IMPACT OF POPULATION ON ECONOMIC DEVELOPMENT : A CASE STUDY OF UTTAR PRADESH

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CERTIFICATE

This is to certify that the dissertation entitled: IMPACT OF POPULATION ON ECONOMIC DEVELOPMENT: A CASE STUDY OF UTTAR PRADESH, submitted by RAJESH KUMAR MISHRA, in partial fulfilment of the Degree of Master of Philosophy (M.Phil) of the University, is his original work according to the best of our knowledge and may be placed before the examiners for evaluation.

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July 1994

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Rajesh Kumar Mishra

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Chapter I

INTRODUCTION

I.I STATEMENT OF THE PROBLEM

In the curent scenario of population explosion it's relationship witheconomic development assumes a serious dimension. It is the impact of the population on development which is causing a grave concern to the whole humanity. The very direct impact of population growth through out the globe is on the development. Most of the repidly growing countries are the countries of low standard of living. However there is impact of evelopment on population growth as well, in this study, therefore an attempt has been made to identify the interrelationdship between population growth and economic development by taking the district wide data of Uttar Pradesh.Population influences economic development through its effects upon the basic factors of production, such as, natural resources, labour , capital and level of technology. Similarly development affects population through its effects upon the basic determinants of population growth, such as, fertility, mortality and migration which affect the size, growth. age-sex structure and characteristics of population, determine and are determined by the level of economic development.

We are all concerned about the problems of Third World countries. they are confronted with poverty, very high rates of population growth, low growth rates of gross domestic product, low rate of industrialisation, extremely high dependence on agriculture, high rate of unemployment and unequitable distribution of income. The main target before these countries is to

eradicate the problems of poverty and unemployment. India is a population giant as second most populous country in the world after china with very high population growth rate to the already large base of population. Despite fourty seven years of independence and development planning, the desired goals to eradicate poverty and unemployment could not be achieved. Over this period, population has increased rapidly but the economic growth has been slow to keep pace with the increasing population. Now it is felt that, it is very difficult to boost the development upto that extent which could eradicate poverty and unemployment in the presence of present high growth rate of population. High growth rate of population is supposed to be one of the main hurdles in the process of economic development. Despite all the concerted effort to boost the development process, the desired level of development could not be achieved. Because repidly growing population diverts the major part of national savings towards the basic amenities for the increasing population which hampers the investment and capital formation. Therefore, it seems very obvious that repidly growing population has been affecting the developmemt process over the years.

There is two way circular relationship between population and economic variables, as has been asid earlier. The impact of population growth on economic development has been examined in the present study for the obvious reason of the importance of population trends in guiing the process of economic development. Though this would in no way hamper the importance of the impact of economic development on population growth, which is not in the purview of the present study.

I.2: SCOPE OF THE STUDY

The importance of population has been realised since time immemorial. At different times, it has been viewed as an important factor for different purposes; either it may be political or economical or any other purpose. But since last couple of centuries population factor is playing a pivotal role in the economic growth of any country. It means in someway or other population is related with the economic development. However, the nature of relationship varies from time to time and region to region. It is therefore important to identify the relationship between population and various economic variables so that future demographic and economic planning of any region can be a successful one in achieving its desired objectives.

Unfortunately, in the developing countries, a vicious circle between population growth and economic development has been created. High population growth with low economic development creates the conditions for continuation of high population growth leading to further economic backwardness. Breaking of this circle is one of the desired goals of the economic planners of most of the developing countries. This can not be achieved without clear understanding of the relationship between population growth and economic development.

Despite such important role of population in the development process, very few studies have been done, focussing the impact of population in the development of the country. At the certain level there are certain studies on the interrelationship of

population and development. Uttar Pradesh as the second biggest state in area and as the largest state in terms of population and politically heartland of India should play very important role in the nation building process. Despite having such important place, Uttar Pradesh has witnessed very high growth rate of population and very slow growth rate of socio-economic development. Therefore, in this study, an attempt has been made to understand the complex process of relationship between population growth and economic development using the district wise secondary data of Uttar Pradesh for the years 1981 and 1991.

I.3: OBJECTIVE OF THE STUDY

In the present study, an attempt has been made to analyse the relationship between population and economic variables. For this purpose the following objectives have been set:

I: to study the spatial variation in population variables viz; population growth rate, dependency ratio, density and share of urban popualtion.

II: to analyse the regional variation in economic variables viz; per capita net output from agriculture and animal husbandry sector, per capita net output from forestry and logging sector, per capita net output from manufaturing sector, cropping intensity, workforce participation rate, share of secondary workers, share of tertiary workers, literacy rate, percent electrified villages to total inhabited villages,number of working factories per lakh of population,number of beds per lakh of population in allopathic health services and surfaced roads per lakh of population.

III. to identify the various forms of interrelationship between population and economic variables.

I.4: Hypothesis

In the light of the above objectives and conceptual framework, the following hypothesese can be framed :

Hypothesis I. Per capita net output from manufacturing sector is positively related with population growth rate, dependency ratio, density and share of urban population.

Hypothesis II. Cropping intensity is positively related with population growth rate dependency ratio, density but negatively related to share of urban population .

Hypothesis III. Workforce participation rate is positively related with population growth rate but negatively related with dependency ratio, density and share of urban population.

Hypothesis IV. Share of secondary worker is positively related with population growth rate, dependency ratio, density, share of urban population.

Hypothesis V. Share of tertiary worker is positively related with population growth rate, dependency ratio, density and share of urban population.

Hypothesis VI. Literacy rate is negatively related with population growth rate , dependency ratio, density and positively related with share of urban population.

Hypothesis VII. Per capita net output from agriculture and animal husbandary sector is negatively related with density,

Hypothesis VIII. Per capita net output from forestry and logging sector has negative relationship with dependency ratio,

density and positive relaionship with population growth rate.

Hypothesis IX. Percent electrified villages to total inhabited villages is positively related with population growth rate, dependency ratio, density and share of urban population.

Hypothesis X. Number of working factories per lakh of population is positively related with population growth rate, dependency ratio, density and share of urban population.

Hypothesis XI. Number of schools per lakh of population is negatively related with population growth rate, dependency ratio, density and share of urban population.

Hypothesis XII. Number of beds per lakh of population in allopathic health services is positively related with population growth rate, share of urban population but negatively related with dependency ratio and density.

Hypothesis XIII. Surfaced road per lakh of population is positively related with population growth rate but negatively related with dependency ratio, density and share of urban population.

Chapter II

RESEARCH DESIGN

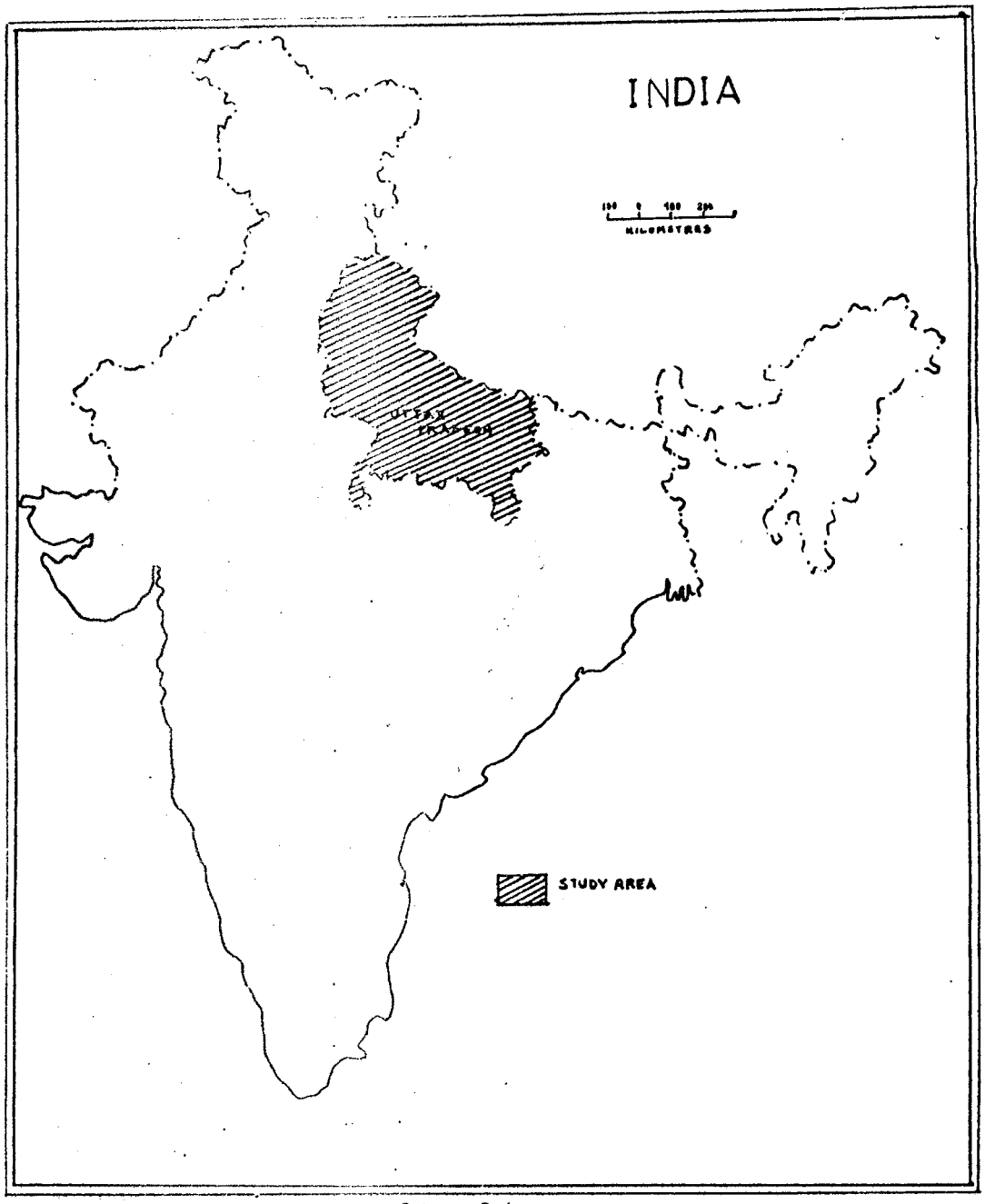
II.1: Choice of the study area.

Uttar Pradesh, the largest state in terms of population, second biggest state in terms of area and politically heartland of the Republic of India, has been selected to study the relationship between population growth and economic develeopment. Having such an important place, Utter Pradesh is supposed to play pivotal role in Indian economy. But it has witnessed rapid growth of population and slow growth of economy. It has occupied first position in terms of population size while remains among the most backward states of India. Although, it is a backward state, regional disparity is significantly prevalent. Some districts have developed while others remained backward. These population and economic aspects compelled me to select this topic and observe the relationship between population and economic variables by taking Utter Pradesh as my study area. Attempts have been made to analyse the regional population and economic disparity, population-economy relationship and impact of population growth on the level of economic development.

Detailed analysis at district level for rural, urban, male and female seperately, has been attempted in order to make a meaningful study.

II.2:Variables Selected

The selection of the variables has been done keeping in view, the objectives of the study. There are two types of varia-



MAP NO - 2.1

bles viz population variables as Independent variables and Development variables as dependent variables. The maximum possible variables are selected keeping in view the data constraints and purpose of the study. The variables are given as follows:

2.1: Independent Variables

Here four important population variables are taken in the study which are as follows:

(i) Population Growth Rate

Population growth rate is the percent decadal growth in the absolute population. It has been taken for two intervals of time viz, 1971-81 population growth rate related to 1981 developmental variables and 1981-91 population growth rate, related to 1991 developmental variables. It has been taken with the break ups as total, rural and urban. It has been denoted by PGRT, PGRR and PGRU for total, rural and urban respectively.

(ii) Dependency Ratio

Dependency ratio is the ratio of nonworkers to workers multiplied by hundred. It has been taken with the break-ups total, rural and urban and is denoted by DRT,DRR and DRU. It is calculated by

$$DR = \frac{\text{Non Wokers}}{\text{Workers}} * 100$$

(iii) Density

Density is defined as the population per square kilometre. It has been taken with the break-ups total, rural and urban are represented by DT, DR and DU. It is calculated by the formula:

$$D = \frac{\text{Total Population}}{\text{Total Geographical Area}}$$

(iv) Share of Urban Population

Share of urban population is defined as the urban population as the percent of total population. It has been represented by SHOUP and is calculated by :

$$SHOUP = \frac{\text{Urban Population}}{\text{Total Population}} * 100$$

2.2: Dependent Variables

Here thirteen important development variables are taken in the study which are as follows :

(i) Per Capita Net Output from Agriculture and Animal Husbandry Sector

It is the ratio of net output from Agriculture and Animal Husbandry Sector (In terms of Rs.) and the total population. It has been taken for the years 1980-81 at current prices and 1989-90 at 1980-81 prices, to make the figures comparable.

(ii) Per Capita Net Output from Forestry and Logging Sector

It is the ratio of net output from Forestry and Logging Sector (In terms of Rs.) and the total population. It has been also taken for the years 1980-81 at current prices and 1989-90 at 1980-81 prices to make the figures comparable.

(iii) Per Capita Net Output from Manufacturing Sector

It is the ratio of net output from manufacturing sector (Registered and unregistered both) and the total population. It has been also taken for the years 1980-81 and 1989-90 at current and at 1980-81 prices respectively to make the figures compara-

ble.

(iv) Cropping Intensity

Cropping Intensity is the gross cropped area as percent of net sown area. Gross cropped area consists of net sown area plus area sown more than once, while net sown area refers to the physical area sown. It has been shown by C.I. and calculated by

$$C.I. = \frac{G\ C\ A}{N\ S\ A} * 100$$

(v) Work Force Participaion Rate

Work force participation rate is the working population as percent of total population. In working population, only main workers have been taken. It has been taken with the break-ups total, male, female, rural and urban. It has been represented by WFPR and is calculated by :

$$WFPR = \frac{\text{Main Workers}}{\text{Total Population}} * 100$$

(vi) Share of Secondary Workers

Secondary workers are the sum of main workers engaged in Va, Vb, and VIth categories out of nine industrial classification of main worker.Share of Secondary workers is the secondary workers as the percent of total main workers engaged in all the nine categories. It has been taken with the break-ups total, male, female, rural and urban. It has been represented by SSW and is calculated by : .ls 1

$$SSW = \frac{\text{Secondary workers}}{\text{Total Main Workers}} * 100$$

(vii) Share of Tertiary Workers

Tertiary workers are the sum of main workers engaged in VIIth, VIII th and IX th categories out of nine industrial classification of main workers. Share of tertiary workers is the tertiary workers as the percentage of total main workers engaged in all the nine categories. It has been taken with the break -ups total, male, female, rural and urban. It has been represented by STW and is calculated by :

$$STW = \frac{\text{Tertiary Workers}}{\text{Total Main Workers}} * 100$$

(viii) Literacy Rate

The definition of literates has been changed over 1981 to 1991. In 1981, it was the population aged five years and above knowing reading and writing with understanding. But in 1991 it was the population aged seven years and above knowing reading and writing with understanding. So for 1981, Literacy rate is the literates as the percent of total population aged five years and above. And in 1991, it is the literates as the percent of total population aged seven years and above . It has been taken with the break-ups total, male, female, rural and urban. It has been represented by LR and is calculated by the formula :

$$LR = \frac{\text{Literates}}{\text{Population aged seven years and above (As in 1991)}} * 100$$

(ix) Percent Electrified Villages to total Inhabited Villages

It is the number of electrified villages as the percent of total number of inhabited villages. It has been represented by PEVTIV and is calculated by the formula :

$$PEVTIV = \frac{\text{Number of electrified villages}}{\text{Total Inhabited Villages}} * 100$$

(x) Number of Working Factories per Lakh of Population

It has been calculated by dividing the number of working factories by the total population, multiplied by one lakh. It has been represented by NWFPLP and is calculated by :

$$NWFPLP = \frac{\text{Number of working factories}}{\text{Total Population}} * 100000$$

(XI) Number of School Per Lakh of Population

The data availbale on this variable was in three groups viz, number of higher secondary schools (HSS) nummber of senior basic schools (SBS) and number of junior basic schools (JBS). To convert these three into a composite index, simple assumption has been taken i.e, one HSS is eqiivalant to four JBS and one SBS is equivalent to two JBS. In this way, these three has been converted into total no. of school as JBS. And then, it

has been calculated, dividing number of schools (JBS) by total population, multiplied by one lakh. It has been represented by NSPLP ans is calculated by the formula:

$$NSPLP = \frac{\text{Total Number of School (as JBS)}}{\text{Total Population}} * 100000$$

(XII) Number of Beds Per Lakh of Population in Allopathic Health Services

For health indicator representing the development, only allopathic health services is taken due to it's most important role in health services and the availability of up-to date data. The other services except allopathic has not been taken due to data constraints. It has been represented by NBPLPAHS and is calculated by the formula :

$$NBPLPAHS = \frac{\text{Number of Beds in Allopathic Health Service}}{\text{Total Population}} * 100000$$

(Xiii) Surfaced Road Per Lakh of Population

Indicating the transport facilities as development variable, surfaced road per lakh of population has been taken. t has been shown by RPLP and is calculated by the formula:

$$SRPLP = \frac{\text{Total Lenght of Road Available}}{\text{Total Population}} * 100000$$

II.3: Source of Data

The present study is entirely based on the secndary sources of data obtained from census of India, census of Uttar Pradesh and various official agencies. For all population and economic

variables, data has been collected for two points of time, 1981 and 1991. By the time of writing this dissertation, the data for certain variables has not been published for the year 1991. To overcome this data constraint all attepts has been made to collect the current data. It includes, taking help of computer floppies and unpublished sources of data. Till now, the census data published on Uttar Pradesh is provisional. Therefore, for population variables and certain economic variables, the final data has been taken from computer floppy available in CSO. Despite all the attempts, the data for all the economic variables could not be managed for the year 1991. For these variables, the data of adjoining years to 1991 has been taken. Seven new districts originated in 1991. To work out the population growth rate 1981-91, the population for new districts has been estimated for 1981 on the basis of teritorial units of 1991. For certain economic variables, data was missing for some districts in 1991. This has been worked out by taking the average value of the districts, from which the new district has been carved out, in case of data missing for any new district. For other cases of data missing it has been worked out by taking the average of adjoining districts.

The publications that we referred to in our study may be listed as follows :

(i) Census of India, 1981, Series-22, Uttar Pradesh Part-II-A, General Population Tables

(ii) Census of India, 1981, Series-22, Uttar Pradesh Part-III-A & B, General Economic Tables

(iii) Census of India, 1991,Series-1, India Paper-2 of 1991, Provisional Population Totals

(iv) Census of India, 1991, Series-1, India Paper-I of 1991, Final Population Totals

(v) Census of India, 1991, Series-25, Uttar Pradesh Paper-I of 1991, Provisional Population Totals

(vi) Statistical Abstract of Uttar Pradesh, 1980-81 & 1989-90

(vii) District Domestic Net output, Uttar Pradesh, Sept 1986 & 1989-90 (Unpublished), Economics & Statistics Division, State Planning Institute U.P.Lucknow.

II.4: METHODOLOGY

Keeping in view the objectives of the study, various statistical techniques and methods are anlysed here in greater details.

First to study the regional variation in population as well as economic variables, we have used, standard deviation and coefficient of variation. The formula used to calculate the above measures are as follows :

Standard Deviation or

$$S.D. = \sqrt{\frac{\Sigma(X_i - \bar{X})^2}{N}} = \sqrt{\frac{\Sigma X^2}{N}}$$

(where Σ denotes summation, x^2 denotes square of the deviations of the items from their mean and N stands for number of observation).

Coefficient of variation or

$$C.V. = \frac{S.D.}{Mean} \times 100$$

(where S.D. refers to standard deviation, mean to arithmetic mean).

Second to find out the relationship between population and economic variables, we have used Karl Pearson's coefficient of correction. It is calculated by the following formula :

$$r = \frac{\Sigma XY}{\sqrt{\Sigma X^2}\ \sqrt{\Sigma Y^2}}$$

(where X and Y refer to the deviations of items from their respective mean. The value of "r" so calculated lies between -1 and +1, meaning highest negative and highest positive correction respectively. When "r" equals to zero, ther is no correlation).

To identify the impact of population variables on economic development the regression analysis has been used by taking population variables as independent and economic variables as dependent. Thus for each development variables one regression line is fitted using the same set of independent variables. The coefficient of multiple determination, that is R^2, which has been calculated by the following equation :

$$R^2 = \frac{\Sigma \hat{Y}^2}{\Sigma Y^2}, \quad \text{where } b_o = Y - b_1 X_1 - b_2 X_2 \ldots - b_n X_n$$

F-test has been applied to test the significance of R^2 various level. It is calculated by the following formula :

$$F = \frac{R^2/(K-1)}{(1 - R^2)/(n - K)}$$

T-test has been applied to test the significance of the coefficients of populaion variables. The formula used for its calculation is :

$$t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}}$$

Finally principle component nethod has been used to calculate the composite index of economic variables, the major step of which are outlined below.

The aim of the principle components method is the construction of new variables (Pi), called principle components out of a set of variables. For that the first step is to standardise the variables by the formula :

$$Z_j = X_j / SX$$

(where $j = (1,2,3,\ldots\ldots\ldots n)$

The simple Karl Pearson's coefficient of correlation is calculated. The correlation matrix R is symmetrical.

The second step of PCA is to find the factor loadings and weights to prepare a composite index from the standardised variables.

The factor loadings are the values of the eigen vector normalised to corresponding eigen values and the weights are the values of the eigen vector normalised to unity. Factor loadings help us in interpreting a principal component.

The factor loadings for each variable is calculated by dividing each column (row) sum by the square root of the grand total or by the formula :

$$a_{ij} = \left(\sum_{j}^{n} rX_i X_j\right) \Big/ \sqrt{\sum_{i}^{n}\sum_{j}^{n} rX_i X_j}$$

where $i,j = (1,2,3, \ldots\ldots\ldots,n)$

(where i refers to the i^{th} variable X)

When we sum the squares of the loadings of each principal component, we get the eigen value or the latent root, which is

calculated by the formula : $\lambda_m = \sum_i^n L_{mi}^2$

(latent root of the m^{th} principle component)

where i = (1,2, ..., n)

Finally principle component is calculated by the formula :

$P_1 = L_{11} Z_1 + L_{12} Z_2 + \ldots\ldots\ldots + L_{1n} Z_n$

(where L denotes weights and "Z" standard variables)

In multiple regression anlaysis, the problem of multicollinearity in explanatory variables is very common, specially when we are dealing with the social variables. To overcome the problem of multicollinearity, stepwise regression analysis has been attempted in the present study. This procedure helps us in many ways.

Firstly, it tells us the contribution of an added variable in explaining the dependent variable (by seeing the changes in the value of R^2). Secondly, it helps to see whether the new variable is worth including in the model or not (by seeing the changes in the value of R^2. It also helps us in keeping a watch over the changes in the values of the regression coefficients and their standard errors.

(For a good discussion on multicollinearity, please refer to J. Johston, op.cit.pp. 159-168 and A.Koutsoyiannis, Theory of Econometrics, Macmillan, 1973,pp. 225-249).

CHAPTER - III

BACKGROUND OF THE STUDY

III.1: Role of population in the economy

The importance of the study of interrelations between population and economic problems lies in three basic considerations.[1] First the development efforts at all stages of economic development and in countries with different ideological as well as socio-economic structures, tend to produce systematic effects at national and even global levels that have a cumulative impact on the productive process and attainment of longterm development objectives. Second,these systematic effects result from strong interaction between demographic, social and economic factors, but the casual linkages are not clear. Third taking this casual links as given, there is uncertainty as regards the likely long-term impact of such systematic effects.

The population of any region, may change following the birth of a baby in that area, the death of a person of that area, the moving of people of other area into that area, and the moving of people out of that area to other areas. Corresponding to these four events, there are three aspects of population change, namely, fertility, mortality, and migration, which determine the size, growth, structure and characteristics of any population. The demographic process of fertility, mortality, and migration effect size, growth, structure and characteristics of population and in turn, have an impact on the economy.

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1. Ghosh, P.K (ed)."Population, Environment and Resources, and Third World Develoopemnt,' Greenwood Press, London, 1984,p.4.

Simon Kuznets[2] has given the most comprehensive definition of economic development by taking into consideration its major determinants. According to him, the capacity to sustain rapidly increasing populaion at the same or only slightly lower levels of living, can be viewed as economic development. But the distinctive characteristics of economic development is the combination of high rates of population growth with high rates of growth of the per capita product, which implies enormous increase in the total product. Further, Kuznets mentions that higher level of per capita product leading to better standard of living, requires structural changes in the economy, like changes in the occupation structure or transfer of employment from agriculture to non-agriculture activities, changes in the spatial distribution of population between rural and urban areas, changes in employment status and finally, changes in the distribution of product among households for consumption and among capital formation and public consumption.

The aim of economic development is to improve the quality of human life. But there is no unanimous view amongst the economists and leaders of political, social and cultural systems as regards the way of attaining this goal. One strategy is treated as better than the other, considering the specific country or regional economic, political and social situations. So different development strategies[3] have evolved all round the world. For instance, in many developing countries, emphasis is laid on the

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2. Kuznets, Simon, "Modern Economic Growth: Rate, Stricture, and Spread", Yale University Press, New Haven, 1966, pp.1-66.

reduction of inequalities between classes through the improvement of social, economic and overall living conditions of the poorer strata of the population. In other countries, the major concern of the governments is to reduce regional and sectoral disparities so that balanced economic development can be possible with equal accessibility to avaible opportunities for all sections and regions of population.

However, the attainment of the above objectives requires a unified approach envisaging all spheres of economic and social life, such as, employment, education, health, nutrition and housing and emphasising well-being of children and participation of youth and women in the development process. These objectives depend to a great extent on the demographic factors that a region is experiencing like birth and death rates and migration. So the demographic factors emerge as important elements for the formulation of development strategies and economic policies. As a result any strategy for devleopment should be in accordance with the needs and demands imposed on the economy by the change in population and its structure. Moreover, attention should be given to the demographic changes so that they may not distort a more equtable distribution of the benefits of economic development.

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3. United Nations, "Population Policy and Development Planning", New York, 1981, pp.4-18.

III.2 Population and development in India

The overwhelming view today in our country is that continued popualtion growth will increase poverty in the future. In other words, it is held that growth of population means a decline in the standard of living. This view is held at the highest levels in our country without much reservation.[4]

The population development relationship can be compared among different regions of the world, particularly the developed and the developing ones. Inspite of cyclical ups and downs, the developed countries have maintained a high level of employment due to a high rate of capital formation, investment and the availability of most sophisticated technology. So the total output can be said to be related to the size of population as directly as to the total available stock of capital in these developed countries considering the age-structure and consequent work force participation. but in the developing countries like India,no such direct relationship can be assumed between the size of population and total output because of the fact that a substantial part of the labour force does not participate effectively in the production process due to very poor rate of savings, capital formation and consequent low level of investment with backward technology.[5]

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4. Bose. A, Mitra. A, Desai.P.V, Sharma. J N, (ed)"Population in India's Development 1947-2000",Vikas Publishing House Private Ltd. Delhi, 1974, p.211.
5. Leontief, Wasily., "Population growth and economic devlopment", Populatin and Development Review. Vol. 5, No-1, March, 1979, PP. 1 and 27.

During the two preceeding centuries, sustained economic development of Western Europe and North America was accompanied by steady and sustained growth of population. A growing population had been accepted as a contributor to economic development because of its stimulating effect on demand and so its risk reducing incentive to investment, its effects on improvement of the labour force with better trained workers, its encouragement for technological innovation, particularly in agriculture and its permission of economies of scale in production for large markets.[6] a number of economists in theorizing about the relationship between population and ec onomic development, have sought a positive effect of the former on the latter.

But the post world war-II period saw completely disasterous situation, that is, an unprecedent rate of population growth in India as a result of sharp decline in death rate which was combined with a very high and non declining birth rate. The obvious result of the situation with birth rate remaining constant while death rate declines sharply, is population explosion, so population growth now seemed negatively related to economic prospects of India.

The situation was so worsened due to the fact that India is experiencing at least twice as fast rate of population growth as it was in Europe in eighteenth century. As a result of this high

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6. Birdsall, Naney,"Analytical Approaches to the Relationship of Population Growth and development",Population and Developmenmt Review, v.3, n.1-2, March and June 1977,pp.63-102.

growth, the age composition of the developing countries with half of the population in non-productive age is certainly unfavourable to production and more burdensome with respect to consumption and social overhead investments.

III.3: Macro Effects of Population Growth in India

The unprecendented population growth created a renewed interest in population among economists beings influenced by a concern with the limits to growth. The argument that rapid population growth has adverse effects on economic development is based on the premise of finite resources, particularly land and that it diverts the savings required for economic development into consumption and unproductive demographic investments.

The impact of population on capital formation in India has been based on the belief that high rates of population growth slows down savings rate which has a negative effect on investment and overall economic development . This is because an increased dependency ratio lowers per capita income and also increases consumption at the cost of savings. So, investment is automatically shifted from production sectors to demographic investments which are relatively unproductive in terms of economic growth effort.

The relationship between population and industrialisation in a developing country has been considered by many writers as being based on negative correlation . A rapidly growing population initially slows down the rate of capital accumulation and the expansion of markets for manufactured products and then makes it

difficult to transfer surplus labour from agriculture to industry in comparision to agriculture.[7] Alternately, rapid population growth also produces heavy pressure on rural agricultural sector due to a very pressure on rural agricultural sector due to a very high degree of income elasticity of demand for food at lower income levels as a result of which a rapid increase in the supply of agricultural goods is required . Thus both agricultural and industrial sectors have a serious setback consequent upon a population boon in the developing countries.

