# AN ANALYSIS OF URBAN INFLUENCE ON RURAL SURROUNDINGS
## A Case Study of Selected Cities of Bihar, 1981.

Dissertation submitted to Jawaharlal Nehru University
in partial fulfilment of the requirements
for the award of the Degree of
**MASTER OF PHILOSOPHY**

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## CERTIFICATE

This is to certify that this dissertation entitled "AN ANALYSIS OF URBAN INFLUENCE ON RURAL SURROUNDINGS : A CASE-STUDY OF SELECTED CITIES OF BIHAR, 1981" submitted by Miss Ballari Bagchi in partial fulfilment of the requirements for the award of the degree of MASTER OF PHILOSOPHY, is a bonafide work to the best of my knowledge and may be placed before the examiners for evaluation.

Hoda Mahmood
Supervisor

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Ballari Bagchi

- Ballari Bagchi

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# CHAPTER - I

# INTRODUCTION

## 1.1 Background of the study

Implicit in the concept of 'Development', is the process of societal transformation from tradictional to modern society. In this transformation process, the modern sector seems to play an important role in upgrading the traditional sector.

Urbanisation, representing the "geographical manifestation of economic development and growth"[1], is identical with the complete transformation of human habital from rural to urban. Urban structure is the outflow of modernisation, while the rural structure is largely a survival of traditional society. Yet, these two sectors of a region are of mutually interdependent in socio- eco-cultural aspects. In the context of balanced regional development, integration between urban core and rural surroundings is a prerequisite condition.

This rural-urban interaction is a two-way process. First, the city or the town extends its sphere of influence or dominance on the countryside and the countryside reacts to this urban challenge through responses in spatial and socio-economic and demographic aspects. Secondly, the rural areas also influence the town mainly through the environmental

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1. Bryant C.R., Russwurun, L.H., and Mclellan A.G., "The city's countryside", Longman, London and New York, 1982 P-6.

constrainsts as well as its resource supplies. This two-way process helps develop a region surrounding the cities, which is termed as 'urban-field' or city-region'. However the former one is a consequence of the process of urbanisation as increasing urbanisation initiates expansion of cities into their countrysides, and thereby occurring changes in the countrysides.

Hence, in the rural - urban interaction process, cities, being the origin of socio economic and cultural changes, assume a dominant role, in radiating the modification into the countryside or city-region.

Considerations of interlinkages between urbanization and rural change have led some commentators to use the term 'generative' and 'parasitic' for cities. The formers are those which drain the resources from their surrounding regions without giving much in return. The generative cities permeate their influence into their surrounding region serving as a stimulus for change and development.[1]

Most of the cities of the developing economics are of the parasitic type[2] and so urbanisation in less developed countries is not concommittant with economic development. India also exemplifies this picture, where urbanisation and

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1. Hoselitz, B.(1955), 'Generative and Parasitic cities", Economic Development and cultural changes, Vol.3, pp. 278-294.
2. Mcgee, T.G. "Urbanisation processes in the third World", Bell, London, 1971, P-34.

modernisation have created a gulf between cities and country-side which is termed as 'Rural-Urban dichotomy'.

Thus, the first part of the process of rural-urban interaction i.e. the influence of urban areas on rural areas is relevant to study in the context of Indian economy in order to evaluate the contribution of urban centres on rural development.

In the present study, therefore, an attempt has been made to investigate the urban influence of different cities, on their rural surroundings. The urban influence of a city on rural peripheries implies the infiltration of non-farm elements or urban-type characteristics in rural areas. These characteristics are generally more prominent in rural areas located in the vicinity of the city and gradually diminish with the increasing distance from urban centre. Thus, the influence of urban centres diminishes, as the distance from city increases. Again, the intensity of this influence varies from region to region and from one type of town to another type.

That is why, the present study evaluates the urban influence of different types of cities, considering the demographic and socio economic characteristics of the rural surroundings in relation to their distance from their interest cities.

However, as the present study is primarily concerned with one aspect of the city - region relationship, i.e. - the urban influence on its surroundings, - therefore the following section reviews some theories and empirical works in this field.

## 1.2 Review of Literature

### 1.2.1 Theoretical Background

The concept of city - region relationship is not old one, although its anticeedents could be found in the writings of early geographers. Ratzel[1] one of the founders of modern geography, developed the concept of hinterland and examined the influence of the city on it. Even prior to him, J.H. Von Thunen[2] expounded the city's influence on the agricultural use of land around it. In the early nineties, Maxinillen Sorre[3] also gave attention to the study of impact of urban centre on a surrounding countryside.

However, the role of regional urban centres in spatial organisation and development has been well recognised by some theories.

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1. As referred to by R.E. Dickinson "The Markets of Modern Geography", Routledge and Kegaul Pawl Ltd., London, 1969, pp 70-71.

2. As referred to by Leong and Morgan "Human and Economic Geography", Oxford University Press, Page 110.

3. Dickinson, R.E. op. cit., p. 238.

In the Central Place Theory, Walter Christalter (1933)[4] visualises a Central place which serves a hexagonal hinterland of settlements, smaller than itself. The larger is the central place, the larger will be its service area (hinterland).

The Growth Pole Theory with its economic spatial connotations came up first (by Berroux) (1955) and that of the growth centre with its geographical spatial connotations, followed(by Boudeville (1981)[5]. With due coginzance of economies of agglomeration, this theory, maintains that if growth is concentrated in a few selected potentially viable locations, then a process of growth will be initiated in the hinterlands of these growth centres as well by the generation of 'spread effect' or 'trickle down mechanism'.

According to Hirschman (1958)[6], the interregional unbalances in development leads to the initiation of growth of certain initial points where spatial concentration of economic activities occurs.Thus some growth points or poles are emerged where the active forces of pressure tension and compulsion diffuse the process of economic growth at subsequent points in the backward hinterland. This process of trickle down ultimately well gain upper hand over the polarisation process.

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4. As referred to by Leong and Horgan,'Humand and Economic Geography',Oxford Univ.Press,p.90.
5. As referred to by M.Kalpana',Regional Urban Centres:Structure and Interaction', Inter-India Publication,New Delhi. 1985, p.11.
6. As referred to by Chodwick,G.'Models of Urban and Regional Systems in Developing Countries' Pergamon Press,1987,p.160.

In studying the problem of spread of economic development Myrdal[7] in 1957, propounded that the tendency for polarization forces is stronger than the tickling down forces. The process of "trickling down" and "polarization" in Hirschman's postulation of growth pole correspond the concept of "spread" and 'backwash' of Myrdal's theory. Contrary to Hirschman, Myrdal in his model of Cummulative Cansation argues that economic development operates in such a way that centripetal forces become stronger and centrifugal transmission of growth donot occur. Hence, in order to developp backward areas, a deliberate policy of intervention is necessary to neutralise backwash effect.

The Spatial Diffusion Theory of Hagarstrand (1967)[8] explains the transmission and spread of growth impulses on innovations in a region. He advocated that economic growth filters down from a higher order centre to lower order one and thus diffused over the entire area in the long run. This theory holds that mass media and personal contacts are the channels through which innovations are diffused, whereas distance from these channels acts as a barrier to the diffusion. Again, in terms of this theory, "the spatial extent of developmental spread effects radiating from a given urban centre is proportional to the centres size and function".

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7. Chadwick, G., op. cit. 1987, page 160.

8. As referred to by Warmati S. "Geography of a rural service system in India".

Misra, Sundaram and Rao integrate the features of three above-mentioned theories - central place, growth pole and spatial diffusion[9] and present a growth-pole hypothesis that is modified for Indian conditions. They propose a five-tier hierarchy of "growth foci" which consists of central villages at the local level, service centres at the micro-regional level, growth-points at the sub-regional level, growth-centres at the regional level and growth-poles at the national level.

However, all these above mentioned theories focus on the role of more developed sectors (urban) on less developed sectors (rural) of a region.

Now, the discussion turns towards an overview of work done in this field.

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9. As referred to by Wanmali S., op. cit. page 24.25.

### 1.2.2 An Overview of similar works.

The impact of the urban centre on the region manifests itself in a variety of ways and has been studied both in world and in the Indian context, by several scholars. The studies relating to the influence of city on surrounding areas contribute a major aspect of the theme of city-region relationships. However, the broad theme of city-region relationships have been studied mainly in two ways:

1) delimitation of city region
2) the impact of city on the surrounding areas.

The delimitation of city-region boundary has been an important concern of geographers. The method of delimitation of city-region boundary in such studies is primarily based on different socio-economic cultural services which the urban centres perform to foster mutual relations with their surrounding areas.

For example, Harris, C.(1940)[1], deliminated the sphere of influence of Salt Lake city on the basis of twelve functions: related trade, wholesale grocery trade, the state boundary, the area served by the federal reserve Bank of San Fransisco, newspaper circulation area, religious boundary, telephone area, bakery area and petroleum products area.

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1. Harris,C.D. 'Salt Lake City: A Regional Capital', University of Chicago Press, Chicago, 1949.

Smailes, A.E. (1944)[2] determined the urban hierarcy in and a England Wales by using some of the above-mentioned functions.

The hinterlands of New York and Baston was demarcated by Green, H.L. (1953)[3] on the basis of six indices which are (i) transport, communications (ii) agriclture (iv) recreation (v) manifacturing (vi) finance . With the help of this, he drew the composite boundary of these two cities.

Dickison, R.E., (1956)[4] has delimited the city region of London in the same way.

However, the basic purpose of all these studies is to examine how far an urban centre extends its relation with the surrounding area. The extent of the region varies greatly, depending on the nature of different criteria used. Hence different terms like 'Hinterland', 'Umland', 'Urban Field', 'Zone of influence', 'sphere of influence', 'Catchment Area', 'Tributary area' etc. have been used to represent the 'city-region'.

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2. Samailies, A.E., "The Urban Hirrarchy in England and Wales' in Geography, 29 June, 1944, pp. 41-54.

3. Green, L.H., 'Hinterland Boundaries of New York City and Boston in southern New England", in Economic Geography, 31, 1955, pp 283-303.

4. Dickinson, R.E., in City-Region and Regionalism" Rontledge and Kegan Paul, 1956.

The impact of urban centres on their surrounding area is another vital aspect of the theme, of city-region relationship studies. These type of studies have received consederable attention particularly in the research of urban-rural interrelationship in U.S.A. Bogue[5] made the most systematic formulation along these lines. In his work 'The Structure of the Metropolitan community', he found that the metropolis or modern large and complex city exercises an organising and integrative influence on the social organisation of a broad expanse of territory.

Duncan, O.D., (1956)[6] studied the gradients of urban influence on the rural population in U.S.A. The general hypothesis of this study was that rural population in areas under the immediate influence of urban centres differ systematically from the rural population, in areas somewhat remote from these centres. The selected indicators are present population, fertility ratio, dependency ratio, medium school years completed and percent in labour force, percent white callars, percent rural farm males, family characteristics etc.

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5. Bogue, D.J., The Structure of the Metropolitan Community: A study of Dominance and Sule-dominance, Ann Arbor: The University of Michigan, 1949.

6. Duncan, O.D., "Gradient of Urban Influence on the Rural Population" in Gibbs , J.P., (Ed.) Urban Research Methods, 1961.

Hawley[7] and others (1956) have mapped the gradients of urban influence over the social, economic political and demographic structures of peripheral areas. Another pioneering work in this line is by Brunner and Kolb.[8] In this study, 18 cities ranging from 20,000 to over a half million population in each were selected and the zone of influence of each city was demarcated on the basis of variables like fertility rate, sex ratio, proportion of land in farms etc. In this study, the distance from the city centre was found to be an effective force on the spread of urban influence in the neighbouring rural areas. Several significant gradient relationships' were derived in successive concentric zones, and the distance from the city was found to have an important effect on these patterns.

In the context of India, a good number of works has been found in this allied field. But most of them deal mainly with the delimitation of city-region or umland boundaries, and description of their physical and socio-economic characteristics. A few studies deal with the pattern of urban-rural gradient relationship or the impact of the city on the surrounding countryside.

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7. Hawley, A.H., "The changing shape of Metropolitan America" (Glencoe: The Free Press, 1956).

8. Brunner, Edmund, D.E.S. and Kolb, K.H., Rural social trends, New York, Megraw Hill Bosk, Co. Inc. 1933.

Ellefsen, R.A. (1961)[9] studies the city-hinterland relationships with special reference to the hinterlands of Bombay, Delhi, Madras, Hyderabad and Baroda, restorting to its demographic and socio economic characteristics and the gradients from the city. The indicators are specifically (i) density of population (ii) sex ratio (iii) proportion of literates in population, (iv) proportion of person dependent on commerce as percent of total population and as percent of non-agricultural population (v) Proportion of workers in non-agricultural activities. He finds that accessibility is an important factor in spreading urbanization in the hinterland. The extension of hinterlands, according to his findings, is up to an average distance of eleven miles from the city periphery.

Singh, R.L. (1964)[10], attempts to use Western techniques by measuring bus services, newspaper circulation, milk supply, vegetable supply to delineate the hinterland boundary of Banaras and then analyses the relationship between the delineated hinterland and city.

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9. Ellefsen, R.A., "City-Hinterland, Relationships in India" with special reference to the Hinterlands of Bombay, Delhi, Madras, Hyderabad and Baroda", in Roy Turner (ed.) India's urban future, Bombay, Oxford University Press, 1962, Page 95-116.

10. Singh, R.L. "Banaras, A study in Urban Geography" Nand Kishore, and Bros, Banaras, 1955.

In a study of Metropolitan Hyderabad and its region, Alam S.M. and others (1965)[11], have used the following in-dices to delimit the hinterland of Hyderabad city: (i) circulation of daily newspapers (ii) University enrolment (iii) regional accessibility and traffic shed (iv) supply zone of vegetables (v) milk supply region and (vi) fruit supply region. Also the area of direct participation or the metropolitan district has been delimited which represents the core of this region. The measures adopted in this case may broadly be classified as the "principal" and "reflective" elements. The principal elements are (a) Suburban transport (b) commuting areas of workers to factories, (c) retailing (d) water supply (e) electricity (f) telephones and (g) Postal services. The reflective elements are those social - economic aspect which respond to urbanizing impulses of the metropolis. These are -

(a) villages with over 50% of the working population engaged in non-agricultural occupations.

(b) villages with a density exceeding 640/sq.mile 1000 units

(c) villages with electricity consumption exceeding 1000 units per month (d) villages with a population growth rate exceeding 22% in 1951-61; & (e) villages with a sex ratio of 951 or less females per thousand males. They also represent a three-fold

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11. Alam, S.M., Hyderabad, Secunderabad: A study in urban Geography, Osmania University Press, Hyderabad, 1965.

classification of the metropolitan region: (i) the metropolitan core which extends within a radius of 6 to 8 miles from the city centre (ii) the peri-urban zone, which extends to a radius of 16 miles & (iii) The rural hinterland which extends upto 40 miles.

Mahadev, P.D. and Jaysankar, D.C. (1969)[12] have used a mathematical model for the delimitation of the potential hinterland of Mysore city. They have modified the simple and well-known gravity model of Newton and applied it to arrive at break-points between adjacent towns.

While studying the relation between Delhi and village situations. Rao, M.S.A. (1970)[13] identifies three types of urban impact, the nature of which varies according to the kind of relations of a village has with a city or town. Three different situations are -

(1) Villages in which a sizeable number of people have sought employment in far cities. They live their living behind the members of their families in their native villages.

(2) The second kind is to be seen in villages which are situated near an industrial town. These are exposed to a different kind of influence from those with a sizeable group of urban emigrants. The nature of influence follows the nature of industry.

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12. Mahadev, P.D. and Jaysankar, D.C., "People, space and economy of an Indian city", Mysore, 1969.

13. Rao, M.S.A. "Urbanisation and Social change: A study rural community on a Metropolitan fringe," Orient Longmans Ltd., 1970.

(3) The growth of the metropolitan cities accounts for the third type of urban impact on the surrounding villages. Normally, the city expands, it sucks in the villages lying on the outskirts. While a few villages are totally absorbed in the process of expansion, only the kind of many others excluding the inhabited area, is used for urban development. Such a policy of urban development explains the existence of rural pockets in the city area.

These three situations are not mutually exclusive.

The structure of the city region of Bangalore has been studied by Rao, V.L.S.P. and Tewari, V.K. (1979)[14] on the basis of

(1) Population variables: (a) population density per Sq.mile , 1971; (b) ratio of non agricultural to agricultural workers (c) population growth, 1961-1971; (d) males per thousand females, 1971.

(2) Land-use variables: (a) area under forest, permanent pastures and miscellaneous tree crops as per cent to total area; (b) net town area as percent to tetal area; (c) net irrigated area as percent to net sown area; and (d) area under fruits and vegetables as percent to total area. Furthermore, the commuter's zone has been delimited by the frequency of bus services to suburban destinations.

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14. Prakasa Rao, V.L.S. and Tewari, V.K., "Regions in Karnataka," Mimalographed, Institute for Social and Economic change, Bangalore, 1974.

The study of Nangia, S.(1976)[15] is limited a single city region of Delhi. A radius of 40 Km from the city has been taken by her. She finds that distance has an important bearing on the settlement structure and the population size of the region. Growth and density of population and percentage of workers engaged in tertiary activities,however,vary from one variable to another showing both positive and inverse relationships. For example, while population size,density and workers in the tertiary activities. Show an inverse relationship with distance, male female ratio, agricultural activity, etc. show a rising trend upto 8 km and a declining trend beyond. In the distant peripheral areas the relationships are found to be very much noisy.

Two other studies, namely, 'Impact of Metropolitan City on the surrounding Region: A Study of South Kolaba,Maharashtra' by Deshpande and others[16] and 'The Impact of urbanization on Land-use in the Rural Urban fringe' by M.M.P.Sinha[17] are worth mentioning in this connection. In the former the anothers attempt to study as to how far the regional hierarchy of towns has been disturbed by the influence of metropolitan

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15.Nangia,S.K. 'Delhi Metropolitan Region: A study in settlement Geography',K.B.Publications,New Delhi,1976.

16.Deshpande C.D.,Arunachalam,B., & Bhat,L.S. 'Impact of a Metropolitan City on the Surrounding Region: A study of South Kolaba' Maharashtra,Concept Publishing Co,New Delhi. 1980.

17.Sinha,M.M.P. 'The Impact of Urbanization on Land-use in the Rural Urban Fringe,Concept Publishing Co.New Delhi, 1980.

Bombay and what are the patterns and implications of the rural to urban migration, i.e. from south Kolaba Region to Bombay. In this study the adverse effects, including that of out-migration from the metroplis, on the settlement hierarchy of South Kolaba have been shown. But it does not deal directly with the gradients of rural-urban interaction. In the latter study the impact of Patna City on the land-use patterns of its rural-urban fringe has been studied. Here the another finds that the impact of Patna city on its fringe is limited not only to land-use, agricultural practices, and land values, but it extends also to other characteristics, such as number of agricultural workers, population density, services etc. The degree of impact an various farms is found to decrease in general with increase in distance from the Patna City.

Markandey, Kalpana's (1982)[18] work on four regional urban centres of Andhra Pradesh is three-forked i.e. inter regional intra-regional and intra-city. The main thrusts of this study are:-

(a) Delimitation of urban fields of the regional urban centres.

(b) Study of the structural correletes (demographic and socio-economic structure) of regional urban centre.

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18. M.Kalpana, "Regional Urban Centres: Structure and Interaction", Inter-India Publications, New Delhi, 1982.

(c) State-level interaction of these centres. The variables selected to gauge the extent and degree of urban influence are (i) Density of population (ii) growth rate (iii) sex ratio (iv) Percent literate population (v) Percent working population (vi) Percent of workers in non-agricultural sector (vii) Ratio of agricltural to non-agricultural workers. Her finding is that, extension of high influence zone in up to 15 Km., and the area between 15 k.m. to 30 k.m. and 30 k.m. - 80 k.m. are respectively termed as urban shadow zone and peripheral rural zone.

The study on Gauhati's city - region has been done by Jayasree Borah (1985)[19]. Which is based on both primary and secondary survey.

In this study, delineation of Gauhati's hinterland has been done by using statistical techniques like gravity models, breaking point distance. Besides, the common method of demarcation of service zones also has been carried out. After demarcating the hinterland, the different socio-economic and demographic characteristics of the city region have been studied in relation to distance from cities. Thus, this study presents an overall idea about the surrounding region of Gauhati city.

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19. Borah, Jayasree, "Spatial Strcuture of Urban Influence In The Neighbouring Areas of Gauhati City", Inter-India Publication, New Delhi, 1985.

The foregoing literature survey reveals, that most of the studies are concerned with various ways of demarcating the hinterland of a city and finding out the extent of influence of that city on the demarcated hinterlands.

But, not any study has considered the influence of only the nearest city on its surroundings. A hinterland of a city, demarcated in the above mentioned ways is a broad concept as it may be very large in extent. There may be every possibility of inclusion of some villages (in that hinterland), from which the core town is not the nearest town. Therefore a village may fall in the hinterland of its nearest town, and also in the hinterland of any other neighbouring town. Obviously, the impact of a nearest town is expected to be significant to study.

Thus, an attempt has been made here, to evaluate the comparative influence of the different nearest towns.

Again, the economic base is the main backbone of a city. Difference in economic bases from city to city may induce difference in the pattern of city's influence on its surroundings. But, not any of the earlier studies have viewed the urban influence from the angle of City's functional specialisation.

Thus, the present study attempts to bridge the gaps of the earlier studies, with the following objectives.

1.3 Objective:

The main objective of this study is to make a comparative evaluation of influence of the nearest urban centres with different economic bases, on their rural surroundings.

Speaking specifically, the objectives are as follows:

(a) Comparison between the villages and their nearest cities, in respect of certain demographic and socio economic characteristics.

(b) Comparison between different distance zones of the surroundings, in terms of those demographic and socio economic characteristics.

(c) Comparison between the extent or gradient of influence exerted by cities of different functional types.

1.4 Hypothesis

It may be generally hypothesized, that the urban type characteristics are inversely related to the distance from cities to villages.

In terms of certain demographic and socio economic characteristics of the hinterlands the hypotheses and the rationale behind them, can specifically be spelt out as follows:

i) Density of population and growth rate of population are expected to be inversely related with the distance from cities i.e. the nearer the villages to cities higher will be density and growth rate of population and vice versa.

The reason behind this is, villages close to the city could be attributed to the land-use and occupational structure, which permit a more dense compaction of population. It is also the result of the settlement by immigrants both from rural and urban areas. The greater sense of affinity to rural areas, along with the desire to avail opportunity of urban areas, induce the rural immigrants to settle in the immediate surrounding of the cities. Again because of the comparatively cheaper land than the proper city , these nearer village villages experience a large spill-over of persons from urban areas.

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(ii) Sex ratios are presumed to be relatively low close to cities and high farther away, since the former areas are supposed to be at the receiving end of 'male-immigrants stream and the latter at the giving end.

(iii) An inverse relation may be expected between dependency ratio* and distance from cities, because of two following reasons.

*The definition has been given in section 3.1.4 Chapter.III.

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First, the agriculture is more labour intensive than the other non-agricultural occupation for which a small proportion of agricultural workers in the areas close to cities, bear the burden of a bloated up non agricultural work-forde. Secondly, more remunerative jobs in near the cities, afford a high propensity of dependency, compared to the rural areas, where almost every member of the family is employed.

(iv) The proportion of scheduled caste population may be assumed to be inversely related with distance from cities probably because of the less provision of employment and more caste-conflict in the remote rural areas.

(v) Literacy rate is assumed to be negatively correlated with distance from cities to villages because:-

a) cities are the origins of social development where the need for educational attainment is great in order to gain social and economic escalation in the urban environment.

b) and the easy availability of educational facilities is urban areas.

c) urban areas demand skilled and educated work force, for which the literacy close to cities is also high.

However because of these factors both male and famale literacy may be assumed to have downward gradient with distance from cities.

(vi) The work participation rate is assumed to be directly related with distance from cities, because of the more labour intensive character of the agricultur and also for the poorer rural economy (than the urban economy) which compells every member of a rural family to work.

Hence, total, male, female literacy will be higher as distance increases from cities.

(vii) It is generally hypothesized that distance from cities to remote rural areas will increase the proportion of cultivators, as the rural economy is agro-based and urban economy is non-agro based.

(viii) Because of the same reason (as that of cultivators), the proportion of agricultural labourers may also be directly related with distance from cities.

(ix) As household industry typifies the rural industrialisation, therefore, the proportion of workers in household industry may be presumed to be lower close to cities than to rural areas.

(x) In absence of the data solely for the non-agricultural workers, from 1981 census* , the category of workers in 'others' can be considered basically as non-agricultural workers. Thus in relation to distance from cities this (others') characteristic may be assumed to be inversely/just related for the opposite reason for cultivators/ agricultural labourers.

(xi) In relation to the increasing distance from cities, the overall availability of infrastructural facilities in the villages may be expected to be decreased i.e. there may exist an inverse relationship between distance from cities and availability of facilities in the villages, as the urban centres generally possess a large variety of amenities and facilities in contrast to rural areas.

However, all these hypotheses have been attempted to test in the present context, in view of the different economic bases of cities.

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* as the 1981 census doubled the data for nine industrial category to four categories for which the 'others' category includes workers in , secondarry, tertiary, service and some section of primary section like livestock, orchards.

## 1.5 Chapter Scheme

The present study of urban influence on rural surroundings has been organised into several chapters.

The first chapter 'Introduction' presents the background of the study, review of related literatures, objective and hypotheses of the present study.

In second chapter, the reasons for selecting the study area, methodology, data base and a description of geo-economic set-up of the study area have been discussed.

The third chapter entitled 'An overview of demographic and socio-economic profile' city- hinterland comparison' gives a comparative analysis of different demographic and socio-economic aspects of the four selected cities and their hinterlands.

In the fourth chapter the relationship between distance from cities and different social and demographic aspects of the surrounding villages have been analysed.

Likewise, the fifth chapter brings out the relations of distance( from cities)with economic characteristics of the rural surroundings.

Chapter six is concerned with the discussion of infrastructural facilities available in the villages and focuses the relation between distance and the availability of some important facilities.

Finally chapter seven sums up all the observations emerged out from the study and attempts to draw conclusions on that basis.

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## Chapter - II

## AREA OF STUDY, METHODOLOGY, DATA BASE

The present chapter is divided into three broad sections The first section presents the rationale for selection of study area. The second section deals with methodology and data base. The third section describes the geo-economic set-up of the study area.

### 2.1 Rationale for Selection of the Study Area :

The foci in this evaluation - study of urban influence on rural surroundings, are villages around some class-I cities of Bihar. The bases for selecting the state of Bihar, in particular, have been given in following lines :

In India, four major metropolises -- Delhi, Madras, Calcutta, Bombay -- form the major regional systems of cities in north, south, east and west part respectively. Among these regional systems, eastern region is the most important, because of its historicity. It stands as an evidence of colonisation in India. Because of this historical significance, this region draws attention to be studied.

In this region, the ideal choice should have been of West Bengal -- the most important state in this part. But mainly due to the non-availability of data for many of the

villages of West Bengal, this state could not be selected.[1]

The study, therefore, has chosen Bihar -- the next important state in the eastern region. Furthermore, from the aforementioned review of literature (Chapter I), it is apparent, that the comparative studies of urban influence on the neighbouring rural areas are few for Bihar. This fact is an additional reason to select the state of Bihar as the study area.

Now, a question may crop up as to why this study is restricted to the peripheries of some of the class-I cities, in particular. The answer is this: larger cities are evidently the foci of modernisation and regional economic development. As, towns of smaller dimensions exhibit many characteristics of rural areas, large urban communities may be considered as representative of the regional urban system. Therefore, in comparison to smaller towns, larger cities with their greater opportunities and facilities, are expected to exert a more far reaching influence on the socio-economic development of their surrounding regions. Our attention is thus, on the surroundings of class-I cities.

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1 Village-level data are available in District Census Handbook, Part A and Part B. But, for many of the districts of West Bengal, Part A (Town Directory) was not available, for which the state could not be taken.

A study based on the villages in the hinterland of all class I cities of Bihar, would have been beyond the scope of the present work. This study, therefore, has chosen four cities (class I) to represent four different types of towns, which are namely, Purnia, Dhanbad, Darbhanga and Patna.

The criterion for selecting these four towns is their different economic specialisations, as, the basic objective is to investigate various patterns of influence of cities, in the light of their different economic bases. The functional nature of these cities are as follows:

Purnia - Agricultural (Dominant Primary sector)
Dhanbad - Industrial (Secondary sector based)
Darbhanga - Tertiary sector - dominated.
Patna - Service sector and tertiary sector based.
(for functional classification of these cities, see Table 2.1)
[The procedure to deduce these functional classifications, has been given in 'Methodology', page 32 ]. In spite of presence of other cities (except the above four) with same economic bases, the reasons for selecting these particular cities are as follows:

(a) Among the sixteen class-I cities of Bihar, the percentage of workers in primary sectors is the highest in Purnia.[2]

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2 See Table 2.1, pp. 47

Again, this percentage is higher than the percentage of the other sectors of Purnia itself. That is why, this particular town has been selected as a representative of agro-based town.

(b) Dhanbad has been chosen because of its industrial sector. Though Jamshedpur is also an important industrial city, yet in terms of percentage share of workers engaged in secondary sector, Dhanbad exceeds Jamshedpur,[3] for which it has been taken.

(c) Darbhanga, consisting of a substantial proportion of workers in tertiary sector, and being an ancient city, has become the attraction for the present study.

(d) Apart from the dominant service base, (along with the base of tertiary sector), Patna has been specially chosen because of its importance as state capital.

