	(3)	(4)	(5)
1. Steel	724	49.23	1,305	33.44
2. Engineering	198	13.46	960	24.60
3. Building and Repairing Ships	9	0.61		
4. Chemicals	135	9.16	421	10.80
5. Petroleum	110	7.47	403	10.33
6. Mines & Minerals	106	7.19	299	7.66
7. Avistion and Shipping	80	5.48	155	3.97
8. Trading	-	-	268	6.87
9. Miscellaneous	41	2.76	84	2.15
10. Financial Institutions	6	4.64	7	0.18
<b>TOTAL</b>	<b>1409</b>	<b>100.00</b>	<b>3,902</b>	<b>100.00</b>

Source: "A Handbook on Public Enterprises", op.cit. p.5.

to the investment shares of Bihar and West Bengal as well, which received investments in both steel and engineering.

The next question that arises is what can we say regarding the factors governing the location of public sector plants in an economy like India's? Location of public projects has been one of the very sensitive issues creating long drawn battles between various states. We do not have the data of feasibility studies of alternative sites in choosing the specific locations. Given the concentration of public sector investment in key capital intensive sectors of steel engineering, chemicals and petroleum, we can presume that techno-economic considerations are bound to be of paramount importance.

1

To quote the Third Five Year Plan, "As regards the diffusion of industrial activity, so far as the larger industries are concerned, economic and technological considerations are always important and in practice only marginal deviations are feasible. In the location of public sector projects, the claims of relatively backward areas have been kept in view, wherever this could be done without giving up the essential technical and economic criteria. The location of several projects like steel plants has been determined on the basis of expert study and on economic considerations."

Given the spatial and sectoral distribution of public investment, what can we say regarding the likely regional growth effects of these investments? The role of public sector investment is emphasised by Hirschman, both in his strategy of unbalanced growth and the spatial incidence of growth where he envisages the concentrated public investments in key sectors with high forward and backward linkages. Such investments can act as inducements to further private investment in the industries related to the key sector by way of linkages. In the literature on the backward regions in developed countries, also, the role of the public sector investment is emphasised in various forms. Although we shall not go into "the

1. "The Third Five Year Plan of India", Government of India, Planning Commission, 1961, p.145.

growth centre" concept as advocated for the backward regions in the developed countries, we can state that the concept is essentially based on the expected primary and secondary growth effects of the large public sector investment and its impact on creating further investment opportunities for the private investment. Further, the "growth centre" concept as applied in developed economies has a specific regional objective, i.e. the size and the form of investment is oriented to attain certain desired regional objectives and is also supported by a number of other measures that further induce the regional growth in the specific region.

While considering the possibilities of large public sector investments in the backward states in India spearheading the growth around them, we have to remember that these specific investments are incidental to the other national objectives. Neither size or form of the investment is determined out of specific regional orientation. Given this fact, we can summarize some of the factors that will influence the secondary growth effects of the primary investments. i) Since the bulk of the public sector investment is in highly capital intensive industries, the direct employment is likely to be low. In addition, the direct demand for local labour may be influenced by the technical nature of the projects. Although local unskilled and semi-skilled labour may be recruited in the construction phase, demand for such labour will be limited in the production phase. For example, in the steel projects at Bhilai, Rourkela and others, the staff in the skilled categories is mostly recruited from all over India. Hence, in terms of employment, the regional effects are likely to be higher, in the construction phase. This is the phase, also, in which demand for local labour may increase due to the construction activities ancillary to the main project. These include building new roads, building the new townships along with the residential and other amenities for the staff.

ii) In terms of the increased demand for the products linked to the basic investment by way of backward or forward

linkage, we can say that this will be affected by the existence of such industries in the region and the import content of the primary investment. For the investment such as steel, which is located in the proximity of raw material base, the increased demand for the basic inputs such as coal and raw iron would be direct. However, in so far as the industries using the steel are concerned (such as engineering, machine tools, ship building and so on) these may not exist initially in the backward region. With a very low level of industrialisation, such industries do not exist in Orissa and Madhya Pradesh, which have received considerable public investment, although Bihar has a larger industrial base.<sup>1</sup> However, we can say that regional growth effects of public investment are likely to differ in regions such as Madhya Pradesh and Orissa as compared to West Bengal, which also has received considerable public investment, and in this state the industries with forward and backward linkages already exist and the private entrepreneurship also exists ready to take advantage of investment opportunities created by the public investment. Lastly, apart from the use of the basic raw materials, the demand for local inputs will be limited by the high import content of the investments. Even the demand for local services for repairs, maintenance, etc. is likely to be limited if a lot of machinery is imported.

We can then summarise that the beneficial spread effects of the large public sector investments amount to the increased demand for the raw materials, the additional employment arising in the construction phase, opening up of new transport routes and an increase in the infra-structural investments incidental to the primary investments. Apart from these, we can say that the leakages by way of imports and the ones arising out of demand for intermediate inputs from other regions and recruitment of labour from other regions are likely to be quite high. Given these considerations, we cannot expect the large public sector investments to act as spearheads of new growth points by themselves.

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1. See Section I of Chapter V for estimates of regional industrial structures in these low income states.

We can now examine the trends in the private sector investments and see if the private sector investments have responded by way of increased investment in the low income regions. Here we shall mainly use the evidence before the licensing committee and the reports of the enquiries into the operation of industrial licensing system in India.<sup>1</sup>

We may briefly summarise first how the industrial licensing system in India operates and its goals in industrial planning as laid down by the planning commission.

Industrial development at national level is guided by the broad principles of the Industrial Policy Resolution of 1956, which provides for a flexible approach in the development of industries within the public, private and cooperative sectors. At the same time the policy takes into account the need to prevent private monopolies and concentration of economic power in the hands of small numbers of individuals. To quote from the Fourth Plan;-

"Subject to overall considerations of resources, the programmes in the public sector envisage further expansion of the public sector in the high priority fields to fill the gaps in industrial structure and investments in certain other industries in which private sector has fallen short of the requirements of the economy. Cooperative and private sectors are envisaged to make a significant contribution to industrial development in all other fields and necessary facilities for such expansion will be provided, except to the extent restrictions are considered necessary to achieve social objectives of prevention of concentration of economic power."<sup>2</sup>

We propose to analyse some of the data made available by the Hazari Report,<sup>3</sup> which covered the distribution of

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1. Hazari, R.K., "Industrial Planning and Licensing Policy", Government of India, Planning Commission, 1967. Also, The Report of the Industrial Licensing Commission Government of India, Department of Industry and Trade, Ministry of Industrial Development, Internal Trade and Company Affairs, 1969.
  2. "Fourth Five Year Plan", Government of India, Planning Commission, 1970, p.304.
  3. op.cit.

applications and approvals for licensing from 1959 through June 1966. The Fourth Five Year Plan made a number of proposals for revising the operation of a licensing system in the light of the reports of the two commissions mentioned above and the recommendations of the Administrative Reforms Commission. We shall take up these proposals in Chapter IX, where we discuss the national policy for regional development for the period under consideration here (1959-1966). The minimum exemption limit for licensing of new undertakings was raised from Rs. 500,000 to Rs. 10,00,000 in 1960 and with the exception of some industries to Rs. 25,00,000 in 1964.<sup>1</sup> The categories of new articles and substantial expansion of undertakings already licensed are not covered by the exemption limit. Substantial expansion is defined to mean an addition of more than 10 per cent to the total licensed capacity. The distinctions between the three types of licenses: new article, new undertaking and substantial expansion are not always clear and overlapping was found in many cases. Further, the evidence before the licensing committee, furnishes the intentions of the investments, and there is a time lag between the approvals by the committee, an issue of license by the government and actual implementation of the investment. The Licensing Committee classifies its applications by three categories: i) the free list which consists of licenses outside the exemption limit mentioned above, ii) the merit list in which applications are for investments above the exemption limit and in which licenses are given on the merits after scrutiny by the licensing committee and iii) the rejection list. Hazari Report analyses mainly the data on the merit and the rejection lists.

The objectives of licensing systems basically stem from the need to ensure a proper allocation of scarce resources. Regulation of industrial development was

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1. This also includes an import content of Rs.25,00,000 and above.

considered primarily in relation to the allocation of foreign exchange.

In addition, the licensing system was also aimed at providing for government control over the location, expansion and setting up of private industrial undertakings with a view inter alia to channel investments into the desired directions, promote balanced regional development, protect small and cottage industries and prevent concentration of ownership and control to the common detriment. We can notice a certain degree of conflict between the various objectives specified above and we may also note that the two licensing committee reports have outlined the basic limitations of the system as it operated then.<sup>1</sup> In terms of regional development, the licensing system has even less positive a role to play as it only considers the applications as they come with specific locations, but has no direct controls to influence the location choices themselves. Within these limitations, the data of licensing can throw light on the following aspects of regional differences in private sector investment.

- i) A regional distribution of total private sector investment.
- ii) Industrial distribution of private investment by the regions.
- iii) Regional concentration of private entrepreneurship in terms of different linguistic groups.

Table 4 gives the distribution of private investment by states and types. The total approvals are divided into three groups, viz. new undertakings, substantial expansion and new articles. The following observations can be made from the table:

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1. See Hazari, R.K., op.cit., Final Report, p.17. "It is a well established and admitted fact that since the First Plan, shortfalls in investment and output have been large and persistent, mainly in basic industries, notably steel, cement, machinery and fertilisers. The gains in terms of balanced regional development and wider distribution of entrepreneurship are at best moderate. That licensing has served to channel investment appears to be extremely difficult."

TABLE 4

APPROVALS BY STATES AND TYPES - 1959-June 1966  
(Amounts in Rs. crores)

State	New Undertakings				Substantial Expansion				New Articles			
	Number data available	%	Investment	%	Number data available	%	Investment	%	Number data available	%	Investment	%
Grand Total	1827	100.00	1133	100.00	1153	100.00	575	100.00	932	100.00	237	100.00
Andhra	64	3.50	66	5.83	29	2.52	32	5.57	28	3.00	6	2.53
Assam	25	1.36	24	2.12	5	0.43	Neg	0.00	2	0.21	1	0.42
Bihar	70	3.84	117	10.33	38	3.50	20	3.48	17	1.82	9	3.80
Delhi	66	3.61	34	3.00	30	2.50	4	0.70	30	3.22	3	1.27
Jammu & Kashmir	1	0.05	Neg	0.00	3	0.26	1	0.17	-	0.00	-	0.00
Gujarat	140	7.66	49	4.32	78	6.76	31	5.39	74	7.94	17	7.17
Kerala	47	2.57	32	2.82	26	2.25	11	1.91	12	1.29	2	0.84
Madhya Pradesh	77	4.21	16	10.24	21	1.82	15	2.61	12	1.29	10	4.22
Madras	170	9.30	128	11.30	91	7.89	91	8.69	50	6.33	19	8.02
Maharashtra	501	27.44	171	15.10	402	34.87	171	29.74	345	37.03	74	31.22
Mysore	51	2.79	49	4.32	63	5.48	35	6.09	29	3.11	8	3.38
Orissa	32	1.75	44	3.88	8	0.69	1	0.17	6	0.64	3	1.27

(continued)

TABLE 4 (continued)

q State	New Undertakings				Substantial Expansion				New Articles			
	Number data avail- able	%	Invest- ment	%	Number data avail- able	%	Invest- ment	%	Number data avail- able	%	Invest- ment	%
Punjab, Haryana & Himachal	157	8.59	64	5.65	40	3.47	9	1.56	78	8.37	12	5.06
Rajasthan	44	2.51	53	4.67	8	0.69	5	0.87	11	1.18	5	2.11
Uttar Pradesh	121	6.62	83	7.33	45	3.90	56	9.74	40	4.29	16	6.75
West Bengal	252	13.81	100	8.83	263	22.81	130	22.61	188	20.17	52	21.94
Other	9	0.49	3	0.26	3	0.26	4	0.70	1	0.11	Neg	0.00

Source: Compiled from Hazari, R.K. "Report of the Industrial Planning and Industrial Licensing Policy", 1967, op.cit., p.45.

N.B. See Hazari R. K., p. 31 for the definitions of 'new article', 'substantial expansion' and 'new undertaking'.

- (1) Out of total investment of Rs. 1133 crores in new undertakings in the private sector, the shares of Madras, Maharashtra, West Bengal and Gujarat are 11.3, 15.1, 13.8 and 7.6 respectively, while the less industrialised states of Orissa, Andhra, Bihar, Uttar Pradesh and Madhya Pradesh have shares of 3.8, 5.8, 10.3, 7.3 and 10.3 respectively. Thus, in this category, the shares of at least two less industrialised states, viz. Bihar and Madhya Pradesh, are more than 10 per cent.
- (2) With regard to the other two categories, viz. substantial expansion and new articles, the share of industrialised states is predominant. Maharashtra, West Bengal, Madras and Gujarat together account for 66.43 and 69.25 per cent respectively, while their combined share in the new undertakings amounts to only 44.55 per cent. In the substantial expansion category, the investment shares of low income states are Andhra, 5.5, Bihar 3.4, Madhya Pradesh 2.6, Orissa 0.17 and Uttar Pradesh 9.7. Similarly, in the new article category, the shares of these low income states are 2.5, 3.8, 4.2, 3.3 and 6.7 respectively.

Table 5 shows that in the more important products where production had been growing in the period under review the bulk of licenses were concentrated in a few states. Over two-thirds of the licenses for machine tools, agricultural machinery, industrial machinery, metallurgical and non-metallurgical industry, etc. are found to be concentrated in four states.

If we take the industrial distribution of public sector investment as shown by Table 5 we can say that these growth industries in the private sector are linked with the development of basic industries in which public sector investment was concentrated. Thus, while the private sector seems to have responded to the key sector public investment by interrelated growth of industries that use the steel and

other basic commodities, the product-wise growth of private investment is spatially concentrated in the established growth regions.<sup>1</sup>

TABLE 5  
PERCENTAGE DISTRIBUTION OF INDUSTRIAL LICENSES  
IN THE SELECTED INDUSTRIES IN INDIA.

	Maharashtra	Gujarat	W.Bengal	Madras	Punjab & Haryana
Percentage Share of Each State					
Machine Tools	38.72	6.38	20.43	8.51	10.64
Industrial Machinery	37.07	10.12	22.44	9.85	5.20
Metallurgical Industry	23.52	4.79	25.66	7.53	10.09
Non-Metallurgical Industry	32.33	3.01	15.79	8.27	14.28
Bicycles and Miscellaneous Transport Equipment	37.04	3.34	12.22	19.63	18.11
Rubber and Leather Products	21.38	3.45	28.28	19.31	3.45
Fruit Products & Vegetable Oils	19.59	11.46	3.82	7.00	4.62

Source: Report of the Industrial Licensing Policy Enquiry Committee, July 1969

1. This pattern of concentration works also within a given region. For example, in a survey conducted by the Development Commissioner of small-scale industries it was pointed out that in the grant of licenses no attempt was made to avoid setting up of industries in already developed areas. Out of 819 large scale undertakings belonging to 40 large groups of industries, 50 per cent of the total licenses issued between 1961 and 1965 were for locations in cities, with populations of 100,000 and above, and 54 of these locations were in cities with populations of 500,000 and above.

The third aspect of the licensing that has some bearing on our subject is the spatial preferences of industrial houses. Private sector investment in large industry, especially the ones that fall in the purview of the licensing committee, is characterised by the monopolistic control of total production and investment by a few industrial houses.<sup>1</sup> These industrial houses belong to different linguistic communities and they are an important part of the supply of private entrepreneurship in the Indian industry. It is necessary, therefore, to examine their spatial preferences. Table 6 gives the regional distribution of investment by linguistic groups. As can be seen from the table, out of a total private sector investment of Rs.1625 crores, R.761 crores, i.e. 46 per cent, is provided by Marwari (leading industrial house of which is Birla) and Gujarati (there are several big Gujarati industrial houses as well as small groups of entrepreneurs))

The Marwari investment has gone to the following states: (a) Maharashtra 12.7 per cent; (b) West Bengal 27.6 per cent; (c) Madhya Pradesh 10.4 per cent; (d) Bihar 9.4 per cent. Gujarati capital is distributed as follows: (a) 24.2 Gujarat; (b) 53.8 Maharashtra; (c) 10.5 Madras and (d) 10.0 West Bengal. Another important community of Parsi has the following distribution: (a) 42.6 Bihar; (b) 48.5 Maharashtra and (c) 5.4 Gujarat. It is interesting to note further that in the regional distribution of southern capital, 15.9 is located in Maharashtra and 50.9 in Madras. Lastly, the high income states have received the investment in varying proportions from nearly all the linguistic and other groups. Maharashtra tops in all these categories. Thus, we cannot say that the concentration of private investment arises out of spatial preferences of the local investors. Across the regions, the private capital is not highly concentrated in the local investment.<sup>2</sup> Although

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1. The industrial houses originated under the managing agency system, which also operated in the pre-Independence period.  
2. By local investment we refer to the industrial house belonging to a particular linguistic community investing in the same linguistic state. Examples: Gujarati capital in Gujarat, Marwari (from Rajasthan originally) in Rajasthan, etc.

TABLE 6

DISTRIBUTION OF APPROVED INVESTMENT BY STATES AND CATEGORIES  
OF APPLICANTS

(Amount in Rs. crores) - 1959-June 1966

		Marwaris	Gujaratis	Punjabis	Parsis	Bengalis
Grand Total	Amount	477	284	90	68	34
	%	100.00	100.00	100.00	100.00	100.00
Andhra	Amount	9	5	0	-	5
	%	1.89	1.76	0.00	-	14.70
Assam	Amount	16	0	0	-	0
	%	3.35	0.00	0.00	-	0.00
Bihar	Amount	45	0	3	29	8
	%	9.43	0.00	3.33	42.65	23.59
	Amount	1	1	7	-	0
	%	0.21	0.35	7.77	-	0.00
Tammu of Kashmir	Amount	0	0	0	-	-
	%	0.00	0.00	0.00	-	-
Gujarat	Amount	8	68	0	4	0
	%	1.68	24.29	0.00	5.88	0.00
Kerala	Amount	6	1	0	0	0
	%	1.26	0.35	0.00	0.00	0.00
Madhya Pradesh	Amount	50	5	3	1	2
	%	10.48	1.76	3.33	1.47	5.88
Madras	Amount	18	30	2	0	-
	%	3.77	10.56	2.22	0.00	-
Maharashtra	Amount	62	153	18	33	0
	%	12.99	53.87	20.00	48.52	0.00
Mysore	Amount	5	1	0	0	0
	%	1.04	0.35	0.00	0.00	0.00
Orissa	Amount	6	0	0	1	5
	%	1.26	0.00	0.00	1.47	14.70
Punjab, Haryana & Himachal Pradesh	Amount	8	4	45	-	-
	%	1.68	1.41	50.00	-	-
Rajasthan	Amount	23	0	0	-	-
	%	4.82	0.00	0.00	-	-
Uttar Pradesh	Amount	88	15	2	1	-
	%	18.45	5.28	2.22	1.47	-
West Bengal	Amount	132	1	9	1	14
	%	27.67	0.35	10.00	1.47	41.18
Other	Amount	0	0	-	-	-
	%	0.00	0.00	-	-	-

(Continued)

TABLE 6 (continued)

		Maharash- trians	Southern	Other Indian	Domiciled Foreign	Inter- national Combines
Grand Total	Amount %	<del>43</del> 100.00	153 100.00	323 100.00	20 100.00	133 100.00
Andhra	Amount %	- -	31 20.26	11 3.41	- -	2 1.50
Assam	Amount %	<del>15</del> -	0 0.00	1 0.31	4 20.00	1 0.75
Bihar	Amount %	- -	- -	22 6.81	2 10.00	1 0.75
	Amount %	- -	0 0.00	12 3.72	- -	0 0.00
Tammu of Kashmir	Amount %	- -	- -	1 0.31	<del>1</del> -	- -
Gujarat	Amount %	3 6.98	0 0.00	9 2.79	- -	0 0.00
Kerala	Amount %	0 0.00	12 7.84	2 0.62	0 0.00	3 2.26
Madhya Pradesh	Amount %	- 0.00	- 1.96	14 4.33	- -	- -
Madras	Amount %	0 0.00	78 50.98	20 6.19	4 20.00	15 11.28
Maharashtra	Amount %	23 53.49	23 15.03	68 21.05	2 10.00	37 27.82
Mysore	Amount %	11 25.58	26 16.99	15 4.64	0 0.00	4 3.01
Orissa	Amount %	0 0.00	0 00.00	11 .41	1 5.00	1 0.75
Punjab, Haryana & Himachal Pradesh	Amount %	2 4.65	0 0.00	15 4.64	0 0.00	1 0.75
Rajasthan	Amount %	<del>2</del> -	- -	39 12.07	0 0.00	- -
Uttar Pradesh	Amount %	- -	0 0.00	35 10.83	0 0.00	1 0.75
West Bengal	Amount %	0 0.00	0 0.00	44 16.32	8 40.00	66 49.62
Other	Amount %	4 9.30	1 0.65	1 0.31	- -	- -

(continued)

TABLE 6 (continued)

		Total: Private Sector	Coop- eratives	Government	Total: Public Sector	Grand Total
Grand Total	Amount	1625	16	302	318	1943
	%	100.00	100.00	100.00	100.00	100.00
Andhra	Amount	63	2	39	41	104
	%	3.88	12.50	12.91	12.89	5.35
Assam	Amount	22	0	0	2	24
	%	1.35	6.25	0.33	0.63	1.24
Bihar	Amount	110	0	36	36	146
	%	6.77	0.00	11.92	11.32	7.52
	Amount	21	-	19	19	40
	%	1.26	-	6.29	5.97	2.06
Tammu of Kashmir	Amount	1	-	0	0	1
	%	0.06	-	0.00	0.00	0.00
Gujarat	Amount	92	2	1	3	95
	%	5.72	12.50	0.33	0.94	4.88
Kerala	Amount	24	1	20	21	45
	%	1.47	6.25	6.62	6.60	2.31
Madhya Pradesh	Amount	78	0	62	62	140
	%	4.80	0.00	20.53	19.50	7.20
Madras	Amount	167	1	29	30	197
	%	10.28	6.25	9.60	9.43	1.01
Maharashtra	Amount	417	8	10	18	435
	%	25.66	50.00	3.31	5.66	22.38
Mysore	Amount	62	-	29	29	91
	%	3.81	-	9.60	9.12	4.67
Orissa	Amount	25	1	23	24	49
	%	1.53	6.25	7.61	7.55	2.52
Punjab, Haryana & Himachal Pradesh	Amount	75	0	9	9	84
	%	4.62	0.00	2.98	2.83	4.32
Rajasthan	Amount	62	0	1	1	63
	%	3.81	0.00	0.33	0.32	3.24
Uttar Pradesh	Amount	142	0	7	7	149
	%		0.00	2.32	2.20	7.66
West Bengal	Amount	275	1	14	15	290
	%	16.92	6.25	4.64	4.72	14.92
Other	Amount	6	-	0	0	6
	%	0.37	-	0.00	0.00	0.31

- stands for negligible

**Source:** Hazari, R.K., "Final Report of Industrial Planning and Licensing Policy", op.cit. p.48.

local investment in one's own linguistic region is important, there is considerable mobility of private capital. Further, these trends also indicate that the supply of private capital as shown by the number of applications and size of investment proposals of the local (belonging to their own linguistic groups) investors is very small in low income regions. We cannot give separate figures for these states as they are grouped as 'the other Indian', but the proportion of 'the other Indian' for their own state is very small. Even from this group 21 per cent and 14 per cent has gone to the states of Maharashtra and West Bengal. Lastly, in the categories of government investment, 20, 12, 10 per cent has gone to Madhya Pradesh, Orissa and Andhra. However, in the cooperative sector 12.5, 50.0, 6.2 and 6.2 has gone to Gujarat, Maharashtra, Madras and West Bengal respectively. This linguistic pattern of regional investment reflects the spatial preferences of two groups of investors, viz. the big industrial houses and the other investors. The Hazari committee listed 28 big industrial houses. Table 7 gives data on the importance of these industrial houses in private investment. The 28 houses in Table 7 made 1,961 applications (21 per cent of all applications) for which data are available for 1,178 which involved an investment in capital equipment of Rs. 1627 crores (59 per cent of total applied) with an import component of Rs. 704 crores (38 per cent). Approval was granted to 1233 applications for which investment data are available for 832. These 832 approvals involved an investment of Rs. 740 crores (38 per cent of total approved) with an import content of Rs. 490 crores (38 per cent). Although the share of the top 28 houses in total approved investment declined from 46 per cent to 39 per cent, that of the top four houses increased from 22.4 to 25.6 per cent. Relevant data in this regard is brought out by Table 8.

TABLE 7

28 Houses: Applications\* and Approvals - 1959-60  
and 1964-66

		1959-60		1964-66	
		Investment (Rs crore)	%	Investment (Rs crore)	%
Birla	Applied	121	17.7	116	13.5
	Approved	88	17.6	93	13.2
J.K.	Applied	9	1.3	27	3.2
	Approved	3	0.6	26	3.8
Tata	Applied	14	2.0	24	2.8
	Approved	12	2.4	24	3.4
Shree Ram	Applied	14	2.0	37	4.3
	Approved	9	1.8	37	5.2
Walchand	Applied	1	0.1	Neg	Neg
	Approved	1	0.2	Neg	Neg
Sahu Jain	Applied	21	3.1	10	1.2
	Approved	14	2.8	9	1.3
Bangur Samani	Applied	9	1.3	9	1.1
	Approved	8	1.6	8	1.1
A C C	Applied	Neg	Neg	11	1.3
	Approved	Neg	Neg	11	1.5
Kilachand	Applied	18	2.6	2	0.2
	Approved	17	3.4	1	0.1
V. Ramkrishna	Applied	13	1.9	1	0.1
	Approved	12	2.4	Neg	Neg
B. Patnaik	Applied	15	2.2	1	0.1
	Approved	15	3.0	1	0.1
Sarabhai	Applied	3	0.4	10	1.2
	Approved	3	0.6	10	1.4
Arichand Pyarelall	Applied	11	1.6	3	0.4
	Approved	6	1.2	3	0.4
Kamani	Applied	1	0.1	5	0.6
	Approved	1	0.2	3	0.4
Mafatlal	Applied	3	0.4	9	1.1
	Approved	0	0.0	9	1.3
Bajaj	Applied	3	0.4	6	0.7
	Approved	3	0.6	6	0.8

TABLE 7 (continued)

		1959-60		1964-66		
		Investment (Rs crores) %		Investment (Rs crores) %		
18.	Kasturbhai	Applied	6	0.9	6	0.7
		Approved	6	1.2	5	0.7
19.	Seshasayee	Applied	4	0.6	3	0.4
		Approved	4	0.8	3	0.4
20.	Anantharamak	Applied	3	0.4	1	0.1
		Approved	3	0.6	1	0.1
21.	Mahindra	Applied	2	0.3	9	1.1
		Approved	1	0.2	9	1.3
22.	Wadia Shapoorji	Applied	8	1.2	Neg	Neg
		Approved	8	1.6	Neg	Neg
23.	Bajoria Jalan	Applied	11	1.6	11	1.3
		Approved	5	1.0	3	0.4
24.	Thapar	Applied	1	0.1	4	0.5
		Approved	1	0.2	4	0.6
25.	Modi	Applied	3	0.4	4	0.5
		Approved	3	0.6	3	0.4
26.	Goenka	Applied	2	0.3	2	0.2
		Approved	2	0.4	2	0.3
27.	Chinai	Applied	8	1.2	0	0.0
		Approved	3	0.6	0	0.0
28.	Jaipuria	Applied	7	1.0	2	0.2
		Approved	3	0.6	0	0.0
Total 1 to 28		Applied	312	45.5	320	37.6
		Approved	232	46.4	277	39.0
Grand Total (All houses)		Applied	683	100.0	853	100.0
		Approved	500	100.0	710	100.0

\*Applications are net of deferred

Source: Hazari, R.K., op.cit., p. 50.

Thus, in explaining the trends in the private sector investment in <sup>the given</sup> years we are seeking answers to the following related questions.

- (1) What are the factors underlying the locational preferences of large industrial houses in favour of the existing agglomeration centres?
- (2) What are the factors underlying the location decisions of other private investors including small and medium firms around the agglomeration centres?

The underlying factors behind the locational preferences of the two groups of private investors falling under the licensing committee may now briefly be summed up as follows:

- (1) In seeking to explain spatial preferences of the big industrial houses, we need to emphasise their concentration of total investment by industries which can be said to be the crucial factor in their space preferences. Hazari Report points out that the industrial houses, which were previously pioneers in the fields of textiles, chemicals and jute have not been slow to increase their proportion of investment in new growth industries which had high linkages with the large public sector investments. Thus, we are then seeking to explain why these industries were not located in other regions. The advantages of locating these industries in the established growth centres include the nearness to the market, the 'external economies' of the agglomeration centres, the access to the institutional facilities and infrastructural facilities. For the big industrial houses, which operate under the same name controlling both traditional and growth industries, in which traditional industries are located in the established centres, the economies arising out of locations in the same centres far outweigh the disadvantages arising out of higher rents, the costs of congestion, higher labour costs, etc. In addition, the basic commodities like steel, coal, cement are uniformly priced all over India. Hence, there

are no forces that induce these big investors to deviate from the locations which are "optimal" from their private objectives of maximisation.

(2) In the space preferences of the private investors not included in the industrial house category, similar considerations apply. In fact, the location preferences of the big industrial houses provide a lead which other investors may follow. Among the various types of commodities, from the point of view of location several categories may be separated:

- (a) The industries with agriculture as the primary source of input but with the final demand are non-agricultural. e.g. textiles, jute.
- (b) The industries with non-agricultural production input but where agriculture is the source of final demand. e.g. fertilisers.
- (c) The industries which have both source of raw material as well as final demand in agriculture.
- (d) The industries with both source of raw materials and the final demand in manufacturing, e.g. machine tools, engineering.

Location theory emphasises the role of various factors such as transport costs, the nearness to market, etc., in deciding optimum location from the point of view of private entrepreneur. The proximity to the source of raw material is most important in industries such as steel. In the case of raw materials that are weight-gaining in the process of production, the nearness to the source of final demand may be important.

The industrial location trends in the more industrialised countries in recent years show declining importance of transport costs in the reasons for plant location and an increasing importance of factors such as convenience to markets, the availability of labour and the availability of building sites.<sup>1</sup> Table 8 gives a summary of the reasons for plant locations in the United States in 1964. It can be seen from the table that both transport

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1. Report of Economic Commission for Europe, "Criteria for Location of Industrial Plants, 1967.

TABLE 8

THE REASONS FOR PLANT LOCATION FOR 1180 UNDERTAKINGS  
IN THE UNITED STATES

Rank	Reasons for Plant Location	No. of Times Ranked as No.						
		Total	1	2	3	4	5	Other
1	Availability of Labour	559	93	147	96	75	63	85
2	Convenience to Markets	457	143	97	65	54	43	55
3	Availability of buildings or other property	394	96	84	57	65	41	51
4	Lower Labour Costs	343	38	53	79	69	55	49
5	Availability of raw materials	327	89	59	53	32	39	55
6	Less unionisa- tion	299	31	53	50	57	65	43
7	Local coop- erativeness	294	20	28	55	71	89	31
8	Home of management	246	81	41	25	27	32	40
9	Climate	239	48	37	33	29	42	50
10	Transportation costs	230	22	48	42	52	37	29
11	Adequate Power	229	18	30	49	41	45	46
12	Centre of particular industry	221	69	30	29	27	33	33
13	Transportation facilities	174	11	24	37	38	35	29
14	Decentralisa- tion of operation	151	25	27	31	27	25	16
15	Favourable tax structure	127	16	8	17	34	30	22
16	Financial aid	101	18	21	16	14	22	10

Source: International Information Centre for Local  
Credit - Government Measures for the  
Promotion of Regional Economic Development,  
The Hague, 1964, p. 22.

costs and the lower labour costs rank very low compared to the factors such as the nearness to market and the availability of labour as such. Such data or surveys for India are not available, but from our discussion so far, we can say that the relative importance of availability of labour is likely to be low, although availability of skilled labour can be important in many industries. The nearness to market, and transport costs can also be regarded as important factors, although, as we pointed out earlier, the significance of these factors needs to be analysed in relation to their input and output sources. The industries whose sources of inputs and final demand are manufacturing provide the strongest group in which private sector agglomeration would occur at the established centres. We saw that in the case of India, the industrial licensing system or other government policy measures do not act so as to alter the private gains arising from further concentration. The spatial dispersion of public sector investment is not a sufficient force by itself to attract private investment in the less industrialised regions. In addition, the linguistic differences have not deterred the mobility of private capital across the regions. The policy measures to induce private investment in the less industrialised regions thus raises difficult issues. We shall examine the policy measures in greater detail in Chapters VIII and IX.

## Chapter VII

### AN ANALYSIS OF REGIONAL DISPARITIES IN AGRICULTURAL INCOMES, PRODUCTIVITY LEVELS IN MAJOR CROPS AND THE AGRICULTURAL MODERNISATION IN INDIA

In this chapter, we shall examine the extent and nature of regional disparities in agriculture. The importance of analysing the regional disparities in agriculture can be emphasised as follows: firstly, an understanding of regional disparities in agricultural incomes and the productivity levels is crucial as agriculture is the predominant sector in total income and employment, both at regional and national level. Secondly, we found in Chapter IV that the regional inequality index of net agricultural income per worker is lower in agriculture than in manufacturing. We need to pursue a more detailed analysis of the regional agricultural incomes and productivity before we can conclude which of the two sectors has a higher regional inequality. Thirdly, the policy aspects of regional disparities in agriculture need to be considered in the light of an analysis of regional disparities in agricultural incomes, productivity levels of the major crops and the agricultural modernization.

A comprehensive and detailed analysis of regional disparities in agriculture can be a separate subject of study itself. In the limited scope of this chapter we cannot claim to have analysed all the relevant aspects of regional differences in agricultural development. In addition, some literature already exists on the various aspects of regional disparities in agriculture. In agriculture, complex inter-relations exist between the various variables that measure resource factors, institutional factors and the levels of agricultural modernization. In addition, the regional fluctuations in output due to

random factors are likely to vary inter-regionally and a normal rainfall year at national level may coincide with drought in some regions, producing large absolute and relative deviations from the national average. Hence, how far the regional disparity index in a given year is affected by such deviations is difficult to measure. The trends in the disparity indices are more difficult to establish because of the influence of the random factors on regional deviations. As long time-series data on regional agricultural incomes are not available, the analysis of regional disparities in agricultural incomes has to be pursued with a more limited scope, bearing these limitations in mind.

In Section I, we analyse the regional disparities in agricultural incomes for the years 1950-51, 1960-61 and 1967-68. These are the only years for which the data on agricultural income of states are available. Net agricultural income estimates are the estimates of the value of income or net output originating in the entire agricultural sector. The regional value of agricultural output in constant prices reflects both the cropping pattern as well as the physical differences in productivity. In some regions, high value of agricultural output may be due to the fact that a high proportion of the total area is allocated to high value crops. In the other regions, high agricultural income may be attributable to the higher than average productivity of the crops in which a region specialises. Thus, in considering the explanatory factors of regional values of agricultural incomes, we may statistically test the factors that may be regarded as significant in explaining regional differences in the above two factors. We test the statistical significance of a region's average rainfall, irrigation ratio, the percentage of a region's labour force engaged in agriculture, in explaining the regional differences in net value of agricultural output. In addition to

examining the significance of natural resource factors versus irrigation and other factors in explaining the net agricultural incomes, we may also analyse the significance of some of these factors in explaining regional disparities in the physical productivity of major agricultural crops. We may analyse here the importance of the natural resource factors versus those that measure the regional levels of agricultural modernization. We pursue such an analysis of regional differences in average yields of the selected crops for the two years of 1964-65 and 1970-71, in Section II.

In Section III we compare the position of high and low income states in the yield levels of the major crops, in the various indicators of agricultural modernization and the indicators of private investment in agriculture.

