CHAPTER II

STUDY FRAME AND METHODOLOGY

Available literature on the domain of regional planning discusses major elements of a regional development plan but does not provide an integrated operational model of development planning. While the need to integrate the major sectors like agriculture, industry and household are stressed upon, available studies have yet to provide a practical framework for their integration. The present study is a modest attempt in this area of research within the constraints of data and resources.

District planning, viewed in a multi-level planning frame, need to be oriented to the sub-system of agriculture and allied industries and exploitation of regional resources so as to develop the regional economic base. Agriculture forms the major source of income and employment generating activity and way of life for about 80 percent of the regional population, providing about two-third of the employment and about one-half of the regional domestic product. Besides, an approach of regional development planning having the agriculture as the basis will be more operationally acceptable
in a multi-level planning frame, because it will be in consistent with national, state and district level sectoral objectives and priorities. The socio-economic benefits of the investment in agriculture can be assumed to be high, involving the majority of the people in the development process and a co-ordinated plan will generate significant multipliers in the agro-industries, industries oriented to the regional consumption and in service sectors.

The limited success of the growth centre-cum-industrialisation strategy of regional development is attributed to their weak regional linkages, both 'sectoral' and 'spatial'. We have observed that the weak forward and backward linkages of the existing regional industries, which are mainly capital-intensive and export based with the regional economic system is chiefly due to their product mix. Industries tend to be export oriented, mainly to realise the 'economies of scale', within the constraint of a low regional market. Low regional demand, determined by the low purchasing power of the rural mass, is attributed to the low level and unequal distribution of the regional income. We have assumed earlier that 'residential industries' will generate more "spread effects" within the region propagating income and employment multipliers in all related sectors. We may examine in the present study, the regional impact of output expansion and factor requirements
within the frame of alternative assumptions on import leakages of the regional economic system.

Regional development approach of the present study aims at integrating three major sectors of the regional economy, i.e., agriculture, industry and household sectors. Since growth in Service Sector is mainly determined by the growth in agriculture and industrial sectors as well as due to the data constraint, this sector has not been directly included in the development model built in this study. Accepting agriculture as the major economic activity of income and employment generation, we may examine the potentiality of this sector to provide the required regional employment. Logically, we need to approach the industrial sector for additional employment generation. Household Sector in this study is viewed as a consumption sector as well as a source for the supply of labour. An integration of these Sectors provide the frame of this work.

Agriculture development contributes to both employment and income distribution in four inter-related ways:

(1) through expansion of cultivated area,
(2) through increase in intensity of cropping arising due to changes in the technology, mainly irrigation,
(3) through changes in crop mix favouring labour intensive crops,
(4) through changes in land relations in favour of labour owning classes.

The above factors can be studied at two levels of agricultural development strategies; technological development within the existing agrarian relations, and secondly through the institutional approach. Besides, we can have a third variant which combines the above two strategies. Since technological development through increase in the intensity of irrigation changes the cropping intensity and agricultural cropping pattern, the above factors, (1), (2) and (3), can be combined into the technological development strategy.

Any worthwhile change in the technology of production in agriculture until about the mid-sixties came through the increase in the irrigation. Thereafter, change in the technology of production involves irrigation combined with modern inputs; hybrid seeds, chemical fertilisers, pesticides and agricultural machinery. Experiences show that on the basis of the traditional technique, addition to irrigation is credited with atleast 100 percent in labour absorption per hectre. In the package of the modern inputs the mechanical

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1 Mehra B, "Some Aspects of Labour Use in Indian Agriculture", Department of Agricultural Economics, Cornell University, 1976
component is found to reduce employment\(^1\). The biochemical
cOMPONENT in conjunction with irrigation on the other hand
increases labour absorption. Empirical studies in Punjab,
Haryana, Andhra Pradesh and Tamil Nadu show that the net
effect of the package is an increase of 33 to 62 percent
in labour absorption per hectre to the traditional technique
with irrigation. It has shown that the share of irrigation
in this increase of employment is 46 percent and that of
other inputs is 54 percent\(^2\), in an advanced district like
Firozepur (Punjab). Thus it can be concluded that while
increase in employment is about 100 percent per hectre when
the technique changes from the traditional unirrigated to
traditional irrigated; it is 33 to 62 percent when the
modern technique replaces the traditional irrigated. This
provides the scope for alternative strategies within the
technological development.

