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TOWNS OF MYSORE STATE

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STATISTICAL PUBLISHING SOCIETY

Calcutta

Indian Statistical Series No. 2

TOWNS OF MYSORE STATE

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1964

PRINTED IN INDIA

by Kalipada Mukherjee at Eka Press, 204/1 Barrackpore Trunk Road, Calcutta-35
and published jointly by P. S. Jayasinghe, Asia Publishing House, Bombay and
Statistical Publishing Society, Calcutta

SECTION I

SCOPE AND OBJECTIVES

Introduction

The Origin, Level and Scale of Operations:

The urban survey is a part of a general survey of resources of Mysore State for purposes of regional planning that has been conducted by the Regional Survey Unit—Indian Statistical Institute, Calcutta, under the directorship of Dr. A. T. A. Learmonth, and like any Survey in its pioneering stage, had its limitations imposed by lack of trained personnel and time factor. This Survey is a Pilot Sample Survey, carried out at a rapid reconnaissance level, and proceeded in four stages: (i) Preliminary and experimental—A preliminary study of the already collected and mapped data on the towns of the Old Mysore State was made, and experimental surveys were conducted in three sample towns to decide the scope, rate and intensity of town surveys, (ii) Field work, (iii) Tabulation and Mapping, and (iv) Synthesis and drafting of the report.

The area covered by the survey included 65 sample towns spread over the whole of the New Mysore State—an area of 74,286 square miles—the north-south (Bangalore-Bidar) road distance being about 500 miles, and the east-west road distance from Mangalore to Kolar Gold Fields about 310 miles. These were the longest routes travelled by our investigators. From the field investigator's point of view, it is the travel-time spent in bus or train or bullock cart from one town to another, which is more significant. The investigator had sometimes to travel for more than 12 hours either by fast train or bus to reach his next destination. To minimise wastage in travel, usually, each investigator was allotted 4 or 5 towns (not too far apart) at a time. Whether between Bangalore and Mangalore (250 miles by bus) or between Davangere and Tumminkatti (30 miles by bus and bullock cart), it took a full day of tedium and strained journey, and it must have been a real trial for the raw and newly trained investigators, and more so because on arrival they had to be active on their feet next day from 7 a.m. to 5 p.m. excepting for the one hour lunch interval.

Data have been mapped on two scales (1) on 1 million scale for the whole State (regional scale) with taluka or town as the unit area or point (the State having 169 talukas and 288 towns of all categories) and (2) on 1″ = 1 or 2 furlongs scale (field scale) for each sample town. Movement within the town involved a distance varying between 5 and 15 miles both by cycle and on foot. The investigators, and no less the senior worker himself, had a welcome relief when one Municipal authority kindly offered a vehicle, which facilitated rapid traverses across and around the town.

The Survey

Broad objectives and point of view:

The survey of the sample towns and cities was undertaken as a piece of experimental and exploratory work, more as a preliminary to a detailed survey that should follow, which only can, in fact, provide a basis for action programmes. Two basic principles

guided the frame of the survey and its point of view: (1) that town development, particularly in industrial and transport sectors should be related to, and decided upon by wider regional considerations rather than merely parochial ones; it is of course not suggested that local considerations, if they are significant, can or should be neglected or under-valued and (2) that not only strictly urban, but also peri-urban areas[1] should be surveyed, since urban planning should not logically stop at the arbitrary town boundary. This is in accordance with the current trend in regional planning that urban use of the peripheral land should be controlled to prevent the problems of the 'urban-fringe'. Two points should be stressed from a regional planner's point of view: (1) that functionally inter-related areas should be planned as a whole, while any intervening areas of overlap between urban fields should be examined with reference to the competing urban centres; and (2) general problems associated with urban areas should be examined first from the regional and even national points of view. For example, in the case of delimiting potential industrial areas, and in deciding the lay-out of through traffic routes, town-locations and the nature of relations between towns, and producing and consuming areas should be examined, rather than the narrowly based and purely local aspects like street lay-out and widening, drainage, improvement and provision of recreation facilities, and the like, which are naturally within the scope of work of the town planner. It is appropriate now to reiterate that this survey has been designed (1) to discover regional disparities in urban concentration and urbanisation and their chain effects, (2) to evaluate the occupational structures, and (3) to assess the potentialities of urban centres in integrated regional developmental programmes.

The time factor and personnel[2]*:*

The time factor and personnel available are as important as the area and scale factors in deciding the scope and intensity of a survey. The details of dates of survey and the number of investigators are given in Appendix E. Dr. Rao, in charge of this part of the survey spent 86 days—gross, (May 7th 1957 to 30th June 1957 and 16th July 1957 to 16th August 1957) and it required 122 man-days (of 9 hours a day) to complete a rapid reconnaissance survey of 54 towns excluding the Bangalore City (surveyed by Dr. R. L. Singh and his assistant) and some town and city surveys, carried out by the research assistant Shri S. Arunachalam[3], by Shri G. S. Kulkarni[4] and by Shri S. Satyanarayana and Dr. Learmonth[5]. Six investigators (without previous training in geography) were trained for the purpose, and were entrusted with independent survey of towns.

[1] Peri-urban land is defined for purposes of present survey, as that area which lies within two to three miles from the existing town-boundary. This definition is based on the assumption that the outward spread of a town is usually confined to this limit. This assumption of course does not hold good in the case of cities passing through 'explosive phase of spread'; and/or where the spread is interrupted by local terrain. In such cases the peri-urban area may extend to five or ten miles and even more, and then, there may be development of either satellite or dormitory towns.

[2] Regional and urban surveys for regional planning have been carried out in different parts of the world. The survey of the Liege industrial region (Belgium) is a case in point. A preliminary survey was made for the establishment of a development plan. It was a team survey, and it took nearly 3 years to complete a detailed survey of the region—an area of nearly 500 square miles.

[3] Bellary, Mysore, Belgaum, Gadag and Bidar.

[4] Bijapur and Kolar-Gold-Fields.

[5] Karwar, Munirabad, Mercara, Puttur, Gundlupet, Bijapur, Hungund, Chikmagalur, Shimoga, Bhadravati and Udipi.

In addition, one research assistant Miss C. Parvati, working 4 hours a day (part-time) was employed for three months (September to November 1957), to assist in mapping and analysis of field data.

Cost of the Survey:

Six investigators (graduates and semi-graduates) were appointed on a temporary basis for three months (June–August 1957). The total expenditure including the proportionate establishment, cartographic and photographic costs, worked out at Rs. 8000/-. The total and field work per-capita expenditure amounted to Rs. 860/- and Rs. 400/- respectively.

Scope and Methods of the Survey

To suggest areas and types of urban centres which should be given priority in future regional development programmes. If the policy of balanced regional development and decentralisation of industries is to be implemented, less industrialised and less urbanised areas and urban centres showing a declining or stagnant trend should normally be given priority in the future development programmes. In the present survey, regional factors like accessibility to rail, road and power, pressure on agricultural land, and local factors like the cost of land and labour, in the peri-urban areas, and the availability of water have been analysed, and based on these factors, areas where future industrial locations should be encouraged have been suggested.

To (a) examine the character and trend of urban-growth both on the ground (i.e., urban spread) and in population, between 1901 and 1951, and project the future growth of urban population in the State and different regions, and (b) examine the impact of urban growth, if any, on its immediate country side in the form of (i) encroachment on cultivated areas: dry land, wet land and garden land, (the last two being grouped as "A" class agricultural land), which should be protected from urban encroachment, (ii) increased land-values in the urban and peri-urban areas and (iii) depopulation. (An attempt is made to estimate the loss of agricultural land, consequent upon urban expansion).

Chiefly because of the time factor, we could study only two aspects of urban growth: (i) growth in space or urban spread and (ii) growth in numbers. More emphasis is laid on urban spread because this is basic to geographical approach, and consciously or otherwise, this aspect does not seem to have been given due attention to in some urbanisation surveys now in progress in the country.

To map different functions in a town:—Functional zone maps of the sample towns are prepared with the following objectives: (a) to discover whether functions are zonal or azonal, and whether there are any distributional patterns, and examine the inter-relations between different functions since this will help in implementing zoning programmes of the town and regional planning authorities; (b) to demarcate congested areas, showing also slum areas separately, where they exist, as naturally these should be given first priority in rehabilitation; (c) to demarcate areas of inappropriate use e.g., areas that should be commercial or industrial, devoted to residential or vice-versa; first-class agricultural land, devoted to industrial or residential purposes; (d) to indicate the potential land for future town extensions, within and bordering the town; and (e) to indicate anomalies, if any, arising out of regional transport routes, crossing expanding towns or bisecting functionally inter-dependent zones within a town.

To indicate the adequacy, inadequacy or absence of primary urban amenities and services (housing, water, electricity, institutional facilities—education, health, recreation, shopping, commercial and banking facilities to the towns folk, and also to what we might call 'rurban' folk i.e., population of the surrounding area, deriving benefit from town-facilities). This survey has attempted to examine the problem of unsatisfactory service situation in towns, and explored the possibilities of solving this problem through local area planning.

To delimit 'urban fields' and examine their character. The argument for this type of research as a potential planning tool is somewhat as follows: On the one hand the comprehensive approach and functional integration are being stressed as the primary essentials of regional planning. On the other hand the fundamental and the most universal bases of town-hood, or to be more precise, the larger orders of town-hood, are accepted as the collection and distribution of commodities in the surrounding areas and varied opportunities of employment. Such a study then reveals the competitive or complementary relations between town and its surrounding tributary area or between neighbouring towns. Overlaps in urban fields will be indicated and will need more detailed studies. One is confronted with such cases where towns of equal rank and function are located at close intervals, as in the case of north-western and north-eastern Mysore State. If we accept the principle that administrative structure should conform reasonably well to the realities of community life, then delimitation of urban fields becomes relevant, and would assist to a great extent in rationalising administrative boundaries, or at least in working out a scheme of rational grouping of administrative units for regional planning. Here it is advocated that each urban field, particularly in the case of agricultural, administrative and intermediary towns, should constitute a logical and rational urban planning unit, and the trade and population movements to and from the town-nucleus in such a unit should be surveyed in detail, even before preparing the master plan for the town. Such urban-planning units should be treated as *ad hoc* units since they are designed specially for planning town and country and inter-town relations. Such units help in increasing the municipal income of the nucleus town through the contribution of the towns and villages of the Unit.

If urban fields are clearly defined and marked out, they can be developed in a properly planned way. The rural population of the villages of the area thus defined will then be able to derive minimum essential services and facilities from the local town of the area. On the other hand, the focal town will also be ensured of a minimum flow of trade and traffic by the improvement of existing transport facilities or the construction of new roads, so as to link it effectively with the region which it serves. Thus the services and amenities of the focal town will also be adequately sustained.

To prepare synthetic maps: A synthetic map, as the name itself suggests, is obviously the final synthesis of urban survey, and should be of maximum use to perspective planning. The preparation of a synthetic map involves an analysis of related dynamic aspects, and maps of contributing and formative factors. Synthetic maps are prepared on two scales (i) regional scale: the maps showing the potential areas for factory industries, and regional disparities in urban services in the State, and (ii) field scale: the town maps giving the following indications, both positive and negative.

(1) Slums and congested areas needing rehabilitation.
(2) Areas physically unsuitable for buildings.
(3) ,, unavailable for future town development (built up areas and first class arable land).
(4) ,, suitable for future town development.
(5) ,, suitable for future factory location.
(6) ,, of inappropriate use.

Field Work and Questionnaire:

To define the scope of town-surveys in relation to the regional survey project as a whole; and to develop a method which would (a) relate to regional survey for planning, and (b) facilitate a nation-wide survey of towns and systematic mapping of town types and urban areas on a uniform basis. A questionnaire has been designed which indicates the scope of the survey (ref. Appendix D).

The questionnaire covered the following sections:—

(1) Character of urban site and situation; (ii) functions; (iii) services; (iv) urban field (sphere of influence); (v) housing conditions; (vi) labour; (vii) land values in the town and its vicinity and (viii) recent developments and trends in the town.

(2) To classify and standardise mapping categories and methods of representation of (i) urban spread and (ii) urban structure. The map of urban spread incorporated the following details:

(i) Old Town—before 1900.
(ii) Town area between 1900 and 1920.
(iii) Town area between 1920 and 1950.
(iv) Town area after 1950.
(v) Town area in future extensions.
(vi) Wet land within the town limits.
(vii) Dry land within the town limits.
(viii) Garden land within the town limits.
(ix) Town limit.
(x) Municipal and village boundary.
(xi) Limit of town extension (a) physical (b) economic.

The following categories are recognised in the map of urban structure:

(i) zone of mixed functions, (ii) slums, (iii) residential zone (old), (iv) residential colonies (official and labour), (v) residential new extensions, (vi) factory zone, (vii) administrative area, (viii) school zone, (ix) parks, (x) hospitals, (xi) commercial zone: bazzar street—wholesale and retail shops, (xii) bus stand, (xiii) traveller's bungalow—choultry*, (xiv) vacant land, and (xv) limits of town extensions.

(3) To note gaps in the existing statistical information about towns so that wherever possible, they may be filled by the relevant authorities themselves in the course of their regular routine work (ref. Appendix C).

Statistical information on towns is lacking in most cases, and where available, is woefully incomplete. Facts are sacred, and the town municipalities should accurately collect, record and maintain, with this spirit and attitude. The townsfolk should also be educated on the utility of factual surveys, so that the response would be voluntary and genuine.

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* An indigenous form of travellers' shelter with cooking facilities.

SECTION II

SAMPLING—THE NEED AND METHOD

Introduction

To survey all the 258 towns of the Mysore State (Area: 74,286 square miles) excluding the 13 cities and the Tungabhadra town group which itself consists of 17 towns, 1032 man-days are required at the gross average rate of 4 days a town. (Experimental surveys were conducted in three sample towns—Chikballapur, Talakad and Mandya to decide the scope, rate and intensity of town surveys). The cities, as defined by the 1951 Census (i.e. with more than 50,000 population), and much more, the cities like Mysore and Bangalore are types by themselvess, and as such, should be studied separately, and also on a more intensive scale. All the cities excluding Bangalore, which is by itself a complex case, have been included in the frame for purposes of sampling but are treated independently for purposes of survey. There can be, of course, no substitute for a total survey—each town has individual problems, which eventually must be considered individually. But when time and labour need to be conserved for purposes of over-all regional survey, it is submitted that there is no alternative to sampling. It is believed that in this particular context sampling may give results as good as total survey particularly when the 'universe' is sufficiently large, as in the towns of the Mysore State.

Random Sampling vs Type Town Sampling

The two factors that governed the sample design were that (1) the sample towns should be as evenly distributed areally as possible and (2) the sample should be chosen in such a way as to give an equal chance of selection to every town in the 'universe' save for the higher proportion of sampling in groups containing only a small number of towns after stratification using census data had been carried out. *Stratified systematic sampling* with random start was preferred to what one might call subjective *type-town sampling* such as one often uses for academic purposes, chiefly because in the former, there is no bias involved in the selection of the sample, and secondly, both the type and 'atypical' towns are included. The main objection to type-town sampling in a survey for perspective planning is that generalisations and forecasts based on type-town studies may not be valid for all the towns in the region, particularly the 'atypical' towns.

Preliminary Investigation before Sampling:

In studies preliminary to devising the sample method, the *size*, the *growth rate* (1901–1951), and *functions* (as reflected in livelihood classes) of the towns of the Old Mysore State were examined critically both in tabular and map forms, since the information was readily available for the Old State. Of course in the final selection of the sample towns, the new Mysore State was taken as the basic region for purposes of the present survey.

The Old Mysore has 110 towns (1951 Census) of different size-and-growth categories and livelihood classes. Two dimensional scatter-graphs were prepared to find out whether there is any correlation between (a) the size and the growth rates, (b) the size and each

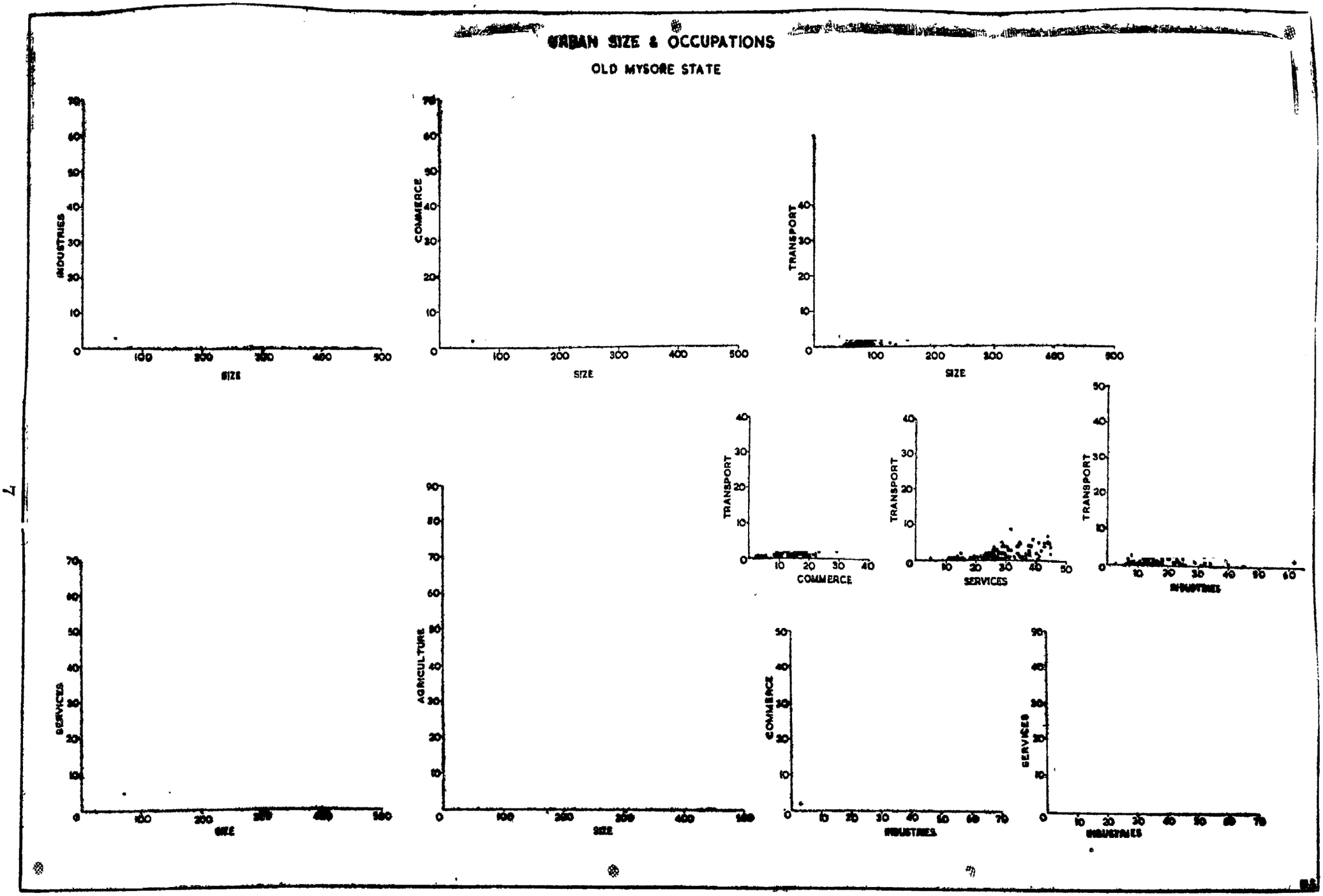

FIG. 1 Urban size and occupations. (Old Mysore State).

Size: square root of the town population

Occupation: Percentage of population under each occupation to the total population.

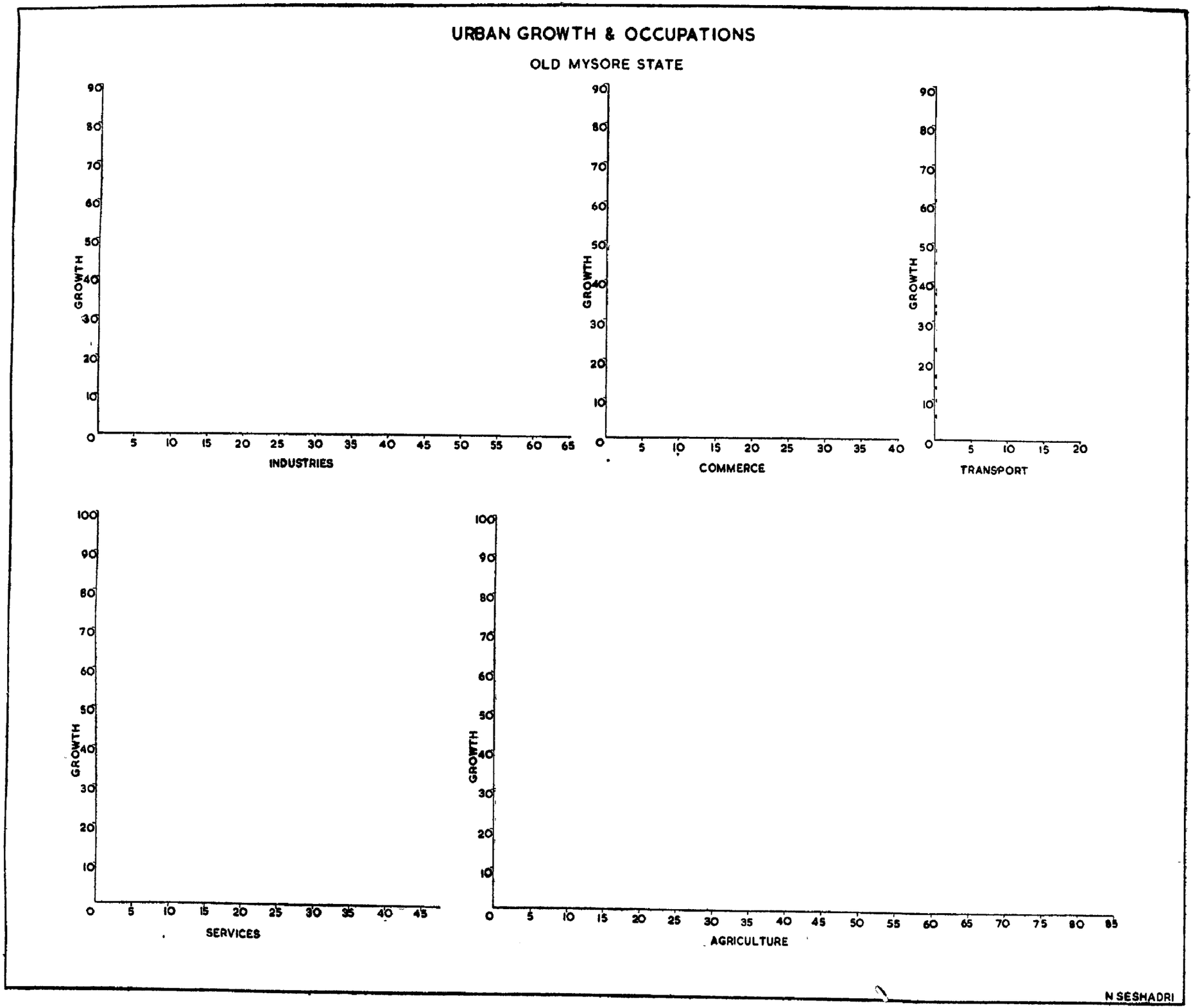
URBAN GROWTH & OCCUPATIONS
OLD MYSORE STATE
GROWTH
INDUSTRIES
COMMERCE
TRANSPORT
SERVICES
AGRICULTURE
N SESHADRI

Fig. 2

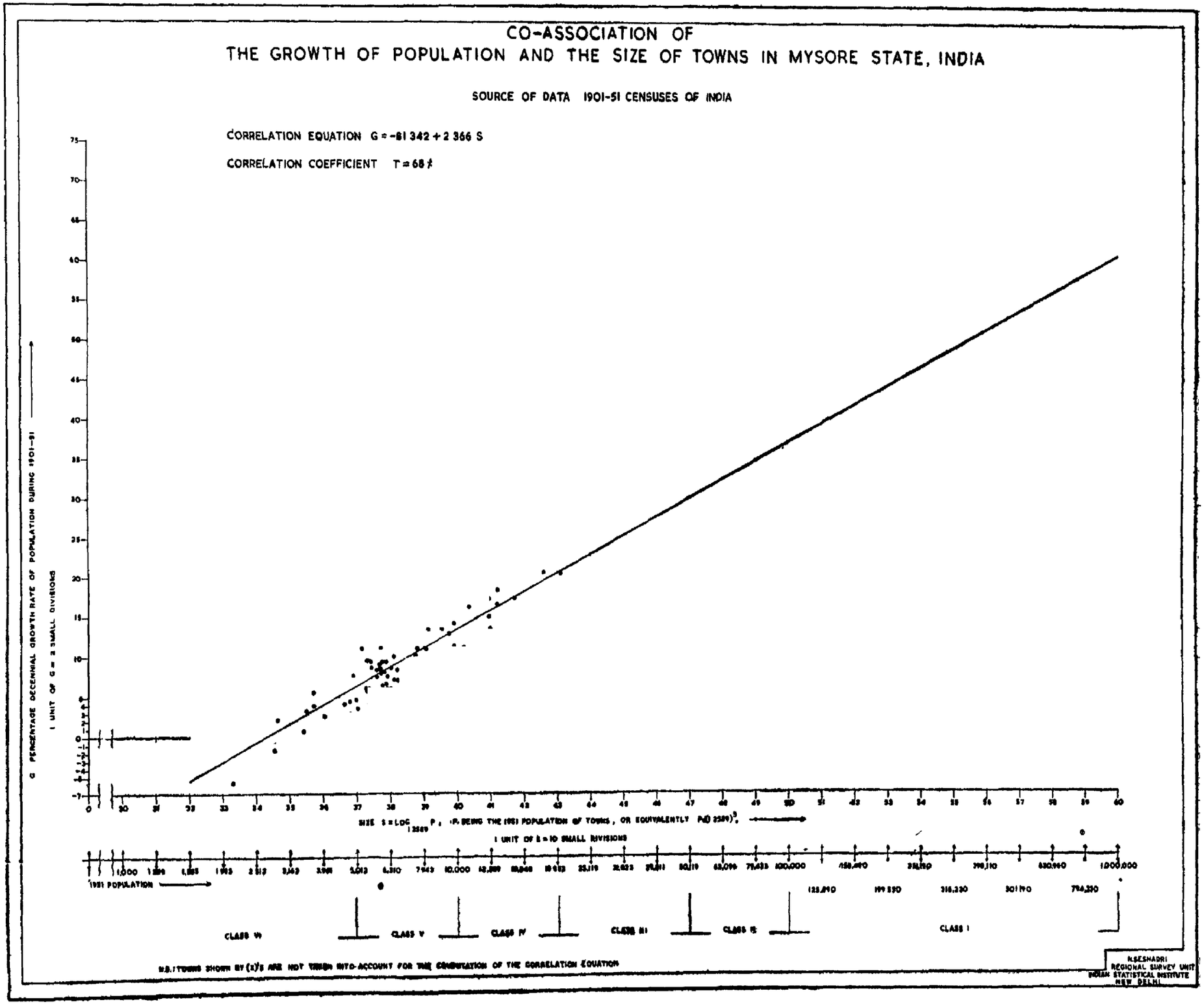
CO-ASSOCIATION OF
THE GROWTH OF POPULATION AND THE SIZE OF TOWNS IN MYSORE STATE, INDIA
SOURCE OF DATA 1901-51 CENSUSES OF INDIA
CORRELATION EQUATION G = -81 342 + 2 366 S
CORRELATION COEFFICIENT T = 68 %
G PERCENTAGE DECENNIAL GROWTH RATE OF POPULATION DURING 1901-51
1 UNIT OF G = 2 SMALL DIVISIONS
SIZE S = LOG P ; P BEING THE 1951 POPULATION OF TOWNS , OR EQUIVALENTLY P=(10 2589)^S
1 UNIT OF S = 10 SMALL DIVISIONS
1951 POPULATION
CLASS VI
CLASS V
CLASS IV
CLASS III
CLASS II
CLASS I
N.B. TOWNS SHOWN BY (x)'S ARE NOT TAKEN INTO ACCOUNT FOR THE COMPUTATION OF THE CORRELATION EQUATION
N.S.E.SHASTRI
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Fig. 3

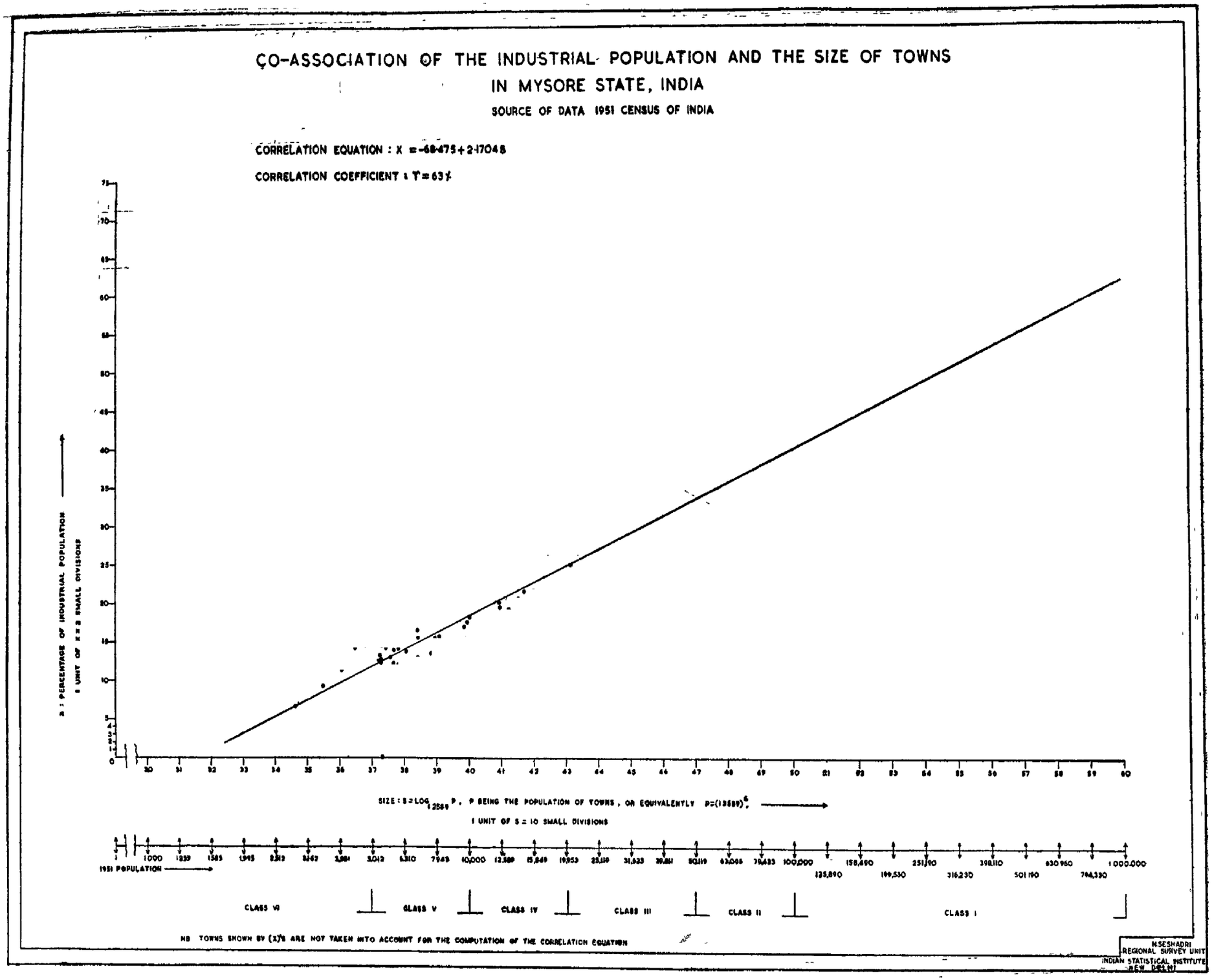
CO-ASSOCIATION OF THE INDUSTRIAL POPULATION AND THE SIZE OF TOWNS
IN MYSORE STATE, INDIA
SOURCE OF DATA 1951 CENSUS OF INDIA
CORRELATION EQUATION : X = -68·475 + 2·17048
CORRELATION COEFFICIENT : r = 63%
X : PERCENTAGE OF INDUSTRIAL POPULATION
1 UNIT OF X = 5 SMALL DIVISIONS
SIZE : S = LOG 1·2589 P , P BEING THE POPULATION OF TOWNS , OR EQUIVALENTLY P=(12589)^S
1 UNIT OF S = 10 SMALL DIVISIONS
1951 POPULATION
1000
1259
1585
1995
2512
3162
3984
5012
6310
7943
10,000
12,589
15,849
19,953
25,119
31,623
39,811
50,119
63,096
79,433
100,000
125,890
158,490
199,530
251,190
316,230
398,110
501,190
630,950
794,330
1,000,000
CLASS VI
CLASS V
CLASS IV
CLASS III
CLASS II
CLASS I
NB TOWNS SHOWN BY (x)'S ARE NOT TAKEN INTO ACCOUNT FOR THE COMPUTATION OF THE CORRELATION EQUATION
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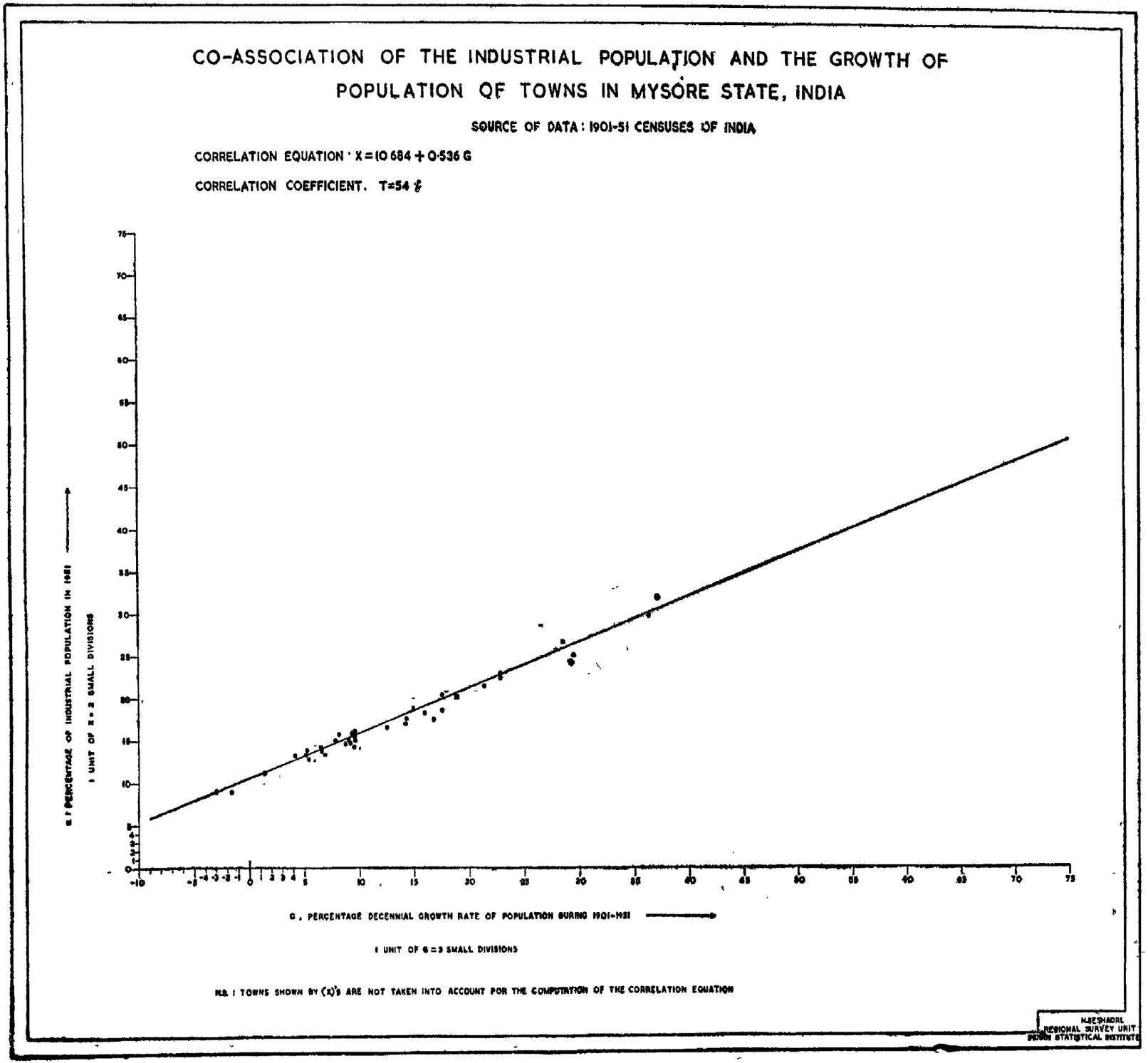
FIG. 4

Fig. 5


CO-ASSOCIATION OF THE INDUSTRIAL POPULATION AND THE GROWTH OF POPULATION OF TOWNS IN MYSORE STATE, INDIA
SOURCE OF DATA: 1901-51 CENSUSES OF INDIA
CORRELATION EQUATION : X = 10·684 + 0·536 G
CORRELATION COEFFICIENT. r = 54 %
X : PERCENTAGE OF INDUSTRIAL POPULATION IN 1951
1 UNIT OF X = 2 SMALL DIVISIONS
G : PERCENTAGE DECENNIAL GROWTH RATE OF POPULATION DURING 1901-1951
1 UNIT OF G = 3 SMALL DIVISIONS
N.B. : TOWNS SHOWN BY (X)'S ARE NOT TAKEN INTO ACCOUNT FOR THE COMPUTATION OF THE CORRELATION EQUATION
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of the livelihood classes, and (c) the growth rate and each of the livelihood classes. The size factor was also examined absolutely.