To evaluate the influence of these four cities villages with a population of 1000 and more have been selected from their surroundings. The reason for selecting only the villages with 1000 and more population is that, the influence of a class-I city is expected to be more evident on these villages, than on the villages of less than 1000 population,

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3 See Appendix 1

# BIHAR

## LOCATION OF THE SELECTED CITIES

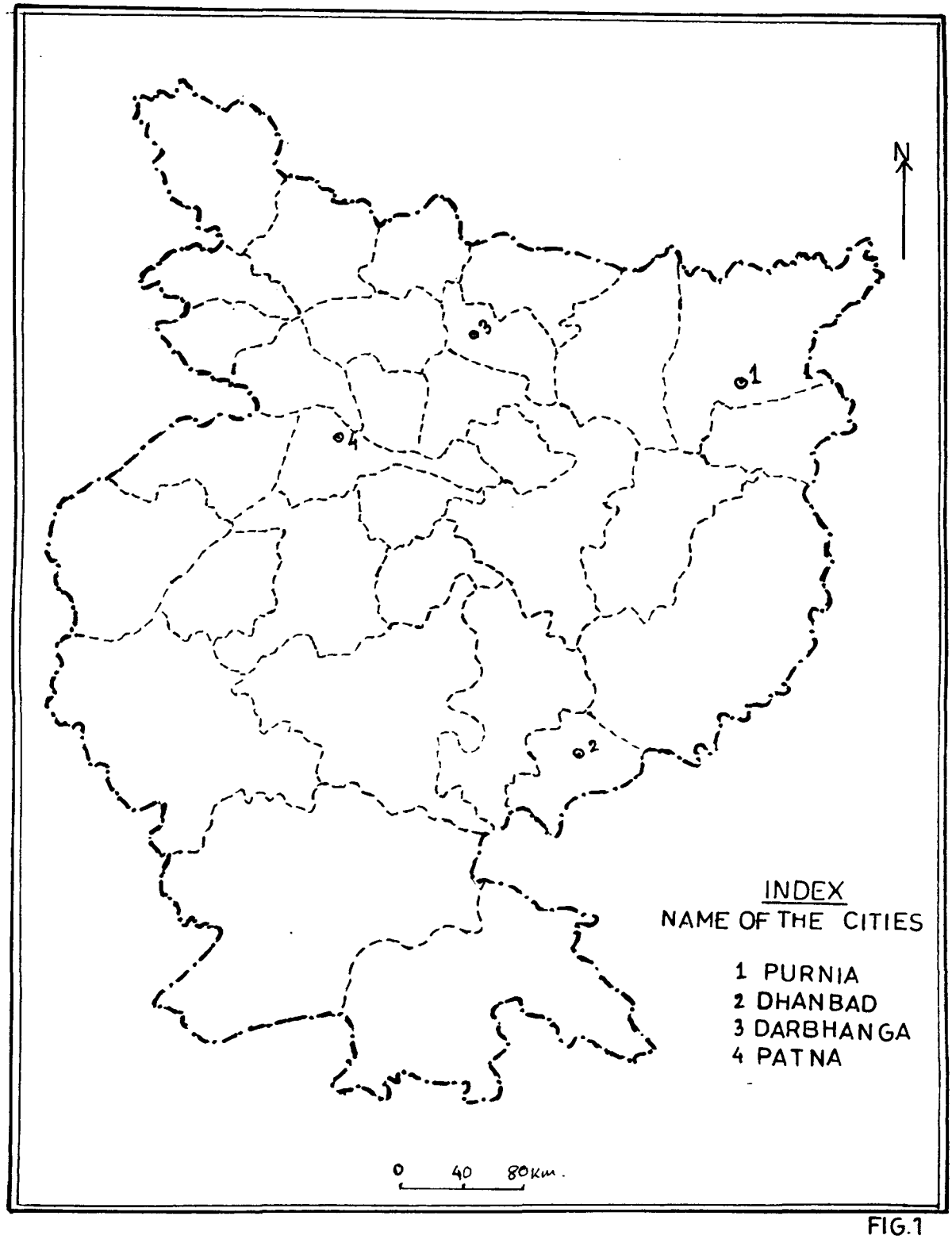


FIG.1

which are so to say, insignificant. The location of the four selected cities

have been shown in Fig. 1

The next subsection discusses methodology and data base.

## 2.2 Methodology and Data Base

The methodology applied for studying the urban influence on the rural surroundings of four class-I cities, has been explained in this section in different stages.

### 2.2.1 Functional Specialization of Cities

The functional specialisations of the cities have been worked out on the basis of nine industrial classification of workers as given in census. These categories are as follows:

(I) Cultivator

(II) Agricultural labourer.

(III) Livestock, forestry, fishing, hunting, plantation, orchards and allied activities.

(IV) Mining and quarrying.

(V) Manufacturing, Processing, Servicing and Repairing.

(a) Household Industry
(b) Other than household Industry.

(VI) Construction.

(VII) Trade and Commerce.

(VIII) Transport storage and communication

(IX) Other services.

But, in 1981 census, the data for these nine categories are not available for town level. It has clubbed these nine categories into four basic categories which are

(I) Cultivator

(II) Agricultural Labourer.

(III) Workers in Household Industry (Va)

(IV) Other Services (III, V(b), VI, VII, VIII, IX).

As from these categories it is not possible to find out the functional specialisation of town, the data of 1971 census have been utilised for this purpose.

At first, the percentage of workers in each of the category to total workers have been calculated, and then those percentages have been clubbed in four major category of Primary, Secondary, Tertiary and Service sector for all the class I cities of Bihar (See Appendix I ). After that the four aforementioned cities have been selected for reasons given in page 29 .

2.2.2 Selection of Villages

One of the objectives of this study, is to find out the influence of the nearest city on its surroundings. Therefore, for each of the four cities, those villages have been selected, from which the distance of these cities is the nearest, compared to other cities. The rationale for considering this nearest-town approach is that, the nearest

towns are supposed to have the greatest influence on villages, than any other neighbouring towns. That is why, the common methods of delineation of hinterland by demarcation of different service zones as bus service, retail trade, vegetable supply, newspaper circulation, education, etc. have not been applied here as these zones may include some villages, from which the respective towns may not be the nearest. Also, for the same reason, no statistical methods for demarcation of hinterland as, gravity model, breaking point concept, have been used here. The only criterion used here is distance of the nearest town from villages.

However, for the present study, a zone of 1-40 Km distance from each cities has been taken, which is further subdivided into four micro distance zones as

(a) 1-10 Km. zone

(b) 11-20 Km. zone

(c) 21-30 Km. zone

(d) 31-40 Km. zone

Despite the non-application of any of above mentioned methods to delineate the influence zone or hinterland of cities, the entire distance zone of 1-40 Km. from the cities may be referred to as the 'city-region' or 'hinterland' in a limited sense, for the purpose of the present study.

Now, from each zones, villages (with a population of 1000 and more) have been selected randomly, covering the whole area. A sample of 40% of the total villages (having population of 1000 and more) has been taken. Nearly the same proportion (40%) has been maintained for each distance zones, barring a few exceptions.

2.2.3 Statistical Techniques

Different statistical techniques have been used for the purpose of the present study.

(a) To represent the absolute number of infrastructural facilities in a comparable manner, composite scores have been constructed using the following formula :

$$C_{ij} = \Sigma x_{ij} W_{ij}$$

Where

$W_i$ = weightage of i-th function denoted by $(W_i) = \frac{N}{F_i}$

$N$ = Total number of villages

$F_i$ = Number of villages having i-th function

$X_{ij}$ = Values of i-th function in j-th village.

$C_{ij}$ = Composite value of i-th function in j-th village.

(This method is generally adopted to measure the centrality scores and hierarchy of settlements).

After calculating '$C_{ij}$' for each of the facilities of each of the villages, they have been added for individual facilities (Educational, Medical, etc.)

Then averages have been worked out from total $C_{ij}$, for each distance zone and for the hinterland as a whole.

(b) To measure the degree of relationship between the distance from the city and different developmental variables, Pearson's product moment correlations have been worked out. Furthermore, three types of regression equations have been fitted to examine the gradients of urban influence, which are as follows:

1. Simple Linear ($Y = a + bx$) where a unit change in the x variable leads to 'b' unit change in the Y variable.
2. Exponential or semi-log ($Y = ab^x$) where a unit change in the x variable leads to a change in the Y variable by 'b' times.
3. Pareto or Double log ($Y = ax^b$) where a relative change in the 'x' variable causes a relative change in the 'Y' variable by 'b' times.

To estimate the regression constants 'a' (intercept) and 'b' (regression coefficients), the principle of least square is applied in the case of linearity of relationship

i.e. $Y = a+bx$.

The exponential and the Pareto functions become linear after logarithmic transformation and hence the principle of least square can be used to estimate the constants. For example, the logarithm of

$Y = ab^x$ (exponential) is

$\log Y = \log a + x \log b$.

This transformation is known as semi log transformation because of the two variables x and y, only y is transformed into its logarithm form and not x.

The principle of least square will estimate the value of log a and log b. Taking anti log of these values, we will get exact estimates of 'a' and 'b'.

Similarly, the logarithim of pareto function

$Y = ax^b$ is

$\log Y = \log a + b \log x$

This transformation is known as double log, because both the variable 'x' and 'y' are converted into their logarithmic values. The principle of least square will give the estimate ef log 'a' and 'b'. Thus, only antilogarithm is required for log a. The value of 'b' is estimated as such.

Apart from fitting the regression equations, tests of significance have also been carried out for correlation coefficients, and regression coefficients.

:.10 (c) To compare various characteristics (demographic and socio-economic) between the cities and their hinterlands bar-graphs have been drawn. For the distance-decay analysis of different characteristics of hinterlands the gradient curves have been drawn by taking the average values of the variables in each distance zones in the y-axis and the distance from the city to villages in x-axis.

2.2.4 Variables and Data Base

To examine the urban influence on rural surroundings the following variables have been taken from different sources.

A. Demographic Variables

(i) Density of population per square kilometre, 1981.

(ii) Growth rate of population (1971-81).

(iii) Sex Ratio - females per thousand males, 1981.

(iv) Dependency Ratio - non-workers per hundred of main and marginal workers, 1981.

B. Social Variables

(i) Total literacy rate, i.e. percentage of literates to total population, 1981.

(ii) Male literacy rate - percentage of male literate to total male population, 1981.

(iii) Female literacy rate - percentage of female literates to total female population, 1981.

C. Economic Variables

(i) Total work Participation Rate - percentage of total workers to total population, 1981.

(ii) Male work Participate Rate - percentage of male workers to total male population, 1981.

(iii) Female work participate rate - percentage of female workers to total female population, 1981.

(iv) Percentage of cultivators to total workers, 1981.

(v) Percentage of agricultural labourers to total workers, 1981.

(vi) Percentage of workers in household industry to total workers, 1981.

(vii) Percentage of workers in 'others' category to total workers, 1981.

D. Infrastructural Facilities

(i) Educational Facilities:

(a) Number of Primary Schools (P) in a village.

(b) Number of Middle Schools (M) in a village.

(c) Number of Secondary Schools (H) in a village.

(d) Number of Colleges (C) in a village.

(e) Number of Training Schools (Tr) in a village.

(f) Number of Adult Literacy class/centres (Ac) in a village.

(g) Number of Other Educational Institutions (O) in a village.

(ii) Medical Facilities :

(a) Number of Hospitals (H) in a village.

(b) Number of Maternity and Child Welfare Centres (MCW) in a village.

(c) Number of Health Centres (Hc) in a village.

(d) Number of Primary Health Centres (PHc) in a village.

(e) Number of Primary Health Sub Centres (PHS) in a village.

(f) Number of Dispensaries in a village.

(g) Number of Family Planning Centres (FPC) in a village.

(h) Number of Registered Practitioner (RP) in a village.

(i) Number of Community Health Workers (CHW) in a village.

(j) Number of Subsidised Medical Practitioner (SMP) in a village.

(k) Number of 'others' (O) in a village.

(iii) Drinking Water Facilities:

(a) Number of wells in a village (W).

(b) Number of tubewells in a village (TW).

(c) Number of Tap in a village (T).

(d) Number of Tanks in a village (TK).

(e) Number of Handpumps in a village (HP).

(f) Presence of Canal/Nala/Spring water (C/N/S).

(iv) Facilities of Post and Telegraph :

(a) Number of Post Offices (PO).

(b) Number of Post and Telegraph Offices (PTO).

(c) Number of Telephones (Phones).

(v) Communication Facilities :

(a) Presence of Bus Stand (BS).

(b) Presence of Railway Station (RS).

(vi) Power Supply :

(a) Availability of electricity for domestic purposes (ED).

(b) Electricity for Agricultural purposes (EAg).

(c) Electricity for others (EO).

(d) Electricity for the above all purposes (EA).

(vii) Approach to Village :

(a) Approach with Pucca Road (PR).

(b) Approach with Kutcha Road (KR).

(c) Approach with Navigable water (NW).

(viii) Days of Market or Hat:

(a) Weekly market.

(b) Bi-weekly market.

(c) Three days of market in a week.

(d) Four days of market in a week.

2.2.5 Data Base

The data for the above-mentioned variables have been collected from following sources:

For Village-Level Data

(i) District Census Handbook, Purnia, 1971*, 1981 Series 4 Part XIII - A & B, Village and Town Directory, Village and Townwise Primary Census Abstract.

(ii) District Census Handbook, Dhanbad, 1971*, 1981, Series 4 Part XIII, A & B, village and Town Directory, Village and Townwise Primary Census Abstract.

(iii) District Census Handbook, Darbhanga, 1971*, 1981, Series 4, Part XIII, A & B, Village and Town Directory Village and Townwise Primary Census Abstract.

(iv) District Census Handbook, Patna, 1971*, 1981, Series 4 Part XIII. A & B, Village and Town Directory, Village and Townwise Primary Census Abstract.

For City-level Data

(i) Census of India, 1981 (series 4), Bihar Part X-A, Town Directory.

(ii) Census of India, 1981 (series 4), Bihar Part III, A & B (i), Economic Tables.

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* District Census Handbook of 1971 for all the four districts have been consulted only to calculate population growth rate (1971-81) of villages.

## 2.3 Geographical Setting of the Study Area

The state of Bihar extends approximately from 22°N to 27°31' N latitudes and from 83°20'E to 88°17'E longitudes. It has an area of 17,3876 square kilometres. With a population of 6,99,14,734 in 1981 -- 10.2 percent of the national population --, it ranks as the second largest state of the Indian Union, (the first being Uttar Pradesh).

Bihar is a heterogeneous geographical unit. It comprises two distinct physiographic units: (a) the vast plain area of the Middle Ganga Valley in the north and (b) the Chota Nagpur Plateau of Peninsular India in the south. These two units, the former being characterised by extensive alluvial plains, intensive subsistence farming, and the latter being richly endowed with minerals, have made their own distinctive contribution to the growth and evolution of urban centres in the state.

The Ganga divides the former region into two unequal parts.

The North Bihar Plain is only 250 ft. above the sea level except a small hilly tract of Himalayan footnills. Here, the perennial character of a number of rivers (the Gondak, the Burhi Gandak, the Baghmati, the Kosi) has been very much responsible for evolution and growth of permanent

settlements in general and town in particular.

The South Bihar Plain rises more rapidly away from the Ganga than on the north of the river, which is ultimately transformed into plateau. Some parts of this plain, are liable to annual flood. "This entire plain area of Middle Ganga Valley has, however, been the cultural and economic heart of India which appear to have been occupied by human settlement deep down during the pre-historic times."[4]

The country south of the 150 m contour line is the hill and plateau region, known as Chota Nagpur plateau. The rugged and undulating terrains have prevented the growth of large urban communities. Again, this entire region abounds in rich mineral deposits particularly coal and iron ore which have been responsible for the birth of a number of urban centres in recent years.

Benefitted largely by favourable plain tracts and climate, the economy of Bihar has been predominantly agrarian. Of course, the plain area of the state in north is agriculturally more productive than the southern Chota Nagpur plateau,

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4 R.L.Singh and K.N.Singh (eds), Middle Ganga Plain in India : A Regional Geography, National Geographical Society of India, Varanasi, 1971, p.184.

which is eminently industrialised region. The industrialisation in turn is responsible for urban agglomerations. This state has a very low profile of urbanisation with 12.5% urban population, which is about half of the national average.

However, the cities and their rural counterparts, selected for the present study, fall in the three physiographic regions of the state, i.e., Purnia and Darbhanga in the North Bihar Plain, Patna in the South Bihar Plain and Dhanbad in the Chota Nagpur Plateau.

Among these four cities, Patna is one of the most ancient cities of India. Before independence, it was the principal capital of Bihar and Orissa. The establishment of Patna University in 1919, created the cultural focus in the city. In post independence period administrative and commercial activities in the city increased manyfold which led to sprawl of the city to its present extent. The city expanded in a linear fashion parallel to the Ganga as the land immediately behind the 'levee' is low and liable to flood. Presently, it is the capital of Bihar, which has a population size of 918903 in 1981.

Extremely north-south along the little Baghmati river, Darbhanga is the largest city in North Bihar plain, and has been important since pre-historic times. The city,

besides being the district headquarter, has also become the seat of higher learning with the establishment of Mithila University headquarters. According to 1981 census, the population of the city is 176301.

The city of Purnia is situated in the eastern part of the North Bihar Plain. As a bordering town between Bihar and West Bengal, this town has an additional importance in view of the inter-state migration. Particularly, after the partition of the country in 1947, this city experienced an exceptionally high rate of population increase. The population size of Purnia urban agglomeration is 109875 in 1981.

Dhanbad, in the southeast part of the Chota Nagpur Plateau region, is significant in respect of mining and industries. Situated in the border of Bihar and West Bengal it is drained by the river Barakar. Its "peculiar nature of coal-field urbanisation, seems to preclude any comparison with other towns and cities".[5] Dhanbad experiences a direct rural-urban migration, raw recruits to the city coming in from the villages, because of its industrial development.

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5 D.Rothermund, E.Kropp, G.Dieuemann, (eds.), "Urban Growth and Rural Stagnation", Manohar Publications, New Delhi, 1980, p.453.

The present population size of this industrial urban-agglomeration is 678069 (1981). Table 2.1 gives an idea about the functional classification of the cities mentioned above, by showing percentage distribution of workers in different sectors:

Table 2.1

Percentage Distribution of Workers in Different Sectors (Selected Cities) 1971

| Name of Cities | Percentage of Workers in | | | |
|---|---|---|---|---|
| | Primary | Secondary | Tertiary | Service |
| Purnia U.A. | 33 | 16.11 | 28.76 | 22.13 |
| Dhanbad U.A. | 2.63 | 62.36 | 21.88 | 13.13 |
| Darbhanga | 8.03 | 23.11 | 41.32 | 27.54 |
| Patna U.A. | 14.83 | 22.99 | 30.34 | 31.84 |

The above table is the basis of the deduced functional specialisation of the cities (see page 29). Thus, the foregoing discussion reveals, that the selected four cities have developed in different geographic and socio-economic environs, which may be reflected differently on their rural surroundings.

The hinterlands of the four selected cities differ in sizes, in respect of the number of villages. These numbers vary in each category of distantezones, of the hinter-

lands. However, for the present study, about 40% of the total number of villages (with a population of 1000 and more), have been taken into consideration. Table 2.2 shows the actual and sampled number of villages in each distant zones of the four hinterlands.

Table 2.2

Distribution of Total and Selected Number of Villages in Different Distance Zones of Hinterlands, 1981

| Hinterland of | | Distance Zones | | | | Total | |
|---|---|---|---|---|---|---|---|
| | | 1-10 Km. | 11-20Km | 21-30KM | 31-40Km. | No. | Percents |
| Purnia | T | 26 | 53 | 60 | 48 | 187 | 100 |
| | S | 10 | 21 | 24 | 20 | 75 | 40 |
| Dhanbad | T | 32 | 34 | 11 | 3 | 80 | 100 |
| | S | 13 | 13 | 4 | 2 | 32 | 40 |
| Darbhanga | T | 72 | 137 | 93 | 68 | 370 | 100 |
| | S | 29 | 55 | 37 | 27 | 148 | 40 |
| Patna | T | 42 | 43 | 16 | 1 | 102 | 100 |
| | S | 15 | 16 | 8 | 1 | 40 | 39.22 |

Note : T = Total Number of Villages

S = Sampled villages.

According to table (2.2) the hinterland of Darbhanga is the largest, while that of Dhanbad is the smallest in size.

This table states another picture. The concentration of villages is the highest in the zone of 21-30 Km. around Purnia, in 1-20 Km around Dhanbad, in 11-20 Km. surrounding Darbhanga and Patna. This pattern is confirmed by the average distances of the sampled villages from their respective urban cores, which are as follows:

| From | Average Distance (Km) of the Hinterland |
|---|---|
| Purnia | 24.17 |
| Dhanbad | 13.72 |
| Darbhanga | 20.16 |
| Patna | 14.45 |

So, the hinterland villages of Dhanbad and Patna are more close to their respective cities, than villages from Darbhanga and Purnia.

Except the hinterland of Patna, the villages around other three cities, are included in the respective districts of cities. But, a part of Patna's city-region includes a few villages of Vaishali District (neighbouring district of Patna), within 1-40 Km. zone, the number of which have been added with the total number in table 2.2 These numbers are given separately in appendix.

Coming to the point of population size of the villages of four hinterlands, it is found that, a number of villages consist a population of more than 5000, which is the boundary line between urban and rural areas (in respect of size of population). Furthermore, some villages exceed 10,000 in population. As villages of 1000 and more population have been taken, therefore, to work out the relative size classes the villages have been categorised as follows:

(i) Small villages -- 1000-5000 population.

(ii) Medium villages -- 5000-10000 "

(iii) Larger villages -- 10000-15000 "

The distribution of these three types of villages in different hinterlands has been given in table 2.3

Table 2.3

Percentage Distribution of Villages in Different size-categories, 1981

| Hinterland of | Percentages of villages | | | Total |
|---|---|---|---|---|
| | small | medium | large | |
| Purnia | 89(63) | 12(9) | 4(3) | 100(75) |
| Dhanbad | 96.88(31) | 3.12(1) | -- | 100(32) |
| Darbhanga | 75(111) | 21.62(32) | 3.38(5) | 100(148) |
| Patna | 75(30) | 22.5 (9) | 2.5 (1) | 100( 40) |

Note: The figures in 'brackets' are the absolute numbers of sampled villages.

Table 2.3 indicates that there exists a great difference between the hinterland of Dhanbad on one side, and the other three hinterlands on other side, in terms of size distribution of villages. Unlike others, the city-region of Dhanbad does not possess any large villages (10,000 - 15,000 population) and has a very small percentage of medium villages. This picture may be explained by the negative physical factors of Dhanbad and its surroundings, preventing the growth of large villages.

Size distribution of villages can also be seen in relation to their distance from the core towns. Table 2.4 gives the size distribution of villages for four distance categories of four hinterlands (Table 2.4).

Thus, it appears from the preceeding discussion, that the location of the villages and their population size largely depends upon the geo-economic set-up of their environs. A more detailed picture of demographic and socio-economic features of the hinterlands in comparison to that of their respective urban cores, can be obtained from chapter III.

Table 2.4

Size-Distribution of Villages in Different Distance Zones of Four Hinterlands, 1981

| Hinterland of | Distance Zone(Km) | Size-categories of villages Small(%) | Medium(%) | Large(%) | Total (%) |
|---|---|---|---|---|---|
| Purnia | 1-10 | 9.33( 7) | 1.33( 1) | 2.67( 2) | 13.33(10) |
| | 11-20 | 22.67(17) | 5.34( 4) | | 28.01(21) |
| | 21-30 | 28.00(21) | 4.00( 3) | | 32.00(24) |
| | 31-40 | 24.00(18) | 1.33( 1) | 1.33( 1) | 26.66(20) |
| | Total | 84.00(63) | 12.06( 9) | 4.00( 3) | 100.00(75) |
| Dhanbad | 1-10 | 57.5 (12) | 3.12( 1) | | 40.62(13) |
| | 11-20 | 40.63(13) | | | 40.63(13) |
| | 21-30 | 12.5 ( 4) | | | 12.5 ( 4) |
| | 31-40 | 6.25( 2) | | | 6.25( 2) |
| | Total | 96.38(31) | 3.12( 1) | | 100.00(32) |
| Darbhanga | 1-10 | 18.24(27) | 1.35( 2) | | 19.59(29) |
| | 11-20 | 27.03(40) | 8.11(12) | 2.03( 3) | 37.17(55) |
| | 21-30 | 16.89(25) | 6.76(10) | 1.35( 2) | 25.00(37) |
| | 31-40 | 12.84(19) | 5.40( 8) | | 18.24(27) |
| | Total | 75.00(111 | 21.62(32) | 3.38( 5) | 100.00(148 |
| Patna | 1-10 | 22.5 ( 9) | 15.00( 6) | | 37.5 (15) |
| | 11-20 | 32.5 (13) | 5.00( 2) | 2.5 ( 1) | 40.00(16) |
| | 21-30 | 17.5 ( 7) | 2.5 ( 1) | | 20.00( 8) |
| | 31-40 | 2.5 ( 1) | | | 2.5 ( 1) |
| | Total | 75.00(30) | 22.5 ( 9) | 2.5 ( 1) | 100.00(40) |

Note: The figures in 'brackets' are the absolute number of villages.

## Chapter - III

## AN OVERVIEW OF DEMOGRAPHIC AND SOCIOECONOMIC PROFILE : CITY-HINTERLAND COMPARISON

In spite of an intimate relationship between cities and their hinterlands, a distinct dichotomy is prevalent between certain characteristics of these two parts of a region. The present chapter, therefore, attempts to analyse the disparities between various demographic and socio-economic characteristics of the four selected cities and the sampled villages of their surroundings.[1]

The demographic, social and economic characteristics are as follows :

### Demographic Characteristics

Population Density
Population Growth Rate
Sex Ratio
Dependency Ratio

### Social Characteristics

Percentage of Scheduled Caste Population
Literacy Rate (Total, Male, Female).

### Economic Characteristics

Work Participation Rate (Total, Male, Female)
Occupational Structure.

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1 According to the discussion in 'methodology', page the surrounding villages (sampled) of the cities have been referred to as 'hinterlands'. The averages of different characteristics of these villages, have been worked out to represent the characteristics of hinterland.

## 3.1 Demographic Characteristics.

The census cut-off points of population size (5000 persons) and population density ( 400 persons/sq. km) between urban and rural areas, lead to the demographic distinction between them. Apart from these two census determined differentiating features (population size and density), there are some other demographic aspects like population growth rate, sex ratio, dependency ratio which differ from rural to urban areas. Hence, the present section discusses all these features of the cities and hinterlands. Of course, because of the absoluteness of the characteristic of population size, it has not been considered here. Thus, the discussion starts with the characteristic of density of population.

### 3.1.1. Density of Population

The number of persons per unit area, known as density of population , is an important distinguishing factor of rural-urban agglomeration, as usually an urban

area should have a minimum population density of 400 persons per sq.km.

A comparative picture of density of population between the selected cities and their hinterlands is obtained from table 3.1. and fig. 2.

Table 3.1

Density of Population (Cities and their Hinterlands) 1981

| Cities | Density per sq.km. | |
|---|---|---|
| | City | Hinterland |
| Purnia | 1823 | 546.85 |
| Dhanbad | 3325 | 787.27 |
| Darbhanga | 8463 | 1011.35 |
| Patna | 9192 | 975.71 |

Table 3.1 reveals that the high population densities of the towns of Darbhanga and Patna have been reflected to their hinterlands, and the lowest density (among the four) of Purnia town is also reflected by that of its hinterland. The position of Dhanbad (town and hinterland) is in the middle.

The range of population density of the four hinterlands varies from about 546 to 1011 persons per sq.km.

But this range is much higher for towns i.e. from about 1823 to 9192 per Sq.km. That is why, the difference in terms of population density between the towns and their hinterlands as depicted by the figure is maximum in case of Darbhanga (which possess highest density among towns) and minimum in case of Purnia(which has the lowest density).

It is quite interesting to note, that with the upgradation of economic bases of towns, density of population has increased. The agricultural town (Purnia) and its hinterland have the lowest density, the industrial town (Dhanbad) and its city region have moderate and the towns with tertiary and service bases (Darbhanga and Patna) and their city regions have higher density.

This higher density of the villages around Patna and Darbhanga, may be easily explained by their physiographic favourability, as these regions are situated in the plain tracts of Bihar.

But, inspite of the location in the north Bihar plain, Purnia and its surrounding villages have the lowest density (among the four).

Though, the town of Dhanbad is a part of rugged,

undulating terrain of Chota Nagpur plateau, yet the industrial development of this town acts as a positive factor for the moderate population density both in the town and in the hinterland villages.

One can relate these density differentials with the considerations of the availability of space (as population density represents population in relation to area). The average size of the villages around the four towns has been given in Table 3.2.

Table 3.2
Average Area of the Hinterland Villages, 1981

| Hinterland of | Area in Sq.Km. |
|---|---|
| Purnia | 6.73 |
| Dhanbad | 3.20 |
| Darbhanga | 4.24 |
| Patna | 4.36 |

From this above table, it is understood that villages around Purnia are the most spacious (in average) than villages of other three hinterlands, which may be a reason for the lowest density in that region.

### 3.1.2 Population Growth Rate

The rate at which a population increases during a definite time period, is an important demographic variable. For the present study, the decade of 1971-81 has been taken for population growth rate.

Table 3.3 states the average growth rate of the hinterlands and of their respective cities:

Table 3.3

Growth Rate of Population
(Cities and their Hinterlands)
1971-81

| Cities | Growth Rate in percentage | |
|---|---|---|
| | City | Hinterland |
| Purnia | 54.08 | 26.61 |
| Dhanbad | 48.61 | 73.35 |
| Darbhanga | 33.50 | 37.73 |
| Patna | 66.71 | 30.19 |

Table 3.3 indicates that the population growth rate is much higher in the hinterland of the industrial city (Dhanbad) than that of other cities, while the growth rate of the city itself is much lower than that of the hinterland. The reason behind this may be the increasing generative power of the Dhanbad industrial town,

## GROWTH RATE OF POPULATION

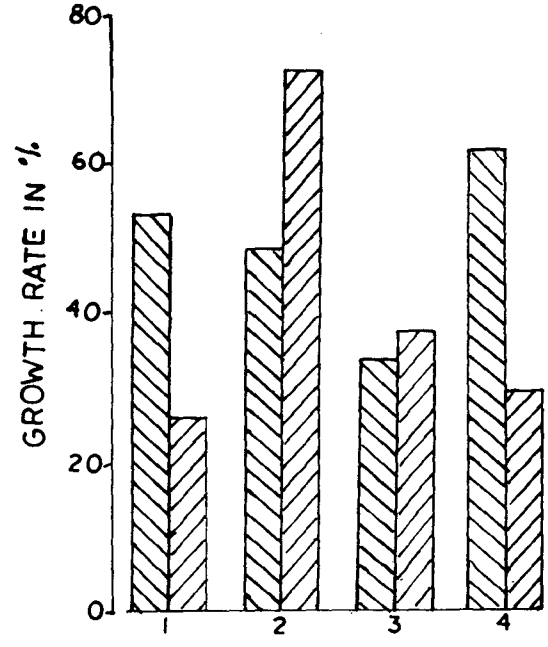


FIG 3

## DENSITY OF POPULATION

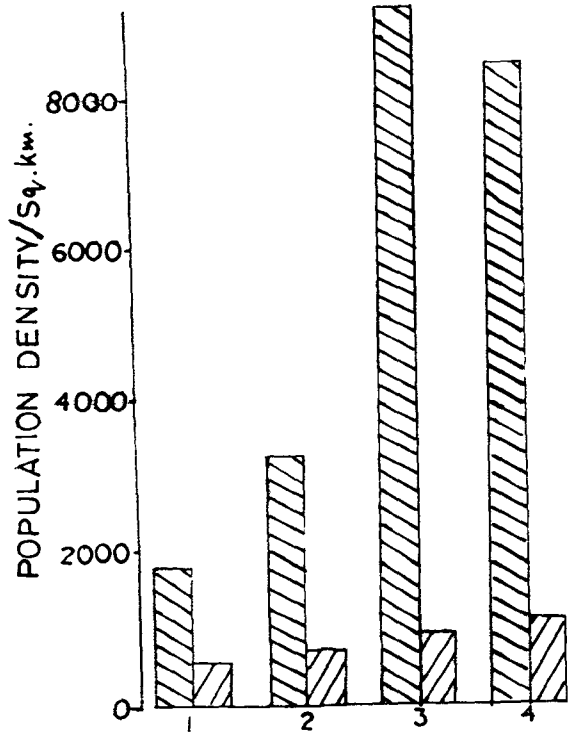


FIG 2

INDEX

CITY

SURROUNDING VILLAGES (AVERAGE)

1 PURNIA
2. DHANBAD
3 DARBHANGA
4 PATNA

3.7 which leads to rapid increase in rural-urban migration rate. But, because of the shortage of space in proper city, the migrants settle in the vicinity of the city. That is why, the growth rate of the hinterland is much higher than that of the city.