Rapid growth of urban population through migration from rural areas as a result of rapid population growth and consequent heavy pressure on agriculture , is no more considered as an optimistic situation for economic developement. It has aggravated the employment situation in the third world countries due to the fact that urban job creating capacity is much less than the demand for it. Growth in the density of urban population imposes heavy burden on the capital formation for education, health, housing, transportation and public utilities and may create unemployment problems and other social disturbances. Besides, uncontrolled urban growth creates problems of congestion and environmental pollution, which has detrimental effect on the quality of life in urban areas. Also disproportionate urban growth is common now in almost all the developing countries, creates further inequalities between rural and urban areas as a result of which balanced regional devlopment becomes a distant possibility.[8.]

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7. Cheok, C. K and Lean.L.L, op cit, p.35.

8. Todaro.M.P,"Internal Migration in Developing Countries: A Review of Theory, Evidence, Methodology and Research Priorities," IID, Geneva, 1976.

High fertility exacerbates the inequality of income distribution. In the developing countries, less educated and lower income parents are likely to have large families and children and these families constitute a large fraction in the population. Moreover when efforts are geared to increase the distribution of utilities or oppurtunities, particularly in terms of education, a disproportionate share of poor children will come from the large families that are least able to respond to it.[9]

The consequences of population increase on demand and supply of food are still unknown due to unavailability of concrete facts about income changes, changes in agricultural technology, the hetrogenity of agricultural conditions etc. So far as the relationship between population and resources is concerned, rapid population growth reduces the per capita availability of resources, particularly land and so the agro based developing countries face the problem of unemployment, specially of disguised nature and consequent vicious circle of poverty.

Rapid population growth leads to a very rapid increase in the demand for employment facilities fifteen years hence. In India with fixed capital-labour ratios in the modern sector, insufficient savings and investment and inability of agriculture and urban informal sector to absorb labour, the problems of unemployment and poverty are the most common result of rapid labour force growth.

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9. Meade, James.E,"Efficiency, Equality and Ownership of Property",Allen and Unwin, London, 1964, pp.46-48.

The adverse effect of population growth on labour force participation and employment situation could be curbed by using labour-intensive technologies in the urban as well as agricultural sector. But India is already having excessive pressure on the agricultural sector[10] as well as the urban informal sector. Besides, manufacturing sector is running short of required capital and advanced technology due to very low level portion of the labour force to stick to low productivity and low-wage jobs in agriculture and informal sector.

Population growth increase costs for providing health services, simply because more people in India have a strong effect on costs of health services because obstetric and pediatric needs constitute a major portion of total demand for health services.

The provision for educating all creates problems not only if[11] there is an excessive number of children but also if there is a deficiency in the age-groups of economically active population. Rapid growth of population has a direct effect on future expendi[12] ture on education. Because high fertility means more children entering the school five year hence, which automatically incr-eaesthe education expenditure in the form of creation of new schools, employment of more teachers etc.

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10. Sen. Amartya,"Employment, Technology and Development",Clarendon Press, Oxford, 1975, p.47.

11. Jones.G.E,and Selveratnam,"Population Grwoth and Economic Development in Cylone",Hansa Publishers, Colombo, 1972, pp.67-68.

12. Stone. Richard,"Demographic Variables in the Economics of Education",in A.J.Cole (ed),"Economic Factors in Population Growth",Mac Milan Ltd.,London, 1976, p.535.

III 4 : Literature Survey

Germs of certain idea which have figured prodominantly in recent theoretical works on population can be found in ancient writings. But in the true sense of the term, no systematic theory of population was to emerge till the work of Malthus in the eighteenth century. The views of the ancient and early thinkers were motivated towards religious, social or political aspects of life. The community interests were more important than any serious economic consideration. The historical development of the theories relating to population can be analysed in the following five stages :

4.1. Early Economic thought

4.2. Pre-Malthusian thought

4.3. Malthusian and the classical thought

4.4. Marxian and the Socialist thought

4.5. Modern thought

4.1: Early economic thought

The early economic thought on the population question can be traced back to the sixth century B.C. when the great chinese thinker Confucious and those belonging to his school of thougth held the view that there was some ideal relationship between the size of an agricultural population and the amount of land available for cultivator. According to them, population growth should not have any burden on the available resources so that it may not distort the levels of living, internal peace and productivity per worker. But contrary to his own view, the doctrines of Confucious on marriage, family and procreation were intended towards a populationist view.

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Plato and Aristotle considered the question of optimum size of population in their discussions of the ideal conditions of a city state in which man's potentialities could be fully developed and highest goods realized. According to them population should be large enough to be economically self sufficient and capable of defending itself but not too large. However neither Plato nor Aristotle inquired exiplicitly into the relationship between population density and per capita output.

The Romans,like the Chinese, view population questions in the perspective of a great empire. They were less conscious than the Greeks of possible limites to population growth and more alert to its advantages for military and related purposes. Perhaps partly because of this difference in outlook, Roman writers paid less attention than the Greeks to population theory, but were much concerned with the practical problem of stumilating population increase.

Economic interpretation of the population size started only in the fourteenth century with the view of the Arab sholar, Ibn Khaldun who stressed the importance of a high population density to obtain a high degree of division of labour and thus a high per capita income. According to him, densely settled population

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13. United Nations,"The Determinants and Consequences of Population Trends",op cit, pp.33-34.

14. Premi. M.K et.al,"Introduction to Social Demography",Vikas Publishers,New Delhi, 1983.

was conducive for better standard of living for it promoted greater division of labour and effective utilisation of resources, and also ensured political stability. He was of the opinion that favourable economic conditions and political stability brought about population growth while economic progress encouraging luxurious living, led to higher taxation and consequently political instability which in turn, led to economic depression and depopulation.[15]

4.2: Pre-Malthusian thought

This phase of thinking ranges from 15th to 18th century, during which striking changes occured in human perception towards several aspects of life including the emergence of capitalism in place of feudalism. Mercantilist and other writers of his time were concerned with the means and ways of increasing the wealth and power of the state, and in particular its supplies of precious metals. Their aim was not to raise the per capita income but to increase the agregate national income. He paid special attention to the relationship between population and foreign trade. Centillon suggested that, if the agriculture of a country could not be expanded in proportion to population, or if such an extension would involve diminishing returns, additional agricultural products could be obtained from abroad in exchange for manufactured goods. Stuart put it that 'work' should be exported and 'matter' should be imported so long as satisfactory terms of trade could be obtained.[16]

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15. United Nations, op cit, p.35.

16. Ghosh. B.N,"Studies in Population and Economic Development",Deep and Deep Publications, 1987, pp.20-21.

The physiocratic shcool evolved in France at a time when there was acute agricultural distress and misery among the people following the dominance of the mercantile policy that led to the growth of industry at the cost of agriculture. This was perhaps due to public resentment and reaction against the Mercantile ideas and policies. So towards the middle of the eighteenth century, prominent thinkers like, Quesney and Mirabeau established a new idea that land was the source of all wealth and thus it was necessary that proper importance be assigned to agriculture.

According to the physiocratic shcool a growing and large population was not always beneficial if it could not raise agricultural production. Because population is directly dependent on agriculture for food supply, any effort to suppress agriculture could be done only at the cost of reducing standard of living. Thus they could see the relationship between population and the means of subsistance which in turn, evolved the idea that agriculture should be encouraged.[17]

4.3: Malthusian and the classical thought[18]

Malthus wrote the first addition of his essay on the "Principle of Population" The first addition was directed against Condorcet's conjectures[19] regarding the perfectibility of man, against Godwin's system of equality and his allegation that the

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17. United Nations, op cit, p.37.

18. Strangeland. Charles Emil, op cit, p.257.

19. Malthus,"An Essay on the Principle of Population",, 1803, pp.7and 473.

sources of mankind originated in human institutions, and against Wallaces contention that over population would develop only in the distant past. Malthus argument rested upon the supposition that man's capacity to increase his means of subsistence was much less than his capacity to multiply. He asserted that man could increase his subsistence only in arithmatical progression, whereas his numbers tended to increase in geometrical progression. He said population always tended towards the limit set by subsistence and was contained within that limit by the operation of positive and preventive checks.

The theorists of 'classical shcool' were concerned with the causes and consequences of population changes in their efforts to discover the laws governing the levels and trends of production, wages, interests, rents and profits. It was generally believed that the cost of production of agricultural commodities tended to rise as a result of increases in population and consequent increases in demand and output, while the cost of producing manufactured goods tended to fall. Decreasing costs(increasing returns) in manufacturing presumly occured because of possibilities of increasing division of labour and continuing technical improvements.

Economists of this period varied in the emphasis placed on diminishing returns in agriculture, also some did not agree that manufacturing was characterised by increasing returns. Mill held that tendency of returns in agriculture to fall as population increased could not be indefinitly offset by capital accumulation or by extension of division of labour and the introduction of

technological improvements in non-agricultural industries. Classical economists of this period also held that the level of wages depended largely on the ratio of population to capital was a commonly held view, the inference being that wages would rise if capital increased more rapidly than population. The relation of size and growth of population to unemployment was also given some consideration during this period. Various views regarding the need for controlling population growth were held during this period. Mill believed that population growth must be effectively controlled, since there were limits in the extent to which the flow of goods and services in any particular country could be increased and since international trade and emigration could afford little relief from population pressure.

4.4: Marxian and the socialist thought

Socialists and Marxist writers since the early part of the nineteenth century have, for the most part, either denied the existece of a population problem or maintained that it should be solved through reorganisation of society. They have attributed human misery, not to excessive population growth, but to the maldistrubution of income and other supposed defects in the existing social order. Moreover they regard the Malthusian interpretation of the relation between population and the economy as pessimistic and as a tool of capitalist exploitations. But they did not formulate any consistent approach to the population problem.

The credit often goes to Karl Marx for formulating a more[20]

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20. Coontz.S.H, op cit, p.85.

general and rational approach to population consistent with the socialist thought. But Marx differed from other socialist thinkers so far as his views of the effect of limiting population growth were concerned. Some socialists writers believed that wages could be increased by limiting population growth, while Marx was in complete contrast with this view. According to Marx, populaion could be reduced only at the cost of underconsumption and so the falling rate of profit which would see the ultimate breakdown of capitalism.[21]

Marixian theory says that surplus population was inherent in the capitalistic system. Similarly Engels also believed that surplus population was associated with surplus capital which would have been overcome only by social transformation. In the opinion of these socialist writers the prevailing vicious circle of poverty in the developing countries can not be traced back to higher reproduction and consequent pressure of population but to faulty social system, which can be cured by some fundamental changes in the social and economic organisations.

4.5: Modern thought

The controvery regarding the relationship between population and economic development prevails in recent years also. Sustained economic growth in the industrial countries in the second half of the nineteenth and first quarter of the twentieth century showed the obvious inconsistency of the theoretical construction of the classical economists, which prevented the analysis of population questions in economic literature for a long time. It is only in

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21. Bizien, Yves, op cit, p.10.

the post war period that a new generation of demographic models appeared when the importance assigned in the past to land and natural resources was replacaed by emphasis on capital formation and investment as strategic factors determining economic growth. Obviously the demographic economic models developed during this period laid great stress on the relationship between population and capital formation.

The concept of optimum population has been interpreted in several ways. It means the size of population which results in the highest per capita income, the highest productivity as measured in different manners, or the highest level of other less well-defined economic indicators, such as economic welfare, level of living, real income and in some cases employment.

According to Edwin Canan,[22] there is a relationship between population and natural resources of a region. With an increase in population, production goes on increasing upto a maximum point after which it starts declining with any more increase in population.

However the theory of optimum population has been criticized by many sholars. This is because the theory does not explain how population size is determined and also does not include the process of demographic and economic changes.

A general and complete theory of the inter-relations of the basic demographic process, including the determination of the age structure and other functions of the population, was developed by

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22. United Nations, op cit, p.55.

Lotka. In his analytical theory Lotka began by discussing the relationships in a closed population between the basic demographic variables, such as population growth, births, deaths and their respective rates, age-specific survival ratios and the age distribution. Taking fertility into account, he distinguished a population, commonly referred to as stable, in which both age-specific fertility and mortality schedules are constant. On the basis of these assumptions he analysed the relationships between the different demographic phenomena and derived certain properties of the populations concerned, demonstrating that under these conditions the crude birth and death rates and the rates of natural increase, among others, would be constant.

The process of demographic transition in the course of economic development as based on the experience of presently industrialised countries has been summarized by Coale and Hoover. The agrarian low income economy is characterized by high birth and death rates, the former being relatively stable and the latter fluctuating in response to varying fortunes. Then, as the economy progresses to become more interdependent, specialized and market dominated, the average death rate begins a continuing decline under the impact of better organization and improved medical knowledge and care. Somewhat later birth rate begins to fall. The birth and death rates pursue a more or less parallel downward course with the decline of the birth rate lagging behind. Finally, as further reductions in the death rate become harder to obtain, the birth rate again approaches equality with the death rate and a more gradual rate of growth is re-established, with,

however, low risks of mortality and small families as the typical pattern. Mortality rates then become relatively stable from year to year and birth rates respond to voluntary decisions rather than deeply embedded customs and may fluctuate from year to year.

While[23] the idea of a demographic transition has been widely adopted and is frequently used as a generalized description of the evolutionary process, a number of writers have emphasized its limitations as a theory. It has been argued that since the transition theory is linked to the experience of western countries, whose historical demographic trends were by themselves far from uniform, it is unlikely that it provides more than vague suggestions about factors which may determine growth in other countries.

Alvin Hensen,[24] developed the model of 'Frontier Spirit', in which he took two functions-demand function and investement function to analyse the impact of a rapid growing population on economic growth. According to this model, a rapid growing population will have a poaitive effect on the economy because of its stimulating effect on demand and its risk-reducing incentive to investment. This model again does not apply to the developing countries situation because of its assumption that investment will be higher order a situation of rapid growing population simply because it create more demand. But the model does not care

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23. Coale and Hoover,"Population Growth and Economic Development",1958, pp. 10 and 13

24. Hansen and Alvin. H,"Economic Progress and Declining Population Growth",American Economic Review,20 March 1939.

of the fact that increasing consumption in the third world countries reduces the rate of savings, capital formation and investment which have a very depressing effect on the productivity and technical progress and finally on economic growth.

Coontz attempted to formulate a theory of population growth consistant with the thesis of the classical school that the demand for labour governs its supply. He assumed mortally to be directly related to fertility, while taking the generally observed inverse relation between fertility and economic status or income as the point of departure for explaining fertility. Considering the wealthy, he argued that the reasons for high fertility among them had disappeared even at an early stage of development since the labour of children and wives was relatively little important. Among the poorer classes as long as there existed a demand for child labour,parents acted retionally in having a large number of children. The birth rates of the poor would decline only when the demand for this type of labour declined and the average quality of the labour demanded increased.

Harrey Leibenstein[25] in his model of economic development assigns great importance[26] to population as endogenous variable. Population growth, through the relations which exist between its basic determinants and income, is regarded as a function of levels of living. Mortally is thought to be negatively related to income, the reasoning being that higher wages, better food, shelter, medical care etc, associated with an increase in income

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25. Coontz,"Population Theories and Economic Interpretation",1957.

26. Leibenstein.Harvey,"A Theory of Economic-Demographic Devel-

opment",Princeton University Press,Princeton,1954.

will lower mortally. Fertility is determined by a great number of factor, but upto a certain point motivations for larger families will predominate. After that, fertility is likely to decline with further gains in income. In explaining the factors which create the motivations for smaller rather than for larger families. Leibenstein holds that both in the less developed and in the developed economies, parents are rational in their decisions and will desire an extra child only when the costs are smaller than the satisfactions.

According to Nelson, many of the under-developed countries are caught in the low level equilibrium trap characterized by a stable equilibrium level of per capita income at or close to subsistence requirements. Capital formation is low and if the capital stock is accumulating, population is rising equally fast, thus precluding the possibility of increases in the amount of capital per worker. Nelson's model is built around three basic variable : income, investment and populaion growth can result only from mortality. Mortality is supposed to be determined by the level of per capita income until the latter reaches a certain level beyond which it has little effect on mortally. Assuming production to be a function of capital stock, including land and population, Nelson shows that average income per head can increase only if the rate of capital formation exceeds that of population growth.

Jorgenson's 'two sector model' concerns the existence of two economic sectors- the advanced modern or manufacturing, and the backward, traditional or agricultural with different production

functions. He assumes diminishing returns in agriculture; constant returns in industry and constant neutral technological change in both sectors. Capital formation is determined by the growth of the manufacturing labour force, by the terms of trade between two sectors and by the Malthusian law of population. More specifically population growth depends on the supply of food per capita and the force of mortality. The birth rate depends on the supply of food per capita, but may attain a biological or social maximum provided the supply of food is sufficient. When output per head is increasing, however, an agricultural surplus is generated and the development of manufacturing sector becomes possible. This process is accompanied by a continuous change in production and by aa transfer of population towards the manufacturing. Population will grow at its maximum rate and in the absence of technological change, capital and output will grow at the same rate.

Cole and Hoover [27] applied Harrod-Domar model to the economic situation and demographic policy making in the developing countries, taking a case study of India. This is a simple simulation model based on three functions, such as, production function, savings function and function of capital productivity. In this model savings are defined as the product of population size and specific investment costs are a function of per capita income growth. So far as the function of capital productivity is concerned, the authors recognise private capital investment as

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27. Coale.A.J and Hoover. E.M,"Population Growth and Economic Development in Low Income Countries: A Caser Study of India's Prospects",Princeton University Press, Princeton, New Jersey, 1958.

having a broad and direct effect on production, while investments on social welfare have weak and delayed impact on the productive efficiency of the economy. The birth and death rates in the model are specifically analysed in the Indian context having reference to a typical developing country and are taken as exogenous variables but depend an demographic policy, which has also been taken as an exogenous variable in the model. As a result of this, the model concluded the economic costs of a high birth rate and it seems the model was designed to illustrate the negative impact of a high birth rate and rapid population growth on the economy.

However, the conclusions of the Coale and Hoover model that demographic policy aimed at reducing the birth rate is essentially necessry for the developing countries and the assumption of its success are for from satisfactory. Because in the first instance, in the absence of any demographic policy, social and economic upliftment of the poorer strata of population, female education and employment, urbanisation etc can reduce birth rate to a great extent. A birth rate reducing demographic policy has obviously failed in case of India for which the model ws specially developed. Because thirty five years of family planning programme in India has not been able to reduce the population growth rate by any considerable margin.

The approach of Ester Boserup[28] unlike Malthus, on the relationship between population and economy, was optimistic. According to pessimists like Malthus, the population is con-

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28. Boserup. Ester,"The Conditions of Agricultural Growth: The Economics of Agrarian Change under Population Pressure",George Allen and Unwin Ltd. London, 1965.

trolled by food production and hence the population has been taken as dependent variable. According to Ester Boserup population growth is a major factor determining agricultural development. So her model is based on the idea that agricultural development is influenced by population changes and hence the population has been taken as independent variable.

She concluded that "as the population increase, agricultural production also increase to keep peace with the need of the people. This improvement in agricultural production is carried out through the improvement in technology, multiple cropping, division of labour and other like factors. Higher growth of population causes the rapid growth of agricultural production. But if we take her model in Indian context, it does not hold good. Because most populous states with rapid growth rate of population have been failed to keep pace with the agricultural production.

Stephen Enke[29] applied the cost-benefit planning model to the population-economy relationship. In this model he proposed two alternative investment policies, the first one to step up urbanization and industrialization which would reduce birth rates and the other on land reclamation. Using his model in a developing country situation, he came to the conclusion that consumption per head is initially higher in case of the former policy and the gap contunues to rise. According to Enke, the difference in per capita consumption trends created by these two invesment policies

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29. Enke. Stephen,"Economic Consequences of Rapid Population Growth",Economic Journal,December 1971.

can be solely entrusted to the difference in the rates of population growth.

Colin Clark[30] in his model of more people, more dynamism, held the view that economic development is the result of population growth as the latter increases the supply of savings. Taking a three years average of agricultural production per head of population in the developing countries, he came to the conclusion that the population growth promotes economies of large scale production for it creates a larger market than a stationary population. But the views of clark are self-contradictory on the ground that in the developing countries the large scale consumption which he considers as a benefit, in the real situation reduces the rate of savings. When rate of savings reduces, capital formation and consequent capital labour ratio comes down as a result of which productivity per worker automatically reduces. Hence the model of Colin Clarke does not apply to a developing country situation, particularly in the long run.

Julian Simon[31] developed a model to observe facts about the overall relationship between population and economic growth, by which he meant growth of productivity per worker. This model is based on two functions-production function and the technical progress function.

He concluded that population size have positive effects upon the rate of economic growth, that is the growth of productivity

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30. Clark. Colin,"The Myth of Overpopulation",Lumen Christi,1975.

31. Simon. Julian.L,"Theory of Population and Economic Growth",Basil Blackwell, New York, 1986.

per worker through their positive effects on the rate of technical progess. However when we apply this model to a developing country situation, like that of Inia, we are unlikely to get the same conclusion as that of Simon because of the fact that the assumption of constant capital labour ratio does not apply to the developing world. This is because the growth of workers is much faster than the growth of capital in the developing countries.

Cassen[32] examined India's contemporary economic and social problems from the point of view of population. According to him, population growth has contributed to the lack of material progress for the bulk of population. His major findings one that, India's population growth rate has passed it's maximum, the key development problem is the Utilisation of labour at the village level, and the process of change required to alleviate poverty should be in accordance to the Indian socio-economic conditions.

Mehta[33] analyses the relationship between population growth and various soci-economic factors in Rajasthan and finds that population growth has negative impact on economic development.

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32. Cassen. R.H,"India: Population, Economy, Society", Holms and Meier, New York,1978.

33. Mehta.B.C,"Regional Population Growth: A Case Study of Rajasthan",Research Books, Jaipur, 1978.

CHAPTER-IV

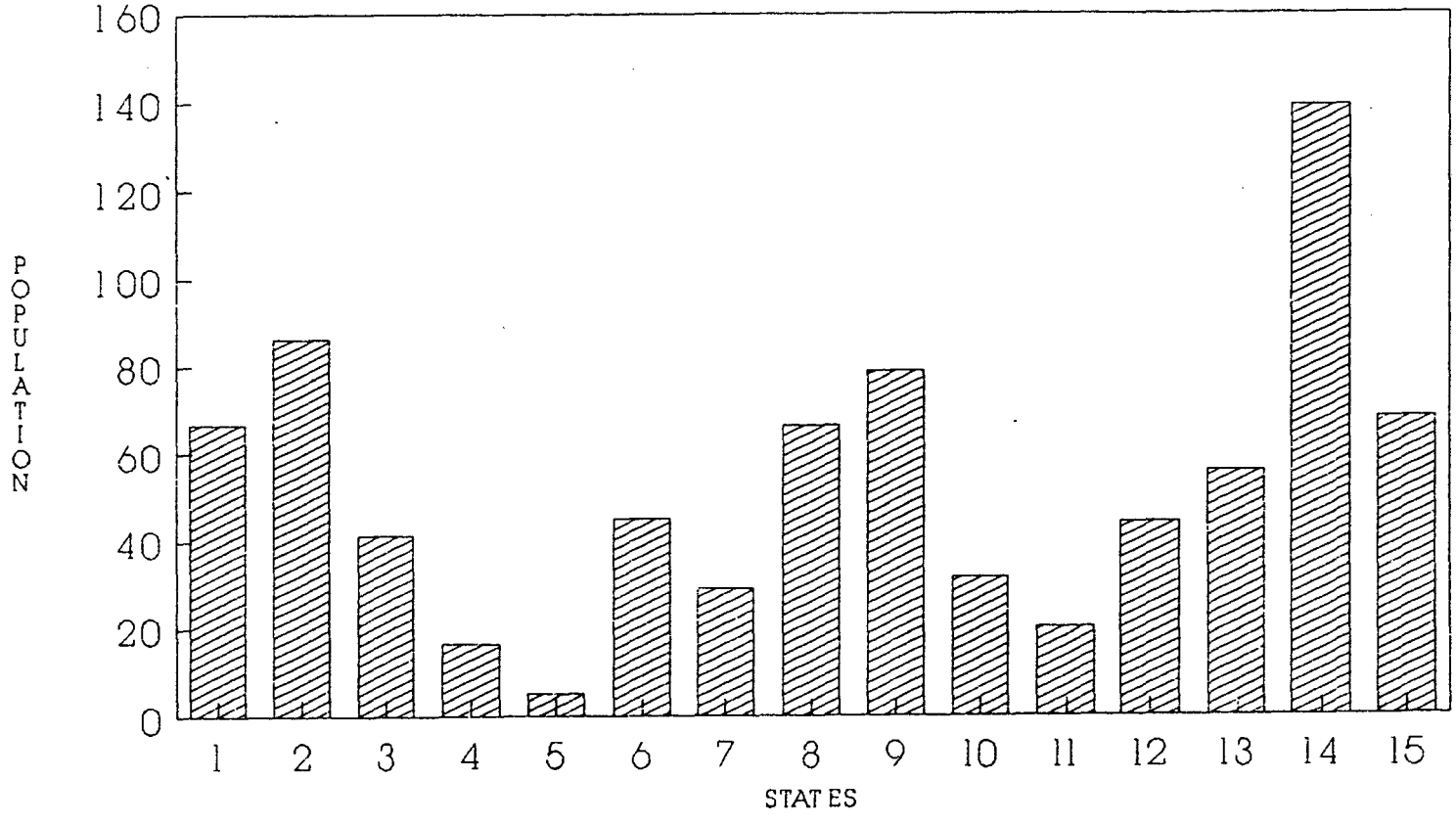
DEMOGRAPHIC AND ECONOMIC PROFILE OF UP

Table - 4.1 : Demographic Situation in U.P.in comparison to the major states of India, 1991

India/ States	Popn in 1991 (mln)	Density (1991)	PGR (1981-91)	DR (1991)	SHOUP (1991)
A-ll India*	816.17	273	23.85	193	26.13
Andhra Pradesh	66.51	241	24.20	134	26.89
Bihar	86.37	497	23.54	237	13.14
Gujarat	41.31	210	21.19	193	34.49
Haryana	16.46	369	27.41	249	24.63
H.P.	5.17	92	20.79	191	8.69
Karnataka	44.98	234	21.12	160	30.92
Kerala	29.10	747	14.32	251	26.39
Madhya Pradesh	66.18	149	26.84	165	23.18
Maharashtra	78.94	256	25.73	155	38.69
Orissa	31.66	202	20.06	205	13.38
Punjab	20.28	401	20.81	233	29.55
Rajasthan	44.01	128	28.44	216	22.88
Tamil Nadu	55.86	428	15.39	145	34.15
Uttar Pradesh	139.11	471	25.48	236	19.84
West Bengal	68.08	766	24.73	231	27.48