## SECTION I

### REGIONAL DISPARITIES IN AGRICULTURAL INCOMES IN INDIA, 1950-51, 1955-56, 1960-61 and 1967-68

The figures of the value of net output originating in the entire agricultural sector by states are available for the years 1950-51, 1955-56, 1960-61 and 1967-68. In Chapter II we discussed the methodology used in estimating the regional net output originating in the various sub-sectors of agriculture. We also pointed out the particular sub-sectors in agriculture which face the data problems. A comparison of the total national net agricultural output with the estimate arrived at by summing up state agricultural incomes showed that the NCAER estimates do not diverge substantially from those of CSO and Tiwari estimates for the various years. Hence, we shall not pursue methodological problems of estimating regional agricultural income here. We may, however, point out several general limitations and uses

of the regional figures of net agricultural output. The regional figures of net agricultural output reflect both the regional differences in the cropping pattern as well as the regional differences in the productivity levels of individual crops and also the various sub-sectors of agriculture. We cannot, however, statistically isolate these two effects as the adequate income data at the sub-sectoral level are not readily available for the regions. Due to these limitations we cannot classify regions as 'high performance' or 'low performance' solely on the basis of total net agricultural income. Secondly, the three years that we have selected here are dictated by the considerations of data availability. All of these are not 'normal' years at national level. As we pointed out earlier, the relation between the 'normal' national year and the 'normal' relative regional dispersion cannot be defined, as even in the normal national year some regions may be faced with adverse weather conditions. In addition, in a bad agricultural year nationally, some regions may have good weather conditions. The incidence of a bad agricultural year nationally also may be unequally distributed interregionally.<sup>1</sup>

In spite of these limitations of the estimates of agricultural incomes of states, we need to analyse the extent of regional disparities in these figures as they provide the estimate of overall regional inequality in the predominant sector of the economy. The figures of the net agricultural income of the regions may be ~~deflated~~ <sup>divided</sup> by two measures, viz. the working force and the net or gross sown area. Thus according to which of the ~~deflators~~ <sup>divisors</sup> is used, we can arrive at the estimates of the value of net agricultural output per worker or per unit of land (acre or hectare). Income per worker is most commonly

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1. This is likely to be so because different regions may be affected by the bad weather conditions. Thus we cannot predict precisely whether the bad national agricultural year would always result in a fall or an increase in the value of regional disparity index.

used indicator of productivity in the manufacturing sector. In agriculture, as we pointed out in the earlier chapters, the estimates of working force raise difficult theoretical and measurement problems. Due to the existence of disguised unemployment and underemployment in agriculture, the working force in agriculture cannot be precisely measured. The census working force figures provide the estimates of working force in agriculture and other sectors of the economy within a given census definition of gainful employment.<sup>1</sup> We shall estimate the net agricultural income per worker using the Census 1951 and 1961 working force data.

Importance of land as a factor production as well as the relative ease of measuring the land as compared to the labour force has lent income per unit of land or the physical productivity per unit of land as a more common indicator in international and interregional comparisons.<sup>2</sup> In Tables 1 and 2 we give the regional estimates of net agricultural income per worker and per acre of net sown area. The following points can be noted from Tables 1 and 2. (1) The ranking of states by income per worker and per acre differs for some regions more sharply than others. In 1950-51, by income per worker measure, Kerala, West Bengal, Punjab, Mysore and Orissa occupied the top five ranks. The regions occupying the top five ranks in agricultural income per acre in the same year are Kerala, West Bengal, Assam, Andhra and Madras. The last four ranks in 1950-51 by per worker measure are Andhra, Rajasthan, Bihar and Madhya Pradesh. The last four ranks by per acre values are Mysore, Rajasthan, Bombay and Madhya Pradesh. Thus, while the ranks of the first two and the last two have remained the same, the other ranks are different between

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1. See Chapter IV and the appendix at the end of Chapter IV for the discussion of census definitions and the resultant estimates of working force.

2 Although land based measure is useful, the limitations arise in interregional and international comparisons due to the differences in arable land frontiers. For more discussion see Ishikawa, op. cit., Chapter 2

In Rs, In 1960-61  
PricesTABLE 1NET AGRICULTURAL OUTPUT PER WORKER IN INDIA:1950-51,1960-61

State	1951	Rank	1961	Rank
(1)	(2)	(3)	(4)	(5)
Andhra	456	10	442	13
Assam	609	7	559	9
Bihar	368	12	381	14
Gujarat	488 <sup>1</sup>	9	650	5
Kerala	1021	2	1166	1
Madhya Pradesh	340	13	454	12
Madras	643	6	559	6
Maharashtra	-		506	10
Mysore	702	4	535	8
Orissa	671	5	553	7
Punjab	913	3	1110	2
Rajasthan	435	11	459	11
Uttar Pradesh	565	8	663	4
West Bengal	1028	1	823	3
National Average	634		566	

1. The figures are for the State of Bombay.

Sources: Compiled from NCAER, op.cit. and the Census of 1961 figures of working population.

TABLE 2

NET AGRICULTURAL OUTPUT PER ACRE IN INDIA: 1950-51, 1960-61  
AND 1967-68 (in Rs in 1960-61 Prices)

State	Net Agricultural Output per Acre					
	1950-51	Rank	1960-61	Rank	1967-68	Rank
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Andhra	278	4	157	8	130	8
Assam	332	3	348	2	231	2
Bihar	171	8	162	7	145	6
Gujarat	114	10	139	10	120	9
Kerala	458	1	445	1	304	1
Madhya Pradesh	82	13	106	13	74	13
Madras	208	5	283	4	193	4
Maharashtra	-	-	132	12	83	12
Mysore	130	11	138	11	113	10
Orissa	179	7	181	5	109	11
Punjab	158	9	156	9	143	7
Rajasthan	130	12	71	14	63	14
Uttar Pradesh	216	6	167	6	167	5
West Bengal	351	2	313	3	229	3
All India	157	-	161	-	129	-

Source: Compiled from NCAER and IIPO, op.cit., and Indian Agriculture in Brief, 1969-70.

the income per worker and income per acre. This applies to the ranking of other years as well. These differences in the ranks show that the regional distribution of national labour force and the net sown area differs. (2) The ranks of states also differ in the various years. The ranks of the top three and the last three are relatively stable for all the years under consideration. Among the other states the ranks of the following states show a marked shift by the per acre figures. Andhra moves from rank 4 in 1950-51 to 8 in the later years; Orissa from 7 to 5 in 1960-61 and 11 in 1967-68. In the per worker figures, Andhra shifts from 10 to 13 in 1960-61, Gujarat 9 to 5, Orissa 5 to 7 and Uttar Pradesh from 8 to 4. (3) At national level, income per worker between 1950-51 and 1960-61 declined by 16 per cent. The income per acre for the same years shows little change. Between 1960-61 and 1967-68 income per acre shows a decline of 20 per cent. We may estimate the regional disparity indices of these national averages for various years, by using the same methodology as in Chapters III and IV. The regional inequality indices are the VW, MW and MWa. The weights in the case of per worker figures are the regional labour force share to total national agricultural labour force. In the case of a land-based index the appropriate weights are the region's share in the national net area sown. Table 3 gives the estimates of the regional disparity indices for various years. The following observations may be made from the table.

(i) The values of VW and MW in the per worker index are much lower than those for the same years in the per acre index. This means that in the per acre indices, there are a number of regional observations with large deviations from the national average and these also have large area shares. <sup>ii)</sup> The regional inequality index VW in agricultural income per acre in 1950-51 and 1960-61 is a little less than that in the manufacturing. We may also

TABLE 3

REGIONAL INEQUALITY IN AGRICULTURE IN INDIA: 1950-51, 1960-61, 1967-68

	Net Agricultural Output per Worker		Net Agricultural Output per Acre		
	1950-51	1960-61	1950-51	1960-61	1967-68
VW <sup>1</sup>	0.298	0.295	0.06465	0.429	0.381
MW <sup>2</sup>	0.28	0.18	0.30	0.33	0.29
MW <sub>a</sub> <sup>3</sup>	181.90	103.68	131.8	153.8	115.53

Notes: (1)  $VW = \frac{\sqrt{\frac{\sum (y_i - \bar{y})^2 f_i}{n}}}{\bar{y}}$  (2)  $MW = \frac{\sum (y_i - \bar{y}) f_i / n}{\bar{y}}$  (3)  $MW_a = \frac{\sum (y_i - \bar{y}) F_i}{n \times 100}$

where  $y_i$  = the net agricultural output per worker or per acre in  $i$ th region

$\bar{y}$  = national average of the variable

$F_i/n$  = regional labour force or area share in national labour force

note that, as in the manufacturing sector, the value of VW is affected by a few extreme deviations from the national average which also have large area shares. This is shown by the fact that in the per acre indices the values of VW and MW diverge. In the per worker index the values of VW and MW are closer for 1950-51 than in 1960-61.

(iii) We can also notice from the values of the inequality indices for the income per acre in the three years that the values of all the indices show some decline in 1967-68 as compared to the earlier years. Since the values of VW and MW remain stable for 1950-51 and 1960-61, and as these are normal years at the national level, we may say that the effect of a bad agricultural year in 1967-68 is reflected in the reduction of regional inequality.<sup>1</sup> Since the incidence of bad weather conditions varies interregionally, we cannot assume that the effect of a bad agricultural year would always be to reduce the regional disparity. Contrary may be the case if the bad weather conditions occur in the regions with low agricultural incomes.

We may now consider the various explanatory factors of regional differences in net agricultural income per worker and per acre. In agriculture, regional differences exist in the natural resource factors such as the average annual rainfall, soil fertility, sunshine, humidity, etc. These natural resource factors affect both the cropping pattern of the region as well as the productivity levels of the crops. Many natural resource factors are difficult to quantify and hence their importance cannot be statistically tested. We can take the average rainfall of the region to represent the influence on

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1. For example, in 1967-68, Kerala's income per acre dropped from Rs 445 to Rs 304 (68 per cent), Assam's from Rs 348 to Rs 229 (69 per cent), and Madras' from Rs 283 to Rs 193 (68 per cent) against a national average decline from Rs 283 to Rs 193, a drop of nearly 20 per cent.

income of the natural resource factors. These factors also significantly affect the cropping pattern of the region. The natural resource factors also affect the regional investments in irrigation as the potentialities for different types of irrigation are affected by the rainfall conditions. Hence, we have to expect some multicollinearity between the average rainfall and the region's irrigated area to total net sown area. However, the regional differences in irrigation reflect the differences in the private and public investment in agriculture. In the case of India, the two regions of Punjab and Madras with the highest irrigation ratio have a low average annual rainfall. Punjab has received large accumulated investment in major irrigation since the British period. In Madras, the percentage of area irrigated by minor irrigation is higher than the major irrigation. Thus, the statistical correlation between average rainfall and the percentage of irrigated to total net sown area need not be significant if there are a number of regions with a low average rainfall, but with a high irrigation ratio. Inclusion of institutional factors such as land ownership pattern and the tenancy system create further problems of multicollinearity. We discuss the regional differences in some of these factors in Appendix 2. The percentage of a region's total labour force engaged in agriculture measures the relation between the region's agricultural income and the degree of industrialisation. An inverse relation can be expected between the two variables. The regression results are summarised in Table 4. The following symbols are used in the equations.

$X_1$  = Net value of agricultural output per acre in  
ith region (i - - - 13 or 14)

$X_2$  = Net value of agricultural output per worker  
in ith region (i - - - 13 or 14)

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I. Inclusion of separate variables such as regional total private capital expenditure and the public expenditure in agriculture will create further problems of multicollinearity especially if there is industrialization bias in the public expenditure in agriculture.

TABLE 4

THE REGRESSION ANALYSIS OF REGIONAL VALUES OF NET AGRICULTURAL OUTPUT PER WORKER AND PER ACRE IN INDIA:  
1950-51, 1960-61 AND 1967-68

Dependent Variable	Year	Constant	Regression Coefficients of Independent Variables				R <sup>2</sup>	R <sup>-2</sup>	F Test	N
			X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>				
X <sub>1</sub>	1951	40.429	3.627 (4.93)*				0.68	0.66	24.36	13
X <sub>1</sub>	1951	-45.41	3.112 (4.22)*	2.301 (1.62)*	-0.094 (1.13)		0.80	0.74	12.72	13
X <sub>2</sub>	1951	411.30	4.59 (1.90)*		-19.14 (-4.24)*		0.24 0.58	0.17 0.62	3.62 10.00	13 13
X <sub>2</sub>	1951	2007.73								
X <sub>2</sub>	1951									
X <sub>1</sub>	1961	19.210	3.760 (5.87)*				0.80	0.72	34.54	14
X <sub>1</sub>	1961	-35.57	3.636 (7.20)*	2.916 (2.90)*			0.85	0.82	32.23	14
X <sub>1</sub>	1961	275.21	3.010 (8.64)*	2.315 (3.59)*	-3.780 (-4.25)*		0.94	0.93	60.88	14
X <sub>2</sub>	1961	1814.18	0.230 (0.16)	3.440 (0.84)	-17.990 (-3.20)		0.52	0.49	21.08	14

TABLE 4 (continued)

Dependent Variable	Year	Constant	Regression Coefficients of Independent Variables			R <sup>2</sup>	R <sup>-2</sup>	F Test	N
			X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>				
X <sub>1</sub>	1967	42.644	2.229 (4.38)*			0.61	0.58	19.22	14
X <sub>1</sub>	1967	-23.83	2.565 (7.89)*	2.168 (4.47)*		0.86	0.83	34.84	14
X <sub>1</sub>	1967	508.34			-5.045 (-3.58)*	0.47	0.51	12.84	14
X <sub>1</sub>	Pooled 1951, 1961	29.39	3.697 (7.85)*			0.71	0.70	61.88	27
X <sub>1</sub>		-14.617	3.405 (8.21)*	2.532 (3.21)*	-0.008 (-2.39)*	0.80	0.77	31.40	27
X <sub>2</sub>		392.11	3.450 (2.04)		-0.070 (-5.83)*	0.61	0.58	19.13	27

Figures in the brackets are t-ratios. The t-ratios with asterisks are significant at 0.05 level.

- $X_3$  = Average annual rainfall in inches in  $i$ th region  
( $i$  - - - 13 or 14)
- $X_4$  = Net irrigated area as percentage of total net  
sown area in  $i$ th region ( $i$  - - - 13 or 14)
- $X_5$  = Percentage of region's total labour force  
engaged in agriculture.

We may draw the following conclusions from Table 4.

(1) The average rainfall is the most significant factor in explaining the regional value of output per acre. However, the  $R^2$  of this factor alone varies in the three years, separately and in the pooled regressions. The  $R^2$  of the average rainfall drops to 0.61 for 1967-68, which was a bad year for rainfall. As we stated earlier, average rainfall is taken here as the proxy for the effect of natural resource factors on income. The natural resource factors influence both the cropping pattern as well as the physical yields of the agricultural crops.

(2) The significance of the irrigation ratio also varies statistically in the three years. In the separate as well as in the pooled regressions, the multicollinearity between the average rainfall and the irrigation ratio is not serious as the regression coefficient of the irrigation is not rendered statistically insignificant. The regression coefficient of irrigation remains stable in the separate as well as the pooled regressions. The irrigation is most significant in 1967-68 in which the average rainfall explains only 61 per cent of total variation.

(3) The percentage of a region's labour force in agriculture is negatively and significantly related to the value of output per acre. We may take this variable to measure the effect of two factors. The inverse relation between the labour force in agriculture and the value of output means that the regions with lower

pressure of labour on land have higher agricultural income per acre. We may also measure the industrialisation bias in the agricultural incomes, also, through this measure. The total size of agricultural outlay of the region can be expected to be influenced by the degree of industrialisation. Thus, we may anticipate that the regions with lower pressure of labour on land and the higher agricultural investments due to higher level of industrialisation have a higher average agricultural income per acre.

(4) The percentage of labour force in agriculture is highly significant in explaining the regional value of agricultural income per worker in 1950-51 and 1960-61 and in pooled regressions. The average rainfall and irrigation are statistically non-significant in 1960-61. However, the regression coefficient of the average rainfall is statistically significant in the pooled regressions. Thus, we may conclude that the industrialisation factor is more important in explaining the regional value of net agricultural output per worker than the natural resource factors measured by the average rainfall. The statistical fit of the net output per worker equations is lower than that of the net output per acre equations.

To conclude, the average regional value of net agricultural output is an important indicator as it measures the income or net output originating to the entire agricultural sector. Regional disparity in the net agricultural output may be measured by two methods, viz. by deflating the total income by the total agricultural labour force or by the net sown area. These two measures give different values of regional disparity indices if the labour force and the area shares vary interregionally. Basically, the regional values of agricultural output reflect both the cropping pattern and the level of productivity of agricultural crops. In addition, the regional values are also influenced by

random factors. In spite of these limitations, we found that the regional disparity indices remained stable for 1950-51 and 1960-61. If we take 1960-61, for which data are more comprehensive, and this also was a normal year for nearly all the regions, we find that the regional disparity indices VW and MW are very high in net agricultural output per acre. The values of VW and MW for this year are a little less than in manufacturing for the same year. VW in 1960-61 in net agricultural output per acre is nearly 17 per cent higher than the corresponding value in output per worker.

Thus, although we cannot ascertain the trends in regional disparity we can conclude that regional inequality in agriculture is much higher if we take the area based index. This is attributable to the fact that there are a larger number of regional observations in the per acre index with marked deviations from the national average and also these regional observations have large area shares. In the per worker figures, such divergence is not noticed as the regional labour force shares are more uniformly distributed, and also because there are fewer extreme deviations from the national average. Thus, we may conclude that the regional disparities in agriculture are high and secondly, as agriculture is the predominant sector, the policy implications of regional disparity in income and productivity levels need to be examined more closely. As in the manufacturing sector, we may pursue a disaggregated analysis of regional disparity in agriculture for the individual crops. The most readily available data for these purposes are the figures of average physical regional yields of the agricultural crops, published by the Ministry of Agriculture. Having tested the significance of the natural resource factors, irrigation and the degree of industrialisation in total agricultural income, we may further test the significance of some of these factors in explaining the regional physical yields of the major crops. We may also further examine if the regional physical

yields in the given crop are positively related to a region's specialisation. We shall pursue this analysis in Section II.

## SECTION II

### REGIONAL DISPARITIES IN PRODUCTIVITY LEVELS OF SELECTED AGRICULTURAL CROPS IN INDIA: A TENTATIVE HYPOTHESIS

Having examined the regional disparity in net agricultural income, we may now extend our analysis to an analysis of regional disparities in the productivity levels of the major selected crops. Such an analysis is necessary to identify the explanatory factors of regional productivity levels in individual crops. Our main purpose in this section is to test the significance of various factors such as the natural resource factors, agricultural specialization and the agricultural modernization indicators in explaining the regional physical productivity of the selected major crops.

We found in Section I that the average rainfall and the percentage of net irrigated area to net sown area are highly significant factors in explaining regional value of net agricultural output per acre. We also found that statistically the regional average rainfall is not significantly correlated to the irrigation ratio because of the high irrigation ratio in several states with low average rainfall.<sup>1</sup> We may therefore test the significance of these two factors independently. For irrigation, the data on the percentage of irrigated to total area under the crop are available for individual crops. We may expect that the significance of average rainfall versus the percentage of irrigated to total area under the crop

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1. In Northern States, Punjab with the highest irrigation ratio has an average rainfall of only 21". In the South, Madras and Andhra have a low average rainfall of 34" and 35", but have higher than national irrigation ratio. Orissa and West Bengal with an average rainfall of 58" and 70" have a lower irrigation ratio than the national average.

would differ for the individual crops. The regional percentage of irrigated to total area under the crop reflects the influence of both demand and supply of irrigation and we cannot isolate these two factors for the individual crops. In addition, we must also emphasize that in assessing the quantitative relation between the irrigated area and the observed regional yield we cannot take into account the impact of qualitative differences in the irrigation facilities. Ishikawa points out that "This is because the effect of irrigation on productivity is likely to vary greatly, even when the ratio is identical depending upon climatic conditions such as the amount and monthly distribution of rainfall, as well as upon the effectiveness of the irrigation facilities concerned." He makes two points regarding the relation between productivity and irrigation. Firstly, that in countries where the rainfall and other natural conditions differ greatly among the regions, the difference in the productivity effects of irrigation among regions is discontinuous and it often brings about different productivity-irrigation pattern. Secondly, even where the two regions have same irrigation ratios, the technical qualities of irrigation may be quite different and hence the productivity effect of irrigation will be different in the two regions. We recognize the limitations of statistical analysis arising from the above factors.

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See Ishikawa Shigeru, "Economic Development in Asian Perspective", Economic Research Series, No. 8, The Institute of Economic Research, Hitotsubashi University, 1967 p.88, 89.

would differ for the individual crops. The regional percentage of irrigated to total area under the crops reflects the influence of both demand and supply of irrigation and we cannot isolate these two factors for the individual crops. In addition to the availability of irrigation facilities, the actual irrigated area under the crop is likely to be influenced by the factors such as the land ownership pattern and in particular by the regional percentage of medium and large cultivators. A region's specialization in a given crop can be measured by the percentage of total area under the given crop. Specification of the agricultural modernization indicators such as the consumption of chemical fertilisers and the area under improved seeds creates some problems as the data on these variables are not available for the individual crops. The total figures for the actual consumption of chemical fertilisers can be expected to be positively correlated to the percentage of area under the crop that is irrigated. However, the statistical correlation is likely to differ for the different crops. Similarly, the percentage of a region's area under improved seeds also is likely to be positively correlated to the irrigation ratio and the consumption of fertilisers. Data on the area under improved seeds also refers to the total area under improved seeds. In addition to these variables, we also expect that the regional level of yield is influenced by the random factors. A statistical non-significance of the above factors would mean that the random factors and the factors not specified here are more important. Although, in the statistical testing, we cannot avoid some multicollinearity, we expect this to differ among the individual crops. Given the importance of achieving the higher average national productivity levels of agricultural crops by the extensions of area under irrigation and through an increased application of modern inputs of fertiliser and improved seeds, their importance in explaining interregional differences in the

yield levels of individual crops needs to be tested. For these purposes, we shall take two years, 1964-65 and 1970-71. These are normal years nationally and, for most regions, in terms of actual rainfall. In addition, these two years are important as 1964-65 represents the year prior to the introduction of new agricultural development strategy. Hence, we can also expect the statistical fit of various modernization indicators to differ between the two years, if the regional yield levels in 1970-71 are significantly affected after the introduction of ~~the~~ new strategy of agricultural development.

The data on the area, production and average yields are published by the Ministry of Food and Agriculture, yearly. We have utilized these data here from the various editions of "Indian Agriculture in Brief". As 1970-71 was the latest volume available here, it was not possible to use the figures on irrigation for the later years. The figures on the irrigated area to total area under the crop in the 1970-71 edition of "Indian Agriculture in Brief" refer to the figures for 1967-68 and 1968-69. For 1964-65, the figures on irrigation refer to the same year. The regional figures of consumption of chemical fertilisers per hectare are published by the Fertiliser Association of India and they refer to the years 1962-63 and 1968-69. These figures are in terms of total per hectare consumption of chemical fertilisers, for all the crops in the region. The figures on the percentage of a region's total area under improved seeds refers to two sets of figures. For 1964-65, the area under improved seeds is compiled from the data published by the Planning Commission in the two volume Report on "Regional Variations in Social Development and Levels of Living". For 1970-71, the area under improved seeds is taken to refer to the regional area under the High Yielding Varieties Programme. The figures on the

area under HYVP refer to the percentage of area to area under cereals, in 1966-67. These figures are available for 1968-69 and 1973-74. The regional area under HYVP to total area under cereals measures the regional share in the HYVP. We are then measuring if average regional yield is significantly explained by the area under HYVP. The use of irrigation, fertiliser and improved seeds figures for different years rather than those of the yield figures is not expected to affect the statistical results substantially, as the yearly variations in these figures are not expected to be large.

We have selected the following major crops for our regression analysis of regional disparities in the average physical yields: rice, wheat, total cereals, total foodgrains, sugar cane, cotton and groundnut. The regression results are summarised in Tables 5 to 9. The following symbols are used in the regression analysis.

- $X_1$  = Average physical yield per hectare in  $i$ th region in  $j$ th crop.
- $X_2$  = Percentage of region's cropped area under  $j$ th crop in  $i$ th region.
- $X_3$  = Percentage of irrigated to total area under  $j$ th crop in  $i$ th region.
- $X_4$  = Chemical fertiliser consumption in kg per hectare gross cropped area in  $i$ th region.
- $X_5$  = Percentage of  $i$ th region's gross cropped area under improved seeds.
- $X_6$  = Average rainfall in  $i$ th region.

We draw the following conclusions from the regression analysis of Tables 5 to 9.

- (1) In rice, the average regional yield is insignificantly

TABLE 5

THE REGRESSION ANALYSIS OF THE AVERAGE REGIONAL PHYSICAL YIELDS OF RICE: 1964-65, 1970-71

Eq. No.	Dependent Variable	The Regression Coefficients of Independent Variables						R <sup>-2</sup>	F-Test	N
		Constant	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>			
1	Rice, 1964-65	917.54			58.57 (3.83)*			0.55	14.72	14
2	"	1086.30				1.37 (0.33)		0.09	0.11	14
3	"	802.56		8.29 (5.86)*				0.71	34.34	14
4	"	664.52		8.57 (6.48)*			2.65 (1.72)*	0.75	21.21	14
5	"	804.28		6.91 (3.01)	14.57 (0.77)			0.75	16.89	14
6	"	866.46				3.59 (0.71)	3.10 (0.78)	-0.109	00.36	14
7	Rice, 1970-71	745.69		12.00 (8.01)*				0.82	64.20	14
8	"	1267.20	-0.26 (-0.56)					-0.08	0.32	14

(continued)

TABLE 5 (continued)

Eq. No.	Independent Variable	The Regression Coefficients of Independent Variables						R <sup>-2</sup>	F-Test	N
		Constant	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>			
9	Rice, 1970-71	1360.96					-2.09 (-0.46)	-0.06	0.22	14
10	"	1119.07			23.70 (2.28)*		-2.22 (-0.58)	0.21	2.76	14
11	"	1158.80				9.34 (1.88)	-0.95 (-0.23)	0.12	1.90	14
12	"	1013.74			23.61 (2.34)*			0.31	5.47	14

TABLE 6

REGRESSION ANALYSIS OF REGIONAL PHYSICAL YIELDS OF WHEAT IN INDIA: 1964-65, 1970-71

Regression Coefficients of Independent Variables										
Eq. No.	Independent Variable	Constant	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>	R <sup>-2</sup>	F-Test	N
1	Wheat, 1964-65	474.38		12.33 (3.35)*				0.52	5.79	12
2	"	938.24	25.54 (1.29)					0.05	0.03	12
3	"	855.41					-31.35 (-0.64)	0.05	0.03	12
4	"	11230.77			-569.05 (-2.01)		-55.26 (-1.23)	0.17	2.28	12
5		4692.61				66.69 (1.40)		0.09	2.21	12
6	Wheat, 1970-71	955.21			20.35 (0.76)			0.05	0.58	12
7	"	825.48				34.31 (1.61)*		0.12	2.60	12
8	"	119.07		22.94 (3.61)*				0.56	13.03	12
9	"	1536.25					-9.60 (0.92)	0.07	0.84	12

TABLE 6 (continued)

Eq. No.	Independent Variable	Regression Coefficients of Independent Variables						R <sup>-2</sup>	F-Test	N
		Constant	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>			
11	Wheat, 1970-71	378.70		22.13 (3.35)*			-5.48 (-0.73)	0.49	6.49	12
12	"	938.24	25.54 (1.29)					0.05	1.68	12

TABLE 7

THE REGRESSION ANALYSIS OF AVERAGE REGIONAL YIELD IN TOTAL CEREALS IN INDIA: 1964-65, 1970-71

The Regression Coefficients of Independent Variables

Eq. No.	Dependent Variable	Constant	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>	R <sup>-2</sup>	F-Test	N
1	Total Cereals 1964-65	583.70		13.15 (3.00)*				0.38	9.03	14
2	"	702.68			47.46 (2.65)*			0.36	7.04	14
3	"	245.27	5.80 (1.50)	14.10 (3.34)*				0.52	6.11	14
4	"	562.72					6.50 (2.50)*	0.34	6.28	14
5	"	462.29		9.85 (2.13)*			4.05 (1.58)	0.45	6.34	14
6	"	440.52			42.82 (3.01)*		5.81 (2.88)*	0.64	9.81	14
7	"	460.61				1.90 (0.46)	7.36 (2.26)	0.35	3.04	14

(continued)

TABLE 7 (continued)

Eq. No.	Dependent Variable	Regression Coefficients of Independent Variables						R <sup>-2</sup>	F-Test	N
		Constant	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>			
I970-7I										
8	Total Cereals	1089.16	-1.08 -(0.12)					0.08	0.14	14
9	"	754.18		16.90 (3.20)*				0.41	10.27	14
10	"	648.99				31.69 (3.21)*		0.55	15.12	14
11	"	733.18			32.17 (3.58)*			0.46	10.34	14
12	"	538.65		10.39 (2.19)*	23.57 (2.87)*			0.69	12.37	14
13	"	650.94		11.23 (2.09)*		21.15 (2.10)*		0.54	8.80	14
14	"	926.87					1.99 (0.43)	0.06	0.18	14

TABLE 8

## THE REGRESSION ANALYSIS OF REGIONAL AVERAGE YIELD IN TOTAL FOODGRAINS IN INDIA: 1964-65, 1970-71

Eq. No.	Dependent Variable	Regression Coefficients of Independent Variables						R <sup>-2</sup>	F-Test	N
		Constant	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>			
1	Total Foodgrains 1964-65	531.89		12.33 (4.56)*				0.60	20.85	14
2	"	654.63	-1.65 -(0.54)	12.13 (4.32)				0.56	9.96	14
3	"	686.86			42.43 (2.45)			0.27	6.01	14
4	"	926.50				-2.69 -(0.72)		0.03	0.52	14
5	"	559.30					6.03 (2.60)*	0.30	6.80	14
6	"	334.61		11.12 (6.40)*			4.87 (4.33)*	0.84	35.23	14
7	1970-71	664.22		19.40 (3.99)*				0.57	15.98	14
8	"	1.87	12.73 (1.57)		31.40			0.10	2.49	14

(continued)

TABLE 8 (continued)

Eq. No.	Dependent Variable	Regression Coefficients of Independent Variables						R <sup>-2</sup>	F-Test	N
		Constant	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>			
9	Total Foodgrains 1978-85	599.07			34.40 (5.14)*			0.66	26.49	14
10	"	602.87				35.12 (5.35)*		0.68	28.66	14
11	"	544.37	10.24 (2.28)*		24.34 (3.36)*			0.75	20.53	14
12	"	553.82	9.59 (2.08)*			25.21 (3.35)*		0.74	20.48	14
13	"	885.33					1.90 (0.44)	0.06	0.20	14

Table - 9

Regression Analysis of Regional Yields in Cotton and Sugarcane

1964-65, 1970-71

The Regression Coefficient of Independent Variables

Eq. No.	Dependent Variable	Constant	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>	R <sup>2</sup>	F Test	N
1.	Cotton 1964-65	109.09	1.71 (0.87)					-0.08	0.47	13
2.	Cotton 1964-65	113.74		2.03 (0.55)				0.02	0.14	13
3.	Cotton 1964-65	100.94			1.00 (1.95)*			0.19	3.81	13
4.	Cotton 1970-71	74.16			2.12 (3.88)*			0.61	15.11	13
5.	Cotton 1970-71	147.94		1.59 (0.39)				-0.01	0.15	10
6.	Cotton 1970-71m	198.14	-5.99 (-0.84)					-0.03	0.70	10
7.	Sugarcane 1964-65	5189.10	1.10 (0.02)					-0.08	0.47	14
8.	"	5377.80		-139.53 (0.37)				-0.07	0.14	14
9.	"	4062.70			17.77 (1.06)			0.01	1.14	14

Table - 9 (continued)

The Regression Coefficients of Independent Variables

Eq. No.	Dependent Variable	Constant	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>	R <sup>2</sup>	F Test	N
I0.	Sugarcane 1970-71	2297.56			38.33 (1.79)			0.61	15.11	10
II	"	5019.58		41.48 (0.77)				-0.01	0.15	10
I2.	"	5532.18	-210.51 (0.59)					-0.05	0.35	10

Note: In cotton and sugarcane it was not possible to specify the area under improved seeds as these figures refer to the area under foodgrains. The rainfall was found to be statistically non-significant in both cotton and sugarcane.

related to the percentage of region's area under rice.

In 1964-65, the irrigation and the rainfall factors accounted for 75 per cent of total variation. In 1970-71, the irrigation alone explains 82 per cent of total variation but the coefficient of rainfall is significant. The coefficient of fertiliser consumption alone gives a low  $R^2$  of 0.31.

2) In wheat, the rainfall factor is statistically non-significant. The total variation explained by the area under irrigation varies for the two years from 52 per cent in 1964-65 to 56 per cent in 1970-71.

3) In total cereals, irrigation and rainfall factors both are statistically significant in 1964-65. Coefficient of fertiliser also is significant. As compared to 1964-65, the area under improved seeds is statistically significant in 1970-71. In 1970-71, rainfall is statistically non significant. Irrigation alone accounts for only 41 per cent of total variation. Thus in total cereals' yields, the other modernization indicators are more important, in 1970-71.

4) In total foodgrains, in 1964-65 irrigation alone accounts for 60 per cent of total variation. The rainfall and irrigation together explain 84 per cent of variation. However, in 1970-71, the  $R^2$  of irrigation alone drops to 57 per cent and the rainfall is statistically non-significant. The percentage of regions area under foodgrains and the area under HUUP account for 74 per cent of variation.

5) In cotton and sugarcane, the statistical fit of the specified variables is lower than in the foodgrain crops. Irrigation alone accounts for a much lower variation in both the crops. In these crops, the soil and other factors not specified here appear to be more important.

Thus the above analysis shows that in individual crops the statistical significance of irrigation and rainfall varied as between the two years and in different crops. In all the crops in which rainfall was significant in 1964-65, had a non-significant t-ratio of this factor in 1970-71. Due to multicollinearity between the three modernization indicators we tested their significance separately. In 1970-71, importance of fertiliser and area under HYUP increased in rice, cereals and total foodgrains. Thus, this shows that the average regional physical yields in these crops are significantly affected by the levels of agricultural modernization.

### SECTION III

#### CLASSIFICATION OF INDIAN STATES BY THE EXISTING ADVANTAGES AND DISADVANTAGES IN PRODUCTIVITY LEVELS AND AGRICULTURAL DEVELOPMENT.

Utilising the 1964-65 data of major crops analysed above we can also attempt to identify the individual states with existing advantages and disadvantages in the yield levels of crops and also compare their ranking position in the various indicators of agricultural development. We can make use of the concept of location quotient to identify the agricultural base of regions vis a vis nation.

In identifying the individual states with existing advantages and disadvantages in the agricultural productivity levels, we shall compare also the high and low income group of states. The concept of location quotient may be summarised as follows:

$$I_{ij} = b_{ij}/b_i$$

where

$$b_{ij} = a_{ij}/j_i \cdot 100$$

and  $a_{ij}$  = area under  $i$ th crop in  $j$ th region

and  $j_i$  = total cropped area of  $i$ th region.

$$b_i = \frac{\sum_j a_{ij}}{T}$$

$$b_i = I_i/T$$

$I_i$  = Total area under  $i$ th crop in all regions

$T$  = Total cropped area in all the regions or system, i.e.  $\sum_i \sum_j a_{ij}$

$0 \leq I_{ij} < 1$  = less than proportionate share of the area under  $i$ th crop in  $j$ th region;

$I_{ij} > 1$  = more than proportionate share of the area under  $i$ th crop in  $j$ th region.

Tables 10 and 11 give the data on the percentage of a region's total area under  $j$ th crop, its location quotient and the absolute ( $\pm$ ) deviation of the average regional yield from the national average. We draw the following conclusions from the table. From table 10 it is possible to identify the states with varying existing advantages and disadvantages in agricultural productivity. We may divide the states into three groups of states.

(1) In the first group of states which have existing advantages in the productivity levels are Punjab, Tamil Nadu and Kerala. These states have higher than average productivity levels in all the major crops considered here, except rice in Punjab and wheat in Tamil Nadu and Kerala.