As, generative power cannot be expected from an agricultural or a service based town, therefore, the growth of those hinterlands is low.

However, unlike the density pattern, variations in growth rate of the hinterlands do not show conformity with the rate of their core towns, since the towns of Dhanbad and Purnia have not the highest and the lowest growth rate as that of their hinterlands.

The figure 3 illustrates that the city-hinterland disparity in growth rate is the highest for Patna, followed by Purnia and Dhanbad. In Darbhanga this difference is the least.

### 3.1.3 Sex Ratio

Sex ratio is the proportion of female population to male population, which is denoted by number of females per 1000 males. This important demographic feature differs from urban to rural areas. Generally, because of the

preponderance of male outmigrants from rural to urban areas, sex ratio in rural areas is higher than that of urban areas. Table 3.4 represents the disparity in sex ratio between the four cities and their hinterlands.

Table 3.4

Distribution of Sex Ratios
(Cities and their Hinterlands, 1981)

| Cities | Sex Ratios per 1000 | |
|---|---|---|
| | City | Hinterland |
| Purnia | 820.40 | 900.50 |
| Dhanbad | 735.20 | 881.80 |
| Darbhanga | 872.48 | 981.90 |
| Patna | 815.60 | 926.10 |

The impact of the highest and the lowest sex ratio respectively in Darbhanga and Dhanbad is evident in their hinterlands as on average the hinterland ofDarbhanga has the highest values and of Dhanbad has the lowest values.

The Figure 4 depicts clearly that the rural-urban disparity is the maximum for Dhanbad and minimum for Purnia.

However, the lowest sex ratio both in the town and hinterland of Dhanbad may be explained by the industrial economy of the town which is attractive more to the males than to the females from the employment viewpoint. On the

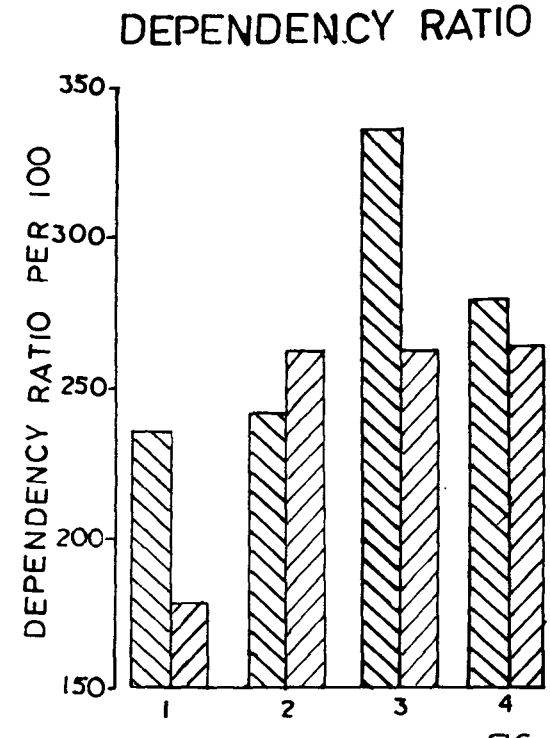


FIG. 5

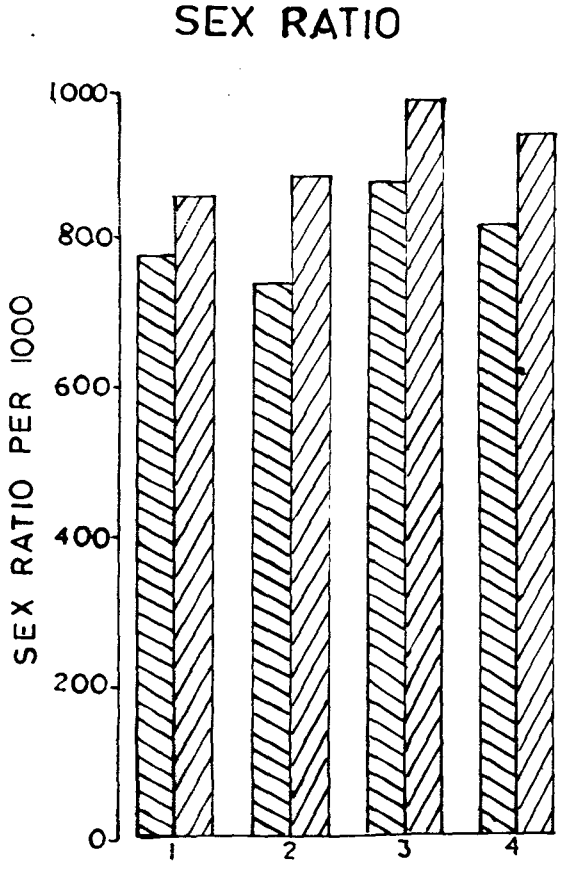


FIG. 4

INDEX

CITY

SURROUNDING VILLAGES (AVERAGE)

1. PURNIA.
2. DHANBAD
3. DARBHANGA
4. PATNA

.9 contrary, Darbhanga with tertiary based economy can generate job opportunities for female to some extent, which in turn raises the proportion of females both in the town and hinterland.

3.1.4 Dependency Ratio

Dependency ratio is a rough measure of dependency burden of a population. It reflects the quantity of man-power of a given population. A very high dependency ratio suggests that the number of workers is comparatively smaller compared to non-workers. Likewise, a low dependency ratio suggests that there is an abundance of employed manpower.

Generally the population of working ages (15-59 age group) is considered as self-dependent and the population below 15 (young population) and above 60 (old population) are regarded as dependent. But in the absence of age-data in village level, dependency ratio is defined as the number of non-workers per hundred of workers.

Dependency ratio is expected to be high close to cities and low in rural areas. This is chiefly because more remunerative jobs in urban areas afford a high propensity of dependency compared to rural areas, where almost every member of the family is employed.

.10 From the point of functional differences of cities, the villages around an agricultural town may have much lower dependency, compared to the hinterlands of cities with other economic bases. The agro-based rural areas being the hinterland of an agricultural town, can avail much technological support from the town, which in turn provides more employment to the people of the villages. So, dependency ratio is expected to be lower there. Table 3.5 shows the average dependency ratios of four hinterlands along with that of their respective cities.

Table 3.5

Distribution of Dependency Ratio
(Cities and their Hinterlands,1981)

| Cities | Dependency Ratio per 100 | |
|---|---|---|
| | City | Hinterland |
| Purnia | 235.94 | 178.39 |
| Dhanbad | 242.09 | 263.42 |
| Darbhanga | 337.26 | 263.12 |
| Patna | 281.33 | 264.97 |

According to table 3.5, the dependency ratio in the city of Darbhanga, is much higher than in its hinterland and also than in the rest three cities. Among the four

3.11 hinterlands, the villages around Purnia have the lowest dependency ratios, which was predicted earlier. Excluding Dhanbad and its city region, in all the three cases, cities dominate their hinterlands in respect of dependency ratio, which implies the prevalance of greater unemployment in cities than in rural areas. For the exceptional pattern of Dhanbad and its surrounding villages, it seems that the agro-based economy of the hinterland cannot compete with the industrial economy of the city to generate employment for their population. This, in turn, raises the non-workers workers ratio of the hinterland more to that of the city.

Fig. 5 depicts that the city-hinterland contrast in dependency ratio, is the maximum between the tertiary based Darbhanga and its hinterland.

## 3.2 Social Characteristics

Urban centres, being the origins of social development, possess contrasting characteristics to that of the rural areas which are in the low stratum of social development. Two pertinent social characteristics, namely, the proportion of scheduled caste population to total population and literacy rates, are focussed here.

.12

### 3.2.1 Distribution of Scheduled Caste Population

Caste is an important social characteristic of any population. In view of the distribution of population of different castes, urban-rural disparities exist distinctly.

Therefore, a close examination of the proportion of scheduled caste for the selected cities and hinterlands is given in table 3.6.

Table 3.6

Proportion of Scheduled Caste Population to total Population (Cities and their Hinterlands) 1981

| Cities | SC Population ( %) | |
|---|---|---|
| | City | Hinterland |
| Purnia | 9.04 | 14.96 |
| Dhanbad | 15.58 | 13.53 |
| Darbhanga | 10.67 | 16.63 |
| Patna | 9.55 | 19.49 |

Except Dhanbad, all other cities have lower proportion of scheduled caste population than that of their hinterlands. The industrial nature of Dhanbad, absorbing many scheduled

PROPORTION OF SCEDULED CASTE POPULATION TO TOTAL POPULATION

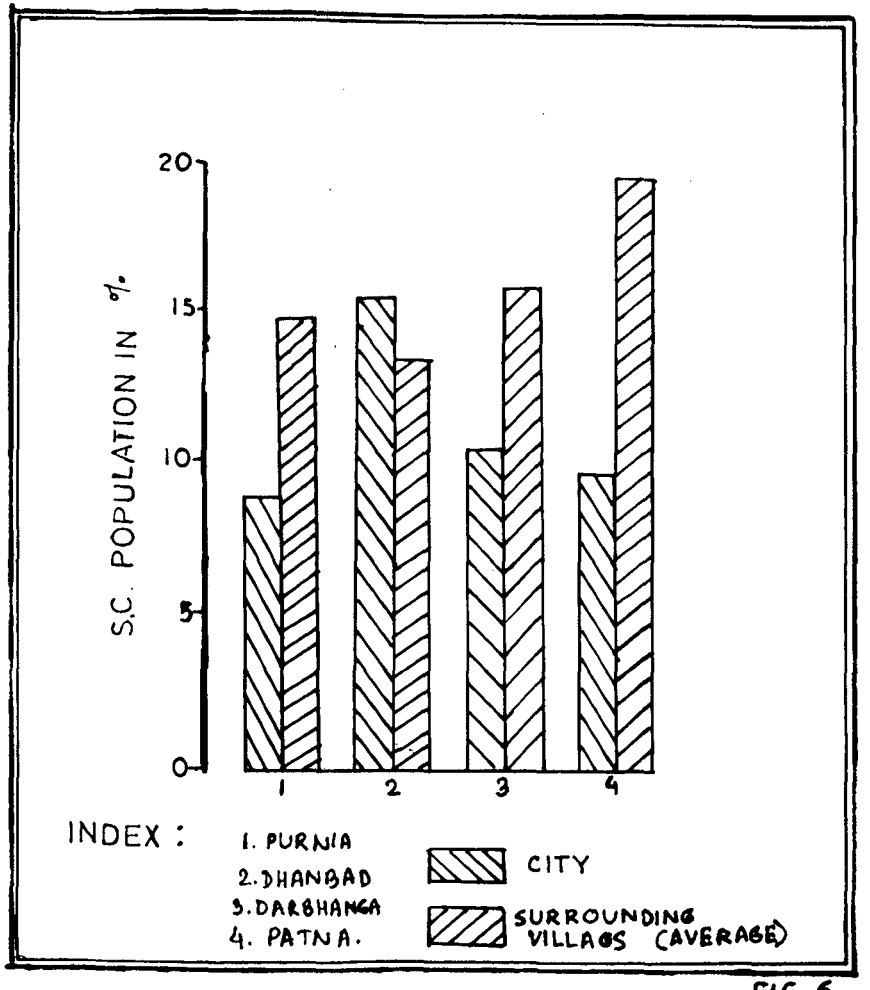


FIG. 6

caste labourers, may be responsible for this exceptional pattern.

2.13

The difference in the proportion of scheduled caste population is minimum between the city and hinterland of Dhanbad and maximum between the city and surroundings villages of Patna (Fig. 6)

3.2.2 Literacy Rate

Literacy rate is denoted by the ratio of literate population to total population. According to census, literates refer to person who can write, read with understanding in any language.

There is a close association between literacy and development, for which urban areas always have higher literates than that in rural areas.

Table 3.7 illustrates the dichotomy in literacy rates of the four cities and their respective hinterlands.

Table 3.7

Distribution of Literacy Rates
(Cities and their Hinterlands, 1981)

| Cities/ Hinterlands | Literacy Rate (%) | | |
|---|---|---|---|
| | Total | Male | Female |
| Purnia | | | |
| City | 48.34 | 57.08 | 37.68 |
| Hinterland | 16.34 | 24.60 | 8.74 |
| Dhanbad | | | |
| City | 50.00 | 59.21 | 37.24 |
| Hinterland | 28.38 | 43.25 | 11.14 |
| Darbhanga | | | |
| City | 51.20 | 62.94 | 37.73 |
| Hinterland | 23.27 | 34.03 | 12.72 |
| Patna City | 57.71 | 66.87 | 46.47 |
| Hinterland | 28.25 | 41.35 | 13.42 |

# LITERACY RATE

## TOTAL LITERACY RATE

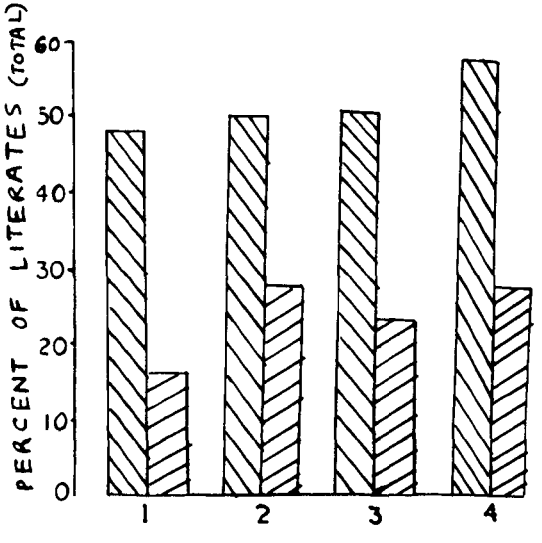


FIG 7a

## MALE LITERACY RATE

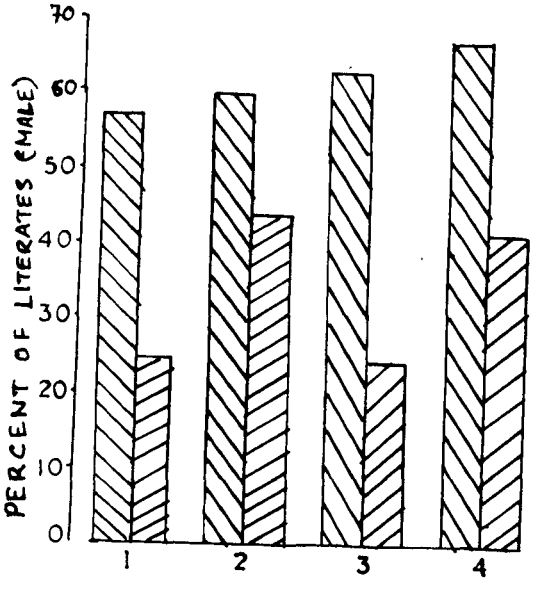


FIG 7b

## FEMALE LITERACY RATE

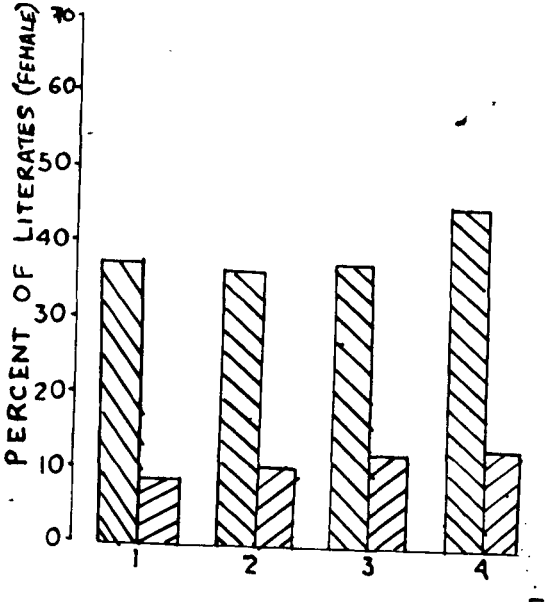


FIG 7c

INDEX

CITY

SURROUNDING VILLAGES (AVERAGE)

1 PURNIA
2 DHANBAD
3 DARBHANGA
4 PATNA

Comparing the cities, Patna being the socio-cultural focus of the state comprises the largest share of literate persons (total, male, female), while Purnia -- the agricultural town -- has the lowest literacy rate (total and male). Female literacy is almost same in Purnia, Dhanbad and Darbhanga, except, Patna, where it is much higher.

In spite of having the highest rate in Patna, its city-region does not show the highest literacy rates.

As is clear from Fig. 7a the difference is the highest between Purnia and its neighbouring villages and the least between Dhanbad and its periphery.

In male literacy rate, city-hinterland disparity is maximum for Purnia and minimum for Patna (Fig.7b.) But in terms of female literacy Patna has the maximum difference from its hinterland (Fig 7c)

### 3.3 Economic Characteristics

Disparity in economic scenario between rural and urban areas, arises from the concept of dualistic economy, characterised by the existence of an advanced industrial system and an indigenous backward agricultural system. The former is urban-oriented, the latter is rural-oriented. Of course, one more sector does exist in urban areas which

is termed as tertiary sector. This type of dualistic or triplistic economy -- rural agriculture on one side and urban industrial or tertiary sector, on the other side -- is a typical nature of developing countries.

Thus, the following section epitomizes this dualism in context of the present study. Some of the selected economic indicators are as follows :

(i) Work Participation Rate, i.e., proportion of workers to total population:

  (a) Male Work Participation Rate.
  (b) Female work participation rate.

(ii) Occupation structure:

  (a) Proportion of cultivators to total workers.
  (b) Proportion of agricultural labourers to total workers.
  (c) Proportion of workers in household industry to total workers.
  (d) Proportion of workers in 'others' to total workers.

### 3.3.1 Work Participation Rate

In an economy, the proportion of workforce to total population - referred to as work participation rate, is the prime index, which reflects the over-all level of development. Usually, this is higher in rural economy as compared to urban economy, as, agriculture is more labour-intensive than industry.

16 Table 3.8 brings out total, male female work participation rates for the selected towns and their hinterlands.

Table 3.8

Work Participation Rate
(Cities and Hinterlands, 1981)

| Cities/ Hinterlands | Work Participation Rate (in %) | | |
|---|---|---|---|
| | Total | Male | Female |
| **Purnia** | | | |
| City | 29.01 | 48.28 | 5.68 |
| Hinterland | 34.66 | 53.21 | 12.84 |
| **Dhanbad** | | | |
| City | 28.95 | 47.24 | 4.08 |
| Hinterland | 26.41 | 45.39 | 4.73 |
| **Darbhanga** | | | |
| City | 22.70 | 39.84 | 3.04 |
| Hinterland | 26.51 | 48.49 | 4.90 |
| **Patna** | | | |
| City | 25.9 | 43.44 | 4.40 |
| Hinterland | 28.24 | 45.55 | 8.05 |

Both Purnia town and its hinterland have the highest work participation rate (total, male, female). Dhanbad has also the same total work participation rate as that of Purnia. But its hinterland has the lowest work participation rate among the four hinterlands.

# WORK PARTICIPATION RATE


INDEX

CITY

SURROUNDING VILLAGES (AVERAGE)

1. PURNIA
2. DHANBAD
3. DARBHANGA
4. PATNA.

An interesting feature obtained from Fig. 8a is that, except the city-region of Dhanbad, the other three hinterlands exceed their urban cores in terms of work participation rate, which is an expected pattern. The exceptionality of Dhanbad may be on account of the city's industrial economy, which provides more employment to the city population than that to the countryside, that is not developed agriculturally.

Rural-urban contrast of male work participation rate is greater for Darbhanga in comparison with other towns. That means the males of the hinterland of Darbhanga, are more mobilised to work than the males of the town itself. Two reasons may stand for this. First, the tertiary based city of Darbhanga cannot have much employment potentials to absorb its male population, while in the rural hinterlands, a large number of male population may participate in agricultural sector.

Secondly, the economic profile of Darbhanga's rural periphery may be much lower than the proper town, and than other hinterlands, for which rural males are compelled to be engaged in work.

In view of the female work participation rate, maximum dichotomy is possessed by Purnia, between the town and hinterland. The hinterland has more than double of town's female workforce. Purnia, being primarily agro-based town is not viable for females to provide jobs. Conversely, in its rural counterpart, the females can work as agricultural labourers.

### 3.3.2 Occupational Structure

A more important economic indicator is the division of labour force or occupational structure, explicitely, this indicates the proportion of workers in different sectors of an economy. The economic connotation of urbanisation is manifested by this concept, since a critical percentage of labour type distinguishes urban areas from rural areas.

In the following sections, the proportion of workers in different sectors have been analysed for selected towns and their hinterlands.

#### (a) Cultivators

According to census, a cultivator is defined as employer, single worker or family worker in cultivation of land owned or held from government and others. The ratio of cultivators to total workers is one of the

determinants of agro-based sector in an economy. This characteristic is relevant to study particularly for rural agricultural economy.

Table 3.9 and Fig. 9 show the percentage of cultivators in the selected towns and in their hinterlands.

Table 3.9

Proportion of Cultivators to total Workers (Cities and their Hinterlands) 1981

| Cities | Percent of Cultivators | |
|---|---|---|
| | City | Hinterland |
| Purnia | 10.98 | 35.84 |
| Dhanbad | 1.08 | 36.26 |
| Darbhanga | 3.03 | 39.89 |
| Patna | 4.62 | 47.20 |

The superiority of the town of Purnia -- predominantly agricultural -- in having the highest percentage of cultivators, has not been reflected on its peripheral areas, which consist the lowest average proportion of cultivators among all hinterlands.

The hinterland of Patna has the maximum proportion of cultivators. It may be due to the extensive fertile flood-plain of Ganga, which attracts cultivators to settle there and to own land.

## AGRICULTURAL LABOURERS
(IN PROPORTION TO TOTAL WORKERS)

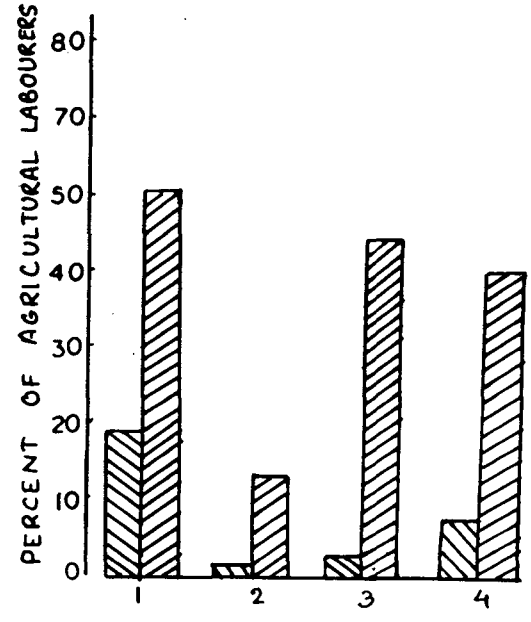


FIG. 10

## CULTIVATORS
(IN PROPORTION TO TOTAL WORKERS)

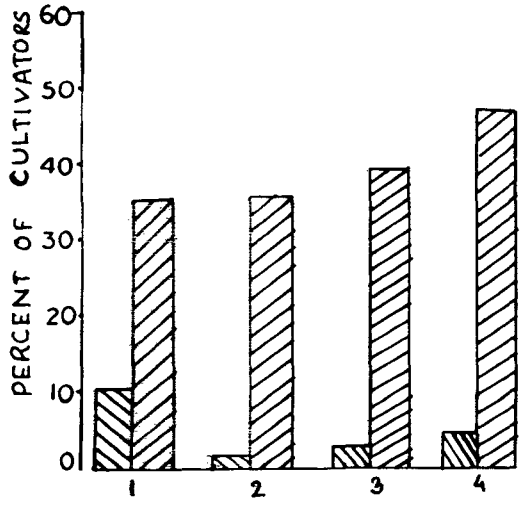


FIG. 9

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CITY

SURROUNDING VILLAGES (AVERAGE)

1. PURNIA 3. DARBHANGA
2. DHANBAD 4. PATNA.

(18)

20 (b) Agricultural Labourers

A person who merely works in another persons's land for wages is regarded as an agricultural labourer. The ratio of workforce in this sector to total workers is another aspect to measure the strength of agrarian sector. Table 3.10 depicts the percentage distribution of agricultural labourers in the selected cities and hinterlands.

Table 3.10

Proportion of Agricultural Labourers to total workers
(Cities and their Hinterlands)
1981

| Cities | Percent of Agricultural Labourers | |
|---|---|---|
| | City | Hinterland |
| Purnia | 19.85 | 52.09 |
| Dhanbad | .71 | 13.45 |
| Darbhanga | 3.58 | 45.62 |
| Patna | 7.60 | 40.77 |

(fig 10)
According to table 3.10, both the city and the neighbouring villages of Purnia have the highest proportion of agricultural labourers. This indicates that both the city and hinterland of Purnia are more attractive to the agricultural labourers than to the cultivators.

(c) Workers in Household Industry

Household industry is defined as an industry conducted by the head of the household and or by the

members of the household at home or within the village in rural areas and only within the precincts of the house where the household lives in urban areas. There is a close connection between the rural areas and household industry, as this industry represents rural industrialisation.

The percentage of workers engaged in household industry of the cities and in their hinterlands, is observed from table 3.11.

Table 3.11

Proportion of Workers in Household Industry to total workers (Cities and their Hinterlands), 1981.

| Cities | Percentage of workers in Household Industry | |
|---|---|---|
| | City | Hinterland |
| Purnia | 1.17 | 1.76 |
| Dhanbad | 1.04 | 4.17 |
| Darbhanga | 3.79 | 2.58 |
| Patna | 2.43 | 1.77 |

A general low level situation of household industry has been emerged out from the above table. However, the contrast between city and hinterland in this regard is the maximum for Dhanbad. Standing on heavy industrial (non-household industry) base, the town of Dhanbad contains the least proportion of workers in household industrial sector,

compared to other cities. But, a paradoxical situation prevails in the hinterland villages of Dhanbad, which possess the highest proportion of household industrial workers, among all hinterlands. For an explanation of this fact, it may be inferred that, the impact of industrial economy of Dhanbad city, is focussed through the substantial proportion of household industry of its hinterland.

The city of Darbhanga and its surrounding villages, have a quite considerable percentage of workforce in household industry. (Fig 11)

(d) Workers in 'Others'

According to 1981 census all those, who work in any field of economic activity other than cultivator, agricultural labourer or household industry, are 'other workers'. This category includes factory workers, plantation workers, those in trade, commerce, business, transport, mining, construction, political or social work, all government servants, municipal employees, teachers, priests, entertainment artists, etc. Except the workers in livestock, forestry, fishing, hunting, plantation and orchards, this category mainly comprises of secondary and tertiary workers. Hence, this feature well

differentiates an urban from a rural area.

Therefore, we will observe the dichotomies, made by the selected cities and their hinterland, in view of this characteristics from Table 3.12 and Fig 12.

Table 3.12

Proportion of workers in 'Others' Sector to total workers (Cities and their hinterlands), 1981

| Cities | Percent of workers in others | |
|---|---|---|
| | City | Hinterland |
| Purnia | 68.00 | 10.31 |
| Dhanbad | 97.16 | 46.13 |
| Darbhanga | 89.00 | 11.83 |
| Patna | 85.35 | 10.31 |

The dominant secondary sector along with a moderate tertiary sector of the city of Dhanbad, has become evident from the percentage of workers in 'others', given in above table. Similarly, the tertiary and service bases of Darbhanga and Patna city are also proved by the same table.

It is quite peculiar, that the town of Purnia, in spite of its dominant primary base, consists a quite substantial proportion (68%) of 'other workers'. This is because of the inclusion of some categories of primary

WORKERS IN 'OTHERS'
(IN PROPORTION TO TOTAL WORKERS)

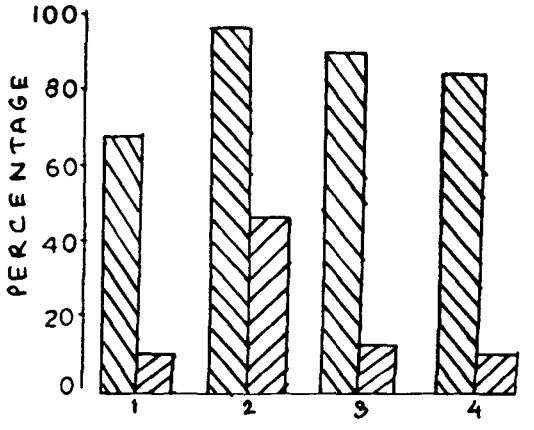


FIG. 12.

WORKERS IN HOUSEHOLD INDUSTRY
(IN PROPORTION TO TOTAL WORKERS)

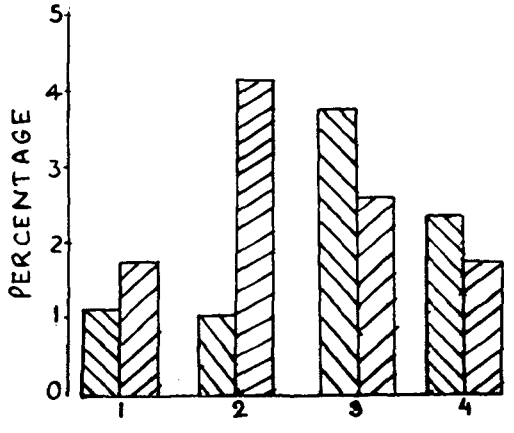


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FIG. 11

activities as livestock, orchard, plantation, fishing, hunting and allied into this category of 'other workers'.