The increase in employment due to changes in crop-mix
comes when the crop-mix changes in favour of labour-intensive
crops. Among food grains, cereals are more labour intensive
and wheat is more labour intensive than jowar, bajra and other
millets. Non-food crops such as cotton, groundnut and other

\[^1\] Hanumanth Rao (1975), ibid

\[^2\] Mehra S., (1976), ibid
cash crops are more labour intensive than food grains\(^1\). Technological change through irrigation will favour a more water-intensive crop-mix like superior cereals and non-food crops and resulting in more employment.

Reduction in the inequalities in land distribution makes a positive net contribution to employment mainly because the intensity of cropping and labour utilisation is inversely related with the farm sizes\(^2\). Changes in land distribution involve institutional changes and a strategy of agricultural development involving institutional changes need to have a structuralist approach and is beyond the scope of the present study. The present study approaches the regional agricultural development within the existing agrarian structure of land distribution. Thus, we approach the agricultural development through the strategy of technological development, especially increase in the levels of irrigation. However, we assume that administrative steps may be taken to check land transfers from the weak to the rich.

If agricultural prosperity is widespread, then local and regional industries which serve regional markets including

\(^1\) Desai G.M and Michael G.G. Schulter, "Generating Employment in Rural Areas", Occasional Paper No.73, Dept. of Economics, University of Cornell, 1974

agricultural inputs and household consumption, can be activated\(^1\). It is observed that the dispersal of manufacturing sector has shown promises only in those regions where agricultural prosperity is wide spread\(^2\). Joan Robinson and many others have attributed the growth and prosperity of small industries in Punjab to the wide spread agricultural prosperity\(^3\). In that case, small industries, especially those catering to the local demand and produced through regional technology will be able to generate effective employment and also will be able to induce employment generation through inter-sector linkages. It is pertinent to note that for developing the regional market the pre-condition is a better income distribution and the wide prosperity realised through the agriculture development is expected to achieve it. Once the regional 'residential market' oriented industrial base is developed, any additional growth in the 'export based' second order industries are bound

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\(^1\) For arguments as to lower local industries even with Govt. support languish in a situation of skewed income distribution and how they become viable when rural prosperity prevails, see Ranjit S\&H, "Indian Economic Growth: Constraints and Prospects, orient longman, 1973, pp.59-60


to generate more income and employment multipliers. If this sectoral linkage can be established, the region will be able to move to a higher level of equilibrium and the region can be expected to pass through the 'stages of growth' discussed earlier. This linkage of agriculture and industry and their integration with the household sector can be expected to establish a symbiotic relationship between the rural and urban economic systems.

Objectives and Scope of the Study:

The study is confined to the following objectives:

1. To map out the regional resources and to indicate the developmental potentialities as well as to identify the levels of development of talukas of the Surendranagar District,
2. To estimate the labour supply and utilisation in major economic sectors,
3. To analyse the trends in agricultural growth and its components,
4. To estimate the agricultural income and its distribution across households with respect to different variants of irrigation development strategy,
5. To study the industrial investment priorities of regional entrepreneurs,
(6) To analyse the regional consumption patterns, particularly of industrial products,

(7) To examine the static inter-industry flows of the region,

(8) To estimate the direct and indirect employment multipliers in a partial input-output frame work,

(9) To identify the potential regional industries which exploit the available regional demand and can absorb regional labour force.

Methodology and Data Base:

The methodology of the present study is dictated by the availability of data. As far as possible secondary data have been utilised and data gaps in crucial areas have been filled in by conducting sample surveys.