The following points emerge from a critical study of the graphs (Figures 1 to 5).

1. Average, median and most frequented (lower quartile) size classes alone do not seem to be a satisfactory basis of sampling.
2. Transport is not significant as a livelihood class.
3. Agricultural towns (population 7000) show a slow growth rate.
4. The growth and size of towns have a high degree of correlation, i.e., the larger towns are tending to grow fastest and tend to have more industry.
5. Perhaps, more surprisingly, there is a relatively weak correlation between industry and growth of towns i.e., the most rapidly growing towns do not necessarily have a large proportion of industry.
6. We can make a tentative conclusion (Figs. 3 to 5)* that while industrialisation is surely a catalyst of vital significance in urbanisation, its importance is not necessarily revealed directly by the proportion of population dependent on industry. Rather is there a sort of *snowball* effect, with service trades as a large factor in the population growth.

The above analysis was used in preparing the sample design for the selection of towns to be studied in the field.

Method of Sampling

The preliminary investigation and experimental surveys were found to be valuable in deciding the method, and in setting up controls to govern the selection of sample towns. The scope of the survey is in itself a basic control determined by the objective of the survey. Three methods were tried, first taking the Old Mysore State as the 'universe': (1) stratified (single dimensional: size factor only) systematic sampling without random start, (2) stratified systematic sampling with random start, within a two dimensional tabulation in respect of (a) relations between proportions of the population dependent on different livelihood classes; and (b) the size of the town and (3) stratified systematic sampling with random start, within a three dimensional tabulation, in respect of (a) and (b) as in (2) above, and also (c) scatter within latitudinal belts, of 1 degree in breadth. The third method, which is in fact a refinement of the second, was finally adopted and extended to the New Mysore State because it conformed more to the primary objectives to be met by the chosen sample design.

First Method:

This first approach, being tentative was worked out only for the six southern Districts of the Old State. Seven frames (i) size of the town; (ii) growth; (iii) industries; (iv) commerce; (v) transport; (vi) agriculture and (vii) services were selected, and in each related frame, towns were arranged in an ascending order, the town having the smallest size or growth rate (1901–1951) or percentage of population in the particular livelihood class—being placed at the head of the array, and the one having the highest at the bottom. In each frame every seventh town was selected as the sample. This interval was decided

* Industrialisation and urbanisation in Mysore State by V. L. S. Prakasa Rao and A. T. A. Learmonth, Ms. 41–52. Applied Economic Papers, Vol. 1, No. 2, 1961.

on the basis of two assumptions: (i) that the period available for the town survey is 40 days and (ii) the survey should be completed in 4 days by one investigator, in which case only 10 towns can be surveyed by each investigator within the time allowed. The size of the frame in this context was 76 (i.e., all the towns in the six districts adjoining the Kolar Gold Fields-Bangalore-Mysore Road). A correlation table was prepared after marking out the sample towns, with a view to finding out inter-relations between the different frame-scales, if any. It was possible from the table to identify and group (a) towns where there is coincidence on two or more frame-scales, (b) towns where there is no coincidence but are repeated on one or the other frame scales and (c) towns which are not repeated at all on any of the frame-scales, thereby suggesting that in this case i.e., (c), there is no inter-relation between the different frames. Only two towns belong to (a) group, while thirty six to (c) group.

This method was found to be too elaborate, because of its many frames (seven in number), and much more, the number of sample towns is too many i.e., 56 out of 76. As a working alternative, the most significant and a composite frame (industrial and commercial) was selected, and the same procedure was followed to select the sample towns.

This method of sampling was abandoned for three reasons:

(1) When expanded to cover the whole of the New State, the demands on man-power would be excessive.

(2) since the first count started from the top, and if by chance there is a change in the size of the frame, the sample town will be different and as such no equal chance was given for any town to be selected, which meant a biased selection, and

(3) the composite frame laid too much emphasis on industry and commerce, while they are not significant at all in agricultural and also administrative towns. The counter argument to the last reason, then could be, that in the first half of the frame, the samples with low values more or less represent agricultural towns or those with other livelihood-base but it should be admitted that this is not a direct approach, and moreover, towns where all the occupations are equally important, though few, are left out altogether.

Second Method:

Since the first method suggested that a sample design could be evolved to cover the whole of the New State within our limits of time, money and man-power, this second method was worked out in relation to the 272 towns of the whole State. After a critical examination of the map of the New Mysore State showing the location, size and livelihood classes and the scatter graphs (already referred to), it was concluded that the proportions between the livelihood-classes in different towns are fundamental, and should be given most significance in stratification. Hence all the towns in the New State were grouped into the following six strata, and code numbers were assigned.

Code Number	*Strata*	
B	Towns where all the occupations are equally important	1
Ia	Imbalanced—Agricultural Towns	
Ii	Imbalanced—Industrial Towns	2
Is	Imbalanced—Administrative Services Towns	
Ib	Imbalanced—Bi-function Towns	3
I″	Intermediary Towns	4

The following working definitions for the different town types were adopted.

1. *Towns* where there is no single major occupation (only four occupations—(i) agriculture, (ii) industry, (iii) commerce, (iv) services were taken into consideration, since transport was found to be insignificant as a livelihood class (see p.12).

2. *A single function town:*—agricultural, industrial, commercial or administrative, is one where more than 50 per cent of its total population is engaged in that occupation[1].

3. *A bi-functional town* has two occupations which are of equal and dominating importance; the difference between them, being not more than 5 per cent.

4. *An intermediary town* is naturally a *left-over*, not belonging to any one of the above types. There are sub-types in this category; one occupation dominating but with a percentage less than 50.

On the above definitions, the towns in the State were grouped and arranged in each of the six strata (horizontally), and according to size (vertically) in an ascending order. The sample towns were then plotted on the map and superimposed on a land-use map, assumed as basic in the earlier stages of the Regional Survey as a whole (map not reproduced in this report). It was found that the regional scatter was uneven, and there were large gaps with numerous towns and without a sample.

Third Method:

Then it was thought that in addition to size and function another dimension might be added to stratification by breaking up into regions to give a better scatter of samples. One way of regional division could be on the basis of natural factors in a conventional manner, dividing the State into, say, three regions: (i) coastal, (ii) trap-plateau and (iii) gneissic-granite-plateau, but this is too general a division to be of use for sampling, and perhaps not particularly relevant to urban studies. Stratification on the basis of micro-regions is, on the other hand, too narrowly based. As a working alternative, and as one capable of universal application, latitudinal division at one degree interval was adopted, and when the samples were plotted on the map, a more uniform scatter was obtained. The latitudinal division narrowed down the range in the size of the stratum from 5 (the smallest, e.g. towns with no single major occupation) and 139 (the largest, e.g. intermediary towns) to 1 (above 18° latitude) and 59 (between 16° and 17° latitudes). Since samples were selected from each stratum and sub-stratum the total number of samples increased from 54 to 65. Latitudinal stratification was found to multiply the number of samples particularly when the stratum-size is small, as in the towns of B type, imbalanced-industrial (Ii), and administrative (Ia) types (see Fig. 6).

The procedure[2] followed in selecting the sample towns was first to stratify all the 270 towns on the basis of latitude at one degree interval, and then to cross-stratify according to functional type. The next step was to arrange the percentage values in each of the strata in an ascending order, and then number them serially. Each number was noted on a slip (name of the town may also be noted) and all the slips in each stratum were thoroughly shuffled, and one number was selected (with closed eyes) which was treated as random start for that stratum. From the random start, the other sample towns were marked on the basis of 20 per cent sampling i.e., every 5th town from the random start in each frame was selected as the sample town.

The list of sample towns is appended herewith (see Fig. 7).

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[1] These criteria are of course crude and arbitrary. For instance, a tertiary or service town should probably be defined as one which exceeds the norm of population dependent on service industries appropriate to that size-category of towns under Indian conditions.

[2] The procedure followed in the second method is the same excepting for the latitudinal division.

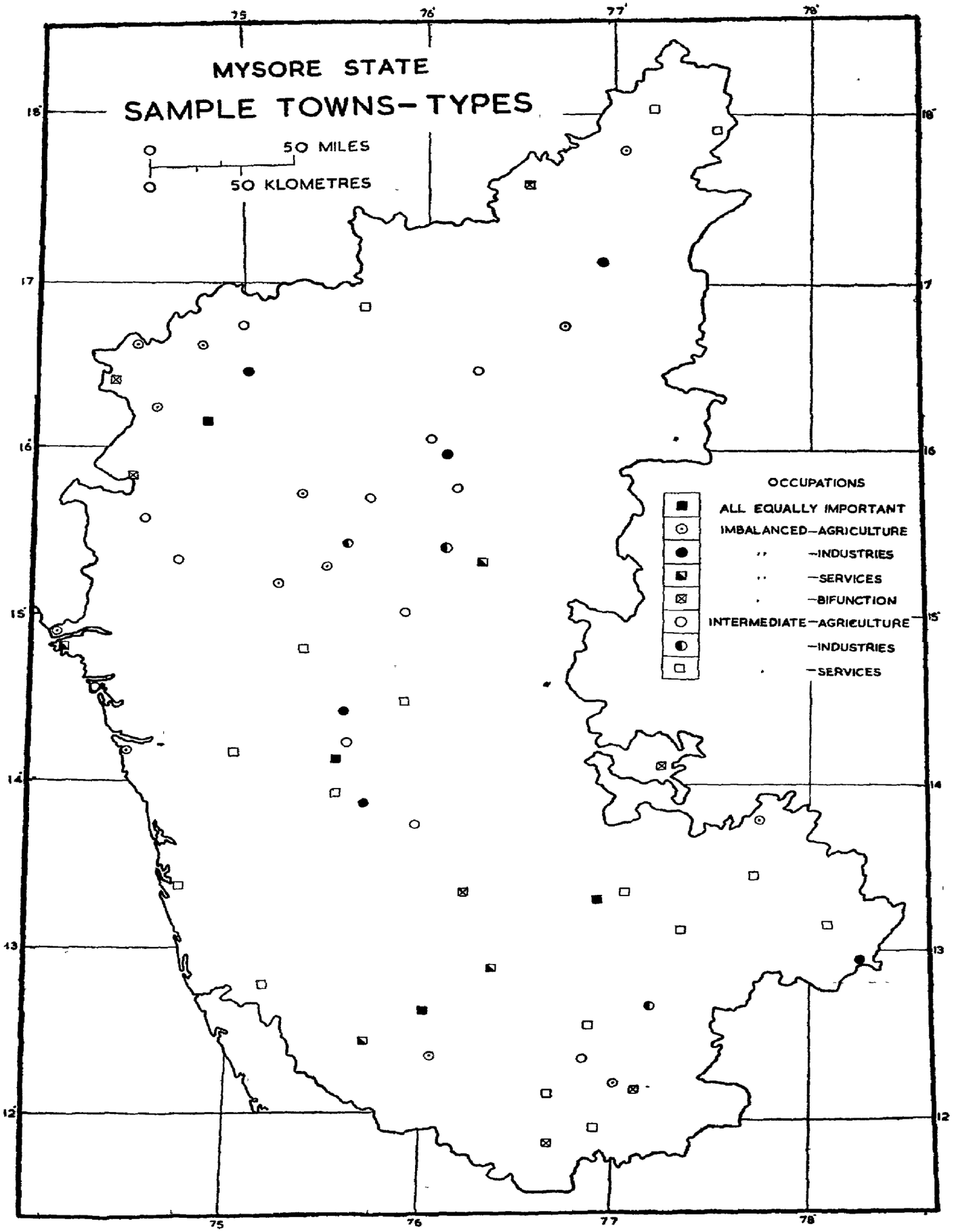
MYSORE STATE
SAMPLE TOWNS–TYPES
50 MILES
50 KLOMETRES
OCCUPATIONS
ALL EQUALLY IMPORTANT
IMBALANCED—AGRICULTURE
—INDUSTRIES
—SERVICES
—BIFUNCTION
INTERMEDIATE—AGRICULTURE
—INDUSTRIES
—SERVICES
75
76
77
78
18
17
16
15
14
13
12

FIG. 6

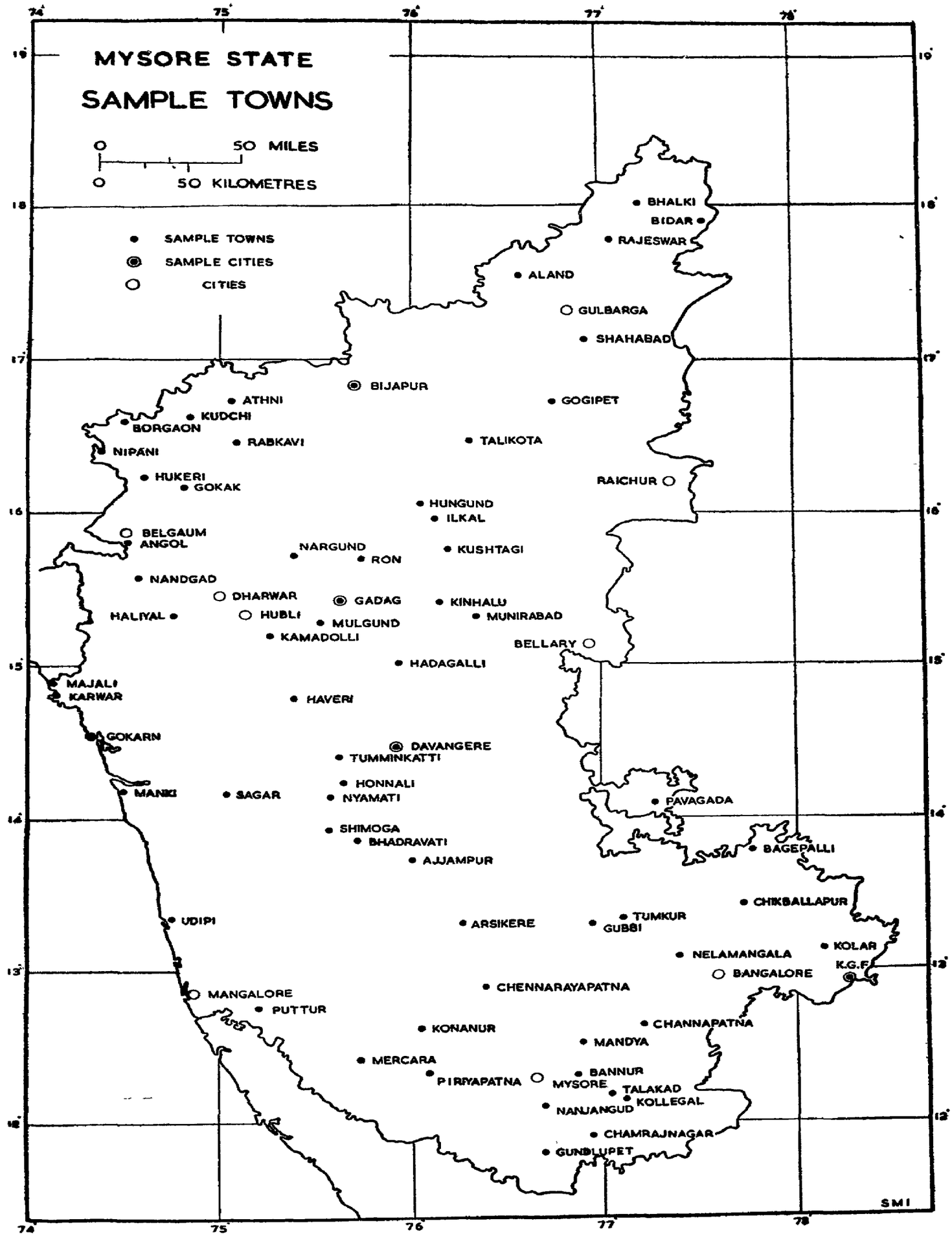
MYSORE STATE
SAMPLE TOWNS
50 MILES
50 KILOMETRES
SAMPLE TOWNS
SAMPLE CITIES
CITIES
BHALKI
BIDAR
RAJESWAR
ALAND
GULBARGA
SHAHABAD
BIJAPUR
ATHNI
GOGIPET
KUDCHI
BORGAON
RABKAVI
TALIKOTA
NIPANI
HUKERI
GOKAK
RAICHUR
HUNGUND
ILKAL
BELGAUM
ANGOL
NARGUND
RON
KUSHTAGI
NANDGAD
DHARWAR
GADAG
KINHALU
HALIYAL
HUBLI
MULGUND
MUNIRABAD
KAMADOLLI
BELLARY
HADAGALLI
MAJALI
KARWAR
HAVERI
GOKARN
DAVANGERE
TUMMINKATTI
HONNALI
MANKI
SAGAR
NYAMATI
PAVAGADA
SHIMOGA
BHADRAVATI
AJJAMPUR
BAGEPALLI
CHIKBALLAPUR
UDIPI
ARSIKERE
TUMKUR
GUBBI
KOLAR
NELAMANGALA
K.G.F
BANGALORE
CHENNARAYAPATNA
MANGALORE
PUTTUR
CHANNAPATNA
KONANUR
MANDYA
MERCARA
BANNUR
PIRIYAPATNA
MYSORE
TALAKAD
KOLLEGAL
NANJANGUD
CHAMRAJNAGAR
GUNDLUPET
SMI
74
75
76
77
78
19
18
17
16
15
14
13
12

FIG. 7

THE SAMPLE TOWNS

	type	name of the sample town	taluk	district	stratum size	interval	number of samples	
	I′	Bhalki	Bhalki	Bidar	1	—	1	
18°								18°
	Ia	Rajeswar (R.S.)	Bhalki	Bidar	3	—	1	
	Ii	Shahabad	Chitapur	Gulbarga	1	—	1	
	Ib	Aland ,,	Aland	,,	3	—	2	
	Ii	Bidar ,,	Bidar	Bidar	8	—	1	
17°								17°
	B	Gokak (R.S.)	Gokak	Belgaum	2	—	1	
	Ia	Kudchi ,,	Raibag	Belgaum	29	5th	5	
	,,	Borgaon	Chikodi	Belgaum				
	,,	Hukeri	Hukeri	Belgaum				
	,,	Gogipet	Sahapur	Gulbarga				
	,,	Hungund	Hungund	Bijapur				
	Ii	Rabkavi (R.S.)	Jamkhandi	Bijapur	6	—	1	
	Ib	Nipani (R.S.)	Chikodi	Belgaum	6		1	
	I′	Bijapur (R.S.)	Bijapur	Bijapur	16	5th	3	
	,	Athani	Athani	Belgaum				
	,,	Talikote	Muddebihal	Bijapur				
16°								16°
	Ia	Hadagalli (R.S.)	Hadagalli	Bellary	30	5th	6	
	,,	Nargund	Nargund	Dharwar				
	,,	Kustagi	Kustagi	Raichur				
	,,	Ron	Ron	Dharwar				
	,,	Mulgund	Gadag	Dharwar				
	Ii	Ilkal	Hungund	Bijapur	1	—	1	
	Is	Munirabad	Koppal	Raichur	1	—	1	
	Ib	Tngol	Belgaum	Belgaum	1	—	1	
	Ii	Kinhal (R.S)	Koppal	Raichur	20	5th	4	
	,,	Gadag	Gadag	Dharwar				
	,,	Haliyal	Haliyal	N. Kanara				
	,,	Nandgo .		Belgaum				
	Ia	Kamadolli	Kundgol	Dharwar				
15°								15°
	B	Nyamati	Honnali	Shimoga	1	—	1	
	Ia	Majali (R.S.)	Karwar	N. Kanara	12	5th	2	
	,,	Manki	Honavar	N. Kanara	2	—	1	
	Ii	Tumminkatti (R.S.)	Ranebennur	Dharwar				
	Is	Karwar	Karwar	N. Kanara	1	—	1	
	Ib	Pavagada	Pavagada	Tumkur	1	—	1	
	Ii	Sagar (R.S.)	Sagar	Shimoga	25	5th	5	
	,,	Honnali	Honnali	Shimoga				
	,,	Gokarna	Kumta	N. Kanara				
	,,	Davangere	Davangere	Chitaldrug				
	,,	Haveri	Haveri	Dharwar				

THE SAMPLE TOWNS—*Contd.*

	type	name of the sample town	taluk	district	stratum size	interval	number of samples	
14°								14°
	B	Gubbi	Gubbi	Tumkur	1	—	1	
	Ia	Bagepalli (R.S.)	Bagepalli	Kolar	4	—	1	
	Ii	Bhadravati	Bhadravati	Shimoga	1	—	1	
	Ib	Arsikere (R.S.)	Arsikere	Hassan	8	5th	1	
	I′	Kolar (R.S.)	Kolar	Kolar	37	5th	7	
	,,	Nelamangala	Nelamangala	Bangalore				
	I′	Shimoga	Shimoga	Shimoga				
	,,	Tumkur	Tumkur	Tumkur				
	,,	Udipi	Udipi	S. Kanara				
	,,	Chikballapur	Chikballapur	Kolar				
	,,	Ajjampur	Tarikere	Chikmagalur				
13°								13°
	B	Konnanur	Arkalgud	Hassan	1	—	1	
	Ia	Periyapatna (R.S.)	Periyapatna	Mysore	10	5th	2	
	,,	T. Talkad	T. Narsipur	Mysore				
	Ii	K.G.F.	Bangarapet	Kolar	1	—	1	
	Is	Mercara	Mercara					
	Ib	Kollegal (R.S.)	Kollegal	Mysore	3	—	1	
	I′	Nanjangud (R.S.)	Nanjangud	Mysore	32	5th	6	
	,,	Mandya	Mandya	Mandya				
	,,	Bannur	T. Narsipur	Mysore				
	,,	Channapatna	Channapatna	Bangalore				
	,,	Channarayapatna	Channarayapatna	Hassan				
	,,	Puttur	Puttur	S. Kanara				
12°								12°
	Ib	Gundlupet	Gundlupet	Mysore	1	—	1	
	I′	Chamarajanagar	Chamarajanagar	Mysore	1	—	1	

SECTION III

A. URBANISM IN MYSORE STATE

According to the 1951 census the urban population of the re-organised Mysore State was 4.45 millions living in 288 towns and townships including the 18 Tungabhadra camp towns, 16 of which are strictly speaking *boom townships*. Even simple indexes like the Urban-Rural ratio (U-R ratio) and urban population density per square mile indicate that the State of Mysore is more urbanised than the country as a whole. This is brought out by the following table:

TABLE 1

I		Mysore State (re-organised)		Indian Union	
urban-population—1951		4,452,970		61,867,109	
urban-rural ratio		23 : 77		18 : 82	
density of urban population per sq.mile		60		49	
urban-per capita area (acres) i.e., $\frac{\text{Total state area}}{\text{Total urban population}}$		11		13	
	II size groups	number	average area per town or city–sq.miles	number	average area per town or city–sq.miles
	million cities	—	3939	5	17392
	class I	6		67	
	class II	7	3377	93	11488
	class III	20		352	
	class IV	57	289	652	448
	classes V & VI	180		1783	
total	all classes together	270+ 18 camp towns	258	2951+ 67 town-ships	421

The average area per city in the State is just above 3500 sq. miles, while in the Indian Union, it is nearly 14,500 sq. miles. Even if the area per town, excluding the cities is taken into account, in Mysore it is only half the area of that in India as a whole.

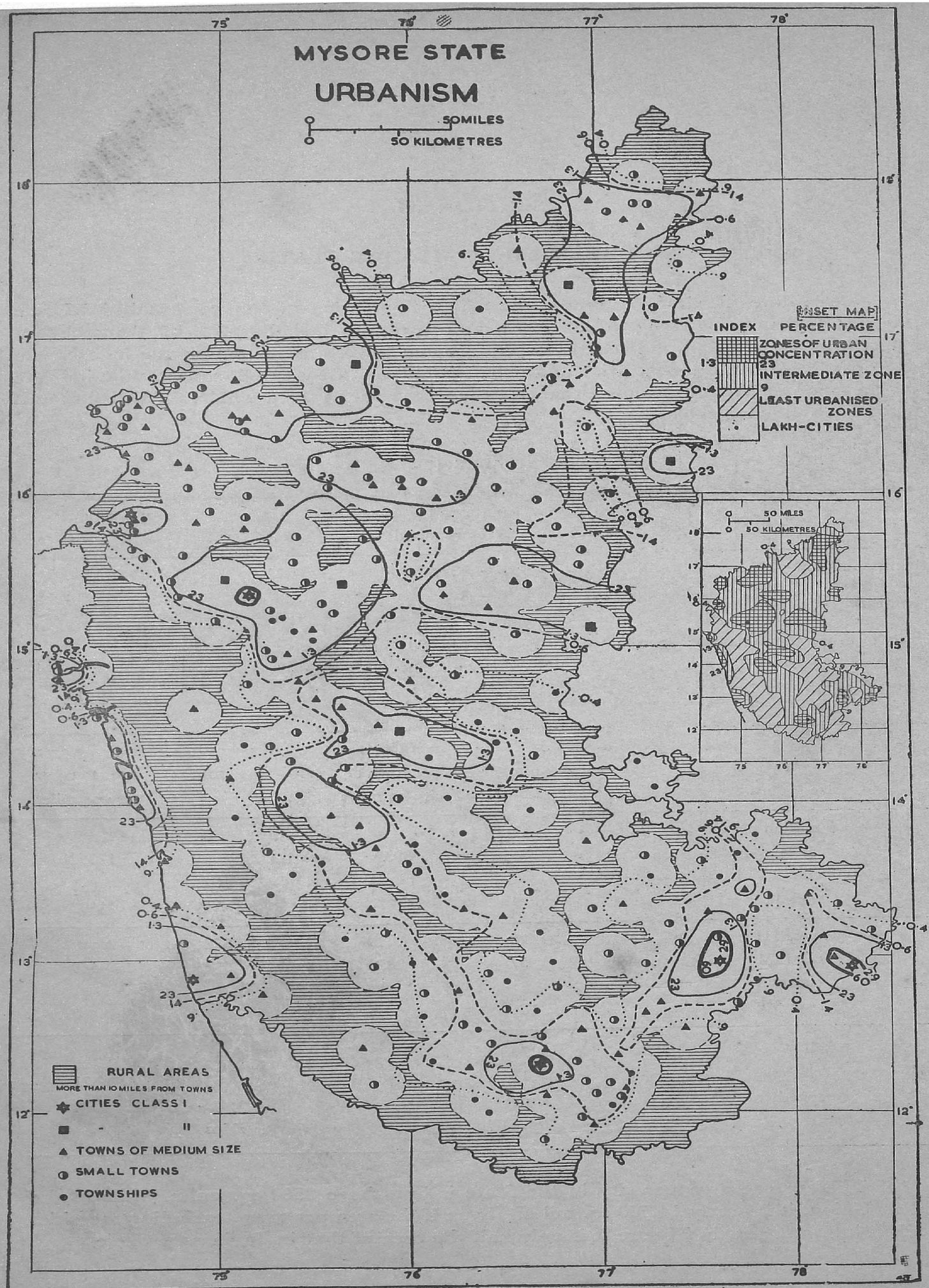
MYSORE STATE
URBANISM
50 MILES
50 KILOMETRES
INSET MAP
INDEX PERCENTAGE
ZONES OF URBAN CONCENTRATION
23
INTERMEDIATE ZONE
9
LEAST URBANISED ZONES
LAKH-CITIES
RURAL AREAS
MORE THAN 10 MILES FROM TOWNS
CITIES CLASS I
II
TOWNS OF MEDIUM SIZE
SMALL TOWNS
TOWNSHIPS

FIG. 8

Fig. 8: URBANISM

Purpose and Method :

The map brings out regional variations in the concentration and scatter of town locations, the population size of towns (class groups) and the concentration of urban population The areas more than 10 miles from towns are shaded. The area within a radius of 10 miles from a town is treated as a local tributary area to that town. For the sake of convenience in mapping, the tributary area is assumed to be circular, and a radius equivalent to 10 miles on the ground is drawn centred on each town, and the arcs joined. The unshaded areas assume a bead like shape when the inter-town distance is less than 10 miles, and when the town locations are linear, along a rail-line or road. There is a contiguous white patch when the towns are irregularly scattered and the inter-town distance is less than 10 miles.

Significant isopleth values :

The percentage values of urban population to total population in each taluka are arranged in a descending order and upper quartile (23 per cent) median (14 per cent) and lower quartile (9 per cent) values are chosen to indicate the isopleths delimiting the areas of urban concentration, intermediate and least urbanised areas respectively. An examination of the values indicated a conspicuous break in the values above the upper quartile (from 53 per cent to 66 per cent) hence 60 per cent is chosen to delimit areas of very high urban concentration. Medium high (17.7 per cent) and medium low (11.4 per cent) represent the mid-values between the median and upper and lower quartile respectively.

A comparative examination of the percentage values with the index values of concentration on population basis indicated that there is a correspondence between the significant values of both, i.e., the talukas with upper quartile, median and lower quartile values in both cases coincide. Hence the isopleths on the map show both the percentage value and the index of concentration,

e.g. upper quartile 23 per cent 1.3 index of concentration
lower quartile 9 per cent 0.4 index of concentration

The percentage values of the talukas have been placed on their respective taluka headquarters which are mostly towns. Where the taluka headquarter is not a town, the value is placed on the particular town site. Where a taluka has more than one town, but the value to be plotted is only one since the total urban population of all the towns in the taluka is taken into account in calculating the percentage, it has been plotted on the taluka headquarters, and isopleths, interpolated without first taking into account the other towns. But the values for the other towns and their location have been used to shift the isopleths. It should be noted in this connection that the shifting and smoothening of isopleths in the case of urban population should be done with reference to town locations, and the values should be placed on the town sites. Then there is no scope here, to shift the value to the centre of the taluka when the taluka headquarters has marginal location as is often attempted in the case of crops where the distribution is assumed to be uniform all over the taluka in the absence of contrary evidence. The urban population lives in towns, and as such is not uniformly distributed.

Distribution of Urban Population

Regional Variations:

In this section an attempt is made to delimit areas of urban concentration. If one of the objectives of regional planning is to attain a balance between the different components of a region, and also between its different sub-regions and tracts, the present attempt to evolve methods and establish inter-regional variations in urbanism has its due share of value, since there are not only inter-regional urban but also urban-rural variations.

The map (Fig. 8) and Table 2 indicate the differences in the degree and areal extent of urbanism in the State.

TABLE 2

classification of talukas	index of urban concentration	percentage of urban population in each taluka to total population in each taluka	percentage of urban population in towns in each class to total urban population in the state	remarks
upper quartile	1.3	22.8	0.21	high (A)
medium high	0.8	17.7	0.15	intermediate (B)
median	0.6	13.7	0.17	
medium low	0.5	11.4	0.14	
lower quartile	0.4	8.5	0.13	low (C)
maximum	3.6	83.7	17.50	Bangalore tract
minimum	0.2	4.1	0.04	least urbanised e.g., Koppa, Hegadadevankote & Hosnagar.
		average for the state: 18		

One significant point that emerges from the above table is the great range in urban concentration, Bangalore area, a single city tract, and Hegadevankote, Hoppa and Hosnagar areas representing the extremes.

Three areal categories are demarcated on Figure 8.

(A) Areas of urban concentration or urban tracts.
  (a) Very high, and
  (b) high, limited by 60 percent and 23 percent isopleths respectively.

(B) Intermediate areas, where both urban and rural elements are important: areas between 9 percent and 23 percent isopleths, 14 percent being the median, and

(C) least urbanised areas, bound by 9 percent isolpleth.

TABLE 3

zonal grading	grade or degree of concentration	total area in sq.miles	number of towns	number of towns per 1000 sq.miles	total urban population	urban density per sq.mile of area
A (high and very high)	areas of urban concentration	14,530	119	8	33,09,555	207
B (medium)	intermediate areas	32,100	123	4	11,52,949	36
C (low)	least urbanised areas	27,656	46	2	29,04,660	10

The following general inferences may be drawn from Fig. 8 with its inset and Table 3.

Patterns of Urban Concentration[1]

(i) The areas of urban concentration stand out as islands of varied size and shape, scattered all over the State, except in the Malnad, surrounded by intermediate areas, aligned mostly along rail-road lines. Eggs: Mysore-Bangalore, and Bangalore-Davangere-Hubli-Belgaum. Thus Zone A, the most urbanised area in the State, has the maximum zonal scatter.

(ii) In the south, the intermediate areas are sandwiched between the two most extensive least-urbanised areas, while in the north, the least-urbanised areas stand out as small islands. Thus the pattern of distribution in the north is different from that of the south.

(iii) We can recognise, the regional core of urbanism with Belgaum, Dharwar-Hubli, Davangere, Bhadravati-Shimoga, Mysore, Bangalore and Kolar-Gold-Fields as its multiple nuclei.

(iv) The least urbanised areas have the minimum number of towns, town and urban population densities, and are non-contiguous, but are not as scattered as areas belonging to Zone A.

(v) There are steep zonal gradients in the distribution of urban population, more conspicuous south of the line connecting Karwar and Bellary. This suggests sharp intra-zonal variation in employment opportunities and rail-road accessibility, the two most important urban bases. The maps of physio-agronomic regions, town-types and rail-road accessibility support this conclusion.

(vi) The coastal zone has a pattern peculiar to its position and local terrain. Practically there is no zone B. Zone A gives place abruptly to zone C. The seaboard location of towns, and the extensive, inaccessible and least urbanised Malnad-zone, isolated the coastal zone from the urban-core. Along the coast, due to interruption in road communications by un-bridged streams, there are three isolated tracts: Mangalore-Udipi; Bhatkal-Gokarn and Karwar-Majali. A secondary urban tract may develop along the coast if the coastal highway and sea-way are developed, and the occupational base of the small and medium sized towns is improved by the development of industries based on local resources, and improvement of urban services. Probably no other region in the State has better prospects for the development of a balanced economy than the Coastal Region but the first handicap is its double isolation, within and from the inner regions.