However, the superiority of Dhanbad city in this regard has been well reflected by its hinterland as this hinterland (among the four ) possesses the highest proportion of 'other workers'. But, despite the substantial proportion (almost 90% ) of workers in 'other' sector in Darbhanga, the city-hinterland contrast is the maximum in this case (Fig. 12 ), as its hinterland have only about 11.80% workers in this sector.

Thus, it appears from the above observations, that an industrial city has more impact on its hinterland, than a service or tertiary based city in terms of the proportion of workers in 'other' sector.

## 3.4 Summery

From the preceeding discussion, the following salient features have been observed.

(a) In terms of the demographic characteristics, the dicahotomy betwen city hinterland is the greatst in case of Darbhanga and its city -region, while the difference is the lowest between Purnia and its city region.

(b) The selected social characteristics (proportion of scheduled caste population and literacy rate) create the greatest conrast between city and hinterland in Purnia and Patna.

9(c) Considering the economic characteristics, prevalence of disparity is maximum between the tertiary based city of Darbhanga and its region.

Thus, it is understood that the dichotomy between city and surroundings is minimum in case of the industrial Dhanbad, regarding the observed features

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# CHAPTER- IV

## DEMOGRAPHIC AND SOCIAL CHARACTERISTICS OF RURAL HINTERLANDS : A DISTANCE-DECAY ANALYSIS.

---

Diminution of urban influence may be enlightened through socio-demographic aspects - representative of urban centres - in relation to the distance from urban centres. Therefore, the present chapter highlights the association of certain demographic and social characteristics of rural hinterlands with distance from their respective urban core.

The relevant demographic and social indicators can be spelt out as follows:

### Demographic Indicators

i) Density of population per square kilometer
ii) Growth rate of population during 1971-1981
iii) Sex Ratio
iv) Dependency Ratio

### Social Indicators

i) Proportion of scheduled caste population
ii) Total literacy Rate
iii) Male literacy Rate
iv) Female literacy Rate

In this part of analysis, first, a distance - wise distributional picture of the above mentioned indicators, (for the four selected hinterlands) has been illustrated. For this purpose, the distance is classified into four zones of 1-10 Km, 11-20 Km, 21-30 Km, and 31-40 Km. The simple means of different variables have been worked out for each distance zone and zone-wise variations are represented by tables and figures.

Secondly, to examine the nature and extent of interrelation between distance and the selected variables, correlation and regression analysis have been carried out. Three commonly used forms of regression analysis have been attempted, which are given below:

a) Simple linear ( $y = a + bx$ ) - where a unit change in independent variable (x), causes a change of 'b' units in the dependent variable (y).

b) Exponential or semi-log ($y = ab^x$ ) - where a unit change in the independent variable (x) leads to a change in the dependent variable (y) by 'b' times

c) Pareto or double log ( $y = ax^b$ ) - where the ratio of the relative change in the independent variable (x) and the dependent variable (y) is equal to 'b'.

The logarithmic transformation of the exponential and Pareto functions to obtain a linear form of relations and the

estimation of regression constant 'a' and 'b', have been discussed in Methodology (Page 36 ).

After this regression analysis the statistical test of significance of these relations has also been carried out.

On the basis of these methods, different hypotheses postulated in this study have been tested. The analysis of these relations have been carried out for hinterlands of selected cities of different economic bases.

## 4.1 Demographic Characteristics

The recognition of demographic aspect in a study of urban influence on rural areas, is of utmost importance, as the process of urbanisation has a demographic connotation. The present section investigates the influence of cities of different economic bases on the demographic features of their rural surroundings.

### 4.1.1. Density of Population

Density of population is an important demographic charateristic, which speaks about the prevalence of the intensity of urban influence on the surrounding rural areas.

So far as distance is concerned, one must have a look on how the density of population varies in different

distance zones of hinterlands.

Table 4.1 states the average density of population in four distance zones of the neighbouring areas of selected cities.

TABLE 4.1

DISTANCE -WISE DISTRIBUTION OF AVERAGE DENSITY OF POPULATION IN DIFFERENT HINTERLANDS (1981)

| Hinterland of | DENSITY PER SQ.KM DISTANCE ZONES | | | |
|---|---|---|---|---|
| | 1-10 Km | 11-20 Km | 21-30Km | 31-40 Km |
| Purina | 435.27 | 499.47 | 618.47 | 566.52 |
| Dhanbad | 747.96 | 745.23 | 374.01 | 872.39 |
| Darbhanga | 1097.62 | 921.08 | 995.19 | 929.33 |
| Patna | 1385.44 | 820.44 | 743.22 | 600.28 |

Comparing the immediate vicinity (1-10 Km) of the four cities, the highest density is possessed by the hinterland of Patna. But, in all subsequent zones (from 11-40 Km), density is the highest in the hinterland of Darbhanga, for which the average density of the entire hinterland of Darbhanga is maximum (Table 3.1 ,Chapter III, Pa...

A graphical representation of the pattern of population density (Fig. 13 ) clearly represents, that a steady decline of average density with increasing distance from the urban core, has been experienced only by the surroundings of Patna; (whereas this trend is found also in the hinterland of Dhanbad upto zone of 21-30 Km) ; Conversely, a steady increase of density is observed upto a distance of 30 Km in the periphery of Purnia.

The villages around Darbhanga do not show any definite increasing or decreasing tendency.

Hence, a distance-decay tendency is apparently prevalent for the villages around Patna and to some extent around Dhanbad. The reverse pattern is true for the hinterland of Purnia (upto 30 Km).

The relationships have been investigated with the help of product moment correlation and three different regression equations. The results of this analysis are given Table 4.2.

TABLE 4.2

RESULTS OF CORRELATION AND REGRESSION ANALYSIS EXPLAINING THE DENSITY OF POPULATION BY DISTANCE OF THE HINTERLAND VILLAGES FROM THE SELECTED CITIES,1981.

| Hinterland of | Types of Functions | Correlation coefficient | Regression constant 'b' | Regression constant 'a' (for the significant relations) |
|---|---|---|---|---|
| PURNIA | Linear | .19648** | 5.6796 | 424.05486 |
| | Semi-log | .154 | 1.0063 | |
| | Double log | .148 | .114 | |
| DHANBAD | Linear | -.2115 | -15.75623 | |
| | Semi log | -.221 | - .984 | |
| | Double log | -.234 | -.218 | |
| DARBHANGA | Linear | -.0923 | -5.69323 | |
| | Semi log | -.034 | -.998 | |
| | Doublelog | -.118* | -.0993 | 1109.2063 |
| PATNA | Linear | -.28527** | -44.93226 | 1660.63556 |
| | Semilog | -.209* | -.983 | 1038.051 |
| | Double log | -.201 | -.2007 | |

NOTE: * Significant at 10% level of significance

** Significant at 5% level of significance

## AVERAGE POPULATION DENSITY (DISTANCE-WISE)

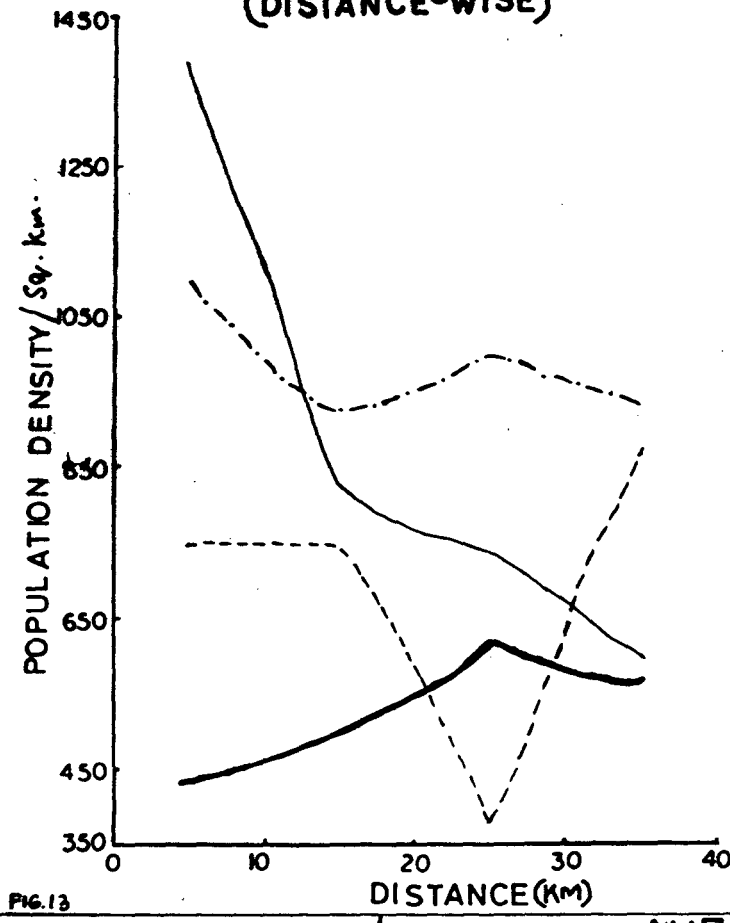


FIG. 13

INDEX

SURROUNDING VILLAGES OF

- PURNIA
- DHANBAD
- DARBHANGA
- PATNA

## AVERAGE GROWTH RATE OF POPULATION (DISTANCE-WISE)

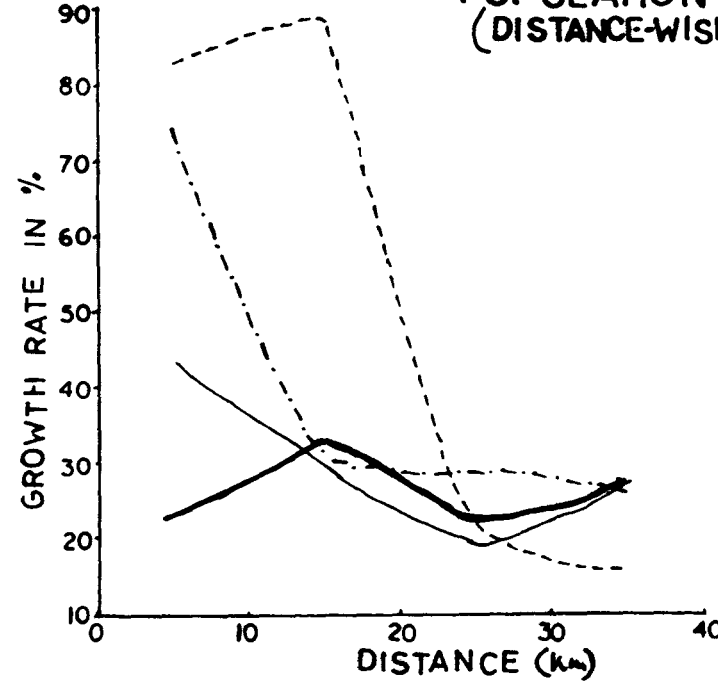


FIG 14.

As is clear from the table 4.2, significant relation between density of population and distance, exists for the hinterlands of Patna and Purnia. The relation is significant in a low level (10%) for the villages around Darbhanga. The hypothesis (no.1 in page21) of inverse relation between distance and population density, has been justified for the peripheries of Patna and Darbhanga and also in case of insignificant relation for the hinterland of Dhanbad.

Only in the villages around Purnia, the distance - decay hypothesis has not been proved, as there exists a positive relation between distance and density.

An explanation may stand for this, that is with increasing distance, the concentration of villages is also increased in the hinterland of Purnia, as the zone of 21-40 Km contains about 59% of the total villages of the hinterland (see table 2.4 ) Fig. 13 shows that the downward gradient of density is steeper for the hinterland of Patna than the upward density gradient of the hinterland of Purnia. In the former case one unit increase in distance leads to 44.93 unit decrease in density while in the latter case, for one unit increase in distance from the city density increases by 5.08 unit.

4.1.2 Population Growth Rate

The gradient of urban influence in terms of population growth rate may be assumed to tapper off with the increase

of distance from cities, because of the decreasing migration rate from urban to rural areas.

A close examination of distance-wise variations in average growth rate of four hinterlands, has been focussed in Table 4.3.

TABLE 4.3

DISTANCE WISE DISTRIBUTION OF AVERAGE GROWTH RATE IN DIFFERENT HINTERLANDS (1971-81 )

| Hinterland of | GROWTH RATE IN PERCENTAGE DISTANCE ZONES | | | |
|---|---|---|---|---|
| | 1-10 Km | 11-20 Km | 21-30 Km | 31-40 Km |
| Purnia | 23.00 | 33.15 | 21.92 | 27.16 |
| Dhanbad | 82.86 | 88.77 | 21.27 | 15.41 |
| Darbhanga | 74.10 | 30.37 | 29.40 | 25.07 |
| Patna | 42.86 | 30.25 | 19.02 | 27.26 |

According to above table, the greatest difference between the two extreme values of population growth rate is observed in the hinterland of Dhanbad, ranging from 88.77% (in 11-20 Km zone) to 15.41% (31-40 km zone). For this reason, the difference between (r-

1-20 Km and 21-40 Km zone is very high. Likewise, the difference in growth rate between 1-10 Km and 11-40 Km zone of the hinterland of Darbhanga is also substantially high.

The figure 14 depicts an althrough diminishing trend of growth rate with increasing distance from the city of Darbhanga.

This pattern is maintained for the villages around Patna, upto the distance of 30 Km, while for the hinterland of Dhanbad, the actual decreasing trend originates not from the closest proximity (1-10 km zone), but from the zone of 11-20 km .

No systematic pattern of growth rate is furnished by the hinterland of Purnia.

The relationships between distance and population growth rate have been investigated by statistical method of correlation and regression, the values of which are given in Table 4.4.

It is understood from table 4.4 that highly significant negative relation is found between distance and growth rate for the villages around Patna and Darbhanga. Among these two regions linearity of relations is obtained by the former, while the latter one tends more towards non-linearity (as more significant in double log linear than simple linear). So, comparing these two cases, one may

TABLE 4.4

RESULTS OF CORRELATION AND REGRESSION ANALYSIS EXPLAINING THE GROWTH RATE OF POPULATION BY THE DISTANCE OF THE HINTERLAND VILLAGES FROM THE SELECTED CITIES,1981.

| Hinterland of | Types of Functions | Correlation coefficient | Regression constant 'b' | Regression constant 'a' (for significant relation) |
|---|---|---|---|---|
| PURNIA | Linear | -.06072 | -.09213 | - |
| | Semi-log | .052 | -1.0207 | |
| | Double log | -.015 | -.0144 | |
| DHANBAD | Linear | -.07171 | -1.43373 | |
| | Semi-log | -.292* | -.963387 | 52.57811 |
| | Double log | -.132 | -.1352 | |
| DARBHANGA | Linear | -.13171* | -1.22926 | 62.511 |
| | Semi-log | -.097 | -.9789252 | |
| | Double log | -.169*** | -.1126 | 79.00412 |
| PATNA | Linear | -.411** | -.99192 | 44.52227 |
| | Semi log | -.376*** | -.9657985 | 41.186066 |
| | Double log | -.367*** | -.1735 | 89.541302 |

NOTE: ***SIGNIFICANT AT 1% LEVEL OF SIGNIFICANCE

** " " 5% " "

* " " 10% " "

state that, for an unit increase in distance, the growth in the hinterland of Patna decreases by .99 unit,[1] whereas one percent increase in distance, decreases the growth rate in the hinterland of Darbhanga by .1126%.

Population growth rate in the hinterland of Dhanbad is inversely related with distance at 10% significance level only and it is a non-linear one. The relation has been found to be totally sinsignificanct for the hinterland of Purnia, whether continuous rise and fall shows no systematic pattern of growth rate. Thus, the formulated hypothesis (No.i in page 21 ) has been fully proved for all the four hinterlands.

4.1.3 Sex Ratio

It is generally found that the immediate surroundings of the city possess more males than females, although to a lesser degree than those in the city. It is because selective male migration takes place to these areas as the employment opportunities offered by the city are more to the males than the females. The masculinity of the population, therefore, falls or the feminity rises progressively at least upto a certain distance from the city periphery.

---

1. For the villages around patna, it may also be said that (a) an unit increase in distance leads to .0348 times decrease in growth rate - (Semi log ) and (b) for one percent increase in distance, growth rate declines by .1735% (double log).

This general pattern is observed for the villages around cities of different functional nature. Table 4.5 gives the distance wise variations in population growth rate in four hinterlands.

TABLE 4.5

DISTANCE-WISE DISTRIBUTION OF AVERAGE SEX RATIO IN DIFFERENT HINTERLANDS

(1981 )

| Hinterland of | Sex Ratio Per 1000 Distance zones | | | |
|---|---|---|---|---|
| | 1-10 km | 11-20 Km | 21-30 km | 31-40 km |
| Purnia | 915.80 | 946.42 | 821.02 | 940.20 |
| Dhanbad | 794.70 | 924.92 | 991.95 | 950.93 |
| Darbhanga | 969.12 | 969.92 | 713.80 | 1005.00 |
| Patna | 897.03 | 925.71 | 974.13 | 984.28 |

Table 4.5 indicates that the immediate vicinity (1-10 km) of Dhanbad contains lower sex ratio than other closest (1-10 km) zones of the rest three hinterlands. Even in the zone of 11-20 km, the city region of Dhanbad, has the lowest sex ratio. This picture implies the dominance of male migrants around an industrial city Dhanbad.

An interesting feature marked by the hinterland of Darbhanga is that the remotest zone of this hinterland possess

## AVERAGE DEPENDENCY RATIO (DISTANCE-WISE)

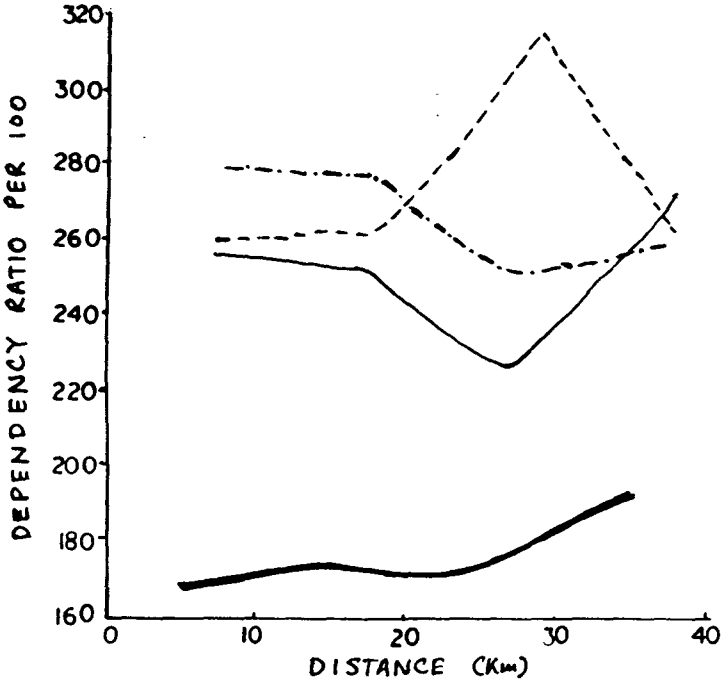


FIG 16

INDEX

SURROUNDING VILLAGES OF
PURNIA
DHANBAD
DARBHANGA
PATNA.

## AVERAGE SEX RATIO (DISTANCE-WISE)

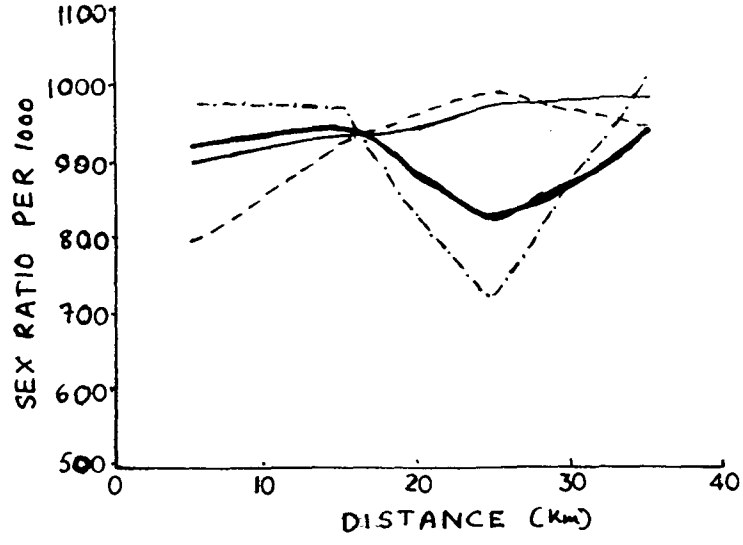


FIG 15

more female than males.

As is depicted by -fig 15 , that the distinct increasing tendency of sex ratio is found for the villages around Patna. This pattern is maintained by the villages around Dhanbad upto a distance of 30 Km.

Table 4.6 presents the values of correlation and regression between population growth rate af hinterlands and their distance from cities.

Highly significant positive relation is established by the villages of Dhanbad, Patna and Darbhanga. Therefore, the hypothesis no relating to distance from cities and sex ratio is accepted. Only in the case of Purnia's city region the insignificant relation is inverse as against our hypothesis (no.ii).

4.1.4 Dependency Ratio

THe earlier discussion about the definition of dependency ratio in chapter III (page 63) implies that it is an indirect indicator of unemployment situation (a dependency ratio, which has been found to be worse in cities than their hinterlands (except Dhanbad) (in Chapter III page 64 ). Therefore, one can assume that this ratio will get decreased with increase of distance from cities. A distance wise distribution of dependency ratios of four hinterlands, has been illustrated in Table 4.7 and fig. 16 .

TABLE 4.6

RESULTS OF CORRELATION AND REGRESSION ANALYSIS EXPLAINING THE SEX RATIO BY DISTANCE OF THE SURROUNDING VILLAGES FROM THE SELECTED CITIES, 1981.

| Hinterland | Types of function | Correlation coefficient | Regression constant 'b' | Regression constant 'a' |
|---|---|---|---|---|
| PURNIA | Linear | -.06135 | -.08015 | |
| | Semi-log | -.068 | -.9988007 | |
| | Double log | -.079 | -.0258 | |
| DHANBAD | Linear | .41081*** | 82194 | 769.0244 |
| | Semi log | .404** | 1.0118 | 731.78378 |
| | Double log | .315** | .0821 | 725.37234 |
| DARBHANGA | Linear | .18049** | .17766 | 946.1096 |
| | Semi log | .116* | 1.0022 | 928.04952 |
| | Double log | .100 | .0304 | |
| PATNA | Linear | .44253*** | .39071 | 869.6443 |
| | Semi-log | .448*** | 1.0043 | 868.7758 |
| | Double log | .460*** | .0535 | 807.53394 |

NOTE: *** Significant at 1% level of significance
*** " " 5% " " "
* " " " 10% " "

TABLE 4.7

DISTANCE-WISE DISTRIBUTION OF AVERAGE DEPENDENCY RATIO IN DIFFERENT HINTERLANDS (1981 )

| Hinterland of | Dependency Ratio Per 100 Distance Zones | | | |
|---|---|---|---|---|
| | 1-10 Km | 11-20 Km | 21-30 Km | 31-40 Km |
| Purnia | 168.70 | 173.67 | 173.00 | 192.72 |
| Dhanbad | 251.65 | 256.59 | 314.80 | 266.55 |
| Darbhanga | 270.03 | 271.16 | 250 | 261 |
| Patna | 247.26 | 246.83 | 226.10 | 276.63 |

Considering the induvidual distance zones seperately it is seen from table 4.7 that dependency ratio is the highest in the zone of 1-20 Km of the hinterland of Darbhanga while in 21-30 Km and 31-40 Km zones this ratio is the highest in the surroundings of Dhanbad and Patna respectively On the other hand, the lowest dependency ratio prevails in all from distant zones of Purnia.

Fig. 16 shows more clearly that a rising tendency of dependency ratio is evident in the villages around Purnia and in the villages up to 30 Km distance from Dhanbad. But, the hinterland of Patna experiences a declining tendency in terms of dependency ratio upto the distance of 30 Km.

An uniform but continuous rise and fall of dependency ratio is seen in case of the periphery of Darbhanga.

Table 4.8 discloses the results of correlation and regression analysis between distance and dependency ratio.

TABLE 4.8

RESULTS OF R CORRELATION AND REGRESSION ANALYSIS EXPLAINING THE DEPENDENCY RATIO BY DISTANCE OF THE HINTERLAND VILLAGES FROM THE SELECTED CITES,1981.

| Hinterland of | Type of Function | Correlation coefficient | Regression constant 'b' | Regression constant 'a' |
|---|---|---|---|---|
| PURNIA | 1Inear | .18553* | .80222 | 158.9932 |
| | Semi-log | .164* | 1.0041 | 156.60082 |
| | Double-log | .136 | .0621 | -- |
| DHANBAD | Linear | .12092 | 1.56469 | -- |
| | Semi-log | .094 | 10044 | |
| | Double-log | .172 | .1003 | |
| DARBHANGA | Linear | -.0856 | -.41353 | |
| | Semi-log | -.076 | -.9986009 | |
| | Double log | -.064 | -.0188 | |
| PATNA | Linear | -.22849* | -147.968 | 264.97216 |
| | Semi-log | -.216* | -.9939185 | 5.5638 |
| | Double-log | -.204 | -.0704 | --- |

Note:

* Significeant at 10% level of significance.

Not any highly significant relation between distance and dependency ratio has been emerged out from the above table. Significance is low (at 10% level) for the hinterlands of Purnia and Patna. The relation is direct in the hinterland of Purnia while an inverse relation is found for the city region of Patna. Therefore, the hypothesis no.iii postulated earlier is proved in case of the hinterland of Patna, where one unit increase in distance from Patna city leads to 1.48 unit reduction in dependency ratio. But this hypothesis is rejected by the city-region of Purnia.

The reasons behind the unexpected picture(a direct relation between distance and dependency ratio) of the hinter land of Purnia may be as follows:

(a) The increased density of population with distance, (Table 4.2 page 90) may stand for the increasing trend of dependency ratio, as the inter-correlation between density and dependency ratio is moderate positive (.371)(which is significant also ) (Appendix V)

(b) Decreased female work participation rate with distance (table 5.6 ) is an important factor for deminishing dependency ratio, since the female work participation rate and dependency ratio are very highly but inversely related ($r = -.849$), which is also a significant relation. (Appendix V)

Thus, distance from urban centre is not the only factor, in this case, to bring about changes in dependency ratio.

On the basis of the above observations in the demographic indicators, it is found, that the hinterland of Patna city has maintained the assumed hypothesis in all cases.

## 4.2 Social Characteristics

The importance of the social characteristics in evaluating urban influence on rural areas, arises from the fact that the urban centres are origins of social development. Thus, the present section analysis some of the social characteristics of the four hinterlands in relation to distance from their respective urban cores.

### 4.2.1 Proportion of Scheduled Caste Population to total Population

It is hypothesized that the concentration of scheduled caste population may be more in the villages closer to cities than in the remote villages.

The provision of employment opportunities near the cities, coupled with the rural caste-conflict, may be attributed to outmigration of scheduled caste population from remote rural areas. Hence an inverse relationship between the proportion of scheduled caste population and distance from cities may be expected (hypothesis no. iv).

The proportion of scheduled caste population in the hinterland of four selected cities has been examined for various distance zones of these hinterlands. The results are given in Table 4.9 and represented graphically (Fig. 17 ).

TABLE 4.9

DISTANCE-WISE DISTRIBUTION OF AVERAGE PROPORTION OF SCHEDULED CASTE POPULATION (to total population) IN DIFFERENT HINTERLANDS (1981)

| Hinterland of | Percentage of Scheduled Caste Population to total Population | | | |
|---|---|---|---|---|
| | Distance Zones | | | |
| | 1-10 km | 11-20 Km | 21-30 Km | 31-40 Km |
| PURNIA | 18.19 | 16.30 | 17.69 | 8.67 |
| DHANBAD | 10.62 | 12.47 | 2.05 | 16.26 |
| DARBHANGA | 20.54 | 15.12 | 17.00 | 11.40 |
| PATNA | 15.49 | 22.56 | 20.41 | 19.04 |

Considering each distance-zone seperately, it is observed that the highest proportion exists in the zone of 1-10 km around Darbhanga, while all the rest zones of above 10 km around Patna, consists the highest proportion, compared to that of the same zones of other hinterlands.

A sudden decrease in scheduled caste population is found in between 21-30 km zone around Dhanbad (See fig. 17 also), as

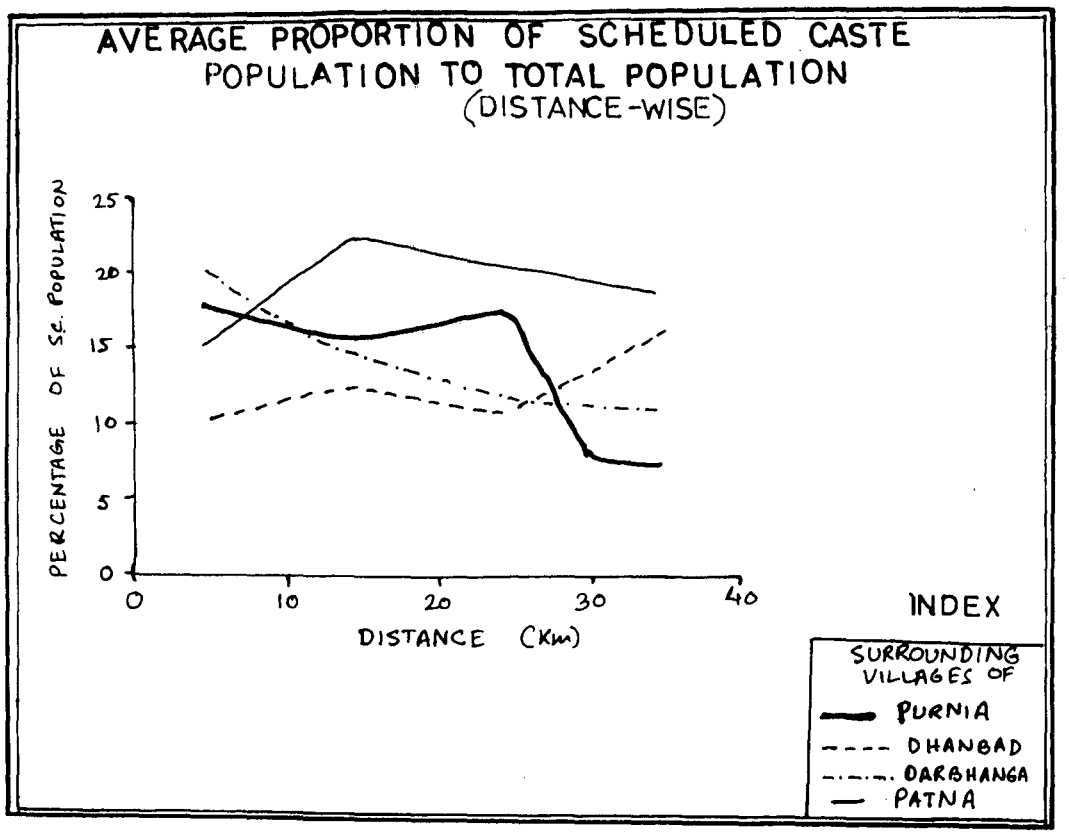
AVERAGE PROPORTION OF SCHEDULED CASTE POPULATION TO TOTAL POPULATION
(DISTANCE-WISE)
PERCENTAGE OF Sc. POPULATION
25
20
15
10
5
0
0
10
20
30
40
DISTANCE (Km)
INDEX
SURROUNDING VILLAGES OF
PURNIA
DHANBAD
DARBHANGA
PATNA

FIG. 17

50% villages in that area do not have any scheduled caste population.