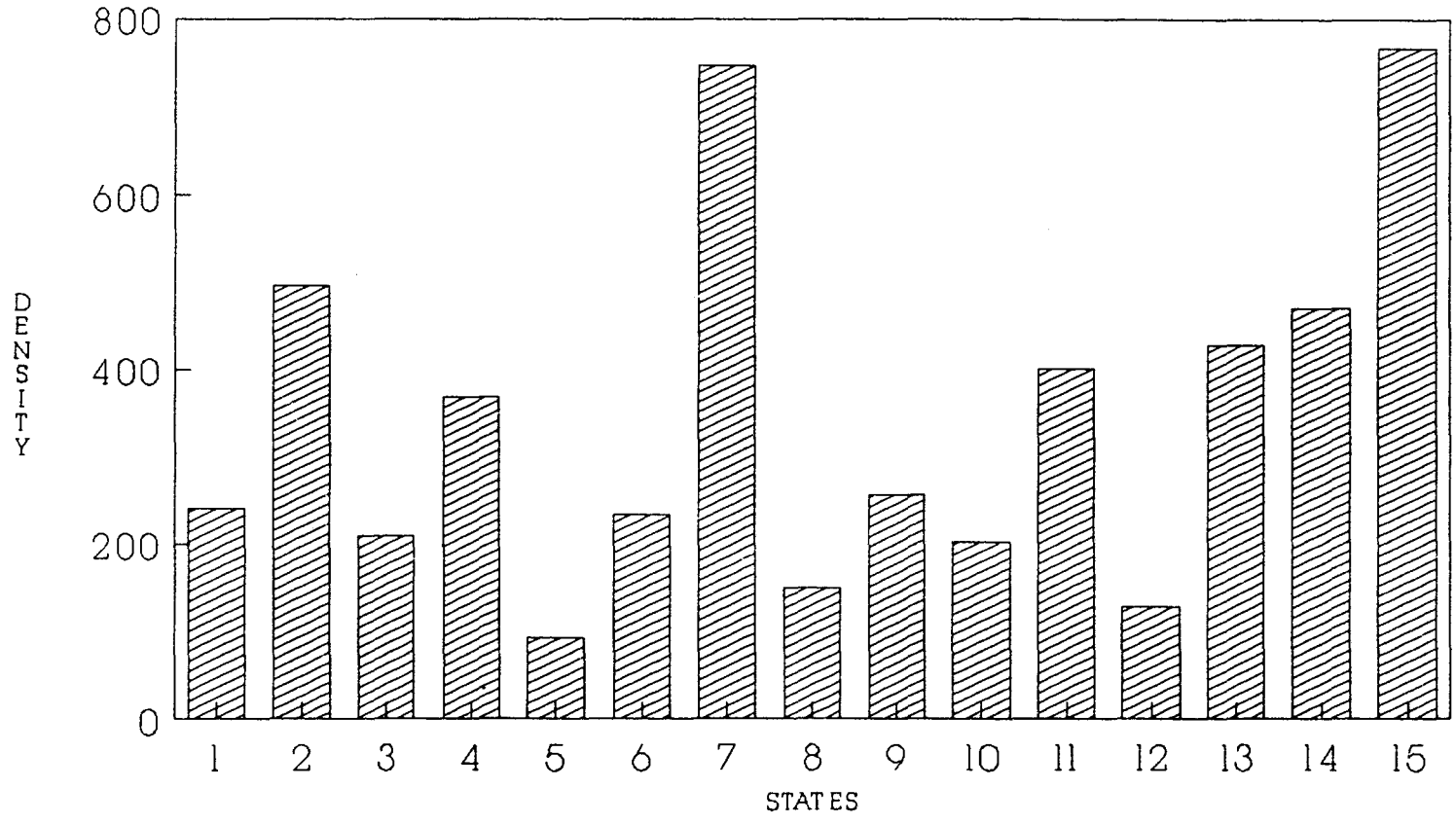
* Excluding Assam and Jammu & Kashmir

GRAPH -4.1 : POPULATION OF MAJOR STATES IN INDIA 1991



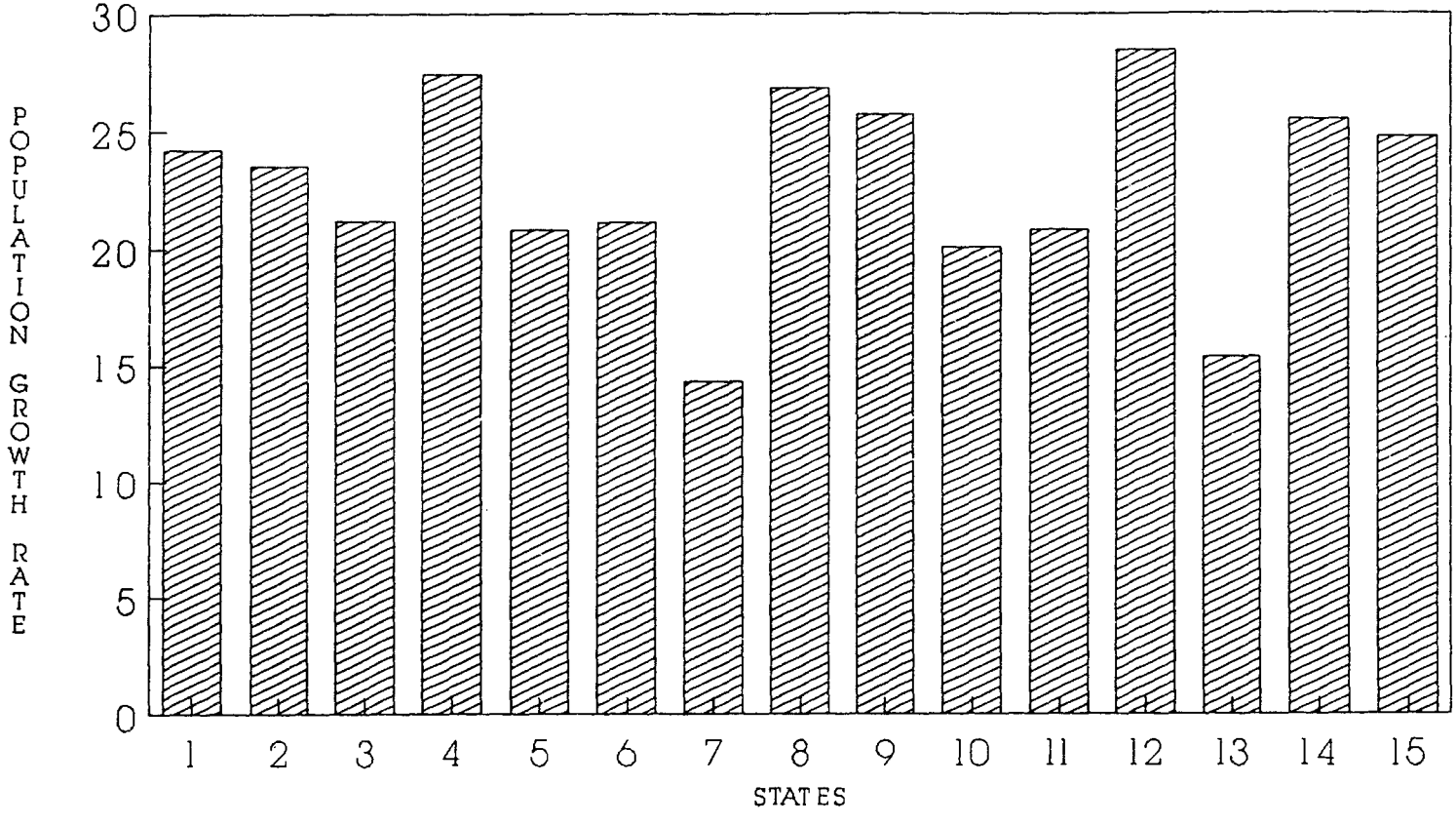
1-A.P. 2-BIHAR 3-GUJRAT 4-HARYANA 5-H.P. 6-KARNATAKA 7-KERALA
8-M.P. 9-MAHARASHTRA 10-ORISSA 11-PUNJAB 12-RAJASTHAN
13-TAMIL NADU 14-U.P. 15-WEST BENGAL

GRAPH -4.2 : DENSITY OF MAJOR STATES IN INDIA 1991



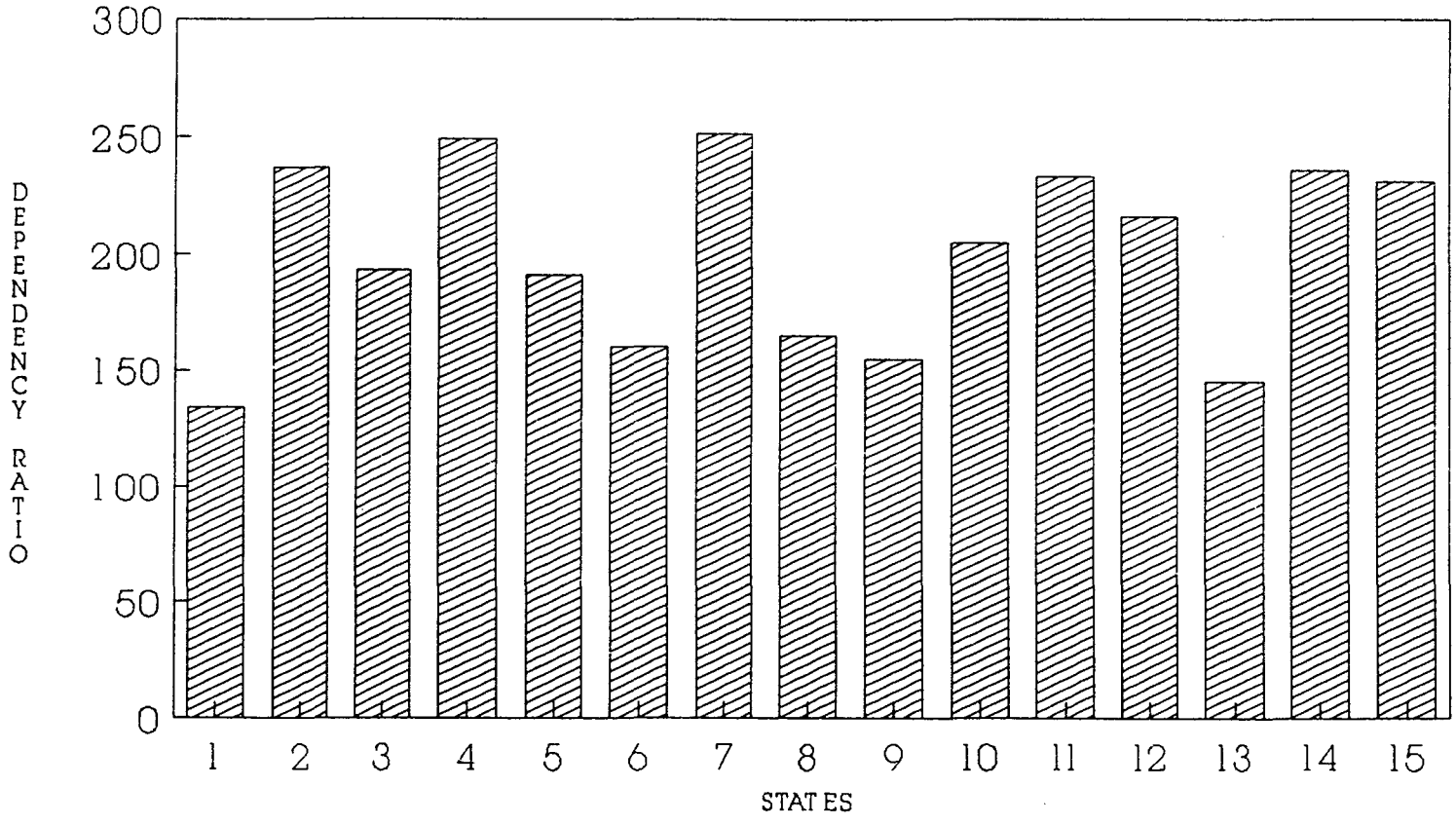
1-A.P. 2-BIHAR 3-GUJRAT 4-HARYANA 5-H.P. 6-KARNATAKA 7-KERALA
8-M.P. 9-MAHARASHTRA 10-ORISSA 11-PUNJAB 12-RAJASTHAN
13-TAMIL NADU 14-U.P. 15-WEST BENGAL

GRAPH -4.3 : POPULATION GROWTH RATE OF MAJOR STATES IN INDIA (1981-91)



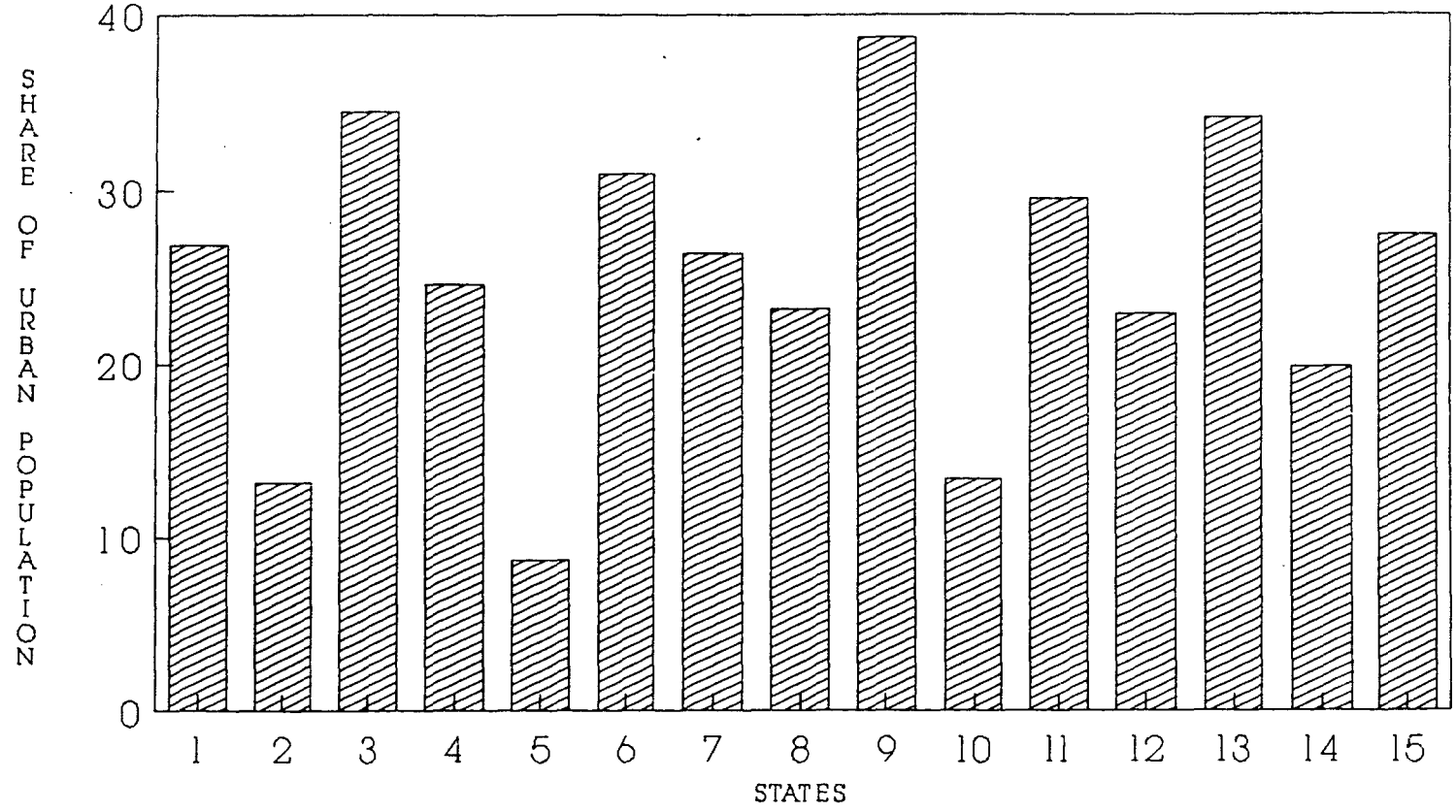
1-A.P. 2-BIHAR 3-GUJRAT 4-HARYANA 5-H.P. 6-KARNATAKA 7-KERALA
8-M.P. 9-MAHARASHTRA 10-ORISSA 11-PUNJAB 12-RAJASTHAN
13-TAMIL NADU 14-U.P. 15-WEST BENGAL

GRAPH-4.4 : DEPENDENCY RATIO OF MAJOR STATES IN INDIA 1991



1-A.P. 2-BIHAR 3-GUJRAT 4-HARYANA 5-H.P. 6-KARNATAKA 7-KERALA
8-M.P. 9-MAHARASHTRA 10-ORISSA 11-PUNJAB 12-RAJASTHAN
13-TAMIL NADU 14-U.P. 15-WEST BENGAL

GRAPH-4.5 : SHARE OF URBAN POPULATION OF MAJOR STATES IN INDIA 1991



1-A.P. 2-BIHAR 3-GUJRAT 4-HARYANA 5-H.P. 6-KARNATAKA 7-KERALA
8-M.P. 9-MAHARASHTRA 10-ORISSA 11-PUNJAB 12-RAJASTHAN
13-TAMIL NADU 14-U.P. 15-WEST BENGAL

IV. 1 : Demographic Situation in Uttar Pradesh

India is the second largest country in the world in terms of population. It combines twenty six states and seven union territories altogether. Among all the states, Uttar Pradesh is the largest state in terms of population with a population of 139.11 million. Of India's 844 million population, Uttar Pradesh shares 17.04 percent of population, which is highest. In the table 4.1, the demographic situation of Uttar Pradesh has been compared with fifteen major states of India. In terms of density, Uttar Pradesh (471) is the fourth densely populated state after West Bengal (766), Kerala (747) and Bihar (497). The average decadal population growth of India during 1981-91, was 23.85 percent. In Uttar Pradesh it was 25.48 per cent which is higher than the national average. Dependency ratio is the ratio of non-workers to the workers which shows the burden on working population. In 1991, the dependency ratio of India was 193. Uttar Pradesh with dependency ratio of 236 is one of few states with very high dependency ratio. Regarding share of urban population, Uttar Pradesh (19.84 percent) comes behind many states with higher share of urban population. So with largest population; higher density, population growth and dependency ratio and lower share of urban population shows that Uttar Pradesh is one of the most demographically backward states of India.

Table - 4.2 : Economic Situation in UP in comparison to the major states of India, 1991.

India/ States	WFPR (1991)	SPW (1991)	SSW (1991)
All India *	34.18	81.61	9.04
Andhra Pradesh	42.77	64.59	11.98
Bihar	29.66	80.60	4.89
Gujarat	34.12	54.46	20.78
Haryana	28.66	57.40	13.88
Himachal Pradesh	34.41	61.46	12.89
Karnataka	38.45	62.68	14.16
Kerala	28.53	47.84	17.14
Madhya Pradesh	37.67	72.67	9.69
Maharashtra	39.29	50.86	20.54
Orissa	32.78	74.32	7.55
Punjab	30.07	57.07	15.03
Rajasthan	31.62	67.27	11.31
Tamil Nadu	40.81	55.29	18.10
Uttar Pradesh	29.73	71.47	9.34
West Bengal	30.23	55.94	17.52

Contd...

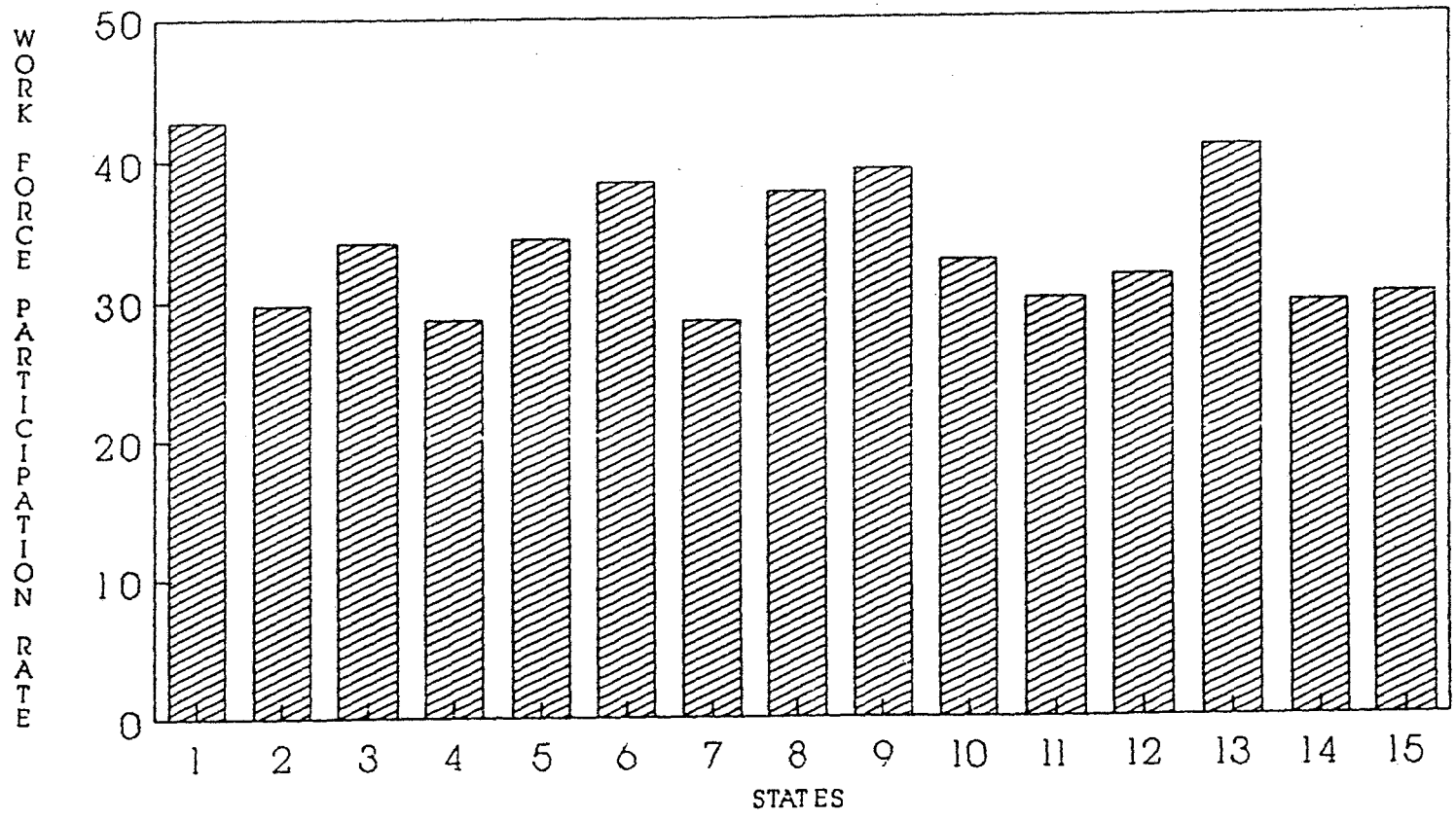
India/States	STW (1991)	LR (1991)	Fd.Pn (Qntl./GCA) (1981)	PCNDP (Rs.) (1981)	MLP (1981)
All India	9.35	52.11	7.60	692	2.75
Andhra Pradesh	23.43	44.09	8.27	647	1.60
Bihar	14.51	38.48	9.03	425	2.60
Gujarat	24.76	61.29	4.25	905	3.44
Haryana	28.72	55.85	11.24	1058	3.91
H.P.	25.65	63.86	13.64	671	1.62
Karnataka	23.16	56.04	5.60	687	3.22
Kerala	35.02	89.91	4.61	643	2.34
Madhya Pradesh	17.64	44.20	5.89	504	1.71
Maharashtra	28.60	64.87	4.89	964	5.17
Orissa	18.13	49.09	6.94	529	2.19
Punjab	27.90	58.51	17.88	1374	4.04
Rajasthan	21.42	38.55	3.80	541	1.72
Tamil Nadu	26.61	62.66	8.62	698	2.62
Uttar Pradesh	19.19	41.60	10.31	519	2.12
West Bengal	26.54	57.70	11.04	759	2.60

* Excludes Assam and Jammu and Kashmir

IV.2:Economic situation in Uttar Pradesh

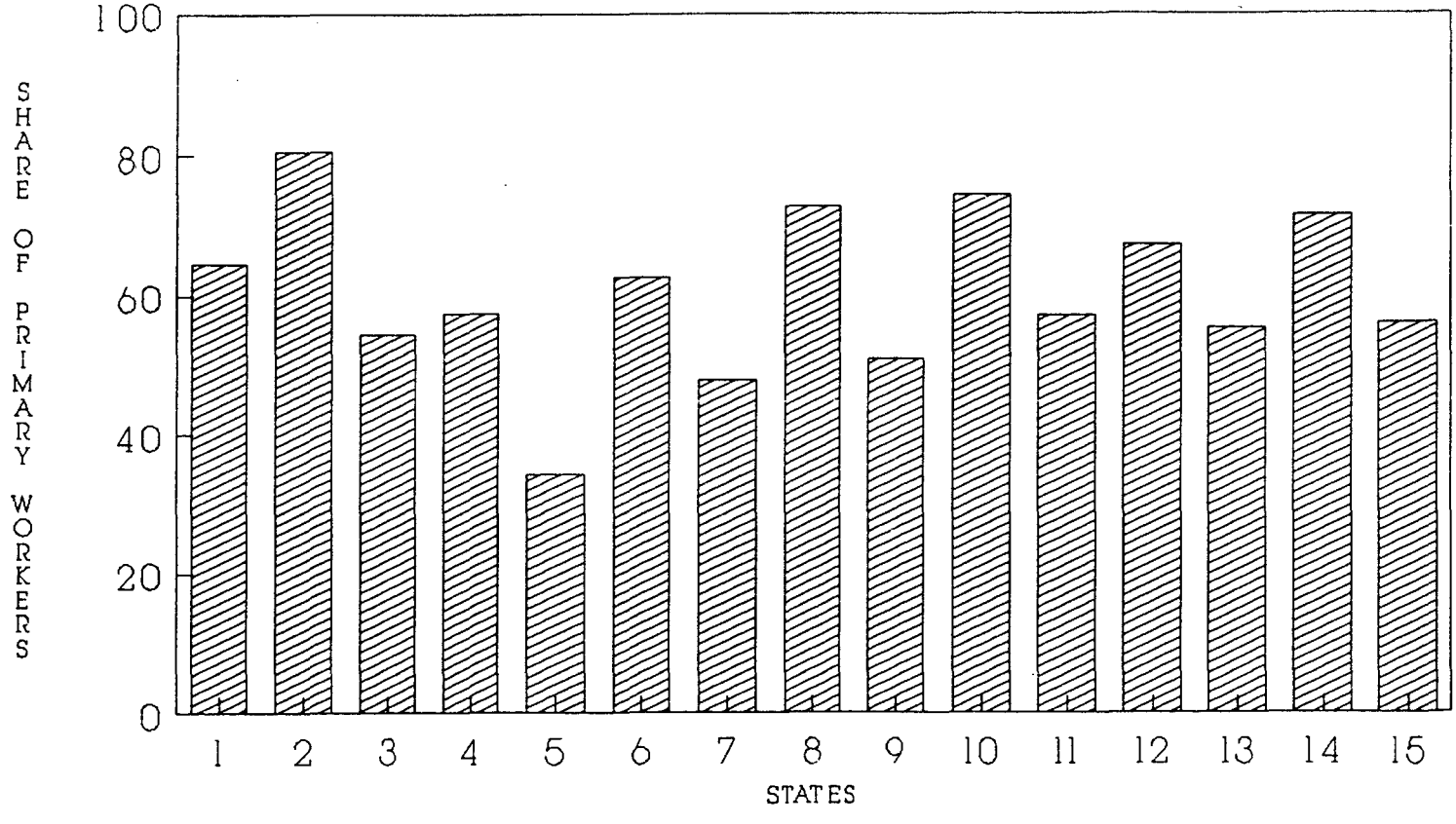
In Table - 4.2, economic situation of Uttar Pradesh has been compared with fifteen major states of India. In 1991, India's work force participation rate was 34.18. Uttar Pradesh with work force participation rate of 29.73 falls behind many states with higher participation rate. Barring Bihar and Madhya PRadesh,

GRAPH-4.6: WORK FORCE PARTICIPATION RATE OF MAJOR STATES IN INDIA 1991



1-A.P. 2-BIHAR 3-GUJRAT 4-HARYANA 5-H.P. 6-KARNATAKA 7-KERALA
8-M.P. 9-MAHARASHTRA 10-ORISSA 11-PUNJAB 12-RAJASTHAN
13-TAMIL NADU 14-U.P. 15-WEST BENGAL