TABLE 10

## REGIONAL AGRICULTURAL CROP BASE AND THE REGIONAL PHYSICAL YIELDS IN INDIA: 1964-65

State	Region's	% of area under crop	Rice		Wheat		Cereals			Total Foodgrains				
	Aij		Iij	L.Q.	Dev	Aij	Iij	Dev	Aij	Iij	Dev	Aij	Iij	Dev
Andhra		27.12	1.20	+378	0.01	0.01	-	62.98	1.04	+ 90	73.97	0.99	- 52	
Assam		70.07	3.10	-410	0.01	-	-	71.26	1.20	+ 79	74.31	0.97	-216	
Bihar		49.02	2.17	-488	5.88	0.69	- 80	68.74	1.15	+ 28	89.13	1.19	+ 23	
Gujarat		5.29	0.23	-530	4.19	0.49	-257	41.01	0.69	-189	46.32	0.62	-152	
Kerala		32.18	1.42	+36 - 14	-	-	-	32.70	0.54	+578	34.47	0.46	+583	
Madhya Pradesh		22.80	1.01	-598	16.63	1.95	-286	62.29	1.05	-104	83.88	1.11	-107	
Madras		36.76	1.30	+ 438	-	-	-	65.97	1.11	+378	72.07	1.02	+358	
Maharashtra		7.11	0.31	-332	4.63	0.54	-451	54.36	0.91	-243	66.50	0.97	-222	
Mysore		9.80	0.43	+ 426	2.55	0.30	-391	55.99	0.94	-114	65.99	0.89	-121	
Orissa		58.21	2.58	- 16	-	-	-	60.33	1.08	-191	71.56	0.88	-171	
Punjab		5.15	0.22	+243 - II	24.25	2.85	+495	44.38	0.74	+292	71.43	0.96	+242	
Rajasthan		0.68	0.03	-	7.63	0.89	- 19	31.86	0.53	-425	76.07	0.96	-307	
Uttar Pradesh		20.68	0.91	-667	18.43	2.17	+125	37.51	0.63	- 43	85.10	1.14	+171	
West Bengal		73.09	3.24	+ 181	0.01	0.01	-	75.04	1.26	+232	87.72	1.18	+360	
National Yield per Hectare in 1964-65 (lbs)				(lbs)	National Average									
					913 (lbs)			817 (lbs)			757 (lbs)			

I036

(continued)

TABLE 10 (continued)

State	Sugarcane			Cotton			Groundnuts			Oilseeds		
	Aij	Iij	Dev	Aij	Iij	Dev	Aij	Iij	Dev	Aij	Iij	Dev
Andhra	1.14	0.48	+3494	2.92	0.55	- 59	11.58	2.59	+54	12.83	1.34	+51
Assam	1.10	0.67	- 511	0.06	0.01	- 51	-	-	-	4.97	0.51	-43
Bihar	1.53	0.01	- 557	0.01	0.01	-	0.01	-	-	2.18	0.22	-224
Gujarat	0.35	0.18	+1210	17.31	3.30	+167	17.76	3.97	+753	20.84	2.17	+159
Kerala	0.40	0.01	+ 64	0.01	0.01	-	-	-	-	1.65	0.17	-177
Madhya Pradesh	0.37	0.22	-2125	4.77	0.91	- 25	2.16	0.48	-18	0.14	0.10	-353
Madras	1.16	0.62	+3668	5.91	1.13	- 43	13.96	3.06	+207	23.35	2.44	+356
Maharashtra	0.77	0.47	+1091	14.68	2.80	+ 60	4.94	1.10	+127	5.53	0.57	+ 67
Mysore	0.73	0.33	+2900	9.07	1.73	- 28	-	-	-	13.00	1.34	+ 99
Orissa	0.54	0.33	- 262	0.01	0.01	-	1.59	0.35	-234	3.67	1.38	-103
Punjab	2.67	0.64	- 500	6.54	1.25	+175	1.29	0.28	+125	4.07	0.42	+199
Rajasthan	0.28	0.70	-3211	1.68	0.32	+ 4	1.53	0.34	+ 48	6.94	0.07	-323
Uttar Pradesh	6.46	3.98	- 548	0.01	0.01	- 7	-	-	-	17.07	1.83	- 87
West Bengal	0.64	0.39	- 915	1.08	0.20	-	-	-	-	2.39	0.25	-250
National Yield per Hectare in 1964-65 (lbs)	National Average 4696 (lbs)			123 bales			720 (lbs)			560		

Source: "Indian Agriculture in Brief" op.cit.

(2) The second group of states consists of a larger number of states. These states have a higher than national average productivity level in some of the crops in which they specialise. We may put into this group the states of Andhra, Bihar, Gujarat, Maharashtra, Mysore, Uttar Pradesh and West Bengal. Andhra has a higher than average yield in rice; total cereals, sugar and oilseeds. Bihar has less than the national average yield in rice and wheat but has more than an average yield in total cereals and foodgrains. In sugar, also, it has more than one location quotient but lower than average yield. Uttar Pradesh has less than an average yield in rice and sugar but a higher than average yield in wheat, total cereals and total foodgrains. In Gujarat, Maharashtra and Mysore the percentage of total area under foodgrains crops is lower than that under non-foodgrain crops; this is also reflected in less than one location quotient in these regions in the various foodgrain crops. In these states the productivity levels in various non-foodgrain crops in which they have more than one location quotient (cotton, groundnuts, oilseeds) are much above the national average. In sugar, we may note that Tamil Nadu, Gujarat, Andhra, Mysore and Maharashtra have less than one location quotient but the productivity levels are much above the national average in these states. In contrast, Bihar and Uttar Pradesh have much higher location quotients in sugarcane, which means that these states have three to four times larger an area under this crop than the national area. However, both in Bihar and Uttar Pradesh the yield is less than the national average. We discussed in Chapter V that the productivity levels in the sugar industry also are lower than the national average in these states compared to the southern and western states. West Bengal has more than one location quotient in the total foodgrains, total cereals and rice. In rice, the yield level in West Bengal is less than the national average, but in total cereals and in total foodgrains its yield level is more than the national average.

(3) The third group of states consists of the states which have existing disadvantages in the productivity levels in most of the crops. These states are Orissa, Madhya Pradesh, Assam and Rajasthan. Although Assam ranked high in net agricultural income, the yield levels in the major foodgrain crops is much below the national average. The high income per acre in Assam, therefore, can be attributed to its specialisation in high value plantation crops. Rajasthan, Orissa and Madhya Pradesh have a lower than average national yield in nearly all the major crops in which they specialise. These states ranked last three also by net agricultural income per acre. We conclude that the natural and acquired advantages and disadvantages of states differ. The regions with existing advantages in agricultural productivity levels consist of Madras, Punjab and Kerala. We classified the first two as high income states while Kerala, along with Mysore, was classified as "average". The second group of states consists of some high income and low income states. Maharashtra, Gujarat and Mysore (Western Region) have less than a proportionate national area under foodgrains. Due to the soil and other natural resource factors, the agricultural base of these regions consists of several non-foodgrain crops. The productivity levels of these states are above the national average in these crops but below the national average in the foodgrain crops. Bihar, Uttar Pradesh and Andhra are foodgrain producing regions. The average productivity levels in these states are above average in some of the foodgrain crops. The low income states of Orissa, Madhya Pradesh and Rajasthan have location quotients of more than one in several food crops but have low productivity levels in most of these crops.

In the acquired advantages of these states we attempted to test the significance of the various indicators of agricultural modernisation at the individual crop level. We may also examine the position of individual states in

the three variables of irrigated to gross area sown, consumption of chemical fertilisers per hectare and the percentage area under HYVP to total area under cereals. We can also include several other variables that measure the acquired advantages of the states. These are (i) multivators with assets of Rs 100,000 and above to the total cultivators; (ii) total private capital expenditure per hectare in Rs; (iii) cooperative credit loans advanced by the primary societies. We draw the following conclusions from the table. (1) The cultivators with assets of Rs 100,000 and above to total cultivators is an important indicator that measures the strength of rich farmers in each region. The proportion of rich farmers is important both with respect to the private investment as well as for attracting higher public investment. The actual use of the irrigation and other modern inputs is also likely to be positively correlated to the proportion of rich cultivators. It can be seen from the table that Punjab, Gujarat, Mysore, Kerala and Maharashtra occupy the top five ranks while Assam, Bihar, Rajasthan, Orissa and Madhya Pradesh have the last four ranks. (2) The regional disparities in private capital expenditure range from Rs 77 in Orissa and Rs 66 in Assam to Rs 339 in Punjab. (3) In the cooperative credit loans, the industrialised states occupy the first five ranks. (4) In the modernization indicators the regional disparities are striking. In irrigation, Punjab and Madras have the highest irrigation ratio. However, the irrigation ratio remains below average in the low income states of Orissa, Rajasthan and Madhya Pradesh. (5) In the consumption of chemical fertilisers per hectare in 1962-63, Kerala, Andhra, Uttar Pradesh, Punjab and Bihar occupy the first five ranks. In 1968-69, however, the fertiliser consumption increased from 2.3 to 9.0 in Maharashtra, 2.3 to 9.7 in West Bengal, and 0.9 to 2.6 in Gujarat and 3.1 to 10.7 in Rajasthan. Compared to that, fertiliser consumption remains low in some states, from 0.5 to 1.8 in Assam, 0.5 to 3.1 in Orissa and 0.9 to 1.6

TABLE II

	Consumption of chemical fertilisers (N + P <sub>2</sub> O <sub>5</sub> + K <sub>2</sub> O) Kg. per hectare of <u>gross cropped area</u>	Cooperative Credit Loans advanced by Primary Societies to Members (Rupees per hectare of gross <u>cropped area</u> .)				HYVP: % of area to total area <u>under cereals.</u>	<u>Percentage of Gross Cropped area Irrigated.</u>	
	1962-63 (1)	1968-69 (2)	1963-64 (3)	1966-67 (4)	1968-69 (5)	1973-74 (6)	1962-63 (7)	1966-67 (8)
Punjab	5.7	29.1	19.1	65.5	47.5	59.0	42.2	64.8
Gujarat	2.3	9.0	33.8	45.5	9.2	33.3	7.8	10.5
Mysore	3.1	12.9	14.3	21.1	4.7	15.0	9.2	11.4
Maharashtra	2.4	10.2	30.2	40.2	8.9	30.0	6.7	7.3
Andhra	8.6	11.3	21.3	14.5	3.6	30.8	29.5	30.2
Madras	11.0	19.5	56.3	43.0	15.6	45.5	45.2	46.1
Bihar	2.4	4.1	4.7	13.5	7.3	78.3	19.9	21.3
Uttar Pradesh	2.2	16.8	22.2	19.4	19.0	23.4	26.6	32.4
Kerala	9.4	24.8	42.7	52.8	17.4	60.0	21.0	20.0
Rajasthan	0.5	1.8	1.8	3.6	3.6	12.0	12.5	13.7
West Bengal	3.3	9.7	10.1	14.9	7.0	30.2	21.5	22.6
Madhya Pradesh	0.9	2.6	13.7	19.9	2.0	6.0	5.6	6.1
Orissa	1.0	1.6	8.3	11.1	3.4	15.0	16.4	15.3
Assam	0.3	3.1	0.6	5.9	3.1	8.3	23.3	21.6
All India								

TABLE - II (continued)

	Cultivators with assets of Rs 10,000 and above percentage to total cultivators	Total Private capital expend- iture per hectare in Rs.	Total Public Expenditure per hectare
	1961-62 (9)	1961-62 (10)	1951-65 (11)
Punjab	45.4	339	178
Gujarat	27.5	237	193
Mysore	20.9	294	160
Maharashtra	20.5	176	344
Andhra	19.8	219	221
Madras	18.9	229	232
Bihar	17.6	99	270
Uttar Pradesh	15.5	183	171
Kerala	15.3	157	379
Rajasthan	14.9	230	126
West Bengal	12.8	87	231
Madhya Pradesh	10.7	119	114
Orissa	8.4	77	177
Assam	6.1	66	184

Original Sources:

- a) Col. 1, 2, Fertiliser Association of India, New Delhi fertiliser Statistics.
  - b) Col. 3, 4, Planning Commission, Fourth Year Plan, 1969-74, p.119.
  - c) Col. 5, 6, Area under HYVP from "fertiliser Statistics -68-69" p. 514. Ministry of food and agriculture.
  - d) Col. 7, 8, computed from the data published by the Directorate of economics and statistics, Ministry of food and Agriculture.
- Col. 1 to 8 reproduced from V. Nath, "Agricultural Growth in 1970's an Analysis", op. cit. Col. 9, 10, and 11 reproduced from Rao. S.K. op. cit. and Shirmagg. H.B., op. cit.

in Madhya Pradesh. The regional averages of fertiliser consumption range from 29.0 kg in Kerala to 1.6 in Madhya Pradesh. (6) In the percentage of area under improved seeds and under HYVP also, an industrialisation bias can be noticed. The percentage of total area under HYVP shows an increase of 7.2 to 30.2 in West Bengal, 8.9 to 30.5 in Maharashtra and 9.2 to 33.3 in Gujarat. Compared to these states, the percentage shares in Madhya Pradesh, Orissa, Assam and Rajasthan remain much below the national average.

We may summarise the conclusions of this chapter as follows: In analysing the regional disparities in agriculture, we have emphasised the two main aspects, viz. regional disparities in agricultural incomes and the regional disparities in the agricultural productivity of the major crops. The former measures the income originating in the entire agricultural sector. The latter measures the average regional observed yield in the given crops. We found that the regional disparity index in agriculture is higher in income per acre than in income per worker. If we compare the value of the regional disparity index in income per acre with the value of the per worker index in manufacturing, we may say that regional disparity in agriculture is a little less than in manufacturing. In both these indices, the values of MW are lower than VW so that we can say that the value of VW is affected by a few extreme deviations with large weights. We also found that in agriculture the values of VW and MW are also affected by the random fluctuations due to bad weather so that the trends in regional inequality over time are difficult to establish unless long term data are available. The regional value of net agricultural output per worker and per acre reflects both the regional cropping pattern and the regional differences in productivity. We took the normal rainfall to represent the influence on agricultural income of the natural resource factors that determine the region's

cropping pattern. We found that the average rainfall is statistically a highly significant variable in explaining regional differences in net agricultural output per acre. The other significant factors are the percentage of irrigated to total area and the percentage of a region's total labour force engaged in agriculture. The statistical significance of these factors was tested for 1950-51, 1960-61 and 1967-68. From these three factors rainfall and irrigation ratio were not statistically significant in explaining regional value of income per worker. The percentage of a region's total labour force engaged in agriculture was negatively and significantly related to the regional value of income per worker.

In order to overcome the problems of comparisons arising due to regional differences in the cropping pattern, it is necessary to examine the productivity differences at the level of individual crops. Data on the regional physical yield of various crops, the area under different crops and the irrigated area to area under crop are made available through the Ministry of Food and Agriculture. We utilised these data to empirically evaluate the significance of natural versus irrigation, fertiliser and improved seeds in explaining regional differences in average yields of the major agricultural crops. Such analysis revealed an interesting pattern for the various crops. Except for wheat, the percentage of a region's area under crop is not significantly related to the average regional yield. In total cereals and foodgrains, regional yields are significantly related to the percentage of a region's irrigated to the total area under crop. Among the other two inputs, fertiliser consumption is significantly related to the regional yield of rice. In cereals, for 1970-71, the regional percentage of cereal area under HYVP is a significant factor. However, for 1964-65, the percentage of total area under improved seeds is not

statistically significant. In the non-agricultural crops, fertiliser consumption is a significant factor in explaining regional yield. Area under irrigation in sugarcane was not found to be statistically significant. In cotton, the irrigated area to total area under crop is significant.

The percentage of a region's cropped area under crop is one index of regional specialisation. We can also measure regional specialisation in relation to national average. Location quotients can be calculated to identify the agricultural crop specialisation of the region vis-a-vis national averages. Comparison of both these averages with the regional observed yields can enable us to identify the regions with varying existing advantages and disadvantages. Since percentage of a region's irrigated to total area under crop was not found to be statistically significantly correlated to the percentage of a region's total area under crop, except in the case of wheat, the regions with existing disadvantages are likely to have below average yields in several crops. We attempted to classify three groups of states by their existing advantages and disadvantages. We then compared the position of these three groups of states in the various indicators of agricultural development. Here, we included irrigation, fertiliser and area under improved seeds as well as the indicators of private investment, percentage of rich farmers to the total cultivators and the loans advanced by the primary cooperative societies to their members. We found that the three regions which we identified as the most advantageous regions in terms of the productivity levels of crops also rank top in the modern inputs and have a higher percentage of rich farmers and high private investment. The second group of states has a varying performance. In this group, the three industrialised states have less than the proportionate area under food-grains. In addition, the percentage of rich farmers, private investment and cooperative loans is higher than

the national average in Maharashtra and Gujarat, but not in West Bengal, Mysore also has a much closer pattern to Maharashtra and Gujarat. The low income states of Uttar Pradesh, Bihar and Andhra occupy the position between the industrialised states and the least advantageous states in the overall performance of indicators of agricultural development. The least advantageous groups of states consist of Orissa, Assam, Rajasthan and Madhya Pradesh. These states have the lowest levels of agricultural development in nearly all the indicators. In analysing the regional differences in agricultural development and the percentage of irrigated to total gross sown area, we need to emphasise the role of several factors. Firstly, the investments in irrigation in the British period were concentrated in a few regions which then acquired a long tradition of irrigation. Secondly, public investment in irrigation and agriculture under planning is distributed unequally over the regions. Since agriculture and irrigation fall in the states' outlay, the size of investment in agriculture is likely to be positively correlated to the state per capita incomes. Thus, various low income states with severe existing disadvantages in agricultural productivity levels but with large area and population shares may fail to get outlays proportionate to their needs in terms of the existing level of agricultural development and their share in population and total area. We shall pursue the analysis of the size and pattern of state expenditure in Chapter IX. Thirdly, the political strength and the bargaining power of states can also be regarded as an important factor, although its precise importance cannot be measured. The strength of rich farmers and their political representation in state governments is one way in which the "fair" share in agriculture may be asserted. The political strength of the state governments may also act as an important factor in centrally sponsored schemes and in the allocation of area under HYVP for each state.

CHAPTER VIIAPPENDIX - IRegional Differences in the Growth of Aggregate Agricultural Output in India: Some considerations.

We shall review below some of the existing literature on the subject and examine various related aspects of regional differences in growth of aggregate agricultural output in India. Table I gives the regional growth rates in agriculture over the period 1952-53 to 1964-65, the period for which the published figures are available. We can note from the table that Punjab, Gujarat and Madras rank among top three regions. The regions with less than national average growth rates are Bihar, Maharashtra, Rajasthan, Andhra, Madhya Pradesh, Orissa, Kerala, West Bengal, Uttar Pradesh and Assam. Some of these states have higher than national average growth rate in the food production so that their low aggregate growth rates reflect the low growth rates in non-foodgrain crops.<sup>1</sup> If we compare the rate of growth of foodgrains output with the regional population growth rates, the following states have growth of foodgrains output lower than that in population, viz. Gujarat, Maharashtra, Rajasthan, Madhya Pradesh, West Bengal, Uttar Pradesh and Assam.

Mitra<sup>2</sup> compares the regional population growth rates and the foodgrains output and comes to the following conclusions.

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1. These states are Bihar, Andhra and Kerala.
  2. Mitra Ashok, "Population and foodgrains output in India: A note on Disparate Growth Rates."  
"Economic Development in South Asia," Ed. E.A.G. Robinson and Michael Kidron, op. cit.

TABLE - I

Agricultural Growth Rates in Indian States, (Compound)  
(1952-3 -1964 -5)

State	ALL Crop output	Foodgrains output	Population
(1)	(2)	(3)	(4)
Punjab	4.56	4.17	2.16
Gujarat	4.55	2.08	2.61
Madras	4.12	3.66	1.25
Mysore	3.54	3.81	2.08
Bihar	2.97	3.06	2.12
Maharashtra	2.93	2.20	2.32
Rajasthan	2.74	2.42	2.68
Andhra Pradesh	2.71	3.21	1.63
Madhya Pradesh	2.49	2.82	2.51
Orissa	2.48	2.89	2.16
Kerala	2.27	3.68	2.33
West Bengal	1.84	1.14	2.92
Uttar Pradesh	1.86	0.83	1.84
Assam	1.17	0.78	3.15
All India	3.01	2.50	2.19

Source: Ministry of Food and Agriculture (Government of India), Growth Rates in Agriculture, 1952-53 to 1964-65.

To quote. "While in the first decade following Independence, the rate of growth of foodgrains output was significantly ahead of the rate of growth of population, a sharp reversal has occurred in the relationship in the more recent years. This asymmetry between the two rates of growth emerges in an acuter light if the trends in individual States are examined." He further concludes that, "Even if the entire range of years (1951-68) is considered, together the conclusion remains unaffected. Over the period 1951-68, only in four States, namely, Andhra, Madras, Punjab and marginally in Kerala has the rate of foodgrains production been higher than that of population growth.

In each of the other states, the position has been the other way round:

He further considers two factors which may affect the states' relative economic and "trade-off" position vis a vis other states. These are if the states with lower growth rates of foodgrains output have high growth rate in non-foodgrains output or if they have substantially higher industrialization. We may summarize his conclusions on above two points. Table 2 gives the compound rates of growth of non-food crops.

He concludes that "The disparity in the rates of growth of population and foodgrains output is not materially narrowed by the trends in the rate of growth of production of cash crops. "Mitra takes the compound rate of growth of per capita consumption of industrial power (1951-67) and concludes as follows on the position of states, with low rate of growth of foodgrains output. "When the states of Assam and Orissa, which show inordinately high rates of growth for the per capita power consumption on account of very low absolute magnitudes in the base year are excluded, a positive and statistically significant rank correlation

TABLE - 2

Compound rates of Growth of non-foodgrains Crops in Indian States  
(1952-53 to 1964-65)

States with more than national average (3.99) growth

Gujarat	6.62
Madras	4.17
Maharashtra	4.33
Mysore	4.06
Punjab	7.04
Rajasthan	4.04

States with near national average growth rate

West Bengal	3.77
Uttar Pradesh	3.61
Madhya Pradesh	3.60

States with less than national average growth rate

Assam	1.49
Andhra	1.60
Bihar	2.49
Kerala	1.70
Orissa	2.95
All India	3.99

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Source: Mitra Ashok, op. cit.

between the rate of growth of foodgrains output and that of power consumption is revealed, suggesting that states where the rates of growth of foodgrains production have been relatively high are also those where industrial expansion has been fastest."

Minhas and Vaidyanathan<sup>I</sup> have attempted to breakdown the sources of agricultural growth into its various components. Such as the percentage increase attributable to a) area increase, b) productivity increase, c) change in the cropping pattern and d) interaction. Their results are given in the Table 4. Although the time period covered by them is shorter, we note from the table that the percentage increase of output attributable to these four factors differs among the states. Area increase alone accounts for an important part of total variation in number of states. Percentage increase attributable to productivity increase is higher in Madras than in Punjab or Gujarat. In the high income states (per capita) of West Bengal, Maharashtra, Gujarat, Punjab and Madras the percentage increase of output attributable to the change in the cropping pattern is much higher than that in low income regions. We noted in Chapter VII that in all the high income states, the location quotient of area under foodcrops works out to be less than one for 1964-65. It can also be seen from the table that in states of Rajasthan and West Bengal the percentage increase attributable to productivity increase is negative.

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I. Minhas, Bis and Vaidyanathan,<sup>A</sup> "Growth of Crop-output in India, 1951-4 to 1958-61. An analysis by component elements in "Readings in Agricultural Development" Ed. Chaudhri Pramit, London, George Allen and Unwin Ltd. 1972.

TABLE - 3

Relative Contribution of Different Elements to the Growth of  
Crop Output - All India and states; 1951-54 to 1958-61

State	Percentage increase attributed to				Total	Overall Growth
	Area	Yield	C rop Pattern	Inter- action		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Punjab	69.93	7.98	22.80	0.29	100.00	5.14
Gujarat	22.18	21.29	25.00	11.68	100.00	4.53
Madras	19.70	52.70	68.21	2.60	100.00	9.12
Mysore	37.29	48.71	11.32	2.68	100.00	4.86
Rajasthan	102.00	18.37	6.90	9.47	100.00	4.20
Kerala	21.42	74.57	6.41	2.40	100.00	4.08
Madhya Pradesh	40.44	53.32	6.45	0.21	100.00	4.07
Mahara- ashtra	31.92	42.60	46.45	0.95	100.00	3.07
Andhra	9.74	48.75	36.61	4.90	100.00	3.05
Bihar	17.73	76.51	16.72	10.95	100.00	2.42
Uttar Pradesh	45.90	34.12	19.39	0.51	100.00	2.20
Assam	99.27	15.99	14.23	0.93	100.00	1.24
Orissa	32.34	61.07	7.33	1.54	100.00	1.05
West Bengal	83.96	54.02	74.02	4.66	100.00	6.21
All India	45.36	45.93	8.16	0.63	100.00	3.57

Source: Minhas and Vaidyanathan, op. cit.

Both Minhas and Vaidyanathan and Mitra's approaches highlight some important issues on regional differences in aggregate growth rates and these also have some policy implications.

In the other literature<sup>I</sup> on the subject we may briefly discuss number of writings that emphasize the role of irrigation in the growth of output of particular states or assess its significance in explaining inter-regional differences in the growth of crop output.

Raj. K.N.<sup>2</sup> emphasizes the role of irrigation with reference to the states of Madras and Punjab. He also compares the inter-district differences in growth rates and the growth of irrigation in these two states. He concludes that "If the achievement of high growth rates in relatively small sized holdings based on family labour is the criterion, the performance of agriculture in Punjab since second World War is therefore more note-worthy of attention than than in Mexico during this period." He further notes that "Madras like Punjab also has long tradition in irrigation and the data on district-wise performance suggests that irrigation appears to be an important source of growth. The highest growth rates of crop output appear to be in the areas in which irrigated area increased most."

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- I. In addition to the writings we discuss here mention may also be made of the following works:
    - a) Macrae John, "The relationship between Agricultural and Industrial Growth with special reference of the Development Studies, Vol. 7, July, 1971.
    - b) Krishna Raj: "The growth of Aggregate Agricultural output in Punjab"; Indian Economic Journal, July-September, 1964.
    - c) Rao C.H. Hanmumantha, "Growth of Agriculture in Punjab during decade 1952-62", Indian Journal of Agriculture Economics July;September, 1965.
  2. Raj. K.N. "Some Questions concerning Growth Transformation and planning in Agriculture in Developing Countries". in "Economic Development in South Asia", Ed. E.A.G. Robinson and Michael Kidron, International Economic Association 1970.

Ishikawa<sup>1</sup> makes the following observation regarding the role of irrigation. "However, in regard to India, at least one point seems certain; namely that the increase in per hectare yield of foodgrains and the less certain paddy for the past ten years or so has been closely related to the conditions regarding irrigation." He further adds two findings. One, that the gross irrigated area of land in foodgrains crops increased during 1952-53 to 1961-62 by 4,321 thousand hectares. Of this increase, 57% is accounted for by Madras, Kerala, Andhra and Punjab, the states where irrigation ratios were originally among the highest. Secondly, as the result of the above factors as well as the fact that per hectare yields of foodgrains are higher in the states with higher irrigation ratios, the differential of per hectare yields of foodgrains among the states is increasing." This finding is supported by him by the following regression:

$$0.5357^{**}$$

$$y = 1.0014 + 0.0089 \times (R^2 = 0.357)$$

$$x = \text{Gross Irrigation Ratio (1956-57)}$$

$$y = \text{Annual Growth Rate of Per Hectare Yield of Foodgrains between 1952-53 and 1961-62.}$$

As can be seen, the empirical support is very weak. His empirical support is still weaker on the relation between the annual growth rate of per hectare yield of foodgrains for the same period and the increase in irrigation ratio between 1952-53 and 1962-63, as a proportion of the irrigation ratio in 1952-53.

$$y = 0.8449 + 0.0061 \times (R^2=0.384)$$

Rao, S.K.<sup>2</sup> takes a somewhat different model regarding the significance of the irrigation factor in explaining the inter-regional differences in growth rates. His model runs as follows:-

$$\Delta O/O = a + b_1 \frac{\Delta I}{S} \cdot \frac{1}{p} + b_2 \frac{\Delta D}{S} \cdot \frac{1}{p} + b_3 \frac{\Delta D}{S}$$

1. Ishikawa Shigeru, "Economic Development in Asian Perspective" Economic Research Series, No. 8. The Institute of Economic Research, Hitotsubashi University, Kinokuniya Book Co. Ltd., 1967, p. II2.

2. Rao, S.K. op.cit.

where  $\Delta\%$  = Percentage Increase in crop output between 1952-53 to 1964-65.

$\frac{\Delta I}{S} \times 100$  = growth in irrigation - 1951-52 to 1965-66.

$P$  = Average output per acre, Rs.

$\frac{\Delta D}{S} \times 100$  = Percentage increase in gross non-irrigated area between the same time period.

Thus the growth of output is attributable only to two factors, viz., the growth in area under irrigation and the extension of area under non-irrigated land, assuming that for any given region the average output per acre on irrigated and non-irrigated land remains constant through time. In his empirical test, irrigation together with the dry land variable explains only 60 per cent of variation and this fit drops if the dry land variable is excluded. Further, objection to the above approach arises due to the basic assumption of constant productivity on irrigated and non-irrigated land over the time period, and thus excluding the component in the total growth that is attributable to increases in productivity.

However, in spite of the limitations of the empirical test, Rao, S.K. concludes, "Thus irrigation can be said to be an important factor in explaining inter-regional differences." Taking this as the basis he then farther investigates the regional differences in public and private investment in agriculture, to conclude as follows:

"1) The most important proximate cause for the disparities in growth is the difference in growth of irrigation. 2) Public investment played a major role in bringing about this growth of irrigation. 3) It is doubtful whether private investment per se has been responsible for the inter-regional differentials."

We believe that because of the objections to his empirical model as well as relative lack of empirical support, these conclusions need to be interpreted cautiously.

In our cross-sectional analysis of Chapter VII we attempted to test the significance of irrigation at two levels, viz. regional net agricultural income per acre and per worker and also at the level of individual crop. Such analysis revealed irrigation to be significant in explaining average regional yield in various major crops. Thus, while we agree regarding the role of irrigation in the growth of crop output of individual states and also irrigation significantly influencing the average regional physical yields of various major crops, the conclusions regarding its role based on the aggregative models need to be drawn very cautiously.

We may summarize briefly the policy issues raised from the above discussion as follows:

Given the objectives of attaining a minimum national growth rate of food production consistent with the demand for food based on the national parameters, the emphasis in agricultural policy on maximizing the growth in regions with existing natural and acquired advantages can be justified. A regional resource allocation oriented towards these objectives may fail to reduce the disparities between regional growth of food output and population growth in the individual states. If the prospects of these states for trade-offs by way of non-food production and higher industrialization are poor, then it raises equity issues regarding the distribution of gains from the rapid growth of output in few regions. Such a pattern of resource allocation can be further justified if a vigorous national food distribution policy exists. In absence of this, the political and social tensions arising out of continued concentration of growth in few regions can lead to deeper imbalances in the political and social fabric of the nation. So on these grounds, there is a case for a higher development effort in agriculture in the states with existing disadvantages. We shall further analyse the pattern of regional resource allocation in agriculture in Chapter IX.

Finally, in assessing the role of irrigation, in addition to the factors analysed so far (in Chapter VII and in aggregative models) we also need to examine the position of individual states with respect to potentiality for various types of irrigation, actual irrigation facilities created and the level of utilization of these facilities. We shall consider some of these aspects in Chapter IX.

CHAPTER VIIAPPENDIX - 2Regional Differences in Rural Poverty and Agricultural Structures in India, Some Considerations

Utilising the National Sample Survey, Report No. 184, seventeenth Round, (Sept. 61 - July, 62), "Tables with notes on consumer Expenditure". V.M. Dandekar and Rath<sup>I</sup> have estimated the national and regional levels of rural poverty. In this appendix we shall first discuss how these estimates are arrived at, their limitation and then examine the regional levels of rural poverty in relation to the agricultural structures of states. Our purpose is to discuss the various inter-relationships and their possible implications rather than to offer firm conclusions.

On the basis of various considerations they have taken an intake of about 2,250 calories per capita per day as adequate under Indian conditions of climate etc. From this, it was estimated that in 1960-61 an annual per capita consumer expenditure of RS 170 was essential to give a diet at least adequate in respect of calories. The cost of minimum living varies not only between rural and urban areas but also as between the rural and urban areas of different states. This is partly due to differences in prices and partly due to differences in consumer preferences. To quote, Dandekar, "It is therefore possible to find for each state, the level of

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I. Dandekar V.M. and Rath, "Poverty in India -I, Dimensions and Trends," The economic and Political Weekly, Jan. 2, 1971 and also "Poverty in India: Policies and Programmes", Jan. 9, 1971, The same Journal.

consumer expenditure at which a diet of 2,250 calories is reached and the proportion of the population below this poverty line. For each state, the monthly per capita expenditure class in which a diet of 2, 250 calories is reached differs and so the does the percentage of population below this poverty line." Table I gives the estimates of rural population below the poverty line in states. We may note the following points from the table.

- 1) Given the different expenditure class that is required to reach the desired minimum intake of calories there are groups of states with similar expenditure class at which they reach the minimum intake level but with different levels of rural poverty. In Punjab, Gujarat, Mysore, Bihar and Orissa the expenditure class at which the minimum calories level is reached is RS 13-15. The percentage of population below poverty line is 13.98 in Punjab, 19.09 in Gujarat, 26.92 in Mysore as compared to 25.79 in Madhya Pradesh, 37.38 in Bihar and 43.88 in Orissa.
- 2) In Madras, Andhra and Maharashtra, West Bengal and Assam the desired calorie level is reached at an expenditure class of RS 18-21 per month. In these states the percentage of rural population below poverty line ranges from 62.14 in Andhra, 55.19 in Madras to 61.04 in Maharashtra, 43.88 in West Bengal and 47.67 in Assam.
- 3) In Rajasthan and Uttar Pradesh the expenditure class is the lowest at RS 8-11. The percentage of rural population below poverty line is below the national average.

TABLE - I

Percentage of Rural Population in the States with  
an Inadequate Intake of Calories

State	Monthly Per Capita Expenditure Class (RS)	Per Capita Total Annual Consumption Expenditure (RS)	Total Calorie Equivalent Diet	Percentage of Rural Population Below this level
(1)	(2)	(3)	(4)	(5)
1. Rajasthan	8-II	120	2495	13.29
2. Uttar Pradesh	II-13	146	2237	18.13
3. Madhya Pradesh	13-15	147	2475	25.79
4. Jammu & Kashmir	13-15	165	2380	13.69
5. Punjab (Inc. Haryana)	13-15	165	2402	13.98
6. Gujarat	13-15	164	2222	19.09
7. Mysore	13-15	172	2238	26.92
8. Bihar	13-15	169	2198	37.36
9. Orissa	13-15	167	2342	43.86
10. W. Bengal	18-21	299	2233	44.09
11. Assam	18-21	233	2260	47.67
12. Tamil-Nadu	18-21	235	2321	55.19
13. Mahara-shtra	18-21	238	2303	61.04
14. Andhra-Pradesh	18-21	236	2355	62.14
15. Union Territories	21-24	276	2388	43.70
16. Kerala	34-43	464	3007	90.75
Total	-	-	-	38.00
All India	13-15	170	2194	30.92

Source: Dandekar and Rath "Poverty in India I Dimensions and Trends" Economic and Political Weekly, Jan - 2, 1971, p. 29.

4) In Kerala, the expenditure class is the highest at RS 34-43 and the percentage of population below the poverty line is estimated at 90.75. This high proportion of rural poverty in Kerala is attributed to two factors by Dandekar, viz. the high cost of living and the regional pattern of diet.

Thus, we can conclude that the percentage of rural population below poverty line shows considerable inter-regional variation in each expenditure class, so that regional differences in cost of living alone cannot be regarded as the explanatory factors of regional levels of rural poverty.

We may take the estimates of rural poverty as given in col. (5) of table I and analyse these in relation to the various indicators of agricultural structures in states. In table - 2 we give data on some important indicators in this regard, col. (2) in table - 2 gives the percentage of rural wage labour households to total households. This measures the proportion of rural households that depends on the agricultural wage as the means of livelihood. The proportion of this labour force is highest in Eastern and Southern States which had a different tenancy system, than the Northern and Western states. The figures of the regional land ownership pattern and concentration also reflect regional variations in these complex historical factors. Col. (6) and (7)

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I. See Dandekar V.M., op. cit.