Of the four hinterlands, only the hinterland of Patna experiences an almost increase in scheduled caste population with increasing distance from the city. Rest of the hinterlands do not have any definite increasing or decreasing pattern of the proportion of scheduled caste population, apparently from the figure 17 . But, if a comparison can be made between the zones of 1-20 km and 21-40 km in terms of the percentage ratio of scheduled caste population, than a decreasing trend can be detected distinctly for these three hinterlands (of Purnia, Dhanbad and Darbhanga).

Table 4.10 illustrates the values of correlation and regression analysis between distance and scheduled caste population of the four-hinterlands.

Table 4.10 states that the proportion of scheduled caste population and distance are correlated significantly for all the cases of the present study. Again, the hypothesis of (no.iv) of inverse relation between distance and scheduled caste population (given in page 22 ) has been accepted in this context, for the hinterland of Purnia, Dhanbad and Darbhanga The city-region of Patna is the only exception, where scheduled caste population is directly related to the distance from city. A probable factor may be responsible for this i.e., the

TABLE 4.10

RESULTS OF CORRELATION AND REGRESSION ANALYSIS EXPLAINING THE PROPORTION OF SCHEDULED CASTE POPULATION (TO TOTAL POPULATION) BY THE DISTANCE OF HINTERLAND VILLAGES FROM THE SELECTED CITIES,1981 ).

| Hinterland of | Types of Functions | Correlation coefficient | Regression constant 'b' | Regression constant 'a' |
|---|---|---|---|---|
| PURNIA | Linear | -.207* | -.27226 | 21.54403 |
| | Semi-log | -.349*** | -.9675385 | 24.156657 |
| | Double log | -.297*** | -.5206 | 53.04 |
| DHANBAD | Linear | -.2351* | -.30931 | 17.77766 |
| | Semi log | -.213 | -.9758952 | |
| | Double log | -.359** | -.5953 | 35.21598 |
| DARBHANGA | Linear | -.21672 *** | -26747 | 21.42193 |
| | Semi-log | -.171** | -.98649 | 16.230627 |
| | Double log | -.212 | -.2651 | 26.167024 |
| PATNA | Linear | 26502** | .38069 | 13.98731 |
| | Semi-log | .291** | 1.0327 | 9.6475114 |
| | Double log | .303** | .4175 | 5.4113576 |

NOTE: *** Significant at 1% level of significance

** Significant at 5% level of significance

* Significant at 10% level of significance

immediate periphery of the state capital of Patna may be crowded by the city-migrants of general cate, which father decreases with distance, leaving places for the residence of scheduled caste population. Thus, the increased distance from the city increases the proportion of scheduled caste population.

4.2.2. Total Literacy Rate

The impact of urban influence on rural surroundings can be reflected by the proportion of literate persons .As an urban centre is the origin of socio-cultural development, literacy rate is supposed to have a downward gradient from the city towards its periphery.

In table 4.11, the mean literacy rates of the villages of hinterland of different cities has been given for four distance zones. The values are also shown graphically in fig. 18 a.

TABLE 4.11

DISTANCE WISE DISTRIBUTION OF AVERAGE LITERACY RATES IN DIFFERENT HINTERLANDS.

| Hinterland of | Literacy Rates in Percentage DISTANCE ZONES | | | |
|---|---|---|---|---|
| | 1-10 km | 11-20 Km | 21-30 Km | 31-40 km |
| Purnia | 18.10 | 16.14 | 15.67 | 16.49 |
| Dhanbad | 28.70 | 29.38 | 22.97 | 30.13 |
| Darbhanga | 21.18 | 23.40 | 24.26 | 23.91 |
| Patna | 26.26 | 28.25 | 31.13 | 35.18 |

It is seen that, the villages at a distance of 1-20 Km around Dhanbad city, have more literate persons (in proportion to total population) compared to that of the same zones around other cities . But between 21-40 Km region, the highest literacy is observed in the hinterland of Patna.

Apparently, the entire surroundings of Dhanbad do not have any well defined trend of total literacy rate; yet between the zones of 1-20 Km and 21-40 Km, the latter one has lesser proportions of literate persons that that of the former.

An almost uniform but decreasing pattern of literacy rates is apparent from Purnia's surrounding region. On the contrary, as one moves from the cities of Patna and Darbhanga, an increasing picture of literacy rates may be obtained. So, while the literacy pattern of Purnia's city region is quite obvious or expected (as it declines with increasing distance), the situations of the hinterlands of Patna and Darbhanga are quite unconventional representing the increasing pattern of literacy with distance from cities.

The results of correlation and regression between distance from cities and total literacy rate are given in Table 4.12.

According to Table 4.12, the relationship between distance from urban centres and total literacy rates is

significant only in case of the hinterland of Patna. But the formulated hypothesis (no.v) relating to distance from cities and total literacy rate has become invalid for the villages around Patna.

TABLE 4.12

RESULTS OF CORRELATION AND REGRESSION ANALYSIS EXPLAINING THE TOTAL LITERACY RATE BY THE DISTANCE OF HINTERLAND VILLAGES FROM SELECTED CITIES,1981.

| Hinterland of | Types of Functions | Correlation coefficient | Regression constant 'b' | Regression constant 'a' for significant relation |
|---|---|---|---|---|
| PURNIA | Linear | -.10863 | -.0686 | |
| | Semi-log | -.101 | -.9958088 | |
| | Double log | -.132 | .1009 | |
| DHANBAD | Linear | -.1748 | -.26643 | |
| | Semi log | -.085 | -.9960073 | |
| | Double log | -.071 | 4.0371 | |
| DARBHANGA | Linear | .09804 | .08365 | |
| | Semi log | .086 | 1.0035 | |
| | Double log | .091 | .06 | |
| PATNA | Linear | .26484** | .27621 | 24.26253 |
| | Semi log | .279** | 1.0118 | 22.841978 |
| | Double log | .343** | .1776 | 17.318928 |

NOTE: ** Significant at 5% level of significance.

The literacy rate may increase due to better communication facilities. In the present case (hinterland of Patna), the literacy rate and composite score of communication facilities have a close positive association ( $r = .52$)*. Therefore, increased communication facilities with distance ( Table 6.7 ) ) may lead to rise in the literacy rate.

This exceptional pattern (direct relation between literacy rate and distance) may further be explained by discussing the male literacy rate and female literacy rate.

### 4.2.3 Male Literacy Rate

Coming to the point of male literacy rate, the more or less same picture, as that of total literacy rate, is obtained. Table 4.13 gives the distribution of male literacy of the hinterland of four cities in different distant zones. The differences are also represented graphically on figure.

indicates that

Table 4.13/literacy rate follows almost similar pattern as that of total literacy of rate for all the hinterlands which is clearly shown by fig. 18b The only minute exception is seen (from the fig 18 b ). in the hinterland of Patna, where the increase in male literacy is lesser than that in total literacy rate. It may be due to the comparatively steeper increase in female literacy rate.

* Appendix VI

TABLE 4.13

DISTANCE WISE DISTRIBUTION OF MALE LITERACY RATE IN DIFFERENT HINTERLANDS

| Hinterland of | Male literacy rate in percentage Distance Zones | | | |
|---|---|---|---|---|
| | 1-10 Km | 11-20 Km | 21-30 Km | 31-40 Km |
| Purnia | 26.11 | 22.97 | 24.64 | 25.50 |
| Dhanbad | 41.85 | 45.76 | 39.09 | 44.36 |
| Darbhanga | 31.95 | 33.85 | 35.50 | 35.00 |
| Patna | 38.52 | 42.27 | 44.43 | 44.54 |

Table 4.14 shows the resultsof correlation and regression analysis between distance and male literacy rate.

From the table 4.14, it is observed that similar to total literacy rate, male literacy rate is also directly related with distance in the hinterland of Darbhanga (which is the only significant relations among the four cases).

Here, one can find that male literacy rate is highly but inversely correlated with the workers in 'others' category ($r = -.552$ - significant). In the next chapter, we will see that other workers have been declined with distance. Thus, the declining trend of other workers may be attributed to the deciving pattern of male literacy rate from the city of Darbhanga.

However, the same hypothesis (no.vi, page 22 ) is not proved between distance and male work participation rate.

TABLE 4.14

RESULTS OF CORRELATION AND REGRESSION ANALYSIS EXPLAINING THE MALE LITERACY RATE BY DISTANCE OF HINTERLAND VILLAGES FROM THE SELECTED CITIES 1981

| Hinterland of | Types of Functions | Correlation coefficient | Regression constant 'b' | Regression constant 'a' (for significant relation) |
|---|---|---|---|---|
| PURNIA | Linear | -.0266 | -.022 | |
| | Semi log | .04 | 1.0017 | |
| | Double log | -.008 | -.9942 | |
| DHANBAD | Linear | -.11489 | -.18394 | |
| | Semi log | .02 | 1.01 | |
| | Double log | .185 | .0954 | |
| DARBHANGA | Linear | .10516 | .10831 | |
| | Semi log | .042 | 1.0018 | |
| | Double log | .046 | .0299 | |
| PATNA | Linear | .20847* | .31203 | 36.8431 |
| | Semi log | .238* | .016 | 30.6092 |
| | Double log | .285** | .233 | 21.45 |

NOTE: ** Significant at 5% level of significance

* significant at 10% level of significance

### 4.2.4 Female Literacy Rate

The proportion of female literates to total female population , is an important feature for urban as well as for rural areas , particularly in Indian context, where the status of women is low . Usually, female literacy may be assumed to wane off with distance from urban centres.

The average female literacy rate of the hinterland of the four cities in different distance zones is given in table 4.15 and graphically shown on figure.18c

TABLE 4.15

DISTANCE WISE DISTRIBUTION OF AVERAGE FEMALE LITERACY RATE IN DIFFERENT HINTERLANDS

| Hinterland of | Female literacy rate in Percentage Distance Zones | | | |
|---|---|---|---|---|
| | 1-10 km | 11-20 Km | 21-30 Km | 31-40 Km |
| Purnia | 9 .02 | 7.65 | 11.13 | 6.86 |
| Dhanbad | 10.69 | 12.18 | 8.28 | 2.19 |
| Darbhanga | 10.72 | 12.35 | 13.10 | 15.13 |
| Patna | 10.79 | 13.08 | 17.49 | 25.68 |

The abrupt rise in female literacy in the remotest villages (in 31-40 km zone) around Patna, explains the steepness in the rise of total literacy rate (mentioned earlier in page). Of course, the only one village represents the sample in that zone (31-40 km) which may create an exception in the previous pattern.

Similar to that of the pattern of total and male literacy, the female literacy rates waxes with distance from the city of Patna, Darbhanga and wanes from the city of Dhanbad.

Though, the figure 18e shows an sudden rise in female literacy ratios in the zone of 21-30 km of villages around Dhanbad, yet generally it has got increased from 1-20 km to 21-40 km zone. The values of correlation and regression analysis between the distance and female literacy rate are presented in table 4.16.

According to Table 4.16, the relation between distance and female literacy rate is significant again for the hinterland of Patna. A low significance (at 10% level) has been found for the hinterland of Darbhanga also. In these two cases also, female literacy rates have been augmented with increasing distance from cities.

For the villages around Patna, a low but significant correspondence between female literacy rate rate and educational facilities (.28)* exists. So, the waxing of educational facilities with distance (Chapter VI, table 6.3 ), may be responsible for high female literacy rate in the extreme periphery.

* Appendix VI

TABLE 4.16

RESULTS OF CORRELATION AND REGRESSION ANALYSIS EXPLAINING THE FEMALE LITERACY RATE BY DISTANCE OF THE HINTERLAND VILLAGES FROM THE REFLECTED CITIES ,1981.

| Hinterland | Types of functions | Correlation Coefficient | Regression constant 'b' | Regression constant 'a' (for significant relations) |
|---|---|---|---|---|
| PURNIA | Linear | -.02981 | -.032 | |
| | Semi log | -.133 | -.9869854 | |
| | Double log | -.148 | -.2674 | |
| DHANBAD | Linear | -.09438 | -.10904 | |
| | Semi log | -.021 | -.9979 | |
| | Double log | .021 | -.026 | |
| DARBHANGA | Linear | .12882* | .12419 | 10.22065 |
| | Semi log | .109* | 1.0091 | 3.70914 |
| | Double log | .105 | .1384 | |
| PATNA | Linear log | .39928*** | .40056 | 7.62868 |
| | Semi-log | .34** | 1.0419 | 5.623195 |
| | Double log | .375** | .5638 | 2.4890472 |

NOTE: *** Significant at 1% level of significance

** significant at 5% level of significance

* significant at 10% level of significance

# AVERAGE LITERACY RATE (DISTANCE-WISE)

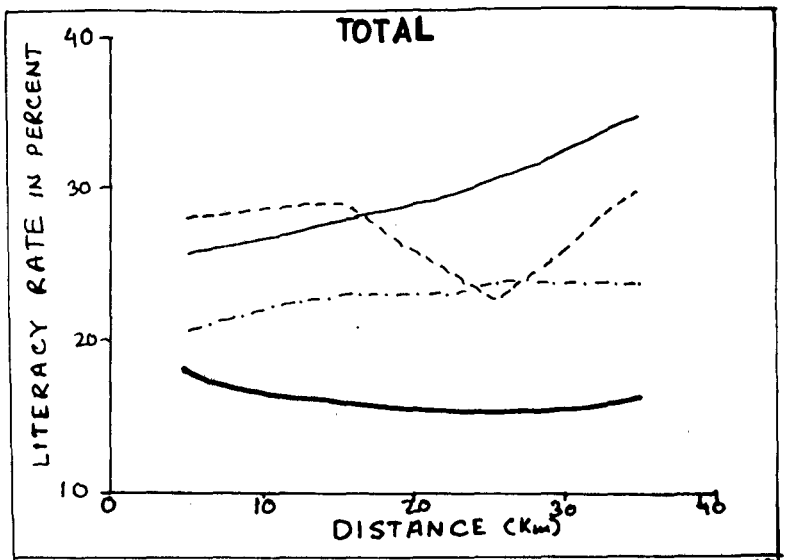


FIG. 18a

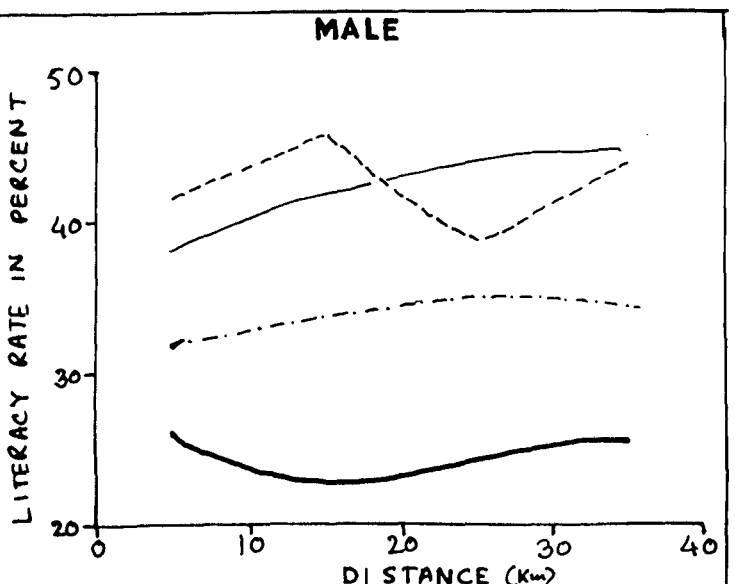


FIG. 18 b

INDEX

SURROUNDING VILLAGES OF
- PURNIA
- DHANBAD
- DARBHANGA
- PATNA

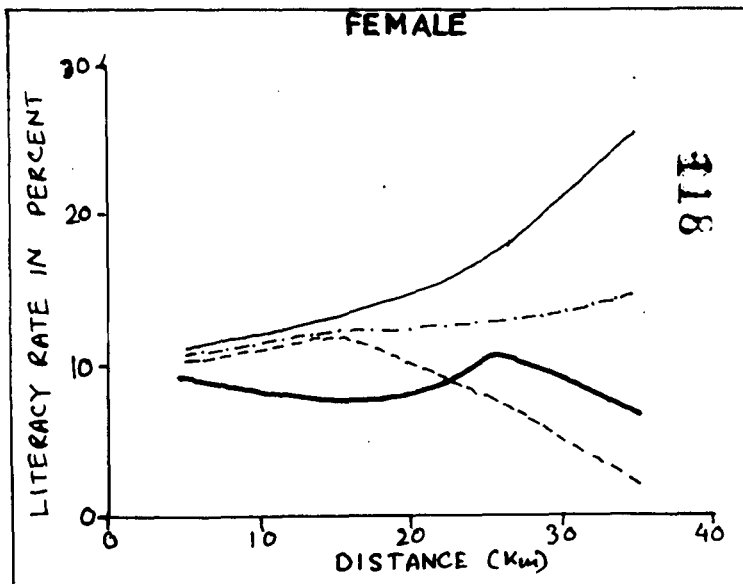


FIG. 18c

Again, female literacy rate and female work participation rate are directly correlated with close association (.637 - significant)[1]. Hence, an increase in female literacy rate may be explained by the fact of increased female work participation rate with distance (table 5.6, Chapter V ).

Considering the villages around Darbhanga, the positive relation between female literacy rate and distance at a low level of significance can not be explained by the present emperical observations.

However, the hypothesis no.V, relating the female literacy rate and distance from cities is mullified for the significant relations, but accepted for insignificant relations.

Thus, the above analysis unfolds that distance from urban centre is not always the sole determinant of variations in literacy rate in rural surroundings of an urban area. Of course, in some cases it is affected by increasing distance from urban centres (which is exemplified in the present study,, by the insignificant relation in the hinterland of Purnia and Dhanbad). But, in some other cases, literacy rate depends upon the overall level of development of the villages. as work participation rate, availability of different types of facilities - particularly educational facilities. Therefore, in view of the relation between distance and literacy rate our hypothesis (no.V) has been proved partly true and partly false.

1 Appendix VI

## 4.3 SUMMARY

On the basis of the entire foregoing discussion, some salient features have been emerged out which are as follows:

A. Demographic Characteristics

1. In terms of demographic characteristics, only the hinterland of the state capital service based (Patna) holds total conformity with the hypotheses (No.i,ii, iii given in Chapter I), relating to distance and the four demographic indicators.

2. For the city region of the literary based city (Darbhanga), the first two hypothesis (no.I,II) concerning the relations between distance in one hand and population density, population growth rate. and sex ratio on the other hand, have been accepted.

3. The villages around the industrial city (Dhanbad) keep parity with the prediction in establishing relation between (a) distance and population rate (no.i) and (b) distance and sex ratio (no.ii).

4. The surroundings of agro-based town (Purnia), nullifies the hypothess of the two significant relations (i and iv) between distance and density of population and sitance and dependency ratio.For other two indicators (growth rate and sex ratio) relations are insignificant.

B. Social Characteristics

1. The observed pattern of scheduled caste population in relation to distance from cities has accepted the assumed inverse relation between them in the hinterlands of agricultural, industrial and tertiary based cities, Only the surroundings of the state capital rejects this hypothesis (no. iv) establishing a significant direct relation between distance and scheduled caste population. This may be because of high priced lands close to the state capital and greater urban sprawl of the city than the rural-urban migration.

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2. Regarding the literacy rate, testing of hypothesis can be made only for the city region of the state capital; But similar to that of scheduled caste population, the hinterland of Patna deviates from the proposed x hypothesis of inverse relation (no.v).

However, to sum up the distance decay effect of demographic characteristics is the most prominent in hinterland of the state capital, while in view of social characteristics this region opposes the hypothesized relations. But, in view of social characteristics, other hinterlands keep more parity with the hypotheses, than the Patna's region.

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# CHAPTER - V

## ECONOMIC CHARACTERISTICS OF THE HINTERLANDS : A DISTANCE - DECAY ANALYSIS

In the preceeding chapter, the relationship between distance from the urban centres of hinterland villages and some of their demographic characteristics were studied. The physical distance of the villages from the cities may also influence some of the economic characteristics of the villages.

In the present chapter, therefore, an attempt has been made to highlight the association between distance and different economic characteristics of the selected hinterland villages. The economic indicators chosen for this purpose are as follows:

(i) Total work participation rate.

(ii) Male work participation rate

(iii) Female work partcipation rate

(iv) Proportion of cultivators to total workers.

(v) Proportion of agricultural labourers to total workers

(vi) Proportion of workers in household industry to total workers.

(vii) Proportion of workers in 'others' to total workers.

As in the case of previous chapter, in this chapter also, the analysis is carried out in two parts for each variable.

In the first part, means of the variables have been worked out for each hinterland cross classified by different distance zones. After identifying the broad patterns of relationship between distance and the values of the variable, the detailed relationship is studied through the correlation and regression analysis.

## 5.1 Work Participation Rate

It is generally assumed, that the proportion of work-force to total population may be higher closer to cities than the distant villages, as the poor rural economy compels the rural population to work more than the urbanities. Besides, agriculture, the backbone of rural economy, is more labour intensive than the urban industrial sector.

The average work participation rates for the villages in different distance zones of the hinterland of each city are given in table 5.1.

Table 5.1 shows that the hinterland of Purnia consists a consistently higher work force than that of other three hinterlands, which is responsible for the highest average work participation rate of Purnia's city region as found in Chapter-III.

Although not well-defined, yet a tendency of decrement of work participation rate has emerged out in the surroundings

TABLE 5.

DISTANCE-WISE DISTRIBUTION OF AVERAGE WORK PARTICIPATION RATES OF DIFFERENT HINTERLANDS 1981

| Hinterland of | Work participation Rate in percentage Distance Zones | | | |
|---|---|---|---|---|
| | 1-10 km | 11-20km | 21-30 km | 31-40 km |
| Purnia | 35.54 | 34.93 | 35.11 | 33.38 |
| Dhanbad | 28.10 | 24.82 | 27.08 | 24.55 |
| Darbhanga | 25.49 | 25.93 | 28.04 | 26.70 |
| Patna | 28.68 | 29.27 | 25.57 | 26.55 |

of Purnia and Patna. The trend is also clear from Fig. 19a In spite of the continuous rise and fall of workers' ratio in the hinterland of Dhanbad, a total reduction has corrurred from 1-20 km to 21-40 km zone. On the contrary, work participation rate is higher in the villages of 21-40km than in 1-20 km around Darbhanga. Hence, only the pattern in the surroundings of Darbhanga keeps parity with the aforementioned assumption.

The results of the relationship between distance as independent variable and total work participation rate as dependent variable, for each hinterland, are given in table 5.2 (through correlation and regression analysis).

TABLE 5.2

RESULTS OF CORRELATION AND REGRESSION ANALYSIS EXPLAINING TOTAL WORK PARTICIPATION RATE BY THE DISTANCE OF HINTERLAND VILLAGES FROM SELECTED CITIES, 1981.

| HINTERLAND OF | Types of Function | Correlation coefficient | Regression constant 'b' | Regression constant 'a' (for significant relations) |
|---|---|---|---|---|
| PURNIA | Linear | -.10533 | -.05687 | - |
| | Semi log | -.086 | -.0016 | |
| | Double log | -.097 | -.0324 | |
| DHANBAD | Linear | -.06153 | -.05828 | |
| | Semi log | -.012 | -.0006 | |
| | Double log | | | |
| DARBHANGA | Linear | .14896** | .06 | 25.30165 |
| | Semi-log | .178** | 1.0034058 | 24.363838 |
| | Double log | .276*** | .0715 | 21.308371 |
| PATNA | Linear | -.05486 | -.04715 | |
| | Semi log | -.186 | | |
| | Double log | -.146 | | |

NOTE: *** Significant at 1% level of significance

** significant at 5% level of significance

* significant at 10% level of significance

According to the Table 5.2, the total work participation rate and distance are directly correlated only is in the villages around Darbhanga. This relationship is found to be significant also. The direct relationship is in confirmity to the hypothesis vi (page 23, Chapter I), also. Of course, this relation tends to be more non-linear than linear.

Though insignificant, yet the relation is inverse in three cases of the hinterland of Dhanbad, Purnia and Patna. This contradiction between the hinterlands of Darbhanga on one hand and of Dhanbad Purnia and Patna on the other hand, may be on account of the functional differences of the cities. For example, Dhanbad the industrial city - provides more employment to the people of its immediate vicinity than of the remote periphery. It indicates that the villages nearer to an industrial town largely depend on the city for occupational purposes.

The agricultural town of Purnia can diversify the agricultural economy more of the villages close to it than of the far-off villages which is the probable reason for decreasing work participation rate with distance.

Patna being a state capital - can obviously provide various types of employment to the people of its close proximity than to the far away population.

Contrary to these three cases , Darbhanga with its tertiary base, does not have much employment generation capacity, for which the expected pattern of increasing work participation rate with a increase of distance has become prominent here.

However, the increasing nature of work participation rate in villages around Darbhanga is well-represented by double log (pareto ) function .

## 5.2 Male Work Participation Rate.

Following the general principle of work participation rate, male workers are also supposed to get abated with the increase of distance from cities.

The male work participation rate has been examined in relation to different distance zones of hinterlands through their means and are given in Table 5.3. These values are also shown graphically in fig 19(b)

Here also it is seen that in every distance zones, the hinterland of Purnia dominates other hinterlands, regarding male work participation rate. Only the hinterland of Darbhanga has experienced a progressive increasing tendency of male work participation rate from the city core to the extreme peripheral area.

TABLE 5.3

DISTANCE -WISE DISTRIBUTION OF AVERAGE MALE WORK PARTICIPATION RATE IN DIFFERENT HINTERLANDS 1981

| Hinterland of | Male work participation rate in percentage Distance Zones | | | |
|---|---|---|---|---|
| | 1-10 km | 11-20 km | 21-30 km | 31-40 km |
| Purnia | 54.93 | 99.31 | 53.23 | 56.42 |
| Dhanbad | 47.59 | 43.05 | 45.67 | 45.81 |
| Darbhanga | 46.19 | 48.61 | 49.81 | 48.70 |
| Patna | 44.66 | 47.53 | 42.52 | 51.39 |

Except the villages around Dhanbad, all the three hinterlands have more male workers in the extreme periphery (31-40 km zone) than that in the immediate proximity (1-10 km zone). In spite of having lower male workers in the farthest zone (than in the nearest surroundings), the city region of Dhanbad consists slightly more male workers in 21-40 km zone than in 1-20 km. zone. The same is true for the hinterlands of Patna, Purnia and obviously of Darbhanga.

Thus, from this general picture, the hypothesis (no.vi, postulated in chapter 1) of increasing male work participation rate with distance, seems to be true, Of course, a statistical justification should be drawn for this.

Table 5.4 presents the corresponding results of correlation and regression analysis using distance as independent

variable and male work participation rate as dependent variable.