GRAPH-4.7 : SHARE OF PRIMARY WORKERS OF MAJOR STATES IN INDIA 1991



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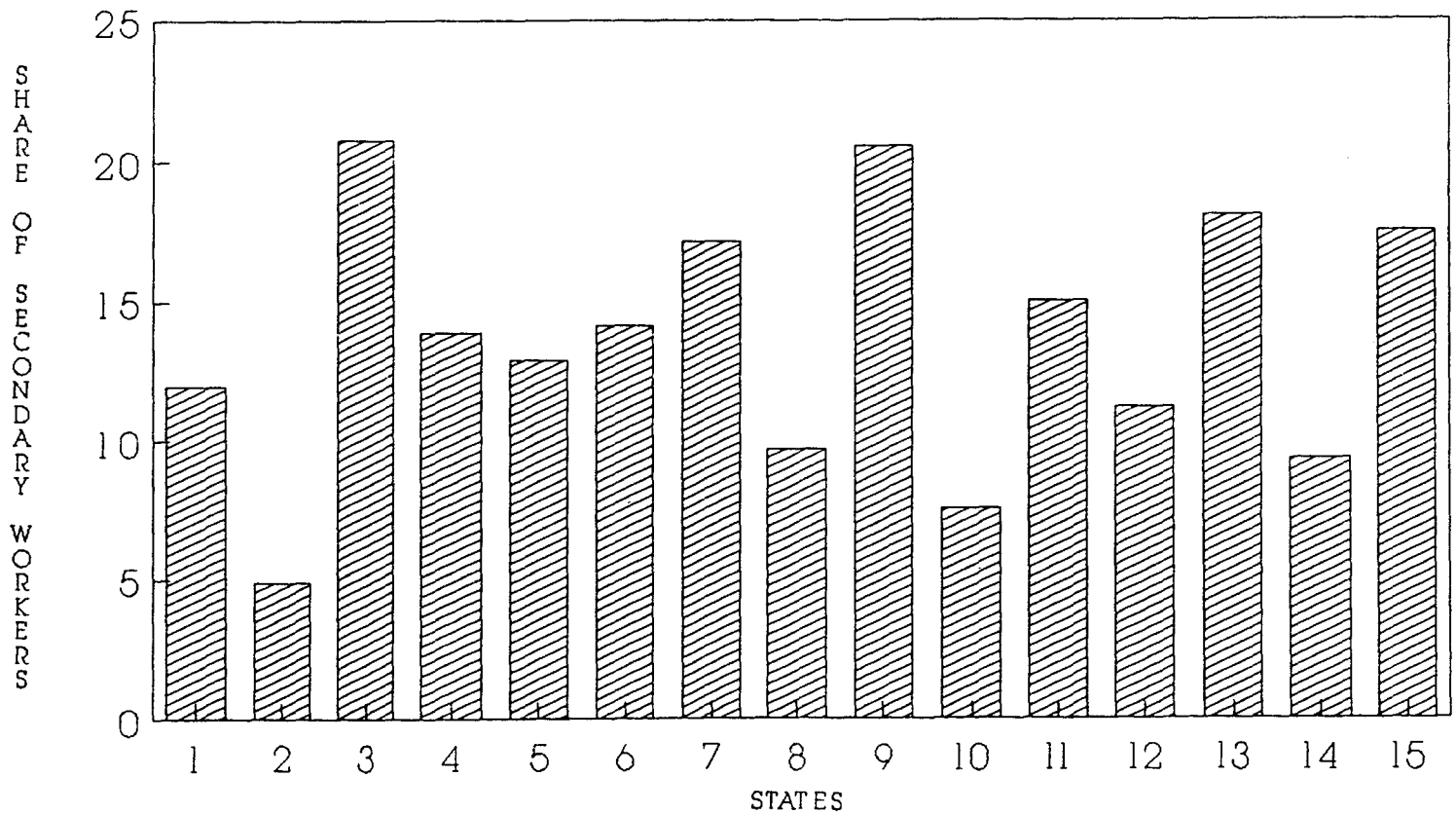
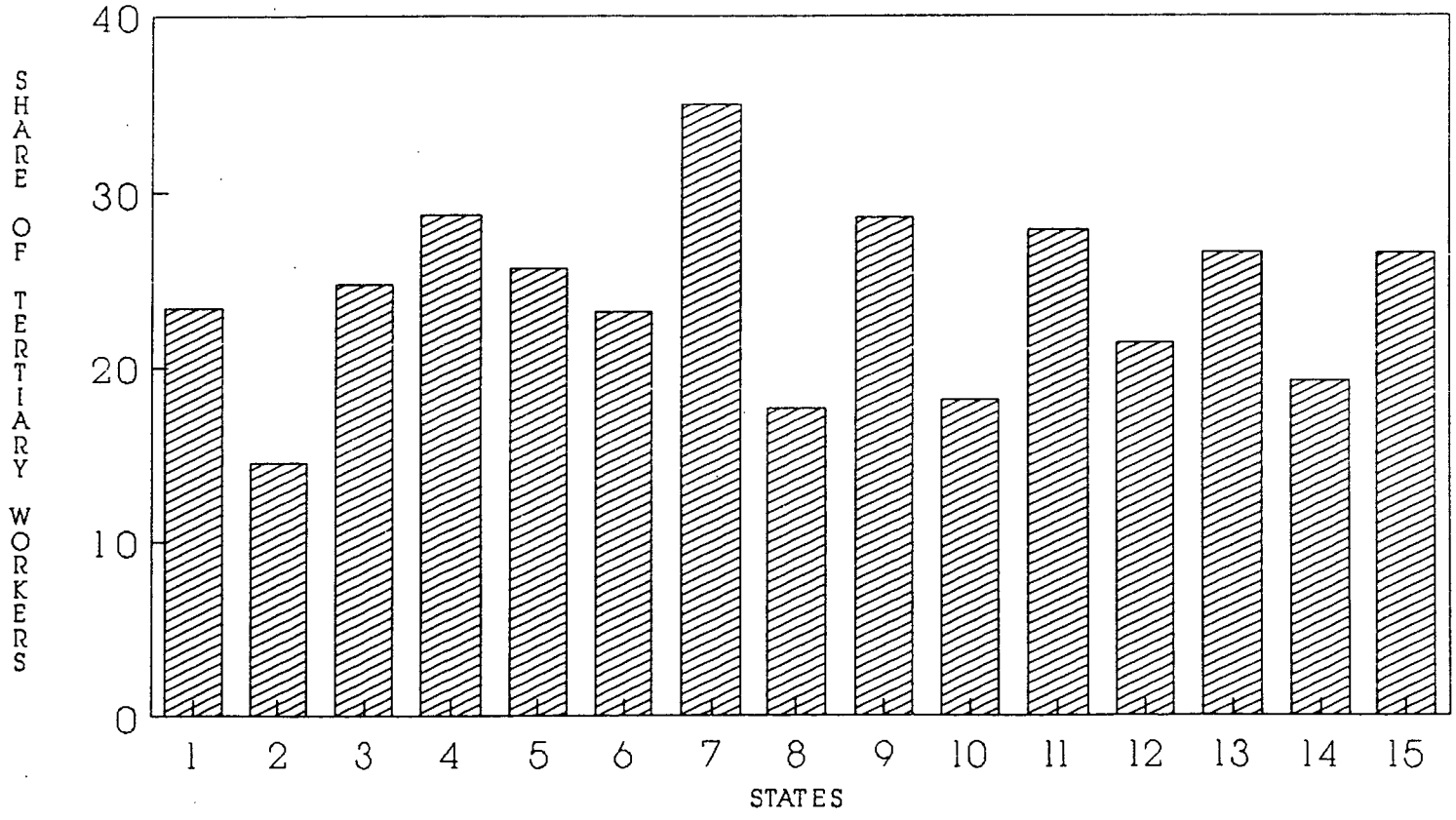
8-M.P. 9-MAHARASHTRA 10-ORISSA 11-PUNJAB 12-RAJASTHAN
13-TAMIL NADU 14-U.P. 15-WEST BENGAL

GRAPH-4.8 : SHARE OF SECONDARY WORKERS OF MAJOR STATES IN INDIA 1991



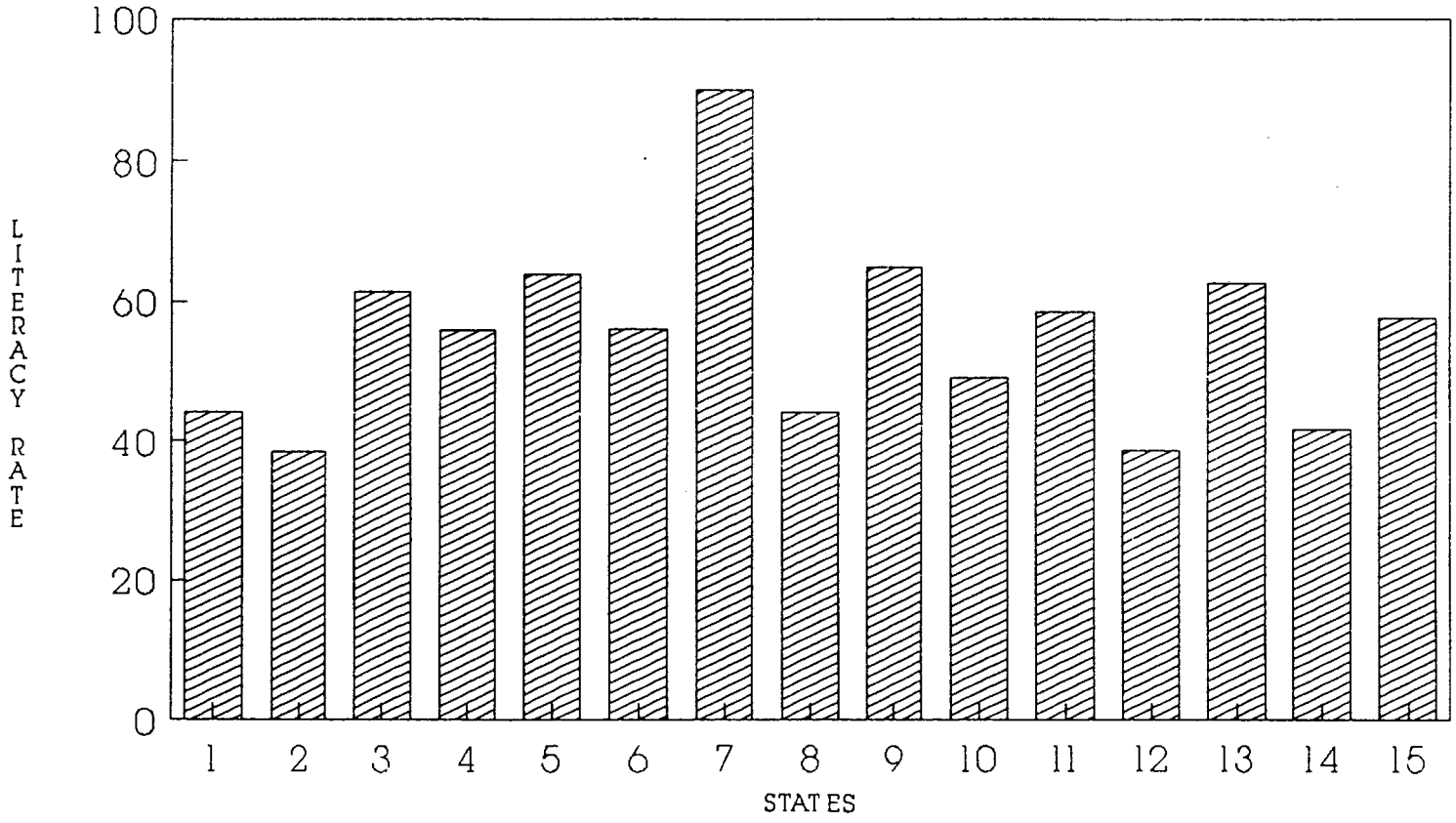
1-A.P. 2-BIHAR 3-GUJRAT 4-HARYANA 5-H.P. 6-KARNATAKA 7-KERALA
8-M.P. 9-MAHARASHTRA 10-ORISSA 11-PUNJAB 12-RAJASTHAN
13-TAMIL NADU 14-U.P. 15-WEST BENGAL

GRAPH-4.9 : SHARE OF TERTIARY WORKERS OF MAJOR STATES IN INDIA 1991



1-A.P. 2-BIHAR 3-GUJRAT 4-HARYANA 5-H.P. 6-KARNATAKA 7-KERALA
8-M.P. 9-MAHARASHTRA 10-ORISSA 11-PUNJAB 12-RAJASTHAN
13-TAMIL NADU 14-U.P. 15-WEST BENGAL

GRAPH-4.10 : LITERACY RATE OF MAJOR STATES IN INDIA 1991



1-A.P. 2-BIHAR 3-GUJRAT 4-HARYANA 5-H.P. 6-KARNATAKA 7-KERALA
8-M.P. 9-MAHARASHTRA 10-ORISSA 11-PUNJAB 12-RAJASTHAN
13-TAMIL NADU 14-U.P. 15-WEST BENGAL

Uttar Pradesh has the highest share of primary workers. With 71.47 percent workers engaged in agriculture sector and very low share of secondary (9.34%) and tertiary (19.19%) workers shows that Uttar Pradesh has an agrarian economy dominated by agriculture with nearly 80 percent of the population living in rural areas. The developed states like Punjab, Haryana, Gujarat and Maharashtra have low share of primary workers and higher share of secondary and tertiary workers. In 1991, India's literacy rate was 52.11 percent many states have improved their literacy rate upto a satisfactory level in last twenty years. But Uttar Pradesh, with literacy rate of 41.60 lies with the most illiterate states like Rajasthan and Bihar. The food production (Qntl/GCA) in Uttar Pradesh was 10.31 Qntl/GCA in 1981 which shows a good position but certainly not very good because with such a huge population and high growth rate of population, the food productivity should be much more than this level. India's per capita NDP (Rs.) in 1981 was Rs. 692. Uttar PRadesh with per capita NDP of Rs. 519 is amongst the most poor states like Bihar (Rs. 425), Madhya Pradesh (504 Rs.), Orissa (Rs. 529) and Rajasthan (Rs. 541) against the developed states like Punjab (Rs. 1374), Haryana (Rs. 1058), Maharashtra (Rs. 964) and Gujarat (Rs. 905). The manufacturing labour productivity of Uttar Pradesh is also very low (Rs. 2120) in comparison of other states and is also lower than the nation average.

Therefore, Uttar Pradesh, with high dependency on agriculture, lower share of secondary and tertiary workers, very low literacy rate, low per capital NDP and with low manufacturing labour

productivity; lies in most backward states of India. This demographic and economic backwardness prompted me to select Uttar Pradesh as my study area.

IV. 3 : Regional Demographic and Economic Pattern

Table - 4.3 and 4.4 comprises mean, S.D. and coefficient of variation of the population and economic variables for the year 1981 and 1991. Coefficient of variation shows the disparity among the districts. Higher the coeff. of variation for any variable, higher is the disparity among districts for that particular variable. This aspect of regional disparity alongwith the changes in disparity over the period from 1981 to 1991, are explained separately for population and economic variables.

Regional Demographic Pattern

The coeff. of variation for population growth rate is not-very high but it is significant for urban population growth rate. The coeff. of variation for urban population growth rate is 48.04 and 37.49 in 1981 and 1991 respectively. This shows that urban population growth rate significantly differ in different districts and a reduction in coeff. of variation from 1981 to 1991 shows the reduction in disparity. Though over all, the coeff. of variation for dependency ratio is not very high but it is minimum for urban dependency ratio which shows the similarity in dependency ratio in urban areas of different districts. But coeff. of variation for density is high and has increased from 1981 (48.16) to 1991 (62.16). The increase in coeff. of variation shows the increase in disparity. The coeff. of variation for share of urban

population is 68.74 in 1981 and 76.94 in 1991 which shows a high degree of variation among distric

Table - 4.3: Regional Demographic Pattern of UP,1991

Variables	Mean		S.D.		Coeff. of var.	
	1981	1991	1981	1991	1981	1991
PGRT	25.71	25.04	5.19	5.89	20.20	23.52
PGRR	19.69	22.05	5.90	5.42	25.97	24.59
PGRU	82.13	39.12	39.46	14.67	48.04	37.49
ORT	230.75	230.06	49.55	38.72	21.47	16.83
DRR	225.55	222.27	50.06	38.51	22.19	17.32
DRU	264.23	269.13	36.50	39.13	13.81	14.53
DT	417.61	546.95	201.12	340.01	48.16	62.16
DR	330.11	422.25	158.25	190.77	47.94	45.17
DU	4208.80	5595.95	2094.99	2916.25	49.77	52.11
SHOUP	17.36	18.78	11.94	14.45	68.74	76.94

Table - 4.4 : Regional Economic Pattern of UP, 1991

Variables	Mean		S.D.		Coeff. of Var.	
	1981	1991	1981	1991	1981	1991
PCNOAAMS	651.74	678.19	190.05	232.18	25.16	34.23
PCNOFLS	59.51	19.28	183.77	49.21	308.81	255.24
PCNOMS	135.51	234.60	158.74	341.39	117.14	145.82
CI	145.24	148.99	14.85	15.81	10.22	10.61
WFPRT	30.47	30.80	4.84	4.28	15.91	13.30
WFPRM	45.54	40.20	7.31	3.65	14.76	7.43
WFPRF	7.80	9.64	10.83	10.10	138.84	104.79
WFPRR	31.01	31.53	5.02	4.39	16.21	13.92
WFPRU	27.80	27.22	3.49	3.16	12.57	11.60
SSWT	9.43	8.61	5.26	6.13	55.83	71.26
SSWM	9.89	9.02	5.32	6.26	53.81	69.26
SSWF	12.92	9.23	11.79	9.05	91.24	98.08
SSWR	5.89	5.32	9.61	3.75	61.40	71.32
SSWU	27.69	22.63	7.16	9.81	25.87	43.35
STWT	16.02	18.31	11.03	9.39	68.87	51.29
STWM	17.30	20.27	11.31	10.27	65.41	50.67
STWF	18.63	15.60	16.09	14.43	86.37	92.81
STWR	7.91	32.18	3.51	174.64	44.35	542.66
STWU	51.93	56.31	10.39	10.56	20.01	18.76
LRT	28.07	42.94	7.85	10.63	27.99	24.76
LRM	40.14	57.11	9.41	11.90	23.46	20.85
LRF	14.66	26.86	7.16	11.60	48.84	43.18
LRR	24.19	38.26	6.62	10.07	27.37	26.34
LRU	46.58	61.49	10.32	9.98	22.15	16.23
PEVTIV	89.77	75.11	18.44	18.48	46.35	24.60
NWFPLP	4.42	5.93	6.10	8.73	137.98	147.18
NSPLP	129.66	114.90	66.23	69.60	51.08	58.70
NBPLPAHS'	54.95	54.26	44.26	42.66	80.85	78.61
SRPLP	62.13	70.18	57.26	59.94	92.17	85.40

3:2 Regional Economic Pattern

The coeff. of variation for per capita net output from forestry and logging sector is 308.81 in 1981 and 255.24 in 1991. which shows a high degree of disparity among districts in per capita net output from forestry and logging sector and a reduction in coeff. of variation from 1981 to 1991 shows the reduction in disparity over time. This seems to be true because the forestry

and logging sector has developed in limited areas where the climatic conditions are favourable. Per capita net output from manufacturing sector has also high coeff. of variation which is 117.14 in 1981 and 145.52 in 1992. But for the cropping intensity, the coeff. of variation is very low in both 1981 (10.22) and 1991 (10.61) which shows nearly no disparity or very less disparity among the districts. Therefore, the pattern of cropping intensity in all over Uttar Pradesh is nearly same.

High degree of disparity is found in female work force participation rate for which the coefficient of variation is 138.84 in 1981 and 104.79 in 1991. This may be due to the fact that factors affecting the female participation are different in different districts. The coefficient of variation for share of secondary workers and share of tertiary workers is moderate in both 1981 and 1991. But the female share of secondary workers and female share of tertiary workers is moderately higher than male, rural, urban and total share of secondary and tertiary workers respectively.

Again regarding the literacy rate, female literacy rate has maximum coeff. of variation in both 1981 (48.84) and 1991 (43.18) which shows the high disparity in female literacy rate among districts. Percent electrified villages to total inhabited villages has the coeff. of variation 46.35 in 1981 and 24.60 in 1991 which shows that the variation in percent of electrified villages has come down from 1981 to 1991. The coeff. of variation for number of working factories per lakh of population is very high both in 1981 (137.98) and 1991 (147.18) which shows that dispari-

ty among districts for this variable is high and has increased from 1981 to 1991. Number of schools per lakh of population, Number of beds per lakh of population in allopathic health services and Surfaced road per lakh of population have also moderate coeff. of variation in both 1981 and 1991 which shows disparity upto some extent, showing a marginal decline over time.

3.3 Economic Spatial Distribution by Using Principal Components

The factor loadings (i.e. first principal component and second principal component) are the coefficients of correlation of a component with each of the given variables, which are given in the table - 4.5 for both 1981 and 1991. The factor loadings of first principal component of 1981 show that it has a significant positive correlation with WFPRU, SSWM, STWM, STWR, STWU, LRT, LRM, LRF, LRR, LRU, NSPLP, NBPLPAHS and SRPLP. Again the factor loadings of first principal component of 1991 show that it has a significant positive correlation with PCNOFLS, WFPRF, WFPRU, STWT, STWM, LRT, LRM, LRF, LRR, LRU, NSPLP, NBPLPAHS and SRPLP. As these variables are almost same in both 1981 and 1991, and can be considered as the consequence of the urbanisation and so this factor may be considered as "Index of Urbanisation".

The second principal component of 1981 has positive significant correlation with PCNOMS, SSWT, SSWM, STWF and NWFPLP. And again the second principal component of 1991 is positively and significantly correlated with SSWT, SSWM, SSWF, SSWR, STWT, STWF and NWFPLP. As these variables are almost same in both 1981 and 1991 and can be considered as the consequence of the industrialization and so this factor may be called as "Index of Industrial Development.

Table - 4.5 : Factor Loadings

Variables	Factor 1		Factor 2	
	1981	1991	1981	1991
PVNOAAHS	.06957	-.16946	-.13782	.11295
PCNOFLS	.27621	.62651*	-.31949	-.43894
PCNOMS	.41310	.36983	.66386*	.38976
CI	.36865	.11911	.00111	.12032
WFPRT	.40580	.41172	-.74567	-.76423
WFPRM	-.21472	-.56764	-.02447	-.08872
WFPRF	.57327	.62070*	-.73451	-.68678
WFPRR	.42865	.45189	-.72587	-.70997
WFPRU	.61481*	.64004*	-.58439	-.46712
SSWT	.45820	.34460	.79015*	.83942*
SSWM	.63134*	.46263	.61750*	.77282*
SSWF	-.14636	-.10110	.59548	.62999*
SSWR	.44619	.30756	.58634	.66252*
SSWU	.04462	.10307	.47835	.58252
STWT	.46295	.63778*	.52748	.62658*
STWM	.62266*	.86359*	.33547	.34476
STWF	.01405	.09440	.67578*	.72768*
STWR	.80669*	.04688	.30674	.10465
STWU	.63454*	.53367	-.14047	-.10092
LRT	.87507*	.89173*	.20229	.24639
LRM	.88497*	.90594*	.00527	.07205
LRF	.78264*	.73457	.36024	.32194
LRR	.77373*	.83290*	.04729	.05184
LRU	.79896*	.81427*	-.37637	-.29472
PRVTIV	.04298	.25268	.50776	.50364
NWFPLP	.42115	.27956	.72264*	.66982
NSPLP	.66422*	.73070*	-.69266	-.59174
NBPLPAHS	.79982*	.80817*	.02830	.12314
SRPLP	.66878*	.74442*	-.66265	-.55144

* Significant at 1% level of significance.

Table - 4.6 : Scores of Principal Components - 1981

	Districts	First Principal component	Second Principal component
1.	Uttarkashi	4.47246	-.36789
2.	Chamoli	2.93983	.87103
3.	Tehri Garhwal	2.83088	-.43556
4.	Dehradun	.26911	2.60996
5.	Garhwal	1.25701	2.04402
6.	Pithoragarh	1.63442	1.66954
7.	Almora	1.06182	1.47408
8.	Nainital	.8442	1.20680
9.	Saharanpur	-.14765	.08686
10.	Muzaffarnagar	-.19100	.41211
11.	Bijnor	-.2096	-.14862
12.	Meerut	-.35207	.70715
13.	Ghaziabad	-.29666	.47103
14.	Bulandshahar	-.62201	.00210
15.	Moradabad	.72530	-1.78456
16.	Rampur	.03322	-2.62697
17.	Badaun	-.08369	-1.35108
18.	Bareilly	-.32118	-.99349
19.	Pillibhit	.07276	-.83365
20.	Shahjahanpur	-.09523	-.80119
21.	Aligarh	-.61008	.23555
22.	Mathura	-.50672	.44463
23.	Agra	-.56077	.32925
24.	Etah	-.53804	-.15187
25.	Manpuri	-.79876	.83023
26.	Farrukhabad	-.38755	.16327
27.	Etawah	-.96886	1.24767
28.	Kanpur	-.70677	1.47552
29.	Fatehpur	-.33378	.00270
30.	Allahabad	-.33531	.14117
31.	Jalaun	-.65540	1.38107
32.	Jhansi	-.70107	1.28710
33.	Lalitpur	.10501	-.52758
34.	Hamirpur	-.26642	.38974
35.	Banda	.09624	-.09079
36.	Kheri	.06178	-.93160
37.	Sitapur	-.09817	-.65113
38.	Hardoi	-.30800	-.58845
39.	Unnao	-.45389	-.13415
40.	Luknow	-.63752	1.18470
41.	Rat Bareli	-.21146	-.37896
42.	Bahriach	.06930	-1.47896
43.	Gonda	.05164	-1.39378
44.	Bara-Banki	.30567	-1.46003
45.	Faizabad	-.23544	-.59543
46.	Sultanpur	-.36135	-.18545

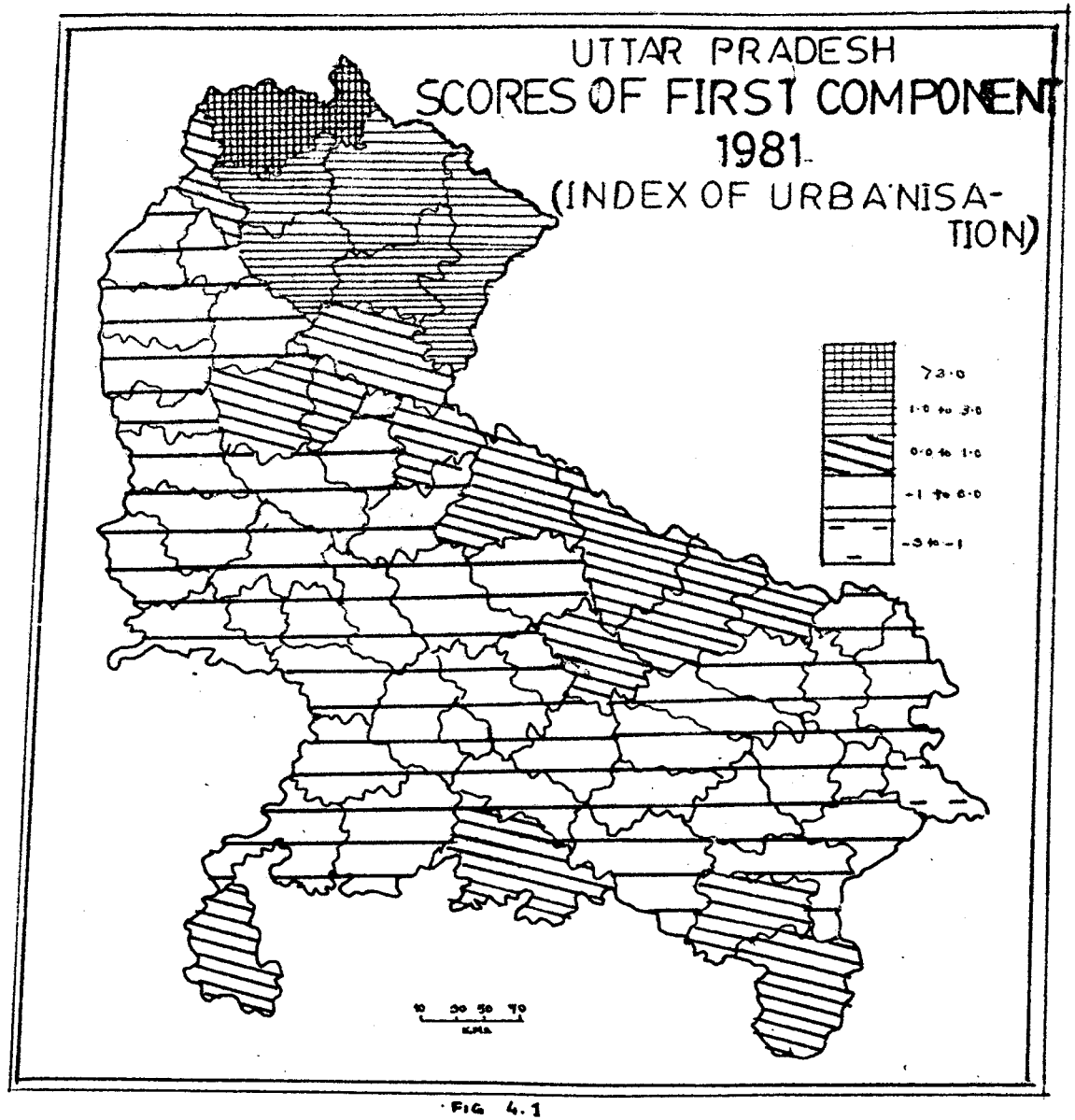

UTTAR PRADESH
SCORES OF FIRST COMPONENT
1981
(INDEX OF URBANISA-
TION)
>3·0
1·0 to 3·0
0·0 to 1·0
-1 to 0·0
-3 to -1
10 30 50 70
KMS.