The primary objective of the study is to build a development planning model for the district. Due to the data gaps and constraints of resources, a well structured model could not be built to answer all planning questions. We have attempted to analyse separately each of the Sectors of the model and at the end a modest attempt has been made to integrate and link the sectors. It is important to note that one has to make quite a few assumptions in the process of linking the Sectors of the model, mainly due to the data
and resource constraints and it can said to be the limitation of the methodology of the present study.

Broadly three sub-sectoral elements constitute the Regional Development Planning Model i.e., the Agricultural Sub-Model, the Consumption Sub-Model and Industrial Sub-Model. These major Sub-Models are linked in the framework of a partial Input-Output Model. Even though, detailed methodological steps and issues are discussed separately in each of the sections dealing with these sub-models, a general frame of the study methodology is discussed here.

The Agricultural Sub-Model aims to estimate the regional agricultural income and its distribution across various farm sizes with respect to the different strategies of levels of irrigation. We have conceived a Simulation Model for this purpose and the details of which is given in the section dealing with this aspect. Besides, the secondary data available from the District Agricultural Department and Season and Crop Reports, data for agricultural land holding at disaggregate level from (1) Agricultural Census for the year 1970-71 and (2) National Sample Survey, 32nd round, 1977-78 are made use of. Since the definition of land holding of these sources of land holding data at the disaggregate level is different, a methodology to match these data has
been developed. The base year of the present study being 1977-78, the agricultural data has been projected to the base year by using the growth of distributional parameters. The land holding distribution data obtained from the District Statistical Office, using the definition of technical unit similar to the Agricultural Census definition, for the year 1974-75, have been used for the projection.

Estimation of agricultural value-added and its distribution, determined by the various strategies of the level of irrigation, is done across seven farm household classes. The farm households used for this analysis are:

1. Landless Agricultural Labourers,
2. Submarginal Farmers,
3. Marginal Farmers,
4. Small Farmers,
5. Medium Farmers,
6. Large Farmers,
7. Very Large Farmers.

These seven farm household classes have been used throughout the study of agricultural sector.

The analysis of the Consumption sub-model is based on the consumption data available from the 32nd round of the National Sample Survey (1977-78) conducted for the district. We have obtained 192 household Consumption Schedules having
96 Schedules each for rural and urban Surendranagar. These schedules have been obtained from the Bureau of Economics and Statistics, Gandhinagar, Gujarat State. Consumption items listed in the schedules are grouped into the Industrial Classification so as to achieve the product correspondence to link the Consumption Sub-Model with the Industrial Sub-Model.

Significant secondary data limitation was faced to analyse the industrial structure of the region. To analyse the industrial structure and to construct the partial input output model for the region, a primary survey was found necessary. Accordingly, a survey of about 12 percent of the organised industrial units was conducted in the year 1978. The partial regional input output model is constructed at the purchaser's price. Few assumptions on the behaviour of the Final Demand, especially, for Government Sector, Investment and the regional trade has been made.

Each sub-model has few variants according to the study hypothesis. These variants will provide the planner with alternatives. The agricultural sub-model has five strategies of the level of irrigation. Various simulated agricultural system involve different levels of time and resource implications. The Consumption Sub-Model has two variants. Firstly, the regional expenditure is estimated in a static form without incorporating population growth. The second variant is by
incorporating the population growth in the projection model of regional expenditure. Similarly, we have four variants in the industrial sub-model with respect to the Final demand and Technology. We have conceived the variants with respect to Domestic portion of final Demand and Technology and Imported portion of final Demand and Technology and a combination of these two sets. The Final Demand and the Technical Co-efficient Matrix, i.e. the 'A' matrix, is decomposed into two parts: (1) the final demand and the technical coefficient matrix allowing for the import leakages and (2) without allowing for the import leakages. These two variants in Final Demand and Technology allow us to formulate Four variants of the partial regional Input output model indicating various levels of "openness" of the region implying different development alternatives.