(vii) The urban core region is an elongated but discontinuous zone mainly in the western part of the Northern Maidan and the Southern Maidan. Moving outward from its several nuclei, grades B and C are encountered. It contrasts with the narrow but again interrupted strip, noted in (vi) above. Areas of urban concentration: sixteen tracts of urban concentration are delimited[2] (Fig. 8).

There are only four zones of very high concentration: the Bangalore, the Mysore, the Kolar-Gold-Fields and the Hubli, all of them being single-city areas, belonging to the lakh-city groups. Only Bangalore, Mysore, Kolar-Gold-Fields and Hubli have developed

[1] Urban concentration as used in the study refers to higher density of towns and/or larger share of urban population in the taluka to the total urban population in the State or a higher percentage of urban population to total population in each taluka.

[2] 1. Bidar-Gulbarga, 2. Bijapur, 3. Nipani-Chikodi, 4. Belgaum, 5. Bagalkote, 6. Raichur, 7. Hubli-Gadag, 8. Bellary-Hospet, 9. Karwar, 10. Kumta, 11. Davangere, 12. Shimoga-Bhadravati, 13. Mangalore, 14. Bangalore, 15. Kolar-Gold-Fields, and 16. Mysore.

typical semi-urban zones[1] around them, Bangalore having the largest. The regional primacy of concentration of these city areas can be explained by their nodal situations, and varied urban-base, dominated by industrial and tertiary occupations. Mangalore and Belgaum, though lakh-cities, have not reached the same level of concentration as the other cities, either absolutely or relatively. This is indicated by the isopleth and location-factor values of these two cities (Fig. 8). The case of Mangalore may be explained chiefly by its former marginal-location to all the three States, and regional isolation caused by inadequate communication facilities and extensive hill-forest environment. The maps of forests-land-use and rail-road inaccessibility bring out the isolation of Mangalore very clearly[2]. The case of Belgaum is more difficult to explain with the evidence we have. Two reasons are probable: 1) It is in the shadow of Bombay and Poona, on one hand, and the vigorously growing towns of Dharwar and Hubli on the other, and 2) the presence of a number of small towns of intermediate type in its immediate neighbourhood may have satisfied the local needs.

Fig. 8 reveals a contrast in urban concentration between the north and the south. The median line (14 per cent isopleth) can be taken as the dividing line separating the two zones. Numerically, the areas of concentration are divided equally between the north and the south. The differences lie in their disposition, extent, and town and urban population densities.

The following are the characteristic differences between the different tracts of Zone A.

1) The total area of the urban tracts of the south is nearly 4000 sq. miles with 29 towns and 16.8 lakhs urban population, while in the north, which has more than double the area, the urban tracts have 90 towns with a total population of 13.3 lakhs.

2) The urban tracts of the south are characterised by fewer towns and high densities, while of the north, by numerous towns and both high and low densities.

3) The Bangalore tract has the highest urban density in the State (1140 per sq. mile), Bellary-Hospet tract, a multiple town tract, with as many as 25 towns, having the next (1120 per sq. mile). Hubli-Gadag tract stands next in the number of towns, being 20, but urban density is only 125. Shimoga-Bhadravati and Kolar-Gold-Fields tracts are the typical urban-industrial tracts after Bangalore, having 3 towns each and nearly 110 and 550 urban densities respectively[3]. Karwar and Kumta tracts of the coastal region have the highest number of towns and highest urban population density for the region, Karwar having a higher density, e.g. (532) comparable with Mangalore tract (374). Belgaum tract has a high density (910) but has only 5 towns. Nipani and Chikodi tract has 10 towns with a density of 193, and Bagalkot tract has 8 towns, with a very low urban density (85), followed closely by Bijapur tract with 9 towns and an urban density of 91. Raichur tract is a single-city tract, and has a density of 284.

Three points emerge from the above study: (1) even in the A grade, there are sharp contrasts in town and population densities, (2) the multiple town tracts are greater in number, and more evenly distributed in the north while in the south, a few large and highly scattered city tracts dominate, (3) as a result, rural-urban and inter-urban variations are sharper in the south than north, an essential difference which must be comprehended in regional planning.

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[1] A semi-urban zone is defined as an area around the city where the percentage of non-agricultural population to total population is 60 and more. This is the potential area for the future location of industry near the city, and it is also the area of maximum urban impact.

[2] Mysore State—Vol. I—An Atlas of Resources.

[3] Shimoga and Bhadrawati have large municipal areas in relation to population.

Least urbanised areas:

The Malnad and the east central part of the Southern Maidan (lying mostly between Y.N. Hoskote and Challakere in the north and Saravanabelagula and Magadi in the south) constitute the most extensive and contiguous areas of least urbanisation. A third area, not a small one, Sindgi—Afzalpur tract, nearly 3000 sq. miles with the lowest urban density in the whole State should be added to this category. Santpur tract in the north-eastern corner, Mulbagal-Bagepalli tract, a narrow rugged and inaccessible strip, and another small tract, Malur-Hoskote, may be classified as minor ones, based on their extent, number and size of towns. No special mention need be made of the very small islands like the one between Manvi, Deodrug and Yelbarga.

It is in this zone of C grade, particularly in north Malnad, that there lies a compact area of just above 3000 sq. miles in extent, which does not have even townships. Supa, Yellapur and Siddapur are some of the talukas in this tract.

The least urbanised areas are located in two contrasting environments, (1) the Malnad tract and (2) the famine tract (east central Southern Maidan and the Krishna-Bhima middle catchment area). Environmental conditions coupled with rail and/or road inaccessibility, and the presence of larger urban centres nearby, are really the chief limiting and retarding factors for town formation in C zone in general.

Even in the least urbanised area, there are contrasts, but insignificant. The east-central Southern Maidan has 18 towns with nearly 14,000 population, and the urban density is 15, while the famine tract of the north (Krishna-Bhima Catchment) has only 2 towns, with a population of just above 12,000 and a density of nearly 500. Malnad has 11 towns with nearly a lakh of population, and urban density nearly 100.

The intermediate zone:

This zone (B grade zone), lying between the isopleths of 9 per cent and 23 per cent is subdivided into two; above and below the median line. The zone of medium high and the urban tracts of A zone are the areas of maximum urban impact on the country side, in the form of high land values, high wage-rates and ribbon development (see figures on land values, urban spread and functional zones). The coastal zone does not have intermediate area as such, while it is most extensive in the north. In the south, it more or less coincides with the road-rail accessibility zone. It is in this intermediate zone, on either side of the median line, that we find the problem areas like Shimoga-Bhadravati, where the country-side is being depopulated. These problem areas are referred to in the last section of the report.

Locational analysis:

It is accepted as a working hypothesis that each urban centre primarily exerts some influence as a service or market centre on the nearby or farther country side, or upon another urban centre. The degree of such influence depends on its population, size and function. An industrial or administrative city has a greater influence on its neighbouring or farther country side, than a small agricultural town. The degree or extent of urban influence also is greater nearer the urban centre than farther from it, progressively decreasing from the centre outwards, being maximal within the urban limits and minimal at the periphery of its area of influence. This hypothesis is used as a basis to work out a formula, and apply it to design a map, for locational analysis of towns.

The working formula can be expressed as:

$$D = \frac{T \times A}{U}$$

$$R = \sqrt{\frac{T \times A}{U}}$$

where D = Degree of urban influence.
A = Total area of Mysore State.
U = Total urban population of Mysore State.
T = Town population.
R = Radius of the circle.

$\frac{A}{U}$ is a standard value, and is a constant (K).

The degree or extent of influence of each town is measured by the area that it is expected to influence, and the index is derived by multiplying the constant K with its total population T. The area of influence is assumed to be circular, chiefly for the sake of convenience in mapping. The larger the circle, the greater the degree of influence*. On this basis, Bangalore has the largest, and a township, the smallest circle.

Fig. 9. (p. 30) which shows the degree of influence of each town by proportionate circle, complements and confirms some of the inferences drawn from Fig 8, relating to regional variations in size and concentration of urban population, and also least urbanised areas. A more precise delimitation of the areas of town concentration and scatter, and areas outside the influence of towns is possible with the map (Fig. 9).

The percentage and frequency of overlaps of circles, together, give an index of town concentration. The greater the frequency and the higher the percentage of overlaps, the greater the concentration of towns. An examination of Figure 9 clearly brings out that Nipani-Chikodi tract, with its maximum number, and high percentage of overlaps, ranks first in concentration of towns. The average inter-town distance (4.5 miles) in this tract is the minimum in the whole State. Dharwar-Hubli area, with its two interlinked areas of Gadag and Belgaum, ranks next in frequency and percentage of overlaps. Gadag and Hubli circles overlap to the extent of 30 per cent while Dharwar and Belgaum circles are interlinked by circles of one class IV and one class V town. Dharwar and Hubli circles overlap to the extent of nearly 80 per cent, and their inter-city distance is 12 miles, the only case of two cities located so close, in the whole State. There is a 75 per cent overlap of Bangalore and Kolar-Gold-Fields circles but the inter-city distance is just above 40 miles. Kundgol-Shigali area is a secondary and a local area of concentration, and it is an elongated and closely linked area of small towns and townships. Davangere and Savanur are linked by a chain of circles along the railway line, and have overlaps of 25 to 50 per cent. Kalyani-Chitguppa area in the north-east of the Northern Maidan, Gokarn-Bhatkal area on the coast and the Kollegal-T. Narsipur area, south-east of Mysore are the other areas of concentration. Gulbarga and Bijapur have minimal overlaps of small towns. Raichur and Bellary are unique in that there is not an overlap even with one town. The nearest town to each of them is 15 to 20 miles, a handicap to the nearby rural tracts.

* There seems to be some correspondence between the overlap areas in urban fields (e.g., Mandya), mapped based on field work, and overlaps of the circles drawn to indicate their degree or extent of influence.

Situation and Rail accessibility:

Situation and rail accessibility are important accelerating factors in urban growth, if not the formative ones. Urban centres in a transitional zone like Semi-Malnad, become more powerful converging points, and if their situation is nodal*, it further adds to the spiral of urban growth.

In the State, there are 95 urban centres with nodal situation out of which 50 per cent are medium sized towns. Nearly 25 per cent are agricultural, 45 per cent tertiary and 10 per cent industrial towns. There are 21 terminals out of which 9 are railway and 12 are road. Excepting for the Kolar-Gold-Fields city which is a rail-terminal, all the other five class I cities are nodal, road and/or rail. All the class II cities are served by railway and road, and are transit or junction points. All coastal towns, excepting Mangalore which is a rail-terminal, are served by roads only interrupted by unbridged perennial streams, crossed by undependable ferry services.

With the evidence in our hands it is difficult to state to what extent, railway accessibility is the cause of town formation, but we can accept a closer relation between railway accessibility and comparatively rapid rate of urban growth, particularly at a nodal or transit point. This becomes evident when the maps showing net variation and railway accessibility are compared.

The following tables bring out the relation between number of towns, their size and type and railway accessibility. Towns located more than 25 miles from a railway line are treated as inaccessible.

TABLE 4

size	number of towns within 10 miles	10–25 miles	more than 25 miles inaccessible	total number in the state
class I	—	—	—	6 } cities
II	—	—	—	7 }
III	2	1	3	20
IV	2	20	10	57
V	25	61	21	136
VI	6	22	3	44
total	35	104	37	270
town types				
Ia	15	42	13	88
Ii	2	6	1	12
Is	—	1	2	3+18
Ibf	—	12	—	23
I'a	10	21	6	59
I'i	4	6	4	19
I's	3	14	11	60
I'Com	—	—	—	1
balanced	1	2	—	5
total	35	104	37	270

* For purposes of present study, a nodal town is defined as one on which different routes of communications converge. No distinction is made between 'natural nodality' i.e., where the route patterns are affected by physical configuration, say convergence of valleys, and 'artificial' or acquired 'nodality' where there is convergence of routes, unrelated to the conditions of terrain.

All the cities and 14 out of 20 major towns have rail and also road accessibility. Out of the 270 towns in the State, 104 towns are located at 10 to 25 miles from the railway line, and 37 more than 25 miles. Most of them are small agricultural towns. Out of the 37 towns inaccessible to railway, 21 are small towns, 19 of which are agricultural towns, 3 are townships, 10 are medium sized, and 3 are major towns. There are 4 lakhs of people living in these 37 towns, to whom a direct access to rail is not available.

A regional break-down of size and type of towns in the inaccessible area alone is attempted and tabulated below with remarks.

TABLE 5

regions and sub-regions	total	size				type			remarks
		3	4	5	6	ag.	ind.	services	
1. coastal	13	1	3	9	–	5	–	8	all situated in A zone.
2. northern Maidan	17	2	2	11	2	14	3	–	all except one are in the B zone and one only is in A zone.
3. southern Maidan									
(a) Malnad	5	–	3	1	1	–	–	5	all situated in the least urbanized zone (C zone).
(b) Maidan	2	–	2	–	–	–	2	–	
total	37								

An analysis of the above table with Fig. 8 helps us to draw the following conclusions:

(1) The Northern Maidan has the maximum number of inaccessible towns, the Coastal Region being the next.

(2) In the Coastal Region, while all the inaccessible towns are agricultural and tertiary, in the Northern Maidan, they are agricultural and industrial. In both the regions the majority are small towns.

(3) All the towns in the coastal zone are situated in the A zone while in the Northern Maidan, all excepting one, are in the B zone.

(4) In the Malnad, there are three medium sized towns, one small town and one township, and all of them are tertiary towns, situated in the least urbanised zone.

(5) In the inaccessible region, as defined here, there are 3 major towns, one in the Coastal Region, and 2 in Northern Maidan; and 10 medium sized towns, 3 each in the Coastal Region and the Malnad, and 2 each in the Northern and in the Southern Maidan. At least one definite conclusion can be drawn, that for the development of major towns, railway facilities are not indispensable as they are in the case of cities. The three major towns, Udipi, Ilkal and Jamkhandi, which do not have rail-accessibility have high road accessibility.

Town location and administrative boundaries

In this section, town locations are analysed in their relation to administrative boundaries, District and State. A town on or near (i.e., within 10 miles of) the District or State boundary is considered to have a marginal location. The analysis of marginal town

locations with respect to administrative boundaries tends to disprove the idea that an administrative unit, say a District, is also a functional unit, economically tributary to the District headquarters, and also stresses the need for coordination and joint action on the part of the neighbouring District or State authorities. Such an analysis serves a useful purpose in pin-pointing the towns and areas which need inter-regional co-ordination at different administrative levels. Here the implied argument is: when a marginal town develops, or declines, the impact will cross the boundaries on either side.

Out of the 141 towns having marginal location, 6 are located almost touching the State boundary, and 39 near it. Belgaum, Bidar, Raichur, Bellary and Kolar-Gold-Fields have marginal location, and all of them excepting Bidar are cities. Bagepalli, Pavagada and Y.N. Hoskote are townships with marginal locations. Trading activity in Bagepalli, a sample town, is linked closely with Hindupur an important market town in Andhra. Residents of Bagepalli have closer social ties with the neighbouring villages in Andhra, and feel isolated from Bangalore. Likewise in the north-western corner, Kognoli, Bhoj, and Nipani, by their marginal location, and also because of their medium or small size, seem to be drawn more into the urban fields of Kolhapur and Miraj.

Now, considering the marginal location of a town in relation to the District boundary, Raichur has the most eccentric location, 54 miles away from the District's geometric centre, Dharwar, Belgaum, Karwar, Mangalore, Shimoga and Gulbarga ranking next in eccentric location. In contrast, Mandya has the least deviation from the centre, only 4 miles, and is most centrally located of all the District headquarters in the State.

We have made only a passing reference to the above line of study, and a detailed enquiry should prove very useful in providing a basis for the formulation of integrated, inter-District or inter-State developmental policy, relating to marginally located urban centres.

Urban Characteristics

Size of Towns: (ref. Figs. 8 and 10)

Population basis: Some observations on the relations between the population size, growth and type of towns, have already been made in the section on sampling (ref. p. 12), and now, aspects relating to size and type, and their regional variations will be examined.

According to the census classification of 1951, there are 13 cities (6 class I and 7 class II), 20 class III, 57 class IV, 136 class V and 44 class VI towns, excluding the Tungabhadra camp-towns of which 16 belong to class VI, and two to class IV and V, one under each. The size of the median town is 7500, the upper-quartile and lower quartile values being 12,500 and 5600 respectively. Frequency of size-groups indicates that the State can be regarded as one of small and medium sized towns (i.e., 5000 to 20000). The townships (i.e., less than 5000) rank next in frequency but this size group is declining (p. 82).

Fig. 8 shows the distribution of the different size-groups. Small towns belonging to the most frequent group, are most widely scattered in the State. The scatter is more even in the north than in the south. A few clusters of this group can be recognised: the Nipani-Chikodi tract in the north-western corner of the State, and a group south-east of Mysore city, being typical. The towns of the small-size group are mostly confined to the intermediate or B zone. Of all the size-groups, the distribution of townships is most zonal, 90 per cent of the towns being confined to the Southern Maidan. The coastal zone does not have any townships. It appears that what we might call urban up-grading has proceeded

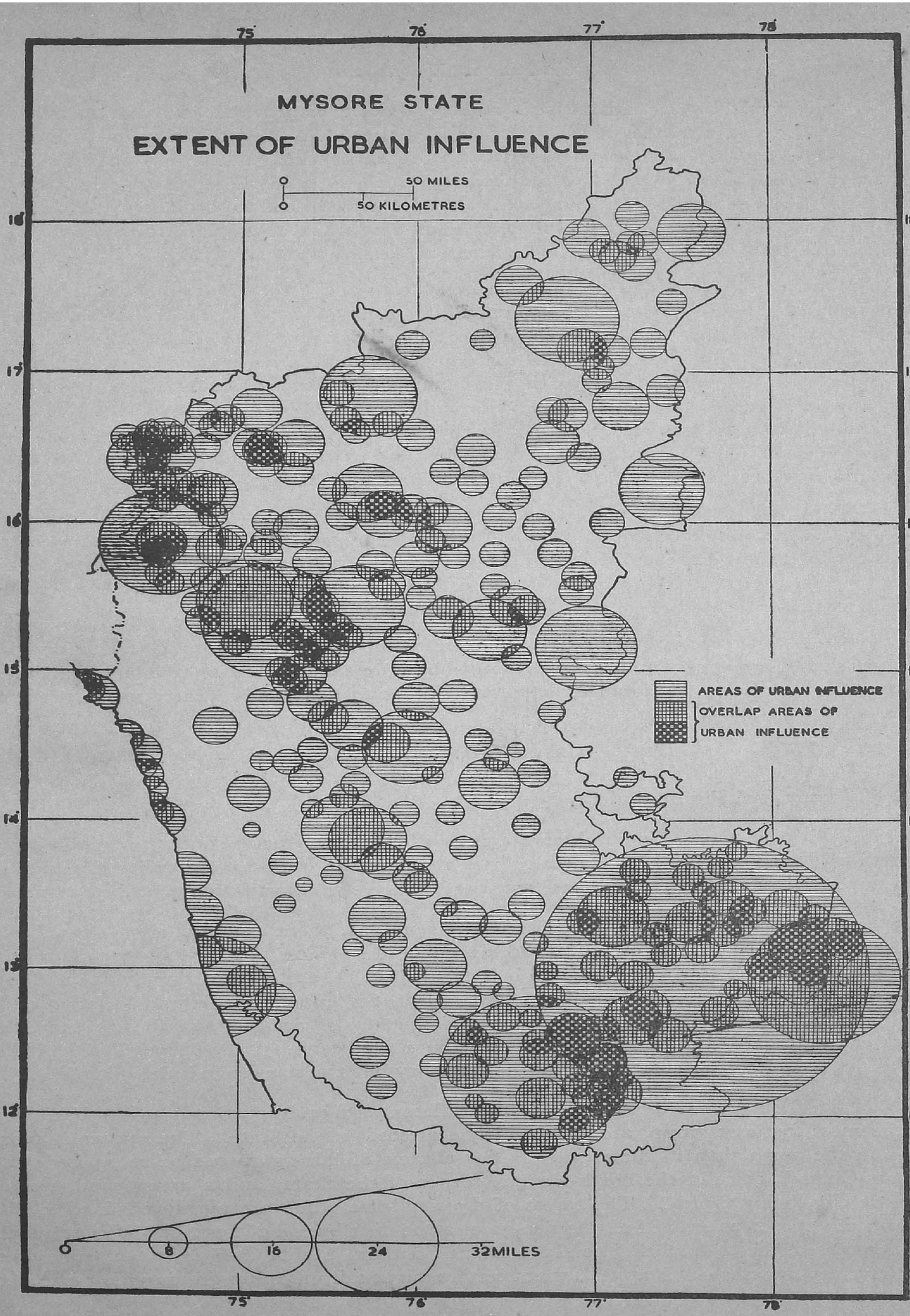
MYSORE STATE
EXTENT OF URBAN INFLUENCE
50 MILES
50 KILOMETRES
AREAS OF URBAN INFLUENCE
OVERLAP AREAS OF
URBAN INFLUENCE
8
16
24
32MILES
75°
76°
77°
78°
18°
17°
16°
15°
14°
13°
12°

FIG. 9

FIGURE 9: EXTENT OF URBAN INFLUENCE

Method:

The map is specially designed to analyse the distributional patterns of town locations. The assumption is that each urban centre exerts some influence as a service or market centre on the nearby or farther countryside or upon another urban centre The degree or extent of influence is greater nearer the urban centre than farther from it. The area of influence is assumed to be circular for the sake of convenience in mapping, and proportionate circle are drawn for all the 272 towns, with radius

$$R = \sqrt{\frac{T \times A}{\pi U}}$$

A = Total area of Mysore State.

U = Total urban population of Mysore State.

T = Town population.

The larger the circle, the greater the degree or extent of influence. On this basis Bangalore has the largest and a township the smallest circles.

Three grades of extent of influence are derived:

i. areas of least influence: areas outside the circles,

ii. areas of greater influence: areas of overlaps,

iii. intermediate areas: areas inside the circles.

Areas of overlap have two categories: (a) single overlap i.e., overlap of two circles, and (b) multiple overlap i.e., overlap of more than two circles. Accepting that the degree of influence is greater nearer the urban centre than farther away, the areas of greater influence (overlaps) can be further subdivided by decreasing the radius to half or one-fourth, and demarcate the overlaps of inner circles, the areas of greater influence. (This is of course not attempted in the present study).

Advantages:

(i) A more precise delimitation of the areas of town concentration and scatter, and the areas outside urban influence or inadequately served by towns, is possible with the help of Figure 9 than Figure 8 or Figure 11.

(ii) Areas served by more than one town can be delimited.

(iii) Figure 9 complements and confirms the inferences drawn from Figure 8, relating to regional variations in population size of towns and distribution of town locations.

Limitations:

(i) The assumption that the area of influence of a town is circular is theoretical.

(ii) The radius of the circle is arbitrary, and with a change in the radius, the extent and frequency of overlaps and the extent of blank areas change, but the relative difference in the population size of towns will be maintained.

(iii) The acceptance without testing of the hypothesis that each town exerts some influence on the nearby or farther countryside or another town is itself open to criticism.

Different methods of locational analysis of towns are being tried, with a view to evolve a refined method, useful for practical application.

to a level where all the townships in the areas have disappeared by rising to their next higher grade. (The alternative to this could be that the townships got down-graded[1] by becoming smaller in population size as a result of towns-folk emigrating to the nearby towns and even large villages). Townships dominate in the Chitaldrug-Sira area, which is in the least urbanised or C zone.

The six class I cities are highly eccentric in their location. Of the highly urbanised areas, the north-coastal zone, the Nipani-Chikodi and Shantpur areas are the farthest from the State capital, involving two days of tedious journey by rail, while travel by bus would involve many changes. If a circle is drawn with Bangalore as centre, weighted by its size, nearly 90 per cent of the State will be left out. Likewise if circles are drawn, even for all the class I cities, more than 50 per cent of the State will be excluded. If circles are drawn for the class II cities also, nearly 25 per cent of the State will be outside the city influence. Davangere is the only city which is located near to the geometric centre[2] of the State. The areas far from city-influence, exclude the northern part of the Coastal Region, the northern and central Malnad and the east-central part of the Southern Maidan, and it is in these areas that urbanisation should be encouraged (See Fig. 9 and pp. 90-91). The practical utility of the above discussions and analysis lies in sieving out the areas outside any city's orbit, since such areas need centres with some city functions, if not actual cities. The eccentric location of cities, and the highly scattered location of the major towns, lead to make out a strong case for the development of Zonal Capitals (see p. 94).

Distribution of Town Types:

Out of the 270 towns in the State there are 147 agricultural towns, 81 service or tertiary (63+18 camp towns), 31 industrial, 19 of which, strictly speaking, have only small scale industries, and 23 bi-function, where agriculture is always one. Byadgi is a small town, a trading centre for chillies, where more than 50 per cent of the population of the town has commerce as occupation. There are 114 towns of different sizes, ranking between townships and cities, but mostly townships and small towns, which are neither district nor taluka headquarters.

The distribution of town-types (Fig. 10) and the relative importance of different urban occupations are shown by Figs. 10 and 11. Fig. 11 also shows the livelihood classes by sectors. Towns which have no administrative function are shown by a special symbol.

Distributional patterns:

The Malnad is the only region in the State where a single town type (tertiary type) dominates, and this is the region of scattered small towns and townships. The pattern of urbanism in Malnad can be described as one of irregularly scattered tertiary small towns and townships. Likewise a coastal pattern can be distinguished. The coastal situation of towns, backed by Malnad lends individuality to the Coastal Region, more than the urban characteristics: town-size and function. The pattern here, is one of small and medium sized towns and mixed town types, strung along the coast, Mangalore being an exception. Out of the 18 towns in the Coastal Region, 13 have coastal, estuary or back-water situation.

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[1] An intensive analysis of census data is necessary to establish this. This may be taken up later as an independent and intensive library research project.

[2] By the Centroid method, Harpanahalli, a medium sized, intermediary agricultural town, located in a high productivity tract is found to be the geometric centre of the State but it has regional inaccessibility, and is not served by a railway.

The Centroid method: A nine sided polygon is obtained by drawing straight lines along the State boundary. The polygon is divided into triangles, and the centroid is found out for each triangle. All these centroids are considered as vortexes for the subsequent triangles. This process is repeated till a single triangle is obtained, the centroid of which becomes the geometric centre for the State.

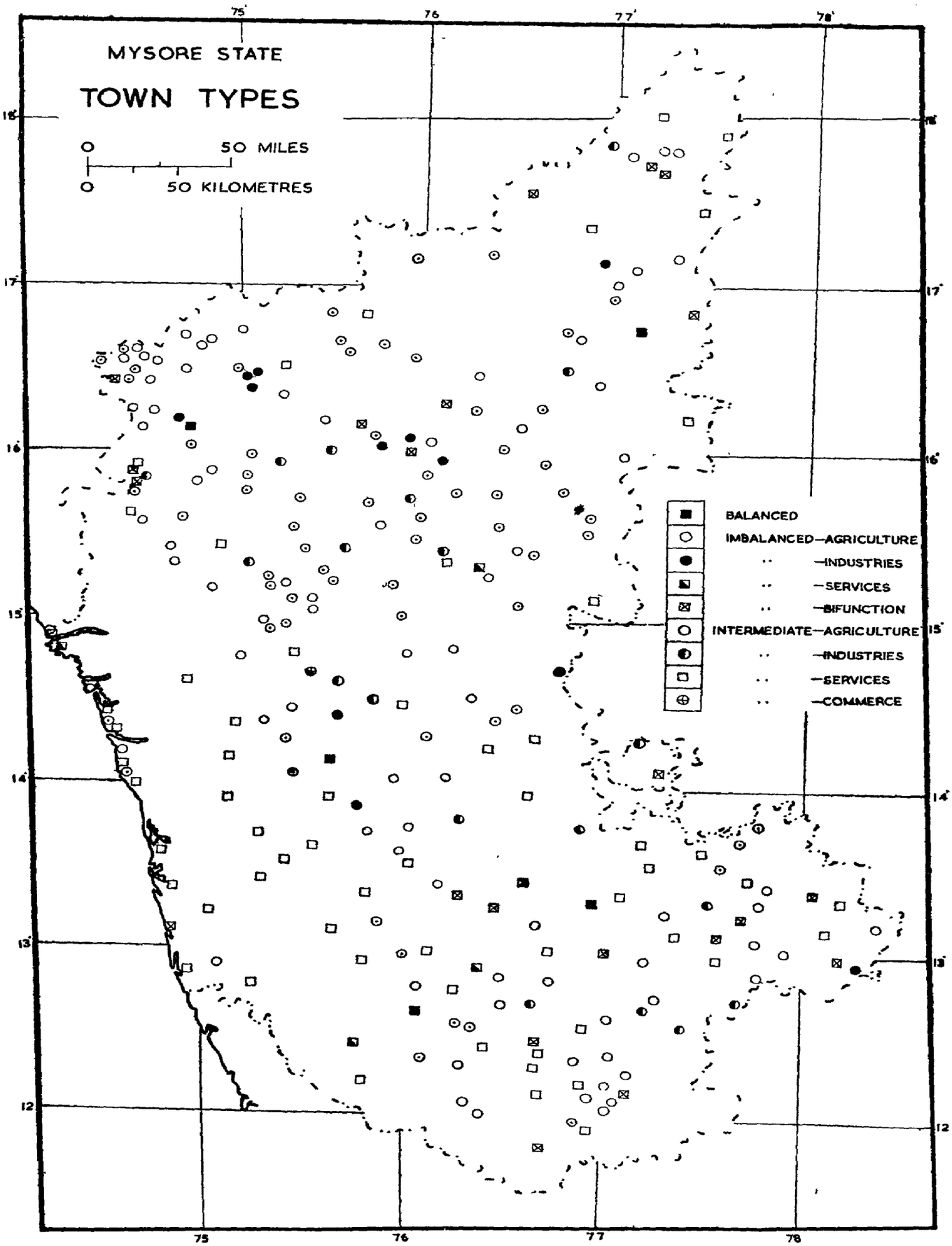
MYSORE STATE
TOWN TYPES
50 MILES
50 KILOMETRES
BALANCED
IMBALANCED—AGRICULTURE
—INDUSTRIES
—SERVICES
—BIFUNCTION
INTERMEDIATE—AGRICULTURE
—INDUSTRIES
—SERVICES
—COMMERCE
75
76
77
78
18
17
16
15
14
13
12

FIG. 10

It is difficult to recognise definite patterns of urbanism on a regional level elsewhere in the State. All over, the pattern is one of mixed size and town types scattered irregularly. Amidst this scatter, there are local clusters, in some cases of the same size and type, (e.g., small agricultural towns as in the case of Chikodi-Nipani tract) while in others, of mixed type, but mostly small towns, e.g., south-east of Mysore. Though a definite line cannot be drawn, the Northern Maidan can be distinguished from the Southern Maidan by its greater degree of scatter and the predominance of agricultural towns. There are also more industrial towns in the north (18 out of 31) than in the south. The three small and medium-sized industrial towns, Banhati, Mahalingapur and Rabkavi form a minor cluster, a case of homogeneous group, while the Belgaum group, which is also more or less a cluster, consists of diversified group, the tertiary city of Belgaum, one industrial, one agricultural and two bifunction towns. There is scope for the development of town-groups in such urban clusters. We shall elaborate this idea in the conclusion. The north-eastern zone lying between Bijapur and Bidar is one of town-less tract and alternating with local clusters of mixed size and type.

Occupational base (Figs. 10 and 11)

No town owes its *raison d'être* to one single function. Even in the case of Kolar-Gold-Fields, a mining town and Bhadravati an industrial town, only 62-63 per cent of the total town population is engaged in industries. In both the centres, services rank next (15 per cent and 22 per cent) and both have also agricultural population (12 per cent and 5 per cent respectively). All the cities excepting Kolar-Gold-Fields and Hubli have services as their main function. Karwar and Mercara are two small towns where the administrative function dominates. In the case of agricultural towns, services rank next, while in the tertiary (service) towns, industry and commerce are next in importance to services. In only five towns, all the occupations are equally important.

A comparison of Figs. 10 and 11 with the different industrial maps prepared by the Regional Survey Unit, shows that cities and major towns mostly have a diversified occupational base, dominated by tertiary (service) function, and in the industrial sector, have different types of industries.

Industries in different towns, in general, reflect the nature of the resources of the tracts in which they are situated. Fishing is a common occupation in all the towns strung along the coast, whether Mangalore, a lakh city or Majali or Mavali, a small town. The textile industries in most of the towns of Northern Maidan, silk factories at Channapatna and T. Narsipur, sugar industry at Mandya, coffee processing at Chikmagalur are a few examples. Then does this mean that raw-material located industries tend to be located in or nearer the towns than in the centre of the raw-material producing rural tracts? This is a controversial question which should be investigated in detail.

Figures 10 and 11 show the distribution and frequency of the five urban occupations. Every town has all the occupation types in some measure or other, transport being the only exception, 13 towns not having this occupation as such. Agriculture does not show any conspicuous peak, like transport, or even as much as industry or commerce (ref. Fig. 11). One conclusion from this is, that there is not a town without some section of its population being engaged in agriculture, and the graph also indicates how in some centres, more than 75 per cent of the total population are engaged in agriculture, and in 11 centres, even more than 85 per cent, which are then urban-villages, and not even rural towns.

Towns dominating in services rank next in frequency followed by industrial towns. The overlap of lines suggests that there are many multi-functional towns with no single function dominating, while the short line and the peak of transport, suggest that there are many towns with a low percentage of population in the transport sector.

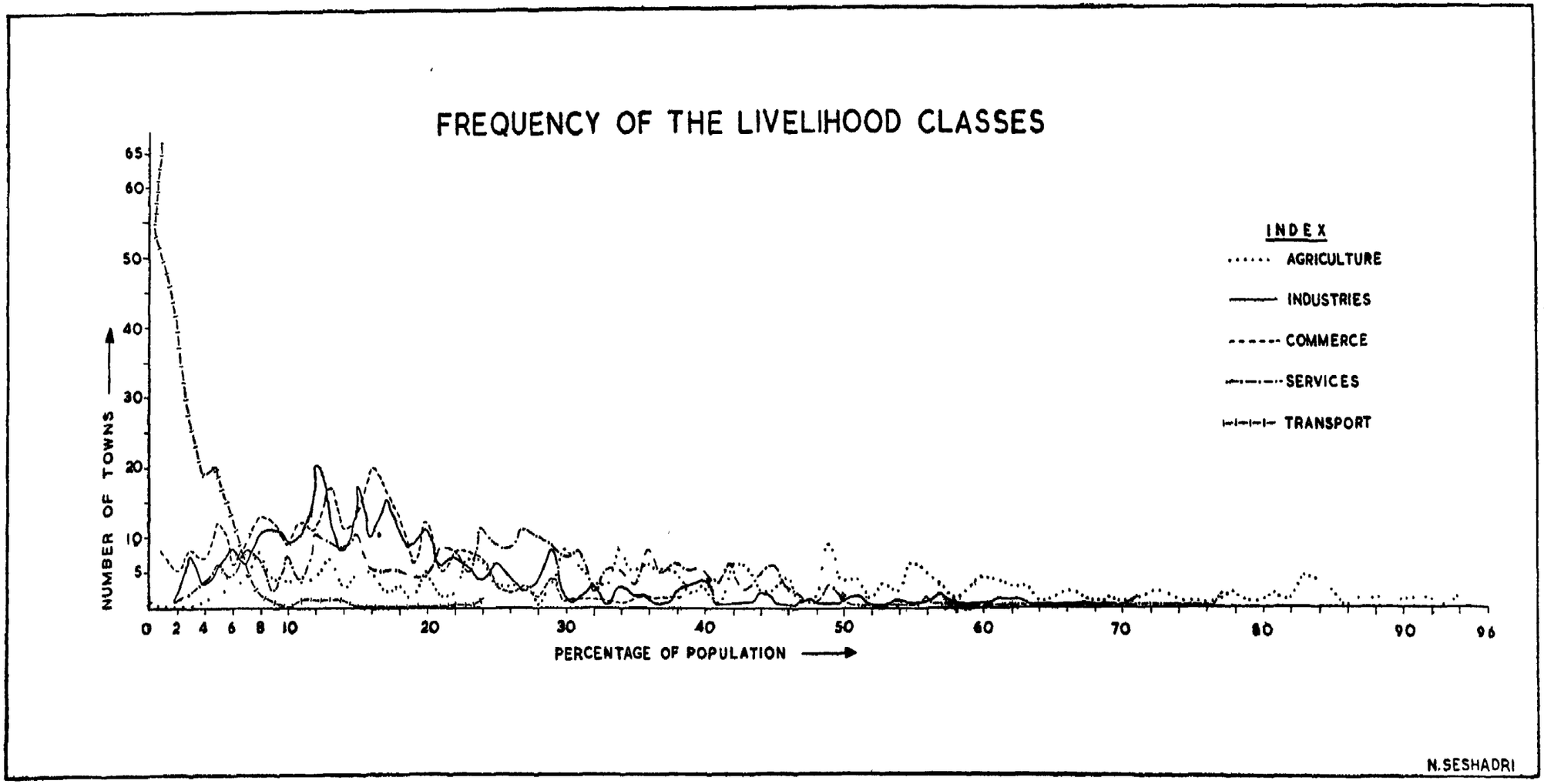
FREQUENCY OF THE LIVELIHOOD CLASSES
INDEX
AGRICULTURE
INDUSTRIES
COMMERCE
SERVICES
TRANSPORT
NUMBER OF TOWNS
PERCENTAGE OF POPULATION
0 2 4 6 8 10 20 30 40 50 60 70 80 90 96
65 60 50 40 30 20 10 5
N.SESHADRI

FIG. 11

Attempt will be made to summarise regional variations in urbanism. (See summary table in conjunction with Figs. 8, 9 and 11).