FIG 4.1


UTTAR PRADESH
SCORES OF SECOND PRINCIPAL COMPONENT – 1981
(INDEX OF INDUSTRIAL DEVELOPMENT)
1·0 to 3·0
0·0 to 1·0
-1·0 to 0·0
-3·0 to -1·0
10 30 50 70
KMs

Fig 4.2

47.	Pratapgarh	-.60919	-.13425
48.	Basti	-.20492	-.78970
49.	Gorakhpur	-.56538	-.14023
50.	Deoria	-.45178	-.30474
51.	Azamgarh	-.23388	-.96876
52.	Jaunpur	-.77233	-.14097
53.	Ballia	-1.46679	.46226
54.	Ghazipur	-.87865	.18901
55.	Varanasi	-.32482	-.10003
56.	Mirzapur	.67470	-.82216

Table - 4.7 : Scores of Principal Components - 1991

	Districts	First Principal Component	Second Principal component
1.	Uttarkashi	4.32824	.34959
2.	Chamoli	2.90389	-03809
3.	Tehri Garhwal	2.47898	-1.31910
4.	Dehradun	.64796	2.92863
5.	Garhwal	1.46129	.58906
6.	Pithoragarh	2.12376	.41591
7.	Almora	2.00916	.41356
8.	Nainital	1.03953	1.00746
9.	Bijnor	-.33061	-.67645
10.	Moradabad	-.49603	-.39852
11.	Rampur	-.26982	-.33082
12.	Saharanpur	-.21656	.30878
13.	Hardwar	-.15125	.62540
14.	Muzaffarnagar	-.10413	-.41110
15.	Meerut	.01974	.74253
16.	Ghaziabad	-.25819	1.70784
17.	Bulandshahar	-.79854	-.26688
18.	Aligarh	-.70491	.08359
19.	Mathura	-.65965	-.18051
20.	Agra	-.68796	.91902
21.	Firozabad	-.55378	-.60107
22.	Etah	-.56594	-.24806
23.	Mainpuri	-.91269	.21632
24.	Budaun	-.35020	-.04953
25.	Bareilly	-.58906	1.19246
26.	Pillibhit	-.20309	-.14539
27.	Shahjehanpur	-.09164	.49688
28.	Kheri	-.08567	-.11412
29.	Sitapur	-.04333	.18124
30.	Hardoi	-.20740	-.23035
31.	Unnao	-.13167	-.39919
32.	Lucknow	-.71602	3.25671
33.	Rae Bareili	-11808	-.53066
34.	Farrukhabad	-.47993	-.58163
35.	Etawah	-.75121	.17313
36.	Kanpur Dehat	-.46155	.37759
37.	Kanpur Nagar	-.87761	3.83948
38.	Jalaun	-.29396	-.32434
39.	Jhansi	-.14355	.84995
40.	Lalitpur	.26154	-.21568
41.	Hamirpur	.29204	-.73300
42.	Banda	.56693	-.60448
43.	Fatehpur	-.25520	-.15379
44.	Pratapgarh	-.52258	-.56715
45.	Allahabad	-.20532	.52137
46.	Bahriach	.08464	-.23298
47.	Gonda	.13196	-.12928
48.	Bara Banki	.43106	-.62839

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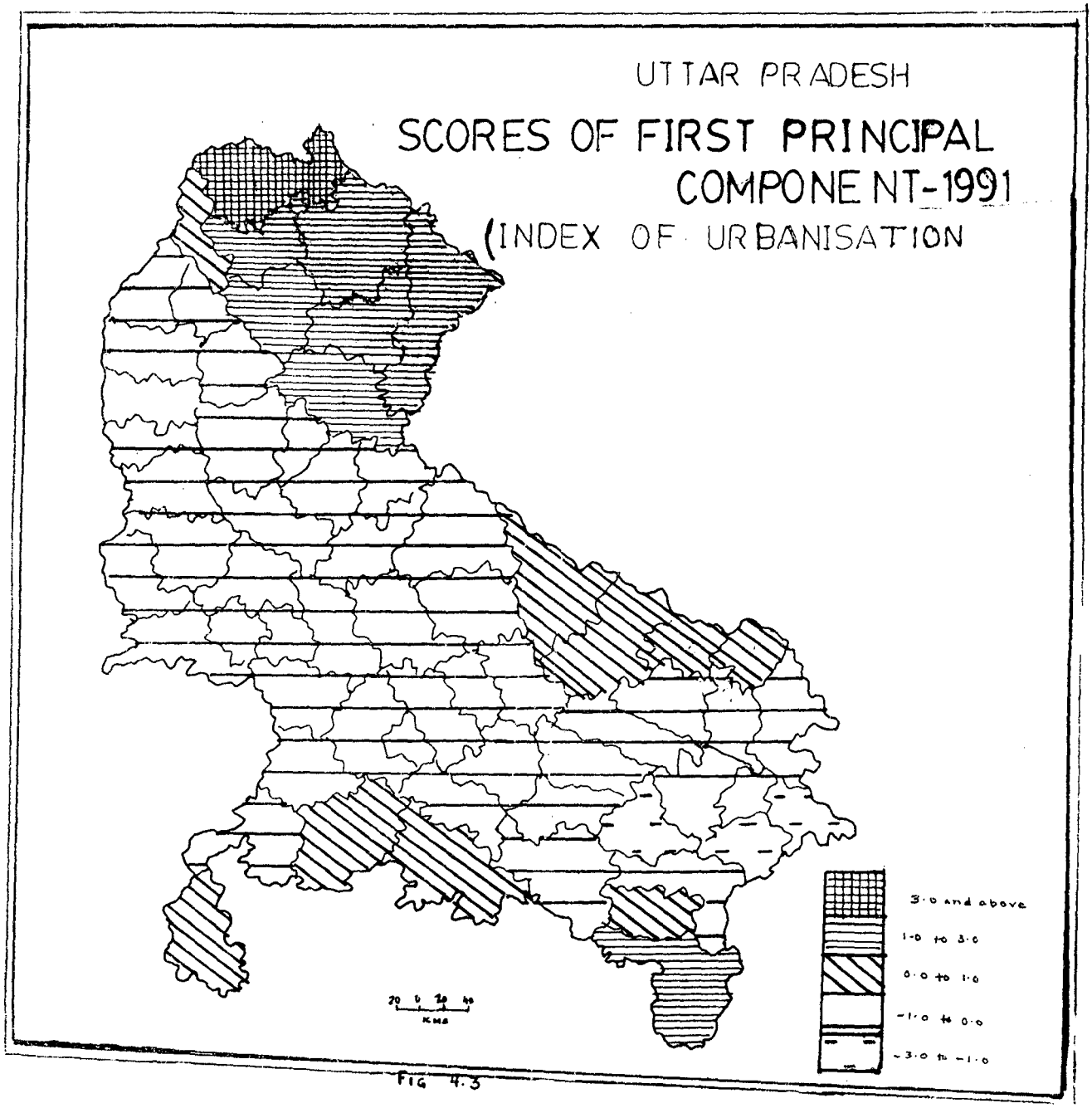
UTTAR PRADESH
SCORES OF FIRST PRINCIPAL COMPONENT-1991
(INDEX OF URBANISATION
3·0 and above
1·0 to 3·0
0·0 to 1·0
-1·0 to 0·0
-3·0 to -1·0
KMS

FIG 4.3

UTTAR PRADESH

SCORES OF SECOND PRINCIPAL COMPONENT 1991

(INDEX OF INDUSTRIALDEVELOPMENT)

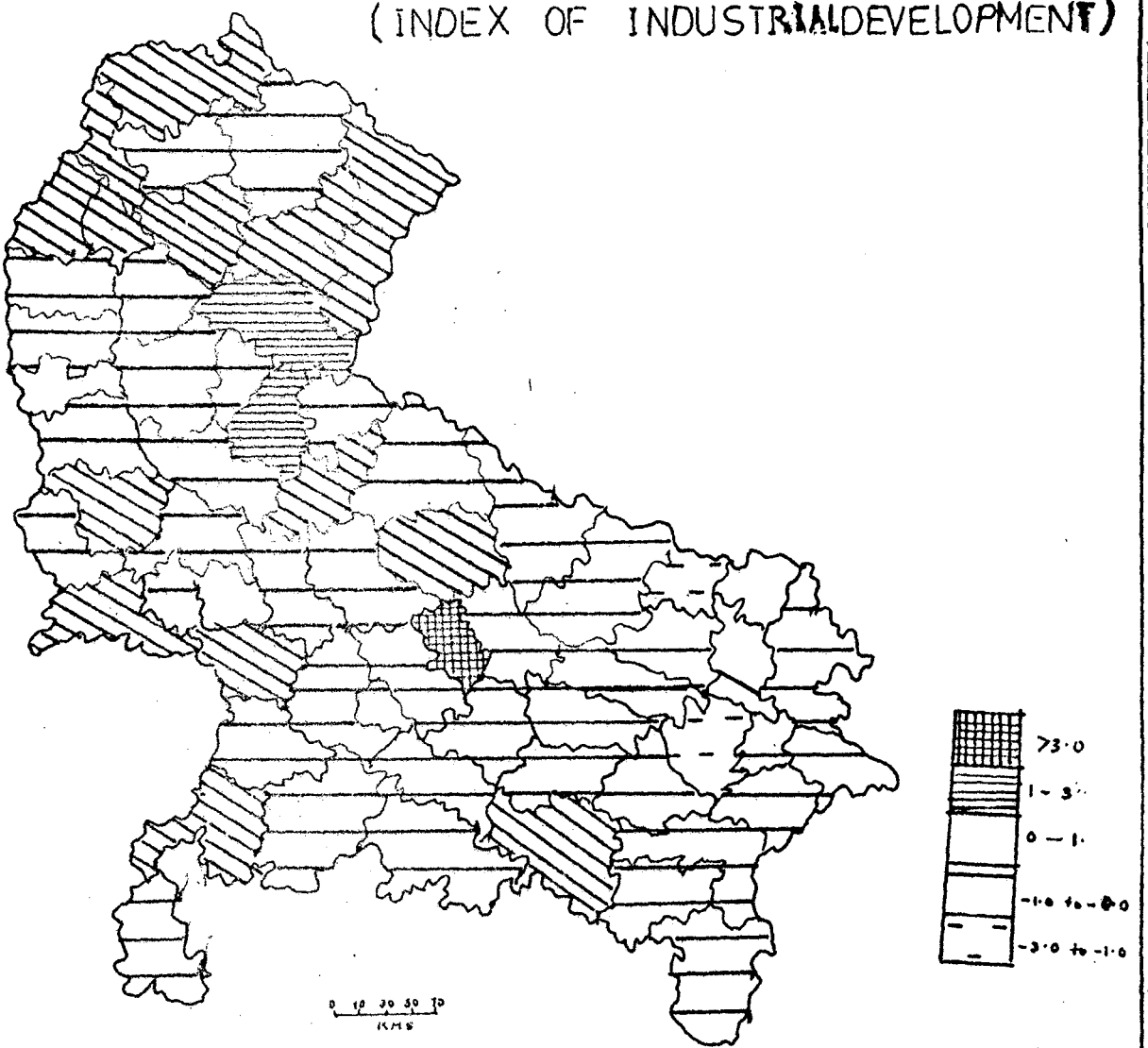

Fig. 4.4

49.	Faizabad	-.34111	-.30371
50.	Sultanpur	-.46771	-.27564
51.	Siddharth Nagar	.17080	-.150174
52.	Mahrajganj	.14720	-.42975
53.	Basti	-.38481	-.68173
54.	Gorakhpur	-.87474	.41837
55.	Deoria	-.74183	-.70363
56.	Mao	-.30431	-2.18068
57.	Azamgarh	-.83495	-1.41657
58.	Jaunpur	-1.10957	-.72980
59.	Ballia	-1.02683	-.62706
60.	Ghazipur	-1.30206	-.11755
61.	Varanasi	-.08628	-.64476
62.	Mirzapur	.43532	-.81732
63.	Son Bhadra	1.21727	-.31283

The scores of the first two principal components for 1981 and 1991, given in the table 4.6 and 4.7 ; have been plotted in the Maps - 4.1, 4.2, 4.3 and 4.4. And the economic spatial distribution has been shown in the forms of "Index of Urbanisation" as first principal component and "Index of Industrial Development" as second principal component for both 1981 and 1991. These plotted scores present true picture of regional economic variation in the forms of two important indices of development i.e. 'Index of Urbanisation' and 'Index of Industrial Development'.

CHAPTER - V

Analysis

The basic objective of this chapter is to analyse : The relationship between population and economic variables, the impact of population variables on different development variables seperately and the impact of population variables on the level of economic development (on the composite index of all the economic variables) in 1981 and 1991. Apart from identifying the dominant pattern of this interrelationship, the changes between 1981 and 1991 will also be highlighted. The variables included in this analysis are listed below:

Population Variables:

1. Population Growth Rate Total - PGRT
2. Population Growth Rate Rural - PGRR
3. Population Growth Rate Urban - PGRU
4. Dependency Ratio Total - DRT
5. Dependency Ratio Rural - DRR
6. Dependency Ratio Urban - DRU
7. Density Total - DT
8. Density Rural - DR
9. Density Urban - DU
10. Share of Urban Population - SHOUP

Economic Variables:

1. Per Capita Net Output from Agriculture and Animal Husbandry Sector - PCNOAAHS

2. Per Capita Net Output from Forestry and Logging Sector - PENOFLS

3. Per Capita Net Output from Manufacturing Sector - PCNOMS

4. Cropping Intensity - CI

5. Work Force Participation Rate Total - WFPRT

6. Work Force Participation Rate Male - WFPRM

7. Work Force Participation Rate Female - WFPRF

8. Work Force Participation Rate Rural - WFPRR

9. Work Force Participation Rate Urban - WFPRU

10. Share of Secondary Workers Total - SSWT

11. Share of Secondary Workers Male - SSWM

12. Share of Secondary Workers Female - SSWF

13. Share of Secondary Workers Rural - SSWR

14. Share of Secondary Workers Urban - SSWU

15. Share of Tertiary Workers Total - STWT

16. Share of Tertiary Workers Male - STWM

17. Share of Tertiary Workers Female - STWF

18. Share of Tertiary Workers Rural - STWR

19. Share of Tertiary Workers Urban - STWU

20. Literacy Rate Total - LRT

21. Literacy Rate Male - LRM

22. Literacy Rate Female - LRF

23. Literacy Rate Rural - LRR

24. Literacy Rate Urban - LRU

25. Percent Electrified Villages to the Total Inhabited Villages - PEVTIV

26. Number of Working Factories per Lakh of Populatioin - NWFPLP

27. Number of Schools per Lakh of Population - NSPLP

28. Number of Beds per Lakh of Population in Allopathic Health Services - NBPLPAHS

29. Surfaced Road per Lakh of Population - SRPLP

V. : Correlation Analysis

To find out the relationship between population and development variables, Karl Pearson's Cofficient of correlation has been worked out. The correlation coefficient values one given in the table 5.1. The values showing the significant correlation between any two variables (one population variable and another development variable) has given with a single star or two stors. Values with single and double stars shows the significant at 1% and 0.1% level of significance respectively. Correlation Coffi-cients are arranged for both points of time 1981 and 1991. The changes in relationships over this period have been discussed with due importance.

The correlation coefficient values given in the table 5.1 shows the relationship between each population variable on the one hand and all the development variable on the other. Different sets of variables (one population and one development variable) are correlated with different level of relationship. Only the important and significant relationships have been discussed here in detail along with the change in the nature and level of relationship from 1981 to 1991.

Table - 5.1 : Correlation

Variables	Year	PCNOAAHS	PCNOFLS	PCNOMS	CI	WFPRT
PGRT	1981	.2014	.1716	.4145**	.0540	.235
	1991	-.0185	-.1168	.4593**	.0300	-.1949
PGRR	1981	-.0315	.2095	.0851	.0698	.1839
	1991	.0517	-.0991	.0028	-.0097	-.0349
PGRU	1981	.1176	.0320	.2329	-.0248	.1796
	1991	-.1110	.0063	.3272*	.2016	.0365
DRT	1981	-.2698	-.3333*	.1919	.0860	-.8078**
	1991	.0219	-.5865**	-.0068	.777	-.9822**
DRR	1981	-.2873	-.3474	.1853	.0837	-.8016**
	1991	.0454	-.5724**	-.0283	.1372	-.9583**
DRU	1981	-.2194	-.4396**	.0044	-.3456*	-.8516**
	1991	-.0113	-.5379**	-.3736*	-.11412	-.6431**
DT	1981	-.3728*	-.2869	.3420*	.1072	-.6549**
	1991	-.1571	-.4224**	.1472	.1761	-.6159**
DR	1981	-.4997**	-.3003	.1658	.0421	-.6626**
	1991	.1910	-.5758**	-.0331	.3075*	-.7364**
DU	1981	.0836	-.1250	.1862	-.0261	-.5207**
	1991	.2335	-.3609*	.0589	.672	-.5088**
SHOUP	1981	- .326	-.0058	.6262**	-.0270	-.2770
	1991	.0697	-.0842	.3452*	-.0747	-.3287*

* Significant at 1% level of significance.

** Significant at 0.1% level of significance.

contd.....

Variables	Year	WFPRM	WFPRF	WFPRR	WFPRU	SSWT
PGRT	1981	.2475	-.1454	.1110	-.0381	.3802*
	1991	.2007	-.2723	-.1267	-.2431	.5047**
PGRR	1981	.1951	.0765	.2413	.0956	.1381
	1991	.2757	-.1386	-.0199	-.2471	.1487
PGRU	1981	-.2172	.2864	.1465	.1069	-.4412**
	1991	.0067	.0400	.0324	.0655	.1044
DRT	1981	-.2576	-.6617**	-.8082**	.6590**	.3127*
	1991	-.1896	-.8134**	-.9665**	-.7370**	.4002**
DRR	1981	-.2779	-.6363**	-.8261**	-.6387	.2874
	1991	-.2089	-.7767**	-.9826**	-.7045**	.3168*
DRU	1981	-.1422	-.8355**	-.8282**	-.9880**	.0551
	1991	.1073	-.6161**	-.6108**	-.8846**	-.1029
DT	1981	-.1305	-.5847**	-.6732**	-.5742**	.3883*
	1991	-.1905	-.4784**	-.5513**	-.4662**	.5603**
DR	1981	-.2331	-.5228**	-.6971**	-.6016**	.1800
	1991	-.1991	-.5509**	-.7578**	-.6582**	.2844
DU	1981	-.1527	-.6615**	-.4959**	-.5274**	.3814*
	1991	.2525	-.6059**	-.4358**	-.4385**	.3878**
SHOUP	1981	-.956	-.3607*	-.1972	-.1565	.7583**
	1991	-.0039	-.3447*	-.1929	-.1066	.7325**

* Significant at 1% level of significance.

** Significant at 0.1% level of significance.

contd.....

Variable	Year	SSWM	SSWF	SSWR	SSWU	STWT
PGRT	1981	.3310*	.1307	.2955	.3491*	.2759
	1991	.4745**	.1932	.4591**	.3312*	.3364*
PGRR	1981	.1558	-.1668	.1553	.2797	.0341
	1991	.1264	.0402	.2842	.1882	-.1934
PGRU	1981	-.4180**	-.2123	-.2533	-.2610	-.3396*
	1991	.1191	-.0306	.0641	.1200	.1221
DRT	1981	.1468	.3971*	.2122	.2669	.1470
	1991	.2762	.4503**	.2657	.2972*	.2781
DRR	1981	.1261	.3967*	.2181	.2725	.1002
	1991	.1938	.4534**	.2494	.2970*	.1178
DRU	1981	-.1679	.2571	-.0106	0.0257	-.0556
	1991	-.2061	.0253	-.0998	-.1131	-.1834
DT	1981	.2358	.2891	.2927	.3285*	.1830
	1991	.4882**	.2849	.2705	.3141*	.5228**
DR	1981	.0350	.1984	.1818	.3024	-.0172
	1991	.1845	.2849	.2410	.3016*	.0039
DU	1981	.2121	.5490**	.1856	.3168*	.1709
	1991	.3002*	.3555*	.1690	.1319	.3436*
SHOUP	1981	.6867**	.3717*	.4092**	.2744	.7277**
	1991	.6983**	.3692*	.3981**	.3275*	.8962**

* Significant at 1% level of significance.

** Significant at 0.1% level of significance.

contd.....

Variable	Year	STWM	STWF	STWR	STWU	LRT
PGRT	1981	.1963	.1426	.1326	-.0711	-.0506
	1991	.1469	.2921	-.0264	-0817	-.0260
PGRR	1981	.0227	-.1371	.0581	.1033	-.1306
	1991	-.2992*	-.1540	-.0581	-.2023	-.3539*
PGRU	1981	-2778	-.4372**	-.1976	-.1778	-.2238
	1991	.0984	.0496	-.0023	-.0582	.0476
DRT	1981	-.0034	.3723*	.0736	-.1351	.0099
	1991	-.0105	.4923**	.0964	-.1476	.0089
DRR	1981	-.423	.3386*	.0583	-.1600	-.0238
	1991	-.1408	.3787*	.1022	-.2095	-.0674
DRU	1981	-.2669	.2589	-.2565	-.2903	-.2959
	1991	-.4133**	.0255	.0360	-.1348	-.3542*
DT	1981	.0231	.3330*	.0140	-.2056	-.1449
	1991	.3074*	.5398**	-.0110	-.0632	.1391
DR	1981	-.1560	.1316	-.0862	-.2910	-.2839
	1991	-.1999	.1585	-.0205	.2649	-.2271
DU	1981	-.0050	.5963**	-.1782	-.1597	-.1923
	1991	.0788	.5694**	.0430	-.0315	-.1340
SHOUP	1981	.6193**	.6957**	.4428**	.1975	.5323**
	1991	.7112**	.7872**	.0515	.1643	.4604**

* Significance at 1% level of significance.

** Significance at 0.1% level of significance.

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Variable	Year	LRM	LRF	LRR	LRU	PEVITV
PGRT	1981	-.1554	.0573	-.1509	-.1428	.1730
	1991	-.1315	.0347	-.2035	-.0911	.2453
PGRR	1981	-.1505	-.0794	-.2155	.0792	-.267
	1991	-.3828**	-.2938*	-.3778*	-.2132	-.0488
PGRU	1981	-.0881	-.3191*	-.0011	-.0293	.0148
	1991	.0956	-.0302	.0675	.1727	.1359
DRT	1981	-.821	.1003	-.0160	-.3369*	.3032
	1991	-.1172	.1210	-.1069	.4819**	.3900**
DRR	1981	-.0913	.0445	-.0300	-.3299*	.2809
	1991	-.1569	.0296	-.1088	-.5219**	.3776*
DRU	1981	-.4061**	-.1786	-.2695	-.6236**	.1805
	1991	-.4302**	-.2174	-.4245**	-.4986**	.0236
DT	1981	-.2301	-.0406	-.2282	-.4526**	.3875*
	1991	.0185	.2193	-.0686	-.1949	.2472
DR	1981	-.2991	-.2312	-.2708	-.4200**	.2176
	1991	-.2625	-.1476	-.2843	-.4577**	.2974*
DU	1981	-.3544*	-.0289	-.3060	-.5011**	.3425*
	1991	-.2631	-.0443	-.3001*	-.3755*	.0853
SHOUP	1981	.3025	.6934**	.2527	-.0120	.3534*
	1991	-.2731	.5101**	.1665	.0623	.3033*

* Significant at 1% level of significance.

** Significant at 0.1% level of significance.

contd.....

Variable	Year	NWFPLP	NSPLP	NBPLPAHS	SRPLP
PGRT	1981	.3220*	-.1874	-.1874	-.0340
	1991	.5642**	-.4558**	.0891	-.3332
PGRR	1981	.0063	-.0437	-.0437	.0925
	1991	-.0470	-.3932**	-.2671	-.2576
PGRU	1981	-.3436*	.1423	.1423	.1085
	1991	.4408**	-.0428	.0396	-.0636
DRT	1981	.2499	-.6438**	-.6438**	-.6345**
	1991	.2906	-.6834**	-.1974	-.6873**
DRR	1981	.2312	-.6363**	-.6363**	-.6447**
	1991	.2501	-.6472**	-.3521*	-.6505**
DRU	1981	.0166	-.8269**	-.8269**	-.8136**
	1991	-.3313	-.6853**	-.3569*	-.6903**
DT	1981	.3717*	-.7147**	-.7147**	-.7289**
	1991	.3759*	-5035**	.1779	-.5685**
DR	1981	.0660	-.6894**	-.6894**	-.7134**
	1991	.1240	-.6705**	-.3258*	-.7158**
DU	1981	.4209**	-.6105**	-.6105**	-.5897**
	1991	.2503	-.5370**	.0517	-.5489**
SHOUP	1981	.7439**	-.2230	-.2230	-.1698
	1991	.5202**	-.2092	.6387**	-.1843

* Significant at 1% level of significance.

** Significant at 0.1% level of significance.

Population Growth Rate and Per Capita Net Output From Manufacturing Sector:

There is positive correlation between total population growth rate and per capita net output from manufacturing sector both in 1981 (.4145) and 1991 (.4593) and the relationship is significant. Urban population growth shares the major portion of total populatiion growth for any duration of time. Higher the urban population growth rate, higher is the share of better trained, educated and efficient workers that will be available to the manufacturing sector. This may lead to the higher per capita net output from manufacturing sector. There is very weak positive correlation between rural population growth rate and per capita net output from manufacturing sector both in 1981 (.0851) and 1991 (.0028). There is again positive correlation between urban population growth rate and per capita net output from manufacturing sector both in 1981 (.2339) and 1991 (.3272) and the relationship is significant in 1991.

Population growth rate and share of secondary workers

There is strong positive correlation between population growth rate (total) and share of secondary workers (total) both in 1981 (.3802) and 1991 (.5047) and the relationship is significant. it is clear that the relationship has become stronger in 1991. There is very limited avenues in the already overburdened agricultural sector. As the population increases, people move towards secondary sector. Therefore higher the population growth rate, higher is the share of secondary workers.

Again, there is positive relationship between population growth rate (total) and share of secondary workers (male), in both 1981 (.3310) and 1991 (.4745) and the relationship is significant. The relationship between the population growth rate (total) and share of secondary workers (female) is very weak. This is due to the fact the secondary sector is dominated by the males. Therefore as the population increases, share of secondary workers (male) increases.

There is a contradictory finding regarding the relationship between population growth rate (urban) and share of Secondary workers (urban). According to the hypothesis these two should be positively related. But there is negative correlation between these two in 1981 (-.2610) and positive in 1991 (.1200). Though the relationship is not significant but it needs further study to analyse this shift in the relationship.

Population growth rate and share of tertiary workers

There is positive correlation between population growth rate (total) and share of tertiary workers (total) both in 1981 (.2759) and 1991 (.3364) and the relationship is significant in 1991. It shows that relationship between these two variables have become stronger in 1991. Higher the growth rate of population, higher is the number of workers. The increased work force look for the employment evenues. Due to low wages and hence the low standard of living, people don't want to be employed in agricultural sector. And during the period 1971 to 1991, the tertiary Sector has expanded; which in turn has attracted the

working pouplation which brought about increase in the share of tertiary workers.

There is very weak positive relationship between population growth rate (rural) and share of tertiary workers (male) in 1981 (.0227) but it has become negative and significant in 1991 (-.2992). This may be due to the fact that the tertiary sector has not expanded in the proprotion of the increase in population. HIgher is the increase in population, higher is the working population. And since tertiary sector demands for educated and skilled labour, the rural working population is, therefore, absorbed mostly in primary sector and marginally in secondary sector. Which results in the reduction of share of tertiary workers. Therefore higher the growth rate of population (rural), lower is the share of tertiary workers (male).

There is negative and significant correlation between population growth rate (urban) and share of tertiary workes (female) in 1981 (-.4372) but there is very weak and positive correlation in 1991 (.0496) between them. This shows very important shift in the relationship. This may be due to the increased female literacy and awareness among women to participate and to compete shoulder to shoulder with men. Therefore higher the population growth rate (urban), higher is the educated female workers and hence higher is the female participation in tertiary sector.

Population growth rate and Literacy rate

Overall, there is weak and negative correlatioin betwen population growth rate and Literary rate. Higher is the increase in population, higher should be increase in educational amenities

to provide education for all. But due to resource scarcity, the availability of schooling facilities could not keep pace with the high growth rate of population. Due to this, many people are deprived of basic education. Therefore higher the growth rate of population, lower is the literary rate.

But there is very strong and significant negative correlation in 1991, between population growth rate (rural) and literacy rate (total) (-.3539), literacy rate (male) (-.3828), literacy rate (female) (-.2938), literacy rate (rural) (-.3778). India lives in villages. Nearly 70 percent of the population belongs to rural areas where the schooling facilities are in it's worst condition. Many basic schools are running in the open sky and undr the trees. Higher increase in rural population will therefore cause an increase in illiterates. Therefore, higher the increase in rural populatioin, lower is the literacy rate.

Population Growth Rate and Number of Working Factories per Lakh of Population

There is strong positive correlation between population growth rate (total) and number of working factories per lakh of population in both 1981 (.3220) and 1991 (.5640) and the relationship is significant. The correlation coefficient values show that the relationship has become stronger in 1991. Higher the growth in population, higher would be the demands for consummable items. This higher demand for different goods and items would cause the increase in number of factories. Therefore higher the growth rate of population, higher is the number of fectories per lakh of population.

Population Growth Rate and Number of Schools per Lakh of Population

There is strong negative correlation between populatin growth rate (total) and number of schools per lakh of population in 1991 (-.4558). Population of utter pradesh has increased very rapidly during 1971 to 1991 but the increase in number of schools has not been that fast. Therefore with the increase in population, the proportion of schools has declined. Therefore higher the growth rate of population, lower is the number of schools per lakh of population. There is also very strong and significant negative correlation between population growth rate (rural) and number of schools per lakh of population in 1991 (-.3932).

Dependency Ratio and per Capita Net Output From Forestry and Logging Sector

There is strong negative correlation between dependency ratio (total) and per capita net output from forestry and logging sector in both 1981 (-.3333) and 1991 (-.5865) and the relationship is significant. This may be due to the fact that if dependency ratio increases, the share of working population will decrease. The decrease in the share of working population means the decrease in working force engaged in forestry and loggiing sector, and which in turn will cause the decline in production from this sector. Therefore higher the dependency ratio, lower is the per capita net output from forestry and logging sector. There is

significant negative correlatioin between dependency ratio (rural) and per capita net output from forestry and logging sector both in 1981 (-.3474) and 1991 (-.5724). Dependency ratio (urban) and per capita net output from forestry and logging sector are also negatively correlated in both 1981 (-.4396) and 1991 (-.5379).

Dependency Ratio and per Capita Net Output from Manufacutring Sector

Overall, there is very weak positive correlation between dependency ratio and per capita net output from manufacutring Sector in 1981 but there is weak and negative correlation between these two in 1991. Dependency ratio (urban) and per capita net output from manufacturing sector are negatively and significantly correlated in 1991 (-.3736). This may be due to the fact that increase in dependency ratio causes the increase in nonproductive population. This population is dependent upon the income of working population. Therefore, higher the dependency ratio, lower will be per capita net output from manufacturing sector.

Dependency Ratio and Cropping Intensity

Dependency ratio (total) and dependency ratio (rural) is positively related with cropping intensity both in 1981 and 1991 but the correlation is very weak. This may be due to the fact that increase in dependency ratio demands for more food for the large number of new entrants. High demand of food and fixed land

resources will cause multiple cropping to cope with the extra demand of food. Therefore as the dependency ratio increases cropping intensity will go up.

But there is negative correlation between dependency ratio (urban) and cropping intensity in both 1981 (-.3456) and 1991 (-1412) and the relationship is significant in 1981. Regarding India as well as Utter Pradesh, it can be stated without much ambiguity that major portion of urban population is the migrated population from rural areas. This inmigrants to urban centres are mostly working population. But this inflow of working population towards cities carry number of dependents with them which in turn causes the increases in dependency ratio. So it can be argued that as the urban dependency ratio increases, the rural dependency ratio will go down. And due to this lessening of dependency burden on rural working group, the cropping intensity will go down. Therefore, higher the dependency ratio (urban), lower is the cropping intensity.