The logic for linking these major sectors can be summarised as follows: firstly, we estimate the income generation from agriculture sector. Secondly, once the rate of growth of agricultural income is given, the rate of growth of consumption is assumed to be the same as that of agricultural income. We assume that Final Demand, especially the non household consumption elements, will change in accordance with changes in Household Consumption, which means given the Components' consumption ($C^1$), Government consumption ($G^1$) and Exports ($E^1$) of final demand ($F^1$), we
assume that the $G_i$ and $E_i$ is a constant proportion of $C_i$.

Given the changed Final Demand the corresponding output expansion can be estimated by using the standard format of the Input-Output Model. Thus the linking of agricultural development with the Industrial Sector has been achieved, providing various levels of industrial production potentialities. Given the potential production levels of each of the industrial sectors, identification of the production levels which will maximise the regional employment or minimise the investment requirement for a given level of employment can be done through a Linear Programming Model using the Lower and Upper boundaries of production potentialities and investment as the Constraints. These potential industries are spatially located according the levels of development of the Sub-regions (Talukas). The Regionalisation exercise done, employing about 28 development indicators through the Composite Index Method identifies sub-regional development typologies and these typologies indicate the spatial priorities in allocating the potential industries. (see Flow Chart-I).

Chapterisation:

The study is presented in Eight Chapters. The First Chapter chiefly contains the theoretical discussions on Regional Planning. Experiences of Indian Backward area development programmes and an evaluation of the Industrialisation
Strategy is presented in this Chapter. The literature Survey includes a detailed account of Growth Centre Concept and Export Based Regional Growth approaches and attempts to evolve the frame of a new Development Approach.

The Second Chapter presents the Study Approach, Framework and Methodology and the Data base.

A mapping out of the Regional resources and developmental potentialities is attempted in the Third Chapter. The estimation of the labour supply and demand has also been included in this chapter and it provides an estimate of the regional employment to be created in the Base year, 1977-78 and in the projected period, 1982-83. In addition, the sub-regional developmental typologies are being identified through a Delineation model, using about 28 developmental indicators.

Analysis of the Agricultural Sub-Model is given in the Fourth Chapter. This chapter has three sections; Section one presents the Regional Agriculture Structure through a detailed analysis of Land Utilisation, Cropping Pattern, Growth of Gross Cropped Area and Output. An attempt to decompose the Growth of Output has been made in this section. The second Section deals with the distribution aspects of land and agricultural income. The third Section deals with
the estimation of crop income and its distribution across farm sizes with respect to various levels of irrigation development strategies. Contribution of the Animal Husbandry to the Farm Income has also been assessed in this Chapter.

Industrial Structure with respect to Spatial distribution, Organisational Characteristics, Production Structure, etc., are discussed in the Chapter Fifth. A brief account on the Regional Entrepreneurial characteristics and industrial developmental perspectives are also presented in this Chapter.

The Sixth Chapter deals with the Consumption Sub-Model and attempts to provide the Regional Expenditure estimate in the Static and Dynamic Variants of the Model. Discussions on the Rural Urban consumption pattern and the projection of the regional expenditure is given in this Chapter.

The Linking of the main elements of the Model is attempted in the Seventh Chapter in the frame work of Partial Regional Input-Output Model. This Chapter discusses the alternative regional potential production levels with respect to the Variants of the Model.

The Concluding Chapter summarises the major findings of the Study.
FLOW CHART: REGIONAL DEVELOPMENT MODEL
(AGRICULTURAL LED INDUSTRIAL DEVELOPMENT)

Legend:
\[\uparrow\] Output
\[\downarrow\] Component
\[\rightarrow\] Linkage
\[\rightarrow\] Process

1. Irrigation Strategy
2. Agriculture Sector
   - Labour Supply
   - Local Demand of Industrial Products
3. Household Sector
   - Employment Generation (Labour Demand)
4. Regional Development
5. Industrial Development
6. Regional Industrial Output Expansion
7. Changes in the Regional Demand (Household Consumption of Industrial Products)
8. Growth of Crop Income
   - Growth and Distribution of Crop Income across Farm Households
9. Changes in the Final Demand

Legend:
\[\uparrow\] Output
\[\downarrow\] Component
\[\rightarrow\] Linkage
\[\rightarrow\] Process