TABLE 5.4

RESULTS OF CORRELATION AND REGRESSION ANALYSIS EXPLAINING THE MALE WORK PARTICIPATION RATE BY DISTANCE OF HINTERLAND VILLAGES FROM SELECTED CITIES 1981.

| Hinterland of | Types of Functions | Correlation coefficient | Regression constant 'b' | Regression constant 'a' (for significant relations) |
|---|---|---|---|---|
| PURNIA | Linear | .18082* | .16542 | 4921282 |
| S | Semi log | .112 | 1.0039 | |
| | Double log | .052 | .0335 | |
| DHANBAD | Linear | .07132 | .01623 | |
| | Semi log | .062 | 1.0031 | |
| | Double log | -.098 | -.061 | |
| DARBHANGA | Linear | .1321* | .0941 | 46.59129 |
| | Semi log | .132* | 1.0029 | 44.848942 |
| | Double log | .195** | .0687 | 39.165646 |
| PATNA | LInear | .0171 | .02476 | |
| | Semi log | -.076 | -.993421 7 | |
| | Double log | -.045 | -.047 | |

Note: ** Significant at 5% level of significance

* significant at 10% level of significance

# AVERAGE WORK PARTICIPATION RATE (DISTANCE-WISE)

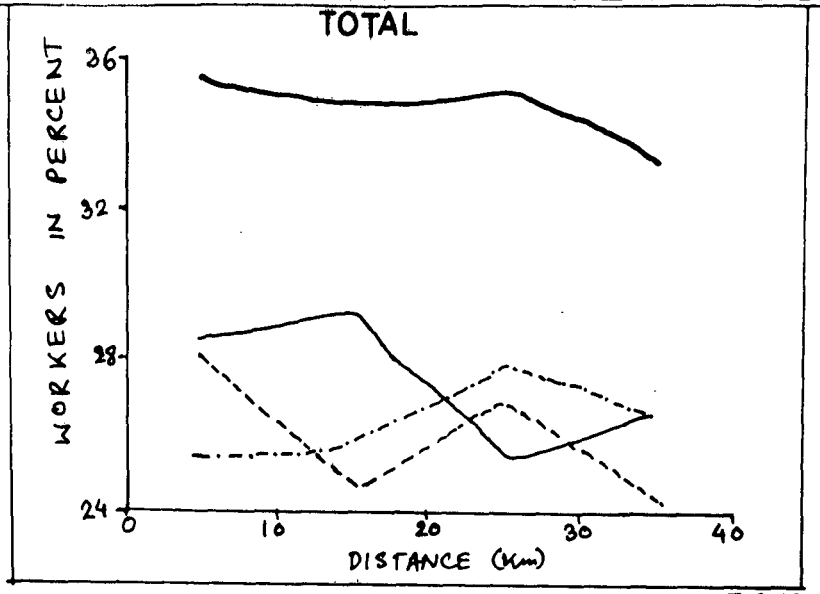


FIG. 19a

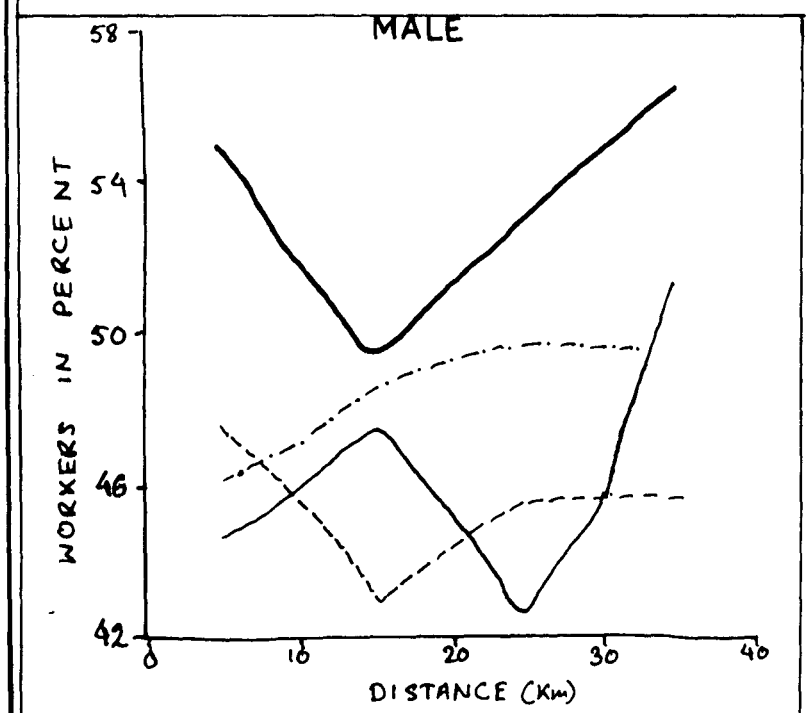


FIG. 19b

INDEX

SURROUNDING VILLAGES OF

- PURNIA
- DHANBAD
- DARBHANGA
- PATNA

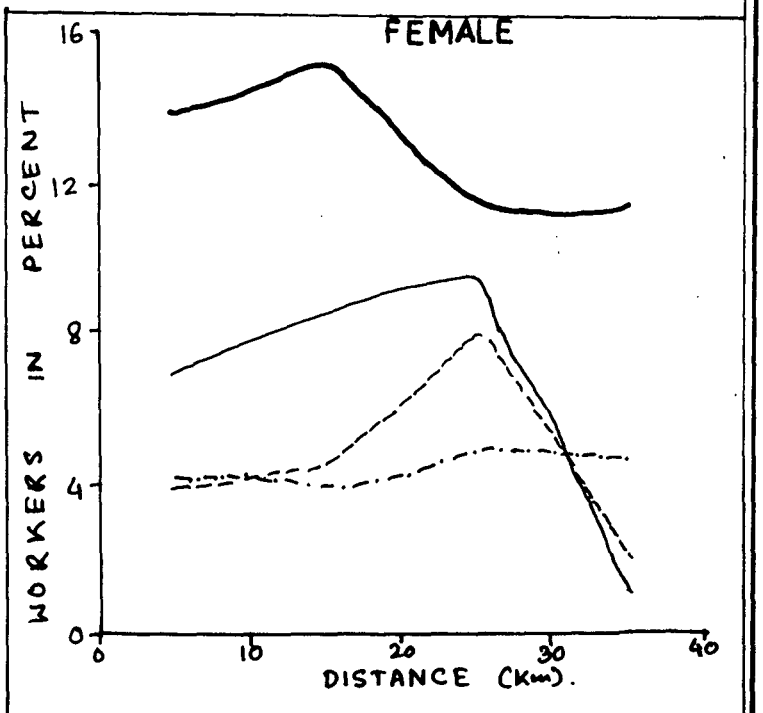


FIG. 19c

Similar pattern as total work participation rate has been manifested by male work participation rate of the surrounding villages of Darbhanga, which is significant and more non-linear than linear in nature as linear is significant only in 10% level and pareto or double log is significant at 1% level of significance. The figure represents this non-linear relationship. In this case 1 percent increase in distance explains .0687 increase in male work participation. rate.

Male work participation rate of the villages around Purnia also, is positively and linearly related with distance, though its statistical significance is very low (10% level) So in these two cases (hinterlands of Darbhanga and Purnia) the hypothesis has been validated. This picture is paradoxical to the picture of total work participation rate of villages around Purnia, which is inversely correlated with distance. This inverse relationship is however found to be statistically insignificant.

This contradiction may be explained by female work participation rate, which may be predicted to be negatively correlated with distance in this case that in turn leads to negative correlation between distance and total work participation rate. Thus, one should now turn to investigate the patterns emerged from female work participation rate.

## 5.3 Female Work Participation Rate

The relevance of the rate of female participation in work force, arises from its close connection with the status of women, which is very low in India, particularly in rural areas. Despite the lower status of rural females than the urban females, the same reason (as for total work participation rate) of poor economic condition leads the rural females to participate more in work than that of mean females.

Hence ,one may assume, that villages closer to the cities have lesser proportion of female workforce than in the villages of extreme periphery. This assumption may be verified from the analysis of the following table.

Basedon different distance categories, table 5.5 states the mean female work participation rates of the four hinterlands.

Table 5.5 states that each distance zone of the hinterland of Purnia consists the highest female workers' proportions among the four hinterlands.

An uniformity in female work participation is each distance zone can be visualised for the villages around Purnia and Darbhanga .But the hinterlands of Patna and Dhanbad experience a steady increase in female workers upto a distance of 30 Km , after which the proportion has dropped suddenly in the region of 31-40 km (Fig.19c ).

TABLE 5.5

DISTANCE WISE DISTRIBUTION OF AVERAGE FEMALE WORK PARTICIPATION RATE IN DIFFERENT HINTERLANDS 1981

| Hinterland of | Female work participation rate in percent Distance zones | | | |
|---|---|---|---|---|
| | 1-10 km | 11-20 Km | 21-30 km | 31-40 km |
| Purnia | 14.10 | 15.27 | 13.51 | 13.59 |
| Dhanbad | 4.02 | 4.73 | 8.28 | 2.19 |
| Darbhanga | 4.42 | 4.02 | 5.1 | 4.94 |
| Patna | 7.03 | 8.69 | 9.55 | 1.32 |

Probably because of the small sample (i.e. 2 and 1 respectively for the hinterland of Dhanbad and Patna), the unexpected pattern arises in this distant peripheral area (31-40 km).

Comparing the distance zone of 1-20km and 21-40 km a reduction of female workers is evident in the latter zone around the city of Purnia and Darbhanga.

The statistical results of correlation and regression between distance and female work participationrate for the four hinterland have been illustrated by Table 5.6.

TABLE 5.6

RESULTS OF CORRELATION AND REGRESSION ANALYSIS EXPLAINING THE FEMALE WORK PARTICIPATION RATE BY DISTANCE OF HINTERLAND VILLAGES FROM THE SELECTED CITIES,1981.

| HINTERLAND of | Type of Functions | Correlation coefficient | Regression constant 'b' | Regression constant 'a' (for significant relation) |
|---|---|---|---|---|
| PURNIA | Linear | -.18945* | -.18767 | 17.37324 |
| | Semi log | -.323*** | -.956882 | 20.43 |
| | Double log | -.29*** | -.7276 | 65.112 |
| DHANBAD | Linear | .02423 | .03185 | |
| | Semi log | -.105 | -.9882 | |
| | Double log | -.129 | -.2204 | |
| DARBHANGA | Linear | -.01546 | -.01 | |
| | Semi Log | .146** | 1.016 | 2.106 |
| | Double log | .102 | .175 | |
| PATNA | LInear | .20543 | .19474 | |
| | Semi log | .186 | 1.0285 | |
| | Double log | .222* | .4061 | 1.9923204 |

NOTE: *** Significant at 1% level of significance

** significant at 5% level of significance

* significant at 10% level of significance

Table 5.6 indicates that the relation between female work and participation rate/distance does exist significantly in the villages around Purnia, Darbhanga and Patna - of course in a very low level (at 10% ) for the last case. In these three cases, the relation is mostly nonlinear type (either semi-log or double log).

Two of these three significant relations i.e. the surroundings of Patna and Darbhanga - have directly association with distance, while keeping parity with the pattern of total work participation rate, the female work force of the hinterland of Purnia, registers an inverse relationship with distance from city. It is highly significant in exponential (semi log-linear) pareto (double log linear) function as one unit increase in distance leads to .9568582 times decrease in female workers and one percent increase in distance is reflected by .7276% fall in female workers.

For this unhypothesized tendency (negative), the same reason (as total work participation rate), of more diversified economy providing more employment to females has been justified here also.

However, our hypothesis (no.vi) postulated earlier between distance and female work participation rate failed for the hinterland of Purnia, but is verified for the villages around Darbhanga and Patna.

## 5.4 Proportion of Cultivators to Total Workers

Villages, being the places of occupation of those engaged in primary activites , are likely to have a high concentration of cultivators. Following this, one may easily expect that the villages closer to cities, have lasser ratio of cultivators than the distant villages, where urbanism has been weakened. So, cultivators' proportion has an inverse association with distance from cities (hypothesis no.vii in Chapter I).

Let this hypothesis be studied in the present situation by analysing the means of proportions of cultivators in different distance zones of the four hinterlands. These values are represented by Table 5.7.

TABLE 5.7

DISTANCE-WISE DISTRIBUTION OF AVERAGE PROPORTION OF CULTIVATORS (TO TOTAL WORKERS) IN DIFFERENT HINTERLANDS, 1981.

| Hinterland of | Cultivators Proportions in percentage Distance Zones | | | |
|---|---|---|---|---|
| | 1-10 km | 11-20 km | 21-30 km | 31-40 km |
| Purnia | 29.46 | 35.79 | 35.39 | 39.62 |
| Dhanbad | 25.16 | 37.74 | 55.22 | 61.85 |
| Darbhanga | 30.69 | 43.60 | 38.84 | 43.67 |
| Patna | 50.00 | 44.92 | 46.89 | 44.11 |

It is observed from the table 5.7 that among the neighbouring two zones (1-10 km and 11- 20km) of four hinterlands, maximum proportions of cultivators are found in the city region of Patna. The site of Patna and its nearby regions, on the bank of the Ganga, may be attributed as a reason to this feature.

On the other hand, the concentration of cultivators is the highest in the zone of 21-40 Km around Dhanbad city.

Despite Purnia's agricultural base not any distance region of its hinterland consists the highest percentage of cultivators. This fact implies that in the surrounding villages of Purnia, not much cultivators are found, but workers belonging to other primary activities (agricultural labourers, workers engaged in livestock, forestry, fishing, plantation etc ) may dominate the work force.

The discussion about the distribution of agricultural labourers (in section 5.5) may clarify this prediction.

However, fig.20 illustrates a well-defined increasing pattern of cultivators' proportions with distance from the city of Dhanbad and Purnia and to some extent of Darbhanga. The villages around Patna opposes the former pattern, with a slight declining tendency.

These patterns have been further studied with the help of correlation and regression analysis. The results are given in table 5.8.

(138)

TABLE 5.8

RESULTS OF CORRELATION AND REGRESSION ANALYSIS EXPLAINING THE PROPORTIONS OF CULTIVATORS TO TOTAL WORKERS) BY THE DISTANCE OF HINTERLAND VILLAGES FROM THE SELECTED CITIES,1981

| Hinterland of | Types of Functions | Correlation Coefficient | Regresssion constant 'b( | Regression constant 'a' (for significant relation) |
|---|---|---|---|---|
| PURNIA | Linear | .30210*** | .28077 | 29.05688 |
| | Semi log | .330*** | 1.0093 | 27.514 |
| | Double log | .386*** | .2011 | 18.634 |
| DHANBAD | Linear | .48863*** | 1.37713 | 17.3706 |
| | Semi log | .353** | 1.0549 | 10.49 |
| | Double log | .332** | .6714 | 4.32 |
| DARBHANGA | linear | .23212*** | .3339 | 33.160 |
| | Semi log | .280*** | 1.0129 | 28.17 |
| | Double log | .347*** | .2518 | 17.89 |
| PATNA | Linear | -.14622 | -.33377 | |
| | Semi log | -.11 | -.9946 | |
| | Double log | -.147 | -.0837 | |

NOTE: *** Significant at 1% level of significance
** Significantat 5% level of significance
* significant at 110% level of significance

## PROPORTION OF CULTIVATORS TO TOTAL WORKERS (DISTANCE-WISE AVERAGE)

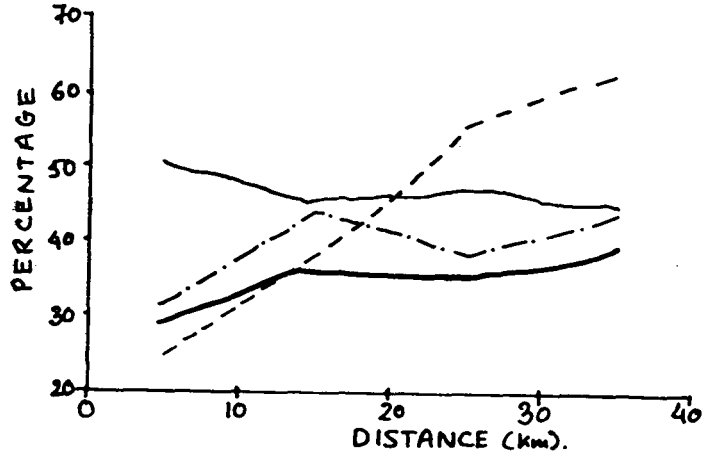


FIG. 20

INDEX

SURROUNDING VILLAGES OF

- PURNIA
- DHANBAD
- DARBHANGA
- PATNA

## PROPORTION OF AGRICULTURAL LABOURERS TO TOTAL WORKERS (DISTANCE-WISE AVERAGE)

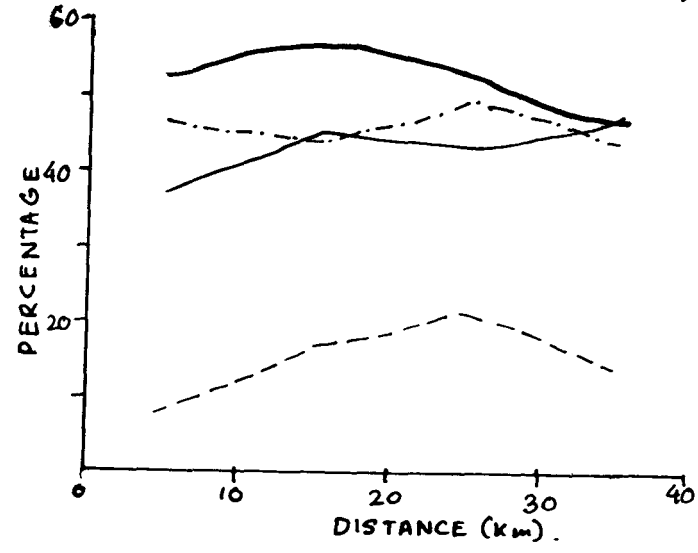


FIG. 21

According to the above table (5.8) there exists a highly significant direct relation between distance and proportions of cultivators of the hinterlands of Dhanbad, Purnia and Darbhanga (These relations are significant in all three types of functions - linear, semi log and double log ).

But for the villages around Patna, no relation between these two variables is found to be significant for any types (linear or nonlinear). Thus, the general hypothesis (no.vii) of direct relation between distance and cultivators, ratio has been proved here except for Patna.

Again, the fig 20 depicts that the upward gradient of cultivators' proportions, is most steep for the villages of Dhanbad - city -region, while it is gentle for the rest two cases (hinterlands of Purnia, and Darbhanga). Numerically speaking, one unit increase in distance from Dhanbad city is consequent upon 1.37 unit increase of cultivators' ,whereas due to an unit increase in distance, increase of cultivators' percentage in the villages around Darbhanga and Purnia is .33 unit and .28 unit respectively.

Therefore, the prediction of more rapid rise in cultivators' proportions around an industrial city than an agricultural town, is applicable in this context.

## 5.5 Proportion of Agricultural labourer

A similar hypothesis of direct relation as that of distance and ratio of cultivators', has been postulated also between distance and agricultural labourers (no.viii), since the latter is another characteristic of primary activity.

The distance wise pattern of means of the percentages of agricultural labourers are obtained from table 5.9. These values are also graphically shown in Fig. 21

TABLE 5.9

DISTANCE WISE DISTRIBUTION OF AVERAGE PROPORTION OF AGRICULTURAL LABOURERS (TO TOTAL WORKERS) IN DIFFERENT HINTERLANDS ,1981

| Hinterland of | Proportions of Agricultural Labourers in Percentage | | | |
|---|---|---|---|---|
| | Distance Zones | | | |
| | 1-10 km | 11-20 km | 21-30 km | 31-40 km |
| Purnia | 52.18 | 55.94 | 53.08 | 46.82 |
| Dhanbad | 7.34 | 16.44 | 20.57 | 14.49 |
| Darbhanga | 45.45 | 43.56 | 49.65 | 44.39 |
| Patna | 35.57 | 43.82 | 43.44 | 48.51 |

The highest concentration of agricultural labourers in the region of 1-30 km surrounding Purnia city, supports the

previous inference, drawn on the basis of observed pattern of distribution of cultivators (page 137 ) . Of course, in the extreme periphery ( 31-40 km), the hinterland of Patna exceeds, Purnia's region in terms of percentage of agricultural labourers.

The hinterland of Patna has got an uniform increase in agricultural labourers.

The villages around Dhanbad also experience an increasing picture of agricultural labourers upto the distance of 30km although the level is low.

Combining together the zone of 1-10 km and 11-20 km on one hand and 21-30 km and 31-40 km on the other hand, it is seen, that the subsequent zones ( 21-40 km) around the city of Dhanbad, Darbhanga and Patna, possess greater proportions of agricultural labourers than the compartively proximate zones (1-20 km) Only the city region of Purnia shows just reverse picture of this.

Hence, an increasing pattern of proportions of agricultural labourers is supported in the case of the hinterlands of Dhanbad, Patna and Darbhanga excepting Purnia which apparently affirms the hypothesis (no. viii) relating to distance and agricultural labourers.

TABLE 5.10

RESULTS OF CORRELATION AND REGRESSION ANALYSIS EXPLAINING THE PROPORTION OF AGRICULTURAL LABOURERS (TO TOTAL WORKERS) BY DISTANCE OF THE HINTERLAND VILLAGES FROM SELECTED CITIES, 1981

| Hinterland | Types of Functions | Correlation coefficient | Regression constant 'b' | Regression constant 'a' (for significant relation) |
|---|---|---|---|---|
| Purnia | Linear | -.2112** | -22151 | 57.44468 |
| | Semi log | -.179** | -.996 | 55.90 |
| | Double log | -.104 | -.041 | |
| Dhanbad | Linear | .23237 | .36421 | |
| | Semi log | .299* | .0407 | 4.99 |
| | Double log | . 448*** | .7897 | 1.23 |
| Darbhanga | Linear | .06555 | .08343 | -- |
| | Semi log | .105 | 1.003 | |
| | Double log | .139** | 1.069 | 35.841269 |
| Patna | Linear | .33974** | 1.67278 | 31.0455 |
| | Semi log | .348** | 1.0235 | 26.47 |
| | Double log | .387*** | 1.3202 | 16.60 |

NOTE: *** Significant at 1% level of significance
** Significant at 5% level of significance
* Significant at 10% level of significance

The hypothesis relating to distance and agricultural labourers - increase in distance from cities will increase the proportion of agricultural labourers - has been confirmed significantly for the villages around Dhanbad, Patna and Darbhanga, excluding Purnia, where a significant inverse relation has been established.

The following reason may be attributed to this exceptional pattern in Purnia's city region:-

There exists a moderate direct relation between the agricultural labourers and female work participation rate ( $\gamma$ value = .515 ) - see appendix V . It means that, a large proportions of female workers are engaged as agricultural labourers. So, the diminution of female work participation rate with distance (table 5.6) may be responsible for the decline of agricultural labourers with increasing distance from Purnia city.

The gap created by agricultural labourers in the distant villages, is filled up by increased proportion of cultivators, as it has been observed earlier from section 5.4.

Thus, it may be deduced that the agricultural town of Purnia is an attraction more to the agricultural labourers to settle in nearby areas, than to the cultivators who prefer to reside in distant peripheries. This picture may be consequent on following fact -

Near the city, the land price-may be expected to be costlier, than that of the remote villages.

Hence, only a few rich cultivators may afford to own these high priced lands. This in turn, reduces the number of cultivators and increases the number of agricultural labourers , as to most of poor villagers, it is more profitable to be engaged as labourers in agricultural activities, than to own a small size of costlier lands.

However, the inverse relation in Purnia's city region is linear (through semi log is also found), while the direct relations in other hinterlands are the most significant in pareto or double log function.

. An interesting feature to note from the fig. 21 is that the upward gradient of agricultural labourers is the most steep in villages around Dhanbad. (the same pattern was observed for cultivators' proportions in the preceeding section ), which implies the most rapid rate of increase of this proportion (.7897% for one percent increase in distance) in that area. The hinterland of Purnia also was a moderate rate of increase (.3202% for one percent increase in distance). the rate is the lowest in the city region of Darbhanga (.069% for 1% increase in distance), as already greater proportions of agricultural labourers are possessed by the immediate surroundings of the city than that of the city of Dhanbad and Patna.

## 5.6 Proportion of workers engaged in household industry to total workers

As household industry typies rural industrialisation, therefore an waxing effect may be expected on the proportion of workers engged in household industry, with the increasing distance from urban centres to rural areas (hypothesis no.ix ).

In order to verify this assumption in the present context, a distance-wise trend of means of percentages of household industrial workers (to total workers) are shown in table 5.11.

TABLE 5.11

DISTANCE WISE DISTRIBUTION OF AVERAGE PROPORTION OF WORKERS IN HOUSEHOLD INDUSTRY (TO TOTAL WORKERS) IN DIFFERENT HINTERLANDS ,1981

| Hinterland of | Household Industrial workers in percentage Distance zones | | | |
|---|---|---|---|---|
| | 1-10 km | 11-20 km | 21-30 km | 31-40 kms |
| Purnia | 1.02 | 1.91 | 5.61 | 2.06 |
| Dhanbad | 1.87 | 7.42 | 1.22 | 3.88 |
| Darbhanga | 3.20 | 2.11 | 2.53 | 2.98 |
| Patna | 2.07 | 1.95 | 1.04 | -- |

Each hinterland is characterised by different pattern of household industrial workers.

The hinterland of Purnia is marked by an increasing tendency of household industrial workers within the region of 1-30 km. Just reverse condition prevails in the villages around Patna, with a continuous decay of workers in household industry, which becomes absolutely nill in extreme periphery (31-40 km zone). Fluctuations in household industrial workers characterise the surroundings of Dhanbad, while the entire city region of Darbhanga has an uniformity in this respect. Fig. 22 shows the same picture. However the corresponding results of correlation and regression analysis between distance and household industrial workers are obtained from table 5.12.

TABLE 5.12

RESULTS OF CORRELATION AND REGRESSION ANALYSIS EXPLAINING THE PROPORTION HOUSEHOLD INDUSTRIAL WORKERS (TO TOTAL WORKERS) BY DISTANCE OF THE HINTERLAND VILLAGES FROM THE SELECTED CITIES 1981.

| Hinterland of | Types of functions | Correlation coefficient | Regression constant 'b' | Regression constant 'a' (for significant relation) |
|---|---|---|---|---|
| Purnia | Linear | .02565 | .008 | - |
| | Semi log | .087 | 1.008 | |
| | Double log | .16 | .2678 | |
| Dhanbad | Linear | .1227 | .09544 | |
| | Semi log | .241 | 1.0431 | |
| | Double log | .265* | .5122 | .7051815 |
| Darbhanga | Linear | -.005 | -.0016 | |
| | Semi log | .001 | 1.00 | |
| | Double log | -.05 | -.0876 | |
| Patna | Linear | -.14493 | -.04304 | |
| | Semi log | -.026 | -.0995 | |
| | Double log | -.013 | .0244 | |

NOTE: * Significant at 10% level of significance.

PROPORTION OF WORKERS IN HOUSEHOLD INDUSTRY TO TOTAL WORKERS
(DISTANCE-WISE AVERAGE)

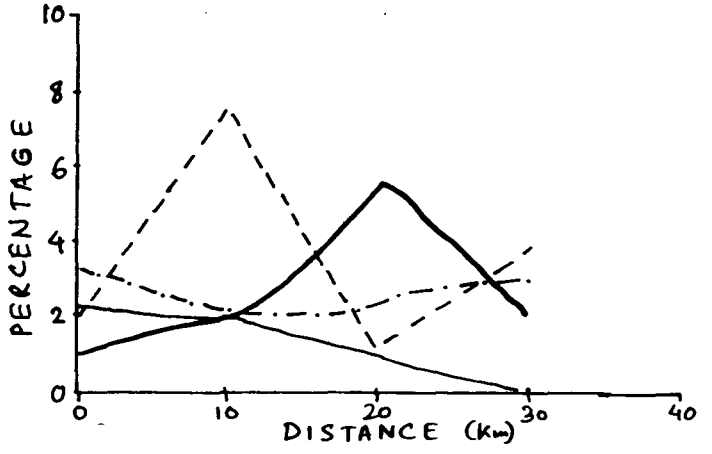


FIG. 22

INDEX

SURROUNDING VILLAGS OF

- PURNIA
- DHANBAD
- DARBHANGA
- PATNA

PROPORTION OF WORKERS IN 'OTHERS' TO TOTAL WORKERS
(DISTANCE. WISE AVERAGE)

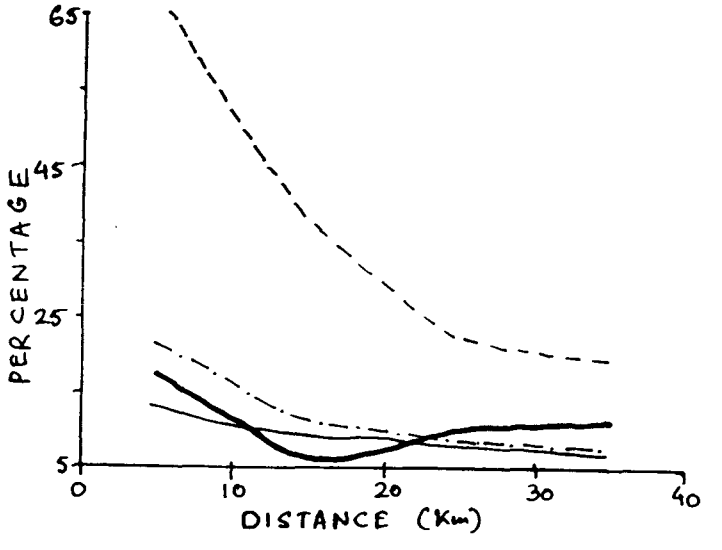


FIG. 23

## 5.7 Proportion of workers in 'others'

This aspect is a vociferous index of urbanisation in reference to economic dimension of urbanisation - 75% of working population should be, non agricultural workers. Though this category[1] includes workers in some primary activities (Orchards, plantations livestock, fishing etc.), yet their proportions are very minute. Thus the workers in 'others' category may be considered to be a significant indicator of urban influence on rural surroundings.

From the standpoint of distance this aspect (the proportion of other workers) is supposed to have a downward gradient from the city towards its periphery, where urban influence is less (hypothesis no.x).

Again considering the functional differences of cities, the downward gradient may be expected to be steeper in case of the tertiary, service based and secondary based cities than that round an agricultural town.

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1 For the definition of this category, see section 3.3.2(d) Chapter-III.

TABLE 5.13

'OTHER'

DISTANCE WISE DISTRIBUTION OF AVERAGE PROPORTION OF/WORKERS ( TO TOTAL WORKERS) IN DIFFERENT HINTERLANDS,1981.

| Hinterlands of | Other workers in percentage Distance Zones | | | |
|---|---|---|---|---|
| | 1-10 km | 11-20 km | 21-30 km | 31-40 km |
| Purnia | 17.38 | 6.32 | 9.88 | 11.49. |
| Dhanbad | 64.93 | 38.51 | 23.00 | 19.78 |
| Darbhanga | 20.66 | 10.72 | 8.98 | 8.53 |
| Patna | 12.39 | 9.38 | 8.62 | 7.38 |

In all distance region , the hinterland of Dhanbad consists the maximum proportion of workers in 'others', consistently. A distinct distance - decay effect on this characteristic, is manifested in the villages around Dhanbad, Darbhanga and Patna - the three non-agro-based cities - of excepting that the agro-based Purnia. Of course the proportion of 'other workers' is lesser in 21-40 Km zone than in the nearer surroundings (1-20 km) of Purnia.

However, the corresponding results of correlation and regression analysis of these above patterns are represented by Table 5.14.

TABLE 5.14

RESULTS OF CORRELATION AND REGRESSION ANALYSIS EXPLAINING THE PROPORTION OF WORKERS IN 'OTHERS' TO TOTAL WORKERS BY DISTANCE OF THE HINTERLAND VILLAGES FROM THE SELECTED CITIES,1981.

| Hinterland of | Types of Function | Correlation coefficient | Regression constant'b' | Regression constant 'a' (for significant relation) |
|---|---|---|---|---|
| PURNIA | Linear | -.0653 | -.0648 | - |
| | Semi log | .088 | 1.0082 | |
| | Double log | -.013 | -.0232 | |
| DHANBAD | Linear | -56145*** | -1.842 | 71140 |
| | Semi log | -.677*** | -.934 | 90.32 |
| | Double log | -.585*** | -.7536 | |
| DARBHANGA | Linear | -.40122*** | -.4228 | 20.36 |
| | Semi log | -.352*** | -.9707 | 15.47 |
| | Double log | -.425 | -.5644 | 42.11 |
| PATNA | Linear | -.3022** | -.29587 | 14.58 |
| | Semi log | -.168 | -.98 | |
| | Double log | -.208* | -.2595 | 15.78 |

NOTE: *** Significant at 1% level of significance

** significant at 5% level of significance

* significant at 10% level of significance

The above table (5.14) states that the predicted inverse relation between distance and the proportion of other workers, has been established significantly in three hinterlands of Dhanbad, Darbhanga and Patna. The relation for Purnia's city region is found to be insignificant, Despite this insignificance, the direction of relation is negative, so, the postulated hypothesis (no.x) of inverse relation between these two aspects, has become totally valid.