Dependency Ratio and Work Force Participation Rate

There is strong negative correlation between dependency ratio and work force participation rate in both 1981 and 1991, for all the three categories, viz; total, rural and urban dependency ratios. And the relationship is highly significant. Dependency ratio is the ratio of youngs plus olds to the adult population. According to the definition only the adult population aged between 15-59 are considered as workers. If the dependency ratio

is high, means the share of yung plus old population i.e. non working population would be high. And hence the workforce participation rate would be low. Therefore higher the dependency ratio, lower is the workforce participation rate.

The relationship between dependency ratio (total, rural and urban) and work force participation rate (male) is also negative but not significant. But the relationship is highly significant for female work force participation rate. This difference in relationship of male and female work force participation rate to the dependency ratio may be due to the reason that bearing and rearing responsibility of children goes to females. Higher is the dependency ratio, higher will be the proportion of children in that population. This responsibility of females to look after the children hampers the participation of women in work. Therefore female workforce participation rate and dependency ratio is highly and negatively related. Dependency ratio and workforce participation rate (rural and urban) is also negatively related and the relationship is significant.

Dependency Ratio and Share of Secondary Workers

There is positive correlation between dependency ratio (total) and share of Secondary workes (total) in both 1981 (.3127) and 1991 (.4002) and the relationship is significant. High fertility is the main cause of high dependency ratio. Nearly 40% of India's population is below the age of 15 years. This population below the age of 15 years is nonporductive and a

major burden on the economy. High dependency ratio puts the pressure on population of working age-group to earn more in way to fullfill the requirements of dependents. Low wages and poor standard of living in agricultural sector is forcing the rural working group to take part in Secondary Sector which ensures the better standard of life. It makes the share of Secondary workes higher, in the total working population.

There is weak positive relationship between dependency ratio (total) and share of Secondary workers (male) but the relationship between dependency ratio (total) and share of Secondary workers (female) is positive and significant. Female work participation has been very low in secondary sector due to highly consenrative customs and traditions. But due to increased dependency burden and high cost of living, it has become envitable for women to take part in secondary sector alredy dominated by men, at large. Therefore, higher the dependency ratio, higher is the share of Secondary workers (female).

Dependency ratio (rural) and share of Secondary workers (rural) are also positively related in both 1981 and 1991 but the relationship is not significant. But there is weak negative correlation between dependency ratio (urban) and share of Secondary workers (urban). This may be due to the fact that higher the dependency ratio, lower will be the share of working poulation in urban areas. And any decrease in share of working population may cause the decrease in share of Secondary workers (urban).

Dependency Ratio and Share of Tertiary Workers

There is positive correlation between dependency ratio (total) and share of tertiary workers (total) in both 1981 (.1470) and 1991 (.2781) but the relationship is not significant. There is weak negative correlation between dependency ratio (total) and share of tertiary workers (male) in both 1981 and 1991. But there is strong positive correlation between dependency ratio (total) and share of tertiary workers (female) in both 1981 (.3723) and 1991 (.4923) and the relationship is significant. This difference in the relationship for males and females is very important and significant. Higher is the dependency ratio, higher will be economic burden on the working population to look after the dependents. Increased economic burden and higher cost of living forced women to give a thought to work participation. These pressures alongwith the increased female literacy and awareness among women must have caused the increases in female participation in tertiary sector.

There is positive and significant correlation between dependency ratio (rural) and share of tertiary workers (female) in both 1981 (.3386) and 1991 (.3787).

Dependency Ratio and Literacy Rate

There is negative relationship between dependency ratio (urban) and literacy rate (total) in both 1981 (-.2959) and 1991 (-.3542) and the relationship is significant in 1991. Dependency

ratio is also negatively related with literacy rate (male) in both 1981 (-4061) and 1991 (-.4302). There is negative correlation between dependency ratio (urban) and literacy rate (urban) in both 1981 (-.6236) and 1991 (-.4986) and the relationship is highly significant. Urban areas have witnessed rapid growth of population over the decades due to large volume of migration from rural areas for the economic pursuits. But the basic amenities e.g; schooling facilities has not increased on that pace. High growth of population in urban areas caused the increase in dependency ratio. The combination of high dependency ratio and insufficient shooling facilities brought about declining literacy rate. Theirfore higher is the dependency ratio, lower will be the literacy rate (urban).

Dependency Ratio and Percent Electrified Villages to Total Inhabited Village

Overall, there is positive correlation between dependency ratio and percent of electrified villages to total inhabited villages. Dependency ratio (rural) and percent electrified villages to total inhabited villages are positively releated in both 1981 (.2809) and 1991 (.3776) and relationship is significant in 1991.

Depdency Ratio and Number of Schools per Lakh of Population

There is negative correlation between dependency ratio and number of schools per lakh of population in both 1981 and 1991 and the relationship is highly significant. As discussed in the

earlier part of this analysis, high dependency ratio is caused by high fertility rate. And if in any population fertility is high, there would be high proportion of children aged below 15 years. It means higher is the dependency ratio, higher would be proportion of population in school going age group and higher would be the growth of population leading to large size of population. Since, number of schools are not increasing as the population growth. Therefore higher is the dependency ratio, lower will be the number of schools per lakh of population.

Dependency Ratio and Number of Beds per Lakh of Population in Allopathic Health Services

Dependency ratio (total, rural and urban) and number of beds per lakh of population in allopathic health services are negatively related in both 1981 and 1991. And the relationship is highly significant. Higher is the dependency ratio, higher would be the population growth and hence the larger will be the size of population. Since allopathic health services has not increased as the growth of population, therefore availability of allopathic health services per lakh of population will go down. So, higher is the dependency ratio, lower would be the number of beds per lakh of population in allopathic health services.

Dependency Ratio and Surfaced Road per Lakh of Population

There is negative Correlation between dependency ratio (all total, rural and urban) and surfaced road per lakh of population.

And the relationship is highly significant. Uttar Pradesh, being a backward state has not experienced much improvement and development regarding the basic amenities like transport. In U.P., population growth rate has been very high but due to shortage of resources, the construction of roads has not taken place in that pace. Therefore higher is the dependency ratio, higher would be the growth of population and lower will be surfaced road per lakh of population.

Density and per Capita Net output from Agriculture and Animal Husbandry Sector

There is negative correlation between desnity (total) and per capita net output from agriculture and animal husbandry sector in both 1981 (-.3728) and 1991 (-.1571) and the relationship is significant in 1981. Density (rural) and per capita net output from agricultural and animal husbandry are also negatively related in both 1981 (-.4997) and 1991 (-.1910) and the relationship is significant again in 1981. More than 70% of Indian population live in rural areas and are dependent on agriculture and animal husbandry for their livelihood. Increase in density means increase in population with fixed land resources. Though advancement in agricultural technology and multiple cropping has increased the agricultural production but the increase in population has been more rapid. As a result per capita net output from this sector has declined. Therefore higher is the density, lower would be per capita net output from agriculture and animal husbandry sector.

Density and per Capita Net Output from Forestry and Logging Sector

There is negative correlation between density (total) and per capita net output from forestry and logging sector in both 1981 (-.2869) and 1991 (-.4224) and the relationship is significant in 1991. It shows that the relationship has become stronger in 1991. Density (rural) and per capita net output from forestry and logging sector are also negatively related in both 1981 (-3003) and 1991 (-.5758) and the relationship is highly significant in 1991. Forestry and logging Sector is affiliated to rural people. Higher is the density, higher would be the size of population and higher would be net output from forestry and logging sector. But the increase in net output from forestry and logging sector is much slower than the increase in population. Therefore higher is the density, lower would be per capita not output from forestry and logging sector.

Density and per Capita Net Output from Manufacturing Sector

There is positive correlation between density (total) and per capita output from manufacturing sector in both 1981 (.3420) and 1991 (.1472) and the relationship is significant in 1981. Higher is the density, larger would be the population. With large population and limited land resources for cropping and also the low returns in primary sector, more people would join the manufacturing Sector. The relationship shows that the expansion and production in manufacturing sector has been faster than the

increase in population. Therefore, higher is the density, higher would be per capita net output from manufacturing sector.

Density and Cropping Intensity

There is positive correlation between density (rural) and croppiing intensity in both 1981 (.0421) and 1991 (.3075) and the relationship is significant in 1991. This is due to the fact that higher is the density (rural) higher would be burden to produce more from the fixed land resources which will lead to the multiple cropping. Therefore higher is the density (rural), higher would be the cropping intensity.

Density and Work Force Participatioin Rate

There is negative correlation betwen density (total) and work force participation rate (total) in both 1981 (-.6549) and 1991 (-.6159) and the relationship is highly significant.
There is weak negative correlation between density (total) and work force participation rate (male) in both 1981 (-.1305) and 1991 (-.1905). But there is strong negative correlation between density (total) and work force participation rate (female) in both 1981 (-.5847) and 1991 (-.4784) and the relationship is highly significant.
Density (rural) and work force perticipation rate (rural) are also negatively correlated in both 1981 (-.6971) and 1991 (-7578) and the relationship is highly significant. Again, there is negative correlation between density (urban) and work force

participation rate (urban) in both 1981 (-.5274) and 1991 (-.4385) and the relationship is significant,

Density and Share of Secondary Workers

There is positive correlation between density (total) and share of Secondary workers (total) in both 1981 (.3883) and 1991 (.5603) and the relationship is significant. Higher is the density, lower would be the land-man ratio and hence higher would be the burden on agricultural sector. Due to low returns and low standard of living, people are joining the non-agricultural sector. Therefore, higher is the density (total), higher will be the share of secondary workers (total). Density (total) is positively and significantly related to the share of secondary workers (male) in 1991 (.4882). There is also positive relationship between density (total) and share of secondary workers (urban) in both 1981 (.3285) and 1991 (.3141) and the relationship is significant.

There is stronger relationship between density (rural) and share of secondary workers (urban) than between density (urban) and share of secondary workers (urban).

Density and Share of Tertiary Workers

There is positive correlation between density (total) and share of tertiary workers (total) in both 1981 (.1830) and 1991 (.5228) and the relationship is significant in 1991. Density (urban) and share of tertiary workers (total) are also positively

and significantly correlated in 1991 (.3436). This shows that relationship between these two has become stronger in 1991. This may be due to the fact that the tertiary sector has significantly expanded from 1981 to 1991 and has absorbed more people in it during this period.

Density (total) and share of tertiary workers (male) are positively and significantly related in 1991 (.3074). But denisty (total) and share of tertiary workers (female) are positively and significantly correlated in both 1981 (.3330) and 1991 (.5398). Higher is the density, larger would be the size of working population and hence larger would be the size of female working population. The tertiary sector jobs are most favourable and suitable to educated women. Almost of the urban educated women are engaged in tertiary sector. Therefore, higher the density (total), higher is share of fertiary workers (females). It has also been shown by the relationship between density (urban) and share of fertiary workers (female) which is positive and significant in both 1981 (.5963) and 1991 (.5694).

Density and Literacy Rate

In general, there is negative relationship between density and literacy rate. Density (total) and literacy rate (urban) are negatively and significantly related in 1981 (-.4526). Density (urban) and literacy rate (urban) are also negatively and significantly related in both 1981 (-.5011) and 1991 (-.3755). Increase in density means increase in population and also increase in dependency ratio. The basic schooling facilities has not

increased at the pace of population increase. That is why a portion of total population remain deprieved of basic education. Therefore higher the density, lower is the literacy rate.

Density and Number of Working Factories per Lakh of Population

There is positive correlation between density (total) and number of working factories per lakh of population in both 1981 (.3717) and 1991 (.3759) and the relationship is significant. Density (urban) and number of working factories per lakh of population are also positively correlated in both 1981 (.4209) and 1991 (.2503) and the relationship is significant only in 1981. Since the time of independence, the main target before planners has been the industrial growth which is the only way out from agrarian economy causing the low standard of living and poverty. Almost industries have been installed in the urban centres due to the availability of infrastructure and skilled labour. Density of urban areas is generally much higher than the rural areas. Higher density i.e. larger population of urban areas is caused by the large scale rural to urban migration for the sake of jobs in industries. There-fore higher the density, higher is the number of working factories per lakh of population.

Density and Number of Schools per Lakh of Population

There is strong negative correlation between density (total) and number of schools per lakh of population in both 1981 (-.7147) and 1991 (-.5035) and the relationship is highly significant. Density (rural) and number of schools per lakh of population are negatively correlated in both 1981 (-.6894) and 1991

(-.6705) and the relationship is significant. Density (urban) and number of schools per lakh of population are also negatively and significantly related in both 1981 (-.6105) and 1991 (-.5370). This may be due to the fact that India as well as Uttar Pradesh has witnessed very rapid growth of population but slower growth of schooling facilities. As the result, number of schools per lakh of population would be much lower. Therefore higher the density i.e. higher the population, lower is the number of schools per lakh of population.

Density and Number of Beds per Lakh of Population in Allopathic Health Services

There is negative and significant correlation between density (total) and number of beds per lakh of population in allopathic health services in 1981 (-.7147). Density (rural) and number of beds per lakh of population in allopathic health services are negatively correlated in both 1981 (-.6894) and 1991 (-.3258) and the relationship is significant. Density (urban) and number of beds per lakh of population in allopathic health services are also negatively and significantly correlated in 1981 (-.6105).

Density and Surfaced Road per Lakh of Population

In general, density and surfaced road per lakh of population are negatively correlated and the relationship is highly significant. There is negative and significant relatioship between

density (total) and surfaced road per lakh of population in both 1981 (-7289) and 1991 (-.5685). Density (rural) and surfaced road per lakh of population are also negatively and significantly correlated in 1981 (-.5489).

Share of Urban Population and per Capita Net Output from Manufacturing Sector

There is strong positive correlation between share of urban population and per capita net output from manufacturing sector in both 1981 (-.6262) and 1991 (.3452) and the relationship is significant. Almost of the industries are located in urban areas. These industries creat plenty of job opportunities which in turn causes large scale rural to urban migration. Higher the number of industries, higher is the net output from manufacturing sector and also, higher would be the extent of migration causing higher share of urban population. Therefore higher is the share of urban population, higher would be per capita net output from manufacturing sector.

Share of Urban Population and Work Force Participation Rate

Overall, there is negative relationship between share of urban population and work force participation rate. Share of urban population is negatively correlated with work force participation rate (total) in both 1981 (-.2770) and 1991 (-.3287) and the relationship is significant in 1991. Share of urban populatioin and work force participation rate (feamle) are also nega-

tively and significantly correlated in both 1981 (-.3607) and 1991 (-3447). In almost all the states of India, rural work force participation rate is generally higher than that of urban. Higher is the share of urban population, lower would be the share of rural population. Since rural work force participation rate is higher than that of urban, any loss in the share of rural population will cause the decline in total work force participation rate. Therefore higher the share of urban population, lower is the work force participationrate.

Share of Urban Population and Share of Secondary Workers

There is strong positive correlation between share of urban population and share of secondary workers (total) in both 1981 (.7583) and 1991 (.7325) and the relationship is significant share of urban population and share of secondary workers (male) are positively correlated in both 1981 (.6867) and 1991 (.6968) and the relationship is highly significant. Share of urban population and share of secondary workers (female) are also positively and significantly correlated in both 1981 (.3717) and 1991 (.3692). Share of urban population and share of secondary workers (rural) are positively and significantly correlated in both 1981 (.4092) and 1991 (.3981). Share of urban population and share of secondary workers (urban) are also positively correlated in both 1981 (.2744) and 1991 (.3275) and the relationship is significant only in 1991. Secondary activites are mostly concentrated in urban centres. Higher the share of urban population,

lower is the share of rural population i.e. higher would be the share of Secondary workers and lower would be the share of primary workers. Therefore higher the share of urban population, higher is the share of secondary workers. The relationship is strongest between share of urban population and share of secondary workers (male). This may be due to the fact that rural to urban migration in India is male dominated. Therefore any increase in share of urban population will cause increase in share of secondary workers (male) than that of female.

Share of Urban Population and Share of Tertiary Workers

There is strong positive correlation between share of urban population on one hand and share of tertiary workers (total, male, female) on the other. But there is weak positive correlation between share of urban population and share of tertiary workers (urban). The correlation coefficient value between share of urban population and share of tertiary workers (total) is highly significant and positive in both 1981 (.7277) and 1991 (.8962). Share of urban population and share of tertiary workers (male) are positively and significantly correlated in both 1981 (.6193) and 1991 (.7112). Share of urban population and share of tertiary workers (female) are also positively and significantly correlated in both 1981 (.6957) and 1991 (.7872). As a well known fact, the process of urbanization has brought about expansion in tertiary sector, which is mainly concentrated in urban areas. Therefore higher the share of urban population, higher is the share of tertiary workers.

Share of Urban Population and Literacy Rate

In general, there is positive relationship between share of urban population and literacy rate. Share of urban population and literacy rate (total) are positively and significantly correlated in both 1981 (.5323) and 1991 (.4604). Share of urban population and literacy rate (female) are also positively correlated in both 1981 (.6934) and 1991 (.5101) and the relationship is significant. Process of urbanisation has brought about change in perceptions and attitutes of people. Urban people are more aware of the importance of education and have started investing Substantial share of their income on educatioin. In urban areas, therefore, literacy rate is much higher than the rural one. Therefore higher the share of urban population, higher is the literacy rate. The strong correlation between share of urban population and literacy rate (female) may also be attributed to the increased awareness about educatioin. Female literacy has been lower then male literacy since ever. Now the increased awarness and eagerness, to participate in all the fields; in women, are the main reason for increase in female literacy. And this shift is mainly due to process of urbanisation.

Share of Urban Population and Percent Electrified Villages to Total Inhabited Villages

There is positive correlation between share of urban population and percent electrified villages to total inhabited villages

in both 1981 (.3534) and 1991 (.3034) and the relationship is significant. Increase in the share of urban population will cause the decrease in share of rural population. Total number of villages will go down with the decrease in the share of rural population. Lower the number of villages, higher is the percentage of electrified villages. Therefore higher the share of urban population, higher is the percent electrified villages to total inhabited villages.

Share of Urban Population and Number of Working Factories per Lakh of Population

There is strong positive correlation between share of urban population and number of working factories per lakh of population in both 1981 (.7439) and 1991 (.5202) and the relationship is significant. Urbanisation causes and is caused by the process of industrilization. Due to heavy industrilization i.e. installation of factories at large scale in urban areas, people migrate from rural to urban areas for the economic pursuits. On the other way round, the burden of large population in urban areas causes the expansion of industrial sector. Therefore as the share of urban population increases, number of working factories per lakh of population also increases.

Share of Urban Population and Number of Beds per Lakh of Population in Allopathic Health Services

There is strong positive correlation between share of urban population and number of beds per lakh of population in allopath-

ic health services in 1991 (.6387) and the relationship is significant. Health Services are centred and have been developing mostly in urban localities due to the availability of infrastructure and skilled man power. Any increase in the urban population demands more hospital and other medical facilities. The private hospitals and health services are playing pivotal role in this field. Therefore higher the share of urban population, higher is the number of beds per lakh of population in allopathic health services.

V. 2 : Regression Analysis

Since the correlation analysis shows interesting correlation coefficients between populatioin and economic variables, it has been further studied through the multiple regression analysis taking ten population vairables as a constant set of independent variables for each of the twenty nine dependent variables. Before subjecting the data to multivariate regression analysis, the intercorrelation matrix among all the varaiables has been prepared and given in appendix - 1. A close look of appendix - I reveals that there is a considerable degree of intercorrelation among the ten independent variables. This intercorrleation is likely to create problems of multiple collinearty in multiple regression analysis which will put many constraints in the analysis. Therefore stepwise approach has been applied for the regression analysis. A stepwise regression analysis for twenty nine dependent variables for two time points will be quite unwieldy. The detail step-wise regression analysis is therefore

attempted only for those variables which have shown significantly higher values of the coefficient of determination (R-square). In the first step, ordinary twenty nine multiple regression lines were estimated for each of the dependent variable. Their value of R-square is given in the table - 5.2 for both 1981 and 1991. Now on the basis of R.square values given in the table - 5.2, all those dependent variables have been selected for step-wise regression analysis whose R-square values are .70 i.e. 70% and above. In this way, there will be different set of variables in 1981 and 1991. For step-wise regression, we have taken union of these two sets of variables. Here percent R-square value shows the variability explained in a dependent variable by the set of all ten independent variables. Therefore, all the variables, whose variation has been explained by 70% and above, in either of 1981 and 1991, are selected for the step-wise regression and are given in table 5.3.

Observing the R-square values from the Table - 5.3 for the years 1981 and 1991, a striking shift has been realised in share of tertiary workers over this period. In 1981, share of tertiary workers; total, male and female are explained by 57.82%, 53.38% and 67.17% respectively but are explained by 87.95%, 76.94% and 75.03% respectively in 1991. This shift shows the ushering of strong relationship between share of tertiary workers and population variables.

Table.5.2 Values of multiple coefficient of determination,1981-1991

Dependent Variable	R. Square (%) (1981)	R. Square (%) (1991)
PCNOAAHS	50.04	27.54
PCNOFLS	24.88	42.93
PCNOMS	70.32	42.79
CI	41.06	30.53
WFPRT	78.12	96.83
WFPRM	23.65	37.49
WFPRF	82.39	78.82
WFPRR	88.73	97.29
WFPRU	97.93	90.69
SSWT	75.26	77.15
SSWM	68.07	71.09
SSWF	48.84	48.97
SSWR	40.00	50.95
SSWU	47.64	46.40
STWT	57.82	87.95
STWM	53.38	76.94
STWF	67.17	75.03
STWR	48.05	3.87
STWU	31.20	14.97
LRU	66.09	55.83
LRM	57.18	49.07
LRF	72.95	51.53
LRR	45.35	47.06
LRU	59.67	48.21
PEVTIV	32.31	36.56
NWFPLP	75.67	74.02
NSPLP	83.12	78.11
NBPLPANHS	82.39	70.88
SRPLP	81.01	73.76

Table - 5.3: Values of multiple coefficient of determination selected for step wise regression analysis,1981-1991

Dependent Variable	R. Square (%) 1981	R. Square (%) 1991
PCNOMS	70.32	42.79
WFPRT	87.12	96.83
WFPRF	82.39	78.82
WFPRP	88.73	97.29
WFPRU	97.93	90.69
SSWT	75.26	77.15
SSWM	68.07	71.09
STWT	57.82	87.95
STWM	53.38	76.94
STWF	67.17	75.03
LRF	72.95	51.53
NWFPLP	75.67	74.02
NSPLP	83.12	78.11
NBPLPAHS	82.39	70.88
SRPLP	81.01	73.76

Step-wise Regression Analysis

For step-wise regression analysis, the value of Beta, T, $(R^2 \times 100)$, increase in $(a^2 \times 100)$ R^{-2} and F are tabulated for both 1981 and 1991, for each dependent variable taken in the step-wise regression analysis. With the tabulated values of 'increase in $(R^2 100)$', we find the percent variability explained by each inde-

pendent variable seperately out of total variability in any dependent variable. For each dependent variable, the total variation explained by all the independent variables as well as variation explained by each individual independent variable has been explained both for 1981 and 1991. For the same dependent variable, the total variability explained and the set of important independent variables explaining it; will differ for two time points. This has also been discussed in detail. T-test values showing the significance of regression coefficients are carried out 1 percent and 5 percent level of significant. F-test values are also carried at 1 percent and 5 percent level of significant. There are fifteen dependent variables out of twenty nine taken in the study which have been selected for the stepwise regression analysis. The results of these fifteen regression analyses are discussed below.

Table.5.4a: Predictor variable selected on the basis of step wise regression method with PCNONS and population variables 1981

Variables	B	T	R^2 (R x100)	Increase in R^2 (R x100)	R^{-2}	F
Step-1						
SHOUP	62.619	5.902*	31.21	-	.3808	34.832*
Step-2						
SHOUP	54.789	4.847*				
PGRT	20.043	1.773	42.61	11.40	.4045	19.679*
Step-3						
SHOUP	47.679	4.153*				
PGRT	23.279	2.102**				
DT	22.031	2.084**	47.03	4.42	.4398	15.395*
Step-4						
SHOUP	53.744	4.724*				
PGRT	28.468	2.610**				
DT	33.423	2.941**				
DU	-27.066	-2.255**	51.84	4.81	.4806	13.725*
Step-5						
SHOUP	47.222	4.003*				
PGRT	50.500	3.021*				
DT	33.065	2.964*				
DU	-27.178	-2.307**				
PGRR	-26.161	-1.76	54.52	2.68	.4997	11.987*
Step-6						
SHOUP	42.613	3.616*				
PGRT	53.971	3.285*				
DT	42.971	3.543*				
DU	-18.896	-1.532				
PGRR	-30.803	-2.040**				
DRU	-22.889	-1.856	57.50	2.98	.5230	11.051
Step-7						
SHOUP	47.383	3.726*				
PGRT	53.874	3.275*				
DT	25.689	1.215				
DU	-16.203	-1.283				
PGRR	-31.970	-2.111**				
DRU	-27.943	-2.095**				
DR	20.918	.998	58.36	0.86	.5229	9.614*

*Significant at 1%level of significance.

** Significant at 5% level of significance.

Table.5.4b: Predictor variable selected on the basis of step wise regression method with PCNOMS and population variables 1991

Variable	B	T	R^2 x100	Increase in R^2 (R x100)	R^{-2}	F
Step-1						
PGRT	45.932	4.039*	21.09	-	.1980	16.310*
Step-2						
PGRT	45.486	4.358*				
DRU	-36.804	-3.526*	34.64	13.55	.3246	15.900*
Step-3						
PGRT	65.173	5.061*				
DRU	-28.862	-2.736*				
PGRR	-32.335	-2.439**	40.62	5.98	.3760	13.457*
Step-4						
PGRT	74.129	4.611*				
DRU	-30.951	-2.867*				
PGRR	-38.317	-2.599**				
PGRU	-12.226	-.932	41.50	0.88	.3746	10.287*

Per Capita Net-Output from Manufacturing Sector

Table - 5.4a shows that in 1981, SHOUP explains the maximum proportion of variability in PCNOMS followed by PGRT, DU, DT, DRU and PGRR. The value of R^{-2} increases in step-6. Thus the relationship given in the step in the step-6 may be identified as an optimal fit. The results given in this step show that SHOUP, PGRT and DT are significant variables as their regression coefficients are significant at 1% level of significance. Another significant regression coefficient (at 5%) is that of PGRR. The value of F-ratio is also significant at 1% level of significance. But in 1991 (table - 5.4b), PGRT explains the maximum proportion of variability in PCNOMS followed by DRU, PGRR and PGRU. The value of R^{-2} increases upto step-3. Thus the relationship given in the step-3 is an optimal fit. The regression coefficient of PGRT and DRU are significant at 1% level of significance. Another significant regression coefficient (at 5%) is that of PGRR. The value of F-ratio is significant at 1% level of significance.

By comparing the 1981 and 1991 results we find that SHOUP, and density has lost their importance over this period. PGRT and DRU have become important variables in terms of explaining the variation in dependent variable.

Table.5.5a: Predictor variable selected on the basis of step wise regression method with WFPRT and population variables 1981

Variable	B	T	R^2 (R x100)	[Increase in R^{-2} (R^{-2} x100)]	R^{-2}	F
Step-1						
DRU	-85.161	-11.939*	72.52	-	.7201	142.530*
Step-2						
DRU	-57.263	-7.768*				
DRR	-43.063	-5.811*	83.28	10.76	.8265	132.037*
Step-3						
DRU	-56.872	-8.272*				
DRR	-41.071	-5.947*				
SHOUP	-15.834	-2.993*	85.74	2.46	.8491	14.223*
Step-4						
DRU	-59.690	-8.607*				
DRR	-109.893	-2.744*				
SHOUP	-21.904	-3.505*				
DRT	72.352	1.744	86.54	0.80	.8548	81.943*
Step-5						
DRU	-58.611	-8.393*				
DRR	-91.082	-2.103**				
SHOUP	-20.891	-3.317*				
DRT	53.226	1.189				
PGRR	6.305	1.124	86.87	0.33	.8556	66.187*
Step-6						
DRU	-57.064	-7508*				
DRR	-81.440	-1.727				
SHOUP	-20.892	-3.293*				
DRT	45.628	.966				
PGRR	6.783	1.186				
DR	-4.374	-.537	86.95	0.08	.8535	54.420*

Table.5.5b: Predictor variable selected on the basis of step wise regression method with WFPRT and population variables 1991

Variables	B	T	R^2 x100)	Increase in R^2 (R x100)	R^{-2}	F
Step-1						
DRT	098.218	-40.812*	96.46	-	.9640	1665.59
Step-2						
DRT	-94.760	-31.511*				
DRU	-5.578	-1.855	96.65	0.19	.9654	867.83
Step-3						
DRT	-98.316	-26.396*				
DRU	-5.079	-1.700				
DT	4.928	1.582	96.79	0.14	.9663	593.88
Step-4						
DRT	-97.932	-26.661*				
DRU	-4.391	-1.480				
DT	7.516	2.196**				
DU	-5.042	-1.702	96.94	0.15	.96736	460.44
Step-5						
DRT	-85.100	-6.319*				
DRU	4.842	-1.612				
DT	6.177	1.678				
DU	-6.018	-1.927				
DRR	-11.524	-0.990	96.99	0.05	.96735	368.43

Work Force Participation Rate (Total)

Table - 5.5a shows that DRU explains maximum proportion of variation in WFPRT followed by DRR, SHOUP and DRT in 1981. Out of nearly 87% total variability explained in WFPRT, DRU and DRR together contribute for 83% variation explained. The value of R^{-2} increases upto step - 5. Thus the relationships given in the Step-5 may be identified as an optimal fit. DRU, SHOUP and DRR are significant variables. The regression coefficients of DRU and SHOUP are significant at 1% level of significant and that of DRR at 5% level of significance. In 1991 (table - 5.5b), DRT explains maximum proportion of variation in WFPRT followed by DRU, Du and DT. But almost the variation has been explained by DRT alone. The value of R^{-2} increases upto step-4. Thus the

relationship given in this step may be identified as an optimal fit. The regression coefficients of DRT and DT are significant at 1% and 5% level of significance.