(a) In the State, the Northern Maidan has the maximum urban population and number of towns of all size-groups.

(b) The Southern Maidan has only 80 towns, in comparison with the north but has an urban population of nearly 19 lakhs out of which nearly 12 lakhs live in the three cities of Bangalore, Mysore and Kolar-Gold-Fields. This region has the lowest urban per capita area and the highest urban population density in the State.

Figures 8, 9 and 11 clearly indicate that the distribution of towns and urban population is more uneven in the Southern Maidan than in the Northern Maidan. Based on the density of urban population per square mile and urban per capita area, the Southern Maidan is the most urbanised region in the State. Though the Northern Maidan has more towns than the Southern Maidan, the Southern Maidan has more or less, the same urban population, and also the same density of towns while the density of urban population in the Southern Maidan is the highest, and urban per capita area the lowest in the State.

(c) The Coastal Region is ranked as more urbanised than the Semi-Malnad because of Mangalore, a lakh city, and if this is excluded, the Coastal Region will be the least urbanised zone in the State after the Malnad. Yet it has a close line of towns with a fair range of urban services.

(d) The Malnad is the least urbanised region in the State. Though there is not much difference in the number of towns between the Malnad and the Coastal Region the urban population of the Malnad is one-third of that of the Coastal Region.

(e) In U-R ratio, the Malnad is the most imbalanced (1 : 8), the Coastal and the Semi-Malnad regions being the next in imbalance. The northern and the southern regions have the same ratio.

It can be concluded that the Malnad and the Coastal Region should be urbanised, and preferably, industrial and trading towns should be developed, or industries should be developed near the existing towns.

Urban Services and Amenities

Regional variations in urban services and amenities* are analysed, and evaluated in this section. Only sample towns and some cities have been included in the study. Fig. 12 and the Tables 7 and 8 bring out clearly inter-town and inter-regional variations in urban services and amenities (also ref. to Table 6).

A limitation in this analysis is again inadequacy and incompleteness of data. The adequacy of each service or amenity could not be examined for lack of data and of specific norms which can be fixed after standards of services are surveyed. An attempt is made below to analyse Fig. 13 in which the degree of attainment of the main services is measured along the radii of a somewhat star-shaped symbol for each town. The size and the form of the symbol are taken as a basis for comparative evaluation. The smaller the size, the more unsatisfactory is the service-situation. Likewise the more lopsided or asymmetrical the form, the greater the ill-balance in services.

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* 1. Electricity, 2. Protected water supply, 3. Conservancy, 4. Hospitals, 5. Educational Institutions, 6. Permanent Picture Houses, 7. Banks, 8. Post-Offices, 9. Radios, 10. Hotels.

A hotel may be a lodging and/or a boarding house serving meals or coffee and tea or all. Sometimes, even a tea or a coffee stall is also called a hotel. Small towns and townships usually have one or two boarding houses serving only meals, and also coffee and tea stalls but not lodging houses.

TABLE 6: REGIONAL VARIATION IN URBANISM

	size						type						towns total	urban population in lakhs	urban population per sq.mile	area per town in sq.miles	urban per-capita area in acres	urban rural ratio
	I	II	III	IV	V	VI	B	Ag	Ind	Ter	Com	Bif						
1. Northern Maidan	2	7	9	32	76	8	2	87	20	13	1	11	134	19.3	59	245	11	1:3
2. Southern Maidan	3	–	6	15	33	23	1	35	10	22	–	12	80	18.5	86	271	7	1:3
3. Semi-Malnad	–	–	3	2	11	8	2	17	1	4	–	–	24	2.6	42	256	15	1:5
4. Coastal Region	1	–	1	7	9	–	–	6	–	11	–	1	18	3.0	58	289	11	1:5
5. Malnad	–	–	1	2	8	5	–	3	–	13	–	–	16	1.1	13	528	49	1:8
state total	6	7	20	58	137	44	5	148	31	63	1	24	272	44.5	60	258	11	1:3.5

B = Of equal importance, Ag = Agriculture, Ind = Industrial, Ter = Tertiary (Services), Com = Commerical, Bif = Bi-function.

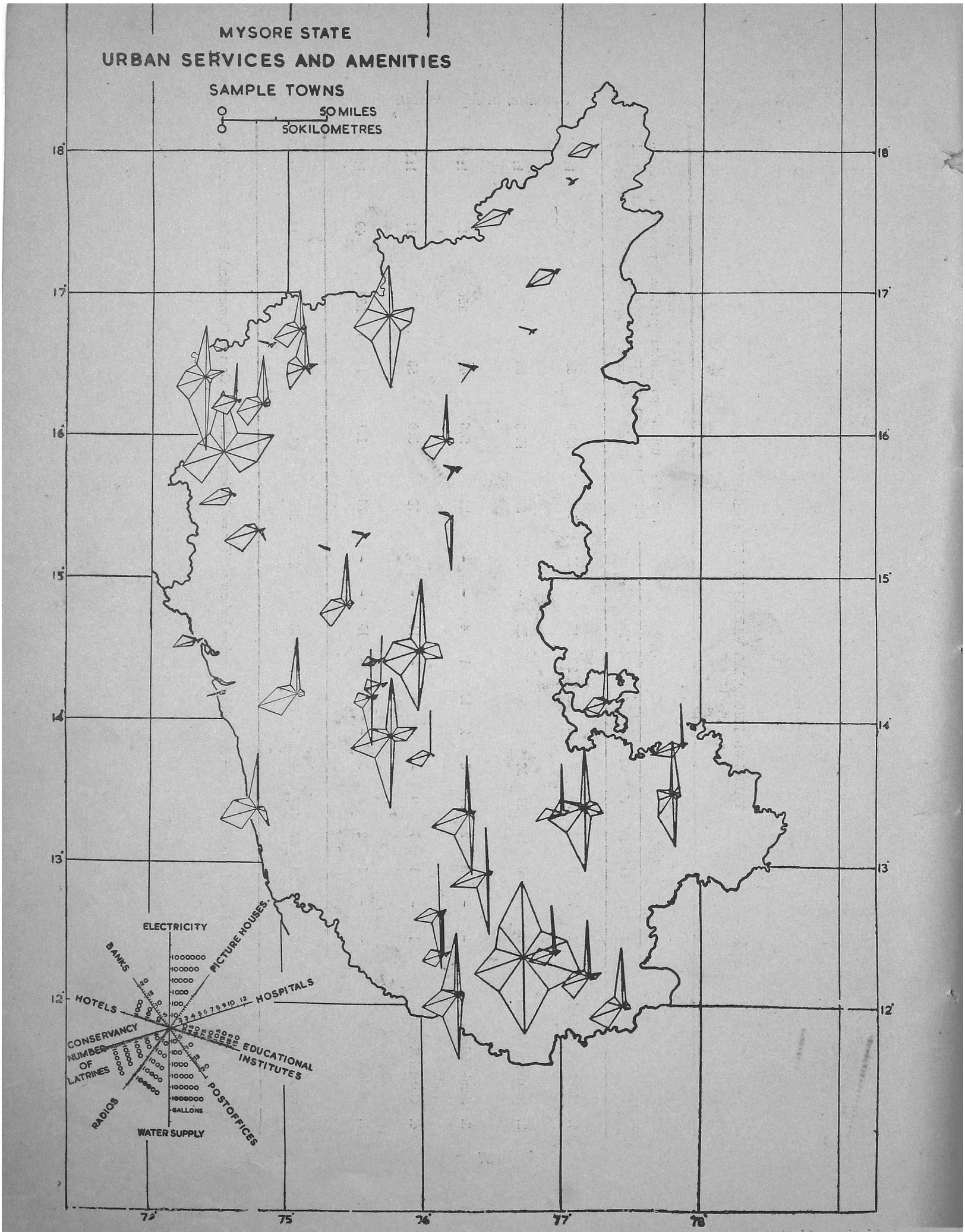

FIG. 12. Urban Services and Amenities. (Sample Towns).

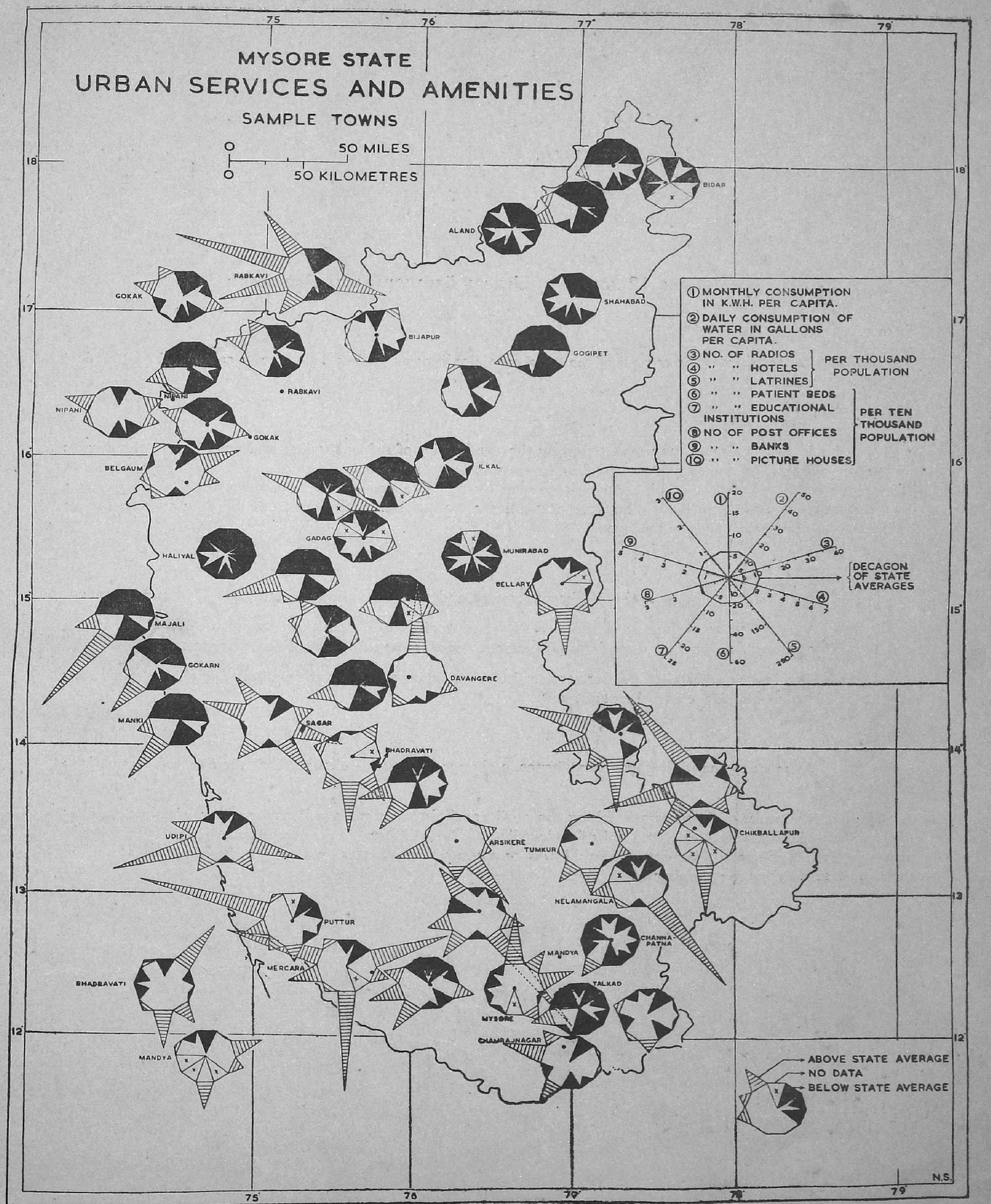
MYSORE STATE
URBAN SERVICES AND AMENITIES
SAMPLE TOWNS
50 MILES
50 KILOMETRES
75
76
77
78
79
18
17
16
15
14
13
12
BIDAR
ALAND
RABKAVI
GOKAK
SHAHABAD
BIJAPUR
GOGIPET
NIPANI
BELGAUM
ILKAL
GADAG
HALIYAL
MUNIRABAD
BELLARY
MAJALI
GOKARN
DAVANGERE
MANKI
SAGAR
BHADRAVATI
UDIPI
ARSIKERE
TUMKUR
CHIKBALLAPUR
NELAMANGALA
PUTTUR
CHANNA-PATNA
MANDYA
MERCARA
TALKAD
BHADRAVATI
MYSORE
CHAMRAJNAGAR
MANDYA
1 MONTHLY CONSUMPTION IN K.W.H. PER CAPITA.
2 DAILY CONSUMPTION OF WATER IN GALLONS PER CAPITA.
3 NO. OF RADIOS
4 " " HOTELS
5 " " LATRINES
PER THOUSAND POPULATION
6 " " PATIENT BEDS
7 " " EDUCATIONAL INSTITUTIONS
8 NO OF POST OFFICES
9 " " BANKS
10 " " PICTURE HOUSES
PER TEN THOUSAND POPULATION
DECAGON OF STATE AVERAGES
ABOVE STATE AVERAGE
NO DATA
BELOW STATE AVERAGE
N.S.

FIG. 13

FIGURES 12 AND 13: URBAN SERVICES AND AMENITIES

Source:

Data collected from the records of the town municipalities and other departments concerned and by field enquiry.

Method:

This is an attempt to map quantitatively the availability of urban services and amenities in the sample towns and cities. The diagrams show the degree of attainment of 10 selected services, measured along the radii of a somewhat star-shaped symbol, centred over each town. The size and form of the symbol are taken as a basis for comparative evaluation. The diagrams indicate the absolute deviations from the state average (above and below) represented by the decagon.

Advantage:

(i) The main advantage is that different services and amenities could be represented in one diagram.

(ii) A comparative evaluation of situation in urban services and amenities between towns and one region and the other is possible since the scale for each element remains the same for all the diagrams.

(iii) Contiguous areas with similar service situation, as suggested by the similarity of shapes of symbols and their distribution, are clearly brought out.

Limitations:

(i) Scale along the radii is arbitrary, hence, a change in the scale changes both the size and shape of the symbol.

(ii) The units of measurement along the radii are different, e.g., in gallons for water, absolute number for hospitals, schools, hotels, etc., and units for electricity. These different units need standardisation, and should also be weighted. Some of the services could also be measured in a better manner e.g., hospitals measured in beds, and schools by the number of children.

All the diagrams are lop-sided; only that of Mysore is nearer to a symmetrical form, which can be taken to indicate, more or less, what a city is providing now for its citizens, in the shape of different services and amenities, compared with those provided by small towns. Fig. 13 clearly indicates that there are contiguous areas with similar service-situations, suggested by the similarity in the shape of the symbols. In the north-eastern area, the symbols of Balki, Aland and Shahabad have the same shape, that of a spearhead, and suggest that, excepting for conservancy, all other services and amenities including basic items like electricity and protected water supply are very limited, or completely absent. Likewise, in the north-west, protected water-supply, hospital and educational facilities are inadequate. Even Belgaum, a lakh city, does not have protected water-supply, though a scheme to provide it is now in course of execution. The service situation is also unsatisfactory in the towns of the northern Coastal Region. In the north-west, between Belgaum and Athani, all towns excepting Borgaon and Kudchi, have electricity but not protected water supply. Towns like Talakad, Nandagod, and Komadoli have only hotels and schools, and not any other service or amenity.

Hotels and educational institutions are present in all the 54 sample towns and cities included in investigation, while 38 do not have protected water-supply. There is neither electricity nor protected water-supply, the two basic public utility services, in 19 towns, i.e., 33 per cent of the sample. There are more unelectrified towns below the population size of 10,000, and this is taken as the economic limit of electrification. Towns, with less than 10,000 population are treated as not having enough load-density[1]. Then the regions of small towns and townships like the Malnad, the north-Coastal Region and the east-central-South Maidan prove to be uneconomical for urban electrification, at present.

The number of hospitals varies from one in the small and even some of the medium-sized towns to 14 in Belgaum, a lakh city. Bhadravati, an industrial and a class III town and Arsikere a commercial, medium sized town, have 4 hospitals each. Bijapur, a class II city and Athani, a medium-sized town, each have 4 hospitals. Nearly 70 per cent of the sample towns have only 1 hospital in a town, total number of beds varying in each from 4 to 250. Shimoga has only one hospital, but with 250 beds. Nipani has three hospitals but with only 10 beds in all. It is difficult to generalise on the relation between the size of a town and the number and strength of hospitals, but this much can be said, that small and medium sized towns do not have adequate hospital facilities. The next equally important productive and central service is education. As already observed, every town has at least one institution, but strictly speaking, it is the type of educational institution that has, and shall have some relation to the size and function of a town.

One generalisation can be drawn from our sample enquiries, namely, that the District head-quarters and the cities have in general, better educational facilities than the small towns. The number of educational institutions in each town varies from 1 in Kinhal, a small town to 137 in Mysore.

The number of hotels and picture houses reflects altogether a different aspect of the status of a town. The relation we find here is: cities and major towns have greater number of hotels and picture houses[2]. Mysore has the largest number of hotels (384) and picture houses (12), Belgaum ranking next with 266 hotels and 9 picture houses. Some small and

[1] Second Five Year Plan, p. 340.

[2] Many of our small towns and townships do not have permanent picture houses (cinemas), and probably once a year, a touring tented cinema camps as it were, for 3 or 4 months, while in some towns like Nelamangala, there are tented cinemas on a more permanent basis. Bagepalli, an agricultural township has a permanent picture house but is open only for a few months in the year, after the harvesting period, when, to quote the proprietor's words, the people, mostly agriculturists, will be in a mood to attend a cinema, only if they had a good harvest.

medium-sized towns have larger number of hotels and picture houses, for their size, in which case the inference is that such towns are transit or redistribution centres with large floating population or serve a large population who make short visits by bus etc. Udipi with its 113 hotels and 5 picture houses belongs to the group as also Sagar having larger number of hotels (65) for its size.

Now we shall examine the water-supply position in towns. This should be treated as a special problem. As mentioned already, nearly 70 per cent of the sample towns do not have protected water supply. Even in the capital city of the State, which also happens to be an all-year health resort, each resident is not assured of his minimum daily quota of water. If the minimum daily per-capita of water supply is 20 gallons, in Bangalore, the supply is only 12 or 13 gallons, in Mangalore, 15 gallons, in Bellary ridiculously low 4 and in Davangere only 8. Out of the 14 towns from the sample, having protected water supply, only Mysore reaches the minimum limit of 20 gallons, closely followed by Shimoga. Probably of all the towns in the State, the sugar-factory town of Mandya is in an enviable position, supplying 25 gallons per capita, tapping the ninth distributary of the Maddur branch of Visveswaraya Canal. In contrast to this, in Mandya town proper, the per capita supply is only 12 gallons.

There appears to be an inverse relation between the size of a town and per capita water supply to its resident. A resident of Bagepalli has a higher per capita consumption than one in the cities like Davangere and Bellary or even a major town like Chikballapur. Even in the cities, queues and clusters of women-folk with pots and vessels near the street pipes are not an uncommon sight. To spend an anxious and sleepless night to get a pot of water is not unusual. Many towns are unable to solve the problem of water-supply partly because of their limited financial resources, and in some cases, also because of their situation on a watershed, which makes any project costly. There are about 20 towns situated on a water-shed: Chikballapur, a sample town is an example.

Nearby streams or sub-surface water, 100 to 150 feet deep, and in some cases, tanks are the chief sources of water supply to towns. In the case of towns without protected water supply, wells are the main source. Puttur, a medium-sized town has 20 public wells and 1000 private wells. Even where there is protected water supply, it is supplemented by wells.

One consequence of high urban-growth would be a drain on sub-surface water in the vicinity of towns. For a town of just above 20,000 population (Chikballapur), three bore-wells pump 2700 gallons per hour per 18 hours-day, and yet each resident gets only 4 gallons, one-fifth of the recognised desirable minimum. The town authorities decided to sink 10 more bore-wells. To supply the absolute minimum quota of 16 gallons, at least 3.2 lakh gallons per day should be pumped. The urban population in the whole state then, needs an absolute minimum of 712 lakhs gallons per day, on the present standards of living conditions in towns. When tanks are the source of water supply for a town, the problem of competitive use between agricultural and urban needs has to be faced. If the Sreenivasa Sagara tank is to be the source of water-supply to Chikballapur, the agricultural fields under the tank are deprived of at least 3.2 lakhs of gallons per day. Thus the problem of water supply to towns becomes regional and interdependent with the problem of irrigation where tanks, streams and channels are involved.

Some critical limits of population size in relation to some services and amenities can be recognised from the above study (Table 7). Towns with less than 10,000 impose limitations arising from small size, for the development of electricity, and permanent picture houses, and less than 7,500, for the development of banking facilities. Most of the townships do not have hospital facilities.

TABLE 7: URBAN SIZE, SERVICES AND AMENITIES

name of the town	type	population	hotels	education	hospitals	banks	permanent picture house	administration	electricity	water supply
1. Mysore	I's	244,323	=	=	=	=	=	=.	=	=
2. Mangalore	I's	117,083	=	=	=	=	=	=.	=	=
3. Belgaum	I's	102,705	=	=	=	=	=	=.	=	*
4. Bellary	I's	70,322	=	=	=	=	=	=.	=	=
5. Bijapur	I's	65,734	=	=	=	=	=	=	=	=
6. Davangere	I's	56,018	=	=	=	=	=	/	=	=
7. Shimoga	I's	46,524	=	=	=	=	=	/	=	=
8. Bhadravati	Ii	42,451	=	=	=	=	=	/	=	=
9. Tumkur	I's	35,999	=	=	=	=	=	=.	=	=
10. Nipani	Ib	24,325	=	=	=	=	=	*	=	=
11. Ilkal	Ii	20,747	=	=	=	=	=	*	=	*
12. Udipi	I's	20,451	=	=	=	=	=	/	=	*
13. Chikballapur	I's	20,219	=	=	=	=	=	/	=	=
14. Kollegal	Ib	18,980	=	=	=	=	=	/	=	*
15. Gokak	B	17,694	=	=	=	=	=	/	=	*
16. Athani	I'a	17,089	=	=	=	=	=	/	=	*
17. Shahabad	Ii	16,550	=	=	=	=	=	*	*	*
18. Haveri	I's	16,470	=	=	=	=	=	/	=	*
19. Chamarajnagar	I's	16,040	=	=	=	=	=	/	=	*
20. Aland	Ib	15,607	=	=	=	*	=	/	*	*
21. Arsikere	Ib	14,390	=	=	=	=	=	/	=	=
22. Sagar	I's	12,537	=	=	=	=	=	/	=	*
23. Talikote	I'a	10,154	=	=	=	=	=	*	*	*
24. Nargund	Ia	9,573	=	=	=	*	*	/	=	*
25. Hukkeri	Ia	9,455	=	=	=	=	*	/	=	*
26. Rabkavi	Ii	9,136	=	=	=	=	=	*	=	*
27. Gokaran	I'a	9,024	=	=	=	=	*	*	*	*
28. Ron	Ia	9,978	=	=	=	=	*	/	*	*
29. Kudchi	Ia	8,608	=	=	=	=	*	*	*	*
30. Haliyal	I'a	8,184	=	=	=	=	*	/	*	*
31. Mulgund	Ia	7,924	=	=	=	=	*	*	*	*
32. Bannur	I'a	7,585	=	=	=	*	=	*	=	*
33. Bhalki	I's	7,458	=	=	=	*	*	/	*	*
34. Gubbi	B	7,145	=	=	=	*	=	/	=	*
35. Hadagalli	Ia	7,126	=	=	=	*	*	/	*	*
36. Manki	Ia	7,073	=	=	=	*	*	*	*	*
37. Borgaon	Ia	6,441	=	=	=	*	*	*	*	*
38. Gogipet	Ia	6,436	=	=	=	*	*	*	*	*
39. Kustagi	Ia	6,082	=	=	=	=	*	/	*	*
40. Honnali	I'a	5,883	=	=	=	*	*	/	=	*
41. Talkad	Ia	5,872	=	=	*	*	*	*	=	*
42. Majali	Ia	5,861	=	=	*	*	*	*	*	*
43. Channarayapatna	Is	5,783	=	=	=	*	=	/	=	=
44. Tumminkatti	Ii	5,688	=	=	=	*	*	*	*	*
45. Rajeswar	Ia	5,517	=	=	=	=	*	*	*	*
46. Nyamati	B	5,457	=	=	=	*	*	*	=	=
47. Nandgod	I'a	5,356	=	=	*	=	*	*	*	*
48. Kinhal	I'i	5,175	=	=	*	=	=	*	*	=
49. Ajjampur	I'a	4,817	=	=	*	*	*	*	=	*
5p. Periyapatna	Ia	4,778	=	=	=	=	*	/	=	*
51. Pavagada	Ib	4,480	=	=	=	=	*	/	=	*
52. Konanur	B	3,734	=	=	=	*	*	*	=	=
53. Kamadolli	Ia	3,472	=	=	*	*	*	*	*	*
54. Bagepalli	Ia	2,914	=	=	=	*	=	/	=	=

Headquarters : District=., Taluk/; Services and amenities : available=, unavailable*; Critical limit—.

TABLE 8: URBAN HIERARCHY

Based on Services and Amenities

	HOT.	ED.	HOSP.	B.	PH.	A.	ELY.	W.	
1. Bangalore									—— 1st order
2. Mysore	=	=	=	=	=	=	=	=	—— 2nd order
3. Bellary	=	=	=	=	=	=	=	=	
4. Bijapur	=	=	=	=	=	=	=	=	
5. Mangalore	=	=	=	=	=	=	=	=	
6. Davangere	=	=	=	=	=	=	=	=	
7. Shimoga	=	=	=	=	=	=	=	=	
8. Bhadravathi	=	=	=	=	=	=	=	=	
9. Tumkur	=	=	=	=	=	=	=	=	
10. Chikballapur	=	=	=	=	=	=	=	=	
11. Arsikere	=	=	=	=	=	=	=	=	
12. Nipani	=	=	=	=	=	*	=	=	—— 3rd order
13. Belgaum	=	=	=	=	=	=	=	*	
14. Udipi	=	=	=	=	=	=	=	*	
15. Kollegal	=	=	=	=	=	=	=	*	
16. Gokak	=	=	=	=	=	=	=	*	
17. Athani	=	=	=	=	=	=	=	*	
18. Haveri	=	=	=	=	=	=	=	*	
19. Chamarajnagar	=	=	=	=	=	=	=	*	
20. Sagar	=	=	=	=	=	=	=	*	
21. Channarayapatna	=	=	=	*	=	=	=	=	
22. Bagepalli	=	=	=	*	=	=	=	=	
23. Ilkal	=	=	=	=	=	*	=	*	—— 4th order
24. Hukkeri	=	=	=	=	*	=	=	*	
25. Rabkavi	=	=	=	=	=	*	=	*	
26. Gubbi	=	=	=	*	=	=	=	*	
27. Periyapatna	=	=	=	=	*	=	=	*	
28. Pavagada	=	=	=	=	*	=	=	*	
29. Aland	=	=	=	*	=	=	*	*	—— 5th order
30. Nargund	=	=	=	*	*	=	=	*	
31. Ron	=	=	=	=	*	=	*	*	
32. Haliyal	=	=	=	=	*	=	*	*	
33. Bannur	=	=	=	*	=	*	=	*	
34. Kustagi	=	=	=	=	*	=	*	*	
35. Honali	=	=	=	*	*	=	=	*	
36. Nyamati	=	=	=	*	*	*	=	=	
37. Kinhal	=	=	*	=	=	*	*	=	
38. Konanur	=	=	=	*	*	*	=	=	
39. Shahabad	=	=	=	=	=	*	*	*	
40. Talikote	=	=	=	=	=	*	*	*	
41. Gokaran	=	=	=	=	*	*	*	*	—— 6th order
42. Kudchi	=	=	=	=	*	*	*	*	
43. Mulgund	=	=	=	=	*	*	*	*	
44. Rajeswar	=	=	=	=	*	*	*	*	
45. Bhalki	=	=	=	*	*	=	*	*	
46. Hadagalli	=	=	=	*	*	=	*	*	
47. Manki	=	=	=	*	*	*	*	*	—— 7th order
48. Borgaon	=	=	=	*	*	*	*	*	
49. Gogipet	=	=	=	*	*	*	*	*	
50. Talkad	=	=	*	*	*	*	*	*	
51. Tumminkatti	=	=	*	*	*	*	=	*	
52. Ajjampur	=	=	*	*	*	*	=	*	
53. Nandgod	=	=	*	*	*	*	*	*	
54. Kamadolli	=	=	*	*	*	*	*	*	—— 8th order
55. Majali	=	=	*	*	*	*	*	*	

Water Supply = W; Permanent Picture House = PH; Education = ED; Banks = B; Administration = A; Hospitals = HOSP; Electricity = ELY; Hotels = HOT.

B. CLASSIFICATION OF URBAN CENTRES

An attempt is made to classify urban centres based on (i) urban services and amenities, (ii) bus service frequency and (iii) size and character of urban fields. Studies of this type may contribute to systematics in urban geography, but there is also the applied side. This classification helps in sieving out towns and regions with unsatisfactory provision of services and amenities, to which priority should be given in a plan for the improvement of urban services. A classification based on urban fields helps in delimiting local areas for regional planning, sometimes including a group of towns whose development should be planned as a whole. Another practical application of classification lies in providing a rational basis in the selection of Zonal Capitals.

Method of classification:

Eight orders or grades of urban centres are recognised. Strictly speaking, the eighth order is a sub-grade of the 7th order. If all the eight components (ref. Tables 7 and 8) selected for purposes of grading are present in a town, it is classified under the second order. Bangalore, by virtue of its size, function and administrative status, is ranked under the first order. The criterion for ranking is the presence or absence of the selected services and amenities, and not, in the present study, their adequacy or inadequacy. If an assessment of quality of different services were available, a more precise and refined classification could be attempted.

As observed already in the section on services, hotels and educational institutions are present in all the centres included in the sample, and hence are not found to be significant for ranking. Second order towns have all the eight components while the eighth order towns do not have six out of the eight. In the 3rd order one component is absent, mostly protected water supply, in the 4th, two components are absent, 3 in the 5th, 4 in the 6th, and 5 in the 7th order. To decide the ranking, first a test table was prepared, with towns arranged in descending order of population size, to find out the frequency-order of the selected services, and then rearranged in the order of frequency to get a better tabulation to facilitate ranking. Table 7 is a rearranged one, on the basis of which Table 8 is prepared.

There are only 10 towns out of the 55 selected for study, which can be ranked under second order. In all the lower orders one or more services are absent. The situation can be considered as highly unsatisfactory in the 6th, 7th and 8th orders i.e., in 27 per cent of the sample towns, where protected water supply, electricity, banking facilities and permanent picture houses are not available. In nearly 11 per cent of the samples, hospital facilities are also not available.

Fig. 14 and Table 9 show the distribution of sample towns of different orders in the five sub-regions of the State.