TABLE - 2

Selected Indicators of Agricultural structures of  
Indian States, 1960-61

State	Rural wage labour households as % of all rural households	Gini Concentration Ratio of operational holdings	% of Rural Households with less than one acre
(1)	(2)	(3)	(4)
Kerala	36.70	0.739	72.39
Punjab	15.83	0.747	53.78
West Bengal	33.83	0.646	44.16
Assam	15.92	0.618	44.09
Gujarat	19.79	0.679	38.76
Madras	36.31	0.732	56.43
Orissa	29.75	0.624	35.57
Uttar Pradesh	15.20	0.626	37.21
Mysore	23.56	0.685	36.32
Maharashtra	30.00	0.706	38.57
Andhra	34.74	0.756	50.63
Madhya Pradesh	22.60	0.634	28.35
Bihar	32.88	0.679	38.76
Rajasthan	11.76	0.667	25.39

TABLE 2 (Contd.)

State	% of rural population below poverty line (1961-62) (5)	% of operational holding in 1-5 acres (1960-61) (6)	% of operational holdings in 10 acres and above (1960-61) (7)	Proportion of cultivated area under pure and mixed tenancy to total cultivated area (1961) (8)
Kerala	90.75	77.21	2.51	57.21
Punjab	13.98	37.62	37.49	48.60
W. Bengal	44.09	74.71	6.86	34.95
Assam	47.67	68.51	3.51	34.63
Gujarat	19.09	35.56	40.45	13.33
Madras	55.19	85.91	6.79	21.92
Orissa	43.88	76.67	11.52	21.91
Uttar Pradesh	18.13	69.87	10.97	8.61
Mysore	26.92	38.00	31.12	32.62
Maharashtra	61.04	35.56	30.64	22.69
Andhra	62.14	70.49	20.41	23.32
Madhya Pradesh	25.79	41.06	33.16	19.91
Bihar	37.38	76.67	8.17	32.18
Rajasthan	13.29	33.74	43.13	10.99
All India	30.92	61.69	18.51	22.41

- Sources: 1) Col. 2, Agricultural Labour Enquiry  
 2) Col. 3, Sau Ranjit, "On Rural Poverty; A tentative Hypothesis", Economic and Political Weekly, Vol. VI, No. 52, Dec. 1971.  
 3) Col. 4, Census of land holdings, op. cit.  
 4) Col. 5, Dandekar V.M. and Rath.  
 5) Col. 6, 7, Census of Land Holdings. op. cit.  
 6) Col. 8, Census of India, 1961.

Note: Col.(3) gives the gini concentration ratio of the area between diagonal line of complete equalization and lorenz curve of the land distribution to the entire triangular area under the diagonal.

give the indicators which would significantly affect the demand for hired labour. Among the historical factors giving rise to regional differences in agricultural structures, the most noteworthy are the differences in tenurial systems known as Zamindari and Ryotwari areas.<sup>1</sup> The zamindari system was in existence in Assam, West Bengal, Bihar, Uttar Pradesh, Orissa and parts of Andhra Pradesh and Tamil Nadu. Similar systems also prevailed in parts of Madhya Pradesh and princely states of Hyderabad and Rajasthan. Ryotwari system affected only the Western and Northern States. In addition to these regional differences in the tenurial systems, the tenurial reforms legislation since Independence has been very uneven. Here also, the tenancy reforms have been more progressive in the Western States than the old Zamindari states.

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1 'Zamindari' system refers to the system of intermediate tenure under which the government determined the total revenue payable to the state which was to be collected by the intermediaries called 'zamindars' or 'jagirdars'. Thus revenue settlements were not with actual tillers of land but with a group of superior holders who were in effect revenue farmers. In the later revenue settlements, the British government introduced direct system of collecting revenues which was known as 'ryotwari' system. See in this connection, Dandekar V.M., Rath N. "Poverty in India - II Policies and Programmes" Economic and Political Weekly, Jan 9, 1971.

give the indicators which would significantly affect the demand for the hired wage labour. For examining the inter-relations between these variables and the regional income per worker and acre in agriculture we give below the correlations Matrix between these variables. In table 3<sup>b</sup> we also give the regression analysis on some of these variables.

Although we cannot claim to offer any firm conclusions on the complex inter-relations between these variables we may draw attention on the following points from the pattern of correlations in the table 3.

1. We can see that the extent of regional rural poverty is positively and significantly correlated to the percentage of households with less than one acre which measures the proportion of the households without land. The regions with higher proportion of wage labour households also have lower agricultural wage and secondly the availability of cheap hired labour may allow the intensification of agriculture and lead to more labour intensive but higher value cropping pattern. Thus we can explain to some extent a positive correlation between the regional income per acre, and the rural poverty.

2. The correlations also give a <sup>negative</sup> ~~positive~~ and significant correlation between the regional income per acre and the average size of holding.<sup>1</sup> and a negative correlation between the concentration of operational holdings in 10 acres and above and income per acre. Since

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1. The correlation coefficient between regional income per acre and the percentage of operational holdings in 1-5 acres works out to be positive and significant

TABLE - 3(A)

Correlation Matrix on the Selected Variables

	X1	X2	X3	X4	X5
X2	0.766	-	-	-	-
X3	0.743*	0.394	-	-	-
X4	-0.783*	-0.293	-0.548*	-	-
X5	0.708*	-0.268	-0.559*	0.972*	-
X6	0.701*	0.220	0.680*	-0.615*	-0.615*

Notes:

- X1 = Net Agricultural Income per acre in RS, 1961
- X2 = Net Agricultural Income per worker in RS, 1961
- X3 = Percentage of rural population with less than one acre.
- X4 = Percentage of operational holdings in 10 acres and above
- X5 = Average size of holding
- X6 = Percentage of rural population below poverty line.

TABLE - 3 (b)

Regression Analysis of Regional Levels of Rural Poverty

$$Y = 26.54Ia + 0.805 x_1 - 0.141 x_2 - 2.08 x_3 \quad (R^2 = 0.65, F \text{ test } 6.30)$$

(2.06)\*
(-0.93)
(-1.69)\*

where y = percentage of rural population below poverty line  
 $x_1$  = percentage of rural population with less than one acre.  
 $x_2$  = percentage of dry area to total regional area.  
 $x_3$  = average size of holding

average regional income per acre reflects both the influence of cropping pattern and the productivity levels, we cannot reach firm conclusions on the controversy regarding the farm size and productivity.<sup>1</sup>

The statistical computations above offer very interesting pattern of relationship. This relationship suggests that the extent of regional level of rural poverty is significantly influenced by the pattern of land ownership and by the regional proportion of the rural households without land. Historically and since Independence the land ownership pattern has evolved differently in the various regions. Regions with higher average output have also higher percentage of agricultural labour households and higher levels of rural poverty. In addition, as we saw earlier, an extremely high level of rural poverty (90% of Kerala which ranks first by net agricultural income per worker and per acre.) reflects also the regional differences in cost of living.

We have so far not commented on whether fixing an arbitrary calorie intake minimum as the dividing line for classifying the rural population above and below poverty line can be regarded as satisfactory from the welfare point of view, such a measure has obvious advantages over income

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I. See Rudra Ahhok, "Farm size and Yield per Acre" Economic and Political Weekly, Special Number, July, 1968 and also in October, 1968.  
See also Rao S.K., op. cit.  
See bibliography for more references on the farm-size productivity controversy based on the evidence of farm management data.

or other related measures. In so far as the national minimum calorie intake is arrived at allowing for regional differences in climate and dietary conditions that exist over the sub-continent there are no substantial arguments for rejecting these estimates or asserting that it is almost impossible to arrive at universally agreeable definition and thus not worthwhile to attempt to measure it. However difficult the policy aspects of rural poverty may be, its existence cannot be denied and its dimensions at national and regional level cannot be ignored.

REGIONAL DISPARITIES AND STRUCTURAL CHANGE  
IN AN  
UNDERDEVELOPED ECONOMY:  
A CASE STUDY OF INDIA.

Mrs. Madhavi Majmudar

Ph.D Thesis submitted  
to the Faculty of Arts,  
University of Glasgow.

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Volume II



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## CHAPTER VIII

### Regional Policy in India: An analysis of Issues

#### Section I Regional Policy in India: A Statement of Issues

In Chapters III through VII we examined the degree and structure of regional disparities at various levels. We can conclude from this analysis that: (1) significant regional differences in economic structures exist and these are reflected in the overall regional levels of per capita and per worker income. (2) At sectoral level, high regional inequality exists in the aggregate value added per worker and at a disaggregated level in both manufacturing and agriculture. The existence of these disparities thus provides one ground to analyse the regional policy framework in India and consider the scope for policy measures to correct regional imbalances at the national level. In this context, we need to examine the relation between the national and regional goals and the possibilities of a conflict between these goals. In addition, we need to distinguish the regional policy framework in an economy undergoing structural change from that in more industrialised countries. We shall examine these issues in Section I. In Section II we relate the discussion of Section I to an examination of regional goals in Indian plans. Whether or not the plans specify the regional goals, regional allocation of resources is implicit in the national planning as the states account for a considerable proportion of the total government expenditure and, in addition, the central assistance is an important source of financing the state plans. Thus, for evaluating the regional framework in India, we need to empirically assess the regional resource allocation under planning in terms of size and pattern of state development expenditure and the direct central investments. We pursue this analysis in Chapter IX.

We can begin with a brief outline of the major issues with which regional policy measures in more industrialised countries are concerned, and distinguish the

factors that are likely to differ in the context of economies at a different stage of development. The specific policy measures adopted in the individual countries differ and we discuss here only the broad areas of policy. These relate to (1) the policy measures that are directed to stimulate the regional level of activity by way of measures that lead to "work to workers"; (2) the policy measures that are aimed towards "workers to work". This includes fiscal and pricing policy which aims at regional allocation by either altering the prices of inputs of production or the output at the commodity level; (3) specific policy measures that are aimed at minimising the regional differences in economic welfare.

Stillwell<sup>1</sup> sums up the controversy regarding the first set of issues as follows: To quote, "The primary argument relates to the loss of economic growth which is caused by interference with the location of industry. It is contended that only when given free choice will businessmen select the optimal location for their plant: and that any restriction on that choice will lead either to the plant not being established at all, being established in an inferior location with resulting loss of efficiency or being established in another country with no such restrictions. Reliance on labour mobility is said not to incur such economic costs because there is no interference with the location decisions of industry."

The advocates of measures of "work to workers" relate their arguments on three basic points. (1) In the case of many industries, costs vary little among alternative locations. (2) Firms do not necessarily make optimal location decisions. Hence, redirection of industry need not necessarily involve additional private costs. (3) The whole efficiency argument is couched in terms of private rather than social costs. The private and social costs are likely to diverge as the latter includes the congestion costs of further agglomeration and the costs of providing additional social capital. Depending on which of the two strategies or a combination of the two is adopted, the policy measures taken by way of price policy or specific direct controls will differ. The specific policy measures

1. See in this connection:

(1) Stillwell, J.B., "Regional Economic Policy; Macmillan Studies in Economics", The Macmillan Press Ltd., 1972.

(2) Brown, A.J. "Framework of Regional Economics in U.K.", 1972

(3) Richardson, H.W., "Regional Economics", op.cit.

will also depend on the classification of regions at which they are directed. These classifications may range from the depressed areas, problem areas, backward areas or congestion areas. By and large, the regional policy issues in the developed countries arise out of the inadequacy of a market solution to correct regional imbalances. Secondly, regional imbalances that persist affect a small part of the national area and population, but have acquired special priority due to the social acceptance of certain minimum goals of welfare regarding regional differences in unemployment rates and the standards of living.

We grant that the regional policy framework for an underdeveloped economy is likely to differ from that in the more developed countries which we have outlined above. The main factors in which the regional policy framework will differ in an underdeveloped economy undergoing structural change may be briefly summarised below.

(1) In an economy undergoing a process of structural change which involves rapid spatial shifts, the role of short-term corrective measures is limited. Examples of short-term corrective measures applied in the developed economies are the various financial and tax subsidies and grants that aim to influence the factor or product prices so as to attain a greater balance between the demand and supply of labour and capital. Another example of short-term measures is the government expenditure as a policy tool to influence the demand by budgetary surplus and deficits. Limitations of these measures as policy tools in the context of structural change are that the correction of regional disparity would involve creating conditions of higher regional growth in the low income regions and at the same time allow higher national economic growth to be attained by concentrating on the growth of established regions. Therefore the policy measures that are advocated for influencing the effective demand are less relevant, as the basic problem is that of creating additional productive capacity.

(2) We argued in Chapter I that the inter-regional and inter-sectoral mobility which played an important role in the developed countries has a restricted role in an under-developed economy, because of the rapid population growth and the rate of investment and employment growth being lower than the required rate of growth to draw the labour away from the low productivity regions or sectors. We also stated that the movements of private capital are likely to be disequilibrating. Hence, in this context the regional approach that emphasises the measures related to "work to workers" is more relevant.

(3) Under planning in India, national goals are adopted to attain higher national economic growth and also to attain more egalitarian distribution of income between different groups of people. Our analysis of Chapter III showed that the low income regions in India account for nearly 48 per cent of the total population. On the grounds of equity alone, however defined, the policy measures need to be directed towards raising their "development share" in the national economic development. Differences are likely to arise in defining the "minimum development share" or the development efforts of the low income regions. In addition, the political criteria of development share may differ from those based on economic criteria that attempt to take into consideration the needs and potentialities of the different low income regions.

(4) The experience of developed countries shows that the regional imbalances are not self-corrective. The post-war period in which the per capita incomes in many developed countries converged was also a period of active government intervention. The argument that, in the long run, at a higher stage of development growth will either spread to the backward regions or that more resources will be made available to the backward regions amounts, in the Indian context, to allowing nearly fifty per cent of the total population to slip into a long term stage of low income and low development. In addition, India has already undergone

a critical phase of national development and completed four Five Year Plans. Rapid strides at national level were attained during this period in terms of industrialisation, import substitution and also in agricultural progress. Hence, more emphasis can now be placed on spreading the economic growth to the low income regions. Emphasis in such an approach should be on manipulating the national policy variables to attain the desired spatial goals.<sup>1</sup> We consider that the above arguments establish the case for a national policy for regional development in India and other economies at a similar stage of development.

We can now proceed to examine the relation between the regional goals and the other goals of national economic development. The possibility of a conflict between the regional and other goals has led many writers to conclude that the regional goals are a luxury for the economy undergoing spatial shifts under the constraint of limited resources. The controversy on the relevance and form of regional goals has centred around several related aspects and we may consider some of these arguments here. It is argued that the goal of maximising national income growth is likely to come into sharp conflict with the objectives of reducing regional disparities, as the resources are limited and need to be concentrated in the regions of highest returns. Thus, Lefebvre<sup>2</sup> concludes as follows: "Regions which have existing advantages can grow faster than others. In the process of growth, employment opportunities increase, a flow of labour from other regions is attracted which should have a beneficial effect

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1. (a) See in this connection, Friedmann, John, "Regional Development Policy: A Case Study of Venezuela", MIT Press, 1966, p.5. "It is by manipulating the national policy variables that the most useful contributions to the future of regional economies can be made." (b) See also Rodwin Lloyd, "Choosing Regions for Development", 'Regional Development and Planning: A Reader', Ed. Friedmann, John and Alonso, William, MIT Press, 1968. (c) Alonso, William, "Urban and Regional Imbalances in Economic Development", Economic Development and Cultural Change, Vol.17, No.1, 1968.

2. Lefebvre, L., "Regional Allocation of Resources in India", in "Regional Development and Planning: A Reader", Ed. Friedmann, John and Alonso, William, p.645.

both on industrialising areas and on the stagnant regions. Furthermore, rapidly growing areas can yield surpluses for future investment. Such surpluses arise from the profits of expanding private and state enterprises and from increasing private incomes, which in turn lead to larger savings and taxes. Initially, a good part of the savings must be used to maintain growth in the vigorous centres; but as savings continue to increase and new investment outlets are needed, more and more resources can be channelled to the development of other areas which, in turn, will raise the living standards of the local population and create new surpluses and resources for continued development. The latter will manifest itself in the creation of 'growing points' in other previously stagnant or slowly moving areas. In good time, the number of growing areas should increase to a density adequate to the regional balance. It is a paradoxical conclusion that, for developing retarded areas, the growth of the more advanced regions must be encouraged. If the latter is stifled because of insufficient investment on an uneconomical scale, surpluses will be insufficient and stagnant regions which are unable to raise their own savings must be doomed to an even longer period of waiting and poverty." Thus, this argument amounts to recommending spatial goals that are aimed at higher growth in the regions with "existing advantage". Such an approach is not a rejection of regional goals in the period of rapid economic development but having goals that will aid or enhance the growth of the "best" regions so as to attain a better regional balance at some future date.

The EEC<sup>1</sup> Report makes the following observation on this issue. To quote, "The difficulty arises from the

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1. "Location of Industrial Plants",  
EEC, 1968.

fact that in most cases the problem of industrial location is associated with drastic differences in income levels between regions. The economic logic demanding concentration of industrial investment in "best" regions is therefore challenged by very important social and political considerations. There are also economic arguments for the promotion of new industrial poles of growth in backward areas in developing countries." The EEC Report further states that "...the arguments presented above should not lead to the conclusion that the solution to regional problems in developing countries should be postponed or neglected. It is suggested that, in the initial stages of economic development of those countries, the regional problems are relatively less important." We may note from the above two quotations that, although the conflict between "efficiency" and "equity" is recognised in both approaches, they lead to different conclusions. Lefeber advocates planned expansion of regions with existing advantages while the EEC Report regards regional problems as relatively less important. Rahman<sup>1</sup> makes a further relevant point regarding the regional differences in the rate of saving. "As a general conclusion we may say that national income is not necessarily maximised by concentrating on the most productive region of a country if regional rates of saving are not identical. Whether a less productive region can offer a significantly higher rate of saving (more specifically a higher internal rate of growth) than a more productive region is a matter of specific enquiry for the country concerned. A priori, the rate of saving in a region does not have a direct connection with productivity. Saving is a function not only of income but also of social habits, institutions and, in a controlled economy, of the administrative and political ability of the central authority to squeeze saving out of the region. It is quite conceivable that, in a particular country, a less productive region may happen to offer a higher

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1. See Rahman, M.A., "The Regional Allocation of Investment", "Regional Development and Planning", op.cit. p.667.

rate of savings. In this case, the possibility of switching the programme cannot be ruled out."

We may now take these three arguments for further discussion. In examining the conflict between "efficiency" and "equity" we need to consider the meaning of concepts more clearly. In the discussion of investment criteria, we make a distinction between the various maximising goals of national economic development. Both the rate of investment and its sectoral allocation would differ in accordance with the specific maximisation goal that is adopted. For example, various maximising goals of "efficiency" or "growth" can be spelled out in terms of goals such as "maximisation of current income", "the maximisation of growth rate over a short period of time" and "maximisation of a long term growth rate of economy". It is asserted in planning literature that planning implies adopting a long term strategy towards economic growth in which returns to investment are not necessarily measured or specified with reference to either a single year or a short term plan period. Similarly, the conflict between "efficiency" and "equity" can be viewed in relation to these goals being phased out over a period of time rather than as goals of short term maximisation.

The following points are relevant in easing the conflict between the goals as phased out over a time period. Firstly, viewed over a longer time period,<sup>1</sup> the efficiency goal includes opening new resource frontiers or what is termed as "the extension of periphery". Secondly, raising the rate of investment in low income regions in the infrastructure investment may be regarded as building ahead of demand. Over a longer period of time, the factors outlined by Rahman may be particularly relevant and thus government policy may be directed towards attaining the desired rate of saving. Thirdly, the "equity" interpreted in terms of equalisation of regional incomes or equalisation of personal incomes is a proposition that may conflict with the efficiency objective over any time span considered. In the

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1. By longer time period we mean simply that the goals and the resultant allocations are based on projections of "costs" and "returns" that stretch beyond the given plan period as it is applied in the sectoral allocation of national resources.

regional analysis, the "equity" goals can be expressed in terms of various trade-offs and time spans in accordance with society's preferences. It is extremely difficult to lay down the equity goals that would suit societies and economies at different stages of development. Evaluation of regional policy goals in different countries suggests that regional goals are expressed more in terms of bringing those below the national average nearer to the average rather than creating convergence by reducing the positive deviation of high income regions. Thus, equity goals may be expressed in terms of goals to be attained over a time span and as efforts to create long term conditions of economic growth in low income regions. When the concept of "equity" is viewed in this context, it appears to be less sharply in conflict with the long term efficiency objectives. Fourthly, we may argue that the degree of conflict between the "efficiency" and "equity" objectives needs to be distinguished with reference to different forms of investment. Investments in public health education and other social services need to be diffused in relation to a uniform measure such as per capita need or in relation to some other measure. In other sectors such as transport, power and communications which involve bulky long gestation investments, the investment has to be concentrated at strategic points. However, here it is possible to visualise the conflict between the need to concentrate these strategic investments in the high growth regions which have an existing higher demand for them or to allocate them to the regions with low levels of infrastructure by building ahead of demand. In the other sectors of manufacturing and agriculture also, the degree of conflict between the "efficiency" and "equity" is likely to vary. Existence of such regional differences in the degree of conflict between the "efficiency" and "equity" objectives give some grounds for considering these objectives not merely in exclusive terms but as those with varying trade-offs both with reference to time span involved as well as the form of investment.

Lastly, we need to distinguish several factors that may act towards reducing the returns from public investment in the

high income regions. The location decision of an individual firm is governed by the objectives of maximization of the profit or net returns based on the estimates of private costs. These do not include the diseconomies arising out of further congestion, the extra demand for social services arising due to a given location or the environmental costs of further agglomeration. In considering the returns to public investment on the basis of social costs and benefits, the inclusion of the above costs may reduce the profitability gap between the high productivity regions and low productivity regions.

We conclude that the regional policy is crucial in India because of the following considerations:-

- (1) The nature of the development process in India indicates a limited role of inter-regional migration of labour force. As the capital flow can be expected to be disequilibrating, the regional imbalances can be corrected only by measures to raise income and productivity levels in the low income regions. On equity grounds alone, since low income regions account for nearly 46 per cent of the total population, the regional development needs of such a large population cannot be neglected.
- (2) The experience of more developed countries shows that time by itself cannot act as a corrective process.
- (3) Finally, regional allocation decisions are implicit in the national planning decisions as the national planning operates through multi-regions. Whether or not the regional allocation under planning was directed to raise the development share of low income regions is a matter of empirical substantiation. In the federal multi region set-up, the political case for regional policy cannot be overemphasised. However, we shall keep these arguments separate and examine their relevance later on.

SECTION IIREGIONAL GOALS IN INDIAN PLANNING

We can now discuss the regional goals in Indian planning. India recognised the existence of regional problems from the early years of planning. Regional goals are specified in the Second and Third Five Year Plans in some detail. To quote the Second Five Year Plan<sup>1</sup>, "In any comprehensive plan of development, it is axiomatic to say that spatial needs of less developed areas should receive due attention. The pattern of investment must be so devised as to lead to balanced regional development. The problem is particularly difficult in the early stages when total resources available are very inadequate in relation to needs; but more and more as development proceeds and larger resources become available for investment, the stress should be on extending benefits of investment to the underdeveloped regions. Only thus can a diversified economy be built up." The Second Five Year Plan also lays down the specific policy variables in this regard. These are (i) through decentralised industrial production; (ii) in the location of new enterprises, public or private, consideration should be given to the need for developing a balanced economy for different parts of the country. The Third Five Year Plan<sup>2</sup> further emphasised the role of public sector projects. To quote, "The benefits of a large project accrue in greater measure to the population of the region in which it is located if certain related or complementary programmes are undertaken. Therefore, as an essential feature of planning, every major project should be regarded as the nucleus for integrated development of the region as a whole." The Third Five Year Plan also emphasises the need for spatial dispersal of the public sector projects. To quote,

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1. Second Five Year Plan, Government of India, Planning Commission, 1956, pp. 36, 37.

2. Third Five Year Plan, Government of India, Planning Commission, 1961, Chapter IX.

"From the decisions which have been reached so far, it is apparent that there will be a fair measure of dispersal and various regions will have a significant share in industrial development. As examples, the following may be cited: expansion of oil refinery fertiliser plant and use and distribution of natural gas in Assam; expansion of fertiliser capacity and construction of shipyard in Kerala; the synthetic drug factory; Vishakhapatam, Andhra Paper Mills in Andhra, expansion of Nepa Mills; the Bhibi Steel Plant and Heavy Electrical project in Madhya Pradesh; the antibiotics factory, fertiliser factory, refractories plant and expansion of precision instruments in Uttar Pradesh; development of copper deposits in Rajasthan; a machine tool factory in Punjab; surgical instruments plant; raw film project, pilot iron and steel plant, Niveli lignite high temperature carbonisation plant in Orissa; teleprinter factory and steel rolling mills in Madras; oil refinery in Gujarat and a cement factory in Jammu and Kashmir."

We may note from the above quotations that the plan documents recognise the need for regional balance as well as the instruments through which these can be achieved. However, the plans do not specify what is to be "balanced" and over what time period. Regional goals are expressed in terms of the "needs of backward areas" without laying any specific criteria for measuring the needs. We may refer to the various committees that assessed the needs of different areas either for areas within the state or for identifying the states.

The planning commission study group at the time of formulation of the Fourth plan requested state governments to pay special attention to the backward areas within the state. The backward areas within the state were classified into five categories in accordance with their needs and potential for development: (i) desert areas; (ii) chronically drought affected areas; (iii) hill areas including tribal areas; (iv) areas with high concentration of tribal population; (v) areas with high density of population, low levels of income, employment and living standards. The study group

suggested 15 indicators to identify the areas within the state that need special attention.<sup>1</sup>

The task of identifying less developed states creates difficult theoretical and conceptual problems. In the regional policy, per capita income is taken as an important indicator as it enables classification of the regions in terms of the differences in economic structures. In the Indian plans the classification by per capita income and other related measures created problems as CSO does not publish state income data. Up to the end of the Third Plan, the plan documents do not classify <sup>States</sup> by the level of development. In the criteria of central assistance to the states, also, the income variables or other economic variables are not specified in determining the quantum of central assistance to each state.<sup>2</sup>

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1. These 15 indicators may be summarised below:

(1) total population and density of population; (2) number of workers engaged in agriculture; (3) cultivable area per agricultural worker; (4) net area sown per agricultural worker; (5) percentage of net area sown more than once to total net area sown; (6) percentage of irrigated area to net sown area; (7) per capita gross value of agricultural output; (8) number of manufacturing establishments using electricity; (9) number of workers per 100,000 of population employed in registered factories; (10) number of commercial vehicles registered in the district; (11) surface roads per 100 square miles and 100,000 population; (12) percentage of literate population; (13) percentage of school going children in 6-11 and 11-14 years age groups; (14) number of places per million population for technical training; (15) hospital beds for 100,000 of population.

2. We shall discuss these issues in more detail in Chapter IX.

At the meeting of the Committee of the National Development Council in 1968, two working groups were set up to study the problem of regional imbalances. One working group<sup>1</sup> was to recommend the criteria for identification of backward states and the second study group<sup>2</sup> was to recommend fiscal and other financial incentives for starting industries in the backward areas. We shall take up the recommendations of these two groups for further discussion in the next chapter. We may summarise here the criteria used by the committee to identify industrially backward states and union territories.

The following criteria were used to identify industrially backward states; (i) Total per capita income. (ii) per capita income from industry and mining. (iii) number of workers in registered factories. (iv) Per capita annual consumption of electricity. (v) Length of surfaced road in relation to area and population. (vi) railway mileage in relation to area and population.

Besides the states of Assam, Jammu and Kashmir and Nagaland, the average percentage of the following states is lower than the national average: Andhra Pradesh, Bihar, Madhya Pradesh, Orissa, Rajasthan and Uttar Pradesh. These are the states which we classified as 'low income regions'. It may be noted here that broad classification of "high" and "low" and "more developed" and "less developed" states is not altered in the number of studies<sup>3</sup> which take different variables for classifying regions. Thus, inclusion of various social and economic variables such as infant mortality, literacy and infrastructure variables does not shift the

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1. Known as Pande Committee.
  2. Under the chairmanship of Wanchoo.
  3. See Introduction. Ch. 1. Some of these studies are (1) Mitra, Census of India, 1961; (2) Rao, S.K.; (3) Pal, M.N.

ranking of the low income states to a more favourable position. Rao, S.K.<sup>1</sup> in his factor analysis using productivity variables and some social and economic indicators suggested that the economic distance between the more developed and less developed remained virtually unchanged between 1950-51 and 1965-66. In our income analysis we considered several structural factors that may be regarded as significant in explaining deviations of regional per capita income and per worker income. Thus, we may conclude that the low income regions that we have identified may also be regarded as less developed when several other variables are included. The Planning Commission Study Group referred to above is the first official report to recognize per capita income as one of the indicators in classifying industrially backward states. Our discussion of regional goals in Indian planning shows that, although regional goals exist in Indian planning, these goals are not adequately specified in a number of aspects that we discussed in Section I. Secondly, there is a tacit assumption (as in the EEC Report) of the conflict between regional goals and the growth objectives. At the same time plans emphasise use of several policy instruments to attain regional balance. The long-term economic projections of Indian planning do not discuss the criteria of regional allocation of resources. In the short-term Five Year Plans, the emphasis on regional goals exists with reference

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1. Rao, S.K., op.cit. Chapters 2 and 3. He classifies the states taking the distance from the richest to the poorest group as follows:

<u>A</u> <u>Most Developed</u>	<u>B</u> <u>Not so Developed</u>	<u>C</u> <u>Least Developed</u>
West Bengal	Madras	Kerala, Andhra
Maharashtra	Mysore	Pradesh, Rajasthan,
Gujarat	Punjab	Bihar, Assam,
		Orissa, Madhya
		Pradesh and Uttar
		Pradesh

He takes the following six indicators to measure the level of regional development in his study: (1) per capita crop output; (2) per capita output in large-scale industry; (3) workers in manufacturing other than household industry; (4) consumption of industrial power; (5) literacy rate and (6) infant mortality rate.

to a number of specific spheres. The issues such as location of public sector projects have received a lot of attention also because of their being political issues. An important area of policy is the size of state plans and the sectoral allocation of state plans. Under the federal set-up, states are a vital part of the overall planning process. An important part of the total plan expenditures is incurred through states and there is a clear division of the central and state government expenditure in each sector. The Third Plan recognises the role of state plans as follows. To quote, "With development on a scale larger and more comprehensive than in the recent past, the Third Plan provides extensive opportunity for the development of different parts of the country. Some of the most important programmes in the plan fall necessarily within the plans of states. In drawing up these plans, the broad objectives have been to enable each state to contribute its best towards increasing agricultural production; to secure the largest measure of increase in income and employment feasible, to develop social services, in particular elementary education, water supply and sanitation and health services in rural areas, and to raise the levels of living in less developed areas. Thus, state plans are intended to be oriented towards greater production and employment and the welfare of weaker sections of the population. Every effort has been made to propose outlays for different states considering their needs and problems, past progress and lags in development, especially in social services, communications and power likely to contribute to the achievement of national targets and potential for growth as well as the contribution in resources which they make towards financing of their plans. In assessing the needs and problems of different states, such factors as population, area, pressure on cultivated land, commitments carried over from the Second Plan projects and the state of technical and administrative services available have been taken into account. Thus, as far as possible, an attempt has been made to consider both national and State priorities. Taken as a whole, the

size and pattern of outlays in the states in the Third Plan are calculated to reduce the disparities in development of different states, although in the nature of things this is a process which must take time. This statement shows that state plans are recognised as an important policy variable to reduce regional disparities."<sup>1</sup> Table 1 gives the data on the proportion of total expenditure of the various sectors accounted for by the state expenditures. It can be seen from the table that the states accounted for 49 and 44 per cent of the total financial outlays in the Third and Fourth Five Year Plans.

In the Third Plan, the states accounted for 86, 98, 87, 52 and 66 per cent of the total expenditure in agriculture and community development, major and medium irrigation, power, village and small industries and social services respectively. The states' share in the outlays on organised industry and minerals and transport and communications is 5 and 10 per cent only. Thus the size and pattern of state outlays needs to be analysed in greater detail. In the next chapter we shall attempt an empirical evaluation of state development expenditure and its relation to regional income change. We will also recapitulate our earlier conclusions on the role of public sector investment and discuss the measures to induce private investment in the low income regions. In the sectoral allocation of the state plan expenditures, inter-regional allocations in agriculture and major and medium irrigation are very important policy variables. Regional allocations in these sectors need to be examined closely. Finally, an empirical evaluation of the policy variables should enable us to give some guidelines on the national policy of regional development.

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1. Third Five Year Plan, Government of India, op.cit., p. 147.

TABLE 1

FINANCIAL OUTLAYS OF STATES AND CENTRE IN THIRD AND FOURTH FIVE YEAR  
PLAN OF INDIA (IN RS CRORES)

Sector	States	Percent- age	Union Terri- tories	Centre	Percent- age	Total Percentage
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Agriculture and Community Development	919	86	24	125	13	100.0
Major and Medium Irrigation	630	98	2	18	2	100.00
Power	880	87	23	109	12	100.00
Village and Small Industries	137	52	4	123	48	100.00
Organised Industry and Minerals	70	5	ny	1450	95	100.00
Transport and Communications	226	10	35	1225	90	100.00
Social Services and Misc.	863	66	87	350	34	100.00
Inventories	-	-	-	200	-	
TOTAL	3725	49.5	175	3600	49.0	100.00

(continued)

TABLE 1 (continued)

## (FOURTH PLAN)

	States	Centre	Centrally Sponsored	Total
	(8)	(9)	(10)	(11)
Agriculture and Allied Sectors	1425.51	1104.26	126.83	2728.18
Irrigation and Flood Control	1050.39	23.50	-	1086.57
Power	1919.07	424.72	22.0	2447.57
Village and Small Scale Industries	783.06	148.65	5.10	293.13
Industry and Minerals	183.06	3150.86	-	3337.71
Transport and Communications	482.54	2622.00	42.00	3237.26
Education	499.89	241.00	30.00	822.66
Scientific Research		140.26	-	140.26
Health	185.75	53.50	176.50	435.03
Family Planning	-	-	315.00	315.00
Water Supply and Sanitation	167.10	3.80	2.00	405.79
Housing, Urban and Regional Development	167.10	48.60	-	237.63
Welfare of Backward Classes	77.43	0.50	59.50	142.38
Social Welfare	10.54	27.43	2.00	41.38
Labour Welfare	27.02	10.00	-	39.90
Other Programmes	92.54	90.68	-	192.31
TOTAL	6606.47	8089.76	780.93	15902.16
Percentage	44	55	1	100

Source: Third Five Year Plan, Government of India, Planning Commission, 1961, p.58 and Fourth Five Year Plan, Government of India, Planning Commission, 1970, p.57.

CHAPTER IXAN EMPIRICAL EVALUATION OF REGIONAL POLICY IN INDIA

In this chapter we shall examine the policy instruments empirically as they operated under planning. The size of state development expenditure is an important measure in the analysis of regional resource allocation under planning, as opposed to the vague statements of regional balance in the plan documents. Section I evaluates the role of state development expenditure in the regional income change. The state development expenditure does not include the direct central investments in manufacturing, transport, etc. In Section II we examine the role of public projects in regional development and the policy measures taken to promote private investment in industrially backward states. In the sectoral allocation of state development expenditure, the regional allocations in agriculture are of special significance because of agriculture's importance in the national and regional economies and also, as we saw in Chapter VII, high regional disparity exists in agriculture. We examine the regional allocation of investment in agriculture and irrigation in Section II. The Appendix at the end of the chapter discusses the regional sectoral allocations in the other sectors. In Section III, a few guidelines are given on the regional policy in India.

SECTION IROLE OF STATE DEVELOPMENT EXPENDITURE IN REGIONAL INCOME CHANGE

In the empirical evaluation of regional policy in India, the analysis of state development expenditure is of vital importance and it can be taken as a proxy for state development effort as it includes state expenditures in the important sectors such as agriculture and irrigation, flood control, power, education and other social infrastructures.<sup>1</sup> The state development expenditure excludes the direct central investments and also the non-development expenditure incurred by the state on non development activities.

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1. See Chapter VIII, Table 1, for the proportions of total government expenditure in each sector incurred by the states.

development activities. If we take a given time period, we may then examine the relation between a region's growth of total income and the size of development expenditure. For measuring the total development effort, we may take accumulated development expenditure of an average, say three years; thus, if it is a five year period, we exclude the first and last year from the calculation of the accumulated development expenditure, and allow for some time lag between the accumulated development expenditure and the region's change in income.