The analysis shows that, in 1981; DRU and DRR are important independent variables but in 1991 DRT is the most important variable. So dependency ratio is the sole important variable explaining the variation in WFPRT.

Table.5.6a: Predictor variable selected on the basis of step wise regression method with WFPRF and population variables 1981

Variables	B	T	R^2 x100)	Increase in R^2 (R x100)	R^{-2}	F
Step-1						
DRU	-83.551	-11.174*	69.80	-	.6924	124.854*
Step-2						
DRU	-67.305	-8.947*				
DU	-32.293	-4.293*	77.59	7.79	.7675	91.786*
Step-3						
DRU	-69.878	-9.806*				
DU	-23.135	-2.977*				
SHOUP	-19.150	-2.835*	80.59	3.00	.7947	71.996*
Step-4						
DRU	-64.802	-7.663*				
DU	-21.884	-2.739*				
SHOUP	-19.042	-2.825*				
DRR	-9.057	-1.109	81.05	0.46	.7956	54.542*
Step-5						
DRU	-65.593	-7.689*				
DU	-19.656	-2.391**				
SHOUP	-16.468	-2.222**				
DRR	-9.060	-1.106				
PGRU	6.317	.848	81.32	0.27	.7945	43.537*

Table.5.6b: Predictor variable selected on the basis of step wise regression method with WFPRF and population variables 1991

Variables	B	T	R^2 x100	Increase in R^2 (R x100)	R^{-2}	F
Step-1						
DRT	-81.344	-10.923*	66.16	-	.6561	119.307*
Step-2						
DRT	-68.051	-8.559*				
DU	-26.655	-3.353*	71.50	5.34	.7055	75.287*
Step-3						
DRT	-81.635	-9.373*				
DU	37.471	-4.528*				
DT	28.812	3.023*	75.32	3.82	.7407	60.043*
Step-4						
DRT	-82.002	-9.551*				
DU	-36.090	-4.403*				
DT	28.428	3.026*				
PGRR	-10.636	-1.660	76.44	1.12	.7482	47.061*
Step-5						
DRT	-75.738	-7.305*				
DU	-35.106	-4.262*				
DT	26.859	2.828*				
PGRR	-8.530	-1.275				
DRU	9.252	-1.075	76.91	0.47	.7488	37.980*
Step-6						
DRT	-72.241	-6.654*				
DU	-33.474	-4.001*				
DT	28.615	2.973*				
PGRR	-9.735E-03	-.100				
DRU	-14.546	-1.467				
PGRT	-10.731	-1.071	77.37	0.46	.7495	31.923*
Step-7						
DRT	-72.453	-6.637*				
DU	-31.619	-3.571*				
DT	30.895	3.012*				
PGRR	-2.879	-.283				
DRU	-15.313	-1.526				
PGRT	-8.189	-.761				
SHOUP	-6.325	-.668	77.55	0.18	.7470	27.156*

Work Force Participation Rate (Female)

In 1981 (table - 5.6a), DRU explains maximum proportion of variation in WFPRF followed by DU, SHOUP, DRR and PGRU. After studying the R^{-2} values, we find that it increases upto step-4. Thus the relationship given in step-4 may be identified as an optimal fit. The result given in this step show that regression

coefficients of DRU, Du and SHOUP are significant at 1% level of significant. But DRR is not an important variable for the relationship in this step. The value of F-ratio is significant at 1% level of significance. IN 1991 (table - 5.6b), DRT explains maximum proportion of variation in WFPRF followed by DU, DT and PGRR. The values of R^{-2} increases upto step-6. Thus the relationship given in the step-6 can be considered an optimal fit. The results given in step-6 shows that the regression coefficient of DRT, DU and DT are significant at 1% level of significant. But the other variables PGRR, DRU and PGRT are not significant. The value of F-ratio is also significant at 1% level of significance. Comparing the important set of variables of 1981 and 1991, we find that DRU is the most important for 1981 but in 1991, it is DRT which is most important. This shows that dependency ratio on overall is the most important independent variable explaining WFPRF.

Table.5.7a: Predictor variable selected on the basis of step wise regression method with WFPRR and population variables 1981

Variable	B	T	R^2 (R x100)	Increase in R^2 (R x100)	$\bar{R}^2$	F
Step-1						
DRU	-82.825	-10.861*	68.59	-	.6801	117.970*
Step-2						
DRU	-50.501	-68.802*				
DRR	-.4989	-6.721*	83.04	14.45	.8240	129.813*
Step-3						
DRU	-54.254	-7.508*				
DRR	-137.982	-3.887*				
DRT	91.495	2.532**	84.90	1.86	.8403	97.509*
Step-4						
DRU	-57.037	-8.765*				
DRR	-213.089	-5.670*				
DRT	172.548	4.431*				
SHOUP	-21.913	-3.734*	88.15	3.25	.8722	94.853
Step-5						
DRU	-56.567	-8.731*				
DRR	-192.115	-4.708*				
DRT	151.444	3.598*				
SHOUP	-230.70	-3.311*				
PGRT	7.262	1.276	88.52	0.37	.8737	77.141
Step-6						
DRU	-56.142	-8.510*				
DRR	-189.752	-4.576*				
DRT	148.954	3.482*				
HOUP	-22.039	-3.463*				
PGRT	4.391	.514				
PGRR	3.572	.454	88.57	0.05	.8717	63.298*

5.7b: Predictor variable selected on the basis of step wise regression method with WFPRR and population variables 1991

Variables	B	T	R^2 x100	Increase in R^2 (R x100)	R^{-2}	F
Step-1						
DRR	-98.259	-41.307*	96.54	-	.9640	1706.300
Step-2						
DRR	-95.679	-39.024*				
DU	-6.690	-2.729*	96.92	0.38	.9682	947.020
Step-3						
DRR	-93.139	-33.188*				
DU	-5.899	-2.407**				
DRU	-4.904	-1.766	97.08	0.16	.96935	654.689
Step-4						
DRR	-94.399	-30.695*				
DU	-7.391	-2.577**				
DRU	4.716	-1.695				
DT	3.128	1.002	97.13	0.05	.96936	491.303
Step-5						
DRR	-80.368	-7.171*				
DU	-6.141	-2.041**				
DRU	-3.619	-1.251				
DT	5.358	1.511				
DRT	-1.687	-1.301	97.21	0.08	.9697	398.079
Step-6						
DRR	-80.152	-7.135*				
DU	-5.928	-1.960				
DRU	4.534	-1.472				
DT	5.582	1.567				
DRT	-16.853	-1.297				
PGRU	2.090	-.875	97.25	0.04	.9695	330.499

Work Force Participation Rate (Rural)

In 1981 (table - 5.7a), DRU explains maximum proportion of variation in WFPRR followed by DRR, SHOUP, DRT and PGRT. The value of R^{-2} increases upto step-5. Thus the step-5 relationship is an optimal fit. The result given in this step shows that DRU, DRR, DRT and SHOUP are significant variables as the regression coefficients of these variables are significant at 1% level of significance. But the regression coefficient of PGRT is not significant. In 1991 (table - 5.7b), DRR explains maximum proportion of variation in WFPRR followed by DU, DRU, DT and DRT.

But out of nearly 37% total variation, DRD alone explains 96% variation. The value of R^{-2} increases upto step-5, thus the relationship given in the step-5 is an optimal get. The result of this step shows that DRR and DU are significant variables as their regression coefficients are significant at 1% and 5% level of significance respectively. In both 1981 and 1991, the value of F-ratio is significant at 1% level of significance.

Observing the results of 1981 and 1991, we find that again dependency ratio is the most important independent variable explaining the maximum variability in WFPRR.

Table.5.8a: Predictor variable selected on the basis of step wise regression method with WFPRU and population variables 1981

Variables	B	T	R^2 x100)	Increase in R^2 (R x100)	R^{-2}	F
Step-1						
DRU	-98.801	-47.021*	97.61	-	.9757	2211.0188
Step-2						
DRU	-98.247	-48.898*				
SHOUP	-5.213	-2.594**	97.88	0.27	.9780	1226.191*
Step-3						
DRU	-97.364	-41.599*				
SHOUP	-4.526	-2.040**				
DU	-1.901	-.745	97.90	0.02	.9778	810.778*

Table.5.8b: Predictor variable selected on the basis of step wise regression method with WFPRU and population variables 1991

Variable	B	T	R^2 x100	Increase in R^2 x100	R^{-2}	F
Step-1						
DRU	-88.455	-14.811*	78.24	-	.7788	219.371*
Step-2						
DRU	-88.763	-17.568*				
PGRT	-25.384	-5.024*	84.68	6.44	.8417	165.897*
Step-3						
DRU	-74.536	-13.704*				
PGRT	-22.184	-4.970*				
DRR	-24.451	-4.461*	88.54	3.86	.8796	152.075*
Step-4						
DRU	-80.308	-13.774*				
PGRT	-31.009	-5.356*				
DRR	-20.268	-3.618*				
PGRR	13.594	2.284**	89.49	.95	.8876	123.513*
Step-5						
DRU	-94.083	-13.759*				
PGRT	-48.003	-6.439*				
DRR	-86.704	-4.145*				
PGRR	27.931	3.972*				
DRT	78.580	3.278*	91.16	1.67	.9038	117.556*
Step-6						
DRU	-95.993	-13.852*				
PGRT	-48.632	-6.560*				
DRR	-100.938	-4.344*				
PGRR	29.075	4.136*				
DRT	99.164	3.520*				
DT	-8.296	-1.365	91.44	.28	.9052	99.763
Step-7						
DRU	-95.829	-13.811*				
PGRT	-48.694	-6.562*				
DRR	-107.275	-4.431*				
PGRR	29.572	4.191*				
DRT	106.713	3.641*				
DT	-6.730	-1.067				
DU	-5.056	-.943	91.58	.14	.9051	85.470*

Work Force Participation Rate (Urban)

In 1981 (table - 5.8a), DRU alone explains almost all the variation in WFPRU followed by SHOUP which explains only 0.27% variation. The percent variation explained by DRU in WFRU is very high (97.61%). The value of R^{-2} increases upto step-2. Thus the relationship given in the step-2 can be considered as an optimal fit. The results in step-2 shows that regression coeffi-

cients of DRU and SHOUP are significant at 1% and 5% level of significance. The value of F-ratio is also significant at 1% level of significance. In 1991 (table - 5.8b), DRU explains maximum proportion of variation in WFPRU followed by PGRT, DRR, DRT, PGRR and DT. The value of R^{-2} increases upto step-6. Thus the relationship given in step-6 may be identified as an optimal fit. The result in this step shows that DRU, PGRT, DRR, PGRR and DRT are significant variables as their regression coefficients are significant at 1% level of significance. The value of F-ratio is also significant at 1% level of significance.

Thus we find that DRU remains the most important variable explaining the variation in WFPRU. But the explaining power of DRU declined in 1991 and other variables like PGRT, DRR and DRT got some importance in 1991.

Table.5.9a: Predictor variable selected on the basis of step wise regression method with SSWT and population variables 1981

Variables	B	T	R^2 (R x100)	Increase in R^2 (R x100)	R^{-2}	F
Step-1						
SHOUP	75.834	8.549*	57.50	-	.5672	73.082*
Step-2						
SHOUP	76.424	8.974*				
DR	20.226	2.375**	61.59	4.09	.6014	42.501*
Step-3						
SHOUP	79.525	9.617*				
DR	35.705	3.419*				
DRU	-24.955	-2.377**	65.35	4.76	.6336	32.703*
Step-4						
SHOUP	77.020	9.302*				
DR	25.288	2.093**				
DRU	-31.504	-2.844*				
DRR	20.434	1.641	67.09	1.74	.6451	25.999*
Step-5						
SHOUP	88.396	9.407*				
DR	18.116	1.506				
DRU	-23.760	-2.126**				
DRR	164.326	2.555**				
DRT	-147.191	-2.278**	70.18	3.09	.6720	23.544*
Step-6						
SHOUP	84.351	9.515*				
DR	15.569	1.384				
DRU	-21.281	-2.036**				
DRR	241.662	3.690*				
DRT	-223.771	-3.408*				
PGRT	25.117	2.929*	74.63	4.45	.7152	24.023*
Step-7						
SHOUP	79.473	7.983*				
DR	17.413	1.533				
DRU	-21.711	-2.079**				
DRR	238.968	3.652*				
DRT	-22.425	-3.392*				
PGRT	25.886	3.012*				
PGRU	-9.163	-1.071	75.22	0.59	.7160	20.817*

Table.5.9b: Predictor variable selected on the basis of step wise regression method with SSWT and population variables 1991

Variable	B	T	R^2 x100	Increase in R^2 x100	R^{-2}	F
Step-1						
SHOUP	73.253	8.404*	53.66	-	.5290	70.635*
Step-2						
SHOUP	71.758	8.704*				
DR	23.964	2.907*	59.38	6.72	.5802	43.855*
Step-3						
SHOUP	70.894	9.673*				
DR	44.843	5.034*				
DRU	-36.632	-4.120*	68.45	9.07	.6685	42.677*
Step-4						
SHOUP	72.163	10.586*				
DR	44.732	5.408*				
DRU	-41.973	-4.985*				
PGRR	22.620	3.230*	73.26	4.81	.7142	39.736*
Step-5						
SHOUP	69.124	10.351*				
DR	27.469	2.556**				
DUR	-48.344	-5.671*				
PGRR	25.809	3.759*				
DRR	26.645	2.390**	75.70	2.44	.7356	35.512*
Step-6						
SHOUP	83.782	7.137*				
DR	49.825	2.735*				
DRU	-49.025	-5.807*				
PGRR	24.339	3.549*				
DRR	21.506	1.864				
DT	-25.645	-1.510	76.65	0.95	.7414	30.639*
Step-7						
SHOUP	89.806	6.808*				
DR	54.037	2.891*				
DRU	-52.838	-5.704*				
PGRR	31.655	3.158*				
DRR	21.917	1.898				
DT	-27.964	-1.632				
PGRT	-10.939	-1.001	77.06	0.41	.7415	26.406*
Step-8						
SHOUP	90.671	6.758*				
DR	52.978	2.788*				
DRU	-51.683	-5.351*				
PGRR	31.650	3.135*				
DRR	22.399	1.918				
DT	-25.893	-1.452				
PGRT	-10.515	-.952				
DU	-4.207	-.463	77.15	0.09	.7377	22.802*

Share of Secondary Workers (Total)

In 1981 (table - 5.9a), share of urban population (SHOUP) explains maximum proportion of variation in SSWT followed by DRU, PGRT, DR and DRT. The value of R^{-2} increases upto step-6. Thus step-6 may be identified as a step with optimal fit relationship. The results in step-6 shows that SHOUP, DRR, DRT and PGRT are significant variables as their regression coefficients are significant at 1% level of significance. The regression coefficient of DRU is significant at 5% level of significance. The value of F-ratio is also significant at 1% level of significance. In 1991 (table - 5.9b), again SHOUP explains maximum proportion of variation in SSWT followed by DRU, DR, PGRR and DRR. The value of R^{-2} declines after step-7. Thus the relationship given in step-7 may be identified as an optimal fit. The results in this step shows that SHOUP, DR, DRU and PGRR are significant variables as their regression coefficients are significant at 1% level of significance. Other variable in this step like DRR, DT and PGRT are not significant. The value of F-ratio is also significant at 1% level of significance.

Thus we find that important explanatory variables are more or less same in both 1981 and 1991. Share of urban population, dependency ratio and population growth rate are the important independent variables deciding the dependent variable.

Table.5.10a: Predictor variable selected on the basis of step wise regression method with SSWM and population variables 1981

Variables	B	T	R^2 (R x100)	Increase in R^2 (R x100)	R^{-2}	F
Step-1						
SHOUP	68.672	6.942*	47.15	-	.4618	48.191*
Step-2						
SHOUP	71.259	7.526*				
DRU	-24.355	-2.572**	53.03	5.88	.5125	29.910*
Step-3						
SHOUP	74.487	8.380*				
DRU	-45.495	-4.031*				
DR	33.726	3.004*	59.96	6.93	.5766	25.966*
Step-4						
SHOUP	72.195	8.053*				
DRU	-51.486	-4.293*				
DR	24.196	1.850				
DRR	18.694	1.387	61.42	1.46	.5839	20.301*
Step-5						
SHOUP	82.441	7.976*				
DRU	-44.512	-3.620*				
DR	17.732	1.340				
DRR	148.293	2.097**				
DRT	-132.571	-11.865	63.93	2.51	.6032	17.725*
Step-6						
SHOUP	85.364	8.432*				
DRU	-39.937	-3.292*				
DR	13.608	1.047				
DRR	211.683	2.812*				
DRT	-194.941	-2.586**				
PGRR	18.648	2.044**	66.76	2.83	.6269	16.405*
Step-7						
SHOUP	82.306	7.551*				
DRU	-40.733	-3.333*				
DR	14.186	1.086				
DRR	220.124	2.883*				
DRT	-203.467	-2.660**				
PGRR	10.827	.795				
PGRT	11.375	.777	67.17	0.41	.6239	14.034*

Table.5.10b: Predictor variable selected on the basis of step wise regression method with SSWM and population variables 1991

Variable	B	T	R^2 x100	Increase in R^2 x100	R^{-2}	F
Step-1						
SHOUP	69.828	7.619*	48.75	-	.4791	58.046*
Step-2						
SHOUP	70.08	7.949*				
DRU	-21.45	-2.433**	53.36	4.61	.5180	34.323*
Step-3						
SHOUP	67.917	8.627*				
DRU	-43.595	-4.565*				
DR	38.996	4.075*	63.60	10.24	.617534	.371*
Step-4						
SHOUP	69.191	9.343*				
DRU	-48.954	-5.352*				
DR	38.885	4.327*				
PGRR	22.696	2.984*	68.44	4.84	.6627	31.456*
Step-5						
SHOUP	84.062	6.750*				
DRU	-50.972	-5.566*				
DR	58.991	3.628*				
PGRR	21.793	2.884*				
DT	-27.101	-1.477**	69.61	1.17	.6694	26.114*
Step-6						
SHOUP	79.516	5.989*				
DRU	-53.642	-5.618*				
DR	46.472	2.255**				
PGRR	23.524	3.033*				
DT	-21.500	-1.120				
DRR	12.910	.989	-70.13	0.52	.6693	21.917*

Share of Secondary Workers (Male)

In 1981 (table - 5.10a), SHOUP explains maximum proportion of variation in SSWM followed by DR, DRU, PGRR, DRT and DRR. The value of R^{-2} increases upto step-6. Thus step-6 may be identified as a step with optimal fit relationship. The result of this step shows that regression coefficients of SHOUP, DRU and DRR are significant at 1% level of significance. The regression coefficient of DRT and PGRR are significant at 5% level of significance. Despite explaining 6.93% variation, DR is not significant.

The value of F-ratio is also significant at 1% level of

significance. In 1991 (table - 5.10b), again share of urban population (SHOUP) explains maximum proportion of variation in SSWM followed by DR, PGRR, DRu and DT. The value of P^{-2} increases upto step-5. Thus the relationship in this step is an optimal fit. The result of this step shows that regression coefficients of SHOUP, DRU, DR and PGRR are significant at 1% level of significance. Dt is also significant at 1% level of significance. Dt is also significant but at 5% level of significance. The value of F-ratio is also significant at 1% level of significance.

Thus SHOUP remains most important explanatory variable explaining the variation in SSWM. The other set of variables explaining SSWM are DR, DRU and PGRR which remain same in both 1981 and 1991. Rural density is another variable playing important role in deciding SSWM.

Table.5.11a: Predictor variable selected on the basis of step wise regression method with STWT and population variables 1981.

Variables	B	T	R^2 (R x100)	Increase in R^2 (R x100)	R^{-2}	F
Step-1						
SHOUP	72.769	7.796*	52.95	-	.5208	60.778*
Step-2						
SHOUP	79.085	7.819*				
DU	-15.382	-1.521	54.92	1.97	.5321	32.284*
Step-3						
SHOUP	78.064	7.627*				
DU	-10.706	-.909				
DRU	-8.462	-.784	55.44	0.52	.5287	21.571*

Table.5.11b: Predictor variable selected on the basis of step wise regression method with STWT and population variables 1991.

Variables	B	T	R^2 x100	Increase in R^2 x100	R^{-2}	F
Step-1						
SHOUP	89.618	15.776*	80.31	-	.7999	248.871*
Step-2						
SHOUP	89.85	17.444*				
DRU	-19.41	-3.769*	84.08	3.77	.8355	158.478*
Step-3						
SHOUP	84.339	15.134*				
DRU	-29.125	-4.390*				
DRT	15.773	2.221**	85.31	1.23	.8456	114.224*
Step-4						
SHOUP	92.101	14.966*				
DRU	-25.127	-3.840*				
DRT	18.568	2.696*				
DU	-16.125	-2.529**	86.77	1.46	.8585	95.104*
Step-5						
SHOUP	91.961	15.138*				
DRU	-22.240	-3.315*				
DRT	16.487	2.382**				
DU	-15.339	-2.430**				
PGRR	-7.891	-1.592	87.33	.56	.8622	78.603*
Step-6						
SHOUP	88.812	13.681*				
DRU	-22.052	-3.308*				
DRT	12.051	1.574				
DU	17.506	-2.700*				
PGRR	-8.080	-1.640				
DT	9.906	1.3118	87.71	0.38	.8639	66.639*
Step-7						
SHOUP	83.392	8.895*				
DRU	-21.650	-3.228*				
DRT	16.625	1.739				
DU	-18.106	-2.766*				
PGRR	-7.181	-1.417				
DT	17.982	1.431				
DR	-10.491	-.804	87.85	0.14	.8631	56.850*

Share of Tertiary Workers (Total)

In 1981 (table - 5.11a), SHOUP explains maximum proportion of variation in STWT followed by DU, but most of the total variation has been explained by SHOUP itself. The value of R^{-2} increases upto step-2. Thus step-2 may be considered as the step with optimal fit relationship. The results of this step show

that only SHOUP is the significant explanatory variable as the regression coefficient of only this variable is significant (at 1% level of significance). The other variable DU is not significant. The value of F-ratio is also significant at 1% level of significance. In 1991 (table - 5.11b), again SHOUP explains maximum proportion of variation in STWT followed by DRU, DU, DRT, PGRR and DT. The value of $\bar{R}^2$ increases upto step-6. Thus the relationship in this step may be identified as an optional fit. The results of this step shows that regression coefficient of SHOUP, DRU and DU are significant at 1% level of significance. Other variables like DRT, PGRR and DT are not significant. The value of F-ratio is significant at 1% level of significance.

Comparing the results of 1981 and 1991, we find that the explanatory power of SHOUP has shot up to 80.31% in 1991 from 52.95% in 1981. And in 1991, other variable like DRU and DRT also got some explanatory power to explain STWT.

Table.5.12a: Predictor variable selected on the basis of step wise regression method with STWM and population variables 1981

Variables	B	T	R^2 (R x100)	Increase in R^2 (R x100)	R^{-2}	F
Step-1						
SHOUP	61.932	5.796*	38.35	-	.3721	33.599*
Step-2						
SHOUP	65.506	6.676*				
DRU	-33.647	-3.429*	49.54	11.19	.4764	26.026*
Step-3						
SHOUP	71.629	6.695*				
DRU	-25.770	-2.283**				
DU	-16.949	-1.377	51.32	1.78	.4851	18.276*
Step-4						
SHOUP	71.412	6.737*				
DRU	-35.908	-2.700*				
DU	-20.046	-1.618				
DRR	18.089	1.408	53.14	1.82	.4947	14.462*
Step-5						
SHOUP	74.115	5.905*				
DRU	-34.646	-2.519**				
DU	-20.084	-1.608				
DRR	48.586	.644				
DRT	-32.054	-.411	53.30	0.16	.4863	11.414*

Table.5.12b: Predictor variable selected on the basis of step wise regression method with STWM and population variables 1991

Variable	B	T	R^2 x100	Increase in R^2 x100	R^{-2}	F
Step-1						
SHOUP	71.118	7.901*	50.57	-	.4976	62.426*
Step-2						
SHOUP	71.623	9.865*				
DRU	-42.189	-5.811	68.37	17.80	.6732	64.858*
Step-3						
SHOUP	86.678	10.393*				
DRU	-32.337	-4.316*				
DU	-27.781	-3.106*	72.82	4.45	.7143	52.689*
Step-4						
SHOUP	85.252	10.591*				
DRU	-28.836	-3.919*				
DU	-26.808	-3.111*				
PGRR	-16.101	-2.387**	75.25	2.43	.7354	44.089*
Step-5						
SHOUP	79.300	8.878*				
DRU	-32.222	-4.219*				
DU	-30.779	-3.441*				
PGRR	-15.531	-2.322**				
DT	13.745	1.474	76.16	0.91	.7406	36.420*
Step-6						
SHOUP	71.655	6.319*				
DRU	-28.284	-3.353*				
DU	-31.458	-3.514*				
PGRR	-14.988	-2.238**				
DT	28.815	1.731				
DR	-15.730	-1.091	76.65	0.49	.7415	30.650*
Step-7						
SHOUP	76.255	5.933*				
DRU	31.331	-3.353*				
DU	-30.863	-3.422*				
PGRR	-9.392	-.949				
DT	26.630	1.571				
DR	-12.043	-.790				
PGRT	-8.477	-.770	76.90	0.25	.7369	26.165*

Share of Tertiary Workers (Male)

In 1981 (table - 5.12a), SHOUP explains maximum proportion of variation in STWN followed by DRU, DRR and DRU. The value of R^{-2} increases upto step-4. Thus the relationship given in Step-4 may be identified as an optimal fit. The results of this step shows that regression coefficients of SHOUP and DRU are signifi-

cant at 1% level of significance. But the other variables DU and DRR are not significant. The value of F-ratio is also significant at 1% level of significance. In 1991 (table - 5.12b) SHOUP explains maximum proportion of variation in STWM followed by DRU, DU, PGRR, DT and DR. The value of R^{-2} increases upto step-6. Thus the relationship in this step may be identified as an optimal fit. The results of this step shows that the regression coefficients of SHOUP, DRU and DU are significant at 1% level of significance. Another variable PGRR is also significant but its regression coefficient is significant at 5% level of significance. Other variables DT and DR are not significant. The value of F-ratio is also significant at 1% level of significance.

Thus the value of urban population and urban dependency ratio plays important role in explaining the share of tertiary workers (total). The set of important explanatory variables remains same in both 1981 and 1991.

Table.5.13a: Predictor variable selected on the basis of step wise regression method with STWF and population variables 1981

Variables	B	T	$(R^2 \times 100)$	Increase in $(R^2 \times 100)$	R^{-2}	F
Step-1						
SHOUP	69.568	7.117*	48.239	-	.4744	50.644*
Step-2						
SHOUP	54.226	5.692*				
DU	37.361	3.921*	60.00	11.61	.5849	39.752*
Step-3						
SHOUP	54.359	6.098*				
DU	39.620	4.379*				
PGRR	-22.335	-2.700*	64.92	4.92	.6289	32.077*
Step-4						
SHOUP	55.306	6.101*				
DU	36.163	3.531*				
PGRR	-21.139	-2.496**				
DRR	6.936	.732	65.28	0.36	.6256	23.977*

Table.5.13b: Predictor variable selected on the basis of step wise regression method with STWF and population variables 1991

Variables	B	T	R^2 x100	Increase in R^2 x100	R^{-2}	F
Step-1						
SHOUP	78.718	9.969*	61.96	-	.6134	99.378*
Step-2						
SHOUP	74.516	10.126*				
DRR	25.669	3.488*	68.37	6.41	.6732	64.869*
Step-3						
SHOUP	100.251	7.860*				
DRR	144.235	2.920*				
DRT	-126.514	-2.435**	7.24	2.87	.6978	48.725*
Step-4						
SHOUP	96.909	7.678*				
DRR	162.282	3.289*				
DRT	-151.249	-2.865*				
DU	16.870	1.868	72.87	1.63	.7100	38.956*
Step-5						
SHOUP	95.636	7.793*				
DRR	166.148	3.465*				
DRT	-155.845	-3.037*				
DU	19.661	2.217**				
PGRR	-14.280	-2.123**	74.86	1.99	.7265	33.950*
Step-6						
SHOUP	90.809	7.3112*				
DRR	167.570	3.549*				
DRT	-142.814	-2.794*				
DU	21.830	2.473**				
PGRR	-12.366	-1.840				
DR	-18.267	-1.676	76.06	1.20	.7349	29.657*
Step-7						
SHOUP	86.205	6.637*				
DRR	172.822	3.656*				
DRT	147.927	-2.893*				
DU	22.538	2.555**				
PGRR	-19.674	-2.149**				
DR	-19.720	-1.803				
PGRT	11.7	1.171	76.64	0.58	.7367	25.784*
Step-8						
SHOUP	79.023	5.032*				
DRR	179.556	5.731*				
DRT	-151.734	-2.947*				
DU	21.099	2.339**				
PGRR	-19.179	-2.089**				
DR	-31.914	-1.726				
PGRT	12.604	1.244				
DT	14.538	.819	76.93	0.29	.7351	22.510*

Share of Tertiary Workers (Female)

In 1981 (table - 5.13a), SHOUP explains maximum proportion of variation in STWF followed by DU and PGRR. The value of R^{-2} increases upto step-3. Thus the relationship given in this step may be identified as an optimal fit. The results of this step show that regression coefficient of SHOUP, DU and PGRR are significant at 1% level of significance. The value of F-ratio is also significant at 1% level of significance. In 1991 (table - 5.13b), again SHOUP ranks first in explaining STWF followed by DRR, DRT, PGRR, DU, DR and PGRT. The explaining power of SHOUP has shot up to 61.96% in 1991 from 48.39 in 1981. The value of R^{-2} increases upto step-7. Thus step-7 may be considered as a step with optional fit relationship. The results of this step show that the regression coefficients of SHOUP, DRR, and DRT are significant at 1% level of significance. Whether DU and PGRR are significant at 5% level of significance. But the regression coefficient of DR and PGRT are not significant. The value of F-ratio is also significant at 1% level of significance.