TABLE 9

	1	2	3	4	5	6	7	8
Coastal	–	1	1	–	–	1	1	1
Malnad		–	1	–	2	–	1	–
Semi-Malnad		2	–	1	1	–	1	–
Northern Maidan	–	3	5	3	8	5	3	1
Southern Maidan	1	4	4	2	1	–	1	–
grade:	satisfactory		unsatisfactory		very unsatisfactory			

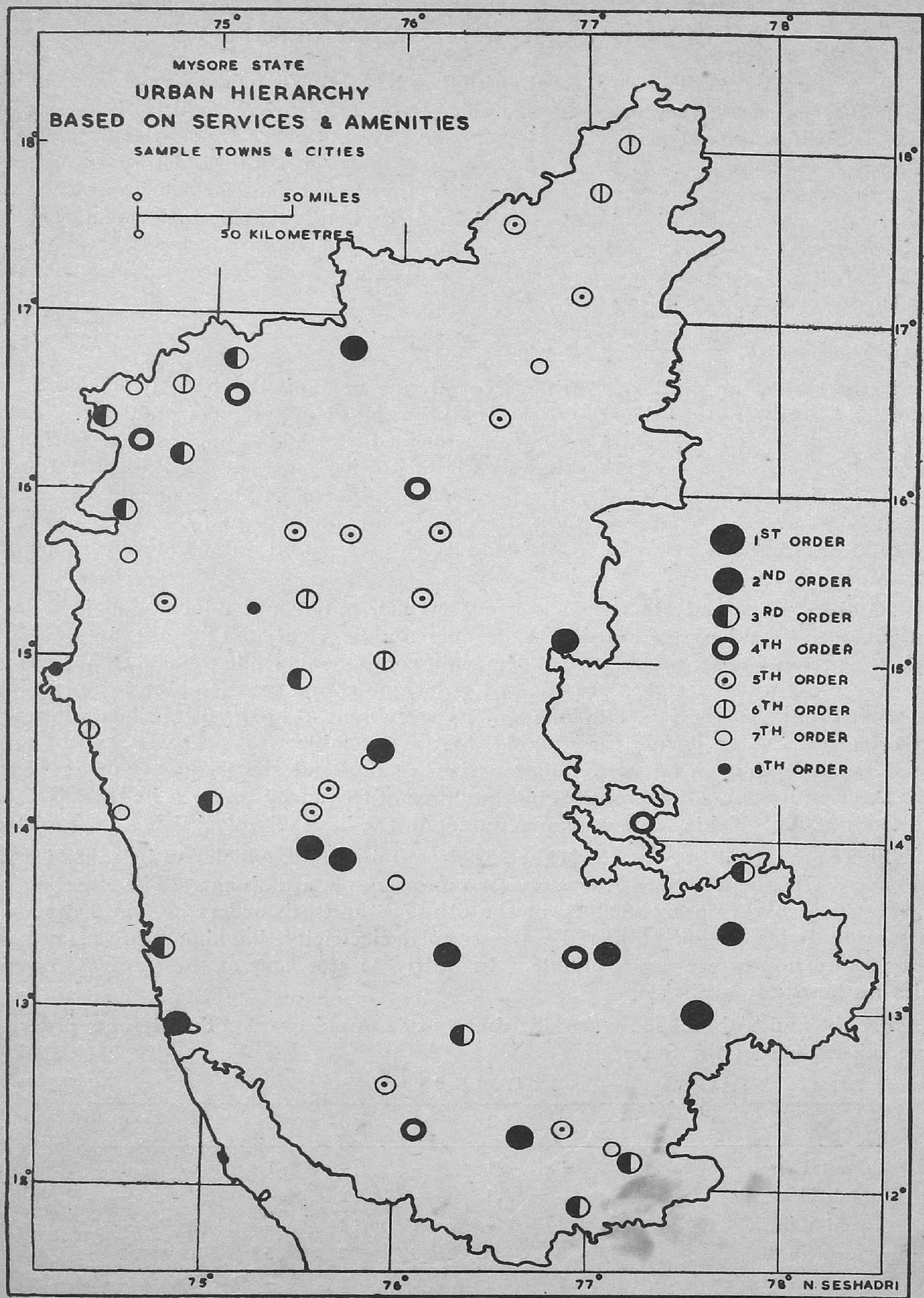
MYSORE STATE
URBAN HIERARCHY
BASED ON SERVICES & AMENITIES
SAMPLE TOWNS & CITIES
50 MILES
50 KILOMETRES
1ST ORDER
2ND ORDER
3RD ORDER
4TH ORDER
5TH ORDER
6TH ORDER
7TH ORDER
8TH ORDER
75°
76°
77°
78°
18°
17°
16°
15°
14°
13°
12°
N. SESHADRI

FIG. 14

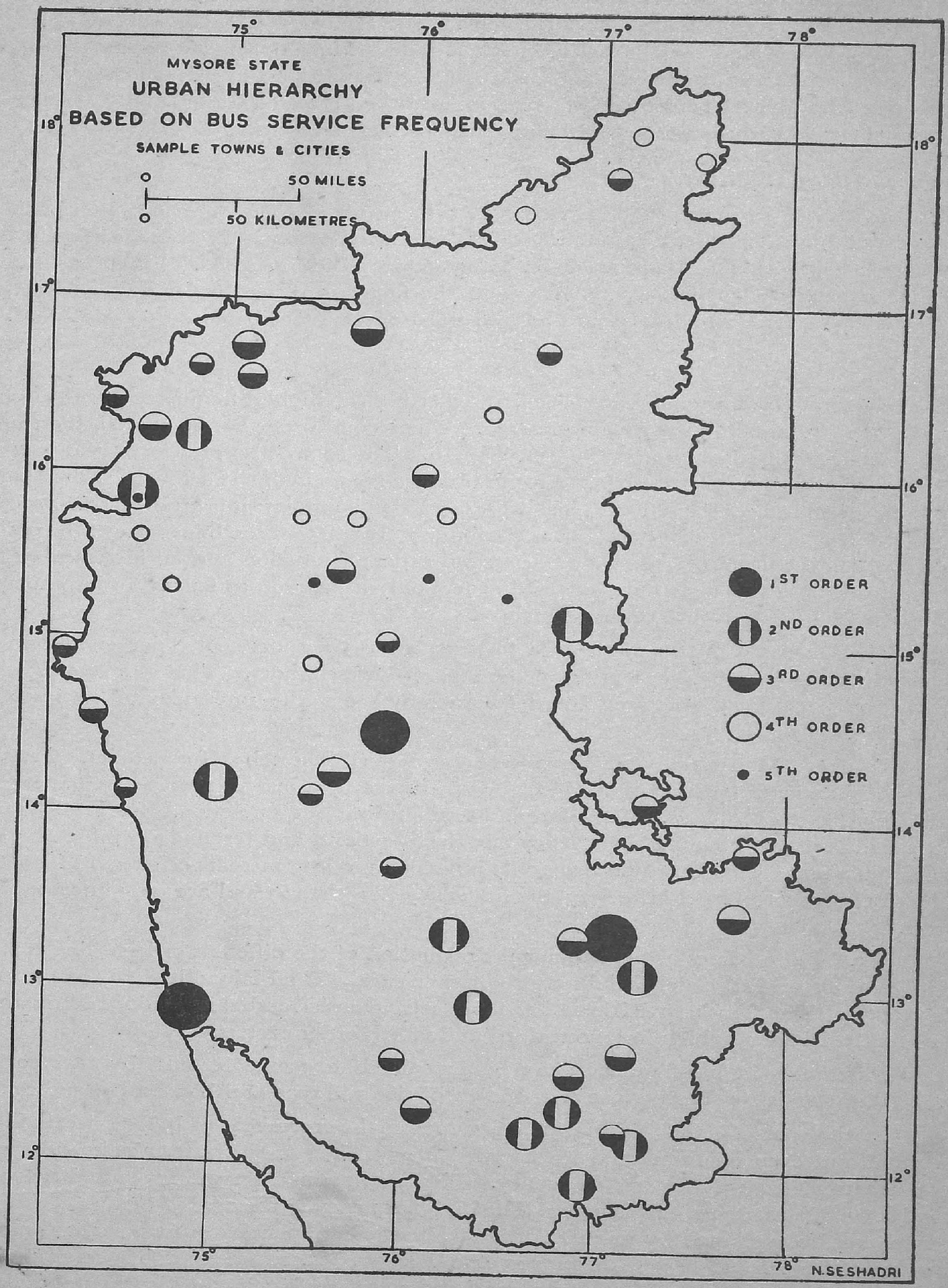
MYSORE STATE
URBAN HIERARCHY
BASED ON BUS SERVICE FREQUENCY
SAMPLE TOWNS & CITIES
50 MILES
50 KILOMETRES
1ST ORDER
2ND ORDER
3RD ORDER
4TH ORDER
5TH ORDER
75°
76°
77°
78°
18°
17°
16°
15°
14°
13°
12°
N.SESHADRI

FIG. 15

The main point emerging from the table and Fig. 14 is that in every region urban services and amenities are unsatisfactory. The Southern Maidan is better placed, while in the Malnad and the Coastal Region (excluding Mangalore), the services are most unsatisfactory. The Northern Maidan has a greater proportion of centres under 5th and 6th orders, i.e., a greater percentage of them do not have protected water supply, electricity and permanent picture houses. In 10 per cent, banking facilities are not available.

Bus service frequency (Fig. 15).

Bus service frequency and the status of the centre, as a bus junction, intermediary point, or a terminus, or all, are used for classification since a preliminary examination showed some correlation with the classification based on services and amenities. Excepting in few cases like Chikballapur, Bijapur and Belgaum, the first and second order towns based on bus frequency correspond with the second and third order towns based on services.

Method:

Five grades are recognised. The first order has the highest frequency in the sample i.e., between 100 and 140 services, both ways. The second order has 50 to 100, the third, 30 to 50, the fourth 16 to 30 and the 5th, 2 to 16. Towns are also graded on the basis of their status as bus-transport centres. Five grades are recognised. If a town is a bus junction, and a terminus, which will also be naturally a starting point, it is graded as first order. A junction implies that the bus centre has a tributary area to feed the bus traffic of the place. A town which is a terminus, is graded as second order; a junction and an intermediate or midway town on a through route, as third order; only a junction as fourth order and just a transit or mid-point as fifth order.

Grading based on the status of a town as a bus transport centre does not seem to be related to the frequency excepting in the case of lowest grades. Thus the centres with very low bus frequency (between 2 and 7 both ways) are the intermediate or midway centres also.

Tumkur, Mangalore and Davangere have the highest bus frequencies, Tumkur having the maximum in the sample (140). Tumkur is only a bus junction while Davengere is a junction, and a terminus. Mangalore is a terminus but not a junction. Sagar, Belgaum Bellary and Kollegal have high frequency and are junctions, and terminals, while Arsikere, Nelamangala and Channarayapatna are only junctions and intermediate centres. Mulgund, Kinhal, Borgaon and Angol have very low frequency (less than 7) and are only intermediate centres.

Fig. 14 also brings out the regional distribution of the different orders. The coastal region has only one first order and 3 second order centres. The Malnad has only one second order centre. The Southern Maidan has more second order and third order centres than the Northern Maidan, which has more third and fourth order centres.

Differences in bus-frequency can be explained to some extent by comparing Fig. 15 with the figure showing the distribution of size and type of urban centres and roads.

In the case of nodal cities and major towns, the frequency of bus service is high. The small and even medium sized towns particularly when they are terminals with peripheral location, have a low bus frequency. Bidar, a medium sized town and Bagepalli, a small town are examples of this type. The high frequency in the case of Nelamangala, for instance, can be explained by its junction and intermediate position on important through bus routes from Bangalore to Chitradurg and Hassan. More frequent bus services and greater number of centres of first and second order, as we find in the Southern Maidan, suggest daily population movements from country to town on a considerable scale.

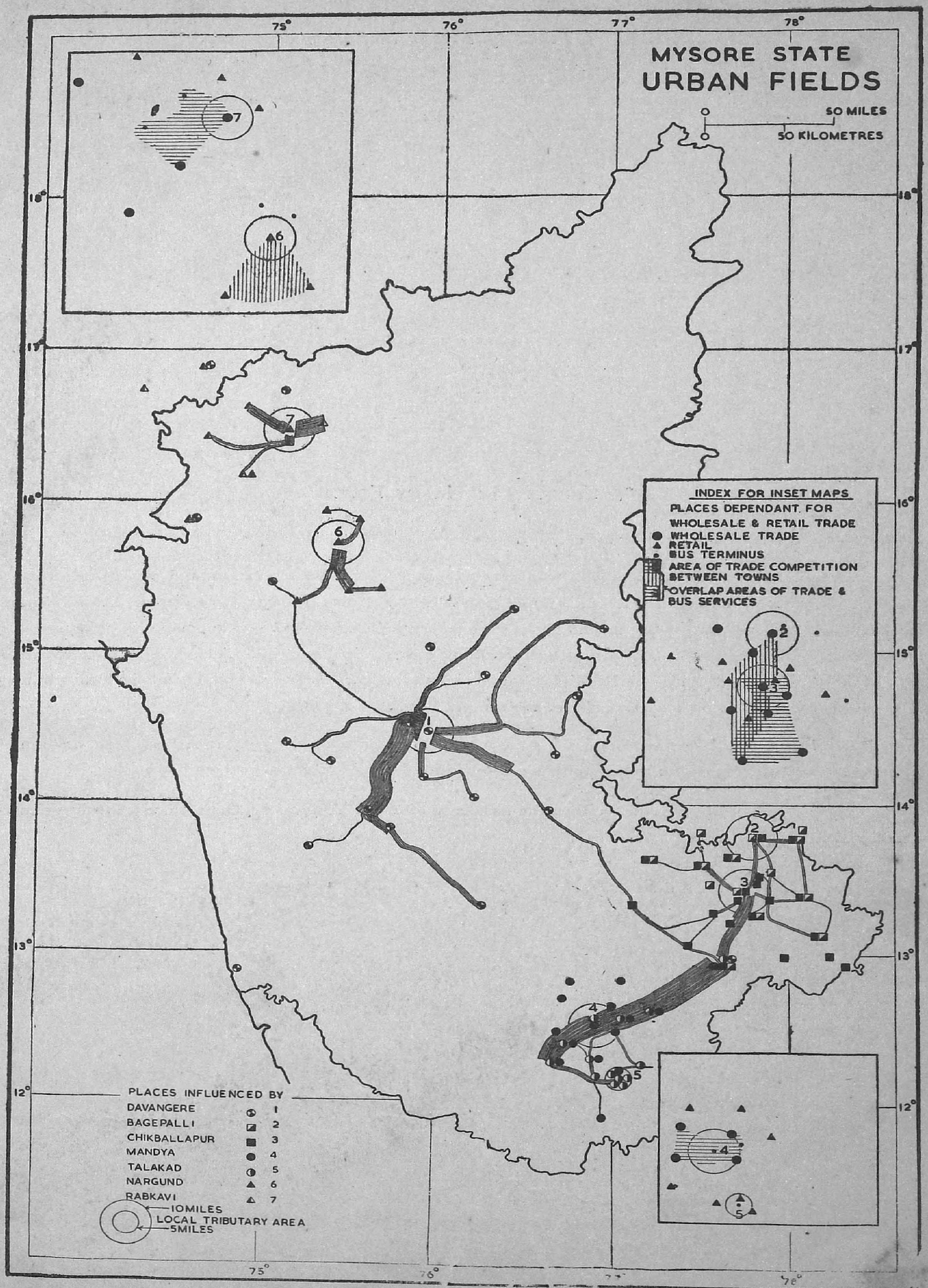
MYSORE STATE
URBAN FIELDS
50 MILES
50 KILOMETRES
INDEX FOR INSET MAPS
PLACES DEPENDANT FOR
WHOLESALE & RETAIL TRADE
WHOLESALE TRADE
RETAIL
BUS TERMINUS
AREA OF TRADE COMPETITION
BETWEEN TOWNS
OVERLAP AREAS OF TRADE &
BUS SERVICES
PLACES INFLUENCED BY
DAVANGERE 1
BAGEPALLI 2
CHIKBALLAPUR 3
MANDYA 4
TALAKAD 5
NARGUND 6
RABKAVI 7
10MILES
LOCAL TRIBUTARY AREA
5MILES
75°
76°
77°
78°
18°
17°
16°
15°
14°
13°
12°

FIG. 16

FIGURE 16 : URBAN FIELDS

Source: Data collected in the field by enquiry.

Method: Towns and villages with which the sample town has trade relations and bus service links are shown. The same symbol is used for the sample town and the centres belonging to its urban field. Centres, located outside the State, which are related to the regional centre, are not shown on the map unless they are very important to it. Bus frequency is shown by lines, each line representing two trips. A circle of 10 miles radius for each of the six towns and 5 miles for Talakad, a small agricultural town, is drawn to represent the local tributory area to the town, based on our enquiries in the sample towns.

The inset maps: The inset maps show the wholesale and retail trade centres and bus links or terminii by separate symbols. Areas and places of trade competition between towns are shown by shading.

Note: No attempt is made to draw the boundary of urban fields on the map, since it involves a more detailed field study.

Classification of Urban Centres

A model of urban hierarchy[1]

In our tentative model[2] of urban hierarchy for the Mysore State and its adjoining area (Fig. 16), we have envisaged regional capitals for the sub-regions, regional market centres for the crop regions, service and retail trade centres for the different tracts, and local market (shandy) villages. Apart from town localisation of central and commercial functions at selected places in different area levels, the envisaged scheme provides for a market place for all villages within a radius of 5 miles (walking distance)[3], retail and basic central services within 25 miles, and a wholesale market within 50 miles, to act as a collection and a distribution centre for the agricultural produce of the region. The proposed regional capitals are not separated by more than 200–250 miles distance (one night's train journey). The mode of movement by foot, bullock cart, bus and train have also been taken into account in ranking.

The Mysore State will have 7 regional capitals, 33 regional market and service centres and 85 retail trade and basic service centres. A hierarchic development on this model naturally involves the upgrading of a number of centres in service and market facilities, and also the improvement of regional/local accessibility in some cases. We should also fit in the present and the envisaged growth points.

Urban fields of seven sample towns[4] of different types and sizes are studied and mapped (Fig. 16). Wholesale and retail trade and bus service frequency and the extent of hinterland, are the three indexes selected to delimit the urban fields. No attempt was made to draw the boundary of the urban field on the map since it involves a more detailed study. A circle of 10 miles radius for each of the six towns and 5 miles for Talakad is drawn to represent the local tributary area to the town. Talakad has a smaller tributary area for two reasons: (i) because it is a small agricultural town and (ii) also because T. Narsipur, the taluk headquarters with better services is less than 10 miles from Talakad, as such, the neighbouring villagers would prefer to go to T. Narsipur.

Fig. 16 shows the towns and villages, with which the sample town has trade relations and bus service links. The same symbol is shown for the sample town, as well as the centres belonging to its urban field. Centres outside the State are not shown on the map, unless they are very important to the Regional Centre. Some of the towns like Davangere and even Chikballapur have trade connections with Bombay, Madras and even Calcutta, and such places naturally cannot be shown on the present map. Bus frequency is shown by lines, each line representing two trips. The inset maps show the wholesale and retail trade centres and bus-link or terminus by separate symbols. Areas and places of trade competition between towns are shown by shading. It should be mentioned in this connection that only local and regional trade areas are shown, where lorrry and bullockcart transport play an important part.

Three grades of intensity can be recognised within each urban field; first grade, the most intense, where wholesale trade, retail trade and bus frequency zones coincide; second grade, where two out of the three coincide, and third-grade, the fringe area where there is only one of the three. Davangere has the largest area under the first grade while Talakad does not seem to have developed any urban field as such, excepting for a small retail trade area.

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[1] I am obliged to L. S. Bhat for his assistance in working out the hierarchic model for the Mysore State.

[2] Strictly speaking a regional model of urban hierarchy cannot be divorced from a regional development model/plan of resources.

[3] Not identified on the map.

[4] 1. Davangere, 2. Bagepalli, 3. Chikballpur, 4. Mandya, 5. Talakad, 6. Nargund, 7. Rabkavi.

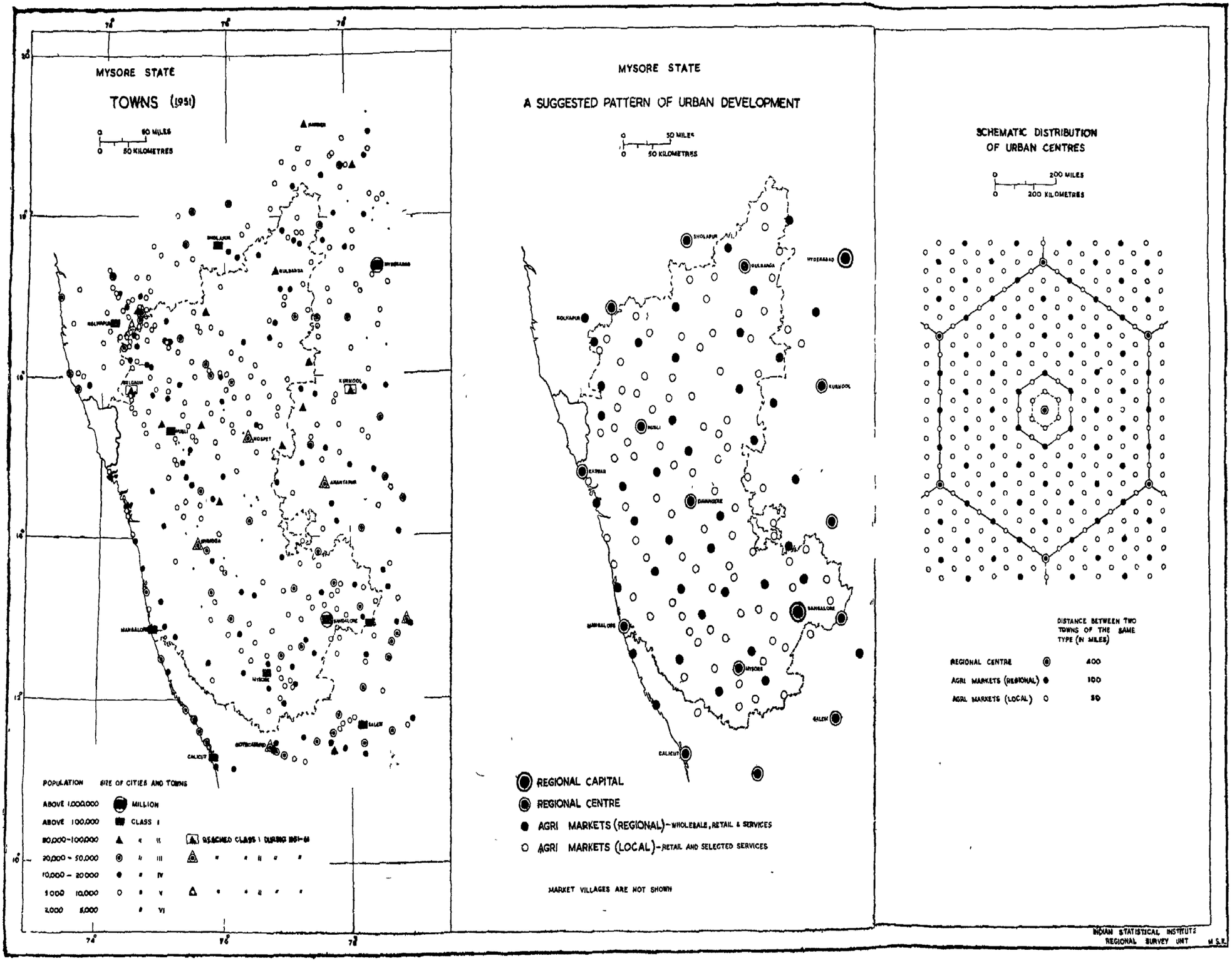

MYSORE STATE
TOWNS (1951)
0 50 MILES
0 50 KILOMETRES
POPULATION SIZE OF CITIES AND TOWNS
ABOVE 1,000,000 MILLION
ABOVE 100,000 CLASS I
100,000-100,000 II
20,000 - 50,000 III
10,000 - 20000 IV
5000 10,000 V
2,000 5,000 VI
RESCHED CLASS I DURING 1951-61
MYSORE STATE
A SUGGESTED PATTERN OF URBAN DEVELOPMENT
0 50 MILES
0 50 KILOMETRES
REGIONAL CAPITAL
REGIONAL CENTRE
AGRI MARKETS (REGIONAL)-WHOLESALE, RETAIL & SERVICES
AGRI MARKETS (LOCAL)-RETAIL AND SELECTED SERVICES
MARKET VILLAGES ARE NOT SHOWN
SCHEMATIC DISTRIBUTION
OF URBAN CENTRES
0 200 MILES
0 200 KILOMETRES
DISTANCE BETWEEN TWO TOWNS OF THE SAME TYPE (IN MILES)
REGIONAL CENTRE 400
AGRI MARKETS (REGIONAL) 100
AGRI MARKETS (LOCAL) 50
INDIAN STATISTICAL INSTITUTE
REGIONAL SURVEY UNIT

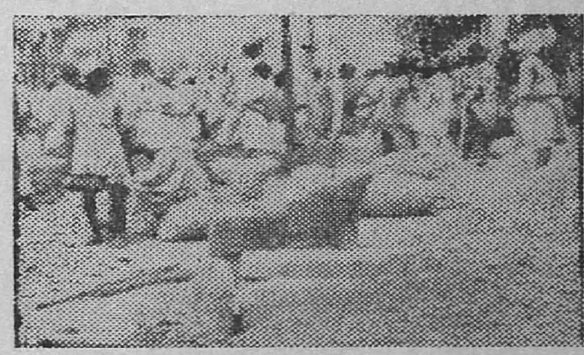
Fig. 17

The wholesale and retail trade areas and the bus service area do not always coincide, and their areal extents also differ. In the case of Davangere, all the three are fairly extensive, the wholesale trade area being the largest. The trade connections of Davangere extend of course as far as Bangalore, Mysore, Belgaum and Bellary. Its central location in the State, road and rail accessibility, industrial and commercial functions have enabled the city to build up an extensive trade area, both wholesale and retail. The city is a major collecting and distributing centre. Ragi, jowar, cotton, tobacco and groundnut are the important incoming commodities. Annually, nearly 4 lakh Bengal maunds of Ragi, (50 per cent from Tumkur), 6.6 lakh of groundnut (60 per cent from Jagalur), 2 lakh of cotton (chiefly from Hubli, and Bellary-Hospet cotton tracts) arrive into the Davangere regulated market. Byadgi and Shimoga are the main suppliers of chillies to Davangere; the most intensive trade area, both wholesale and retail, lies within a radius of 40 miles.

The retail trade area is larger than the wholesale trade area in the case of Chikballapur, Mandya and Bagepalli while the wholesale trade area of Nargund is larger than its retail trade area. Both the trade areas of Rabkavi coincide more or less.

In general, inward trade into the town consists of food and provisions, piece goods and toilet articles. Outward trade in these articles takes place on a comparatively larger scale in some centres like Mandya. Talakad depends on T. Narsipur or Mysore for all these consumer articles, and Chikballapur on Bangalore, while Bagepalli to a great extent depends on Chikballapur. As a consequence of this, Chikballapur is a redistributing centre.

Chikballapur is situated in the potato-onion tract, Mandya in the contact zone of rice, ragi and sugar cane, Rabkavi in the tract of onions and plantain gardens, and Nargund in the wheat-cotton tract. These different centres act as collection and distribution centres for the commodities of their respective tracts. The trading importance of the centre depends on the extent of its distributing area. Rabkavi collects onions and plantains from the surrounding villages chiefly to be sent to Kolhapur and Belgaum. Likewise, wheat and cotton collected in Nargund are sent chiefly to Hubli, Gadag and Gokak. In the case of Chikballapur (inset photo), potato and onions are distributed over a larger area. The total production of potato crop is estimated to be 30,000 cartloads a year, 60 per cent of which is consumed in Hassan and Chikmagalur areas, quite surprisingly, for seed purposes for planting in early monsoon. The commodities are also exported to Madras, Bombay, Calcutta and Vijayavada by train, and by lorries to Bangalore*.



Mandya, Chikballapur and Bagepalli are selected to illustrate the significance of overlaps in urban hinterlands. These are the areas of trade competition. The trade relations between Chikballapur, Bagepalli and Bangalore show that Bagepalli depends more on Chikballapur for consumer articles than on Bangalore, and on Hindupur in Andhra for commodities like groundnut. After the reorganisation of States, there seems to be some change in orientation. A number of small towns and villages between Mandya and Mysore depend more on Mandya than Mysore, since at least consumer articles are costlier in Mysore than in Mandya. Central services (schools and hospitals) can be commanded

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* Potato cultivation in Chikballapur area by K. Ranganatha Rao. The Mysore Agricultural Journal. Vol. 31, No. 1, 1956, p. 59.

at a lesser cost in Mandya than Mysore. Thus Mandya seems to be developing an independent urban field, out of the larger urban fields of Mysore and Bangalore. The urban field of Mandya more or less lies in the overlap-area of the extent of urban influence of Mysore and Bangalore (Fig. 16).

We can conclude: (i) that urban fields differ in extent, character and intensity, all the three being related to the population size, function and situation of the Regional Centre, (ii) when towns of equal or different rank are located closely, areas of competition develop, and (iii) all centres do not develop urban fields. For example, Talakad, a small agricultural town has not developed a significant trade area.

Based on the extent and intensity of urban field, and the quantum of trade handled at the Regional Centre, the following four grades are recognised:

I. Davangere
II. Chikballapur and Mandya
III. Bagepalli, Rabkavi and Nargund
IV. Talakad.

C. URBAN SPREAD*

Method:

Both qualitative and quantitative methods have been tried to map urban spread i.e., growth of the town on the ground. Where available, one-inch topographical maps of different dates were used. Before final mapping, tracings of the built up area of the town in selected years were examined in the light of knowledge of the town gained by field work. Mangalore and Mandya Field mapping involved the identification of the different parts of the town, in the field, and also on the town plan, with the help of the town 'Shanboag' (village accountant), municipal officers, and especially health inspectors who have an intimate knowledge of the town. Older citizens, born in the town, and the 'Shanboags' were very helpful in mapping the urban spread. Where the year of construction was inscribed on the houses, public offices, churches or schools, it was also used in delimiting areas belonging to different periods. To map and estimate the areas of new and future extensions, and ascertain the nature of the lands encroached upon by the built up area, field reconnaissance was undertaken, with the health inspector and sometimes with the town-Shanboag. A conference of the Shanboags of the villages adjacent to the town under study was also convened, and the Shanboags were instructed, before hand, to bring with them the records and maps of their respective villages. In some cases, the vice-chairman of the town municipality and the deputy tahasildar were also kind enough to be present at the meeting to give the benefit of their knowledge of the town.

Five periods of spread are recognised: (i) before 1900, (ii) 1900–1920, (iii) 1920–1950, (iv) after 1950 (new extensions), and (v) after 1957 (future extensions). Recorded information is available for these periods, which are found to be significant. For example, the area before 1900 mostly coincided with the original site of the village from which the town developed. It should be mentioned in this connection that most of the towns in the State, with the exceptions of mining or industrial towns, have developed from one or more villages. The area of the village site or sites was traced from the village maps available with the Shanboag or at the local taluk office. This was treated as the town area before 1900, subject to such local checking as possible. The period 1900–1920 was one of railway development, and some of the toposheets were printed after 1900 and before 1920. So these maps were used as base maps. As for the rcecent years, (1950 and after) the municipalities have fairly detailed recorded information.

After mapping the urban spread in different periods, the area under each period was calculated from the map by means of estimation from a count on transparent graph paper placed on the map.

The following discussion and analysis are based on Tables 10 and 11 and urban spread maps. The blighted areas as already pointed out in the section on functional zones are those areas of the town, shown as "before 1900 and 1920" on urban spread maps. We can generalise from the sample-town studies that no town, irrespective of its size and type, is without a blighted area. Mangalore, Gokak and Chikballapur have more than 50 per cent of their area under blight, including slums. It is doubtful whether the municipal authorities of the towns like Haveri and Pavagada with their limited financial resources could ever attempt to rehabilitate. In general the area before 1900 could be treated as blighted or even in the slum-stage. On this basis Gokak, a medium sized town and

* Seventeen towns were studied to draw generalisations, and the three towns given here (Figs. 18 and 19) are intended to serve as an illustration.

Tumminkatti, a declining small town have a large proportion of their areas (42 and 31 per cent respectively) under blight. Talakad and Haliyal have the smallest areas. Davangere, compared with the other towns, has a low proportion of its total area, (13 per cent) even if we include the area under extensive and numerous labour slums (2 per cent) which sprang up after 1920.

TABLE 10: URBAN SPREAD—PERCENTAGE OF TOTAL AREA

towns	area (in acres) in				total area (in acres)	potential* extension area (in acres)	percentage of potential area over 1960 area
	1900	1920	1950	1960			
Davangere	250	530	1,330	2,580	4,800	2,220	85.0
Mandya	110	210	a840	900	960	40	6.7
Haveri	215	354	467	505	960	455	91.0
Bellary	825	—	2,162	2,388	7,360	4,972	208.0
Tumminkatti	200	—	310	340	640	300	88.2
Mysore	1,207	2,120	4,037	4,605	9,235	4,630	100.4
Mangalore	480	3,000	4,280	4,987	5,107	120	2.6
Pavagada	34	82	146	177	186	9	5.1
Gadag	354	—	940	965	2,560	1,595	165.3
Belgaum	760	900	1,140	1,240	3,680	2,440	196.8
Haliyal	60	—	148	192	1,602	1,410	934.3
Gokak	198	252	—	406	474	68	16.6
Athani	120	180	—	867	870	3	0.3
Nipani	133	162	228	483	653	170	34.7
Nelamangala	60	—	120	150	544	394	262.6
Talakad	20	80	190	220	1,280	1,060	481.3
Chikballapur	—	730	1,220	1,290	1,440	150	11.6

In towns like Nelamangala and Halyal, the large potential extension area is because of their large municipal area, including the neighbouring village lands for octroi purposes.

TABLE 11: URBAN SPREAD—DECENNIAL AREAL GROWTH RATES

town	percentage decennial increase in area in			1900–1950	1900–1960
	1900–1920	1920–1950	1950–1960		
1. Davangere	46.0	36.0	94.0	40.0	47.5
2. Mandya	38.0	59.0	7.0	50.0	42.0
3. Haveri	28.3	9.6	8.1	16.8	15.2
4. Bellary	not available	not available	10.5	21.3	19.3
5. Tumminkatti	not available	not available	9.6	9.1	9.2
6. Mysore	33.0	24.0	14.0	27.5	25.0
7. Mangalore	150.0	13.0	17.0	55.0	48.0
8. Pavagada	55 3	21.2	21.3	33.9	31.6
9. Gadag	not available	not available	2.7	21.5	18.2
10. Belgaum	8.8	8.1	8.7	8.4	8.5
11. Haliyal	not available	not available	29.7	19.8	21.7
12. Nipani	10.0	12.5	111.0	12.0	24.0
13. Nelamangala	not available	not available	25.0	14.9	16.5
14. Talakad	100.0	33.5	16.0	57.0	49.0
15. Chikballapur	not available	19.0	6.0	not available	15.3

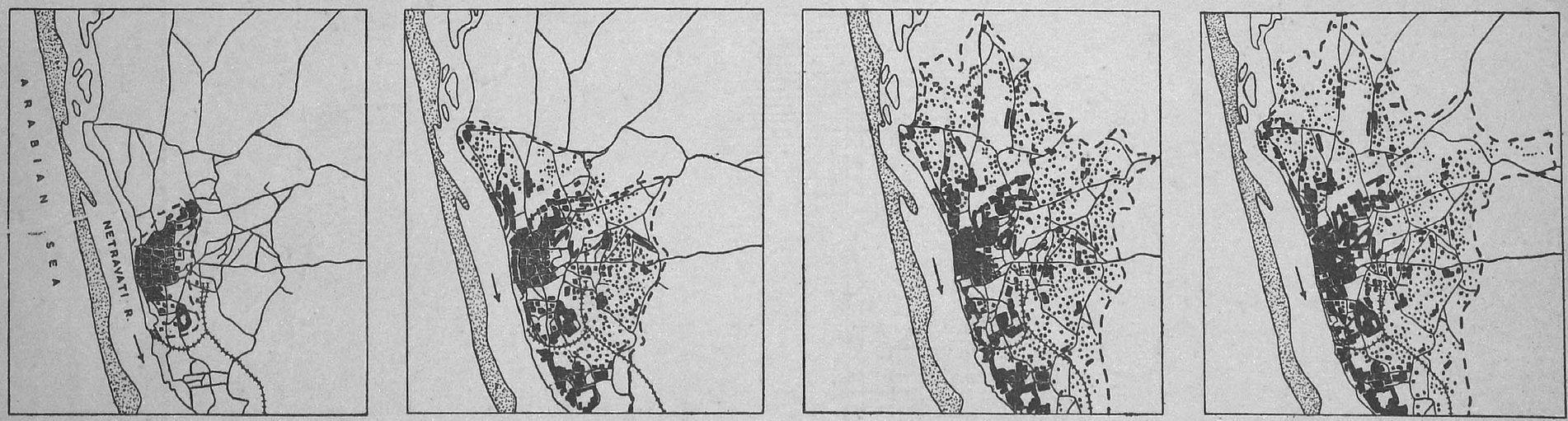
* The potential extension area figure is obtained by deducting the area in 1957–60 from the total town area. The area between 1957 and 1960 is actually the area earmarked by the municipality for future extensions.