The total expenditure of the state is financed from ~~from~~ ~~from three~~ sources: (1) the state's own revenue raising effort; (2) share in the divisible taxes and grants awarded by the finance commission and (3) central assistance in the form of planning grants and loans. We may point out here that although we are taking the accumulated development expenditure as an independent variable in analysing regional income change, it is likely to be positively related to the region's base level income, as richer regions can raise more resources of their own than the poorer ones. On the other hand, if there is substantial transfer of central resources to the low income regions so as to increase the size of their development expenditure, the relation between the accumulated development expenditure and the initial level of income may change. Similarly, it is possible to stipulate that the relation between a region's income change and the initial level of a region's income may change from a positive significant statistical association to a negative one, if the low income regions have a higher income change than the higher income regions. Statistical non-significance of both the size of a region's income as well as the accumulated development expenditure would mean that the other factors not specified in these two variables or the random factors such as weather may be more important in influencing a region's income change.

A region's income change may be measured by several variables. Some of these are average growth rate, percent-

age increase in the region's income and the absolute additional regional NDP over the relevant time period. Where possible, average growth rate was tried but its results were found to be statistically non-significant. The use of regional percentage increase in NDP or net industrial output creates difficulties due to very unequal base level incomes so that for some states small increases in output will result in very large percentage changes. We recognise that even in taking additional absolute values, we cannot overcome all the problems arising from the unevenness of base level incomes. Limitations in our approach also arise because of the limitations of basic data themselves. In our simple model, because of the <sup>data</sup> difficulties we cannot include variables such as regional export base and direct central investment. However, we consider the empirical testing of the role of development expenditure in regional income change crucial in understanding the regional resource allocation under planning in India. We distinguish our approach from the estimates of regional multiplier by some writers.<sup>1</sup> Although the concept of regional multiplier is useful, the basic limitations in the context of many underdeveloped economies arise because the basic data<sup>2</sup> required to estimate the regional leakages are not available. An estimate of regional multiplier on the basis of national parameters has very little operational value. In our simple model here, we may attempt to measure income elasticity of state development expenditure for the various time periods considered here, and draw some conclusions from it within the general limitations of the data. On a priori grounds we may say, however, that we can expect <sup>some</sup> regional differences in the income elasticity of development expenditure in the high income and low income regions.<sup>3</sup>

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1. See Hug, M., "A Study of Government Expenditure - with Special Reference to Economic Development in Pakistan", an unpublished M.Litt. Dissertation, University of Glasgow, 1972. "Regional Multiplier in East Pakistan", Appendix to Chapter I.

2. Basic data required to estimate regional multiplier consist of regional values of propensity to save, import and tax.

3. As we examined in Chapter 6 the agglomeration of private investment in high income regions means that both in terms of existing demand for social capital and the response of private sector's investment ~~to the given increases in~~ to the given increases in government expenditure are likely to be higher than in the low income regions.

## THE METHODOLOGY AND SOURCES OF DATA

The major source of data on Indian state finances in the Bulletin of the Reserve Bank of India, which annually reviews the state finances since 1951-52. As the state boundaries have changed since 1951-52 some problems arise in choosing the appropriate state units. In analysing state income data we used the data on 14 major states after the reorganisation. NCAER state income data for 1950-51 and 1955-56 are in terms of these reorganised states. Here also we shall use a similar procedure and convert the state expenditure data for the period 1951-52 to 1955-56 in terms of reorganised states. For the states of Maharashtra and Gujarat which were formerly the state of Bombay, we will keep the reorganised Bombay State for 1950-51 and 1955-56. This reorganised Bombay State was bifurcated in 1959-60 to form the separate states of Maharashtra and Gujarat. Table I gives the formulae used in computing the expenditure levels in terms of reorganised state boundaries. Since we are concerned with the state's total development effort, we shall take development expenditure which is arrived at by deducting non-development expenditure from the total expenditure. Non-development expenditure consists of items such as civil administration, debt services, collection of

TABLE 1

FORMULA FOR ESTIMATING STATE EXPENDITURE (FOR THE POST REORGANISATION STATES) FOR 1951-52

State	Add	Deduct
Andhra Pradesh	(1) 35% of composite Madras (2) 54.3% of Hyderabad State	-
Bombay	(1) Saurashtra (2) 35.8% of pre-1956 Madhya Pradesh (3) 25.5% of Hyderabad	(1) 14.5% of pre-1956 Bombay State
Kerala	(1) Travancore-Cochin (2) 8.3% of composite Madras	-
Madhya Pradesh	(1) 64.2% of pre-1956 Madhya Pradesh (2) Madhya Bharat (3) Bhopal State (4) Vindhya Pradesh	-
Mysore	(1) 14.5% of pre-1956 Bombay State (2) 20.2% of Hyderabad State (3) 5.1% of Composite Madras (4) Coorg (5) Pre-1956 Mysore	-
Punjab	(1) Pepsu State (2) Punjab	
Rajasthan	(1) Ajmer State (2) Rajasthan	
Madras	-	(1) 35% included in Andhra (2) 8.3% included in Kerala (3) 5.1% included in Mysore

Source: Reserve Bank of India Bulletin, June 1966

taxes, etc. In computing development expenditure, we have combined the development expenditure both on current and capital account in a given year to arrive at the total development expenditure. This total development expenditure excludes all central investments in organised industry and minerals, transport and communications as well as in other sectors. We do not have data to include a specification of this component of total regional investment, although we analysed the data on these items for a few planning years in Chapter VI. As we mentioned earlier, the state's development effort measured in this way is financed from various sources. Appendix 1 at the end of the chapter examines these sources. Among the other sources, it includes the central loans and grants, which is one of the main factors in determining the size of total development expenditure in the low income states.

The estimates of increase (or additional) in NDP over the relevant time periods is calculated from the NCAER and IIP0 data for the three time periods for which data are available, viz., 1950-51, 1955-56, 1955-56 to 1960-61 and 1960-61 to 1967-68. The estimates of additional net industrial output are also calculated from the same sources.

ESTIMATING MODEL: We may now specify our simple model and the estimating equations of the regression analysis. In the regression analysis we use two types of variables. In accordance with that, we may divide the regression analysis into two parts, as follows:

Part I. We may regard additional NDP or industrial output as a function of two variables, viz. the accumulated development expenditure (a three-year average) and the initial level of region's output. Thus,

$$\Delta y = f(\Sigma DE, y_{ito})$$

As dependent variables of  $\Delta y$  we use additional NDP in  $i$ th region ( $i \dots 13$  or  $14$ ) and alternatively additional net industrial output over the relevant time period in  $i$ th region (i.e.  $1 \dots 13$  or  $14$ ).

$y_{ito}$  = Base level regional NDP (or net industrial output) in the beginning of each time period. We expect multicollinearity between the  $\Sigma DE$  and  $y_{ito}$ . However, an

assessment of these two factors separately and together can reveal an interesting pattern of relationship between the following variables: (a)  $\Delta y$  and  $\Sigma DE$ ; (b)  $\Delta y$  and  $y_{ito}$  and (c)  $y_{ito}$  and  $\Sigma DE$ . It is possible to visualise that this relationship will change over the relevant time periods. We attempt regression analysis of individual time periods as well as pooled regressions. We also estimate the income elasticity of development expenditure for different time periods and for pooled regressions.

In the second part, we attempt to overcome the multicollinearity problem by looking at the relation between the regional change and development expenditure as proportions of base level income, i.e.

$$\Delta y / y_{ito} = f\left(\frac{\Sigma DE}{y_{ito}}\right).$$

We then add state dummy variables to include the state effect not specified in the above variable. We regard such an analysis as important in evaluating the size of state development expenditure as the policy variable. However, we need to point out again that the conclusions from the empirical results need to be drawn, keeping the limitations of the basic data in mind. The results of regression analysis may now be presented as follows:

The following notations are used in the regression analysis for the various dependent and independent variables:

- $X_1$  = Additional NDP in the time period  $t$  in Rs. 100,000, in  $i$ th region.
- $X_2$  = Additional net industrial output in the time period  $t$  in  $i$ th region, in Rs. 100,000.
- $X_3$  = Accumulated development expenditure in Rs. 100,000 in  $i$ th region.
- $X_4$  =  $y_{ito}$  - the NDP in the beginning of the time period in Rs. 100,000.
- $X_5$  = The net industrial output in the beginning of the time period ( $t = 0$ ) in  $i$ th region, in Rs. 100,000.

REGRESSION ANALYSIS: PART I

Table 2 gives the regression results on these variables for the individual time periods. Table 3 gives the results of pooled regressions.

TABLE 3

POOLED REGRESSIONS: 1950-51 to 1967-68

No. of Equation	Dependent Variable	Constant	Independent Variables			R <sup>2</sup>	N
			X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
12	29.I3 (2,37) X <sub>1</sub>	807.00	0.433 (2.68)	0.110 (3.04)*		0.52	40
13	29.I3 (2,37) X <sub>2</sub>	-1197.04 (-1.31)	0.074 (1.54)		0.288* (5.32)	0.61	40

(Figures in Brackets are f-ratios; \* gives significance at 0.05 level)

We may draw the following conclusions from Tables 2 and 3:

- (1) The significance of  $\Sigma DE$  alone has varied over the different time periods and between  $X_1$  and  $X_2$ .
- (2) When  $\Sigma DE$  is considered alone, the  $\Sigma DE$  is significant for all the three time periods. However, only in the period 1955-56 to 1960-61 does  $\Sigma DE$  alone give a high  $R^2$ .
- (3) When  $\Sigma DE$  and  $y_{ito}$  are introduced together, the regression coefficient of  $\Sigma DE$  is rendered statistically non-significant. The  $y_{ito}$  variable is significant in 1950-51 to 1955-56 and 1955-56 to 1960-61. It is not significant in the last period with reference to the  $X_1$  variable. We consider, therefore, that the random factors such as bad harvest are more important during this period.
- (4) The statistical fit with reference to the  $X_2$  variable also varies for different time periods.  $\Sigma DE$  alone is significant

TABLE 2

REGRESSION ANALYSIS OF REGIONAL INCOME CHANGE IN INDIA, 1950-51 to 1967-68

Equation Number	Dependent Variable	Constant	Regression Coefficients of Independent Variables			R <sup>2</sup>	N	F Test
			X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
1950-51 to 1955-56								
1	X <sub>1</sub>	3243.89 (0.73)	1.02 (2.13)*			0.29	13	4.57 (I, II)
2	X <sub>1</sub>	4503.13		0.0918 (2.38)*		0.34	13	5.68 (I, II)
3	X <sub>2</sub>	-145.11	-0.138 (-1.62)		0.040 (7.92)*	0.92	13	62.85 (2, IO)
	X <sub>2</sub>	-1229.95 (-1.01)	0.403 (3.08)*			0.52	13	13.49 (I, II)
1955-56 to 1960-61								
4	X <sub>1</sub>	-18547.50 (-2.79)	2.318 (5.92)			0.73	13	35.13 (I, II)
5	X <sub>1</sub>	-7392.77 (-1.28)	0.188 (0.27)	0.252 (3.42)*		0.86	13	40.53 (2, IO)
6	X <sub>2</sub>	-7869.09 (-1.72)	0.753* (2.80)			0.36	13	7.87 (I, II)
7	X <sub>2</sub>	-2959.17 (-0.74)	0.0459 (0.141)		0.499 (2.84)*	0.61	13	10.57 (2, IO)
1960-61 to 1967-68								
8	X <sub>1</sub>	10146.10	0.519 (1.60)*			0.10	14	
9	X <sub>1</sub>	14273.28 (I, IS)	0.113 (0.16)	0.082 (0.65)		0.063	14	1.43 (2, II)

(continued)

TABLE 2 (continued)

Equation Number	Dependent Variable	Regression Coefficients of Independent Variables				R <sup>2</sup>	N	F Test
		Constant	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
1960-61 to 1967-68 (continued)								
10	X <sub>2</sub>	-1077.54 (-0.56)	0.218 (3.67)*			0.49	14	13.49 (1.12)
11	X <sub>2</sub>	97.79  (0.058)	0.111 (1.68)*		0.132 (2.42)*	0.69	14	12.45 (2,II)

Notes: Figures in brackets give  $F$  ratios; \* give significance at 0.05 level.

in all the three time periods but is rendered non-significant when introduced with  $y_{ito}$ .  $y_{ito}$  is significant in all the three time periods.

(5) In the pooled regressions, the multicollinearity problem is less acute as the regression coefficients of both the variables are statistically significant.

The multicollinearity problem between  $\Sigma DE$  and  $y_{ito}$  shows that the high income states have a higher total  $\Sigma DE$ . The pattern of relationship between the  $\Sigma DE$  and  $y_{ito}$  as well as between  $y_{ito}$  and  $\Delta y$  may also be analysed in terms of the simple correlations between these variables. The fact that the simple correlations between these variables change over different time periods is evidence of some shift of resources to the low income regions. Table 4 gives the simple correlations between the various variables. We may note the following points from Table 4.

(1) Although it may appear to start with that the introduction of the variable  $y_{ito}$  would only indicate that the region's income change is predominantly influenced by the initial conditions, the pattern of simple correlation together with the regression analysis shows that this is not entirely the case. Column (3) in Table 4 shows that the correlation between  $\Delta y$  NDP and  $y_{ito}$  is high and positive only for the 1955-56 to 1960-61 period.

(2) Column (2) shows that the positive significance between  $\Sigma DE$  and  $y_{ito}$  also declines. However, if we take  $\Sigma DE/y_{ito}$  and  $\Delta y$  NDP (column (5)), then there is an inverse relation between the regional income change and  $\Sigma DE/y_{ito}$  ratio. This is one indication that the low income states have increased their DE proportionate to their level of income. However, the regional income change continues to be higher in high income regions.

(3) The correlation between  $\Delta y$  industrial and  $y_{ito}$  also indicates positive and significant relation, but the value of the coefficient declines from 1950-51 to 1967-68.

Both the regression analysis and the pattern of simple

TABLE 4

SIMPLE CORRELATIONS BETWEEN THE ABSOLUTE NDP AND THE DEVELOPMENT EXPENDITURE

$\frac{\Sigma \text{DE and } y_{ito} \text{ NDP}}{X_3 \quad X_4}$		$\frac{\Sigma \text{DE and } y_{ito} \text{ Industrial}}{X_3 \quad \text{and} \quad X_5}$	
(1)		(2)	
1950-51			
to			
1955-56	+ 0.91*	0.80*	
1955-56			
to			
1960-61	+ 0.91*	0.76*	
1960-61			
to			
1967-68	+ 0.88*	0.65*	
$\Delta y \text{ NDP and } y_{ito} \text{ NDP}$		$\Delta y \text{ Ind. and } y_{ito}$	$\Delta y \text{ NDP and } \frac{\Sigma \text{DE}}{y_{ito}}$
$X_1$	and $X_3$	$X_2$ and $X_5$	$X_1$ and $X_6$
(3)		(4)	(5)
1950-51			
to			
1955-56	0.58*	0.95 *	-0.21
1955-56			
to			
1960-61	0.94*	0.82 *	-0.50
1960-61			
to			
1967-68	0.45	0.78 *	-0.53 *

\* gives significance at 0.05 level.

correlations show that the significance of  $\Sigma DE$  and the  $y_{ito}$  variable varied over different time periods and between the two variables considered here. From the regression analysis, we can also calculate the income elasticity of state development expenditure with reference to both the regional NDP and net industrial output. These are given in Table 5. If the value of elasticity is less than 1 it shows that a unit of state development expenditure results in a less than a unit change in income. The converse would be the case if income elasticity was more than 1. Income elasticity of government expenditure is more than 1 only in the period 1955-56 to 1960-61, the period in which the simple correlation between  $\Sigma DE$  and  $y_{ito}$  was found to be the highest. The last period in which there was some evidence of a greater shift of resources to low income regions has an income elasticity of only 0.55 with reference to NDP. One explanation is that we can expect the income elasticity of government expenditure to be higher in high income regions, as they already have a high level of social infrastructures and concentration of private investment and higher levels of productivity in the industrial sector. However, the importance of these factors versus the influence of the random factors of bad harvest years in this period cannot be precisely quantified. If the role of government expenditure in low income regions is that of building ahead of demand, low elasticities may continue for some time. The above computations also show that the income elasticity of government expenditure is higher with reference to industrial output than with respect to net domestic product. Thus, the development expenditure is more elastic with reference to increase in net industrial output than with respect to additional regional NDP.

#### REGRESSION ANALYSIS: PART II

The importance of government expenditure can also be assessed by taking a slightly different model in which both the regions' income change and government expenditure are taken as ratios of the absolute level of the income in the beginning of the time period. Thus,

Table - 5

Elasticities of State Development Expenditure and the Initial Levels of Regional  
Income with reference to the Regional Income Change

1950-51 to 1967-68

<u>State Development Expenditure</u>		$X_3$		
1950-51 to 1955-56	Elasticity of $X_1$ with reference to elasticity of $X_2$ with reference to	0.71		
1955-56 to 1960-61	Elasticity of $X_1$ with reference to Elasticity of $X_2$ with reference to	2.00		
1960-61 to 1967-68	Elasticity of $X_1$ with reference to Elasticity of $X_2$ with reference to	0.56		
		1.09		
<hr/>				
Pooled Regressions		$X_3$	$X_4$ NDP Yito	$X_5$ Industrial
1950-51 to 1967-68	Elasticity of $X_1$ with reference to	0.40	0.53	-
	Elasticity of $X_2$ with reference to	0.32	-	0.80

Notes Table - 5

1. Elasticity of dependent variable ( $X_1$  or  $X_2$ ) with reference to independent variable<sup>2</sup> = regression coefficient of Independent variable

$X$  Mean of Independent Variable  
Mean of Dependent Variable

2. The elasticities of  $X_1$  and  $X_2$  with reference to individual time periods are estimated from the equations that specify the government expenditure alone. In pooled regressions, in which the multicollinearity problem was found less acute they are estimated from the equations as given in Table 3.

3. We have estimated the elasticities with reference to Yito variables only in the pooled regressions because of the multicollinearity problem.

$$X_1/X_4 = f(X_3/X_4)$$

i.e.  $\Delta y/y_{ito} = f(\Sigma DE/y_{ito})$

and  $X_2/X_5 = f(X_3/X_5)$

i.e.  $\frac{\Delta y}{y_{ito}} \text{ Industrial} = f\left(\frac{\Sigma DE}{y_{ito}}\right) \text{ Industrial}$

Here we can overcome the problem of multicollinearity between the  $y_{ito}$  and  $\Sigma DE$  as both sides are ratios. It is then interesting to examine the relation between the expenditure-income ratio and the change in income at the level of the individual state. To allow for the influence on income change of the quantitative and qualitative factors that vary among states but are not specified in the expenditure-income ratio, we can specify the 'state effect' in our formulation. Thus, we exclude one state which forms our basis of comparison and then measure the state effect of being in a particular state when other state effects are zero. The state variables can be included in our pooled regressions. Tables 6, 7 and 8 give the regression results of individual time periods and the pooled regressions. We may draw the following conclusions from Tables 6, 7 and 8.

(1)  $\Sigma DE/y_{ito}$  is positively related to  $\Delta y \text{ NDP}/y_{ito}$ , except in the first time period. The significance of  $\Sigma DE/y_{ito}$  varies in the different time periods. The regression coefficient of  $\Sigma DE/y_{ito}$  is significant in the period 1955-56 to 1960-61 and in the pooled regressions. The significance of  $DE/y_{ito}$  also varies with reference to  $\frac{\Delta y}{y_{ito}}$  industrial for different time periods. It is

TABLE 6

REGRESSION ANALYSIS OF REGIONAL INCOME CHANGE AND STATE DEVELOPMENT EXPENDITURE AS PROPORTIONS OF THE INITIAL LEVELS OF INCOME: 1950-51 to 1967-68

Time Period	Equation Number	Dependent Variable	Regression Coefficients of Independent Variable			R <sup>2</sup>	N
			Constant	X <sub>3</sub> /X <sub>4</sub>	X <sub>3</sub> /X <sub>5</sub>		
1950-56	14	X <sub>1</sub> /X <sub>4</sub>	0.158 (1.97)	-0.019 (-0.026)		-0.09	13
"	15	X <sub>2</sub> /X <sub>5</sub>	0.172 (3.92)*		-0.0029 (0.068)	0.09	13
1955-1960-61	16	X <sub>1</sub> /X <sub>4</sub>	-0.087 (-1.13)	+1.620 (4.43)*		0.60	13
"	17	X <sub>2</sub> /X <sub>5</sub>	0.287 (3.10)*		-0.0037 (-0.082)	-0.090	13
1961-68	18	X <sub>1</sub> /X <sub>4</sub>	0.173 (1.25)	+0.393 (0.98)		-0.0029	14
"	19	X <sub>2</sub> /X <sub>5</sub>	0.131 (1.65)*		+0.108 (4.33)*	0.61	14
Pooled Regression	20	X <sub>1</sub> /X <sub>4</sub>	0.0798 (2.14)	+0.716 (4.67)*		0.34	40
	21	X <sub>2</sub> /X <sub>5</sub>	0.124 (3.13)*		+0.096 (5.58)*	0.43	40

Figures in the brackets give t-ratios. \* gives significance at 0.05 level.

TABLE 7

Equation No. 22 Dependent Variable  $X_1/X_4$ 

	Independent Variable	Regression Coefficient	T-Value
	Constant	0.190	3.57
$X_2/X_5$	$X_2/X_5$	0.643	5.10
Andhra	$D_1$	-0.140	-2.00
Assam	$D_2$	0.102	1.41
Bihar	$D_3$	-0.940	-1.34
Kerala	$D_5$	-0.163	-2.32
Madhya Pradesh	$D_6$	-0.0750	-1.07
Madras	$D_7$	-0.666	-0.95
Mysore	$D_8$	-0.166	-2.37
Orissa	$D_9$	-0.162	-2.288
Rajasthan	$D_{10}$	-0.187	-2.58
Punjab	$D_{11}$	-0.97	-1.39
Uttar Pradesh	$D_{12}$	-0.151	-2.21
West Bengal	$D_{13}$	-0.144	-2.07
State missed out is Bombay			

R Squared Adjusted 0.59

R Squared Unadjusted 0.73

F Test (13.25) = 5.25\*

N = 39

\* Significant at 0.05 per cent level

TABLE 8Equation No. 22    Dependent Variable  $X_2/X_5$ 

	Independent Variable	Regression Coefficient	T-Value
	Constant	0.328	4.50*
$X_2/X_5$	$X_2/X_5$	0.114	5.11
Andhra	D <sub>1</sub>	-0.316	-2.99*
Assam	D <sub>2</sub>	-0.412	-3.94*
Bihar	D <sub>3</sub>	-0.201	-1.99*
Kerala	D <sub>5</sub>	-0.305	-3.00*
Madhya Pradesh	D <sub>6</sub>	-0.185	-1.82*
Madras	D <sub>7</sub>	-0.144	-1.42
Mysore	D <sub>8</sub>	-0.264	-2.60*
Orissa	D <sub>9</sub>	-0.208	-1.95*
Rajasthan	D <sub>10</sub>	-0.174	-1.54
Punjab	D <sub>11</sub>	-0.354*	-3.23*
Uttar Pradesh	D <sub>12</sub>	-0.330	-3.23*
West Bengal	D <sub>13</sub>	-0.252	-2.50*

R Squared Adjusted    0.601

R Squared Unadjusted 0.738

F Test (13.25) 5.42\*

\* Significant at 0.05 per cent level

significant in the third time period and in the pooled regressions in Table 6. The overall low  $\bar{R}^2$  in the pooled regressions can be attributed to varying significance of  $\Delta DE/y_{it0}$  in different time periods and the exclusion of the state effect.

(2) Inclusion of the 'state effect' in Tables 7 and 8 improves the statistical fit, and in both equations of 7 and 8 the regression coefficients of  $\Delta DE/y_{it0}$  are significant. The  $\bar{R}^2$  is much higher in these equations.

To summarise briefly, our main findings of the empirical test, we can emphasise first the limitations of our simple model in three aspects:

(1) We have been able to include only state development expenditure in our analysis. This excludes the central investments in the states in manufacturing, transport and communications and the other sectors.

(2) We recognise the two-way relationship that exists between expenditure-income. We justified the use of development expenditure as an independent variable.

(3) We have basically applied a model in which the regional income change is regarded as a function of the size of development expenditure, initial conditions, the state effect and the random factors. We therefore had to introduce the base level absolute income ( $y_{it0}$ ) as one of the variables. This created some multicollinearity problems. In addition, since the base level absolute regional incomes are very unevenly distributed, any measure of regional change magnifies the unequal bases statistically. These limitations do not undermine the conclusions that we can draw from our empirical test.

The importance of state development expenditure

versus the other factors in explaining regional income change varied over the three time periods considered.

(1) In the first period of 1950-61 to 1955-56, the  $y_{ito}$  variable is significant in explaining the NDP change and the change in the industrial output.  $\Sigma DE$  is not significant in this period.

(2) In the second period of 1955-56 to 1960-61, both  $\Sigma DE$  as well as  $y_{ito}$  are significant. However, since  $\Sigma DE$  is positively and significantly correlated to the  $y_{ito}$ , the  $\Sigma DE$  is rendered statistically non-significant when both the variables are introduced together.<sup>1</sup>

(3) In the last period, the correlation between  $\Sigma DE$  and  $y_{ito}$  NDP declines. However, in this period the random factors are predominant in influencing the change of NDP. The random factors are not predominant in the equations on the change of the net industrial output.

(4) In the pooled regressions, the regression coefficients of  $\Sigma DE$  and  $y_{ito}$  are both significant and the multicollinearity problem is less serious.

(5) The income elasticity of state development expenditure varies in accordance with the varying significance of  $\Sigma DE$  versus other factors in different time periods. In pooled regressions the income elasticity of government expenditure with reference to the change in NDP and industrial output is less than 1. Income elasticity of development expenditure is more than 1 with reference to NDP change only in the time period 1955-56 to 1960-61. We consider two main

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1. Thus, in the Second Five Year Plan of India, which embarked on the rapid industrialization, the regional resource allocation through state development expenditure was highly favourable to the high income states.

factors relevant in the overall low income elasticity of government expenditure with reference to NDP. One is the importance of random factors such as a bad harvest year in influencing regional NDP change, in various time periods. The regression coefficients of  $DE$  and  $DE/y_{it0}$  are rendered statistically non-significant in the third period with reference to NDP but are significant with reference to net industrial output.

Secondly, income elasticities of development expenditure are likely to be different as between the high income regions and the low income regions. Income elasticity of development expenditure can be expected to be higher in high income regions because of several factors. For example, these regions already have been able to create conditions of higher internal growth and thus additional development expenditure merely enhances the process of expansion. In the low income regions, previous private and public investments are low and leakages by way of a propensity to import may be high. A lower income elasticity of development expenditure does not imply that it is not an important policy tool. If the objectives of increasing development expenditure in the low income regions are the creation of long term conditions of higher regional growth, a lower current elasticity may have to be accepted. The analysis of the state development expenditure up to 1967-68 showed that the size of the development effort of the states is positively and significantly related to the level of state income. Although there was some shift of resources towards low income regions in 1960-61 to 1967-68, it was not possible to evaluate the impact of this shift on regional change, as the regional change was affected by the two bad agricultural years.

In our simple model above, we have attempted to analyse the relation between the change in the regional NDP and net industrial output and the total size of the development effort. If the size of the development effort of low income states was more than proportionately raised through central assistance, we could expect to find a negative

correlation between the  $\Sigma DE$  and  $y_{ito}$ .<sup>1</sup> However, up to 1967-68, this does not appear to be the case. Since we do not have the state income figures for the later years it is not possible to extend our computations to the more recent years. We may, however, briefly review size of the state development outlays in the Fourth Plan. The Fourth Plan lays down several objective criteria by which quantum of central assistance to the states is determined in the Fourth Plan.<sup>2</sup> To quote, "It was decided that after providing for the requirements of Assam, Nagaland and Jammu and Kashmir, the central assistance to the remaining states for the Fourth Plan should be distributed to the extent of 60 per cent on the basis of their population, 10 per cent on their per capita income if below national average and 10 per cent on the basis of tax effort in relation to per capita incomes and another 10 per cent to be allotted in proportion to the commitments in respect of major continuing irrigation and power projects. The remaining 10 per cent, it was decided, should be distributed among the states in order to assist them in tackling certain special problems, e.g. those relating to metropolitan areas, floods, chronically drought affected areas and tribal areas." The Fourth Plan further states that "Hitherto the plan schemes under different heads of development had their own patterns of assistance and the states could draw on grants or loans accordingly. Outlays under certain heads of development, as also were some of the specified schemes, were earmarked and could not be diverted to other heads of development or schemes." In the Fourth Plan central assistance would not be related to any specific scheme or programme under state plans, but would be given to the states through block grants and loans. Each state would get a fixed proportion (30%) of central assistance in the form of a grant and the balance (70%) by way of loans. In order to ensure that the overall priorities of the plan were adhered to,

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1. Although  $\Sigma DE$  is significantly and positively correlated to the  $y_{ito}$  NDP in the three time periods considered here, there is a  $y_{ito}$  negative correlation between  $\Delta y$  NDP and  $\Sigma DE/y_{ito}$ , and this works out to be -0.53 for the period 1960-61 to 1967-68.

2. Fourth Five Year Plan of India, Government of India, Planning Commission, 1969, p.54-55.

outlays under certain heads of developments would be earmarked. The Fourth Plan further emphasises that "the decision that 60 per cent of the assistance should be distributed on the basis of population and that states in which per capita incomes are below the national average should get another 10 per cent of total assistance is a step towards the reduction of regional imbalances". Table 9 gives the relevant figures on states' resources, central assistance, total outlay and per capita outlay. The total outlay figures include development and non development expenditure. The appendix at the end of the chapter gives a comparative picture of the states' resources over various five year plans. The following points can be noted from the table:

(1) There is  
considerable inter-regional variation in the states' resources among the groups of low income and high income states. The states of Andhra, Bihar and Uttar Pradesh from the low income states have a higher proportion of their total outlay covered by their own resources. In the high income states Maharashtra, Gujarat, Tamil Nadu and Punjab have 27, 35, 39 and 34 per cent of their resources accounted for by central assistance. West Bengal is the only state which has 69 per cent of the total outlay accounted for by the central assistance.

(2) The resultant per capita outlay and per capita central assistance are unequally distributed. The correlation coefficient between state per capita income and per capita outlay in the Fourth Plan works out to be +0.65 and that between per capita income and central assistance is -0.20. Thus, the development effort of states in the Fourth Plan will continue to be higher in high income states.

We conclude, therefore, that contrary to the objectives laid down in the Third and Fourth Plans, regional development effort and regional income change will be greater in the high income regions. Inclusion of 10% of assistance on the basis of per capita income and 60% on the basis of population in the Fourth Plan did not result in a substantial reallocation of total outlays to low income regions. If we grant that the income elasticities of

TABLE 9

STATES' OUTLAYS IN FOURTH FIVE YEAR PLAN OF INDIA  
(in Rs Crores)

State (1)	States' Resources (2)	Central Assistance (3)	Total Outlay (4)	% of Total Outlay ac- counted for by Central Assistance (5)	Per Capita (in Rs)	
					Outlay (6)	Central Assistance (7)
Andhra	180.50	240.00	420.50	57	101.2	57.8
Assam	41.75	220.00	261.75	84	177.6	149.3
Bihar	193.28	338.00	531.28	64	96.4	61.4
Gujarat	297.00	158.00	455.00	35	180.6	62.7
Haryana	146.50	78.50	225.00	35	236.8	82.6
Jammu & Kashmir	13.40	145.00	158.40	92	402.0	368.0
Kerala	83.40	175.00	258.40	68	127.3	86.2
Madhya Pradesh	121.00	262.00	383.00	68	98.7	67.5
Maharashtra	652.62	245.50	898.12	27	188.4	51.5
Mysore	177.00	173.00	350.00	49	125.0	61.8
Nagaland	5.00	35.00	40.00	88	95.2	83.3
Orissa	62.60	160.00	222.60	72	107.7	77.4
Punjab	192.56	101.00	293.56	34	210.6	72.5
Rajasthan	82.00	220.00	302.00	73	121.4	88.5
Tamil Nadu	317.36	202.00	519.36	39	136.0	52.9
Uttar Pradesh	439.00	526.00	965.00	55	111.1	60.5
West Bengal	101.50	221.00	322.50	69	75.7	51.9
	3106.47	3500.00	6606.47	53	128.9	68.3

Source: Compiled from "Fourth Five Year Plan", Government of India, op.cit.

development expenditure are likely to vary among these two groups of states, we must reach the conclusion that regional income disparities in the Fourth Plan will not be substantially reduced but may increase.<sup>1</sup>

## SECTION II

### AN EVALUATION OF REGIONAL POLICY INSTRUMENTS IN MANUFACTURING AND AGRICULTURE

In this section, we shall discuss the regional policy instruments in manufacturing and agriculture. Our quantitative analysis of regional disparities in these sectors (Chapters V, VI and VII) provides us with some understanding of the process of regional disparity in each sector. Hence, where possible, we shall draw on our earlier conclusions.

MANUFACTURING: The total state expenditure excludes direct central investments in manufacturing and transport. It includes, however, the state expenditure on the industrial development and village and small industries. The policy measures in manufacturing can be discussed under two headings, viz. (i) the measures to create a more diversified industrial base through direct public investment and (ii) the measures to promote private investment in the low income regions. The plan documents lay a great stress on the role of public sector projects in regional development. Various statements in the plans quoted earlier<sup>2</sup> emphasise the need for a "fair share" in the regional distribution of public investment. At the same time it is asserted in the plans that the location of public projects is largely determined by the techno-economic considerations. The feasibility studies<sup>3</sup> on the alternative locations of public sector investment are not published and hence we cannot discuss the criteria used in choosing the optimum location for a given project. The data on regional distribution of public investment are available for a few years and these were examined in Chapter VI. These data also classify the types of investment projects in each state. Background tables at the end of the chapter

1. Similar views are also expressed by various other writers. See (i) Vithal, B.P.R., "Central Assistance for State Plans: How Equitable Is It?", Economic and Political Weekly, June 14, 1969. (ii) Zaveri, N.J., "Transfer of Non-Plan Resources to States", Economic and Political Weekly, June 7, 1969.

2. See Chapter VI for a more detailed discussion on the regional distribution of public investment in India.

3. The feasibility studies on the location of all public projects are made by the Planning Commission but are not available for private research.

give the data on the regional distribution of public investment in 1968-69 and in the Fourth Plan. We pointed out in Chapter VI that a substantial proportion of total public investment in the Second and Third Plans went to Bihar, Orissa and Madhya Pradesh out of techno-economic considerations. However, this by itself need not lead to a creation of new growth centres in these regions. An application of the growth centre concept would require a number of inter-related public sector projects to be located in specific low income regions and the undertaking of additional policy measures to support regional development at these new growth centres. An examination of regional investment by projects in 1968-69 and for the Fourth Plan shows that nearly every state received some public sector projects. The number of projects and the total investments differ in each state. The low income states of Bihar, Orissa and Madhya Pradesh have received large public sector investments in steel and heavy industries. However, if we consider the number and amount of public investments in 1968-69 and those proposed in the Fourth Plan it becomes clear that additional public investments in Madhya Pradesh and Orissa either in additional investment in steel projects or other projects are much smaller than those in Bihar. Bihar has received a larger number of public projects in steel, coal and heavy engineering up to 1968-69. With additional large public investments in Bokaro in the Fourth Plan together with the location of other public projects in the Fourth Plan, Bihar can be placed as one of the low income states with the largest amount of accumulated public investment and thus has greater scope to respond to selective measures to induce private investment.<sup>1</sup> We may further emphasise that there are economic advantages to be gained from concentration of locations of public sector projects at selected spatial points as far as these are permitted by the techno-economic considerations. Creation of new growth centres in the periphery need not mean "maximum dispersal" or "fair share". However, here the efficiency objectives are in some conflict with the political objectives of "balance".

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1. The relative advantages and disadvantages of the other low income states need to be examined at regional level in relation to their industrial structures and the size and pattern of the public investment.