Thus we find that in 1981, SHOUP, DU and PGRR are the only variables explaining STWF. whether in 1991, DRR and DRT have got important place in explaining the dependent variable. In 1981, STWF is explained upto only 65% but the same is 77% in 1991.

Table.5.14a: Predictor variable selected on the basis of step wise regression method with LRF and population variables 1981

Variables	B	T	R^2 x100	Increase in R^2 x100	R^{-2}	F
Step 1						
SHOUP	69.344	7.072*	48.08	-	.4712	50.016
Step 2						
SHOUP	84.836	8.895*				
DU	-37.729	-3.956*	59.92	11.84	.5840	39.617*
Step 3						
SHOUP	91.786	9.466*				
DU	-34.993	-3.774*				
PGRT	-20.666	-2.250**	63.47	3.55	.6136	30.124*
Step 4						
SHOUP	94.345	9.897*				
DU	-27.181	-2.676*				
PGRT	-24.125	-2.613**				
DT	-16.642	-1.730	65.50	2.03	.6279	24.208*
Step 5						
SHOUP	94.862	10.346*				
DU	-33.542	-3.355*				
PGRT	-24.103	-2.743*				
DT	-31.438	-2.886*				
DRT	26.973	2.506**	69.35	3.85	.6628	22.628*
Step 6						
SHOUP	91.659	10.160*				
DU	-27.741	-2.749*				
PGRT	-24.525	-2.879*				
DT	-27.129	-2.521**				
DRT	36.988	3.214*				
DRU	-22.505	-2.058	71.79	2.44	.6833	20.782
Step 7						
SHOUP	54.470	9.801*				
DU	-28.216	-2.784*				
PGRT	-33.284	-2.479**				
DT	-27.631	-2.556**				
DRT	37.066	3.211*				
DRU	-21.124	-1.905				
PGRR	10.432	.0846	72.20	0.41	.6815	17.812*

Table.5.14b: Predictor variable selected on the basis of step wise regression method with LRF and population variables 1991

Variables	B	T	R^2 x100)	Increase in R^2 (R x100)	R^{-2}	F
Step 1						
SHOUP	51.014	4.632*	26.02	-	.2481	21.459*
Step 2						
SHOUP	76.145	6.426*				
DU	-46.016	-3.883*	40.88	14.86	.3891	20.746*
Step 3						
SHOUP	72.980	6.311*				
DU	-42.323	-3.650*				
PGRR	-21.678	-2.229**	45.47	4.59	.4270	16.401*
Step 4						
SHOUP	71.831	6.161*				
DU	-46.644	-3.700*				
PGRR	-21.411	-2.196**				
DRT	9.873	.882	46.19	0.72	.4248	12.449*

Literacy Rate (Female)

In 1981 (table - 5.14a), SHOUP explains maximum proportion of variation in LRF followed by DU, DRT, PGRT, DRU and DT. The value of R^{-2} decreases after step-6. Thus this step may be considered as a step with optional fit relationship. The results of this step show that regression coefficients of SHOUP, DU, PGRT and DRT are significant at 1% level of significance. And the regression coefficient of DT is significant at 5% level of significance. Whether DRU is not a significant explanatory variable. The value of F-ratio is significant at 1% level of significance. In 1991 (table-5.14b), SHOUP again explains maximum proportion of variation in LRF followed by DU and PGRR. The value of R^{-2} declines after step-3. Thus the relationship given in this step may be identified as an optional fit. The results of this step show that regression coefficients of SHOUP and DU are significant at 1% level of significance whether the regression coefficients of PGRR is significant at 5% level of significance.

The value of F-ratio is also significant at 1% level of significance.

Thus in both 1981 and 1991, SHOUP and DU remained as most important explanatory variable. DRT had some explanatory power in 1981 but it has disappeared in 1991.

Table.5.15a: Predictor variable selected on the basis of step wise regression method with NWFPLP and population variables 1981

Variables	B	T	R^2 x100	Increase in R^2 x100	R^{-2}	F
Step 1						
SHOUP	74.385	8.179*	55.33	-	.5450	66.890*
Step 2						
SHOUP	69.408	7.572*				
DT	18.759	2.046**	58.60	3.27	.5704	37.513*
Step 3						
SHOUP	68.241	7.744*				
DT	32.878	3.086*				
DRU	-24.282	-2.351**	62.57	3.97	.6042	28.986*
Step 4						
SHOUP	62.485	6.684*				
DT	29.616	2.776*				
DRU	-30.773	-2.823				
DU	17.806	1.648	64.47	1.90	.6168	23.135*
Step 5						
SHOUP	63.169	6.760*				
DT	23.497	1.964				
DRU	-35.836	-3.043*				
DU	16.551	1.527				
DRR	14.048	1.120	65.34	0.87	.6187	18.852*
Step 6						
SHOUP	80.766	7.632*				
DT	13.207	1.130				
DRU	-26.297	-2.297**				
DU	17.412	1.723				
DRR	202.022	3.095*				
DRT	-192.392	-2.927*	70.49	5.15	.6688	19.516*
Step 7						
SHOUP	79.250	7.681*				
DT	13.665	1.202				
DRU	-23.793	-2.124**				
DU	13.178	1.310				
DRR	253.914	3.692*				
DRT	-244.025	-3.530*				
PGRT	17.965	1.957	72.67	2.18	.6869	18.241*
Step 8						
SHOUP	72.894	6.808*				
DT	36.139	2.147**				
DRU	-18.143	-1.590				
DU	8.484	.833				
DRR	273.767	4.014*				
DRT	-257.674	-3.786*				
PGRT	20.625	2.266**				
DR	-31.171	-1.779	74.40	1.73	.7004	17.076*
Step 9						
SHOUP	67.935	6.047*				

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DT	35.841	2.148**				
DRU	-21.368	-1.848				
DU	9.787	.965				
DRR	257.135	3.741*				
DRT	-241.821	-3.530*				
PGRT	33.320	2.554**				
DR	-28.517	-1.631				
PGRR	-16.306	-1.348	75.37	0.97	.7055	15.644*
Step 10						
SHOUP	72.030	5.732*				
DT	35.329	2.105**				
DRU	-21.416	-1.843				
DU	12.017	1.130				
DRR	260.029	3.759*				
DRT	-244.049	-3.542*				
PGRT	29.947	2.158**				
DR	-29.746	-1.685				
PGRR	-13.416	-1.051				
PGRU	7.155	.742	75.67	0.30	.7026	13.997*

Number of Working Factories Per Lakh of Population.

In 1981 (table - 5.15a), SHOUP explains maximum proportion of variation in NWFPLP followed by DRT, DRU, DT, PGRT, DU, DR, PGRR and DRR. The value of R^{-2} decreases after step-9. Thus the relationship given in this step may be identified as an optional fit. The results of this step show that the regression coefficients of SHOUP, DRR and DRT are significant at 1% level of significance. And regression coefficients of DT and PGRT are significant at 5% level of significance. But DRU, DU, DR and PGRR are not significant as their regression coefficients are insignificant. The value of F-ratio is significant at 1% level of significance. In 1991 (table - 5.15b), PGRT explains maximum proportion of variation in NWFPLP followed by PGRR, DRR, DRU and SHOUP. The value of $^{-2}$ decreases after step-5. Thus step-5 may be identified as a step with optional fit relationship. The results of this step show that PGRT, DRU and DRR and highly significant variables as their regression coefficients are sig-

nificant at 1% level of significance. The regression coefficients of PGRR and SHOUP are significant at 5% level of significant. The value of F-ratio is also significant at 1% level of significance.

The major shift took place in SHOUP as in 1981, it has maximum explanatory power but in 1991, it has lowest explanatory power. In 1991 PGRT has become most prominent. Other explanatory variable remained same for two points of time.

Table.5.16a: Predictor variable selected on the basis of step wise regression method with NSPLP and population variables 1981

Variables	B	T	R^2 x100	Increase in R^2 x100	R^{-2}	F
Step 1						
DRU	-82.69	-10.806*	68.38	-	.6779	116.779*
Step 2						
DRU	-62.143	-7.795*				
DT	-36.132	-4.532*	77.21	8.83	.7635	89.792*
Step 3						
DRU	-61.507	-8.313*				
DT	-36.885	-4.985*				
PGRT	-18.836	-3.094*	80.75	3.54	.7964	72.739*
Step 4						
DRU	-57.494	-7.441*				
DT	-33.376	-4.375*				
PGRT	-15.557	-2.449*				
DU	-12.016	-1.576	81.65	0.90	.8021	56.732*
Step 5						
DRU	-53.603	-6.367*				
DT	-22.573	-1.863				
PGRT	-15.870	-2.504**				
DU	-14.829	-1.857				
DR	-13.973	-1.146	82.11	0.46	.8033	45.926*
Step 6						
DRU	-56.072	-6.294*				
DT	-23.669	-1.938				
PGRT	-16.089	-2.530**				
DU	-16.182	-1.983				
DR	-16.561	-1.316				
DRT	8.088	.865	82.23	0.12	.8023	38.204*

Table.5.16b: Predictor variable selected on the basis of step wise regression method with NSPLP and population variables 1991

Variables	B	T	R^2 x100	Increase in R^2 x100	R^{-2}	F
Step 1						
DRU	-68.532	-7.350*	46.96	-	.4609	54.020*
Step 2						
DRU	-69.095	-9.537*				
PGRT	-46.419	-6.407*	68.51	21.55	.6746	65.268*
Step 3						
DRU	-52.198	-6.407*				
PGRT	40.531	-5.934*				
DR	-29.597	-3.565*	74.09	5.58	.7277	56.242*
Step 4						
DRU	-47.999	-5.871*				
PGRT	-36.326	-5.234*				
DR	-27.078	-3.317*				
DU	-15.452	-2.090**	75.90	1.81	.7424	45.681*
Step 5						
DRU	-43.899	-5.326*				
PGRT	-37.699	-5.537*				
DR	-42.151	-3.823*				
DU	-24.697	-2.873*				
DT	22.520	1.978	77.45	1.55	.7547	39.162*
Step 6						
DRU	-41.682	-4.976*				
PGRT	-37.950	-5.603*				
DR	-32.813	-2.493**				
DU	-23.028	-2.663**				
DT	21.355	1.880				
DRR	-13.317	-1.282	78.09	0.64	.7574	33.277*
Step 7						
DRU	-45.708	-4.374*				
PGRT	-39.860	-5.376*				
DR	-25.216	-1.429*				
DU	-23.546	-2.698*				
DT	13.30	.790				
DRR	-44.241	-.909				
DRT	33.237	11.553	78.26	0.17	.7549	28.290*

Number of Schools Per Lakh of Population.

In 1981 (table - 5.16a), DRU explains maximum proportion of variation in NSPLP followed by DT, PGRT, DU and DR. The value of R^{-2} decreases after step-5. Thus this step may be identified as a step with optional fit relationship. The results of this step

show that the regression coefficient of only DRU is significant at 1% level of significance. The regression coefficient of PGRT is significant at 5% level of significance. Other explanatory variables are insignificant as their regression coefficients are not significant. The value of F-ratio is significant at 1% level of significance. In 1991 (table - 5.16b), DRU again explains maximum proportion of variation in NSPLP followed by PGRT, DR, DU, DT and DRR. The value of R^{-2} decreases after step-6. Thus the relationship in this step may be identified as an optional fit. The result of this step show that DRu and PGRT, the two most important explanatory variables are highly significant as their regression coefficients are significant at 1% level of significance. The regression coefficients of DR and Du are significant at 5% level of significance. The other variables DT and DRR are not significant. The value of F-ratio is significant at 1% level of significance. The set of important variables (DRU, DT, PGRT, DU and DT) are same in both 1981 and 1991.

Table.5.17a: Predictor variable selected on the basis of step wise regression method with NBPLPAHS and population variables 1981

Variables	B	T	R^2 x100	Increase in R^2 x100	R^{-2}	F
Step 1						
SHOUP	58.905	5.357*	34.69	-	.3348	28.692*
Step 2						
SHOUP	64.159	7.244*				
DRU	-49.467	-5.585*	58.89	34.20	.5734	37.363*
Step 3						
SHOUP	76.508	8.571*				
DRU	-33.581	-3.566*				
DU	-34.183	-3.328*	66.11	7.22	.6415	33.813*
Step 4						
SHOUP	76.428	8.673*				
DRU	-30.835	-3.257*				
DU	-36.970	-3.89*				
PGRR	12.546	1.535	67.60	1.49	.6507	26.610*
Step 5						
SHOUP	92.242	10.736*				
DRU	-29.180	-3.528*				
DU	-34.906	-3.878*				
PGRR	48.452	4.305*				
PGRT	-49.929	-4.125*	75.82	8.22	.7341	31.370*
Step 6						
SHOUP	94.846	10.881*				
DRU	-23.602	-2.586**				
DU	-32.211	-3.529*				
PGRR	49.327	4.416*				
PGRT	-52.647	-4.331*				
DT	-12.462	-1.389	76.74	0.92	.7389	26.949*
Step 7						
SHOUP	94.323					
DRU	-28.949	10.880*				
DU	-33.418	-2.902*				
PGRR	49.440	-3.666*				
PGRT	-52.834	4.456*				
DT	-17.451	-4.375*				
DRT	13.344	1.285	77.51	0.77	.7423	23.642*
Step 8						
SHOUP	77.631	8.691*				
DRU	-37.706	-4.077*				
DU	-30.951	-3.782*				
PGRR	43.537	4.327*				
PGRT	-58.360	-5.348*				
DT	-5.822	-.627				
DRT	2.152	3.787*				

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DRR	-2.037	-3.600*	82.37	4.86	.7937	27.463*
Step 9						
SHOUP	76.729	7.416*				
DRU	-37.647	-4.026*				
DU	-31.457	-3.612*				
PGRR	42.952	4.035*				
PGRT	-57.648	-4.937*				
DT	-5.532	-.582				
DRT	215.584	3.752*				
DRR	-204.138	-3.568*				
PGRU	-1.497	-1.85	82.39	0.02	.7894	23.914*

Table.5.17b: Predictor variable selected on the basis of step wise regression method with NBPLPAHS and population variables 1991

Variable	B	T	R^2 (R x100)	Increase in R^2 (R x100)	R^{-2}	F
Step 1						
SHOUP	63.872	6.483*	40.79	-	.3982	42.034*
Step 2						
SHOUP	71.553	8.896*				
DRR	-46.920	-5.823*	62.22	21.43	.6096	49.410*
Step 3						
SHOUP	70.278	9.268*				
DRR	-46.289	-6.112*				
PGRR	-22.105	-2.954*	67.09	5.87	.6541	40.092*
Step 4						
SHOUP	81.489	9.412*				
DRR	-39.574	-5.072*				
PGRR	19.619	-2.698*				
DU	-22.298	-2.403**	70.06	2.97	.6800	33.945*
Step 5						
SHOUP	76.330	7.810*				
DRR	-44.630	-4.968*				
PGRR	-19.782	-2.727*				
DU	-25.346	-2.628**				
DT	12.825	1.28	70.72	0.66	.6815	27.538*
Step 6						
SHOUP	69.613	5.112*				
DRR	-81.195	-1.557				
PGRR	-19.542	-2.679*				
DU	-26.772	-2.707*				
DT	11.419	.985				
DRT	40.174	.712	70.98	0.26	.6787	22.834*

Number of Beds Per Lakh of Population in Allopathic Health Services.

In 1981 (table - 5.17a), SHOUP explains maximum proportion of variation in NBLPPAHS followed by DRu, PGRT, DU, DRR, PGRR, DT and DRT. The value of R^{-2} decreases after step-8. Thus the relationship given in this step may be identified as an optional fit. The results of this step show that SHOUP, DRU, Du, PGRR, PGRT, DRT and DRR are significant explanatory variables as their regression coefficients are significant at 1% level of significance. Only DT is not significant. The value of F-ratio is significant at 1% level of significance. In 1991 (table 5.17b), again SHOUP explains maximum proportion of variation in NBPLOPAHS follows by DRR, PGRR, Du and DT. The value of R^{-2} decreases after step-5. Thus the relationship given in this step may be identified as an optional fit. The results of this step show that the regression coefficients of SHOUP, DRR and PGRR are significant at 1% level of significance. The DU is also significant but its regression coefficient is significant at 5% level of significance. But DT is insignificant.

Thus SHOUP, dependency ratio and population growth rate are important explanatory variables and remained same for both 1981 and 1991. But in 1991 DRR has replaced DRU and has got the second most important place in explaining the dependent variable.

Table.5.18a: Predictor variable selected on the basis of step wise regression method with SRPLP and population variables 1981

Variables	B	T	R^2 (R x100)	Increase in R^2 (R x100)	$\bar{R}^2$	F
Step 1						
DRU	-81.357	-10.282*	66.18	-	.6556	105.713*
Step 2						
DRU	58.979	-7.311*				
DT	-39.348	-4.877*	76.66	10.48	.7578	87.058*
Step 3						
DRU	-53.754	-6.478*				
DT	-35.068	-4.299*				
DU	-15.224	-1.961	78.27	2.61	.7701	62.438*
Step 4						
DRU	-48.750	-5.410*				
DT	-21.226	-1.636				
DU	-18.969	-2.321**				
DR	-17.825	-1.364	79.03	0.76	.7739	48.070*
Step 5						
DRU	-51.731	-5.441*				
DT	-22.536	-1.727				
DU	-20.715	-2.476**				
DR	-20.950	-1.558				
DRT	9.835	.984	79.43	0.40	.7737	38.626*

Table.5.18b: Predictor variable selected on the basis of step wise regression method with SRPLP and population variables 1991

Variable	B	T	R^2 x100	Increase in R^2 x100	R^{-2}	F
Step 1						
DR	-71.577	-8.005*	51.23	-	.5043	64.081*
Step 2						
DR	-47.770	-5.011*				
DRU	-41.876	-4.393*	63.10	11.87	.6187	51.302*
Step 3						
DR	-40.074	-4.453*				
DRU	-46.569	-5.273*				
PGRT	-26.186	-3.537*	69.55	6.45	.6800	44.931*
Step 4						
DR	-36.771	-4.230*				
DRU	-41.064	-4.717*				
PGRT	-20.673	-2.798*				
DU	-20.259	-2.573**	72.57	3.12	.7079	38.564*
Step 5						
DR	-34.837	-3.941*				
DRU	-44.905	-4.815*				
PGRT	-17.053	-2.121**				
DU	-20.163	-2.567**				
PGRU	-9.282	-1.130	73.27	0.60	.7092	31.254*
Step 6						
DR	-40.622	-3.285*				
DRU	43.093	-4.419*				
PGRT	-17.828	-2.185**				
DU	-23.633	-2.506**				
PGRU	-8.616	-1.037				
DT	8.435	.672	73.48	0.21	.7064	25.870*

Surface Road Per Lakh of Population

In 1981 (table - 5.18a), DRU explains maximum proportion of variation in SRPLP followed by DT, DU and DR. The value of R^{-2} decreases after step-4. Thus the relationship given in this step is an optional fit. The results of this step show that the regression coefficients of DRU and Du are significant at 1% and 5% level of significance respectively. The value of F-ratio is also significant at 1% level of significance. In 1991 (table - 5.18b), it is DR which explains maximum proportion of variation

in SRPLP followed by DRU, PGRT, DU and PGRU. The value of R^{-2} decreases after step-5. Thus the relationship given in this step may be identified as an optional fit. The results of this step show that the regression coefficients of DR and DRU are significant at 1% level of significance. PGRT and Du are also significant as their regression coefficients are significant at 5% level of significance. But PGRU is not significant. The value of F-ratio is significant at 1% level of significance. In 1981, the variable with highest explanatory power is DRU but in 1991, it is DR which explains maximum variation in SRPLP. In 1981, other important variable explaining SRPLP is density but in 1991, a new variable population growth rate has been added in the set of explanatory variables.

TABLE-5.34:

Predictor Variable selected on the basis of step-wise regression method with FSCORE and Population variables, 1981

variables	β	T	(R^2x100)	Increase in (R^2x100)	R^{-2}	F
Step1						
DRU	-90.003	-15.175 *	81.00	-	.8065	230.254*
Step 2						
DRU	-73.884	-10.44 *				
DRR	-24.882	-3.516 *	84.59	5.59	.84.01	145.559*
Step 3						
DRU	-73.581	-10.827 *				
DRR	-23.342	-3.419 *				
SHOUP	-12.243	-2.541 *	86.06	1.47	.8526	107.067*
Step 4						
DRU	-74.383	-11.848 *				
DRR	-21.292	-3.361 *				
SHOUP	-18.911	-3.591 *				
PGRT	16.542	3.169 *	88.35	1.25	.8744	96.771*
Step 5						
DRU	-76.742	-12.046 *				
DRR	-83.399	-2.078 **				
SHOUP	-22.961	-3.558 *				
PGRT	13.094	2.339 **				
DRT	64.844	1.567	88.90	0.55	.8779	80.116*
step 6						
DRU	-79.218	-11.747*				
DRR	-88.861	-2.202**				
SHOUP	-25.155	-4.109*				
PGRT	11.745	2.054**				
DRT	69.085	1.666				
DU	6.851	1.101	89.17	.27	.8784	67.249*
step 7						
DRU	-79.004	-11.513*				
DRR	-88.282	-2.163**				
SHOUP	-25.788	-3.865*				
PGRT	11.986	2.048**				
DRT	68.519	1.634				
DU	6.344	.962				
PGRU	-1.477	-.252	89.19	.02	.8760	56.549*

TABLE 5.35

Predictor variable selected on the basis of step wise regression method with FSCORE and population variables, 1991.

Variable	β	T	R^2 x 100	Increase in R^2 x 100	R^{-2}	F
step 1						
DRT	91.105	17.259*	83.00	-	.8272	297.863*
step 2						
DRT	70.670	13.382*				
DRU	32.969	-6.243*	89.69	6.69	.8935	261.140*
step 3						
DRT	68.929	12.995*				
DRU	36.220	-6.526*				
PGRU	-7.328	-1.681*	90.16	0.46	.8966	180.336*
step 4	-	-				
DRT	67.606	11.869*				
DRU	35.800	-6.378*				
PGRU	-6.981	-1.583				
DU	-3.148	-.658	90.24	.08	.8956	134.062*

FACTOR SCORE

In 1981 (table - 5.34), DRU explains maximum proportion of variation in factor score followed by DRR, SHOUP, PGRT, DRT and DU. The value of R^{-2} increases upto step-6. Thus the step - 6 may be considered as a step with optional fit relationship. The results of this step show that the regression coefficients of DRU and SHOUP are significant at 1% level of significance and the regression coefficients of DRR and PGRT are significant at 5% level of significance . The value of F-ratio is also significant at 1% level of significance . In 1991 (* table - 5.365) , DRT explanins maximum proportion of variation in Factor Score followed by DRU and PGRU . The value of R^{-2} increases upto step - 3 . Thus the relationship givenin this step may be identified as an optimal fit. The results of this step show that the regression coefficients of DRT, DRU and PGRU are significant at 1% level of significance. The value of F-ratio is also significant at 1% level of significance . Thus we observe that the set of importent explanatory variables expalining almost the variation in Factor Score are same in both 1981 and 1991 . We find that dependency ratio is the most important independent variable explaining Factor Score and is negatively correlated with level of economic development.

CHAPTER VI

SUMMARY AND CONCLUSION

VI.1 : Summary

Population and economy are related with each other. They depend on each other and so also affect each other. The size and growth rate of population have been considered as important factors related to the economic situation of any region since early civilization. Even after four decades of sustained efforts to check the population growth of India, the population explosion could not be averted. It is the impact of population on development which is causing a grave concern to the whole humanity. India is confronted with very high growth rate of population, low growth rate of gross domestic product, low rate of industrialization and high rate of unemployment. In this study therefore an attempt has been made to study the interrelationship between population and economic development. The impact of population grwoth on economic development has been examined in the present study for the obvious reason of the importance of population trends in guiding the process of economic development.

The main objectives of the study are to study, spatial variation in population variables, spatial variation in economic variables and to identify the various forms of interrelationship between population and economic variables. On the basis of these objectives, thirteen hypotheses are framed. The important hypotheses are given as below :

(i) population growth rate, dependency ratio, density and share of urban population are positively related with per capita net output from manufacturing sector

(ii) cropping intensity is positively related with population growth rate, dependency ratio, density but negatively related with share of urban population.

(iii) Work force participation rate is positively related with dependency ratio, density and share of urban population.

(iv) Share of secondary workers and share of tertiary workers are positively related with share of urban population.

(v) Literacy rate is negatively related with population growth rate, dependency ratio, density and positively related with share of urban population.

Uttar Pradesh is a state with largest population and one of the most backward states of India. Therefore, Uttar Pradesh has been selected for the study. The anlysis is basde on the district-wise data of Uttar Pradesh. There are two sets of variables i.e. independent and dependent variables. Population variables are taken as independent set of variables and economic variables are taken as dependent set of variables.

Keeping objectives in mind, many statistics have been applied for the statistical analysis. Mean, S.D. and coeff of variation has been used to study the regional variation. The scores of principal component have been used to analyse the economic spatial distribution. Karl Pearson's coeff. of correlation has been used to study the relationship between population and economic variables. Step wise regnession method has been used to study the percent variation explained by each independent variable in any dependent variable. This gives us the important set of independent variables explaining any dependent variable. Finally with the help of principle component method, the composite index of all the economic variables has been worked out. Taking the

composite index as dependent variable and population variables as independent set of variables, step-wise regnession analysis has been carried out.

There is positive and significant relationship between population growth rate and per capita net output from manufacturing sector while dependency ratio and work force participation rate are negatively and significantly correlated. There is highly significant negative correlation between density and work force participation rate. Urban dependency ratio is negatively and significantly related with cropping intensity. Population growth rate, density and share of urban population are positively and significantly correlated with share of secondary workers. Urban density and share of urban population are positively and significanrly correlated with share of tertiary workers. Share of urban population and literacy rate are positively and significantly correlated. Female literacy and share of urban population are also positively and significantly correlated. Share of urban population and number of working factories per lakh of population are also positively and significantly correlated.

In regression analysis, due to the problem of multiple collinearty, the step-wise approach has been applied. All those important dependent variables are selected for the step-wise analysis whose variability explained is more than 70 percent. The most important variable explaining the variation in per capita net output from manufacturing sector is share of urban population. Urban dependency ratio is most important variable explaining the variation in work force participation rate. Share of urban population and urban density are the independent variables explaining maximum variation in share of secondary workers. Again, share of urban population urban density and urban dependency ratio attain proniment place among independent variables by explaining maximum variation in share of tertiary workers and literacy rate. In 1981, share of urban population explained maximum variation in number of working factories per lakh of population but it is population growth rate which explains maximum variation in 1991.

In step wise regression analysis we observe that share of urban population and urban dependency ratio is an important set of variables explaining maximum variation in most of the dependent variables. So it is the process of urbani-

sation which is affecting the development in maximum proportion. All the dependent variables like PCNOMS, WFPRT, WFPRM, WFPRF, SSWT, STWT, STWF and NWFPLP which have been explained mostly by SHOUP, urban dependency ratio and urban density; have significant correlation with these independent variables.

When we take the level of economic development as detremined by the composite index of all the economic variables as dependent on population variables, the coefficient of multiple determination shows very high degree of relatationship between them. We see that composite index is explained nearly 90 percent by all the population variables in both 1981 and 1991. And we find that urban dependency ratio as the variable having highest explaining capacity in the variation of composite index. The set of important explanatory variables explaning Factor Score is share of urban dependency ratio, share of urban population, population growth rate and urban density. Besides, share of urban population, has a positive and significant relationship with the level of economic development but urban dependency ratio has negatively significant relationship with the level of economic development.

VI.2 : Conclusion

Uttar Pradesh is a state with much regional disparity in demographic and economic field. The striking regional disparity is found regarding urbanisation. Some districts are highly urbanised whether others have very low urban population. Regarding the regional economic pattern, the disparity is very high in the development of manufacturing sector. Female work force participation highly varies from one region to other. Therefore the main stress in the development process should be given to remove the regional imbalances.

We find that urbanisation process is the most important factor affecting the economic development. Therefore the process of urbanisation should be encouraged in the backward areas. Uttar Pradesh, being a population giant expends a major portion of its income on basic amenaties, which in turn hampers the capital formation and investment, the essentials of economic development. Therefore the check on the rapidly growing population is must for the sake of all round socio economic development.

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