The three cases of significant relations have been the most well-suited to linear functions. The gradient of relation is the most step for the hinterland of Dhanbad, followed by that of Darbhanga and than of Patna (Fig.23 ). An unit increase of distance decreases 1.84 unit of other workers in the surroundings of Dhanbad, while this (b) value is .4228 and .29587 respectively for the villages of Darbhanga and Patna.

This fact implies that the villages in the immediate neighbourhood of Dhanbad are more urban. than the villages of other city region.

## 5.8 SUMMARY

To synthesize the preceeding discussion in a nutshell, the following features have come into light:-

a) Among the four hinterlands of cities of different functional nature, only for the villages around the tertiary based city (Darbhanga) , the two aspects of distance and work participation rate (total, male, female) are significantly related which again supports the postulated hypothesis (no.vi direct relation between distance and work participation rate).

b) The significant but inverse relation of distance with female work participation rate, opposes the pre-determined assumption, in the villages around the agro-based Purnia, which gives more economic support to the females of nearer villages than that of remoter areas, with its diversified agricultural sector.

c) The hypothesis no. vii about the relation between distance and a cultivators, has been totally proved, for the cases of significant relations established by the hinterlands of the agricultural, industrial and tertiary based towns.

d) Considering the characteristic of agricultural labourers' proportions, only the city region of Purnia does not

fulfill a the assumption of direct relation between agricultural labourers and distance. It may be a consequence of declining female workers with increasing distance (agricultural labourers and female work participation rate is positively correlated). Besides the decreasing land value with distance seems to play a role in increasing the cultivators' proportions and reducing the proportions of agricultural literature.

e) In view of the household industrial workers in relation to distance, not any significant relation, but in the city region of Dhanbad industrial city, has been observed. Of course this only significant relation at a very low level of significance (at 10% ) goes with the hypothesis no.ix.

f) The prediction i.e. the characteristic of workers in 'others' category has an inverse relation with distance, has been fully proved in cases of significant relations established by the hinterlands of industrial, tertiary and service based cities.

Thus one can conclude that, the relation between distance and economic characteristics of rural hinterlands is pertinently determined by the functional nature of the urban core.

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CHAPTER- VI

# INFRASTRUCTURAL FACILITIES OF THE HINTERLANDS : A DISTANCE - DECAY ANALYSIS

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Urbanisation leads to an increased availability of a wide range of services in terms of housing, food, clothing, educational facilities, medical, transport and communication facilities etc. Therefore, in analysing the role of urban cores on the development of their rural surroundings, the availability of these benefits in rural hinterlands should also be taken into considerations.

Of course, unlike the demographic and socio-economic indicators, the availability of facilities in rural areas is not a direct manifestation of urban influence. In terms of services and facilities, urban influence can straightforwardly be measured by considering the diffusion of proper urban benefits (like educational services, medical services, bus services, retail trade etc.) to rural surroundings. But, these types of information need primary survey, which is beyond the scope of the present study.

That is why, for an indirect analysis of urban influence the presence of different types of facilities in rural hinterlands have been considered here.

It may be assumed that the villages closer to cities will have better levels of infrastructural facilities, than the remote villages.

Based on this idea, the present chapter is divided into two broad sections. The first section deals with the overall level of availability of different facilities in the hinterlands of the selected cities. The second section is concerned with the relation between distance from the cities and some of the important facilities available in the villages.

## 6.1 Level of Different Facilities

In order to have an overall picture of the availability of facilities in different hinterlands, the following facilities have been considered.

a) Educational facilities
b) Medical facilities
c) Drinking water facilities
d) Post and Telegraph office
e) Communication
f) Power Supply
g) Approach to village
h) Days of market/hat.

The detailed break-up of each of these facilities are given in 'methdology' page.39-42.

Since each of these above-mentioned facilities are of different types, (like educational facilities consist primary schools, middle schools, nigh schools colleges, etc.), therefore, weights are given to them on the basis of their importance as shown by their distribution types. The weights of different types of services are found out on the basis of their availability in relation to the total number of settlements within the neighbouring influence zone*. (The weights for different facilities of different hinterlands have been given in Appendix III ). Table 6.1 gives the composite scores of different facilities for four hinterlands.

Table 6.1 states that regarding educational facilities the highest score has been registered by the hinterland of Purnia. It is because of the presence of different types of educational institutions in the villages around Purnia (Appendix III ). Varieties like colleges, other institutions are also found in the hinterland of Darbhanga; yet the number of these facilities are not sufficient to cater the

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* The procedure used for calculating weights is given in 'Methodology', page.35.

needs of a large number of settlements (148) there, for which the composite score of educational facilities has become lower than that of the city-region of Purnia (where the number of settlements are 75). The villages around Dhanbad have the least educational services with only primary, middle and high schools (Appendix III ).

Considering the medical facilities, villages around Darbhanga , are the most well-equipped. The hinterland of Purnia has also a satisfactory level of medical services. Almost all types of medical facilities are available in these two regions (Appendix III ).

TABLE 6.1

DISTRIBUTION OF COMPOSITE SCORES FOR DIFFERENT FACILITIES IN DIFFERENT HINTERLANDS,1981.

| Facilities | Hinterland of | | | |
|---|---|---|---|---|
| | Purnia | Dhanbad | Darbhanga | Patna |
| Educational | 8.71 | 3.03 | 6.29 | 6.84 |
| Medical | 17.11 | 7.08 | 18.98 | 11.07 |
| Drinking water | 10.06 | 6.26 | 7.83 | 8.11 |
| Post and Tele- | 2.00 | 2.55 | 3.29 | 2.00 |
| graph Office(P&T) | | | | |
| Communication | 2.00 | 1.80 | 2.52 | 2.80 |
| Power Supply | 3.92 | 2.53 | 4.20 | 4.44 |
| Approach to village | 3.03 | 2.92 | 2.78 | 2.63 |
| Days of market/ hat | 1.89 | 1.55 | 1.83 | 1.50 |

Here, also, it is observed that the hinterland of Dhanbad is served by a few medical services. In terms of drinking water facilities, the hinterland of Purnia has the highest position, Considering the facility of power supply the city region of Patna has the highest level.For some facilities (like P&T, Days of market/hat), the four hinterlands have almost same condition.

## 6.2 Relation between distance and some important facilities

In the preceeding section, an overall idea about the different infrastructural facilities of the hinterlands of selected cities has been given. Some of the basic facilities are considered to be strongly associated with distance from cities. Such facilities are given below:

a) Educational facilities

b) Medical Facilities

c) Communication facilities

d) Power supply

Thus, the present section analyses the relation between distance and the above facilities.

### 6.2.1 Educational facilities

Educational facility is a basic social function Especially for rural areas the accessibility of educational facilities can directly stand as cure for social backwardness

asilliteracy, traditional outlook etc.

Considering distance, from the four selected cities of different functional types, one may assume that the villages close to Patna and Darbhanga - the service and tertiary based cities, possess more educational facilities than the villages close to Dhanbad and Purnia - the industrial and agricultural town. So, the gradient of urban influence in terms of availability of educational facilities is supposed to be more steep for the hinterlands of Patna and Darbhanga, than that of other two hinterlands.

An idea about the availability of educational facilities in different distance zones of four hinterlands is obtained from Table 6.2, which gives the distance-wise distribution of the average composite scores of educational facilities in the four hinterlands.

A close examination of the table 6.2 shows that in the hinterland of Purnia, the diminishing effect operates on the availability of educational facilities. while this availability increases from the city to the surrounding rural areas of Darbhanga. Again, the villages of 1-20 km around Patna have more educational facilities than the villages of 21-40 km. The reverse is true for the hinterland of Dhanbad. Except in the extreme peripheral area (31-40 km) in every individual zone of 1-30 km around Purnia, the average

TABLE 6.2

DISTANCE-WISE DISTRIBUTION OF AVERAGE COMPOSITE SCORES OF EDUCATIONAL FACILITIES IN DIFFERENT HINTERLANDS ,1981

| Hinterland of | Average composite scores Distance Zones | | | |
|---|---|---|---|---|
| | 1-10 Km | 11-20 Km | 21-30 km | 31-40 Km |
| Purnia | 14.77 | 8.59 | 7.53 | 6.8 |
| Dhanbad | 2.49 | 3.93 | 1.69 | 3.38 |
| Darbhanga | 3.56 | 4.71 | 6.81 | 11.69 |
| Patna | 4.16 | 4.77 | 5.36 | 43.89 |

educational facilities is higher than the same zones of the rest three hinterlands. On the contrary, the consistent lowest availability is registered by the hinterland of Dhanbad.

Table 6.3 presents the corresponding results of correlation and regression between distance and the composite scores of educational facilities of different hinterlands.

According to table 6.3, the relation between distance from cities and educational facilities is found to be highly significant for the villages around Darbhanga and moderately significant in the hinterland of Patna. In the rest two cases the relation is insignificant.

TABLE 6.3

RESULTS OF CORRELATION AND REGRESSION ANALYSIS EXPLAINING THE COMPOSITE SCORES OF EDUCATIONAL FACILITIES BY DISTANCE OF THE HINTERLAND VILLAGES FROM SELECTED CITIES,1981

| Hinterland of | Types of Functions | Correlation coefficient | Regression constant 'b' | Regression constant 'a' (for significant relation) |
|---|---|---|---|---|
| PURNIA | Linear | -.12375 | -.17168 | |
| | Semi log | -.105 | -.9882693 | |
| | Double log | -.126 | -.2565 | |
| DHANBAD | Linear | -.01459 | -.00508 | |
| | Semi log | .049 | 1.00444 | |
| | Double log | -.074 | -.0843 | |
| DARBHANGA | Linear | .27778*** | .25197 | 1.20561 |
| | Semi log | .296*** | 1.0308 | 1.8635812 |
| | Double log | .269*** | .4437 | .9873803 |
| PATNA | Linear | .32936*** | .46724 | 1.0926326 |
| | Semi log | .229* | 1.0324 | 2.484571 |
| | Double log | .188 | .3285 | |

Note: *** Significant at 1% level of significance

** Significant at 5% level of significance

* Significant 10% level of significance

However, in both the former cases of significant relations, direct relation between distance and educational services has been established, which discards the hypothesis postulated earlier (hypotheis no.xi). This unexpected pattern may be attributed to the following facts:

The city of Patna and Darbhanga with service and teritary bases are two seats of learning in Bihar ,as they possess universities, colleges and other important educational institutions. The villages closer to these cities can avail the facilities provided by the city, which is not feasible for the people of the remoter villages. So, the remoter villages have more educational institutions to serve the villagers.For example, in the distant periphery (31-40 km) of Patna, only one village (named Parthu sampled for that region) is served by one primary school, four adult literacy centres and one other educational institution, for which the average C.I. value (of educational facilities) has got an abrupt increase in that region. Undoubtedly, this is an ideal picture, But this fact indirectly implies that the influence zone of Patna in terms of educational services, is not extended upto the distance of 40 km, for which the villages at that area, have to be self-sufficient in availing educational facilities. The same implication may be true also for the city region of Darbhanga.

6.2.2. Medical Facilities

The importance of medical facilities arises from its association with human life. But in contrast to urban centres, the rural areas largely face the problem of non-availability of medical facilities. That is why, the present section aims at the discussion of presence of medical facilities in the rural hinterlands of selected cities. The distance wise score of medical services for the four hinterlands are given in Table 6.4.

TABLE 6.4

DISTANCE-WISE DISTRIBUTION OF AVERAGE COMPOSITE SCORES OF MEDICAL FACILITIES IN DIFFERENT HINTERLANDS ,1981.

| Hinterland of | Average C.I. Values Distance Zones | | | |
|---|---|---|---|---|
| | 1-10 km | 11-20 Km | 21-30 km | 31-40 km |
| Purnia | 50.35 | 7.49 | 14.50 | 13.73 |
| Dhanbad | 16.96 | 12.21 | -- | 11.55 |
| Darbhanga | 9.25 | 16.13 | 15.85 | 39.53 |
| Patna | 11.50 | 9.78 | 12.97 | 10 |

Table 6.4 brings out that the immediate surroundings (1-10 km) of Purnia is the most developed in terms of medical facilities compared to that of other three hinterlands.

But the villages in the subsequent zones of 11-40 km, around Darbhanga, have more medical services than the other hinterland villages of the same zone.

Again from the nearer to remote villages surrounding Darbhanga, the provision of medical services increases consistently. Another important feature represented by Table 6.3 is that, the villages located in the region of 21-30 km from Dhanbad, suffer from the non-existence of any kind of health facilities.

The entire hinterland (1-40 km) of Patna has an almost uniform availability of medical facilities.

However, in order to have detailed understanding about the relation between distance from cities and medical facilities in the hinterlands, correlation and regression analysis have been again carried out. The numerical values of correlation, regression and significance of the relation are given in Table 6.5.

It is understood from the above table (6.5) that there exists a highly significant relationship between the distance from city and the provision of medical facilities only in the villages around Darbhanga, Otherwise, this relation is found to be low significant (at 10% level) in the villages around Dhanbad, and insignificant in other cases.

TABLE 6.5

RESULTS OF CORRELATION AND REGRESSION ANALYSIS EXPLAINING THE COMPOSITE SCORES OF MEDICAL FACILITIES BY DISTANCE OF THE HINTERLAND VILLAGES FROM SELECTED CITIES,1981.

| Hinterland of | Types of functions | Correlation coefficient | Regression constant 'b' | Regression constant 'a' (for significant relation |
|---|---|---|---|---|
| Purnia | Linear | -.10956 | -.49486 | - |
| | Semi log | -.11 | -.9023074 | |
| | Double log | -.1 | -.1976 | |
| Dhanbad | Linear | -.23877* | -.31234 | 11.36458 |
| | Semi log | -.314 | -.9810812 | -- |
| | Double log | -.414* | -.3687 | 32.4857 |
| Darbhanga | Linear | .27226*** | .96616 | .49889 |
| | Semi log | .229** | 1.0208 | 16.886255 |
| | Double log | .146 | .2376 | -- |
| Patna | Linear | -.0926 | -.20597 | |
| | Semi log | -.157 | -.9828487 | |
| | Double log | -.167 | -.2368 | |

NOTE: *** Significant at 1% level of significance.
** Significant at 5% level of significance.
* Significant at 10% level of significance.

The significant relation in Darbhanga's city-region is positive in direction, which means, that the increasing distance from the city, creates an waxing effect on the medical facilities of the surroundings villages. This pattern rejects the hypothesis. The reason behind this unexpected relation may be as follows:

Inspite of the dominant tertiary base of Darbhanga city, the service sector is also quite high as about 28% of total worke force are engaged in that sector (See Table 2.1 Chapter II). Therefore, the medical facilities of the city may be expected to be developed which serve the people of the nearby villages. But, as the remote villages cannot avail these facilities, of the proper city, they have to be self-sufficient in terms of availability of medical services. An indirect inference can be drawn from this i.e. the influence zone of health services around Darbhanga is limited in extent, which compels the distant villages of its hinterland to be independent in health facilities.

6.2.3 Transport and Communication Facilities

One of the important facilities, available in villages , is transport communication,which is an effective medium to transmit urban influence on its rural counterpart. As, urban centres are hubs of transport communication, therefore the villages closer

to an urban area are supposed to have better communication facilities than the remote villages.

On the basis of this assumption, the present section deals with the relationship of distance and levels of communication facilities in the villages of the hinterlands of selected cities.

The means of the composite scores of communication facilities as mentioned earlier have been worked out for different distance zones of the hinterlands of each city. These values are given in Table 6.6.

TABLE 6.6

DISTANCE-WISE DISTRIBUTION OF MEAN COMPOSITE SCORES OF COMMUNICATION FACILITIES OF DIFFERENT HINTERLANDS, 1981.

| Hinterland of | Average Composite Scores Distance Zones | | | |
|---|---|---|---|---|
| | 1-10 km | 11-20 km | 21-30 km | 31-40 km |
| Purnia | 5.46 | 2.92 | .99 | .51 |
| Dhanbad | 2.54 | 1.52 | -- | -- |
| Darbhanga | 1.34 | 2.76 | 3.65 | 1.73 |
| Patna | 2.13 | 2.00 | 6 | -- |

The above table indicates that the level of communication facilities decrease consistently with distance in the city region of Purnia.

The hinterland of Dhanbad also has similar type of pattern as the villages in the distance zones of (21-40 km) around the city do not have any type of communication facilities.

The sudden increase of composite score of communication facilities in the zone of 21-30 km around in Patna is a consequence of the presence of a railway station in one village of that zone. But only one village which represents the distant periphery of Patna (31-40km) does not have any bus stand or railway station. The availability of communication facilities is almost uniformly distributed in the entire hinterland of Darbhanga.

Table 6.7 shows the results of correlation and regression analysis between the availability of communication facilities in the villages and their distance from their urban cores.

According to the table 6.7, there exists a significant relationship between the availability of communication facilities of the villages and their distance from the cities, the hinterland of Purnia ,Dhanbad and Patna except for Darbhanga.

In the villages around Purnia and Dhanbad the direction of relation is negative, indicating that, the

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TABLE 6.7

RESULTS OF CORRELATION AND REGRESSION ANALYSIS EXPLAINING THE COMPOSITE SCORES OF COMMUNICATION FACILITIES BY THE DISTANCE OF THE HINTERLAND VILLAGES FROM THE SELECTED CITIES, 1981.

| Hinterland of | Types of functions | Correlation coefficient | Regression constant 'b' | Regression constant 'a' (for significant relation) |
|---|---|---|---|---|
| Purnia | Linear | -.2347** | -.15248 | 5.686 |
| | Semi log | -.325* | -.97531 | 7.23 |
| | Double log | -.327* | -.4522 | 16.07 |
| Dhanbad | Linear | -.133 | -.0932 | |
| | Semi log | -.697* | -.9087 | 25.68 |
| | Double log | -.823** | 1.4012 | |
| Darbhanga | Linear | -.01834 | .01196 | |
| | Semi log | -.078 | -.993 | |
| | Double log | -.091 | -.1323 | |
| Patna | Linear | .11 | .09446 | -- |
| | Semi log | .573 ** | 1.0387 | 5.75 |
| | Double log | .439* | .3215 | 4.42 |

NOTE: ** Significant at 5% level of significance

* Significant at 10% level of significance

increased distance from urban centres decreases the availability of communication facilities of the villages.

The exceptional pattern of relation in the city region of Patna - direct relation between communication facilities and distance - may be explained by the presence of railway station in one of the distant villages of Patna's surroundings as mentioned earlier.

6.2.4 Power Supply

The facility of power supply in villages is assumed to be another important indicator of urban influence, generally the villages closer to urban areas are electrified than the remote villages because of some socio-political reasons.

Table 6.8 shows the mean composite scores of power supply in different distance zones of the four hinterlands.

The table indicates that availability of power supply almost has the same pattern as that of the communication facilities, particularly for the hinterlands of Purnia, Dhanbad and Darbhanga. The villages around Purnia, experience a consistent decreasing picture of power supply with increasing distance from city. The villages of 21-40 kms zone around Dhanbad do not avail the benefits of electricity. The hinterland villages of Darbhanga are in almost level in terms

TABLE 6.8

DISTANCE WISE DISTRIBUTION OF AVERAGE COMPOSITE SCORES OF POWER SUPPLY IN DIFFERENT HINTERLANDS 1981.

| Hinterland | Average Composite Scores Distance Zones | | | |
|---|---|---|---|---|
| | 1-10 km | 11-20 km | 21-30 km | 31-40 km |
| Purnia | 9.06 | 4.03 | 2.91 | 2.45 |
| Dhanbad | 4.10 | 2.12 | -- | --- |
| Darbhanga | 9.07 | 4.14 | 3.14 | 3.82 |
| Patna | 6.47 | 3.47 | 2.00 | 2.5 |

of the availability of power supply. The villages around Patna also have a slightly declining tendency in view of the availability of electricity.

However, the corresponding values of correlation and regression analysis between distance from cities and availability of power supply in the villages are presented in table 6.9.

Significant relations between distance and power supply have been established (from Table 6.9). in the surroundings of Purnia and Darbhanga and also of Darbhanga in a low level.

TABLE 6.9

RESULTS OF CORRELATION AND REGRESSION ANALYSIS EXPLAINING THE COMPOSITE SCORES OF POWER SUPPLY BY THE DISTANCE OF THE HINTERLAND VILLAGES FROM THE SELECTED CITIES,1981.

| Hinterland of | Types of Functions | Correlation coefficient | Regression constant 'b' | Regression constant 'a' (for significant relation) |
|---|---|---|---|---|
| Purnia | Linear | -.205** | -.15985 | 7.78662 |
| | Semi log | .144 | 1.0085 | |
| | Double log | .058 | .0543 | |
| Dhanbad | Linear | -.41301* | -.20501 | 5.34594 |
| | Semi log | -.042 | -.997 | |
| | Double log | .420 | .1525 | |
| Darbhanga | Linear | -.0049 | -.0036 | |
| | Semi log | .215** | 1.031 | 6.541. |
| | Double log | .183 | .1891 | 4.194 |
| Patna | Linear | -.1795 | -.1804 | |
| | Semi log | -.011 | -.9989 | |
| | Double log | .059 | .0751 | |

NOTE: ** Significant at 5% level of significance
* Significant at 10% level of significance

Among these three hinterlands, the hinterlands of Purnia and Dhanbad support the hypothesis (no $x^1$ ) postulated earlier while the city region of Darbhanga opposes this showing a direct relation between distance and power supply.

This unexpected relation can be understood from the earlier discussions of educational and medical facilities. The remote villages of the hinterland of Darbhanga are more developed than the nearer villages regarding the availability of educational and medical services. Hence it is obvious that these developed villages also avail the facility of power supply.

## 6.3 Summary

The following facts have been enlightened from the above discussion.

(a) In terms of educational facilities, the surroundings of service based and tertiary-based cities (Patna and Darbhanga respectively) significantly oppose the postulated hypothesis of negative relation between distance and facilities. (No. xi ).

This exceptional pattern may be explained by the limited extent of educational services of the city of Patna and Darbhanga, which compell the distant villages to be self-dependent in possessing educational facilities.

In other two hinterlands (of agricultural and industrial town) the hypothesis has been insignificantly proved.

(b) Considering the medical facilities available in the hinterlands, the same above mentioned reason limited extent of city services may stand for the direct relation. with distance from the tertiary based city of Darbhanga. In the industrial periphery (of Dhanbad), the hypothesis of inverse relation has been proved.

(c) The relation between the facilities of transport communication, and distance is found to be significant in all cases except in the villages around the tertiary based Darbhanga.

However, among the significant relation, the regions of agricultural and industrial town (Purnia and Dhabbad), support the assumption of inverse relationship between distance from cities and the availability of communication facilities in the surrounding villages.

The direct relation has been experienced by the hinterland of the state capital, because of the presence of a railway station in the distant village of Patna.

(d) The predicted inverse relation beween the facility of power supply in the villages and sitance from their

cities, has been accepted significantly in the city region of agricultural, industrial town and insignificantly in the villages around the state capital . Conversely, the reverse picture is observed in the villages around the tertiary based city of Darbhanga, which is satistically significant also.

Therefore, it is understood that the hinterlands of the agricultural and industrial town support the distance decay hypothesis for all the selected facilitie s either significantly or insignificantly.

On the contrary, both in the surrounding region of the tertiary-based city (Darbhanga) and the state capital Patna, all the significant relations between distance and facilities are positive in direction.

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# CHAPTER-VII

## SUMMARY AND CONCLUSIONS

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An evaluation of urban influence on rural surroundings has been attempted to focus in the present study.

Based on the assumptions, that

(i) the villages may be influenced the most by their nearest cities (as compared to by other neighbouring cities.) and,

(ii) the nature of urban influence may vary according to the different economic bases of the cites :— the prime objective of this study was to compare the influence of the nearest cities of different economic bases on their rural surroundings.

For this purpose, four cities of different economic bases of Bihar have been selected which are

(a) Purnia with dominant agricultural base

(b) Dhanbad with industrial base

(c) Darbhanga with tertiary base

(d) Patna the state capital with service and tertiary base.

As the main objective was not to find the zone of influence of the city, no commonly used methods of hinterland

demarcation have been used. The nearest city of a village is considered as its core and the villages are taken as the surrounding periphery. Likewise the surrounding peripheries of these four cities have been identified. Around each of the cities a distance of 1-40 km has been considered. From this zone only the villages with 1000 and more population has been taken, considering that villages with less than 1000 population, are insignificant to reflect urban influence. The number of such villages (having population of 1000 and more) are 187, 80, 370 and 102 respectively in the city region of Purnia, Dhanbad, Darbhanga and Patna.

However, because of the limitation of time, it was beyond the scope of the study to take all the villages. So, a sample of 40% has been considered from the universe of the present study.

For the investigation of urban influence, certain demographic and socio economic characteristics of the villages have been selected as dependent variables, while distance from cities is the independent variable.

The study has been carried out in two parts. The first part relates to a simpler understanding of the phenomena. The zone-wise means have been prepared and the emerging tendencies were analysed.

To substantiate these findings, more detailed study of relationship in the form of correlation and regression analysis is carried out in the second part.

The variations in means of different variables of different distance zones showed almost the same kind of relationships as found from correlation analysis.

The major findings of the present study are as follows:

1. The hypothesized relations between distance and all demographic characteristics, i.e. inverse relations of distance with population density, population growth rate and dependency ratio and direct relation with sex ratio (no.i, ii, iii, as given in Section 1.4 Chapter I), have been accepted only for the surrounding villages of service-based state capital Patna.

For the hinterland of tertiary sector based Darbhanga, only the hypothesis no iii, relating to distance and dependency ratio has not been proved. In other three aspects - the relation between distance and population density, population growth rate and sex ratio - the hypotheses have been proved for the city -region of Darbhanga.

Population growth rate and sex ratio in relation to distance, have again been supported by the empirical observations of the surroundings of industrial city of Dhanbad.

These two hypotheses i.e. negative relation between distance and growth rate and direct relation between distance and sex ratio, have been insignificantly proved for the villages around agro-based Purnia where the other two hypothesized relation of distance with density of population and dependency ratio, have become nullified.

Thus among all demographic characteristics, sex ratio and population growth a rate are found to be the most effective consequential factors of urban influence in the present context, irrespective of the economic bases of the cities.

From the stand point of the functional nature of the cities, only the hinterland of service-based state capital of Patna holds total conformity with the postulated hypotheses concerning the relation between distance and demographic indicators.

2. Among the social characteristics, hypothesis no.iv. indicating the distance-decay of scheduled caste population has been accepted for the surroundings of agricultural (Purnia), industrial (Dhanbad) and tertiary based (Darbhanga) cities, In contrast , the scheduled caste population in the city-region of service-based state capital has shown a direct relation with distance which is statistically significant. The reasons behind this may be the greater spill over of urban population to the immediate surroundings than the rural outmigrants (as has been

discussed earlier in Sedtion 4.5 Chapter IV) and the existance of high priced land around the state capital which is difficult to own by the scheduled caste population.

Similarly, in establishing the relation between literacy rate and distance, the hinterland of Patna has given the reverse picture of postulated negative hypothesis (v). The villages belonging to other city-regions do not show any significant relations, except for the surroundings of Darbhanga, where the significance of the relation between x famale literacy rate and distance is low (at 10% level), which again opposes the hypothesis.

Thus, in the present context of social characteristics, scheduled caste population, is more affected by the distance from urban centres, than the literacy rate.

3. In view of the economic characteristics, the assumed direct relation between work participation rate (total, male, female) and distance, has been supported only by the surroundings of tertiary based Darbhanga. In most of the other cases, the relation is either insignificant or rejects the hypothesis.

Coming to the point of workers in different sectors, the relation between distance and proportion of cultivators has significantly accepted the postulated hypothesis of positive relation (no. vii) in the hinterlands of agricultural , industrial and tertiary based towns. In the city-region of the state capital, the relation is insignificant.

An interesting feature has been reflected by the agricultural labourers proportion in relation to distance, except the surroundings of the agricultural town of Purnia, the rest three hinterlands have confirmed the proposed hypothesis of direct relation siginificantly. Conversely, Purnia's city region rejects the hypothesis, by establishing significant inverse relaton between agricultural labourers and distance. This fact implies that the agricultural town of Purnia is an attraction to the agricultural labourers, probably because of more diversified agricultural activities which can generate more employment opportunities for the labourers.

The assumed positive association between the household industrial workers and distance from cities is proved significantly (only at 10% level) only in the surroundings of industrial city of ~~x~~ Dhanbad. Otherwise, this relation is insignificant.

The hypothesis (no.x) of negative relation between the workers in others category and distance has been significantly validated in the surroundings of the industrial ,tertiary and service based cities, and insignificantly proved in the hinterland of agricultural town of Purnia.

Thus, among all economic characteristics, the characteristic of workers in 'others' has been the most influenced by distance from cities.

This was quite expected as this characteristics broadly matches with the economic connotation of urbanisation.

Paradoxically, the characteristics of cultivators and agricultural labourers, which represents ruralism, have also been affected by the distance from cities in opposite ways.

It may therefore be inferred , that the occupational structure or the division of labour in different sectors of the rural hinterlands can indicate the prevalence of urban influence more effectively than the general characteristic of work participation rate. The empirical observations suggest that the economic characteristics of rural hinterlands is largely determined by the economic bases of their urban cores.

4. The observed pattern of relations between the availability of important facilities in the hinterland and the distance from cities, reveals that, the assumed negative relation has been significantly proved for the industrial city regions in terms of the facilities of medical ,communication and power supply. For educational facilities, the hypothesis has been insignificantly proved in the hinterlands of industrial Dhanbad.

Also in the surroundings of the agrarian Purnia, the distance decay hypothesis hasbeen accepted significantly for communication and power supply and insignificantly for power educational and medical facilities.

Contrarily in the surroundings of tertiary based Darbhanga and service based state capital - Patna , the established significant relations between-

(i) educational facilities and distance( for both cases)

(ii) medical facilities and distance (for the villages around Darbhanga).

(iii) Communication facilities and distance (for the villages around Patna).

(iv) Power supply and distance (for the city region of Darbhanga).

are positive in direction, which nullifies the distance - decay hypothesis.

However, to sum up all these above mentioned findings the following features have been revealed.

(a) The expected diminution of all the demographic characteristics is prevalent only in the surroundings of the state capital. But, regarding the social characteristics, this region reflects entirely unexpected picture, while the other hinterlands confirm the expected relation to some extent.