PATTERNS OF URBAN SPREAD

0 1 MILE
0 1 KILOMETRE

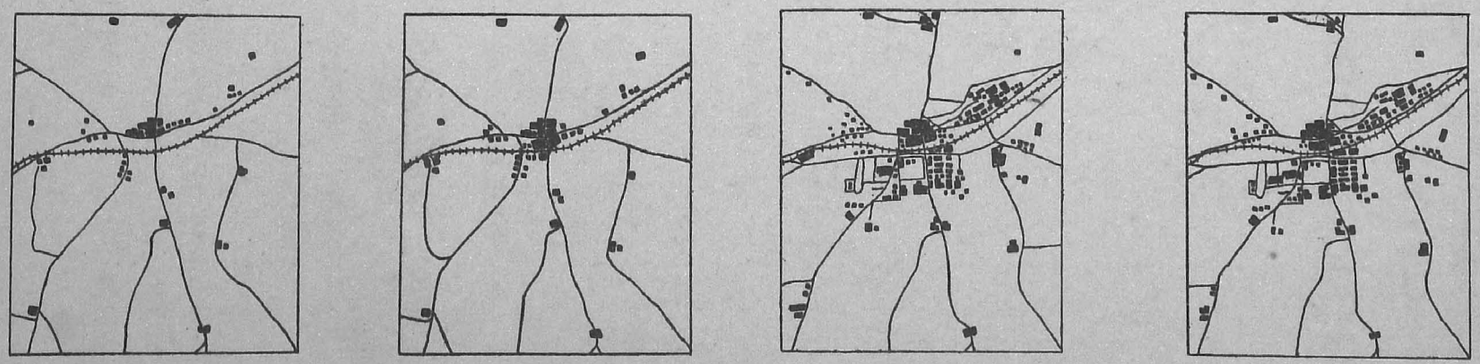
MANGALORE

1900 1920 ---- URBAN LIMIT 1950 1957



MANDYA

1900 1920 1950 1957



N. SESHADRI

Fig. 18

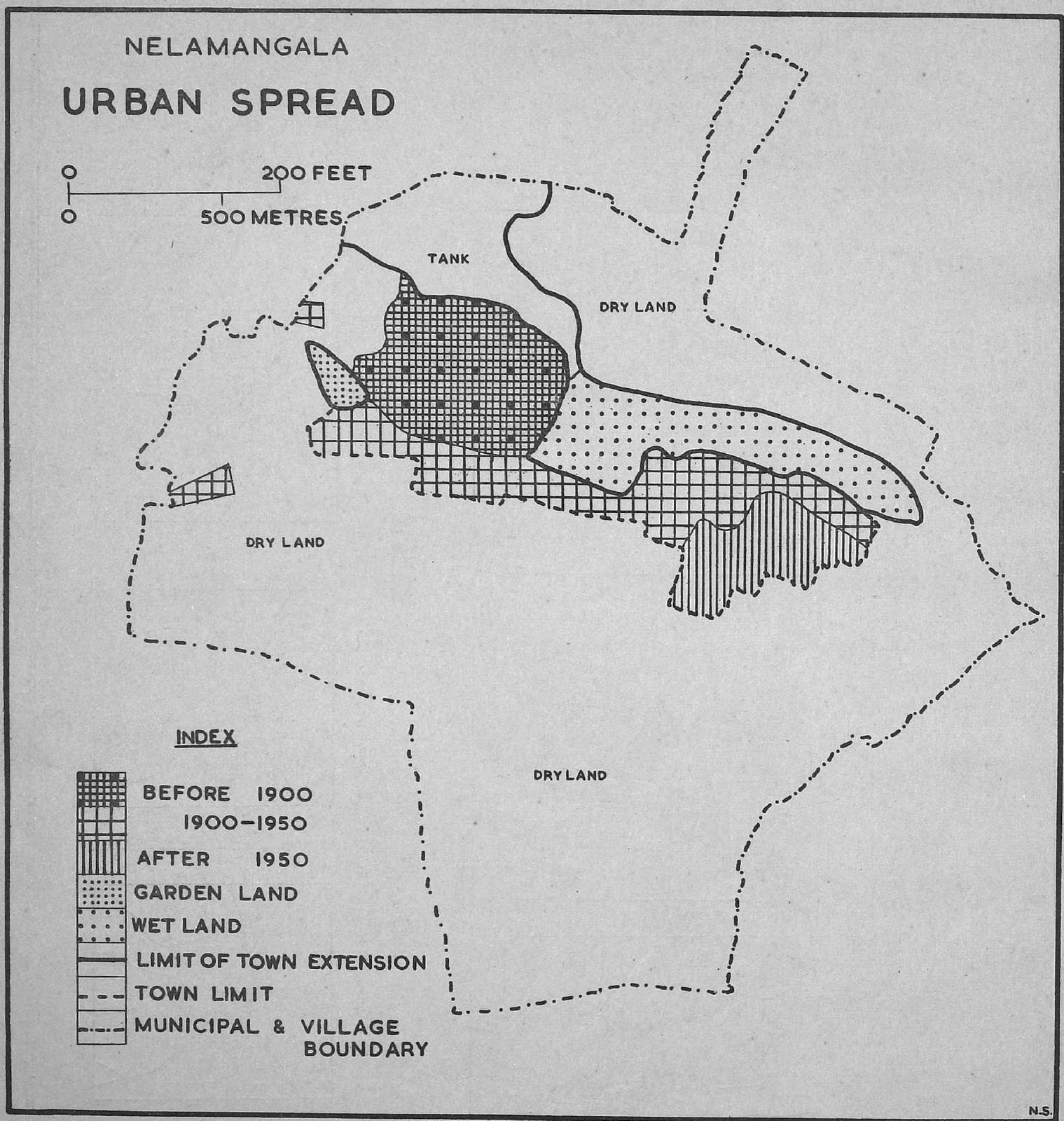

NELAMANGALA
URBAN SPREAD
200 FEET
500 METRES
TANK
DRY LAND
DRY LAND
DRY LAND
INDEX
BEFORE 1900
1900–1950
AFTER 1950
GARDEN LAND
WET LAND
LIMIT OF TOWN EXTENSION
TOWN LIMIT
MUNICIPAL & VILLAGE BOUNDARY
N.S.

Fig. 19

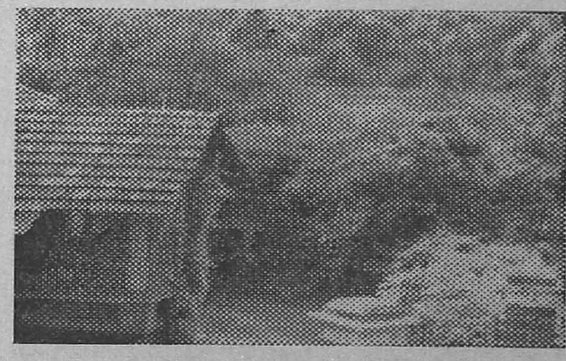
Urban Spread

It is very difficult to attempt a generalization on the rates of growth of town areas based on Table 11. Decennial growth rates examined in conjunction with the urban spread maps seem to be more helpful in interpretation. A few sample towns which have been studied in greater detail will be examined below. The very high growth rate of Mangalore between 1900 and 1920 (Fig. 18) suggests either high influx of population into the town or incorporation of the neighbouring village or villages into the municipal area. That it is not an influx in the case of Mangalore, but the extension of municipal limits is clearly indicated. In the case of Mandya, the period 1920–50 was one of rapid development, so there was encroachment on cultivated land. It was in this period that the sugar factory was started, and the town expanded south and west, across the railway line and along the roads, towards Hosahalli.

In the towns like Gadag, Belgaum, Haliyal, Talakad and Nelamangala, the spread promises to be very extensive after 1960. This is corroborated by the development of new extensions, and to some extent by the areas earmarked or included in these towns. In the case of Davangere, a large inward growth or infilling is in progress. In general, the extensive spread after 1950 can be explained by large immigration into the towns either because of development of factories, and service trades, as in Davangere, or colonisation by businessmen and retired officials as in Nelamangala. In Davangere, during the last 4 years, at least 4000 houses must have been constructed. Nearly 30 per cent of the total population of the city consists of labour mostly migrated from Bijapur, Bellary, Shimoga and even Madras and Nellore. In other towns like Nelamangala, which is now becoming an unofficial satellite of Bangalore, nearly 100 sites have been earmarked for house construction, and in some of them, construction has already started. We have also a few cases at the other extreme, where municipalities are finding it very difficult to induce house construction on the earmarked sites e.g., Haveri and Tumminkatti.

Characteristics and patterns of urban spread:

The urban spread maps reveal characteristic patterns of spread in different periods (i) before 1900, (ii) 1900–20, (iii) 1920–1950, and (iv) 1950–1957 and after. Figure 18 showing the patterns of spread for Mangalore and Mandya reveals the characteristics most strikingly. In the period before 1900 the pattern was one of concentration, the area more or less coinciding with the kernel, the original village. The period 1900 and 1920 was chiefly characterised either by incorporation of the neighbouring villages, (e.g. Mangalore) or spread to a limited extent, due to an increase in population because of improved communication facilities chiefly railway (e.g. Mandya). During this period, in medium sized towns, a pattern of concentration is visual. But in towns like Mangalore, outward spill occurred. It was during the period 1900 and 1920, that some of the wet lands in Mangalore were encroached upon by residential houses (inset photo). The encroachment on cultivated land does not seem to have been significant in this period, judging by the character of the land over which the towns developed*. During the period, 1920–1950, the spread took place in a haphazard manner, along and across road



* Field observation sometimes gave a general idea of the character of the land, as could be seen in some of the unbuilt pockets. Thin gravelly soils or saline waste lands in Mandya or Chikballapur, and uncultivated scrubby wastes to the south of Gadag, and between Gadag-Bagegeri, over which the town developed in the earlier periods, could be seen, only if one looks for them.

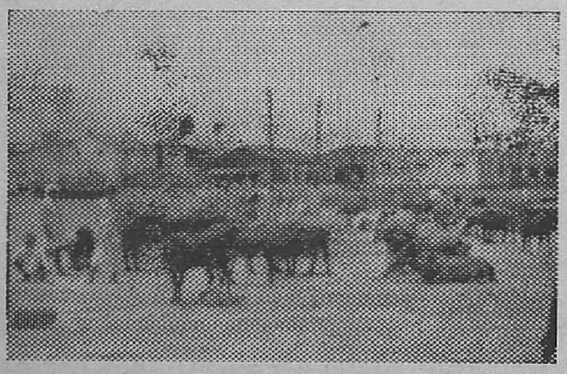
and rail communications, leaving out or thinly filling interstices. This period witnessed vigorous growth by the development of factories or central and public utility services. Infilling continued intermittently and haphazardly. This was the period of maximum encroachment on cultivated land, and naturally then, this was the period of rising land values, varying between 300 to 500 per cent in Mandya or Chikballapur, and 800 and even 1000 per cent in cities like Mangalore. Cities started 'exploding' as it were from 1940–50 onwards. In the case of cities like Mangalore, 'explosion' started along main radiating routes, while in the case of towns of smaller size, haphazard fringe development (may be well laid-out colonies, school zones or offices) took place. In Tumkur, Chikballapur and Mandya, the spread was both outwards and inwards. There was encroachment on cultivated lands of the adjacent villages, but not to the same extent as in the previous period. In this period again, as in the second period (1900–1920), neighbouring villages were incorporated into the town limits, chiefly for purposes of extension of conservancy service or electricity or protected water supply.

The pattern of spread seems to be basically influenced by the character of site and situation. In the case of Mangalore, the character of the site is complex, lying at the foot of low lateritic plateau dissected by a number of streams and streamlets. So the pattern of spread of Mangalore is complicated by the lateritic ridges and streams with wet lands, and the back water situation with Gurupur and Netravati rivers on the west and the south.

We shall here attempt to indicate the patterns of spread of towns which were originally wet-point settlements e.g. Nelamangala, Mandya, Tumkur, Davangere, Haveri and Chikballapur, since these have been studied in greater detail. It can be generalised that the perennial tank with its wet land and the communication lines (road and rail) are the two controlling factors in urban spread.

A town which was originally a wet point settlement cannot spread in all directions, due to the limits imposed by a perennial tank and the low-lying first class agricultural land irrigated by it. Whether a town spreads on all sides of the kernel as in Mysore, or Haveri, or only on two or three sides as in Mandya, Tumkur or Nelamangala, depends on (1) the siting of the kernel with reference to the perennial tank and the first class agricultural lands and (2) the alignment of the main or through routes of communication, road and/or rail. The large perennial tanks in Mandya, Tumkur and Nelamangala prevent these towns spreading across them.

Uncultivated or cultivated dry lands with prospects of sinking wells and a road nearby offer ideal areas for spread. As the town spreads, the neighbouring villages are incorporated into the municipal limits. During this period, the inliers of dry lands, (cultivated and uncultivated) get filled up in a haphazard manner. Thus the main town and the neighbouring village or villages get merged. Central services develop in the newly built up area. Strings of shops and houses develop at road crossings. Where first class agricultural lands intervene they are left as such, and in some cases like Mangalore and Tumkur, have been encroached upon to a certain extent. In Mangalore a residential area developed over nearly 300 acres of wet land, while in Tumkur, rice and oil mills developed in the north, over 20 acres of wet land just at the foot of the tank bund. In Haliyal, the town extended over a part of the rice land. Some of the town maps show pockets of vacant lands, which are dry tank beds. Davangere has a number of them. These tank beds are being used for different purposes. In Chikballapur, an old tank bed is now a park.



Cattle shandy in a tank bed

In Davangere, a tank bed is earmarked for small scale industries, a bazaar and timber yard. Another tank bed is used for a labour colony. A cattle shandy is held every week in one of the tank beds (inset photo).

With the urban spread maps, the one inch topo-sheets and the village records of the Shanboags of the town and its adjoining villages, an attempt has been made to calculate the loss of cultivated area, as a result of town development, during the period of 1920 to 1960, in seven sample towns. We find that nearly 20 per cent of the town area in Chikballapur consists of cultivated land encroached upon by town development, 34 per cent in Mandya, 35 per cent in Gadag, 63 per cent in Nelamangala, 37 per cent in Talakad, 54 per cent in Haliyal and 49 per cent in Haveri. Considering all the seven towns together, nearly 30 per cent (just over 1100 acres) of the total town area consists of formerly cultivated land, permanently lost as a result of urban spread, during the period 1920–1950. There is an indication that by 1950, 185 acres of cultivated land (nearly 4 per cent) will be converted to house sites or school zones, or other urban uses. Most of these areas have already been earmarked, and in some of them, construction has already started.

With the data available, it is difficult to project the probable future loss of cultivated land due to urban spread, but encroachment seems inevitable, whether in a small agricultural town with slow growth like Talakad or rapidly growing centres like Chikballapur, Mandya or Gadag. Even if there are extensive areas of flat or gently undulating waste lands, as in Bidar or east of Mangalore, the town does not develop easily in those areas, chiefly because of the problem of water supply.

Land values (Fig. 20):

Though data on the sale-values of the dry, wet and garden lands represented by horizontal, vertical and diagonal lines respectively were collected and mapped, only the sale values of the dry lands are discussed here, since in majority of towns, they are the potential areas for the future expansion of the town. Both the residents in the town and the municipal authorities seem to have recognised the value of first class agricultural lands, now, if not in the past, and in some of the towns steps are being taken to prevent encroachment of buildings or other urban uses on such lands. Likewise in every town, first class agricultural lands, if any, should be protected.

Fig. 20 shows that land-values are very high in the peri-urban areas of Mangalore Rs. 8000/- per acre, Kollegal Rs. 5000/-, and Channapatna Rs. 3000/-. Near the towns like Davangere, Nelamangala, Mandya and Bellary, the sale values vary between Rs. 1000/- and Rs. 2000/-. The high value of land in the peri-urban areas cannot always be associated with the high demand for it, due to the spread of the town, and it may be due to its high agricultural productivity, as in Kollegal. The land values are lowest near the towns like Rajeswar, Athani, and even Bijapur. Fig. 20 strikingly brings out that in the Northern Maidan (except in the north-western corner), and the north of the Coastal Region, sale-values of peri-urban land are the lowest in the State. Near Bagepalli, Pavagada, Shimoga, and even Bhadravati, the values are medium low (Rs. 500/-). In Malnad, nearer the towns like Mercara, the value is nearly Rs. 600/-.

There are sharp variations in the sale values, in different parts of a town, and also even within the peri-urban area, particularly in the newly developing fringes. In Hampankatta, the central and the most active business area in Mangalore, an acre of land costs one lakh of rupees, while in the new extensions, the value varies from Rs. 6000/- to Rs. 8000/-. In Davangere, the value of lands near the mill area is Rs. 4000/- per acre, 400 per cent more than the value of the lands in the developing fringes. In Nelamangala, the value of the peri-urban land, adjacent to the through road is Rs. 1000/-, while off the main road, say a few hundred yards away, it varies between Rs. 600/- and Rs. 800/-.

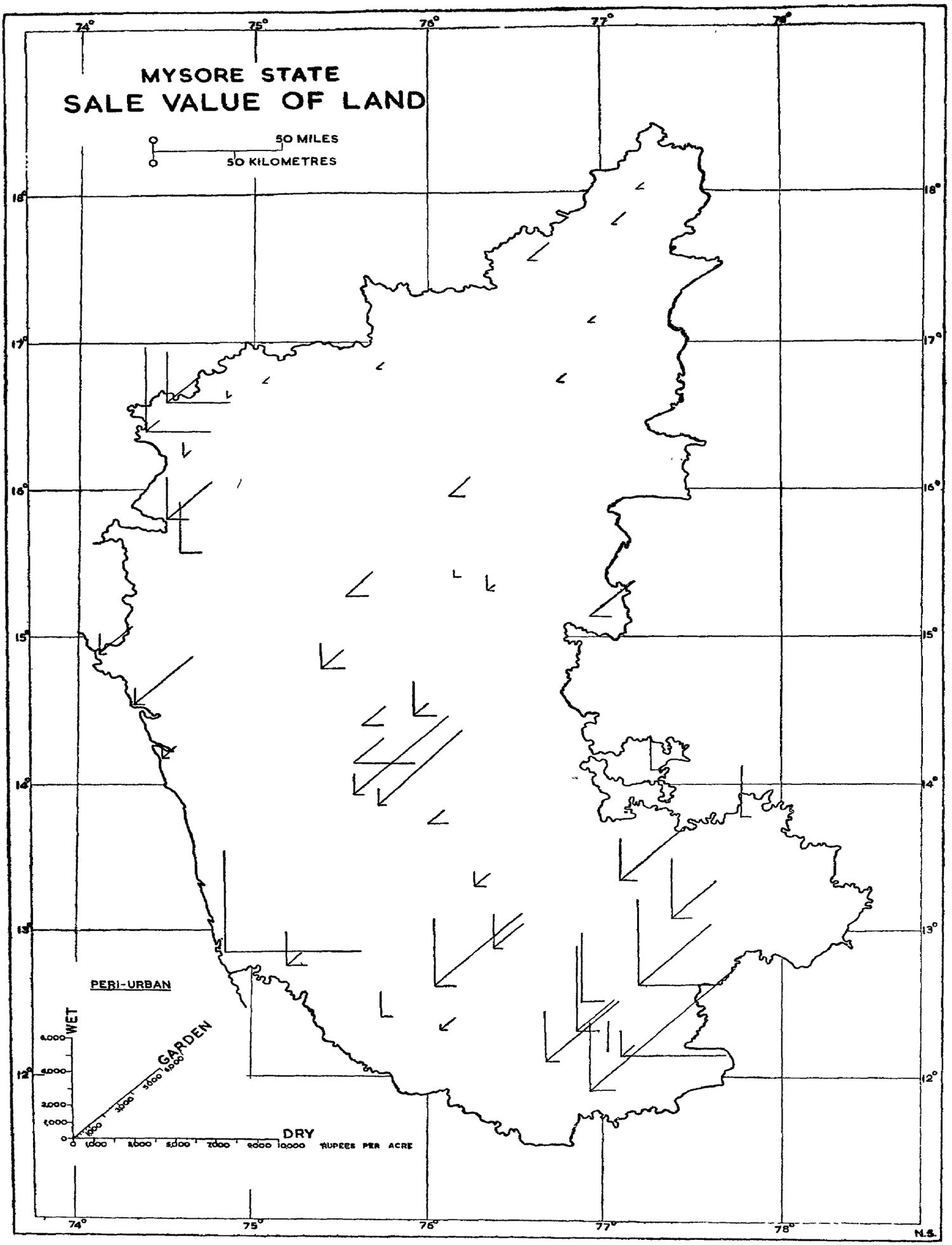

MYSORE STATE
SALE VALUE OF LAND
50 MILES
50 KILOMETRES
74°
75°
76°
77°
78°
18°
17°
16°
15°
14°
13°
12°
PERI-URBAN
WET
GARDEN
DRY
8,000
6,000
4,000
2,000
0
1,000
3,000
5,000
7,000
9,000
1,000
3,000
5,000
2,000
6,000
10,000
RUPEES PER ACRE
N.S.

FIG. 20

D. FUNCTIONAL* ZONES : (URBAN STRUCTURE)

Table 12 shows the area occupied by each of the six zones recognised, for 10 sample towns (see Figures 21 to 26).

Of all the functional zones, residential and mixed zones occupy the largest area, and Mangalore has nearly 77 per cent of the total town area, under this category. Mandya ranks next with 66 per cent. In the case of small agricultural towns like Talakad or Bagepalli, there is only a residential zone, and no other function occupies a contiguous and an extensive area. In Mangalore, Mandya, and Gadag, industrial zones occupy 900 acres (17.2 per cent of the total town area), 80 acres (8.3 per cent) and 100 acres (4 per cent) respectively. Belgaum has the largest administrative zone—510 acres (nearly 14 per cent) while Bagepalli, compared to its size has a large school-zone (8.3 per cent). This seems to be an anomaly. Belgaum does not seem to have developed a school zone as such. Mandya and Gadag have comparatively larger administrative areas. Belgaum is the only town with largest area under the commercial or trading zone. Davangere which is not included in the tabulation also has conspicuous zonation in industrial, commercial and community-service or administrative functions.

The functional zone maps (Figs. 21 to 26) show (i) the area occupied by each of the functions recognised, (ii) whether they are localised or scattered and (iii) their relative position. By a comparative analysis of these maps, the following inferences may be drawn: (a) there are extensive and contiguous residential areas but there is no part of a town which is not residential, and hence this function can be considered as least localised.

(b) In the towns like Chikballapur, Tumkur, Nelamangala and Gadag, administrative or community service functions are localized in one zone, while in Mangalore, Mandya and Davangere, these are distributed in more than one zone. In cities, the administrative zone occupies an extensive area, either in one or more zones.

(c) Mandya, Davangere, Gadag and Mangalore have large and contiguous industrial zones. An industrial zone may consist of a single factor as in Mandya, or more than one, as in Davangere, with its textile industries and oil mills, and in Mangalore, with its tile factories and oil mills. The stream side factory zone of Mangalore, with its towering factory chimneys, and the mixed and wholesale trading zones constitute the largest and more continuous area with maximum house and ground congestion. In Mangalore there are two separate zones with small-scale industries, one in the centre and the other in the southeast. Automobile and mechanical repair workshops, iron foundry, carpentry, and leather works are located in these areas. Nelamangala has a small industrial zone of silk and cotton weavers in the centre of its mixed zone. In general, the factory industrial zones are located nearer the communications, road, rail or stream. In contrast the small-scale or cottage industries are located in the centre of the old town because the skilled labourers reside in those localities. Mangalore, Davangere and Nelamangala illustrate this locational contrast between the factory and small scale or cottage industries.

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* Professor Smailes rightly thinks that in 'eastern cities'/towns there are functional categories rather than true or typical functional zones, as in 'western cities'/towns. In the towns under study, perhaps more often, it is a matter of increased proportion of say, retail trade along with residence. (Personal communication, dated 8-1-1959 from Dr. A. T. A. Learmonth, Liverpool).

TABLE 12: FUNCTIONAL ZONES

Area in acres

	residential and mixed zone		commercial zone		administrative or community service zone		school zone		industrial zone		vacant lands with or without scattered building		total area
	area	percent	area	percent	area	percent	area	percent	area	percent	area	percent	acres
1. Mysore City	3834	41.4	71	0.7	159	1.7	71	0.7	71	0.7	5029	54.4	9,235
2. Mandya	630	65.5	10	1.0	60	6.2	30	3.1	80	8.3	150	15.2	960
3. Gadag (Betgeri)	695	27.1	18	0.7	148	5.7	—	—	100	3.9	1599	62.4	2,560
4. Chikballapur	190	13.1	3	0.2	13	0.9	8	0.5	—	—	1226	85.0	1,440
5. Belgaum	1050	28.5	510	2.4	510	13.8	—	—	—	—	2030	55.1	3,680
6. Talakad	280	21.8	—	—	—	—	—	—	—	—	1000	77.8	1,280
7. Bagepalli	14	37.7	—	—	—	—	3	8.3	1	—	18	54.0	36
8. Nelamangala	69	12.7	—	—	14	2.5	5	0.9	5	0.9	428	82.8	544
9. Haveri	170	17.7	—	—	10	1.1	—	—	10	1.1	290	67.8	960
10. Mangalore	3920	76.6	40	0.8	200	3.9	80	1.5	880	17.2	—	—	5,107

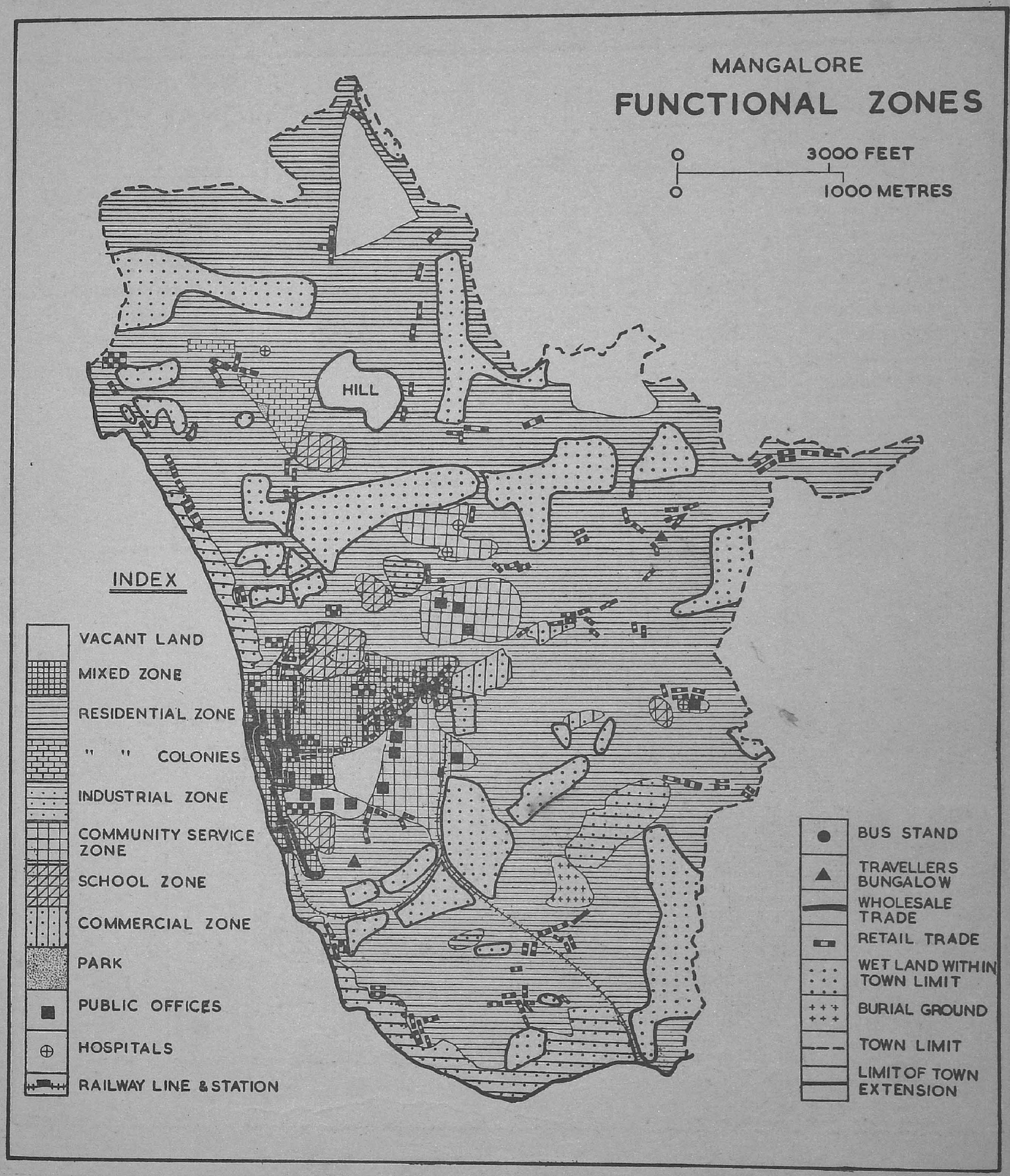
MANGALORE
FUNCTIONAL ZONES
3000 FEET
1000 METRES
HILL
INDEX
VACANT LAND
MIXED ZONE
RESIDENTIAL ZONE
" " COLONIES
INDUSTRIAL ZONE
COMMUNITY SERVICE ZONE
SCHOOL ZONE
COMMERCIAL ZONE
PARK
PUBLIC OFFICES
HOSPITALS
RAILWAY LINE & STATION
BUS STAND
TRAVELLERS BUNGALOW
WHOLESALE TRADE
RETAIL TRADE
WET LAND WITHIN TOWN LIMIT
BURIAL GROUND
TOWN LIMIT
LIMIT OF TOWN EXTENSION

FIG. 21

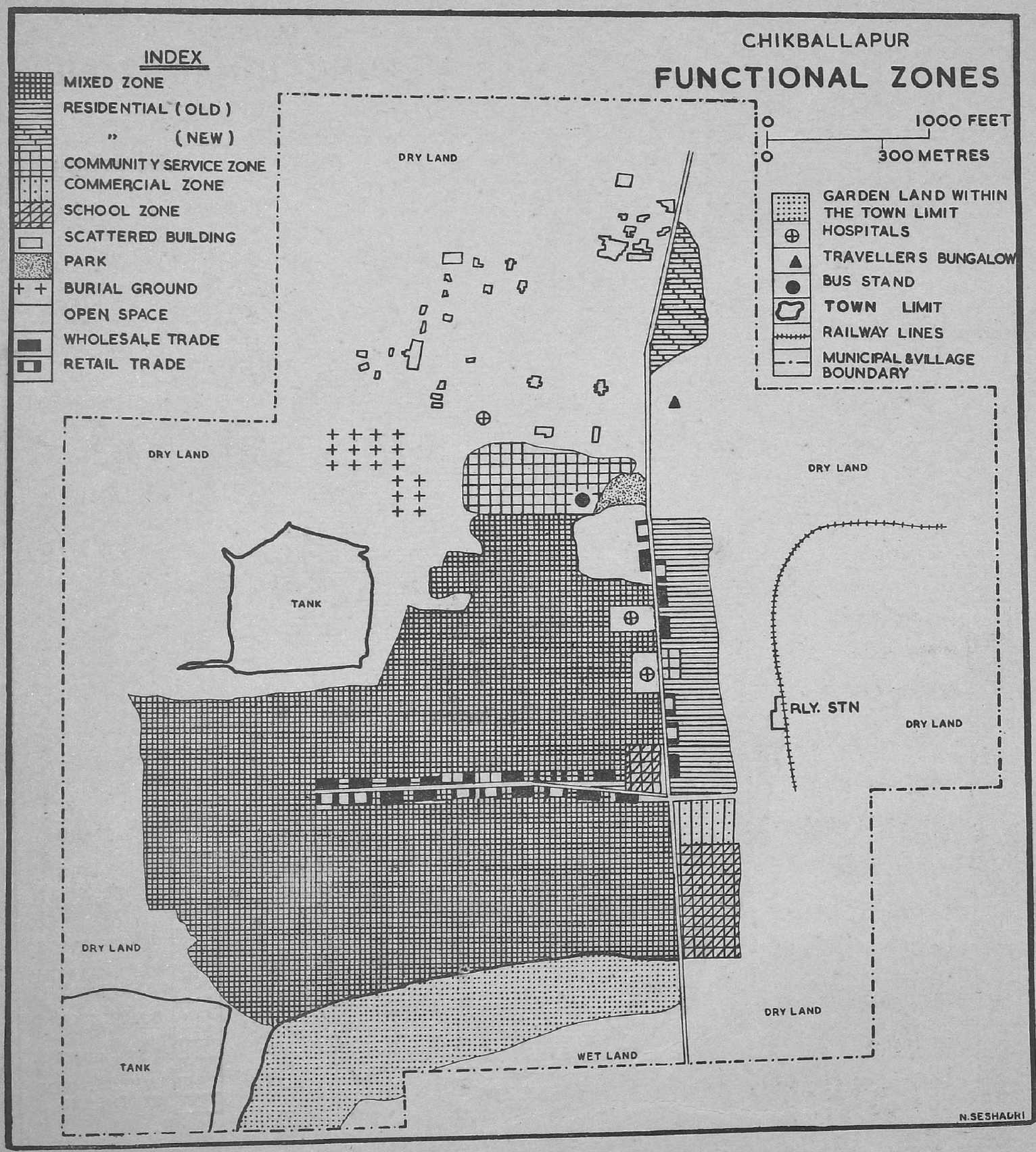
CHIKBALLAPUR
FUNCTIONAL ZONES
INDEX
MIXED ZONE
RESIDENTIAL (OLD)
" (NEW)
COMMUNITY SERVICE ZONE
COMMERCIAL ZONE
SCHOOL ZONE
SCATTERED BUILDING
PARK
BURIAL GROUND
OPEN SPACE
WHOLESALE TRADE
RETAIL TRADE
1000 FEET
300 METRES
GARDEN LAND WITHIN THE TOWN LIMIT
HOSPITALS
TRAVELLERS BUNGALOW
BUS STAND
TOWN LIMIT
RAILWAY LINES
MUNICIPAL &VILLAGE BOUNDARY
DRY LAND
DRY LAND
DRY LAND
TANK
RLY. STN
DRY LAND
DRY LAND
DRY LAND
TANK
WET LAND
N.SESHADRI

FIG. 22

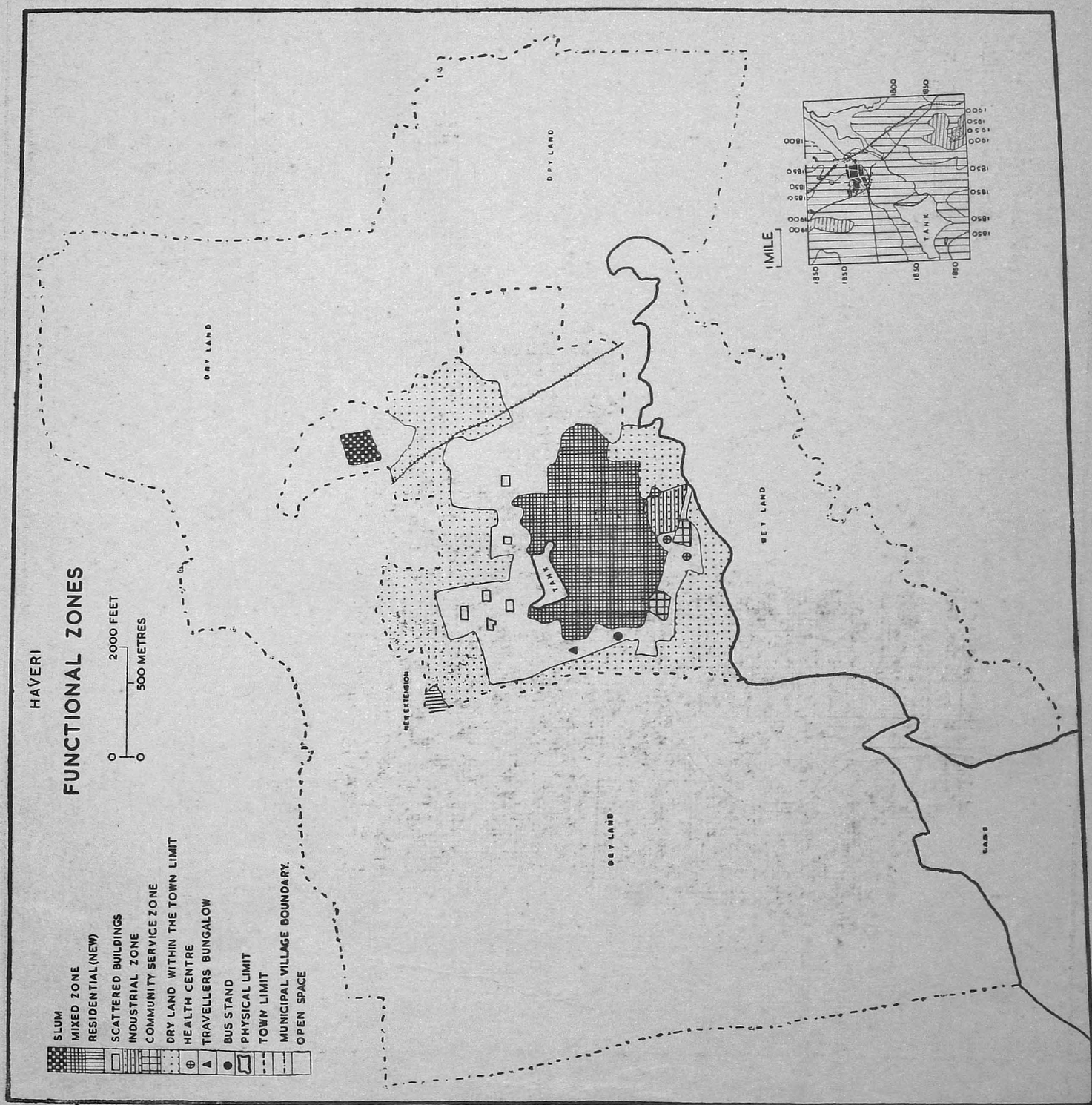
HAVERI
FUNCTIONAL ZONES
0 2000 FEET
0 500 METRES
SLUM
MIXED ZONE
RESIDENTIAL (NEW)
SCATTERED BUILDINGS
INDUSTRIAL ZONE
COMMUNITY SERVICE ZONE
DRY LAND WITHIN THE TOWN LIMIT
HEALTH CENTRE
TRAVELLERS BUNGALOW
BUS STAND
PHYSICAL LIMIT
TOWN LIMIT
MUNICIPAL VILLAGE BOUNDARY.
OPEN SPACE
DRY LAND
DRY LAND
DRY LAND
WET LAND
NEW EXTENSION
TANK
TANK
1 MILE