The measures to channel private investment in the desired directions have taken various forms. These include (a) measures to reduce the monopolistic control of private industry by a few large industrial houses; (b) measures to promote decentralised industrial development away from large metropolitan centres; (c) measures to promote private investment in the industrially backward states. We stated in Chapter VI that, in analysing the trends in the private sector investment, we need to emphasise the role of the big industrial houses which exercise a monopolistic control over private investment in manufacturing. These industrial houses and the rest of the private sector have responded to the public sector investment in manufacturing by way of investment in the new growth industries. However, spatially these investments have occurred in the large metropolitan centres and in more industrialised states. We reviewed the evidence before the Licensing Committee in this regard. This evidence shows a continued trend towards further agglomeration in the metropolitan centres and in more industrialised states.

The U.N. Report<sup>1</sup> comes to the following conclusion regarding the decentralised industrial development. "The evidence of most of the countries in South East Asia seems to indicate that a decentralised urban industrial growth, i.e. away from large metropolitan centres, would require strong intervention. The experience of the Government of Maharashtra in India is illustrative in this respect. Some years ago the Government of Maharashtra offered a "package programme" of incentives to potential entrepreneurs who would consider industrial location away from over-congested Bombay area. The incentives included provision of land free or at a nominal cost, concessional water and power rates, exemption from sales tax and preferential treatment in the purchasing policy of the government. In addition, the government embarked on a programme of developing new land areas where basic urban facilities could be provided by the

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1. "Regional Development: Experiences and Prospects, South East Asia", Vol. II, p. 219, Ed. Lefebvre, L. and Datta - Chaudhri Mrinal, Geneva, 1970.

new industries. Judging by the poor response of entrepreneurs to the incentive scheme and by the continued high pace of growth in the Bombay-Thana area, it is clear that in the private profit calculations the risk-averting entrepreneur requires stronger incentives and deterrents to divert new industries away from the metropolis." The Pande and Wanchoo Committee reports<sup>1</sup> dealt with the identification of industrially backward states and the recommendation of the financial and other incentives measures to promote the private investment in the industrially backward states. In Chapter VI, an examination of available data on private investment showed that the private investment continued to concentrate at the established industrialised areas and did not respond to the large public sector investment in some of the low income regions. We can further conclude that in considering the impact of public investment on attracting private sector investment, there is a need to examine the size and pattern of regional accumulated public investment and its relation to the region's industrial structure and then consider the possibilities of attracting private investment. The scope of various measures will differ among the various low income regions as the regional industrial structures and specialisation as well as the size and pattern of accumulated public investment differs. Ultimately, the extent of the success of the incentive schemes will depend on how far the profit calculations of private investors as a result of the incentive and disincentive schemes are pursued by the regional governments.

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1. See Section II, Chapter VIII for a classification of the industrially backward states by these reports.

AGRICULTURE:

Our analysis of Chapter VII indicated that regional disparities in agriculture are as important as those in manufacturing. As we have analysed the extent and nature of regional disparities in agriculture up to 1967-68, we may concentrate here on the policy aspects and the new agricultural development strategy adopted since then under the Intensive Agricultural Development Programmes (IADP) and High Yielding Varieties Programmes (HYVP). We may analyse in this connection three interrelated issues: (1) The new agricultural development strategy since 1967-68 and the targets of agricultural production in the Fourth Plan did not specifically depend on or were aimed at raising the average productivity levels in agriculture in the low income states.

(2) The total outlays on agriculture and irrigation in the Fourth Plan were much lower in the low income regions in relation to their needs.

(3) At national level, adequate policy measures to raise the average productivity levels in the dry farming areas do not exist. This has regional implications for a few low income regions which do not have adequate resources to undertake programmes to protect and raise the productivity levels of large proportions of their area.

We may elaborate on these three points in greater detail. It is not possible to review all the literature on "Green Revolution" and on the IADP<sup>1</sup> and HYVP<sup>2</sup> Programmes. We have tried to list some of the literature on the new agricultural development strategy in the bibliography. This strategy concentrates on selecting areas of minimum risk and with existing irrigation facilities. The Fourth Plan lays down two main objectives in agriculture. The first one is to provide conditions necessary for a sustained increase in agricultural production of about 5 per cent per annum over the next decade. The second objective is to enable as large a

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1. Intensive Agricultural Development Programme.

2. High Yielding Varieties Programme.

section of the rural population as possible, including the small farmer, the farmer in dry areas and the agricultural labourer to participate in development and share its benefits. In foodgrains production, the plan aims to increase the food production from 98 million tonnes in 1968-69 to 129 at the end of the Fourth Plan. Of this additional 31 million tonnes, 21 million tonnes is to come from HYVP. This is expected to be achieved largely by the extension of the programme from 9.2 million hectares in 1968-69 to 25 million hectares in 1973-74.<sup>1</sup> Various writers have expressed that inter-regional disparities in agricultural growth will persist and may also increase. V. Nath<sup>2</sup> comes to the following conclusion in this regard. He classifies the states by their performance in agriculture in High and Low states. This classification is similar to our classification of states into regions with existing advantages and disadvantages. To quote, "It is clear that half the states of India, having more than half of the total cropped area and the total value of agricultural output are not participating adequately in agricultural progress. The Fourth Plan, while it contains programmes for achieving rapid increases in some directions in some Low States such as rural electrification in Uttar Pradesh and Bihar or for meeting particular problems such as floods in Assam, will not substantially reduce inter-state differentials in growth rates of agricultural output and of increase of productivity of croplands. What is more important, it does not have an adequate content such as by way of HYVP for greatly accelerating agricultural growth in Low States. But persistence of a low growth rate over a large part of the country will make achievement of a high overall rate of growth of agricultural output very difficult. Moreover, persistent regional disparities in agricultural growth will lead to -a regional dichotomy in economic development and growth, which will complicate enormously the task of economic development.

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1. See Fourth Five Year Plan, Government of India, Planning Commission, Chapter 7. Thus even by 1973 the percentage of total cultivated area covered under HYVP will be only 19 per cent.  
 2. Nath, V. "Agricultural Growth in 1970's: An Analysis", Economic and Political Weekly, Dec. 1970.

The causes of slow agricultural progress in Low States should be identified and remedial measures should be taken." Table 10 gives data on outlay on agriculture and irrigation by the states in the Five Year Plans. We may note the following points from the Table.

- (1) The total all-India outlay on agriculture was low at Rs 877 crores in the Second Plan. The total outlay on agriculture increased to 4689 crores in the Fourth Plan. This amounts to more than four times increase in outlay on agriculture.
- (2) Total per hectare outlay on agriculture was higher than the national average in the Second Plan in the following states: Kerala, Punjab, West Bengal, Tamil Nadu, Andhra, Bihar and Orissa.
- (3) At national level per hectare outlay on agriculture and irrigation increased from Rs 65 in the Second Plan to Rs 114 in the Third Plan and Rs 167 in the Fourth Plan. We may note the position of individual states against this national average. Kerala increased the outlay from Rs 115 to 409 in the Fourth Plan, Assam from Rs 70 to Rs 246, Tamil Nadu from 81 to 240, Maharashtra from Rs 52 to 178, Gujarat from Rs 77 to 197 and Bihar from Rs 97 to 236. The states which remain below the national average are Madhya Pradesh from Rs 43 to Rs 98, Rajasthan from Rs 34 to Rs 69, Orissa from 79 to 106 and Andhra from Rs 84 to Rs 121. Among the low income states, Uttar Pradesh and Bihar are the only states with more than national per hectare outlay on agriculture.
- (4) The overall position of the states is reflected in column (10) to column (14). From columns (13) and (14) we can see that there are several states which have received a higher share in total outlay than their respective area shares. These states are Assam, Bihar, Kerala, Gujarat, Tamil Nadu, Punjab and Uttar Pradesh.

We may further examine the position of the individual states in the total outlay on major and minor irrigation. Table 11 gives the outlay in these sectors. These figures

TABLE 10

## PLAN OUTLAY ON AGRICULTURE AND IRRIGATION IN INDIAN STATES

State	Second Five-Year Plan			Third Five-Year Plan			Fourth Five-Year Plan			Overall Outlay in the Second, Third and Fourth Five-Year Plans				
	Total Estimated Expenditure (Rs crores) (1)	Outlay Per Hectare of Net Cultivated Area (Rs crores) (2)	Rank (3)	Total Estimated Expenditure (Rs crores) (4)	Outlay Per Hectare of Net Cultivated Area (Rs crores) (5)	Rank (6)	Total Estimated Expenditure (Rs crores) (7)	Outlay Per Hectare of Net Cultivated Area (Rs crores) (8)	Rank (9)	Outlay (10)	Outlay Per Hectare of Net Cultivated Area (Rs crores) (11)	Rank (12)	% of outlay in Each State (13)	% of Area in Each State to the Total Net Sown Area (1965-66) (14)
Andhra Pradesh	95	84	4	151	137	4	133	121	11	379	344	9	8.1	8.1
Assam	16	70	9	27	114	7	56	246	2	100	429	4	2.1	1.7
Bihar	81	97	2	144	173	2	197	236	4	422	506	2	9.0	6.1
Gujarat	73	77	7	111	116	6	187	197	5	371	390	6	7.9	7.0
Kerala	22	115	1	54	264	1	85	409	1	161	781	1	3.4	1.5
Maharashtra	93	52	12	167	92	11	316	175	8	576	318	10	12.3	13.3
Madhya Pradesh	70	43	13	118	71	11	162	98	13	350	212	12	7.5	12.1
Tamil Nadu	49	81	6	90	151	3	143	240	3	281	473	3	6.0	4.4
Mysore	60	58	11	103	102	8	156	156	10	318	318	10	6.8	7.4
Orissa	47	79	8	60	99	9	64	106	12	170	285	11	3.6	4.4
Punjab (including Haryana)	65	86	3	69	92	10	128	172	9	261	352	8	5.6	5.5
Rajasthan	46	34	14	130	92	10	98	69	14	274	194	13	5.8	10.4
Uttar Pradesh	96	55	10	201	116	6	317	183	7	614	354	7	13.1	12.8
West Bengal	45	82	5	81	149	5	102	188	6	229	419	5	4.9	4.0
Jammu & Kashmir	7	107		19	285		36	559		64	954		1.4	0.5
Union Territories	12	152		24	243		83	839		118	1207		2.5	0.7
Total	877	65		1547	114		2265	167		4689	345		100	100

Source: Compiled from Fourth Five Year Plan, op. cit. and Shivmagg, H.B., op. cit.

TABLE 11

## OUTLAY ON IRRIGATION IN FOURTH PLAN, BY STATES

State	Outlay on Major and Medium Irrigation Programmes	Outlay per 1000 Hectares of Cultivated Area in the State	Rank	Outlay on Minor Irrigation Programmes	Outlay per 1000 Hectares of Cultivated Area in State	Rank
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Andhra Pradesh	6450	0.56	7	2800	0.24	10
Assam	571	0.25	14	1100	0.48	6
Bihar	9930	1.16	8	4600	0.54	3
Gujarat	10500	1.09	4	2922	0.30	9
Jammu & Kashmir	706	1.01		600	0.86	
Kerala	2675	1.31	2	950	0.47	7
Madhya Pradesh	6100	0.36	11	3000	0.18	12
Tamil Nadu	3000	0.50	9	3070	0.51	2
Maharashtra	12393	6.80	1	6500	0.36	6
Mysore	6800	0.65	6	3200	0.31	8
Orissa	1800	0.30	13	1075	0.18	11
Punjab	1600	0.42	5	2320	0.61	1
Haryana	2268	0.68		850	0.25	
Rajasthan	7400	0.51	8	800	0.06	13
Uttar Pradesh	9700	0.53	10	9600	0.52	4
West Bengal	1900	0.35	12	2674	0.49	5
All-India (including Union Territories)	885706	0.62		47568	0.34	

Source: Shivmaggi, H.B.  
Economic and Political Weekly, Review of Agriculture,  
 September 1969.

further highlight the unequal state expenditure in these sectors in various states. The largest outlay in major and medium irrigation was to be spent by Gujarat, Maharashtra, Bihar, Uttar Pradesh and Mysore. In terms of expenditure per 1000 hectares of cultivated area, the states with lowest expenditure are West Bengal, Orissa, Madhya Pradesh, Rajasthan and Andhra. In minor irrigation, also, the last five states by per hectare expenditure are Andhra, Orissa, Rajasthan, Madhya Pradesh and Gujarat. It may be argued that the outlays on irrigation in these states may be low because of the low irrigation potential of these states due to larger proportions of dry areas in these states. We may take the figures on ultimate irrigation potential of individual states as quoted by the Fourth Plan itself. Table 12 gives data on these aspects. The following points may be noted from the table.

(1) At the end of 1968-69, the percentage of irrigation with reference to ultimate irrigation potential (columns 4 and 7) works out to be very uneven for different states. Assam, Gujarat, Maharashtra, Madhya Pradesh, Orissa, Rajasthan and Uttar Pradesh have a low percentage. We can note that at the end of 1973-74 (Column 11) Gujarat and Maharashtra would have increased their irrigation ratio from 22.4 and 26.7 in 1968-69 to 38.7 and 42.9. The position of Madhya Pradesh, Rajasthan, Uttar Pradesh and Andhra would change only marginally as their irrigation ratio would change from 16.7 to 23.1, 32.4 to 41.6, 40.0 to 48.9 and 37.5 to 47.2 respectively. Punjab and Tamil Nadu would have 88 and 97 per cent of their irrigation potential realised.

(2) The utilisation of actual irrigation also differs and the utilisation is particularly low in Madhya Pradesh, Rajasthan, Uttar Pradesh, Maharashtra, Mysore and Bihar. Actual utilisation is high in Kerala, Punjab, Madras and Orissa. We may draw the following conclusions from our discussion of state outlays in agriculture and irrigation: (a) The New Agricultural Development strategy since 1967-68 and the Fourth Plan production targets rely heavily on the areas of minimum risk and with assured water supply. The production targets

**TABLE 12**  
**BENEFITS FROM MAJOR AND MEDIUM IRRIGATION SCHEMES**  
( '000 Hectares gross)

State	Ultimate Irrigation Potential	Irrigation from pre-plan schemes	Benefits to end of 1968-69 from Schemes pot. utilisation	Benefits to end of 1968-69 from Plan	Potential to end of 1968-69 including Pre-Plan (Col.3 & 4)	% of pot. to end of 1968-69 w.r.t. ultimate irrigation potential	Estimates of Benefits during IV Plan	Pot. to end of 1973-74 including Pre-Plan Col.6 & 8)	% of pot. to end of 1973-74 w.r.t. ultimate irrigation potential		
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	Andhra Pradesh	6480 <sup>1</sup>	1676	751	572	2427	37.5	629	413	3056	47.2
2	Assam	970 <sup>2</sup>	65	18	14	83	8.6	52	333	135	17.5
3	Bihar	4290 <sup>3</sup>	590	1250	770	1840	43.1	1050	1020	2890	67.3
4	Gujarat	2150 <sup>3</sup>	33	450	310	483	22.4	3350	350	833	38.7
5	Haryana	5	5	920	900	920	5	150	100	1070	5
6	Jammu & Kashmir	100 <sup>4</sup>	43	20	18	63	63.0	16	10	79	79.0
7	Kerala	630 <sup>4</sup>	158	179	179	337	53.5	119	111	456	72.3
8	Madhya Pradesh	5630 <sup>3</sup>	513	430	172	943	16.7	360	313	1303	23.1
9	Maharashtra	2350 <sup>3</sup>	279	350	200	629	26.7	380	310	1009	42.9
10	Mysore	1780 <sup>2</sup>	308	490	400	798	44.8	95	125	893	50.1
11	Nagaland	N.A.	-	-	-	-	-	-	-	-	-
12	Orissa	2430 <sup>3</sup>	455	635	600	1090	44.9	260	190	1350	55.5
13	Punjab	4140 <sup>4</sup>	1656	685	681	2341	78.7	25	9	2366	83.0
14	Rajasthan	3150 <sup>2</sup>	320	700	600	1020	32.4	290	210	1310	41.6
15	Tamil Nadu	1560 <sup>4</sup>	1141	310	290	1451	93.1	70	70	1521	97.5
16	Uttar Pradesh	7610 <sup>2,2</sup>	1991	1050	970	3041	40.0	680	450	3721	48.9
17	West Bengal	2310 <sup>2</sup>	440	660	610	1100	47.6	240	180	1340	58.0
18	TOTAL	45580	9668	8898	7286	13566	40.7	4766	3894	23332	51.2

<sup>1</sup>State Government.

<sup>2</sup>C.W. & P.C.

<sup>3</sup>Relevant Reports on Techno-Economic Survey - National Council of Applied Economic Research

<sup>4</sup>On the basis of figures furnished by the C.W. & P.C. with marginal adjustments in the Planning Commission.

<sup>5</sup>Included in Punjab.

<sup>6</sup>Haryana's figures included.

Source: Fourth Five-Year Plan, Government of India, Planning Commission, 1971.

of the Fourth Plan in food production are expected to be met largely through HYVP. These programmes cannot lead to a reduction of regional disparities in agriculture.<sup>1</sup>

(b) The plan outlays in agriculture in the Second, Third and Fourth Plans have increased substantially in high income states. The total outlay on agriculture in Madhya Pradesh, Orissa, Rajasthan and Andhra in the Fourth Plan remain low mainly because their total resources are very limited. We saw in Section I that as compared to Madhya Pradesh, Andhra, Rajasthan and Orissa, Bihar and Uttar Pradesh have larger total outlays in the Fourth Plan.

(c) Among the various low income regions the percentage of dry area to total cultivated area differs. Rajasthan has the highest proportion of dry area to total area. At the national level, out of 138 million hectares of cultivated area nearly 47 million or 37 per cent of the total area receive rainfall below 750 millimetres and consequently often suffer from drought. The other states with large areas with insufficient rain are Punjab, Tamil Nadu, Maharashtra, Gujarat, Madhya Pradesh and Andhra. The first four states are well placed in terms of their own resources to undertake some special efforts to protect dry areas and also to undertake programmes to raise the productivity levels in dry areas. With inadequate resources in Andhra, Madhya Pradesh and Rajasthan, these states are in a less advantageous position to divert resources to dry farming areas.

Thus, in agriculture, we recognise the conflict between "efficiency" and "equity" arising out of the need to attain national targets of production through a concentrated effort in the best areas that are spread all over the country and through higher effort in the states which have existing advantages and have been able to create conditions conducive to higher agricultural growth. However, since such concentrated effort through HYVP would affect only 19 to 20 per cent of cultivated area, the need arises to undertake additional steps to spread the agricultural development to larger areas of the country, and especially those in the

Although, as we pointed out in Chapter VII, as a result of unequal distribution of regional area under HYVP, the regional disparity can be expected to increase as the low income regions of Madhya Pradesh, Rajasthan, Orissa continue to have a low share in area under HYVP.

low income regions which are inadequately placed in terms of their own resources. It is essential to relate their outlay in agriculture and irrigation to their development needs and potential. Greater resources for these states for agriculture can be made available through several ways. One of these is a higher central assistance to these states for increasing their outlay in agriculture. Thus in the criteria of determining the central assistance, the states with inadequate outlays on agriculture and irrigation, and with low agricultural development, may get additional assistance. Secondly, there is scope for centrally sponsored schemes for states such as Rajasthan and Madhya Pradesh for dry area farming.<sup>1</sup> Thirdly, a greater effort to raise additional resources may come from these states if they are encouraged to undertake a greater development effort in agriculture. This appears to be the case in Bihar and Uttar Pradesh.

We may finally conclude that between the two sectors of manufacturing and agriculture, public investment is spatially more diffused in manufacturing up to 1968-69 and in the Fourth Plan. The public investment in agriculture is spatially concentrated. Since agriculture accounts for more than 40 per cent of state income in the states, the need for a "fair" share of development effort in agriculture at state level is more important than the political demands of various states to have steel mills or fertiliser plants located within given state boundaries.

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1. For a similar approach, see Shivamaggi, H.B., Economic and Political Weekly, Review of Agriculture, September 1969.

SECTION III: GUIDELINES ON NATIONAL POLICY FOR REGIONAL DEVELOPMENT

An empirical evaluation of regional goals and policy instruments in Indian planning leads us to the following conclusions:-

- (1) The regional goals in Indian plans are expressed in terms of vague statements of the needs of different areas and the "regional balance". These goals are not specified in terms of targets or by a classification of regions.
- (2) The national planning process operates through the multi-regional planning bodies and hence a considerable proportion of the national expenditure in various important sectors occurs through state plans. The role of centre in the state plans is crucial as the size of the state plans and its sectoral allocation is prepared in consultation with the centre and, secondly, the central assistance is an important source of financing the state plans. Thus, the size and pattern of the state development effort is an important regional policy variable. The regional development effort in the low income regions remained much below that in the high income regions during the period 1950-51 to 1965-66. During this period, the reduction of regional disparities or the level of a state's development was not taken as an explicit criterion in the allocation of central assistance. In the Fourth Plan, greater weight was given to the level of a state's development in the criteria of central assistance. However, this in itself did not result in an adequate increase in the state outlays of the low income regions.<sup>1</sup> An examination of the states' resources in the Fourth Plan reveals<sup>2</sup> that, in spite of greater additional tax effort in the low income regions as compared to some high income regions, the total resources of the low income states remained low as they had large

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1. We considered earlier the various reasons for inadequate outlays in low income states.

2. See the appendix<sup>1</sup> at the end of the Chapter.

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negative balance in capital account due to past loan indebtedness; and secondly, the resources raised by these states in the market loans and other miscellaneous sources were much lower than in high income states.

(3) An examination of sectoral outlays in agriculture and irrigation in the Fourth Plan showed that the per hectare outlay in agriculture and irrigation remained below national average in three low income regions which we classified as the least advantageous in agriculture.<sup>1</sup>

The share of these states also remains the lowest in the HYVP. The Fourth Plan did not propose specific programmes for, or allocations to these states to step up their outlay on agriculture or to undertake additional centrally sponsored schemes. In the plan literature, the regional disparity in agricultural investment is less emphasised than the need for the regional balance in the public sector projects.

(4) The regional allocative criteria in the location of public sector projects are not discussed in the planning literature. Planning documents emphasise that in addition to techno-economic considerations, the needs of the backward areas are given special attention. This assertion in the plans resulted in allocation of some public sector project to each state and also led to long battles between the states for the location of certain industrial projects. To quote Lefebvre,<sup>2</sup> "Unfortunately state governments frequently compete for certain types of industrial investments, not on economic grounds, but out of political necessity or misguided eagerness. In effect, regional self-sufficiency in fertiliser production or in petroleum refining is almost a status symbol and a sign of an active government. Rational economic evaluation of regional production patterns and real cost-benefit calculations would demonstrate that many of these projects are wasteful from the point of view of both nation and the state."

Thus, we conclude that up to the Fourth Plan the

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1. These are Orissa, Madhya Pradesh and Rajasthan.

2. Lefebvre, L., "Regional Allocation of Resources in India", op.cit.

national planning operated without specific regional orientation towards reducing regional disparities, and yet obtained the consensus of states on their respective shares in outlays through the complex mechanism of centre state political, planning and financial relationships and through the regional allocation of public sector projects. To quote M. Chaudhry, "The structure of economic planning, both national and regional, reflected this important fact of the country's political life. Rational planning implies the considering of alternative problems, making a choice on the basis of certain socially accepted criteria and evolving a hierarchy of decision-making apparatus on the different levels to implement the policy implications of these choices. In the 1950's, the Indian planning process tried to specify the alternatives regarding the allocation of resources among different sectors of commodity production as well as those regarding the techniques of production, applying economic analysis in an attempt to reach a national solution. However, the process almost deliberately sidetracked all questions concerning inter-regional conflicts of interests. The objectives of planned development were stated in such a fashion as to hide all questions of choice inherent in the planning process of multi-region economy. Because the same political party controlled all governments, it could afford to make the process of formulating both central and state plans a cooperative and almost informal venture. Conflicts naturally developed, but no formal machinery for their resolution was established". He further adds that "Although the Indian planning process did not try to find a rational solution to problems of regional allocation (in fact, it made no attempt to state these problems realistically), actual decisions concerning regional allocation had to be made. In practice, except for the few cases in which non-institutionalised political bargaining provided the solution, the allocation problem was solved by analogy with solutions of other choice

problems concerning commodity composition and choice of techniques."<sup>1</sup>

The role of the centre dominated planning process in influencing the "development-mindedness" or the "development-orientation" of states is also noted by other writers. George Akerlof<sup>2</sup> concludes as follows: "Thus the plan placed pressure on the states to be 'development-minded' administratively since the preparation of well-formulated plans would most likely lead to increased appropriation of funds from the centre. It is difficult to assess quantitatively: (1) the degree of pressure from the centre, (2) the success of the centre in inducing the states to prepare better plans and finally (3) even the value of this exercise. A glance, however, at consecutive state plans does indicate that there was some force at work which caused greater care in the preparation of these documents and more precision in the project proposals. In each of the three Five Year Plans, the allocation of aid to each and every state in the Indian Union came closer than in the previous plan to the percentage population of the state in the total population of India."

We believe that the alternatives or modifications to the regional framework up to the Fourth Plan need to be considered in the light of two factors. Important political changes have taken place in the late 'sixties and early 'seventies, resulting in a situation in which the ruling party at the centre no longer controls all the state governments. This process of change and instability is not yet complete, but it is bound to influence the centre-state relationships and the operation of national and regional

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1. M. Datta-Chaudhri, "Regional Planning in India", in "Issues in Regional Planning", Eds. David Dunham and Jos.G.M. Hilhorst, A Selection of Seminar Papers, Institute of Social Studies, The Hague, 1971 - p.174.

2. George Akerlof, "Centre-State Fiscal Relations in India", Indian Economic Journal, 1968.

planning process.<sup>1</sup> Secondly, since this new situation demands that the informal and cooperative planning of the earlier era is no longer possible, the economic criteria of resource allocation and the trade-offs between various alternatives must be considered with greater urgency.

The modifications to the regional policy framework need to be considered against this background. We shall examine below the three important aspects in which these changes must be sought, both to provide a rational basis of regional resource allocation and, through it, to form a basis to obtain a consensus of multi-regions under the new political framework. These are (1) formulation of regional goals; (2) efficiency in industrial location; (3) the criteria of central assistance and the size of state plans.

Formulation of regional goals: Formulation of long term and short term regional goals occupies an important place in national and regional planning. Such goals can be worked out both in relation to long term and short term Five Year Plans. Consideration of alternative long term regional goals would involve examining the relation between the alternative regional goals and their relation to long term goals of national planning. Such goals can be considered in two forms, such as: (1) select the regional distribution of investment according to explicit regional objectives and then decide on the sector in which investment should take place: (2) select the sectoral distribution of investment according to some national objective and then

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1. See Chaudhry, M., op.cit., "During the last three years, important political changes have taken place. The congress party has lost control of more than half of the state governments, even though it retains control at the centre. The old system of informal and cooperative planning is no longer possible. The entire planning machinery is undergoing drastic change, with the intention of introducing greater autonomy for the states in formulating their plans and of specifying the rules for inter-state resource allocation. A clear picture of the new situation has yet to emerge, thus making it rather difficult at present to assess the regional planning techniques as practised in India."

consider its regional distribution.<sup>1</sup> The national planning in India corresponds to the second form in which regional resource allocation follows after the sectoral allocation of resources. Here, an application of different regional goals would lead to a different pattern of regional investment within each sector. Such long term projections would highlight the areas of conflict and thus serve as a useful guide for rational allocation of resources in the short term plans, as the short term goals can then be worked out in relation to the long term objectives of national and regional planning. We consider that formulation of long and short term goals in national planning can provide a basis for cooperation between centre and states and create a more rational basis on which regional gains in the development effort may be evaluated. M. Chaudhry concludes in this regard as follows: "However, rational use of a country's resources is feasible only when the various opportunities for the use of these resources are known. The full potentialities of certain development schemes become apparent only when viewed at close quarters. Therefore, ground level planning efforts are often more efficient in formulating development schemes which are consistent with the endowments of the place and needs of the people. But it is not easy to devise an institutional machinery which can efficiently explore development potentials and also exercise social choice consistent with the objectives of efficiency and distributive justice. Current political developments in India are improving the situation in the former sense by decentralising the planning process. The need to devise a mechanism of rational choice

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1. For more discussion on these issues, see (1) Stilwell, J.B. Frank, "Regional Economic Policy", op.cit., 1972, also (2) "Issues in Regional Planning", ed. Dunham, David and Hilhorst, Jos.G.M., op.cit., (3) Meade, J.E., "The Theory of Indicative Planning", Manchester University Press, 1970, (4) Rahman, M.A., "Regional Allocation of Investment", op.cit.

is correspondingly becoming more and more important but the major innovation in this field is yet to come".<sup>1</sup> Lefebvre also concludes that "The short-run solution is to apply more vigorous criteria to regional investment choices in accordance with a rationally adjusted pricing mechanism. In the long run, however, the states cannot be expected to cooperate unless the distant benefits of current patience are spelled out in the forms of explicit long term plans. Without such plans the democratic approach to development will have to be replaced by fiat".<sup>2</sup>

Efficiency in Industrial Location: We examined earlier<sup>3</sup> the regional distribution of public sector investment. We emphasised that out of techno-economic considerations public sector investment in manufacturing has gone to various low income regions. The regional growth effects of the public sector projects are likely to vary among the low income regions. The industrial location choices by strict application of national and regional efficiency criteria may not coincide with a "fair" regional distribution of public sector investment asserted in the plans. National and regional efficiency criteria can be better served by spatial concentration of public investment at the selected spatial centres. An examination of the location pattern of public investment in four plans is necessary to examine the future potentialities of various locational clusters to receive further public investment. Such examination can also show the linkages of the existing clusters to the regional production structures and the existing advantages or disadvantages of these clusters in terms of the social infrastructure facilities.<sup>4</sup> If the development gains of the

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1. Chaudhry, Mrinal Datta M., "Regional Planning in India, op.cit.
  2. Lefebvre, M., "Regional Allocation of Resources in India, op.cit.
  3. See Chapter VI and Section II of this chapter.
  4. Lefebvre cites the example of location of oil refinery in Assam as the case in industrial location in which the considerations of economies of scale and nearness to the market would have led to a different location and to a more rational allocation of resources.

regions are specified in more concrete terms through regional goals, these may help to lessen the political demands of states for the location of industrial projects.

Central Assistance to the States: Up to the period 1965-66, the regional level of economic development was not taken as a specific criterion for determining the central assistance. In the Fourth Plan, three important changes were introduced in the centre-state relationship: (1) The per capita income was taken as one of the criteria in determining the central assistance to the states. (2) A fixed proportion of the total assistance was allocated in the form of grants. (3) States were given greater initiative than in earlier plans to allocate their state plans among different projects. Introduction of these changes did not lead to a reduction in the regional disparities in the size of state plan outlays and the regional allocation in agriculture and irrigation. We propose that formulation of long term and short term regional goals in national planning which are accepted by all the states would result in larger state plans without substantial efficiency loss to the low income regions in the following conditions:- (1) A reallocation of resources from high to low income regions need not result in a lowering of development effort in these states if there is underutilised tax and saving potential. We noted earlier that the additional tax effort of some high income states in the Fourth Plan was not substantially higher than in low income regions. (2) The basic development problem in low income regions consists of low investment. While it is possible to agree on the former, the dimensions of the latter problem cannot easily be quantified, at least in aggregate terms. We noted earlier that the income elasticity of development expenditure over a short period is likely to be higher in high income regions. This, in itself, does not undermine the role of development expenditure considered over a longer time period. In addition, we need to emphasise the possibilities of varying trade-offs between "efficiency" and "equity" if we consider the alternative regional pattern of investments, such as through higher

investments in social infrastructures or in the agricultural development and rural programmes.<sup>1</sup> The importance of higher development effort in agriculture in low income regions can be emphasised from several aspects. Firstly, if the objectives of greater regional orientation are to spread, the benefits of development to the people in different geographic areas who have a distinct identity of their own, and are not perfectly mobile, increased income and employment opportunities in rural areas should receive priority. In addition, these additional income and employment benefits can also arrest large influxes of labour force to the urban areas. Secondly, in agriculture we noted earlier that there is a conflict from the efficiency point of view between the allocation of scarce resources to the regions which already have natural and acquired advantages, and thus concentrated effort in these areas can lead to greater national growth of output and productivity. Agricultural modernisation through investments in modern inputs is a highly capital intensive process and the efficiency criteria of evaluating the returns from investments in alternative regions have to be strictly considered.

Hence, we conclude that the agricultural programmes in the regions with existing <sup>dis-</sup>advantages should be such that they do not involve the use of scarce capital intensive resources. The labour intensive rural development programmes, minor irrigation and the agricultural development programmes aimed to increase the productivity levels in dry farming which fall into this category. The potentialities for different types of projects can only be worked out at the level of each state. Thirdly, it is also possible to suggest that centrally sponsored schemes may be

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1. See, for example, Haddad, Paulo Roberto, "Problems of Regional Planning in Brazil", in "Issues in Regional Planning", op.cit. He notes that, in Brazil, the types of policies of regional development changed from a low emphasis on investments in social and economic infrastructures in the earlier plan (1949-53) to higher emphasis on such investments in later plans.

undertaken in the regions which have existing disadvantages in agriculture. Such schemes may be undertaken to tackle the problem areas of the region.

We can summarise the guidelines as follows: The informal and cooperative era of regional and national planning up to the late 'sixties owed much of its origin to the centre-dominated political and planning process. Important political changes in the late 'sixties and 'seventies have created a new situation in which the earlier basis of cooperation and consensus is no longer possible. The possibilities of introducing rational criteria for regional resource allocation have to be considered against this background. We consider that such rational criteria are all the more imperative in the current situation and although the precise goals or measures cannot be specified here as not being within the scope of the present study, we can consider the broad directions in which the regional policy framework can be modified. The formulation of long and short term regional goals in national planning, modifying the criteria of central assistance in accordance with these goals, and greater regional orientation in agricultural development appear to be of crucial importance in addition to the more decentralised planning introduced in the Fourth Plan.

Background Tables of data used in  
the regression analysis of Chapter IX

1950-51 - 1955 - 56

State	Net Domestic Product Average Growth Rate	Net Industrial Output Average Growth Rate	Additional Net Domestic Product Rs. 100,000	Additional Net Industrial Output Rs. 100,000	Accumulated Development Expenditure, Three years, Rs.100,000	Net Domestic Product Rs.100,000	Net Industrial Output Rs.100,000
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1. Andhra	3.26	3.10	13048	1027	9365	80129	6762
2. Assam	3.32	3.90	4908	736	2338	29548	3768
3. Bihar	3.40	2.13	11923	1263	7479	70041	11832
4. Bombay	6.40	8.10	31318	9178	15752	181447	33382
5. Kerala	2.96	2.79	6095	965	5675	41173	6622
6. Madhya Pradesh	6.30	4.00	19346	1647	5380	61467	8200
7. Madras	5.20	4.01	19190	2496	9708	73713	12111
8. Mysore	3.70	4.01	10334	1634	9884	55651	7835
9. Orissa	1.62	4.83	3002	559	4219	36876	2269

1950-51 - 1955-56 (Continued)

State	Net Domestic Product Average Growth Rate	Net Industrial Output Average Growth Rate	Additional Net Domestic Product Rs. 100,000	Additional Net Industrial Output Rs. 100,000	Accumulated Development Expenditure, Three years, Rs.100,000	Net Domestic Product Rs. 100,000	Net Industrial Output Rs.100,000
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
10. Punjab	1.58	3.90	5150	1414	9714	65,254	7238
11. Rajasthan	4.16	1.96	8512	282	3511	40931	2865
12. Uttar Pradesh	0.94	1.97	8017	1502	14848	171022	15240
13. West Bengal	3.66	4.57	12366	5127	10718	123982	22409

Calculated from:-

- Sources: 1) NCAER, "Estimates of State Income" op. cit.  
 2) IIPO, op. cit.  
 3) Reserve Bank of India Bulletins, 1952 through 1966.