(b) Considering the economic characteristics, no single region can exclusively be marked to reflect the postulated pattern of relationship. Of course, the industrial city of Dhanbad and tertiary based Darbhanga have matched with the expectation in propagating urban influence (on their city region) in a better way, than the agricultural and service based towns. However there is a tendency of the economic characteristics of the hinterland to be primarily determined by the economic bases of their core cities.

(c) In view of the availability of facilities, the expected urban influence has been noticed in the surroundings of agricultural and industrial town, whereas contradictions prevail in the regions of tertiary and service based cities.

Thus, it may be inferred that, the distance-decay process of urban influence has not been uniformally operated for all the four city regions of the present study. It varies according to the characteristics of the surrounding villages.

The limitations of the Present study are as follows :-

First, to find out the functional types of the cities, this study has used data from 1971 census, as the relevant data were not available from 1981 census. Therefore, there may be every possibility for the functional shift of the cities in 1981 as deduced from 1971.

Secondly, due to time constraints, only four cities have been selected to represent four different functional types of cities. But, as there are many cities in the same functional types (studied here), then, it would have been far better to study more number of towns which might give an aggregative picture of urban

influence.

Thirdly, some of the unexplainable phenomena of this study, might be explained, if a larger number of villages (than that of the present sample) would have been considered.

However, it may be concluded, that despite the limitations mentioned above, this study attempts to present an idea about the urban influence on rural surroundings in a low urbanised state of Bihar.

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## APPENDIX -I

### PERCENTAGE DISTRIBUTION OF WORKERS IN DIFFERENT SECTORS OF CLASS I CITIES OF BIHAR 1971

| Sl. No. | Name of the Class I Cities. | Percentage of Workers in Primary | Secondary | Tertiary | Other services |
|---|---|---|---|---|---|
| 1. | Patna U.A. | 14.83 | 22.99 | 30.34 | 31.84 |
| 2. | Bihar | 19.50 | 37.11 | 28.18 | 15.21 |
| 3. | Gaya | 10.26 | 26.40 | 37.53 | 26.27 |
| 4. | Arrah | 19.20 | 17.51 | 35.82 | 27.47 |
| 5. | Chapra | 25.93 | 17.52 | 32.94 | 26.61 |
| 6. | Muzzafarpur | 5.95 | 22.96 | 37.50 | 33.58 |
| 7. | Darbhanga | 8.03 | 23.11 | 41.32 | 27.54 |
| 8. | Purnia U.A. | 33.00 | 16.11 | 28.76 | 22.13 |
| 9. | Katihar | 13.45 | 27.74 | 41.46 | 17.36 |
| 10. | Bhagalpur | 11.65 | 30.41 | 29.66 | 28.28 |
| 11. | Dhanbad UA | 2.63 | 62.36 | 21.88 | 13.13 |
| 12. | Bokaro Steel City U.A. | 9.23 | 61.45 | 14.07 | 15.25 |
| 13. | Barma U.A. | 4.41 | 62.74 | 17.34 | 15.51 |
| 14. | Ranchi U.A. | 7.46 | 27.46 | 22.48 | 23.95 |
| 15. | Jamshedpur U.A. | 3.37 | 57.65 | 23.74 | 15.24 |
| 16. | Munger | 14.70 | 28.64 | 33.58 | 23.07 |

(185)

## APPENDIX - II

VILLAGES OF VAISHALI DISTRICT WHICH ARE INCLUDED IN THE HINTERLAND OF PATNA

| Distance Zones. | NUMBER OF VILLAGES | | |
|---|---|---|---|
| | TOTAL | SAMPLED | |
| 1-10 km | 7 | 3 | |
| 11-20 km | 9 | 4 | |
| 21-30km | 5 | 2 | |
| 31-40 km | -- | - | |
| TOTAL | 21 | 9 | (42.50 ) |

## APPENDIX- III

WEIGHTS OF DIFFERENT FACILITIES IN DIFFERENT HINTERLANDS

| Sl. No. | HINTERLAND OF Purnia | | Dhanbad | | Darbhanga | | Patna | |
|---|---|---|---|---|---|---|---|---|
| | $F_i$ | $W_i$ | $F_i$ | $W_i$ | $F_i$ | $W_i$ | $F_i$ | $W_i$ |
| 1. Educational facility | | | | | | | | |
| Primary school (P) | 66 | 1.14 | 29 | 1.1 | 136 | 1.09 | 38 | 1.05 |
| Middle school (M) School (H) | 29 | 2.59 | 15 | 2.13 | 66 | 2.24 | 20 | 2 |
| Matriculation or secondary . | 9 | 8.3 | 5 | 6.4 | 21 | 7.05 | 9 | 4.44 |
| Collece(c) Training School (Tr) | 1 | 75 | -- | -- | -- | -- | --- | --- |
| Adult Literacy Class (AC) Center other educational institutions | 3 | 25 | -- | -- | -- | -- | 7 | 5.71 |
| | 9 | 8.33 | -- | -- | 33 | 4.48 | 2 | 20.00 |
| 2. Medical facilities(H) | | | | | | | | |
| Hospital (H) | 4 | 18.75 | 3 | 10.67 | 9 | 16.44 | 1 | 40 |
| Maternity & child welfare (MCW) | 2 | 37.50 | 4 | 8 | 5 | 29.60 | -- | -- |
| Child Welfare Center (CWC) | 2 | 37.50 | -- | -- | 7 | 21.14 | -- | -- |
| Health Center Primary (HC) | 3 | 25 | 3 | 10.67 | 9 | 16.44 | 2 | 20 |
| Primay Health Centre (PHC) | 5 | 15.00 | -- | -- | 10 | 14.8 | 3 | 13.33 |
| Dispensary (D) | 5 | 15 | 2 | 16 | 12 | 12.33 | 2 | 20.00 |

contd.....

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Family Planning Centre (FPC) | 3 | 25 | 5 | 10.67 | 10 | 14.80 | 5 | 8.00 |
| Registered Practioner(RP) | 5 | 15 | 5 | 10.67 | 25 | 5.92 | 5 | 8.00 |
| Community Health Worker (CHW) | 5 | 12.5 | -- | -- | 12 | 12.33 | 6 | 6.67 |
| Others | 1 | 75 | -- | -- | 7 | 21.14 | 1 | 40 |
| Subsidised medical | 1 | 75 | -- | -- | 2 | 74 | 4 | 10 |
| Practioners (SMP) | -- | -- | -- | -- | -- | -- | -- | -- |
| Primary health Sub-Centre | 13 | 5.76 | 5 | 6.4 | 11 | 13.45 | 3 | 4.44 |
| 3. Drinking water | | | | | | | | |
| Well | 75 | 1.00 | 31 | 1.06 | 142 | 1.04 | 39 | 1.02 |
| Hand pump | 72 | 1.04 | .9 | 3.67 | 145 | 1.02 | 39 | 1.02 |
| Tank | 33 | 2.27 | 32 | 10 | 127 | 1.16 | 5 | 8 |
| Tubewell | 21 | 3.57 | 2 | 15.50 | 79 | 1.87 | 16 | 2.5 |
| Canal | 20 | 3.75 | -- | -- | 9 | 16.44 | 1 | 40 |
| River | 23 | 3.26 | -- | -- | 50 | 2.64 | 8 | 5.00 |
| River | 23 | 3.26 | 4 | 8.25 | 16 | 8.25 | -- | -- |
| Nala | 11 | 6.81 | -- | -- | 1 | 148 | -- | -- |
| Others | 3 | 2.5 | 1 | 33 | -- | -- | -- | -- |
| Tap | 2 | 37 | -- | -- | -- | -- | -- | -- |

contd..3..

APPENDIX-III contd...

| | Purnia(N-75) | | Dhanbad (N-32) | | Dharbhanga(N-148) | | Patna (N=40) | |
|---|---|---|---|---|---|---|---|---|
| | $F_i$ | $W_i$ | $F_i$ | $W_i$ | $F_i$ | $W_i$ | $F_i$ | $W_i$ |
| Facilities of Post-Telegraphs. | | | | | | | | |
| P.O. | 28 | 2.68 | 10 | 3.3 | 69 | 2.18 | 16 | 2.5 |
| P.T.O. | 1 | 75 | 1 | 33 | 12 | 12.33 | -- | -- |
| Phone | 1 | 75 | -- | -- | 8 | 18.50 | 2 | 20 |
| Communication | | | | | | | | |
| Bus stand | 22 | 3.41 | 6 | 5.50 | 52 | 2.35 | 5 | 8 |
| Railway station | 2 | 37.5 | 1 | 38 | 5 | 29.60 | 1 | 40 |
| Approach to Millage | | | | | | | | |
| Pucca road | 28 | 2.68 | 12 | 2.75 | 73 | 2.82 | 6 | 6.67 |
| Kutch Road | 75 | 1.00 | 29 | 1.14 | 141 | 1.05 | 32 | 1.25 |
| Mangable river | 2 | 37.5 | 1 | 33 | 7 | 21.14 | 4 | 10.00 |
| Facilities of power supply | | | | | | | | |
| Electricity for agri-cultural Purpose (EAg) | 7 | 10.71 | -- | -- | 16 | 9.25 | 16 | 2.5 |
| Electricity ofor domestic purpose | 13 | 5.77 | 6 | 5.5 | 25 | 5.92 | 8 | 5 |
| Electricity for others | 2 | 37.5 | 3 | 11 | 4 | 37 | 1 | 40 |

contd

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Electricity for others | 2 | 37.5 | 3 | 11 | 4 | 37 | 1 | 40 |
| Electricity for allthe above | 8 | 9.37 | 4 | 8.25 | 20 | 7.4 | 5 | 8 |
| Days of market/hat | 27 | 2.78 | 4 | 8.25 | 19 | 7.78 | 4 | 16.00 |

* $F_i$ = No.of villages having the particular function (like primary,school) middle school etc.) N = Total number of villages

$W_i$ = Weightage of the function = $N/F_i$

## APPENDIX IV

### NAME OF THE SELECTED VILLAGES AND THEIR DISTANCE FROM THEIR RESPECTIVE CITIES

| Villages in surroundings of | Distance (km) from |
|---|---|
| a) Purnia | Purnia |
| 1. Mahanga | 3 |
| 2. Lalganj | 5 |
| 3. Harda | 6 |
| 4. Jhuni Istamrar | 6 |
| 5. Birpur | 8 |
| 6. Parora | 8 |
| 7. Goasi | 9 |
| 8. Kararia | 10 |
| 9. Bithunauli Khemchand | 10 |
| 10. Bhutia | 10 |
| 11. Bahadurpur | 11 |
| 12. Bilauri | 12 |
| 13. Ganeshpur | 12 |
| 14. Maheshkhunt | 14 |
| 15. Parmanandpur | 15 |
| 16. Gokhulpur | 15 |
| 17. Garhia | 15 |
| 18. Dewangaj | 16 |
| 19. Ekhua | 16 |
| 20. Maharajpur | 17 |

| | | |
|---|---|---|
| 48. | Nikharail | 30 |
| 49. | Cinghia Bhagta | 30 |
| 50. | Nirpur | 30 |
| 51. | Bardela | 30 |
| 52. | Tarauna | 30 |
| 53. | Basdaila | 30 |
| 54. | Panisadra | 30 |
| 55. | Kanhara | 30 |
| 56. | Sotibhag | 31 |
| 57. | Chopra | 32 |
| 58. | Hakka | 34 |
| 59. | Chiraia | 34 |
| 60. | Champi | 35 |
| 61. | Bishampur | 35 |
| 62. | Karia | 35 |
| 63. | Jabar | 35 |
| 64. | Siripur | 36 |
| 65. | Machhatta | 36 |
| 66. | Gehuria | 36 |
| 67. | Mogaha | 37 |
| 68. | Parasarar | 38 |
| 69. | Bangaon | 39 |
| 70. | Kukraun | 39 |
| 71. | Bhamet | 40 |
| 72. | Amour | 40 |
| 73. | Belka | 40 |
| 74. | Pundale | 40 |
| 75. | Sathiana | 40 |

| Villages in surroundings of | | distance (km) from |
|---|---|---|
| b) | Dhanbad | Dhanbad |
| 1. | Bishunpur | 1 |
| 2. | Kalakusma | 2 |
| 3. | Dhaunsar | 3 |
| 4. | Dhakhra | 4 |
| 5. | Bankalau | 5 |
| 6. | Nagrikalau | 6 |
| 7. | Amalghata | 7 |
| 8. | Bardubhi | 8 |
| 9. | Asalbani | 8 |
| 10. | Bario | 9 |
| 11. | Sialgudri | 10 |
| 12. | Jainagar | 10 |
| 13. | Singra | 10 |
| 14. | Gobindpur | 11 |
| 15. | Gortopa | 12 |
| 16. | Moranga | 12 |
| 17. | Udayapur | 14 |
| 18. | Kurmidi | 14 |
| 19. | Magarkeri | 14 |
| 20. | Parasi | 14 |
| 21. | Bagsuna | 15 |
| 22. | Baludih | 16 |
| 23. | Kharni | 16 |
| 24. | Asanbani | 16 |

| | | |
|---|---|---|
| 25. | Jangalpur | 18 |
| 26. | Barba | 20 |
| 27. | Mayramawatnar | 21 |
| 28. | Bardahi | 23 |
| 29. | Kaladabar | 24 |
| 30. | Machamahul | 25 |
| 31. | Tundi | 32 |
| 32. | Purnabi | 39 |

| | | |
|---|---|---|
| C. | Darbhanga | Darbhanga |
| 1. | Padri | 2 |
| 2. | Kabir Chak | 2 |
| 3. | Ojhaul | 3 |
| 4. | Semra | 3 |
| 5. | Bhairopatti | 4 |
| 6. | Rampur Madan | 4 |
| 7. | Gangapatti | 4 |
| 8. | Bazidpur | 5 |
| 9. | Sara Mahamad | 10 |
| 10. | Dekuli | 5 |
| 11. | Chandan Patti | 5 |
| 12. | Ranipur | 6 |
| 13. | Kharthua | 6 |
| 14. | Ghorghata | 7 |
| 15. | Anantpur | 7 |
| 16. | Raiam | 7 |
| 17. | Siso | 8 |

| | | |
|---|---|---|
| 18. | Chaprar | 8 |
| 19. | Dih Lahi | 8 |
| 20. | Dome | 8 |
| 21. | Purkhopatti | 9 |
| 22. | Panchobh | 9 |
| 23. | Karjapatti | 9 |
| 24. | Dhoi | 10 |
| 25. | Pura | 10 |
| 26. | Mahsudpur | 10 |
| 27. | Baghela | 10 |
| 28. | Pindaruch | 10 |
| 29. | Khirma | 10 |
| 30. | Badh Basti | 11 |
| 31. | Madhuban | 11 |
| 32. | Sirmia | 11 |
| 33. | Gorhiari | 11 |
| 34. | Telehan | 12 |
| 35. | Basdeopur | 12 |
| 36. | Rasulpur | 12 |
| 37. | Bansdih | 12 |
| 38. | Pator | 12 |
| 39. | Banauli | 12 |
| 40. | Kothi Majhiama | 12 |
| 41. | Pathra | 12 |
| 42. | Gundauli | 13 |
| 43. | Darma | 13 |
| 44. | Simri | 14 |
| 45. | Dahura | 14 |

| | | |
|---|---|---|
| 46. | Matunia | 14 |
| 47. | Ketuka | 15 |
| 48. | Kusothri | 15 |
| 49. | Jalwara | 15 |
| 50. | Chhatauna | 15 |
| 51. | Siranpur | 15 |
| 52. | Tehtar | 15 |
| 53. | Kothia | 15 |
| 54. | Sekhpur Dagarwara | 15 |
| 55. | Sarjapur | 15 |
| 56. | Pilakhwar | 16 |
| 57. | Jurja | 16 |
| 58. | Bijuli | 16 |
| 59. | Ughara | 16 |
| 60. | Madhopatti Raghauli | 16 |
| 61. | Nimathi | 16 |
| 62. | Panta | 17 |
| 63. | Khaira Kunji | 17 |
| 64. | Bharathi | 17 |
| 65. | Lalgang | 17 |
| 66. | Naya Gaon | 17 |
| 67. | Muria | 18 |
| 68. | Koro | 18 |
| 69. | Rupauli | 18 |
| 70. | Rampura | 18 |
| 71. | Patthan Kawai | 18 |
| 72. | Garipur | 19 |
| 73. | Basant | 19 |
| 74. | Kansi | 19 |

| | | |
|---|---|---|
| 75. | Ruchaul | 20 |
| 76. | Balaha | 20 |
| 77. | Bhalpatti | 20 |
| 78. | Ami | 20 |
| 79. | Hariharpur | 20 |
| 80. | Mohanpur | 20 |
| 81. | Momobihat | 20 |
| 82. | Attar | 20 |
| 83. | Sadua | 20 |
| 84. | Thathupur | 20 |
| 85. | Dularpur | 21 |
| 86. | Bihata | 21 |
| 87. | Haridih | 21 |
| 88. | Chhoteapatti | 22 |
| 89. | Hawasa | 22 |
| 90. | Chhatwan | 22 |
| 91. | Raghopur | 22 |
| 92. | Rambhadarpur | 23 |
| 93. | Harpur | 23 |
| 94. | Kolhatte | 24 |
| 95. | Monkauli | 24 |
| 96. | Kamtaul | 24 |
| 97. | Hathauri | 24 |
| 98. | Samadhpura | 24 |
| 99. | Chakla | 24 |
| 100. | Birdipur | 25 |
| 101. | Bishunpur | 25 |
| 102. | Dadpatti | 25 |

| | | |
|---|---|---|
| 131. | Kora | 34 |
| 132. | Baheri | 34 |
| 133. | Kotha | 35 |
| 134. | Ejhahatta | 35 |
| 135. | Semaraon | 35 |
| 136. | Mirzapur | 35 |
| 137. | Padri | 35 |
| 138. | Ratanpur Abhiman | 36 |
| 139. | Pali | 37 |
| 140. | Ujan | 38 |
| 141. | Ramauli | 38 |
| 142. | Patai | 39 |
| 143. | Baigani | 39 |
| 144. | Peorha | 40 |
| 145. | Massa | 40 |
| 146. | Pakharbhinda | 40 |
| 147. | Narawanpur | 40 |
| 148. | Ramnagar | 40 |

| D. | Patna | Patna |
|---|---|---|
| 1. | Pakri | 2 |
| 2. | Jalangirpur | 3 |
| 3. | Ranapur | 5 |
| 4. | Bairia | 5 |
| 5. | Sabalpur | 6 |
| 6. | Sukwarar | 6 |
| 7. | Shakhpur | 6 |
| 8. | Bhelaura | 7 |
| 9. | Fatehpur | 8 |

| | | |
|---|---|---|
| 35. | Kalianpur Basiawan | 23 |
| 36. | Nainauri | 24 |
| 37. | Pothi | 25 |
| 38. | Chaksingar Bararia | 25 |
| 39. | Behrawa | 26 |
| 40. | Parthu | 32 |

## APPENDIX V

### Correlation Coefficients

(Surrounding Villages of Purnea)

| | Dependency ratio | Agricultural labourers |
|---|---|---|
| $x_1$ | .371** | .230 |
| $x_2$ | .286 | .009 |
| $x_3$ | -.055 | .032 |
| $x_4$ | -.243 | .266 |
| $x_5$ | -.236 | -.176 |
| $x_6$ | -.123 | -.395 |
| $x_7$ | -.008 | -.133 |
| $x_8$ | -.864 | .511 |
| $x_9$ | -.140 | -.006 |
| $x_{10}$ | .849*** | .515*** |
| $x_{11}$ | .414 | -.39 |
| $x_{12}$ | -.485 | 1 |

*** Significant at 1% level

** Significant at 5% level

$x_1$ Density of Population

$x_2$ Growth rate of Pupulation

$x_3$ Sex ratio

$x_4$ Scheduled Caste population (% to total )

$x_5$ Total literacy rate

$x_6$ Male literacy rate, $x_7$ Female literacy rate

$x_8$ Total work participation rate

$x_9$ Male work participation rate

$x_{10}$ Female work participation rate

$x_{11}$ Proportion of Cultivators

$x_{12}$ Proportion of agricultural labourers

## APPENDIX VI

### Correlation Coefficients

(Surrounding Villages of Patna)

| | Total literacy rate | Female literacy rate |
|---|---|---|
| $x_1$ | .061 | .085 |
| $x_2$ | .037 | -.155 |
| $x_3$ | .55 | .721 |
| $x_4$ | .235 | .376 |
| $x_5$ | 1.00 | .919 |
| $x_6$ | .707 | .765 |
| $x_7$ | .897 | 1.00 |
| $x_8$ | -.11 | -.126 |
| $x_9$ | .039 | .067 |
| $x_{10}$ | .505 | (.637)*** |
| $x_{11}$ | -.595 | -.543 |
| $x_{12}$ | .599 | .592 |
| $x_{13}$ | .011 | -.122 |
| $x_{14}$ | .357 | .130 |
| $x_{15}$ | .102 | .044 |
| $x_{16}$ | .191 | (.28)** |
| $x_{20}$ | (.52)*** | -.001 |

*** Significant at 1% level.

** Significant at 5% level.

$x_1$ = Density of population, $x_2$ = Growth rate of population $x_3$ = Sex Ratio, $x_4$ = Proportion of Scheduled Caste population $x_5$ = Total literacy rate, $x_6$ = male literacy rate, $x_7$ = female literacy rate, $x_8$ = total work participation rate, $x_9$ = male work participation rate, $x_{10}$ = female work participation rate, $x_{11}$ = percentage of cultivators, $x_{12}$ = percentage of agricultural labourers, $x_{13}$ = percentage of workers in household industry, $x_{14}$ =percentage of workers in other sectors, $x_{15}$ -dependency ratio, $x_{16}$= composite scores of educational facilities, $x_{20}$=composite score communications facilities.

# BIBLIOGRAPHY

## B O O K S


1. Alam S.M., 'Hyderabad - Secunderabad : A Study in Urban Geography' Osmania Univ Press, Hyderabad.1965.

2. Anderson, N. 'Our Industrial Urban Civilisation', Asia Publishing House, New York, 1964.

3. Anderson, N. 'The Urban Community - A World Perspective', Routledge & Kegaul Paul, London,1962.

4. Beaujea, Garnier & J. Chabot, G.,'Urban Geography', Longmans, London, 1969.

5. Berry, B.J.L., 'Geography of Market Centres and Retail Distribution', Foundation of Economic Geography Series, Eaglewood Cliffs. Prentice Hall, 1967.

6. Berry , B.J.L., 'The Human Consequences of Urbanisation', McMillan, Great Britain, 1975.

7. Bhat, L.S., 'Regional Planning in India', Asia Publishing House, Calcutta, 1972.

8. Bhat, L.S., 'Central Place Hierarchy for a Developing Agricultural Region', A case study of Karnal area, Indian Statistical Institute,New Delhi,1974.

9. Blalock, Hubert, M., 'Social Statistics', McGraw Hill International Book Company, New York, 1984.

10. Bogue, D.J., 'The structure of the Metropolitan Community: A Study of Dominance and Sub-dominance', Ann Arbor : The University of Michigan, 1949.

11. Borah, Jayasree, 'Spatial Structure of Urban Influence In the Neighbouring areas of Gauhati City', Inter-India Publication, New Delhi,1985.

12. Breese, G. 'Urbanisation in Newly Developing Countries', Prentice Hall, New Delhi,1969.

13. Bryant, C.R., Russwurm,, L.R., Mclellan, A.G., 'The City's countryside', Longman, U.S.A., 1982.

15. Chadwick, George, 'Models of Urban and Regional Systems in Developing Countries', Pergamon Press, Oxford, 1987.

14. Burgess E.W. 'The urban community' Chicago, 1926.

16. Deshpande, C.D., Arunachalam, B., and Bhat, L.S., 'Impact of Metropolitan City in the Surrounding Region: A study of south Kolaba', Concept Publishing Company, New Delhi,1980.

17. Dickinson, R.E., 'City and Region: A Geographical Interpretation, Routledge & Kegaun Paul, London,1967.

18. Dickinson, R.E., 'City Region and Regionalism', Routledge Kegan Paul Ltd., London,1956.

19. Duncan, O.D. and Reiss, Jr. A.J. 'Social Characteristics of Rural and Urban Communities', New York, John Wiley, & Sons, Inc., 1956.

20. Giblès, J.P., 'Urban Research Methods', Von Nostrand East West Press, New Delhi,1966.

21. Green F.H.W., 'Urban Hinterland in England and Wales - An Analysis of Bus Services', Urban Research Methods, Affiliated East West Press, New Delhi,1966.

22. Haggett, Peter, 'Locational Analysis in Human Geography, Edward Arnold, London,1970.

23. Harris C.D., 'Salt Lake City: A Regional Capital', Univ. of Chicago Press, Chicago, 1940.

24. Hawly, A.H., 'The changing shape of Metropolitan America', Glencoe 'The Free Press,1950.

25. Johnson, E.A.J. 'Urban Geography ' Pergamen Press, London, 1969.

26. Kulkarni, M.M.,'Urban structure and Interaction', Concept Publishing Company, New Delhi.

27. Kundu,A., 'Measurement of Urban Processes' Popular Prakasan, Bombay 1980.

28. Leong Go ,Cheng & Morgan, 'Human and Economic Geography ' Oxford Univ. Press,

29. Mahadev, P.D. and Jaysankar, D.C., People Space and Economy of an Indian City', Mysore,1969.

30. Mahmood Aslam, 'Statistical methods in Geographical' Studies', Rajesh Publications, New Delhi, 1977.

31. Markandy Kalpana, 'Regional Urban Centres', Structure and Interaction' Inter-India Publications, New Delhi, 1982.

32. Mcgee, T.G., 'Urbanisation processes in the Third World', Bell, London, 1971.

33. Mitra, Ashok, 'A Functional Classification of India's Town', Institute of Economic Growth, New Delhi,1965.

34. Mukherjee,R' Rubanisation for Human Settlements in Developing Countries, International Publishers, Calcutta.

35. Mumford, Lewis, 'The city in History, Secker and Warburg, London,1961.

36. Nangia, S. 'Delhi Metropolitan Region', A study in Settlement Geography', K.B. Publications, New Delhi,1976.

37. Prakasa Rao, V.L.S., and Tewari ,V.K., 'Regions in Karnataka ', Mimetographed, Institute for Social and Economic Change, Bangalore,1974.

38. Rao, M.S.A., 'Urbanisation and Social Change : A study of rural community on a Metropolitan fringe', Orient Longmans Ltd, New Delhi,1970.

39. Redfield, R. 'The Folk culture of Yucatan', University of Chicago Press, Chicago,1941.

40. Rothermund, D. Kropp, E. and Dienmanu, G. Urban Growth and Rural Stagnation': Studies in the Economy of an Indian Coalfield and its rural hinterland', Manohar Publications, New Delhi,1980.

41. Roy, Turner (ed.) 'India's urban Future' Oxford Univ. Press, Bombay, 1962.

42. Singh, R.L. 'Banaras , A Study in Urban Geography', Nand Kishore and Bros, Banaras,1955.

43. Singh, R.L. and Singh, K.N. (ed), 'Middle Ganga Plain in India: A regional Geography National Geographical Society of India, Varanasi,1971.

44. Sinha, M.M.P., 'The Impact of Urbanisation on Land-use in the Rural-Urban Fringe', Concept Publishing Company, New Delhi,1980.

45. Sevani, N.V., 'Urbanisation and Urban India', ASIA Publishing House, Bombay,1966.

46. Taylor, Griffith, 'Urban Geography : A study of site, Explaination , Pattern and Classification in Villages, towns and cities' McThevens, London, 1968.

47. United Nations : 'The Mysore Population Study', Department of Economic and social Affairs, New York, 1961.

48. United Nations, 'Planning of Metropolitan Areas and New Town', U.N.Publication, Geneva, 1969.

49. UNESCO Research Centre' Urban-Rural Differences in Southern Asia' Report on Regional Seminar,Delhi,1962.

50. Wanmali, S. 'Regional Planning for Social Facilities' National Institute of Community Development,Hyderabad, 1976.

51. Wanmali, S.,'Geography of a rural service system in India' , National Institute of Community Development, Hyderabad,

## ARTICLES

1. Ellefsen, R.A., 'City-Hinterland Relationship in India, with special reference to the Hinterlands of Bombay, Delhi, Madras, Hyderabad and Baroda', in Roy Turner (ed) India's Urban Future, Oxford University Press, Bonbay,1962.

2. Green, L.H., 'Hinterland Boundaries of New York City and Boston in Southern New England', in Economic Geography, Vol.31, 1955.

3. Hoselitz, B. 'Generative and Parasitic Cities', Economic Development and Cultural Change' Vol.3, 1955.

4. Hoselitz Bert F., 'Urban -Rural Contrast as a factor in Socio-cultural Change' Economic Weekly Vol.12, Nos.4,5,& 6, Jan.1960.

5. Kundu, A. 'Urbanisation and the structure of human settlements, an analysis of the trends in the context of strategies for signal development' in K.P. Bhattacharya (ed) Human Settlement,Habitat Centre, Centre for Human Settlements, Calcutta, 1986.

6. Kundu, A., and Sharma R.K. , 'Industrialisation and Urbanisation and Economic Development', in Urban India Vol.3, No.1.

7. Kundu, A. 'Theories of City-size distribution and Indian urban structure', A reappraisal Economic and Political Weekly, Vol.18, No.31, 1983.

8. Mohan, R. and Paul C., 'Morphology of Urbanisation in India - some results from 1981 Census' EPW Vol.17, No.30, & 39, Sept.1982.

9. Rao, M.S.A. 'Economic Change and rational in a fringe village 'Economic Weekly, vol.14, no.38, Sept.1962.

10. Raza, M, Kundu, A. & Nangia , S. 'Urban-Rural Continum in India , Indian and Foreign Review, Vol. 12, No.15, & 16.

OTHERS

1. Census of India, District Census Handbook, Purnia, 1981 Series 4 Part XIII - A & B, Village and Town Directory, Village and Townwise primary Census Abstract.

2. Census of India, District Census Handbook,Dhanbad 1971*, 1981, Series 4, Part XIII, A & B, Village and Town Directory, Village, and Townwise Primary Census Abstract.

3. Census of India, District Census Handbook, Darbhanga, 1971*, 1981, Series 4, Part XII, A & B ,Village and Town Directory Village and Townwise Primary Census Abstract.

4. Census of India, District Census Handbook, Patna, 1971* , Series 4, Part XIII, A & B, Village and Town Directory, Village and Townwise Primary Census Abstract.

5. Census of India, 1981 (Series 4 ) ,Bihar Part X-A, Town Directory.

6. Census of India, 1971* (series 4), Bihar, Part III, A & B (i) Economic Tables.

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