FIG. 23

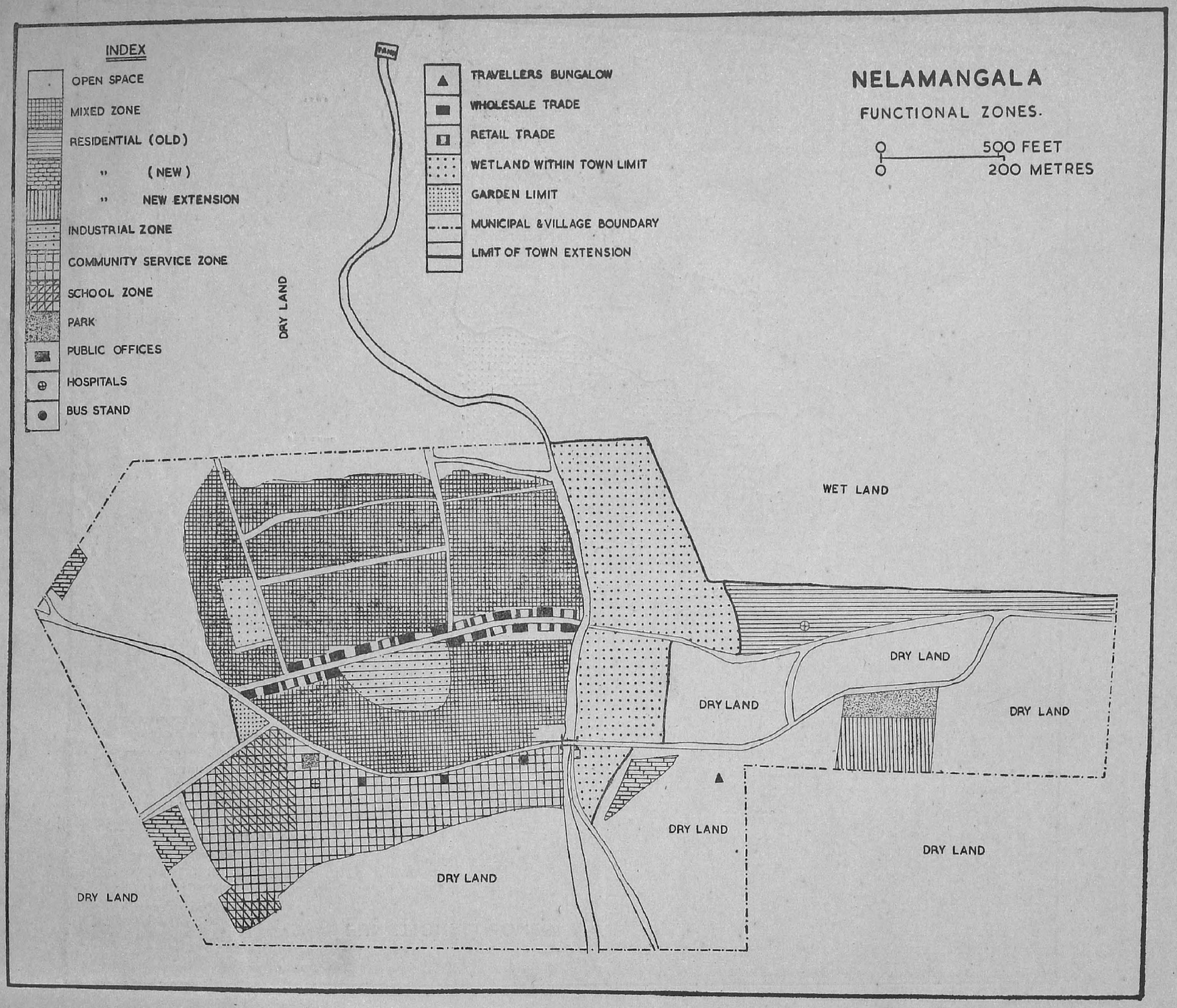
INDEX
OPEN SPACE
MIXED ZONE
RESIDENTIAL (OLD)
" (NEW)
" NEW EXTENSION
INDUSTRIAL ZONE
COMMUNITY SERVICE ZONE
SCHOOL ZONE
PARK
PUBLIC OFFICES
HOSPITALS
BUS STAND
TRAVELLERS BUNGALOW
WHOLESALE TRADE
RETAIL TRADE
WETLAND WITHIN TOWN LIMIT
GARDEN LIMIT
MUNICIPAL &VILLAGE BOUNDARY
LIMIT OF TOWN EXTENSION
NELAMANGALA
FUNCTIONAL ZONES.
500 FEET
200 METRES
DRY LAND
WET LAND
DRY LAND
DRY LAND
DRY LAND
DRY LAND
DRY LAND
DRY LAND
DRY LAND

Fig 24

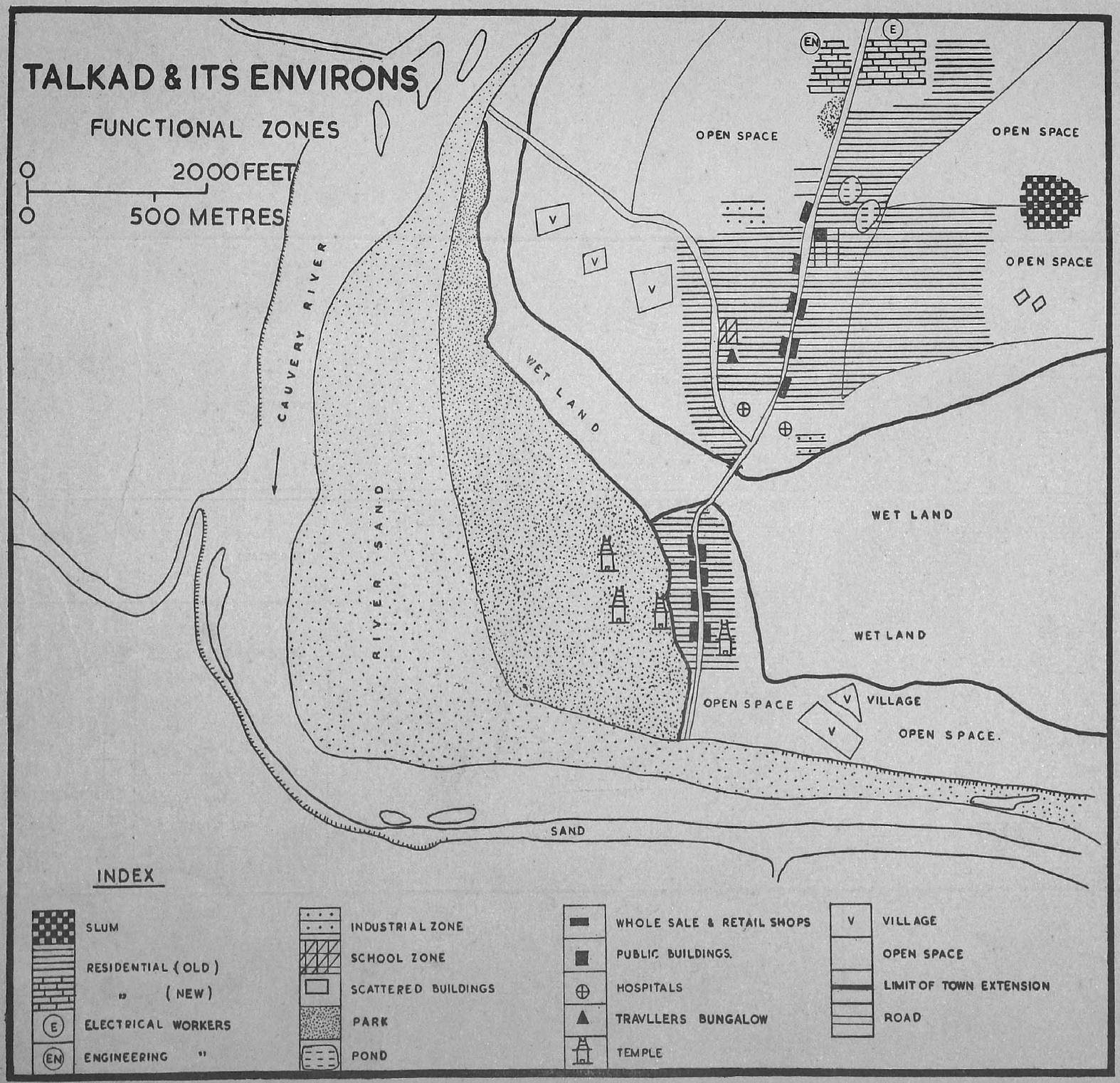
TALKAD & ITS ENVIRONS
FUNCTIONAL ZONES
2000 FEET
500 METRES
CAUVERY RIVER
RIVER SAND
WET LAND
OPEN SPACE
OPEN SPACE
OPEN SPACE
WET LAND
WET LAND
OPEN SPACE
VILLAGE
OPEN SPACE.
SAND
INDEX
SLUM
RESIDENTIAL (OLD)
" (NEW)
ELECTRICAL WORKERS
ENGINEERING "
INDUSTRIAL ZONE
SCHOOL ZONE
SCATTERED BUILDINGS
PARK
POND
WHOLE SALE & RETAIL SHOPS
PUBLIC BUILDINGS.
HOSPITALS
TRAVLLERS BUNGALOW
TEMPLE
VILLAGE
OPEN SPACE
LIMIT OF TOWN EXTENSION
ROAD

Fig. 25

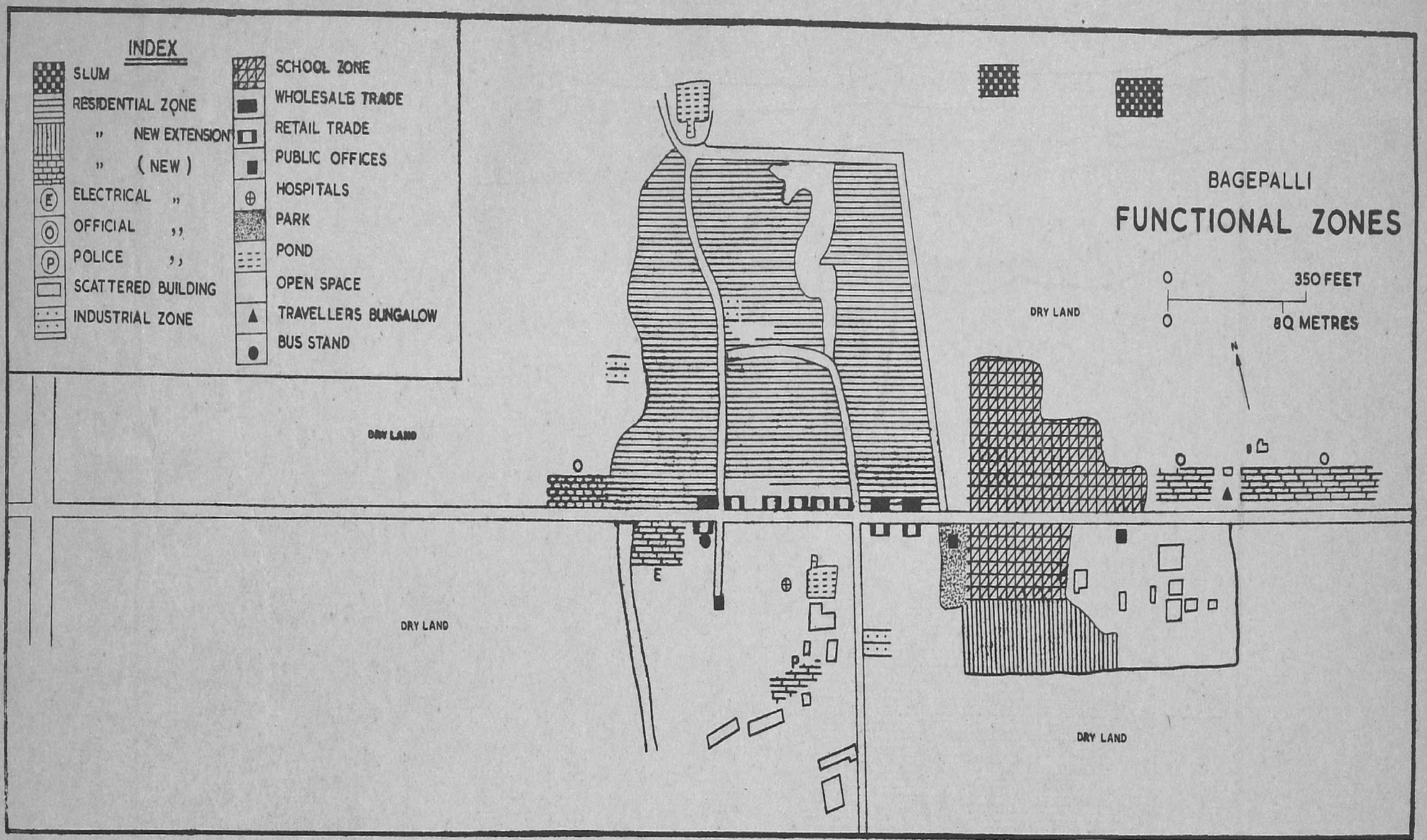
INDEX
SLUM
RESIDENTIAL ZONE
" NEW EXTENSION
" (NEW)
ELECTRICAL "
OFFICIAL "
POLICE "
SCATTERED BUILDING
INDUSTRIAL ZONE
SCHOOL ZONE
WHOLESALE TRADE
RETAIL TRADE
PUBLIC OFFICES
HOSPITALS
PARK
POND
OPEN SPACE
TRAVELLERS BUNGALOW
BUS STAND
BAGEPALLI
FUNCTIONAL ZONES
350 FEET
80 METRES
N
DRY LAND
DRY LAND
DRY LAND
DRY LAND
E
P

Fig. 26

(d) Commercial functions (i.e., wholesale and retail trade) are localised in Davangere, Gadag, Mangalore and Belgaum and there are extensive market areas, while in some towns like Chikballapur, and Tumkur there are bazaar-streets both retail and wholesale. In Mangalore, while retail trade is scattered in different localities, the wholesale trade is localised in an area which lies in the mixed zone. Mangalore has a distinct port area, with its customs office, light house and marine yard on the Gurupur stream front. The port area and the wholesale trade area constitute the commercial zone.

(e) In the case of small agricultural towns with only economic base, like Talakad, it can be said that there is no zonation[1]. Even in the case of Bagepalli, a small agricultural town and a taluk headquarter, functions other than residential do not occupy extensive areas, excepting probably the school zone.

(f) Slums where they exist tend to a distinctly zonal distribution, being located in the centre of cities and medium sized towns (e.g., Mandya and Mangalore), and at the margins in small towns and townships (e.g., Talakad and Bagepalli). Davangere is an exception, where slums are located at the margins of the city, and their location is closely related to the industries. In the case of Mandya, very surprisingly a slum is located near the hospital. By map analysis of the distribution of slums, supplemented by local enquiries, we can conclude that the location of slums is generally guided by one or all of the following factors: (i) nearness to work-place, which is not always possible, in which case it tends to be located at the margins, as space is not easily available in the town (ii) idle land near a tank, and (iii) the availability of land belonging to an absentee owner, or even waste and unused land belonging to the municipality. Here the low rent is an inducing factor,.

Now more detailed observations will be made on two functional zones, (i) slums and mixed zone, and (ii) the open spaces within the town limit. Open space in the present context has a potential function as far as the future urban-growth is concerned. Since some of the open spaces are agricultural lands which are being cultivated, they should be treated as special areas, liable for urban encroachment, and as such, needing a detailed survey to suggest which of them should be released for future urban development.

Slums and mixed zone:

It is needless to mention that the slum is an urban phenomenon, distinguished by ground and house congestion, where very low income groups reside under sub-standard living conditions. The slum-houses typify the slum. The materials used in construction are mud from a nearby tank, straw or leaves. Kerosene tin and bamboo when used for walls and roofing indicate a higher status to the slum dweller. One should only live in a slum in the peak rainfall and summer months to know what slum life is[2].

Typical slums are shown separately on the functional zone maps as distinguished from mixed zones, including some slum houses. Strictly, the mixed zone is a blighted area. In the case of towns like Tumminkatti or Haliyal, conditions as a whole approach slum conditions, and therefore typical slum enclaves are not found. The mixed zone and the slums in each town are the congested areas which need immediate rehabilitation. These are the problem zones in an urban area. The regional planner is as much concerned as the town planner in tackling these problem zones since unplanned dispersal of families from these areas, particularly slums, as is being attempted in Davangere, leads to ribbon development or shifting the workers farther from their work-places. It is not proper to shift slums

[1] In this survey the term zonation is used to mean the existence of a contiguous area of homogeneous urban use in a town.

[2] In a stormy night in October 1956, 300 mud houses were destroyed in Bangalore City alone.

to fringe areas, or other central places in the town, without first understanding the relations between the location of slums and the work-places of slum-dwellers. A fringe location implies that some special arrangement should be made by their employers or by the municipality for movement to work-places. The social groupings are worthy of serious study (see footnote on p. 89).

Slums are found irrespective of the size and type of the town (ref. summary Table 2A columns 3a and 3b on p. 97). There does not seem to be any relation between the size of the slum and the town-type. Out of the 65 sample towns and 4 cities studied, 36 have slums* varying in number, in each, from 1 in towns like Gokak, Nipani and Tumminkatti, to 10 in Mangalore. There are nearly 83,000 slum dwellers in the 36 towns and cities studied, their occupations showing a wide range: milk suppliers in Mercara, agricultural labourers in towns like Bannur and Channapatna, weavers in Pavagada and Rabkavi, mill workers in Davangere, fishermen and Muslim beedi workers in Mangalore, stone breakers in Nipani, Angol, Belgaum and Bellary, and sweepers and scavengers in almost every town.

Both on social and economic grounds the slum areas need immediate rehabilitation, and their distribution should be properly planned after conducting detailed surveys.

Mixed Zone:

The mixed zone usually coincides with the old town i.e., before 1900 or with the town area before 1920, as demarcated in the urban spread maps, except in cases where the town developed more by infilling as in Chikballapur or Mangalore, in which case, it is difficult to separate the old and congested areas since they are mixed up with newly built-up areas. The characteristics of the mixed zone are (i) ground and house congestion, 100–200 houses per acre and 5 to 10 residents per house, which is ill-ventilated as a rule, (ii) mud and thatched houses, and if tiled or terraced, mostly obsolescent, and constitute 50 to 80 per cent of the total houses, (iii) absence of drainage and (iv) use of lanes and streets for living and playing purposes.

This is the zone of confused intermingling of functions, developing in a haphazard manner. The area tends more and more towards congested stagnation. In terms of modern amenities for living, this is the area which should be declared as prohibited area for comfortable living. Every town has a mixed zone, centrally located as in Gadag or with

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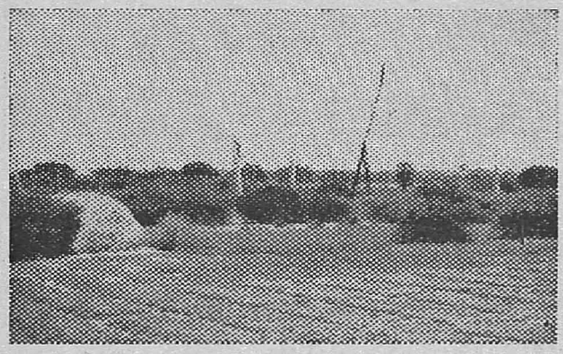
* Slums at Mandya have an interesting aspect. There are two slums to the south of the town, one consisting of completely Telugu workers (2000) and the other Tamil workers (1500). Tamil workers migrated from North Arcot (Tamilnad) and the Telugu workers mostly from Nellore (Andhra), during the period of construction of irrigation canals from the Cauvery. Linguistic segregation is also evident at this slum level. (photos above).

a peripheral location as in Mandya or Nelamangala. The area varies from 6 per cent in Talakad to 51 per cent in Chikballapur and 58 per cent in Mangalore.

Open spaces:

In most of the towns the distribution of open spaces available for urban use is more peripheral than central, thereby suggesting that the stage of in-growth is completed, and now the towns are tending to expand outwards. The existing open spaces within the town, in many cases, are either first class agricultural lands, or parks or those earmarked for specific purpose like schools, hospitals or labour colonies. Davangere and Mangalore are examples of this type. Mysore is a garden city of open spaces but all the gardens are confined to the eastern section and southern sections (ref. map of functional zones, Mysore), while the northwestern and southwestern sections do not seem to have even one park. Towns like Tumkur have extensive cultivated lands within the town limits, and the town is expanding towards the east and south, while there is scope in the north. In Tumkur, there is scope for inward growth in the north.

A comparison of functional zone maps with the urban spread maps shows that the vacant sites are not of the same character. They consist of first class agricultural lands (photos below) and parks as already mentioned, and in addition, wet and dry tanks, hilly



Chikballapur

Chikballapur

areas and sometimes, waste lands or lands with very low productivity as judged by assessment rates, which are ideal for urban use. Tumkur and Chikballapur have such lands.

Now we shall examine the functional zone maps in the context of interzonal relations, and inappropriate use.

In the case of towns with less than 10,000 population and less than one or two square miles in area, like Talakad (photos below) and Bagepalli which have not developed cons-

Talakad

Talakad

picuous zones of different functions, the question of inter-zonal relations does not arise.

Inter-zonal relations become significant in the case of cities or industrial and commercial towns of medium size, and also even rapidly growing tertiary small towns with an important transit function, like Nelamangala. The functional zone maps of Nelamangala, Mandya, Tumkur and Mangalore are selected to illustrate both inappropriate use and lack of integration between different functions within a town. This becomes clear if we examine the distribution of different zones like educational, industrial and commercial or market areas, and new residential and official extensions. Haphazard development is self-evident. Whether in a small agricultural or a tertiary town new extensions, school zones and also administrative zones are located along the through routes, thus unconsciously inviting the problem of crossing the routes, at numerous points by school children and office workers. Nelamangala has already started facing this danger. The peripheral extension of new colonies along the main road is leading to ribbon development (photos below).

Mandya

Mandya

This tendency is evident in Nelamangala, Mandya, and even Bagepalli. The location of schools and official colonies along the main road crossing the town is responsible for ribbon development. In Mangalore and Tumkur, first class agricultural lands have been encroached upon by residential and factory areas.

Now, to sum up, the functional zone maps reveal one commonly recurrent zonal pattern, characterised by (i) the 'core' or the 'kernel'*, the intensive zone of confused intermingling of functions, the village site from which the present town developed, followed by (ii) an inner zone between (i) and (iii), with lower house and ground congestion compared to the kernel, and educational, administrative and recreational functions, localised or scattered, and (iii) an outer, or fringe zone with newly built-up, sometimes well laid-out official and labour colonies and/or residential extensions. In some cases shools are also located in the fringe areas adjacent to the main road. Where the town was originally a trading centre like Gadag, or Belgaum the kernel also becomes the commercial zone with well-developed bazaar-streets. Mysore and Bidar have different types of kernels, the palace town and the fort town, respectively. Bidar is still mostly within the walls, though there is some 'extra-mural' (outside) development.

* The oldest part of the town, which in most cases coincides with the site of the village, from which the town developed.

E. TRENDS IN URBANISATION AND PROJECTION*

During the last 50 years (1901–1951) the urban population in the State increased from 20.02 lakhs to 44.53 lakhs i.e., by 123.2 per cent, while for the country as a whole, the percentage increase was 129.7.

Figure 27 indicates regional variations in the growth of urban population. Bhadravati-Sagar, Davangere, Bangalore, Kunigal, Chintamani and Mandya stand out prominently with a very high rate of increase surrounded by areas of high increase. In the Bangalore-Kunigal-Chintamani tract lies a small island (Nelamangala-Siddalughatta) with medium increase. In the south Coastal Region, Coondapur has a very high growth, while Mangalore and other towns nearby show a high growth. The north Coastal Region is one of low and medium increase. Mysore, Nanjangud, Hassan-Tiptur-Banavar, Kolar-Gold Fields and Bangarpet tracts in the south, and Ilkal-Hungund, Gadag-Mulgund, Gangavati-Kanakagiri, Sahapur-Gogipet, Gulbarga and Bidar in the north are also the areas of high increase. The Northern Maidan and the Malnad have large areas of low increase.

There are two areas of decrease, Nargund in the north and Agramambali in the south, the former located within an area of medium low increase and the latter in an area of low increase.

Regional trends in variability:

Urban population in the Southern Maidan and Semi-Malnad is increasing at a high and very high rate. In the Northern Maidan, only a few isolated tracts, already mentioned, are showing high increase in urban population. The growth rates in the least urbanised areas of Southern Maidan, are higher than those of the Malnad proper and the Northern Maidan. If Fig. 27 is compared with Fig. 8, it becomes evident that excepting in the case of Chintamani, Kunigal and Sira, urban population is increasing at a high or medium high rate in the areas of urban concentration. In the areas adjoining the class I city tracts, the increase is high, excepting near Belgaum.

Table 13 shows the trends and variability in different classes or urban centres population in each grade.

Class I cities show the highest net increase, nearly 850 per cent, Class IV group, the next highest, 215 per cent. Class V group shows a low increase only 40 per cent while the townships (Class VI) are declining (– 64 per cent) both in size and number. The trend in all the class-groups, excluding the declining group (class VI) is fluctuating.

Tables 14 and 15 give an instructive reading of urbanisation in the Mysore State during the last decade. After allowing for the changes in definition, the total percentage increase during the decade (1951–61) has been 31. Maximum increase is observed in class II cities and class III towns (Table 14). The number of urban centres upgraded (above the diagonal) between different classes as well as those upgraded from village level and slipped back to village level are vividly presented in Table 15. It appears that the change in definition (in 1961 census) affected the class V towns most, resulting in down grading of as many as 64 towns to villages. The number of towns along the diagonal indicates the common towns between the 1951 and 1961 census.

*This section is based mainly on sample town studies.

TABLE 13

class	number of towns in						total population of towns in each class in years						percentage variation
	1901	1911	1921	1931	1941	1951	1901	1911	1921	1931	1941	1951	in 50 years 1901-1951
I	1	1	1	2	3	6	161,299	192,429	239,831	415,991	691,159	1,531,781	849 6
								16 1	19.8	42.2	39.9	54.9	percentage variation
II	4	3	4	3	6	7	257,145	216,489	292,282	235,353	403,614	455,375	77.0
								−18.8	25.9	−24.2	41.7	11.4	percentage variation
III	7	8	7	10	9	20	197,431	259,398	248,087	349,762	284,354	547,220	177 1
								23.9	−4.6	29 6	−23.0	48.0	percentage variation
IV	19	16	25	27	41	57	245,782	204,360	318,687	370,318	560,220	773,737	214.8
								−20.3	35.9	13.9	33.9	27.6	percentage variation
V	103	81	84	102	123	136	678,568	538,052	546,369	687,102	816,818	949,935	40.0
								−26.1	1.5	20.5	15.8	11.9	percentage variation
VI	136	161	149	126	88	44	44,487	558,271	575,064	464,253	318,345	160,014	−64.0
								20.4	−8.3	−10.9	−45.8	−98.9	percentage variation

TABLE 14.

size of towns	1961		1951*		new towns due to change in definition in 1961		towns eliminated from 1951 list due to change in definition in 1961		as per the definition of 1961 towns and population in 1951		percentage increase/decrease in 1951–1961	
	no. of towns	population	no. of towns	population	no. of towns	population	no. of towns	population	no. of towns	population	without change of definition	with change of definition
class I												
100,000	6	1,938,244	6	1,532,681	—	—	—	—	6	1,532,681	+26.46	+26.46
class II												
50,000–100,000	10	739,115	7	455,375	—	—	—	—	7	455,375	+62.31	+62.31
class III												
20,000–50,000	32	895,051	21	567,907	3	107,150	—	—	21	567,907	+57.60	+57.60
class IV												
10,000–20,000	78	1,064,924	57	789,428	5	63,149	2	30,233	55	759,195	+34.90	+40.27
class V												
5,000–10,000	57	423,355	137	939,755	5	35,608	64	395,799	73	543,956	−54.96	−22.17
total	183	5,060,689	228	4,285,146	13	205,907	66	426,032	162	3,859,114	+18.10	+31.14
class VI**												
5000	37	126,416	43	160,006	10	21,364	8	34,578	35	125,428	−20.99	+ 0.79
grand total	220	5,187,105	271	4,445,152	23	227,271	74	460,610	271	3,984,542	+16.69	+30.18

* excluding 16 camp towns.

** classified as towns in 1961 mainly because of administrative set up.

Note : (i) Shahpur (Class IV town in 1951) is merged with Belgaum and Belgaum is treated as Class I city in 1951.

(ii) Bhadravati new town (class III in 1961) and Bhadravati (class III town in 1961) are merged together here as they were treated similarly in 1951. Bhadravati has now become a class II city.

(iii) Rabkavi (class V in 1951) and Banhatti (class IV in 1951) merged together has become class III town in 1951.