1955-56 - 1960-61

State	Net Domestic Product Average Growth Rate	Net Industrial Output Average Growth Rate	Additional Net Domestic Product Rs.100,000	Additional Net Industrial Output Rs.100,000	Accumulated Development Expenditure, Three years, Rs.100,000	Net Domestic Product Rs.100,000	Net Industrial Output Rs.100,000
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1. Andhra	2.34	5.24	10866	2044	14997	93177	7789
2. Assam	2.64	4.54	4537	1024	15199	34456	4504
3. Bihar	5.16	7.03	21173	4616	12459	81964	13095
4. Bombay	10.40	15.86	59955	26484	27591	212765	41570
5. Kerala	3.32	3.02	7266	1140	8122	47268	7547
6. Madhya Pradesh	3.50	4.07	14165	2007	14438	80813	9847
7. Madras	4.74	6.80	22909	4971	16844	92903	14607
8. Mysore	2.40	3.73	7929	1709	14976	65955	9469
9. Orissa	3.58	6.61	7132	932	9908	39878	2818

1955-56 - 1960-61 (Continued)

State	Net Domestic Product Average Growth Rate	Net Industrial Output Average Growth Rate	Additional Net Domestic Product Rs.100,000	Additional Net Industrial Output Rs.100,000	Accumulated Development Expenditure, Three years, Rs.100,000	Net Domestic Product Rs.100,000	Net Industrial Output Rs. 100,000
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
10. Punjab	5.46	9.28	19212	4017	17136	70404	8652
11. Rajasthan	2.18	6.00	5378	949	9810	49443	3147
12. Uttar Pradesh	4.40	3.69	36108	3658	27406	179039	16742
13. West Bengal	3.01	7.71	24960		18277	136348	27536

Calculated from:-

- Sources: 1) NCAER, "Estimates of State Income" op. cit.  
 2) IIPO, op. cit.  
 3) Reserve Bank of India Bulletins, 1952 through 1966

1960-61 - 1967-68

State	Net Domestic Product Average Growth Rate	Net Industrial Output Average Growth Rate	Additional Net Domestic Product Rs.100,000	Additional Net Industrial Output Rs.100,000	Accumulated Development Expenditure, Three years, Rs.100,000	Net Domestic Product Rs.100,000	Net Industrial Output Rs.100,000
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1. Andhra	4.10	5.90	34055	4862	1941	104043	9833
2. Assam	2.37	1.80	6960	720	6264	38993	5528
3. Bihar	2.82	3.90	22200	5393	29149	103137	17711
4. Guyarat	5.30	4.70	36181	6529	23577	83108	17361
5. Kerala	2.76	3.60	11638	2447	20222	55134	8687
6. Madhya Pradesh	2.96	6.70	21562	6815	31139	94978	17854
7. Madras	3.50	5.50	31638	8946	36580	115812	19578
8. Maharashtra	2.28	3.40	32351	11231	45071	189612	42503
9. Mysore	4.80	9.20	24845	8115	31164	73884	11236

1960-61 - 1967-68 (Continued)

State	Net Domestic Product Average Growth Rate	Net Industrial Output Average Growth Rate	Additional Net Domestic Product Rs.100,000	Additional Net Industrial Output Rs.100,000	Accumulated Development Expenditure, Three years, Rs. 100,000	Net Domestic Product Rs.100,000	Net Industrial Output Rs.100,000
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
10. Orissa	3.50	10.50	12887	3794	26834	47010	3750
11. Punjab	6.84	10.90	52833	4037	25079	89616	12669
12. Rajasthan	4.85	7.00	21556	2490	20541	54821	4096
13. Uttar Pradesh	2.07	3.70	33190	5819	46350	215147	19838
14. West Bengal	2.04	2.70	24415	7936	38073	161308	38155

Calculated from:-

- Sources: 1) NCAER, "Estimates of State Income" op. cit.  
 2) IIPO, op. cit.  
 3) Reserve Bank of India Bulletins, 1952 through 1966

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CHAPTER IX

Background Table 2  
(In Rs Crores)

Regional Distribution of Public  
Investment by Projects

	Gross fixed Investment at the end of <u>1968-69</u>
1. ANDHRA PRADESH	
Bharat Heavy Electricals Ltd.	35.8
Indian Drugs and Pharmaceuticals Ltd.	21.2
Hindustan Machine Tools Ltd.	7.4
Hindustan Shipyard Ltd.	8.2
Hindustan Aeronautics Ltd.	6.3
Praga Tools Ltd.	4.4
Bharat Heavy Plate & Vessels Ltd.	2.2
Electronics Corporation of India Ltd.	<u>1.4</u>
	<u>86.9</u>
2. ASSAM	
Fertilizer Corporation of India Ltd.	26.8
Indian Oil Corporation Ltd.	15.8
Oil & Natural Gas Commission	20.6
Central Inland Water Transport Ltd.	<u>0.9</u>
	<u>64.1</u>
3. BIHAR	
Heavy Engineering Corpn. Ltd.	179.6
National Coal Development Corpn. Ltd.	104.0
Bokara Steel Ltd.	180.0
Indian Oil Corporation Ltd.	50.3
Fertilizer Corporation of India Ltd.	58.4
National Mineral Development Corpn. Ltd.	12.3
Uranium Corporation of India Ltd.	9.6
Pyrites, Phosphates & Chemicals Ltd.	3.2

Table 2 contd.

	<u>Gross fixed Investment at the end of 1968-69</u>
3. BIHAR contd.	
Hindustan Steel Ltd.	23.5
Hindustan Zinc Ltd.	0.2
Hindustan Copper Ltd.	<u>0.1</u>
	<u>621.2</u>
4. DELHI	
Ashoka Hotels Ltd.	5.1
National Small Industries Corpn. Ltd.	1.5
Hindustan Insecticides Ltd.	0.9
State Trading Corporation of India Ltd.	0.3
Minerals & Metals Trading Corpn. of India Ltd.	0.2
Hindustan Housing Factory Ltd.	0.8
Janpath Hotels Ltd.	0.5
National Research Dev. Corpn. Ltd.	0.1
National Seeds Corporation Ltd.	0.6
India Tourism Dev. Corpn. Ltd.	1.3
Modern Bakeries (India) Ltd.	0.4
National Industrial Dev. Corpn. Ltd.	0.1
Handicrafts and Handlooms Export Corpn.	0.1
Engineers India Ltd.	<u>0.1</u>
	<u>12.0</u>
5. GUJARAT	
Oil & Natural Gas Commission	54.4
Indian Oil Corporation Ltd.	30.8
National Small Industries Corpn. Ltd.	0.7
Hindustan Salts Ltd.	0.5
Modern Bakeries (I) Ltd.	<u>0.3</u>
	<u>86.7</u>

Table 2 contd.

	Gross fixed Investment at the end of <u>1968-69</u>
6. KERALA	
Fertilisers & Chemicals (Travancore) Ltd.	63.1
Cochin Refineries Ltd.	26.4
Hindustan Machine Tools Ltd.	7.8
Indian Rare Earths Ltd.	1.6
Hindustan Insecticides Ltd.	1.1
Hindustan Latex Ltd.	1.1
Modern Bakeries (I) Ltd.	<u>0.3</u>
	<u>101.4</u>
7. MADHYA PRADESH	
Hindustan Steel Ltd.	379.0
Heavy Electricals India Ltd.	69.8
National Coal Dev. Corpn. Ltd.	55.0
National Mineral Dev. Corpn. Ltd.	22.6
National Newsprint & Paper Mills Ltd.	13.9
Bharat Aluminium Co. Ltd.	0.7
Cement Corporation of India Ltd.	<u>2.2</u>
	<u>543.2</u>

Table 2 contd.

	<u>Gross fixed Investment at the end of 1968-69</u>
8. MAHARASHTRA	
Fertiliser Corporation of India Ltd.	46.9
Hindustan Aeronautics Ltd.	26.5
Hindustan Antibiotics Ltd.	7.8
Mazagon Dock Ltd.	10.0
National Coal Dev. Corpn. Ltd.	4.4
Hindustan Organic Chemicals Ltd.	3.9
Lubrizon (I) Ltd.	0.9
Modern Bakeries (I) Ltd.	<u>0.5</u>
	<u>100.9</u>
9. MYSORE	
Hindustan Aeronautics Ltd.	29.9
Hindustan Machine Tools Ltd.	13.1
Bharat Electronics Ltd.	15.1
Indian Telephone Industries Ltd.	11.2
Bharat Earthmovers Ltd.	8.4
Tungabhadra Steel Products Ltd.	0.7
Cement Corporation of India Ltd.	<u>1.2</u>
	<u>79.6</u>
10. ORISSA	
Hindustan Steel Ltd.	386.5
Hindustan Aeronautics Ltd.	29.7
National Coal Dev. Corpn. Ltd.	<u>7.0</u>
	<u>423.2</u>

Table 2 contd.

	<u>Gross fixed Investment at the end of 1968-69</u>
11. HARYANA	
Hindustan Machine Tools Ltd.	<u>7.1</u>
12. PUNJAB	
Fertiliser Corporation of India Ltd.	32.6
Modern Bakeries (I) Ltd.	<u>-</u>
	<u>32.6</u>
13. RAJASTHAN	
Hindustan Zinc Ltd.	12.6
Instrumentation Ltd.	5.2
Sambhar Salts Ltd.	1.2
Machine Tool Corpn. of India Ltd.	1.8
Oil & Natural Gas Commission	0.5
Hindustan Copper Ltd.	5.9
	<u>27.2</u>
14. UTTAR PRADESH	
Bharat Heavy Electricals Ltd.	68.4
Fertiliser Corpn. of India Ltd.	31.3
Indian Drugs & Pharmaceuticals Ltd.	25.0
Oil & Natural Gas Commission	5.8
Hindustan Aeronautics Ltd.	3.0
Triveni Structural Ltd.	3.2
National Small Industries Corpn.	<u>0.3</u>
	<u>137.0</u>

Table 2 contd.

	Gross fixed Investment at the end of <u>1968-69</u>
15. TAMIL NADU	
Neyveli Lignite Corpn. Ltd.	181.0
Madras Refineries Ltd.	36.3
Bharat Heavy Electricals Ltd.	22.7
Hindustan Photofilms Mfg. Co. Ltd.	10.6
Indian Drugs & Pharmaceuticals Ltd.	4.6
Hindustan Teleprinters Ltd.	2.4
Oil & Natural Gas Commission	1.8
Madras Refineries Ltd.	2.0
Indian Rare Earths Ltd.	0.5
Modern Bakeries (I) Ltd.	<u>0.3</u>
	<u>262.2</u>
16. HIMACHAL PRADESH	
Oil & Natural Gas Commission	1.6
Hindustan Salts Ltd.	<u>0.1</u>
	<u>1.7</u>
17. WEST BENGAL	
Hindustan Steel Ltd.	328.8
Mining & Allied Machinery Corpn. Ltd.	30.9
Fertilizer Corpn. of India Ltd.	27.2
Hindustan Cables Ltd.	7.2
National Instruments Ltd.	4.7
Central Inland Water Transport Corpn.Ltd.	2.1
Garden Reach Workshops Ltd.	3.5
Hindustan Steel Works Construction Corpn. Ltd.	2.0

Table 2 contd.

	<u>Gross fixed Investment at the end of 1968-69</u>
17. WEST BENGAL contd.	
Rehabilitation Industries Corpn. Ltd.	1.5
National Small Industries Corpn. Ltd.	1.2
Oil & Natural Gas Commission	1.9
Central Fisheries Corpn. Ltd.	0.2
Hindustan Aeronautics Ltd.	0.2
	<u>411.4</u>
18. UNALLOCATED*	464.7

\* In respect of aviation, shipping, etc. and the State of Jammu & Kashmir and Union, Territories not mentioned above.

Chapter IXAppendix - IStates' Total Resources, Additional Resource  
Mobilization and the States' outlay in Fourth Plan

We may begin with a brief review of the pattern of states' resources and outlay in the first three five year plans and then examine the pattern in Fourth Plan. In the limited scope here we cannot go into all the aspects of the complex centre-state financial relationships which can be a separate subject of study by itself. Instead, we shall discuss only the broad issues with special reference to the resources and outlay in Fourth Plan.

Table I and 2 give the trends in states' expenditure and central assistance in the Three Plans. Row I in Table I gives the total plan and non-plan expenditure of states in the three plans. The total states' expenditure increased from Rs 3359 crores in First Plan to Rs 10833 crores in Third Plan. Row 2 in Table I gives the total transfer of central resources to the states, which increased nearly four times as compared to a three fold increase in expenditure. The distribution of the total central transfer of resources by various items is given in Table 2. The total transfers from Centre consist of states' share of divisible taxes and duties, as awarded by the finance commission and of grants and loans awarded through Planning Commission. Loans alone account for nearly 50 per cent of total central resources while the statutory and other grants met from revenue account for 17, 23 and 26 per cent of total transfer of resources. The planning grants and loans

(84)

Table - I

Trends in States' Expenditure and Central Assistance  
in Three Plans

(RS Crores)

	<u>First Plan</u>	<u>Second Plan</u>	<u>Third Plan</u>
1) Total Expenditure* of States (plan and non-plan)	3359	5585	10833
2) Resources from the centre	1413	2458	5478
resources as percentage of expenditure	42	49	52
3) Total state plan expenditure	1427	2083	4058
4) Resources from Centre deployed on plan side	880	1058	2502
5) Central assistance as percentage of plan expenditure	61.6	50.8	61.5

\* Excluding discharge of debt and repayment of loans.

Source: The report of Administrative Reforms Commission, op. cit.

Table - 2

Transfer of Central Resources to States in RS Crores

	<u>First Plan</u>	<u>Second Plan</u>	<u>Third Plan</u>
i) Share of divisible taxes and duties	327	711	1191
%	(23%)	(24%)	(23%)
ii) Grants (statutory and others) met from revenue	248	668	1148
	(17%)	(23%)	(20%)
iii) Grants from Central Road Fund	16	19	17
iv) Grants met from capital	24	59	137
v) Loans	799	1411	2985
Loans as% of total (56.1%)		(49%)	(51%)
vi) Total Transfer of resources	1413	2858	5478
	(100.00)	(100.00)	(100.00)

Source: The report of Administrative Reforms Commission, op. cit.

together accounted for 73 and 71 per cent of total transfer of central resources. It can also be noted from the table that the central assistance as a percentage of plan expenditure was 61.6, 50.8 and 61.5 in First, Second and Third Plan.

Various writers have analysed the centre-state fiscal relations and come to different conclusions on whether over the three plans, the states' dependence on central resources increased, decreased or remained stable<sup>1</sup> and also on the measures to reform the centre-state fiscal relations. The Administrative Reforms Commission emphasized the following aspects in the analysis of trends of the size and pattern of central resources transferred to the states. 2

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1. Mention may be made of following works:
    - a) Venketraman K., "States' finances in India", Allen and Unwin, 1968.
    - b) Sastri K.V.S. "Federal-state fiscal Relations", Oxford University Press, 1966.
    - c) Chellia, Raja T. "Fiscal Policy in Under-developed Countries", Allen and Unwin, 1969.
    - d) Toye J.F.J. "Government Expenditure and Revenue in the Indian States", Paper read at India Group, 12th November, 1970.
    - e) Lakadawala D.T. "Union-state Financial Relations" Lavani Publishing House, 1967.
    - f) Khatichate D.R. and Bhatt V.V. "Centre-State financial Relations in Context of Planned Development." Economic and Political weekly, Feb. 21, 1970.
    - g) A.K. George, "Centre-State Fiscal Relations in India" op. cit.
    - h) Zaveri N.J. "Transfer of non-plan Resources to states" Economic and Political Weekly, June 7, 1969

2. The Report of the Administrative Reforms Commission, op. cit. The distribution of union and state taxes works out as follows: Progressive or heavy all India taxes, like general income tax, Company taxation, Capital and expenditure taxes, Custom duties (inclusive of export duties) taxes on goods in the course of internal trade, terminal taxes on goods or passengers by sea, air and rail and freights taxes on transactions in the stock exchange fall in the union list. States' taxes consist of land revenue agricultural income tax, taxes on land and buildings, sales and purchase taxes, electricity and entertainment duties, taxes on advertisements, (including newspapers), vehicle taxes, taxes on professions.

To quote "i) the resources for raising funds available to states are comparatively inelastic. ii) the functions allocated to the states are such as lead compulsively to expanding responsibilities, particularly in the context of ambitious development plans. iii) important sources for national plan financing are foreign aid and deficit financing both tending to strengthen central rather than state resources"

As we pointed out in Chapter IX the Fourth Plan laid down several criteria for determining the central assistance to states, the states' resources and the resultant outlay in Fourth Plan can be examined against this background.

We pointed out in Chapter IX that although Fourth plan gave specific consideration to the regional level of development by introducing 10 per cent of central assistance on the basis of per capita income if it is below national average and 10 per cent on the basis of the per capita development expenditure if it was below national average, this in itself did not lead to either an equalization of per capita outlay or even a reduction in the disparity between the per capita outlay of high and low income states.<sup>I</sup> Table 3 gives the distribution of Central assistance to states by the three criteria mentioned above.

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I. The correlation coefficient between per capita outlay and per capita income in Fourth Plan works out to be +0.65 and that between the per capita central assistance and per capita income is -0.20.

TABLE - 3  
Distribution of Central Assistance to States by Categories  
in Fourth Plan

States	(1) 1969-70 Share of Taxes and Grants under Article 275	(2) 70 per cent on popu- lation basis	(3) 10 per cent on the basis of above Average per Capita tax coll- ection	(4) 10 per cent on the basis of below Nation- al Average per capita Income	(5) 10 per cent on the basis of below Average per Capita Devel- opment Expend- iture	(6) 10 per cent on the basis of below Average per Capita Devel- opment Expend- iture	(7) Total (3+4+5+6)
Andhra Pradesh	54.68	37.65	2.21	-	-	-	39.86
Assam	34.19	13.65	-	-	-	-	13.65
Bihar	48.74	50.35	-	23.80	31.13	-	105.28
Gujarat	27.31	23.53	7.50	-	-	-	31.03
Haryana	8.94	8.94	-	-	-	-	8.94
Jammu and Kashmir	19.69	3.29	-	-	-	-	3.29
Kerala	39.98	18.82	4.71	5.85	-	-	29.38
Madhya Pradesh	43.42	35.77	-	8.13	5.85	-	49.75
Madras	45.72	34.35	7.51	-	-	-	41.86
Maharashtra	57.87	43.77	18.60	-	-	-	62.37
Mysore	46.18	25.88	0.80	-	-	-	26.68
Nagaland	16.42	47	-	-	-	-	47
Orissa	43.93	18.82	-	10.02	-	-	28.84
Punjab	13.07	13.18	15.10	-	-	-	28.28
Rajasthan	31.90	23.06	-	10.49	2.08	-	35.63
Uttar Pradesh	83.59	79.53	-	8.94	26.56	-	115.03
West Bengal	51.65	470.59	10181	-	1.61	-	51.95

Source: Zaveri N.J. "Transfer of Non-Plan Resources to States". A suggested Approach". Economic and Political Weekly, June 14, (1969)

\* Allocation of assistance on the basis of tax effort and development has been included under Punjab

These figures show that 10 per cent of allocation on the basis of per capita tax effort meant additional allocation to the high income states and to Andhra and ~~Andhra Pradesh~~ Kerala. Only in the other two criteria the additional allocation occurred only to the low income states.

We may examine the states' total resources by sources to understand the inter-regional differences in states' own additional resource mobilization from various sources. These figures are given in Table 4. States' total resources can be divided into four separate categories, viz. i) contribution by public enterprises ii) market loans iii) miscellaneous capital receipts and iv) additional taxation. Following points can be noted from the table:

1) The contribution of public enterprises to states' resources reflects the influence of two factors, viz. the accumulated public investment and the efficiency of the public enterprises.

Andhra, Tamil Nadu, Maharashtra and Uttar Pradesh have larger resources raised from this source than the other states. In the market loans, the industrialisation bias can be noticed as here the amount of market loans raised by Gujarat, Maharashtra and Tamil Nadu is highest, although this source is relatively unimportant both in Punjab and West Bengal. The surplus or deficit on miscellaneous receipts shows the overall past loan

Table - 4

State Resources in Fourth Plan by Sources

(Rs crores)

State	Contribution By Public Enterprises	(2) Market Loans	Miscellan- eous Capital Receipts	Additional Taxation (F)	(5) Total State Resources
Andhra Pradesh	73.9	37.0	(-)170.7	100.0	120.5
Bihar	40.8	12.3	(-)141.0	100.0	103.6
Gujarat	43.6	63.2	3.7	116.7	292.2
Haryana	20.0	16.2	(-)6.6	30.0	112.0
Kerala	23.0	15.6	(-)81.6	60.0	83.4
Madhya Pradesh	27.9	14.8	(-)147.9	100.0	94.0
Maharashtra	61.5	73.6	209.5	50.0	566.3
Mysore	35.8	8.6	(-)37.5	50.0	154.1
Orissa	9.6	11.6	(-)78.4	35.0	20.5
Punjab	20.7	13.2	(-)6.1	78.0	170.4
Rajasthan	14.2	13.8	(-)96.6	40.0	19.0
Tamil Nadu	75.7	67.1	(-)36.0	85.0	300.0
Uttar Pradesh	73.8	36.5	(-)24.0	175.0	425.0
West Bengal	22.4	19.8	(-)121.5	80.0	99.5
Total	543.1	403.3	(-)734.7	1099.7	2560.5

Source: Vithal B.P.R. "Central Assistance to States", op. cit.

Table - 4 Contd.

States' Resources by Sources in Fourth Plan

	Per capita additional taxation in third plan in Rs. (5)	Per capita additional taxation in Fourth Plan (Rs) (6)	Per capita Outlay Rs. (7)
Andhra	12.6	23.6	64.96
Bihar	4.8	17.7	76.24
Gujarat	18.6	45.1	173.96
Haryana	25.3	30.6	194.59
Kerala	14.3	28.6	124.17
Madhya Pradesh	9.2	25.1	89.45
Tamil Nadu	15.9	21.9	129.15
Maharashtra	10.4	10.2	166.06
Mysore	15.0	17.6	114.33
Orissa	17.3	16.6	85.80
Punjab	23.1	54.4	189.00
Rajasthan	14.1	15.6	93.43
Uttar Pradesh	11.3	19.7	129.15
West Bengal	10.6	18.3	106.65
All States	16.9	21.2	73.24

Source: Vithal, B.P.R. "Central Assistance to states".  
op. cit.

liabilities of the state. A big surplus of RS 209.5 crores existed only in Maharashtra. The negative balance on this account is highest in Andhra, Madhya Pradesh, Bihar and West Bengal. The additional taxation is the most important source of total state resources in all the low income states although its relative importance differs in the various high income states. If we compare the additional per capita taxes instead of overall levels of per capita taxes, Punjab, Gujarat, Haryana, Kerala and Madhya Pradesh occupy the first five ranks while Maharashtra, West Bengal and Tamil Nadu occupy 14, 9 and 7 ranks. Thus, in spite of higher additional tax effort by Madhya Pradesh, both in per capita tax and in additional tax the per capita outlay remained one of the lowest in Fourth Plan. On the other hand, Orissa and Rajasthan improved their ranking position in per capita outlay (11 and 9) from their respective ranking positions in per capita additional taxes. (12 and 13). Maharashtra, Mysore and Tamil Nadu improved their ranking position in per capita outlay as compared to that in per capita additional taxes. Thus, if we take additional resource mobilization of the states as the index of their willingness to raise resources it becomes clear that high income states are not necessarily those contributing the most and yet are compensated for it as their per capita total taxes are higher (see table 2). In addition, as the additional resource mobilization through taxation is not a predominant source of total state resources, their ranking in per capita outlay improves in spite of poor tax effort.

We must also emphasize that the economic factors alone are not sufficient in explaining inter-regional differences in tax effort.<sup>1</sup> Nambiar and Rao<sup>2</sup> estimate the income elasticity in percentage for the Indian states in 1967-68 as follows.

<u>High Income States</u>		<u>Low Income States</u>	
Gujarat	1.46	Orissa	0.80
Maharashtra	1.61	Madhya Pradesh	0.99
West Bengal	0.77	Bihar	0.59
Punjab	1.02	Rajasthan	1.16
Tamil Nadu	2.29	Uttar Pradesh	0.91
	<u>Average</u>	Andhra	1.24
Mysore	1.35	Assam	0.86
Kerala	1.56		

- I. Toye, F.J. op. cit, points out that the strength of the agrarian elite is one reason why on average throughout India revenue levels are low compared with other poor countries. He also concludes that in accounting for revenue differences between states within India neither political nor the technical explanation appears to be satisfactory. Fast rising income level in the previous decade, the relative scarcity of scheduled tribes and castes and a small proportion of male non-workers in population are so far best proven characteristics of states where government raises plentiful revenues.
2. See Nambiar, K.V. and Rao Govinda M., "Tax Performance of States", Economic and Political Weekly, May 20, 1972.

$$\text{Income Elasticity} = \frac{\Delta T}{T} \frac{\Delta Y}{Y} = \frac{\Delta T}{T} \times \frac{Y}{\Delta Y}$$

In their regression analysis to explain the regional T/Y in 1967-68, the statistical fit with reference to urbanization factor is only 0.40.

We may conclude as follows from the above brief discussion. The overall trends in the central assistance to states in first three plans showed that while the total expenditure of states increased nearly threefold, the central assistance increased by nearly four times. Among the various sources of central assistance, the planning grants and loans accounted for an increasing proportion of total assistance. In the Fourth Plan, in the criteria of determining the central assistance, the level of regional development was specifically recognised and hence we analysed how far this resulted into a more equitable distribution of central assistance to states or led to higher per capita outlay in the low income states. Examination of allocation of central assistance by the various additional criteria (per capita tax effort, per capita income and per capita development expenditure) showed that in the first criterion all high income states Andhra and Madhya Pradesh qualified for additional resources. In the other two criteria, additional central resources were allocated to low income regions. An analysis of various categories of states' resources showed that in the market loans and the miscellaneous capital receipts, the high income states had a much better position so that in most of the low income states, additional tax effort was the principal source of state's total resources besides the central assistance.

The additional tax effort was found to be highest (first five ranks) in Punjab, Gujarat, Haryans, Kerala and Madhya Pradesh. In spite of large variations in the additional tax effort, the per capita outlay in Fourth Plan was positively and significantly correlated to the per capita income due to the importance of the above mentioned factors that enhance the resources position of high income states. Thus, we can conclude, that the regional disparities in the state development effort must have increased during the Fourth Plan.

Additional tax effort is one indicator of states' willingness to raise resources. In addition, there are considerable regional variations in the other indicators of tax effort such as states' own tax revenue as proportion of states' net domestic product per capita tax revenue and the income elasticity as discussed earlier. We agree with the various writers that economic factors alone do not appear to be sufficient to explain regional differences in these various indicators of regional tax performance.

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CHAPTER IX

Appendix - 2

The Sectoral Allocation of the state outlays  
and the Physical Indicators of the Levels of Social  
Infrastructures in fourth Plan

We discussed in Chapter IX the role of centre dominated planning process in maintaining an overall consensus of the multi-regions in the period up to the end of Third Plan. We also pointed out that in the fourth plan, some changes were introduced towards greater decentralization of the decision making and in increasing the state initiative in the state plans. However, in Fourth Plan also Centre still retained its influence by earmarking funds by sectors such as agriculture, major irrigation and power, elementary education and rural water supply, allowing switching of funds between the projects in a sector but not between sectors. The sphere of action of centre and state activities was described by Gadgil D.R. as follows. To quote, "The field of action of the Centre and of the states are, to a large extent district.

The centre builds up and maintains the overall instrumentalities of national economic life such as credit and the monetary system, railway and ports. It also acts in relation to the basic requirements of a long-term plan of industrialisation, with emphasis on large industry and exploitation of mineral resources. The states are concerned, on the other hand, with acting on the total life of all the people in their charge and on all the diffused dispersed and small-scale units and activities. The Centre is concerned with highly concentrated action at strategic points; the states must affect all areas and localities, all the relevant

fields and all units. The centre is concerned with the strategy of long term plan and with initiating crucial movements, the states have to engage themselves in transmitting the forces impelling economic development to all areas and units and with concretising for the individual units the fruits of economic development. The generalized objectives of state plan are therefore, making possible initiating and encouraging economic development in all activities and sectors and areas and localities and protecting the standard of living and improving and ameliorating the situation, social and economic of all individuals within their territories.

Another differentiation in the Central and state action lies in the realm of conservation and better utilization of natural resources and provision of public utilities and social services.<sup>1</sup> Thus, the sphere of action of Centre and state is such as to allow for greater state initiative in individual schemes within each sector once the state's allocation of total resources to various sectors is determined in consultation with Centre. Up to the Third Plan and also in Fourth Plan a great uniformity is found to exist in the percentage allocation of regional resources to the various sectors. In spite of the unevenness of development between high and low income regions and

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1. Gadgil D.R. "Planning and Economic Policy in India." Poona, Gokhale Institute of Politics and Economics, 1962, P. 182-3.

the regional differences in the physical levels of the various social infrastructures. We discussed in Chapter IX that regional variations in the pattern of sectoral allocation in the social infrastructures is an important policy variable.

Table I gives the percentage distribution of sectoral allocation of regional resources in Third Plan. It can be seen from the table that the percentage of total resources allocated to each sector shows very small regional variation, although since the total state expenditure is unevenly distributed it would lead to a larger inter-regional variation in the actual amount spent in each sector by each region and the additional benefits accruing from the given expenditure. We discussed in Chapter IX the regional allocation in Third and Fourth Plan in agriculture and irrigation and concluded that the agricultural development effort as measured by the various indicators<sup>I</sup> would remain much below the national average in a number of low income regions.

We may further examine the regional resource allocation in Fourth Plan in two important sectors of power and education. Table 2 gives the figures on the percentage of total state expenditure allocated to power and education, the absolute amounts to be spent by various regions in Fourth Plan and the physical levels of development in these sectors in each state.

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I. We examined the total outlay in agriculture and irrigation, agricultural outlay per hectare and also the physical indicators such as additional irrigation facilities up to Fourth Plan in relation to the ultimate irrigation potential of the region.

**TABLE - I**  
**Allocation of Public Sector Outlays in State**  
**Plans in the Third Five-Year Plan.**

State	<u>Percentage of Public Sector Outlays to</u>						
	<u>Sector</u>						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Andhra Pradesh	14	11	46	6	4	19	100
Assam	11	10	29	8	8	33	100
Bihar	12	12	43	4	6	23	100
Gujarat	17	8	42	3	9	21	100
Jammu & Kashmir	11	7	33	12	12	25	100
Kerala	19	6	35	10	6	24	100
Madhya Pradesh	15	11	39	4	6	26	100
Maharashtra	17	9	38	4	10	22	100
Mysore	16	8	44	6	5	20	100
Orissa	11	13	43	8	6	23	100
Punjab	13	8	45	6	6	23	100
Rajasthan	10	9	51	4	6	20	100
Tamil Nadu	13	9	44	8	4	23	100
Uttar Pradesh	17	13	33	4	6	26	100
West Bengal	18	6	24	9	8	34	100
Total	14	10	40	6	6	24	100

Notes on Sectors: 1) Agriculture      2) community  
 Development and Co-operation;    3) Irrigation and Power;  
 4) Industry and Mining;    (5) Transport and  
 Communication; 6) Social services and Miscellaneous;  
 7) Total.

Table - 2

Allocation of State Outlay to Power and Education and  
the Physical Levels in these Indicators in  
Fourth Plan

State	(crores) (in Rs)	POWER	
		% of total state Outlay	Per capita Annual Consump- tion in K.W.H. (1965-66)
(1)	(2)	(3)	(4)
Andhra	88.50	32	31
Assam	14.82	15	8
Bihar	63.25	28	57
Gujarat	70.80	24	83
Haryana	40.53	86	N.A.
Kerala	48.75	30	39
Madhya Pradesh	26.40	20	36
Maharashtra	142.00	28	106
Mysore	21.90	25	55
Orissa	35.77	30	70
Punjab	73.93	40	102
Rajasthan	28.54	32	21
Tamil Nadu	80.00	30	89
Uttar Pradesh	177.73	38	30
West Bengal	34.00	21	114
All States	974.06	29	61

Table - 2 (continued)

EDUCATION

	Total Outlay	% of State Outlay	Per Capita Expenditure in Rs (1961)	Expenditure on Education to state income in 1960-61
	(5)	(6)	(7)	(8)
Andhra	382.00	9	7.1	2.49
Assam	262.70	10	7.6	2.26
Bihar	414.80	8	4.9	2.20
Gujarat	290.00	6	9.2	2.34
Kerala	192.50	7	11.5	3.64
Madhya Pradesh	215.00	6	4.3	2.19
Maharashtra	647.20	7	12.4	2.64
Mysore	150.00	4	7.5	2.46
Orissa	158.10	7	6.3	1.54
Punjab	218.50	7	9.3	2.05
Rajasthan	176.00	6	4.9	1.81
Tamil Nadu	554.30	11	11.0	2.85
Uttar Pradesh	694.30	7	5.7	2.10
West Bengal	364.50	11	9.8	2.35
All India	5516.59	8	7.8	

Sources:

Col. (2) from "Fourth Five Year Plan of India, op. cit. p.  
Col. (3) Computed from thesectoral outlays of Fourth Plan for each state.  
Col. (4) The Pande Report on the Identification of the industrially Backward States, op. cit.  
Col. (5) "Fourth Five Year Plan" op. cit.  
Col. (6) Computed as in Col. 3  
Col. (7) and Col. (8) Rudolph J. Lloyd and Rudolph Susanne, "Regional Patterns of Education Rimland and Heartland in Indian Education". Economic and Political Weekly, June 28, 1969.  
Col. 7 refers to the private and public expenditure on education. Private expenditure includes fees, tuition, endowment income, gifts etc. as estimated by "Education Commission in Inequalities in Educational Developments", (States and Districts), New Delhi, 1966 Mimu.

We can note the following points from the table.

1) Inter-regional variation in the percentage of state outlay in Power amounts to 15 per cent in Assam to 40 per cent in Punjab. The absolute total outlay varies from RS 14 crores in Assam to 177 crores in Uttar Pradesh. High income states have higher than national average consumption of power per capita. From the low income states, Andhra, Bihar and Uttar Pradesh have improved their ranking in total outlay in power.

2) In education the percentage of state outlay allocated to education varies from 4 per cent in Maharashtra to 11 per cent in Uttar Pradesh and Rajasthan. However here also the previous levels of per capita expenditure on education, expenditure on education as percentage of state income and total outlay in RS is higher in high income states as compared to the low income states.<sup>1</sup>

In Chapter VIII, we discussed the possibilities of conflict between the "efficiency" and "equity" objectives at the sectoral level. We pointed out that in the sectors in which resource allocation criterion is per capita need, such as public health and education, the conflicts between the two objectives are less acute than in the other sectors. Such as power where the criteria of allocation cannot ignore the current demand for power from the large industrial and urban centres and thus there is a greater conflict between the "efficiency" criterion and the "equity" criterion. From the Table 2 we can see however, that even in education

1. See Rudolph J. Lloyd and Rudolph Susanne, op. cit. In Chapter IV we found that the literacy rate is a highly significant factor in explaining regional per capita and per worker income differentials.

per capita equalization in expenditure does not seem to have taken place. In addition to the factors we have already emphasized above we must also mention that here also, the economic factors such as industrialization or urban bias alone cannot explain the regional differences in the educational levels. The role of historical long term factors are important even if we cannot easily identify the separate factors. Higher levels of education in individual states such as Kerala, Mysore, Gujarat, Maharashtra and Tamil Nadu can be attributed to different social and economic factors besides the overall level of urbanisation or the existence of "active" state governments. However, what we can conclude is that the inter-regional equalization in the expenditure per capita in education will not take place in Fourth Plan.

## CHAPTER X

### SUMMARY AND CONCLUSIONS

We shall give the summary of our findings and the conclusions of this study in the following order:†

(a) We shall first give the summary of findings and the conclusions of the study.

(b) In the light of the conclusions of our study regarding the importance of the regional policy, we shall consider the future pattern of regional inequality in India.

#### Summary of Findings and Conclusions:

The theoretical hypothesis regarding the course of regional disparities during the process of national economic development emerges from the fact that, for the national economy to develop, strong centres of development are needed from which national growth emerges and spreads over time. Thus, during this period, regional differences between the centres of growth and other regions increase. The time pattern of regional inequality during the process of economic development is summarised in the wellknown inverted "U" hypothesis, or divergent-convergent thesis. As Williamson puts it, "the early stages of national development generate increasingly large 'North-South' income differentials. Somewhere during the course of economic development, some or all of the disequilibrating tendencies diminish, causing a reversal in the pattern of regional inequality. From then on, instead of divergence in the inter-regional levels of development, convergence becomes the rule, with backward regions closing the development gap between themselves and the already industrialised areas. The expected result is that a statistic describing regional inequality will trace out an inverted "U" shape against the national growth path." Myrdal and Hirschman also emphasise that the factor flows are likely to be disequilibrating, so as to increase regional disparities. In Williamson's, as well as in

Myrdal and Hirschman's theorising, the "peak" of regional inequality is left vague, to be determined by endogenous factors that differ from country to country. Richardson<sup>1</sup> also comes to the conclusion that whether or not the factor flows are equilibrating is a matter of empirical substantiation, since there is no clear theoretical indication. On a priori grounds, however, he expects labour flows to be more equilibrating than the capital flows.

Thus, we argued on the basis of the above theorising that although we can expect the regional disparities to increase during the process of national economic development, the precise nature and the course of regional disparities and the factor flows is a matter of empirical substantiation. The number of developing countries for which regional income and productivity data are available is very few. In this context, the study of regional disparities in India is of special significance, since it can throw additional light on the process of regional disparities in an economy that is currently undergoing structural change. Since the process of structural change in India and other economies at a similar stage of development is different from that in the more developed countries, in their early stages of development, a study of regional disparities in India can highlight the factors that are different in the context of currently developing economies and which in turn will influence the process of regional inequality. In addition, the importance of the study of regional disparities needs to be emphasised in a large country in which sub-national units are as large as or larger than several individual nations. An understanding of regional differences in economic performance of the sub-national units vis-a-vis national economic performance is vital for understanding the aggregate average national performance. The choice of states as regions can be

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1. Richardson, H.W., op.cit. p.329.

justified on the grounds that the states represent identifiable groups of people with separate aspirations of their own, but who also work towards common national goals. The states are also proper units for regional analysis as the political and economic processes work through a complex centre-state mechanism of decision-making. Hence, if we want to draw policy conclusions from an empirical analysis of regional disparities, it is necessary to keep the framework that corresponds to the existing administrative and political boundaries. These advantages of using states as the regional units were considered against the limitations of such a choice arising from the fact that if regions were to be chosen on "homogeneity" criteria, the states are least suitable. In addition, we have to recognise that considerable regional differences in the levels of economic development exist within the different parts of the state. In choosing states as regions we are examining the broad average regional aggregates. (Chapter I)

We considered the following factors especially relevant in the development process in India and which, in turn, can be expected to influence the structure and process of regional inequality in India. The differences in the initial levels of national industrial development between the more industrialised countries in their early stage of development, and the levels at which India and other economies at a similar stage of development started their process of planned economic development, is an important factor which will influence the process of national and regional development. The other important and related factors are the population pressures, the initial unevenness of the regional levels of development arising out of historical and natural resource factors, and an entirely different setting of international trade and technological change. Under planning in India, the national rate of growth of the economy and the rates of investment have been lower than the required minimum rate

of growth either to absorb the new additions to the labour force in non-agricultural employment or to reduce the size of labour force engaged in agriculture. Thus, the inter-regional and inter-sectoral migration of labour force which played an important role in the context of developed economies cannot be envisaged to operate in the case of India. Inter-regionally, the arguments that the labour flows can be expected to be more equilibrating does not hold in the Indian context, given the large surplus labour already existing in the high income states and in big cities. Thus, it becomes necessary in this context to emphasise the need to create the internal conditions of regional growth aimed at influencing the income and productivity levels of a region's economic sectors.

(Chapter I)

An analysis of regional income data in India presents difficult problems, as the Central Statistical Organisation which compiles national income data does not publish regional income estimates. The regional income data published by the State Statistical Bureaux apply different methods of estimation in the various sectors for which direct data are not available. Hence, it became necessary to use the state income data compiled by NCAER and IIP0 for the four planning years. The overall reliability and acceptability of state income figures from these two sources was established by comparing the sum total of state income (which is equivalent to NDP at national level) and the national net domestic output originating in the major economic sectors. An analysis and comparison of state income figures from the various sources revealed the great need for improvement in the regional income data. We pointed out that the centre can play a greater role and initiative in this regard because of several factors. Some of these are that the technical expertise is concentrated in the national planning divisions at the centre; in addition, there are genuine difficulties in enforcing strict methodology and criteria at the multiple regional

levels. Finally, as the centre plays an important part in the regional allocation of resources, the centre should evaluate the regional performance in terms of suitable economic indicators. (Chapter II.)

Regional per capita income as measured at the level of industrial origin is an imperfect measure of regional differences in the economic welfare or the standards of living. However, the regional per capita income is an important indicator as it measures the quantum of productive activities at regional level and, as such, it thus reflects basically the influence on income from two distinct sources, viz. regional differences in economic structures and the differences in the productivity levels within each economic sector. As in other systems of classifications, a certain degree of arbitrariness cannot be avoided in classifying regions into several categories. Taking 1960-61 as the basis of classification, Indian regions were classified in three categories of "high income regions", "low income regions" and "the average".

The degree of regional inequality in India in per capita income was estimated for the years 1950-51, 1955-56, 1960-61 and 1967-68 by applying the indices of weighted coefficients of variation, VW, MW and MWa. The degree of regional inequality in India as measured by these indices was found to be lower than that in some of the "middle-income countries" (by Kuznet's classification) such as Brazil, Italy, Spain, Greece and Yugoslavia. In some of these countries the values of VW and MW show marked difference thus reflecting the fact that the VW is affected by a few extreme deviations with large population shares<sup>1</sup>. In the case of India, the values of VW and MW did not differ in the per capita income index. The value of the regional inequality index remained nearly the same between

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1. See Williamson, op.cit.

1950-51 and 1967-68; however, there was some decline in its value in 1955-56 and 1960-61. (Chapter III.)

As the number of years for which state income figures are available is very small, the long term trends in income differentials and the inter-regional migration pattern could not be examined. On a priori grounds we argued that the role of substantial inter-regional migration of labour force appears to be very limited in the light of the already high open unemployment in the urban areas and the rapid population growth. In relation to the short-term periods for which data are available, we examined the role of two factors, viz. (a) the role of population distribution versus the unequal regional per capita income growth in accounting for the change in the weighted variance in the given time period; (b) an examination of inter-regional migratory patterns for the period 1951-61; and evaluate the inter-relation between the given migratory flows and the levels and change in regional income differentials. With regard to the first factor, we found that the population redistribution factor accounted for as high as 50 per cent of the change in absolute variance between 1951-61. Thus, for this period, the change in the regional population weights was such as to increase the regional inequality. In the second period of 1960-61 to 1967-68, however, the population redistribution factor was not found to be significant. An analysis of inter-regional migratory patterns in India in 1951-61 showed that the migration of the people across regional boundaries accounted for a much smaller proportion of total migration as compared to the movement of people within the same region. In addition, while the intra-regional migration was characterised by a movement of people among the rural areas of the same region, the inter-regional migration of population was essentially a rural to urban movement of the people.<sup>1</sup> We then

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1. Over the period 1951-61 inter-regional migration amounted to 8.6 million people as compared to 57.2 million people who moved within the state boundaries. Out of the total inter-regional migration, 69 per cent accounted for the rural to

urban movement of population, while in intra-state migration, nearly 72 per cent was accounted for by rural to rural movement of population.

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classified states into those with negative net balance of migrants and those with positive net balance. The states in both categories included some high and low income states. Thus, it showed that income differentials can be regarded as only one of the factors in inducing the migration flows across the regions. Whether a given migratory pattern created a change in the regional income differentials and acted as an equilibrating or disequilibrating factor cannot be answered on the basis of limited data. (Chapter III.)

Since state income figures measure the regional income originating in the economic sectors, the degree of regional disparity can be measured in these variables as well. Estimating the value of net output per worker in the economic sectors presented some difficulties due to the inherent conceptual problems arising due to the predominance of agriculture and also due to the change of census definitions of the working force between 1951 and 1961. An analysis of regional distribution of labour force in major economic sectors and the regional disparity in the value of net output per worker led us to the following conclusions:

- (1) An important source of variation in regional per capita income must be attributed to the regional differences in economic structures as measured by the percentage of a region's labour force engaged in the various industrial sectors and the percentage of a region's NDP accounted for by the different sectors.
- (2) The degree of regional inequality in Indian economy was higher in 1950-51 and 1960-61 when measured in net output per worker than in per capita income. This meant that Williamson's hypothesis of a significant and positive correlation between regional per capita income and the labour participation rate did not hold in the case of

India. Regional labour participation rate in a predominantly agricultural economy must be regarded as being influenced by complex social and economic factors that vary among regions and we need not assume even a positive correlation between the regional per capita income and the regional labour participation rate.

(3) Williamson's conclusions on the sectoral inequality also do not seem to hold in the case of India. To quote, "Is regional dualism more prevalent in a traditional sector, agriculture, and one in which technology is more localised by regional resource endowments? The answer to this question is most definitely in the affirmative, although we base it on a very limited sample because of the rare appearance of regional income data with sector breakdown." He further adds that "At the risk of oversimplification, it appears that the persistence of high degrees of regional inequality in such countries as Spain, Brazil, Italy, Yugoslavia and the United States can be further decomposed into two parts: (1) tremendous differentials in agricultural productivity and (2) significant regional differences in economic structures. It would appear that regional "dualism" in the industrial sector plays a minor role and its significance has been grossly exaggerated in the current development literature."<sup>1</sup> The analysis of sectoral inequality in major economic sectors led us to conclude that the regional inequality was highest in the manufacturing sector if we compute the regional inequality in the net output per worker in the major economic sectors. A divergence in the value of VW and MW in the manufacturing sector showed that the regional inequality index was affected by a few extreme deviations with large labour force shares. Regional inequality in agriculture in net output per worker was found to be lower than in manufacturing. However, if we estimate the regional disparity index in terms of net agricultural output per acre, the degree of

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1. Williamson, J.G., op.cit.

regional inequality for the same years was found to be a little less than that in manufacturing. Thus, the Indian data offer a pattern that is different from Williamson's pattern on the few countries for which such data were available. (Chapter IV)

(4) Multiple regression analysis of regional income per capita and per worker income led us to identify the significance of various structural factors in explaining the regional differentials. These were the "pressure of labour on land", labour participation rate, regional percentage of national value added in manufacturing, the literacy rate and the "regionality" variables. In explaining the regional per capita income differentials, the above factors were found to be significant except the labour participation rate which was found to be negatively but statistically insignificantly correlated to regional per capita income differentials. In the regression analysis on per worker income, however, the labour participation rate was found to be negatively and significantly correlated to the per worker income differentials. The negative and significant correlation was also found to exist between the regional per capita income differentials and the "pressure of labour on land". The literacy rate and the regional percentage share in national value added in manufacturing were found to be positively and significantly related to the regional differentials. The statistical significance of these factors showed that the structural factors influencing the regional income differentials in an underdeveloped economy are likely to differ from those in industrialised countries. Regional differences in labour participation, the pressure of labour on land, regional differences in economic structures and the levels of literacy were found to be of crucial significance. The regional differences in these variables represent the influence on regional income of complex social and economic factors and the historical conditions which created regional disparities in these variables. (Chapter IV.)

The regional income analysis was followed by a disaggregated analysis of regional disparities in the two major sectors of manufacturing and agriculture. This analysis was pursued with the following objectives:

(1) The figures of net output per worker in the given economic sector measures the regional income originating in the entire economic sector, and hence it reflects the influence on regional income of two effects, viz. the industrial structure effect and the income and productivity differences within the given industry. Hence, where possible, the importance of these two factors must be assessed separately.

(2) An analysis of regional differences in productivity at a disaggregated level can enable us to identify the explanatory factors in regional disparity at the industry level.

(3) From the regional policy point of view, the future role of private and public sector investment in reducing the regional disparities at sectoral level needs to be considered in the light of past trends.

We summarise below the conclusions of the analysis of regional disparity in manufacturing and agriculture in these three aspects:

(1) The regional disparity indices of weighted coefficient of variation in the sub-sectors of manufacturing showed that the VW was higher in the household and small enterprises sector than in the large industry sector. We found that in all the three sub-sectors, the income per worker was higher in the high income regions. Thus, while low income regions had a larger proportion of their labour force in manufacturing engaged in the household and small enterprises, the average income per worker in these regions was much below the national average, thus giving large absolute deviation resulting in high VW when weighted and squared. A statistical quantification of the sources of variation of the level of manufacturing

income showed that the regional differences in industrial structures were the most significant source of variation in the level of manufacturing income. (Chapter V.)

(2) In the absence of comprehensive data on the income and productivity levels in the household and small enterprises sectors, the disaggregated analysis of regional disparity in the manufacturing productivity was pursued for the large industry sector alone. The cross-sectional analysis of regional disparity in manufacturing was based on the data published by the Annual Survey of Industries. The nineteen industries were selected by their ranks in the national value added in manufacturing. The regional disparity in value added per worker and earnings per worker were calculated and these showed that considerable regional productivity differences existed in these industries. In the cross-sectional analysis, the regional value added per worker in the given industry was regarded as a function of two identifiable factors, viz. capital intensity and the regional percentage of national value added in the industry. The regional differences in capital intensity within the same industry arise because of variations in the technical processes as well as the capital market conditions. Since we assume that surplus labour exists both in the more and the less industrialised regions, the inter-regional variations in the capital intensity are likely to be governed by the capital flows. If these are disequilibrating at industry level, then the industries in the low income regions with locational advantages would still have lower capital intensity and productivity than the more industrialised regions. The importance of the capital intensity factor itself was found to vary among the different industries.

(Chapter V)

The regional differences in the productivity levels in the given industry can be expected to be influenced by the agglomeration factor which was measured as the regional percentage of national value added in the given industry. The industrial concentration of firms in the same region

measures the locational advantages of the region in the given industry. The importance of this factor in explaining the inter-regional variation in the productivity levels was found to vary among the various industries. Our analysis enabled us to classify the industries into four groups, viz. (i) industries in which the capital intensity factor alone was significant; (ii) industries in which there was multicollinearity between the two variables; (iii) industries in which the concentration factor alone was significant; (iv) industries in which none of these factors was found to be significant. The trends in the regional disparity indices in the selected industries also showed that the regional disparity in net output per worker increased in the industries such as cotton textiles, sugar, edible oils, tea manufacturing, art silk and iron and steel. The analysis of regional disparity in individual industries led us to the general conclusion that the trends in the productivity levels, location pattern and the measures to step up productivity levels in the various regions need to be established at the individual industry level. (Chapter V.)

Private sector investment played a predominant role in the creation of regional disparities in the manufacturing sector analysed in Chapter V; as the share of public sector investment in total manufacturing investment can be regarded as small in the beginning of Third Plan<sup>1</sup>. An analysis of the available data on the trends in the regional distribution of private and public sector investment must take into account the different roles played by these two sectors in the industrial planning in India. The private sector investment accounts for a great bulk of the total manufacturing investment.<sup>1</sup> On the other hand, the public sector investment went to the key industries and its share in the total investment rose over the various plans. An examination of regional distribution of public investment showed that this was not spatially concentrated in a few regions. As the great proportion of the total public investment went to the basic heavy industries, the techno-economic considerations were of paramount importance. The location of steel

1. See Chapter VI, for the respective shares of private and public sector investment in total manufacturing investments.

and heavy large public sector projects occurred in a number of low income regions. However, the location of these projects by themselves cannot be expected to create a new growth centre in the periphery. Regional growth effects of the large public sector investments will vary according to the nature of investment, leakages by way of imports of goods and services and the nature of final demand. The direct growth effects of capital intensive public sector investment are limited as these investments have high import content, low employment potential and the links of these projects to the regional economies merely consist of the nearness to the raw material base. Thus, the beneficial effects of the public investments in low income regions will be confined to the increased investments in the social infrastructures and the ~~additional~~ demand of labour and goods during the construction phase of the project. Whether or not location of large public sector projects in low income regions would attract private sector investment needs to be considered separately; as here we have to consider the past trends in private sector investment and examine in the light of these trends if the private sector investment responded to the new locations of public investment in low income regions. (Chapter VI)

Trends in the private sector investment in manufacturing were examined for the period 1959-66 from the evidence before the Industrial Licensing Committee. The data before the committee covered only a part of the manufacturing sector. An analysis of the regional distribution of private sector investment showed that the private sector investment continued to be concentrated in a few more industrialised states. In terms of the pattern of private investment by products, it had responded to the opportunities created by the public sector investment in key industries. However, this increased investment in growth industries had occurred in the already industrialised states. In analysing the factors underlying

the spatial distribution of private sector investment, we must emphasise a number of inter-related factors. An important feature of private manufacturing sector in India is the monopolistic control of private investment by a few large industrial houses. These industrial houses which led the investments in traditional industries of cotton textiles, sugar and chemicals have taken a lead in the investments in new growth industries as well. Hence, an important factor in the continued concentration of private sector investment lies in the spatial preferences of the big industrial houses, which also have their investments in traditional industries in these regions. As the criteria governing the location of private investment are based on the calculations of private costs and gains of further agglomeration, the advantages arising out of the nearness to market economies of scale and external economy effect of further agglomeration are likely to outweigh the disadvantages due to further congestion, high costs of land and other factors of production and social environmental costs. Further, as the basic commodities such as steel, cement, etc. are available at the national uniform prices in all regions, the advantages of locating new investments in the areas producing these basic commodities are limited. Thus, private sector investment can be expected to be concentrated unless the private costs of location in the regions of agglomeration are substantially influenced by the government policy or if the private location decisions are motivated by the criteria of social costs and gains. In Indian industrial policy, the location of private sector investment was not sought to be influenced by the industrial licensing committee or by positive fiscal and pricing devices. We therefore concluded that the industrialisation of low income regions cannot be speeded up only by the location of large public sector investments. On the other hand, the steps to induce private sector investment in the low income regions are likely to be counteracted by the private gains of further agglomeration

to the large industrial houses, and other private investors. An application of "growth centre" concept to the public sector investment in low income regions would require a greater spatial concentration of public investment in specific low income regions so that, over a period of time, accumulated public investment in the inter-related sectors creates external economy effects large enough to attract private investment in those regions. If at the same time the government measures are directed to influence the private costs and benefits of location in the centres of agglomeration,, there would be greater scope to influence the spatial pattern of private investment. We need to emphasise here two aspects, viz. that the process of creating new centres of growth is essentially long term in nature and secondly, a greater spatial concentration of public investment in the selected low income regions rather than "fair share" of the regions in the projects is necessary if regional goals are to be attained. (Chapter VI.)

An examination of regional disparity indices in net agricultural income showed that the regional inequality in agricultural income per worker in 1950-51 and 1960-61 was lower than that in the net income per acre. The regional inequality index in net income per acre was found to be a little less <sup>than</sup> that in manufacturing (for the same years). The trends in the regional inequality in agriculture were difficult to establish as the years for which the data were available included some bad agricultural years. Thus, we must conclude that regional disparity in agriculture was as high <sub>as</sub> that in manufacturing in terms of income per acre. Secondly, due to the importance of agriculture in national and regional economies, the nature of regional disparities in agriculture needs to be understood at a disaggregated level. (Chapter VII.)

The statistical significance of ~~the~~ three identifiable factors was examined in explaining the regional value of net agricultural income, viz. average rainfall, the

percentage of net irrigated area to net sown area and the percentage of a region's total labour force engaged in agriculture. The regression analysis showed all the three factors to be statistically highly significant in explaining regional income per acre. In the income per worker, the average rainfall and irrigation were found to be statistically non-significant.

The regional disparity in the productivity in the agricultural crops was analysed in relation to the importance of natural versus modernisation variables. The national policy of agricultural development aims to raise the average productivity levels of the agricultural crops by extending the area under irrigation and through intensive application of the modern inputs of fertiliser and improved seeds. Hence, we assessed the significance of these factors in explaining the regional physical yield of the various agricultural crops. We found that the significance of average rainfall varied for the two years. However, the percentage of irrigated to total area under crop was found to be statistically most significant in the individual crops and in the total foodgrains. The significance of other modernisation inputs varied for different crops but these were statistically significant in rice, wheat and total foodgrains in 1970-71. (Chapter VII.) We included the percentage of a region's total area under crop as a measure of that region's specialisation. However, except in the case of wheat, the statistical correlation between average regional physical yield and the percentage of a region's area under the given crop was found to be non-significant. The statistical correlation between the percentage of a region's area under crop and the percentage of irrigated to total area under crop was also non-significant. (Chapter VII.)

Regions were classified into three groups in terms of the existing advantages and disadvantages. The first group consisted of regions which had higher than national

average productivity levels in all the major crops grown in the regions. The second group of states consisted of a large number of states both from high and low income regions with more than average productivity levels in some of the crops in which they specialised. The third group of states was classified as the regions with severe existing disadvantages in nearly all the crops in which they specialised. A comparison of these three groups of states in the various indicators of agricultural development showed that the first two groups of states had higher levels of agricultural development compared to the third group, both in the indicators of private and public investments in agriculture. Here, we must emphasise the role of two factors: Firstly, the public investment in irrigation prior to Independence was concentrated in a few regions. These regions received further large public sector investments in irrigation under planning. Thus, the acquired long term advantages of these states surpass all the other states. Secondly, the high income regions had a higher outlay in agriculture than the low income regions as the size of their total plan outlay was much higher than the low income regions. Thus, the role of intersectoral transfer of resources must be emphasised as the resources raised the non-agricultural sector are allocated to agricultural development. High income regions also have a higher percentage of rich farmers. In the new agricultural development strategy of HYVP the more industrialised states increased their share in the area under HYVP more rapidly than the regions with severe existing disadvantages. (Chapter VII)

The existence of regional disparities in income and productivity levels in the major economic sector provides one argument to examine the regional policy framework in India. However, the case for a national approach needs to be established in relation to other goals of national economic development. We recognise that the regional policy framework in an underdeveloped economy

undergoing structural change will differ from that in the more developed economies in the following main factors: The constraint of limited resources weighs more heavily in the case of an underdeveloped economy and this influences the particular regional goals that can be adopted in an underdeveloped economy. Secondly, the possibility of a conflict between the "efficiency" and "equity" goals appears to be higher in the case of an underdeveloped economy. Thirdly, the role of short-term corrective measures aimed at influencing the factor and product prices and the management of demand through government expenditure is limited in an underdeveloped economy, as the process of national economic development and regional development is essentially that of creating additional productive capacity and conditions of higher long term economic growth. We advance the following arguments for adopting regional goals and policy measures under planning in India.

(1) Low income regions in India account for nearly 46 per cent of the total population. On equity grounds alone, therefore, national planning cannot ignore the development needs of such a large proportion of the total population.

(2) The policy measures for low income regions become specially relevant in view of the fact that the role of inter-regional migration of labour is very limited and also not socially desirable in the context of high open unemployment in the large cities. It is therefore necessary to create long term conditions of higher economic growth in the low income regions.

(3) The experience of the developed countries shows that the regional imbalances are not self-corrective. The argument that in the long run, at a higher stage of development, growth will spread to the backward regions amounts to allowing a large percentage of the population to slip into a long term stage of low economic development.

The possibility of a conflict between the regional

goals and those of rapid national economic development led many writers<sup>1</sup> to conclude that the regional goals are a luxury for a poor country undergoing structural change, so that a reduction of regional disparities must wait until a higher stage of national economic development is reached. It is also further argued that, during the period of rapid national economic development, the emphasis should be on maximising the growth in the regions with existing advantages. A further relevant point is made by Rahman that the national growth is not necessarily maximised if the regional rates of saving are not identical. Whether or not a more productive region can offer a higher rate of saving depends not only on income but also on various other social and economic factors. (Chapter VIII)

We regard the conflict between the regional and national goals as at a maximum when both are considered in terms of maximising the current or short-term aggregate national income. If viewed over a period longer than a five year plan, the possibilities of trade-offs between "efficiency" and "equity" increase due to the following factors. Over a longer period of time, the efficiency goal includes opening up of new resource frontiers. Secondly, investments in social infrastructures in the low income regions may be regarded as building ahead of demand, so that a critical amount of accumulated public investment in low income regions can then be expected to attract the private capital into these regions. Thirdly, the regional policy measures can be directed to attain a higher internal rate of saving in the low income regions. Fourthly, the degree of conflict between the "efficiency" and "equity" is likely to differ in different economic

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1. E.E.C. op. cit.

sectors. In the particular economic sectors in which the criteria of allocation are social per capita need, the conflict can be expected to be minimum. In the other sectors in which allocative criteria include, in addition to the social per capita need, the existing demand and the short term returns from investments, the conflict between "efficiency" and "equity" is greater. Inclusion of social environmental costs of agglomeration in the large urban centres can reduce the profitability gap between the location in the large urban area and the periphery, but this need not result in a reduction in the profitability gap between high and low income regions. (Chapter VII.)

An examination of regional goals in Indian planning presents problems as the regional goals are expressed in vague terms of regional balance and the plan documents do not specifically discuss the regional allocative criteria. However, whether or not the goals are specified, the actual decisions of resource allocation were made under planning as the national plans operate through states and as the central resources are an important source of financing state plans. Hence, it was essential to evaluate empirically the size and pattern of regional resource allocation and to arrive at some conclusions on how the regional policy operated in five year plans. (Chapter VIII.)

An empirical evaluation of regional policy framework in India was attempted by analysing the policy instruments which were recognised by the plans. We examined the simple model in which the additional regional NDP was taken as a function of accumulated development expenditure and the initial level of a region's income and the random factors. The regression analysis was applied to the data on three time periods. The significance of these factors varied for the individual time periods. In the period 1960-61 to 1967-68 the regional change was predominantly influenced by the random factors such as bad harvests and, in this period, the development expenditure on the regional

level of income were not significant in explaining the regional change. We also established that the rich regions had higher absolute development expenditure, although the statistical relation between the two varied over different time periods. An estimate of income elasticity of development expenditure for the individual time periods and in pooled regressions showed that the income elasticity of development expenditure with reference to regional Net Domestic Product was less than one in the periods 1950-51 to 1955-56, and 1960-61 to 1967-68. We reached the following conclusions from the values of elasticities: (1) The income elasticity of development expenditure declined in the period in which the random factors predominated in influencing regional change. (2) The income elasticities of development expenditure are likely to differ between the high income and low income regions. (3) The government expenditure was more elastic with reference to change in industrial output than with respect to additional net domestic product.

In order to overcome the problems of multicollinearity between development expenditure and the initial regional income, we also examined the additional regional income and development expenditure as the ratios of the initial level of income. We also included the state effect to measure the influence on regional change of the regional-ity factors that vary between states and are not specified in the expenditure income ratio.

The regressions analysis led us to the conclusion that the state development expenditure was a significant factor in explaining the regional change in the time periods in which the influence of random factors was not predominant. The rich regions continued to have higher development expenditure than the low income regions up to the end of the Third Plan. (Chapter IX)

In the Fourth Plan, the emphasis on reducing regional

disparities increased in two respects. Firstly, two separate committees were appointed to identify the industrially less developed regions and to recommend fiscal and other incentive measures to attract private sector investment. Secondly, in the criteria for allocating central assistance, the per capita income was taken as one of the indicators. In spite of this, both the size of total outlay and per capita central assistance remained much lower in the low income regions as compared to the high income regions. A greater emphasis on the level of development in criteria of central assistance did not lead to a substantial reallocation of central resources to the low income regions or the low income states having the plan outlays which were equal in per capita terms to the national developmental effort or that in high income regions. (Chapter IX.)

Among the sectoral allocation of state outlays, the allocations in agriculture, major, medium and minor irrigation are most important as a regional policy variable. However, in planning literature, the significance of regional differences in outlays in agriculture is less emphasised as compared to the role of public sector projects. The Fourth Plan aimed at two main objectives in agriculture. The first was to provide the conditions necessary for a sustained increase in agricultural production of 5 per cent per annum over the next decade and secondly, to enable as large a section of the rural population as possible, including the small farmer, the farmer in dry areas and the agricultural labourer to participate in development and share its benefits. We pointed out that, as regards the national objectives of increased production, these were aimed to be realised by a concentrated effort on the areas of minimum risk through HYVP. The share of several industrialised regions in the area under HYVP increased more rapidly than that of Madhya Pradesh, Orissa and Rajasthan, which we

classified as the least advantageous regions in agriculture. These states remained below the national average in the per hectare outlay in agriculture in the Second, Third and Fourth Plans. The more industrialised states of Maharashtra, Gujarat, Tamil Nadu and Kerala had a rapid increase in per hectare outlay in agriculture in the Third and Fourth Plans. If we take the region's area share in national area, Assam, Bihar, Kerala, Gujarat, Tamil Nadu, Punjab and Uttar Pradesh received a higher share in national outlay in agriculture than their respective regional area share. The outlays on major, medium and minor irrigation also confirmed the above pattern. In agricultural outlay, Bihar and Uttar Pradesh occupied higher ranks than the other low income regions.

We conclude that the regional disparities in agricultural outlay increased over the Third and Fourth Five Year Plans.<sup>1</sup> In terms of the percentage of a region's ultimate irrigation potential realised also, these states remained much below the national average. Thus, the development effort in agriculture in India was spatially concentrated both in terms of the regional share in HYVP as well as in per hectare outlay in agriculture and irrigation.

In suggesting the guidelines to regional policy in India, we emphasised the role of the centre dominated political and planning process up to the end of the Third Plan in operating the national and regional planning through informal cooperation without elaborating specific regional allocative criteria or goals. The conflicting issues of regional allocation of resources were sidetracked through the dominating influence of the centre in determining the final size of the state plans and its sectoral allocation.

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1. In the Second Plan, the range between the highest and lowest outlay per hectare was Rs 115 in Kerala to Rs 34 in Rajasthan. In the Third Plan this ranged between Rs 264 in Kerala and Rs 76 in Madhya Pradesh. In the Fourth Plan the range increased to Rs 409 in Kerala and Rs 98 and 69 in Madhya Pradesh and Rajasthan respectively.

The political developments in the late 'sixties and early seventies have resulted in a gradual weakening of the centre and in a situation in which the same political party no longer controls all the state governments. For the future survival of the Indian federation and the viability of economic planning, the regional policy becomes crucial in two respects. Since the earlier era of consensus and cooperation through the same political platform is no longer possible, the regional goals in national planning and the conflicting issues of regional allocation must be made more explicit. This should provide a rational basis on which the economic trade-offs between the various objectives can be considered. Secondly, the regional policy at the national level should also act so as to differentiate between the political demands of the states for more resources or more projects as distinct from the resource allocation on economic criteria. (Chapter IX)

If a politically weak centre gives way to the demands of politically strong low income regions for more resources for their states in the sectors in which the national growth objectives require a spatial concentration, it would undermine and stifle the national development effort. To prevent this, a better understanding of the regional disparities in the economic sectors as well as studies of the regional production structures is necessary. This requires an effort both at the national and regional levels. To a great extent, studies of regional disparities and the allocative criteria in short term and long term planning can only be pioneered at the centre. The analysis of regional production structures through input-output studies and the industrial base studies, etc., fall into the category in which state regional departments can serve a useful function. Studies of this nature also provide useful information for regional planning at state level. Greater central initiative is also necessary in estimating state income regularly and to integrate these data with the national income data published by the Central

## Statistical Organisation.

In considering the future pattern of regional inequality we must isolate from the effects of the changes in the above factors in the course of regional disparities and assume a more limited role of examining the trends in the regional disparities in the light of our study. Regional disparities in per capita income reflect the regional differences in the economic structures and the productivity differences within the economic sectors. The relative dispersion around the mean in the regional per capita income can be expected to increase on account of the following factors: (a) The regional disparities in the economic structures will persist due to the spatial concentration of the private sector's investment in manufacturing; (b) The high income states will be able to maintain a higher development effort than the low income regions, which means that they will continue to have higher investments in social and economic infra-structures<sup>1</sup> and a higher per hectare outlay in agriculture; (c) The high income regions have a higher percentage of rich farmers so that the private investment in agriculture can be expected to be higher in these regions than in the low income regions.<sup>2</sup>

Thus, agriculture will play an increasing role in the creation of regional income disparities and in the regional allocation of resources within the agricultural sector itself. We noted earlier that the new agricultural

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1. Classification of Indian regions on the basis of social and economic indicators does not alter the ranking position of low income regions.

2. Rao, S.K., op.cit. comes to the following conclusion in this regard: "It is expected that the economic disparities between regions will widen in the near future. The Green Revolution in agriculture has made investment in agriculture very attractive. We can expect private investment to play a greater role in agriculture. The growth of private investment is likely to be higher in the rich farmer regions because private investment is likely to be constrained by the ability to save by farmers. And, in general, it is the advanced regions who have more rich farmers." The role of rich farmers in obtaining higher cooperative credit and in the regional shares in HYVP was also noted earlier.

development strategy since 1967-68 relies essentially on a concentrated development effort in agriculture in the areas of minimum risk. This meant that in the Fourth Plan the regional shares in HYVP worked out to be much higher in the agriculturally advanced regions and the other more industrialised regions. Objectives of national targets of self-sufficiency in food, rapid population growth and the balance of payment constraints would make it imperative in the near future to concentrate efforts in the regions with existing advantages. Since the investments in fertilisers and major irrigation are highly capital intensive and as there are marked spatial differences in the returns from these investments, application of national criteria would lead to continued higher investments in these regions. The regional development efforts in agriculture in the low income regions with severe existing disadvantages may be concentrated in the programmes to raise their levels of agricultural development by measures directed to the dry farming areas and the labour intensive schemes oriented to increase the employment and income opportunities in the short run and on the rural infra-structures. Such an integrated national approach presupposes that the "externalities" created by the concentration of national effort in few regions are large enough to contain the rest of the regions in a lower share in the technological change in agriculture. If these "externalities" or the "beneficial" effects of higher technological change in some regions are reduced because of the political power of the agriculturally prosperous states and an incoordinated national food distribution policy, the spatially concentrated national effort in agriculture may precipitate the crisis in social and political stability of the country itself. Thus, although the trends in the private and public investment in agriculture suggest that regional disparity in agricultural growth and productivity will increase as a result of the technological change in agriculture and the national constraints would require a

continued concentrated effort, there are inherent dangers in such a situation, especially in the context of a changed political situation.

We conclude that in an underdeveloped economy like India the issues of regional disparities and policy are of great importance, because of the following factors: the stage of national economic development, the size of the country, the limited scope of large scale inter-regional and inter-sectoral migration of labour force and the nature of the political federation through which national and regional planning operates. Regional disparity in per capita income in India was found to be much lower than that in the countries with high regional dualism such as Brazil, Italy, Greece and some of the East European countries. In most of these countries the regional inequality in the economic sectors is lower than in per capita incomes, and also regional inequality in agricultural income is higher than in the manufacturing sector. In the case of India, we conclude that the regional inequality is higher when measured at the sectoral level. Classification of Indian regions on the basis of per capita income is useful, as the regional differences in the per capita income reflect the regional differences in economic structures and the productivity differentials within each economic sector. Classification of Indian regions on the basis of other social and economic indicators does not shift the ranks of low income states to a more favourable position. High regional disparity in the manufacturing income per worker can be attributed to the significant regional differences in the degree of industrialisation and the existence of regional disparities in efficiency at the industry level. Private manufacturing investment has continued to cluster at the large urban centres in the more industrialised states, and has shown a lack of movement to the large public investment in the low income regions. In agriculture, the regional inequality was found to be a little less than in the manufacturing. Regional disparity in the agricultural

income reflects the significant differences in the cropping pattern of regions and high regional disparity in the productivity levels in each crop. Technological change in agriculture through modern inputs is concentrated in the regions with existing advantages. In addition, the more industrialised regions also have a much higher total public investment in agriculture. Private investment in agriculture in these regions is also higher as they have a higher percentage of rich farmers.

We conclude that in the changed political situation the regional policy that lays down more explicit short and long term regional goals<sup>1</sup> can be regarded as crucial for the political survival of the federation and the viability of rational economic planning. Regional policy will have to tackle complex conflicting issues of regional resource allocation which were successfully manoeuvred by the centre-dominated political and planning process until the late 'sixties. While we can expect the regional disparities in per capita income to increase, the most difficult issues are likely to arise due to the nature of technological change in agriculture. Since the constraints of national objectives of self-sufficiency in food and the other national parameters require a continued concentrated effort in some regions additional steps will have to be taken to spread the "externalities" to the other regions, to pursue a vigorous food distribution policy and to have agricultural programmes suited to the needs of the agriculturally least advantageous regions. This can only be achieved by a combination of central and state initiative.

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1. It would be equally necessary to allocate the central assistance in accordance with these regional goals, leading to the size of state plans that are related to the specific regional goals and needs of the low income regions.

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