TABLE 15 : MYSORE STATE—TOWNS : 1951 AND 1961

no. of towns in 1961 considered as	no. of towns in 1951 considered as class								total towns in 1961
	I	II	III	IV	V	VI	villages	total in '51	
class I	6	—	—	—	—	—	—	—	6
class II	—	7	3	—	—	—	—	—	10
class III	—	—	18	11	—	—	3		32
class IV	—	—	—	44	29	—	5		78
class V	—	—	—	—	44	8	5		57
class VI	—	—	—	—	—	27	10		37
villages	—	—	—	2	64	8	X		—
total	6	7	21	57	137	43	X	271	220

Source : Government of India, Registrar General of Census, "CENSUS OF INDIA, 1951"
Government of India, Registrar General of Census, "1961 CENSUS : PROVISIONAL POPULATION TOTALS"

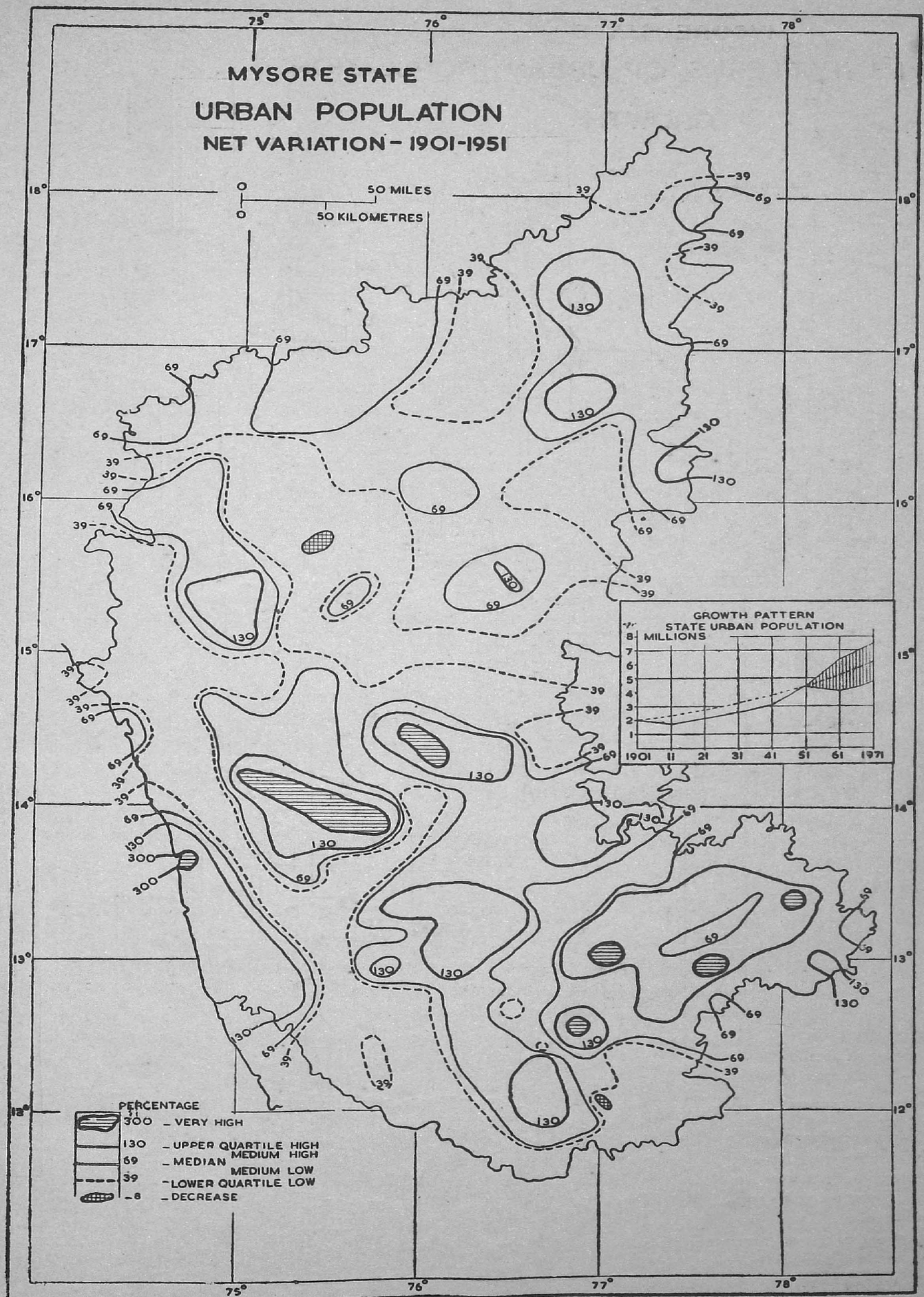

MYSORE STATE
URBAN POPULATION
NET VARIATION - 1901-1951
50 MILES
50 KILOMETRES
GROWTH PATTERN
STATE URBAN POPULATION
MILLIONS
1901
11
21
31
41
51
61
1971
PERCENTAGE
300 - VERY HIGH
130 - UPPER QUARTILE HIGH
69 - MEDIAN MEDIUM HIGH
39 - LOWER QUARTILE LOW
-8 - DECREASE
75°
76°
77°
78°
18°
17°
16°
15°
14°
13°
12°

FIG. 27

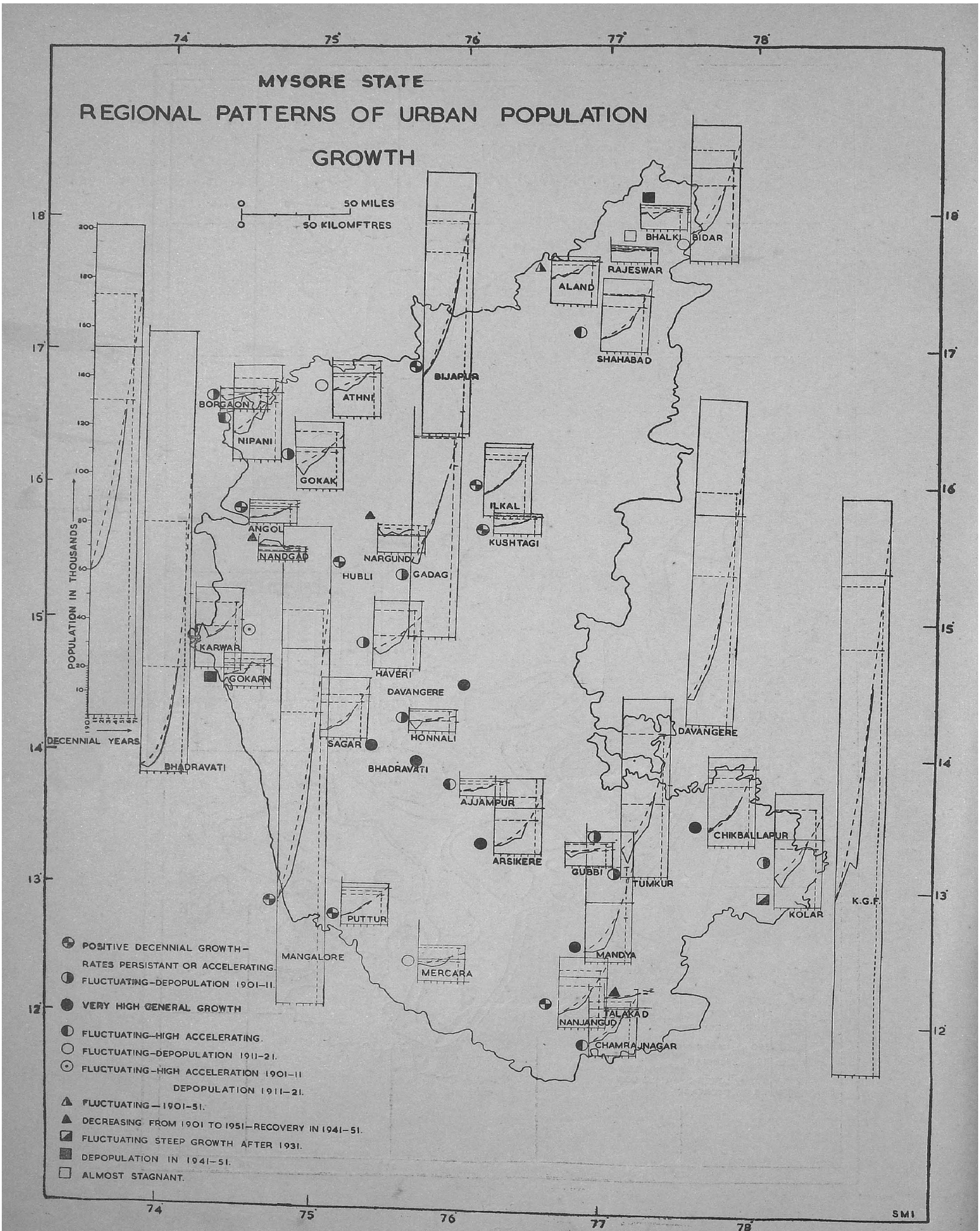

MYSORE STATE
REGIONAL PATTERNS OF URBAN POPULATION GROWTH
50 MILES
50 KILOMETRES
POPULATION IN THOUSANDS
DECENNIAL YEARS
BHADRAVATI
BORGAON
NIPANI
ATHNI
BIJAPUR
GOKAK
ANGOL
NANDGAD
HUBLI
NARGUND
GADAG
ILKAL
KUSHTAGI
KARWAR
GOKARN
HAVERI
DAVANGERE
SAGAR
HONNALI
BHADRAVATI
AJJAMPUR
ARSIKERE
PUTTUR
MANGALORE
MERCARA
BHALKI
BIDAR
RAJESWAR
ALAND
SHAHABAD
DAVANGERE
CHIKBALLAPUR
GUBBI
TUMKUR
KOLAR
K.G.F
MANDYA
TALAKAD
NANJANGUD
CHAMRAJNAGAR
POSITIVE DECENNIAL GROWTH—RATES PERSISTANT OR ACCELERATING.
FLUCTUATING—DEPOPULATION 1901–11.
VERY HIGH GENERAL GROWTH
FLUCTUATING—HIGH ACCELERATING.
FLUCTUATING—DEPOPULATION 1911–21.
FLUCTUATING—HIGH ACCELERATION 1901–11 DEPOPULATION 1911–21.
FLUCTUATING—1901–51.
DECREASING FROM 1901 TO 1951—RECOVERY IN 1941–51.
FLUCTUATING STEEP GROWTH AFTER 1931.
DEPOPULATION IN 1941–51.
ALMOST STAGNANT.
SMI

FIG. 28

Between 1901 and 1951, more class I cities developed than class II. In 1901, the State had only one class I city, Bangalore and strictly speaking, four in 1951, if the two cities of Hubli and Belgaum, belonging to Old Bombay State are excluded. Mysore and Kolar-Gold-Fields were the only two class II cities in 1901. Mangalore became a class II city in 1921, and class I in 1951, while Davangere became a class II city in 1951. Out of the seven class II cities, six are included as a result of the reorganisation of States. The medium-sized towns (class III and IV) increased from 26 to 77, and small towns from 103 to 136, while the townships declined from 136 to 44. In general, higher growth is associated with larger towns, which are scattered in their distribution. The towns which are distributed more evenly are increasing at a comparatively low rate.

Patterns of Growth : Trends

The growth pattern for the whole State is characterised by a decrease between 1901 and 1911, and fluctuating increase from 1911. If 1931 is taken as the base year, the growth rate is showing an accelerating trend. See inset graph-fig. 27.

Figure 28 shows regional variations in trends, which are classified on the basis of the character of actual population growth. Exponential population[1] curve is also shown on the graph, by a broken line, which is used (i) to project population in 1961, and (ii) to determine general growth[2] and mean percentage variability[3]. General population growth and mean percentage variability are used in recognising sub-types.

The following patterns of growth are recognised (Fig. 28). (Letter-symbols are used to help in the identification of area and urban centres on the map).

I. *Persisting and accelerating growth (A):*

Persisting and accelerating decennial growth is the characteristic feature of the urban centres with this pattern of growth. Hubli-Belgaum tract, southern and central Coastal Region (Udipi, Puttur), area south east of Mysore (Nanjangud-Chamrajnagar-Gundlupet) and Ilkal-Hadgalli area are examples. The east-central part of the Southern Maidan also belongs to this group. Udipi, Puttur and Ilkal have very low variability; Mangalore, Hubli, Dharwar, Belgaum and Nanjangud have medium variability, and Kustagi, low variability, and hence these can be strictly considered as sub-types, distinguished on the basis of mean percentage variability.

II. *Fluctuating pattern (B,D,E,F,G and S):*

The growth pattern of Borgaon, Gubbi and Honalli with low or very low general growth, and Tumkur, Kolar and Gadag with high general growth, is characterised by decrease in 1901–1911 and recovery and fluctuating increase after 1911 (*B*). Nipani and Ajjampur (*D*) have an accelerating but fluctuating growth. The towns of the south Coastal Region, Malnad and the famine zones (particularly the north-central part of the Northern Maidan) have low or very low general growth rate with a decrease in 1911–1921 and a general recovery from 1921. The growth tends to be accelerating from 1921. Bidar and Gogipet with their high general growth should be treated as exceptions. In these regions, rural population also decreased in the decade 1911–21, and the epidemic of influenza which

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[1] When the actual population curve coincides with the exponential population curve, the joint effect of net migration rate, death rate and birth rate is most stable from decade to decade.

[2] General growth is the decennial growth rate per thousand of exponential population.

[3] Mean percentage variability or variability is the mean percentage of absolute deviations of actual to exponential population in the five decades between 1901 and 1951.

raged over the villages and towns in these areas could be taken as the main cause for both urban and rural decrease*. Karwar, Haliyal, Puttur, Hungund and Kolar-Gold-Fields represent isolated towns with fluctuating pattern of growth, with a permanent recovery, after 1921. The almost 'shooting' growth of Kolar-Gold-Fields, after 1921 may be explained by the further development of the existing gold mining industry, possibly along with recovery from the influenza pandemic of 1918 and subsequent years.

III. *Mixed pattern (C):*

This is transitional between the first and the second, and the distinguishing characteristic feature is its very high general growth. The growth curves show typical accelerating and steep trend after 1911 or 1921. Sagar, Shimoga, Bhadravati, Bangalore, Mysore, Mandya, Davangere, Chikballapur, and Arsikere are examples of this pattern. A comparison with the variability map shows that these are the centres with a very high variability (see figures 27 and 28).

A comparative study of the variability in rural and urban population, and our enquiries in the sample towns and cities have indicated that the countryside adjacent to Bhadravati is being depopulated, and it is suggested that sample surveys might throw light on the causes of this feature more marked in this particular area than in other peri-urban areas, so far as present data show.

IV. *Relative stagnation (K):*

The growth rates of Manki, Rajeswar, Majali and Hadagalli show a relatively stagnant trend with very low general growth and very low variability. These centres do not seem to offer any inducement for people to immigrate and settle. Lack of opportunities for employment, local inaccessibility and unsatisfactory central and public utility services may be the main causes.

V. *Decreasing trend (H):*

The following nine towns show a general decreasing trend with slow recovery after 1931 or 1941: Nandagod, Nargund, Tumminkatti, Mudgol, Kampli, Mayakanhalli, Melkote, Balkavadi and Agra-Mombali. All these are small agricultural towns or townships, some of them having only cottage industries. Many of these towns have more or less the same handicaps as those with a stagnant trend. The urban centres with relatively stagnant and decreasing trend assume special importance. Particularly if their services are required in the surrounding area, such centres should be given priority in any regional plan for economic revival or development. If other factors like local resources, accessibility and power are satisfactory, we would suggest the location of factory or small scale industries or industrial estates in or near such centres.

Future Trend: Projection: 1951–1971

Fig. 29 shows the projected urban population for the sample towns and cities in 1971 by proportionate circles with their respective upper limits. The inner circle shows the population in 1951.

By 1971 the urban population in the State is expected to be 61.3 lakhs, the upper limit being 74.6 lakhs. If the same trend continues, Bhadravati, Davangere, Dharwar, and Gulbarga should become class I cities. Probably Hubli will lag behind Dharwar and Belgaum in its rate of growth. The population of class I cities will increase from 15.2 lakhs to 25.1 lakhs, that of class II cities from 4.5 lakhs to 6.7 lakhs and class III from 5.5 lakhs to nearly 9 lakhs.

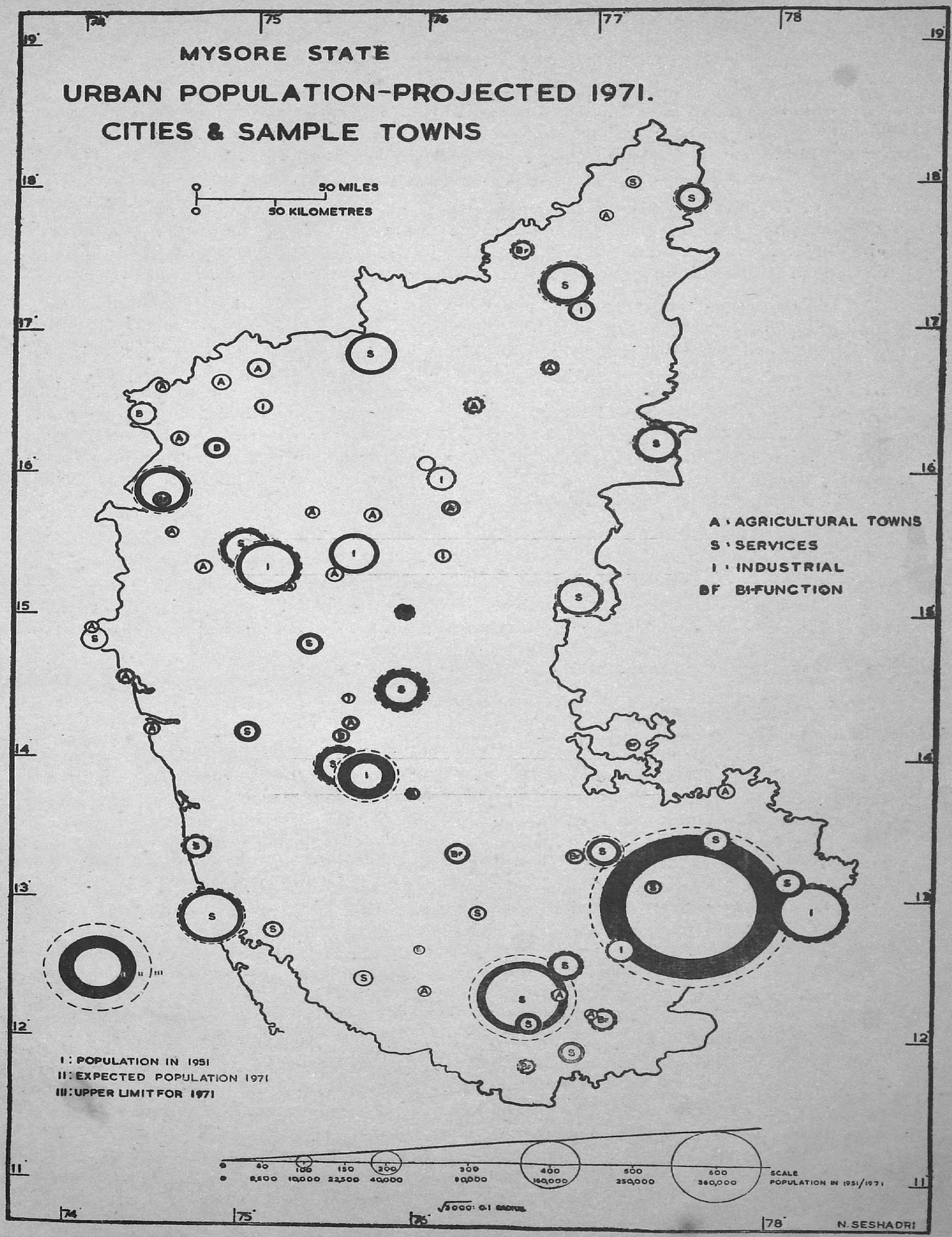
MYSORE STATE
URBAN POPULATION-PROJECTED 1971.
CITIES & SAMPLE TOWNS
50 MILES
50 KILOMETRES
A : AGRICULTURAL TOWNS
S : SERVICES
I : INDUSTRIAL
BF BI-FUNCTION
I : POPULATION IN 1951
II : EXPECTED POPULATION 1971
III : UPPER LIMIT FOR 1971
SCALE
POPULATION IN 1951/1971
N. SESHADRI

FIG. 29

The percentage increase in both class I cities and class III towns may be the same (64–65 per cent), higher than that of class II cities (47 per cent). The Malnad, the least urbanised area with low variability also indicates the lowest rate of future growth (33 per cent) in the State, followed by the Coastal Region (36 per cent).

Fig. 29 shows clearly that there are two contiguous areas, one in the north-west (Nipani being an exception) and the other in the north-east, where the future growth will be low or medium low; while the population in the towns like Nandagod, Nargund and Tumminkatti will continue to decline, inspite of slow recovery between 1941 and 1951.

We can conclude from the above study, that regional variations in urbanism will be maintained because the areas of urban concentration are getting more urbanised, while in the least urbanised areas, the rate of growth is low and appears as if it will remain as such. The rate of recovery in the case of stagnant and declining towns does not seem to be high enough to change the trend, at least as indicated by the projection. The Southern Maidan and the Semi-Malnad will be the most urbanised areas, and the Malnad, the least urbanised area. The Semi-Malnad is getting more urbanised than the Northern Maidan. Between 1901 and 1951 the percentage increase in urban population in Semi-Malnad was 136 while it was only 82 in the Northern Maidan. The U–R ratios in the different regions and the State as a whole, are given below:

	1901	1951	1971
Semi-Malnad	1 : 10	1 : 5	1 : 4
Northern-Maidan	1 : 4	1 : 3	1 : 2.5
Southern-Maidan	1 : 6	1 : 3	1 : 2
Malnad	1 : 13	1 : 8	1 : 7
Coastal Region	1 : 7	1 : 5	1 : 4
Mysore State	1 : 8	1 : 5	1 : 4

SECTION IV

CONCLUSION

Summary and Suggestions

Introduction

This reconnaissance pilot sample survey of urban centres in the New Mysore State is based on (i) published data, chiefly census records, (ii) unpublished data, in manuscript form, available with the town Municipalities and Government Offices and (iii) information collected by enquiry and mapped by observation in the field in the sample towns and cities.

A survey of this type is inevitably subject to limitations, chiefly imposed by inadequate basic data.

(i) It is quite natural that any gap or incompleteness in census data, which formed the basis of analysis affects the final synthesis. Here we refer to the livelihood classification[1] in towns, and also the very definition of a town[2].

(ii) Delimiting the boundary of a town has been a more fundamental limitation. The area within municipal limits has been accepted as a working basis. In many cases, the boundaries of the town area have not been adjusted to the present built up area, and hence, the different town-areas are not comparable.

(iii) Absence of standards or norms, relating (a) to the uneconomic or economic size of a town or a city, and (b) the adequacy or inadequacy of urban services, is another equally important limitation. If an assessment of quality of different services were available, a more refined and precise classification could be atetempted.

Herein lies the need for theoretical studies on the definition and classification of towns, and also intensive and systematic surveys to establish standards of adequacy and inadequacy of urban services. It is suggested here that the Regional Survey Unit in liaison

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[1] *Livelihood categories and classes:* The population of a town has been divided into two livelihood categories: 'agricultural' and 'non-agricultural' and eight livelihood classes: I–III. Cultivators, cultivating labourers and their dependants; IV. Non-cultivating owners of land, agricultural rent receivers and their dependants; V. Production other than cultivation; VI. Commerce; VII. Transport; VIII. Other services and miscellaneous sources. We found that class V and VIII are too generalised for our purpose.

Bhadravati, Kolar-Gold-Fields, and also small towns and townships like Tumminkatti and Molakalmuru had to be grouped as industrial towns, since detailed information is not available on the nature of the industry. A more refined classification of tertiary (services) towns would have been possible if distinction is made between central, public utility and administrative services under class VIII.

[2] *Definition of a town* : There does not seem to be any agreement on the definition of a town. A town is dintinguished from a village on the basis of the size of population of the settlement and what are called urban characteristics. A town is also defined in terms of the type of Government (municipality) without reference to its population size, as in the Old Mysore State. In the Old Mysore State, "Towns" consist exclusively of municipalities, while in Andhra Pradesh, a town is defined as a place, usually having not less than 5000 inhabitants, and possessing distinct urban characteristics (ref. District Census Hand-books). The 1961 Census attempted to iron out the differences by giving a standard definition: three tests were uniformly applied—(i) a population of not less than 5000, (ii) a density of not less than 1000 per square mile, and (iii) at least three fourths of the adult male population employed in pursuits other than agriculture. "All municipalities, cantonments, notified areas and other places enjoying recognised local administration, like civil lines" were also considered as towns.

with the University departments of economics, sociology and geography, and the town municipalities should undertake such studies in different States, so that for the Third Five-Year-Plan period, factual foundations would have been laid well.

Objectives

1) To find out if there are regional variations in urbanism, and if so, indicate their nature and analyse the causes for such variations.

2) To suggest areas and types of urban centres which could be given priority in future regional development programmes.

3) To examine the character and trend of urban growth both on the ground (i.e., urban spread) and in population, between 1901 and 1951, and project the future growth of urban population in the State and different regions.

4) To examine the consequences of unplanned urban growth:

(a) to examine the impact of urban growth on its immediate countryside in the form of (i) encroachment on cultivated areas, dry land, wet land, and garden land (the last two being grouped as 'A' class agricultural land) which should be protected from urban encroachment (here an attempt is made to estimate the loss of agricultural land consequent upon urban expansion), (ii) increased land values in the urban and peri-urban areas, and (iii) depopulation.

(b) to demarcate areas needing rehabilitation in a town i.e., blighted areas and slums: for our purpose the aim is to gain a perspective view of the problem as a whole in the State and its regions.

5) To indicate the adequacy, inadequacy or absence of urban services and amenities, and evaluate their situation in different regions.

6) To delimit 'urban fields' and examine their character.

An attempt is made to select Zonal Capitals and demarcate local areas for planning or development of urban services and amenities, based on urban field studies and urban classification, and also the pattern of distribution of town locations.

Main conclusions and suggestions

In the year 1951 the urban population of the reorganised Mysore State was 4.45 millions living in 288 towns and townships*. Based on the following table we can conclude that the State is more urbanised than the country as a whole.

	Mysore State	*Indian Union*
	Year: 1951	
Urban-Rural ratio	23: 77	18: 82
Density of urban population per square mile	60	49
Urban per capita area in acres: i.e., Total area of the State / Total urban population of the State	11	13

* In the Indian Union, the urban population in 1151 was 41,87 millions, living in 3088 towns and townships.

Conclusion

Our studies on trends and projections indicate that the urban population in the State would increase to 6.13 millions, in the year 1971, the upper and the lower limits being 7.43 millions and 5.8 millions respectively.

Regional variations and patterns

Our study has indicated that there are not only inter-regional variations in urbanism but also urban-rural variations.

There are four tracts of high urban concentration, all single city tracts: Bangalore, Mysore, Kolar-Gold-Fields and Hubli. All these cities developed semi-urban zones around them, Bangalore having the largest, and these are, in turn, surrounded by areas of urban concentration. Some of the tracts of urban concentration are multiple town tracts. Examples are the Bellary-Hospet tract with 25 towns, the Hubli-Gadag tract with 20 towns, and Nipani-Chikodi tract with 10 towns and the Belgaum tract with 5 towns. The distribution of the size and location of urban centres in the State is such that a regional core of urbanism can be recognised, with Belgaum, Dharwar-Hubli, Davangere, Bhadravati-Shimoga, Mysore, Bangalore and Kolar-Gold-Fields as its multiple nuclei. A secondary urban tract may develop along the coast if the coastal high-way and sea-way are developed, and the occupational base of the small and medium sized coastal town is improved, by the development of industries based on local resources, and improvement of urban services.

The Malnad, the east central part of the Southern Maidan and the Sindgi-Afzalpur tract are the three extensive and contiguous least-urbanised areas. Shantpur tract in the north eastern corner, Mulbagal-Bagepalli and Malur-Hoskote tracts are other smaller areas.

There are distinct regional patterns of urbanism. The pattern of urbanism in the Malnad is one of irregularly scattered tertiary small-towns and townships, while the Coastal pattern is one of small and medium sized towns and mixed town types, strung along the coast. The Northern Maidan can be distinguished from the Southern Maidan by its greater degree of scatter and the predominance of agricultural towns. Thus there seems to be some correspondence between the pattern of urbanism and the physio-agronomic regions.

In urban-rural ratio, the Malnad, the least urbanised area in the State, is the most imbalanced (1 : 8), the Coastal Region being the next in imbalance (1 : 5). The Northern Maidan and the Southern Maidan have the same ratio 1 : 3 but the Southern Maidan is the most urbanised region in the State.

Inter-regional urban and rural-urban variations are summarised below:

YEAR 1951

	cities	medium sized towns	small towns & townships	total towns	urban population in lakhs	urban population per sq.mile	urban rural ratio
Northern Maidan	9	41	84	134	19.3	59	1 : 3
Southern Maidan	3	21	56	80	18.6	86	1 : 3
Semi Malnad	–	5	19	24	2.6	42	1 : 5
Coastal Region	1	8	9	18	3.0	58	1 : 5
Malnad	–	3	13	16	1.1	13	1 : 8
State	13	78	181	272	44.6	60	1 : 3.5

Trends and Projection

During the last 50 years (1901–1951) the urban population in the State increased from 20.02 lakhs to 44.53 lakhs i.e., by 123 per cent. In general the urban population is increasing at a high or medium high rate in the areas of urban concentration. The Malnad has a low or very low general growth rate with decrease in 1911–21 and recovery from 1921. The population of the class I cities increased by 850 per cent, while class VI decreased by 64 per cent, from 1901 to 1951.

The growth pattern for the whole State is characterised by a decrease between 1901 and 1911, and fluctuating increase from 1911. If 1931 is taken as the base year, the growth rate is showing an accelerating trend. The growth rates of some of the towns like Manki, Rajeswar, Majali are showing a relatively stagnant trend, while of the towns like Nandagod, Nargund, Tumminkatti, Mudgol and Kampli a declining trend. Some of these towns have shown a slow recovery after 1941. The very high general and accelerating growth of cities or medium sized towns can be explained by the development of industries and services in or near them. Recovery (i.e., recovery from a decline in the previous decade) is often associated with the development of services and new industries or the revival of declining industries. One conclusion can be drawn from our study of growth, size and type relationships, that cities and major towns have a diversified occupational base dominated by tertiary (services) function, and in the industrial sector have different types of industries, while the accelerating growth of a town is generally associated with industrial development.

If the present trends continue, Bhadravati, Davangere, Dharwar and Gulbarga should become class I cities by 1971. Towns like Nandagod or Tumminkatti will continue their declining trend in spite of slow recovery after 1941, unless their occupational base is developed and stabilised.

It appears that regional variations in urbanism will be maintained because the areas of urban concentration are getting more urbanised, while in the least urbanised areas, the growth rate is low. The future trend indicates that the Southern Maidan and the Semi-Malnad will be the most urbanised regions in the State and the Malnad, the least urbanised area.

The planning implication is that the high and accelerated growth of urban population in the area of urban concentration, should be checked to avoid (i) further house and ground congestion or slum development, (ii) pressure on urban services and (iii) adverse impact on the countryside. Bangalore, Mysore, Kolar-Gold-Fields, Mangalore, Bhadravati, Hubli, Belgaum and even Davangere are cities where further immigration should be discouraged. One of the ways of checking the accelerating growth of these cities would be not to locate new industries or administrative offices in or near them. The 'explosive patterns' of urban spread of Mangalore and Bangalore suggest that haphazard urban sprawl should be controlled and satellite towns should be considered.

The least urbanised areas with low urban growth, and the urban centres showing a declining or stagnant trend, should normally be given priority in the future developmental programmes. A comparison of the map of urban concentration with the map of industrial concentration brings out that these are the areas with low industrial development. From an analysis of regional factors like accessibility to rail and road and power (both actual and potential), pressure on agricultural land, and local factors like the cost of land and labour, and also the availability of water, based on the nearness of the area or town to a river or a stream*, in these areas, it is evident that each area or a town has one or more handicaps.

* Areas within 10 miles from a stream are treated as within easy reach to a permanent source of water.

To take a few examples, the Malnad region is inaccessible to railways, and wage rates are high. In the northern Coastal Region, in addition, power is not available. If potential power is tapped, regional factors are favourable in the case of Nandagod. Hadagalli-Sandur area[1] is another priority area, where also, the regional factors are all favourable. The only handicap in the case of Tumminkatti is inaccessibility to rail as well as road. The town is isolated by an unbridged stream, and the nearest bus-stop is 2 miles. We would suggest that both for purposes of stimulating and stabilising economy, industries or new developmental projects should be developed, and also urban-services and amenities improved in these areas and towns. This will also lead to balanced regional development and decentralisation of industries. Afzalpur-Bagewadi, Manvi-Lingsugar, Nargund-Naregal, Hiriyur-Hosdurga areas, the Malnad, and the towns like Karwar, Majali, and Manki in the northern Coastal Region, and Belkawadi Agramambali, Melkote, Mayakanhalli and Tumminkatti are some of the areas and towns which should be given priority in the future programmes of development. An integrated plan for the development of these areas can be prepared by detailed local surveys.

Unplanned urban growth, both growth in space or urban-spread, and in urban population during the last 50 years has led to:

(i) (a) the development of blighted areas and slums and (b) haphazard development of fringe areas and ribbon development as in Nelamangala, Mandya and Bagepalli, (ii) encroachment on cultivated land, (iii) high and sometimes very high increase in the sale-value of lands in the urban and peri-urban areas, (iv) increased pressure on urban services and amenities, and (v) depopulation of the countryside adjacent to the urban centres like Bhadravati as a result of large-scale immigration.

We can generalise from our studies of sample towns and cities that blighted areas and slums exist in towns, irrespective of its size and type. Their extent varies from 80 acres (6 per cent of the total town area) in a small agricultural town like Talakad, and 730 acres (51 per cent) in Chikballapur, a medium sized tertiary town, to 3000 acres (58 per cent) in the class I city of Mangalore. Fifty per cent of the sample towns and cities have slums varying in number, from one in towns like Gokak, Nipani and Tumminkatti, to 10 in Mangalore. There are nearly 83,000 slum dwellers, in our sample towns, their occupations showing a wide range: milk suppliers in Mercara, agricultural labourers in Bannur, cotton weavers in Pavagada, mill workers in Davangere, fishermen and Muslim *beedi* workers in Mangalore, stone breakers in Nipani, and sweepers and scavengers in almost every town. Both on economic and social grounds, the blighted and slum areas need rehabilitation, and their redistribution should be properly planned after conducting detailed surveys. It is not proper to shift slums to fringe areas, or other central places in the town, without first understanding the relations between the location of slums and the working places of slum dwellers. Moreover, it is also not easy to shift or split up a slum, since slum workers very often develop a strong social cohesion, more so, if they belong to one linguistic group, as in the case of Telugu and Tamil slums in Mandya. Slums are really social groups, and they do commonly have a headman[2]. Fringe location implies that some special arrangements should be made by their employers or by the municipaliities, for movement to work places.

The functional zone maps of Nelamangala, Mandya, Tumkur and Mangalore illustrate both inappropriate use and lack of integration between different functions within

[1] This area is now under the influence of the Tungabhadra project.

[2] Miss G. M. Woodruff, conversation 1957. Miss Woodruff, is now completing in the University of Harvard a socio-anthropological study of one particular slum area in Bangalore along with the *cheris* (or out-caste hamlets) from which most of the people come, and also a re-housing area to which some families have moved.

a town. Whether in a small agricultural town like Talakad or Bagepalli, or medium sized tertiary towns like Chikballapur and Mandya, new extensions—schools and offices—are located along the through routes, unconsciously inviting the problem of crossing the routes at numerous points by school going children and office going workers. This haphazard and unintegrated fringe and ribbon development should be controlled by planning the use of land in urban and peri-urban areas. In towns like Nelamangala, ring roads should be developed but town or factory development along the ring road, as we find in Channapatna (photo below), should be prevented. Otherwise the purpose of the ring

road is defeated. Areas near a rail line, if not already built up, should preferably be earmarked for the future location of factory industries and warehouses, instead of permitting residential areas or school zones to develop, as in Tumkur.

Urban spread

Decennial growth rates (1900–1960) examined in conjunction with the urban spread maps of sample towns indicate that the period between 1920 and 1950 was one of rapid development, so there was encroachment on cultivated land. Nearly 20 per cent of the town area in Chikballapur consisted of formerly cultivated land, encroached upon by town development, 34 per cent in Mandya, 35 per cent in Gadag, 63 per cent in Nelamangala, 37 per cent in Talakad, 54 per cent in Haliyal and 49 per cent in Haveri. Considering all these sample towns together, 30 per cent (just over 1100 acres) of the total town area consists of cultivated land permanently lost as a result of urban spread during the period 1920–1950. There is an indication that by 1960, 185 acres of cultivated land will be converted to house sites, or school zones or other urban uses. In Mangalore, residential area developed over nearly 300 acres of first class agricultural land, while in Tumkur, rice and oil mills developed over 20 acres. In Haliyal the town extended over a part of rice land.

Encroachment seems inevitable whether in a small town with slow growth like Talakad or rapidly growing towns like Chikballapur, Mandya and Gadag. Even if there are extensive areas of flat or gently undulating waste lands as in Bidar or east of Mangalore, the town does not develop easily in those areas chiefly because of the problem of water supply.

In most of the towns the distribution of open spaces available for urban use is more peripheral than central, thereby suggesting that the stage of in-growth is completed, and now towns are tending to expand outwards. The open spaces within the town are either first class agricultural lands, or parks or those earmarked for specific purpose like schools, hospitals or labour colonies. Open spaces also consist of dry tanks, hilly areas, and in some cases waste lands, which are ideal for urban use. Dry tank beds are being used for different purposes. In Chikballapur, an old tank bed is now a park. In Davangere, a tank bed is earmarked for small scale industries, a bazaar and a timber yard. Another tank bed is used for a labour colony.

Conclusion

As a result of urban spread, the sale value of lands, in the urban and peri-urban areas have increased. Near the towns like Davangere, Mandya and Nelamangala, the sale values vary between Rs. 1000/- and Rs. 2000/- per acre while in the rural areas, outside the peri-urban areas, the sale values vary between Rs. 400/- and Rs. 600/-. There are sharp variations in the sale values in different parts of a town, and even within the peri-urban area, particularly in the newly developing fringes. In Hampankatta, the central and the most active business area in Mangalore, an acre of land costs one lakh of rupees, while in the new extensions, the value varies from Rs. 6000/- to Rs. 8000/-. In Davangere, the value of lands near the mill area is Rs. 4000/- per acre, 400 per cent more than the value of the lands in the developing fringes. In Nelamangala, the value of peri-urban land, a few hundred yards away, off the main road, is 20 to 30 per cent less than that adjacent to it.

It is not easy to control the sale values of urban and peri-urban land and the associated speculation, as long as the lands are private property. Municipalities with their limited finances can never hope to purchase these potential areas, where the future urban development is likely to take place.

From our study of the functional zones and the urban spread of sample towns, it becomes evident that without planning, adverse effects of urban growth and spread cannot be avoided. Detailed surveys of the urban and peri-urban areas should be conducted, and working plans prepared. Areas of future town development should be demarcated, and the function of each zone indicated. Areas unsuitable for town development, because of both physical and economic reasons should also be indicated. Here air photographs of the urban and peri-urban areas will be of great help.

As an experiment, and to stimulate thought, we have prepared what we have called synthetic maps for two towns, Talakad and Mandya, and these can be refined when detailed surveys are undertaken. Where encroachment on cultivated land is inevitable, as in Talakad, or even in some sections of Chikballapur, the areas with least land productivity, as decided by crop yields and assessment, are marked out for future town development (see synthetic map for Chikballapur, Fig. 30).

Urban services and amenities

Inter-regional and inter-town variations in urban services and amenities* are analysed and evaluated with the help of specially designed maps and tabulations. Eight orders or grades of urban centres are recognised. Bangalore by virtue of its size, function and administrative status is ranked as of first order. There are only 10 towns out of 54 sample towns selected for study, which can be ranked as of second order. The service situation can be considered as very unsatisfactory in the sixth, seventh and eighth order of towns where protected water supply, electricity, banking facilities and permanent picture houses are absent.

Based on this system of ranking, we may conclude that the Southern Maidan is relatively well placed in urban services and amenities, while in the Malnad, the north Coastal Region, and the north-western and north-eastern sections of Northern Maidan, they are highly unsatisfactory.

Hotels and educational institutions are present in all the 54 sample towns and cities. In 33 per cent of sample towns, there is neither protected water-supply nor electricity, the two basic public utility services, while 70 per cent do not have protected water supply. Even in the cities and towns with protected water supply, each resident does not get the

* 1. Electricity, 2. Protected water supply, 3. Conservancy, 4. Hospitals, 5. Educational institutions, 6. Permanent picture houses, 7. Banks, 8. Post-Offices, 9. Radio and 10. Hotels.

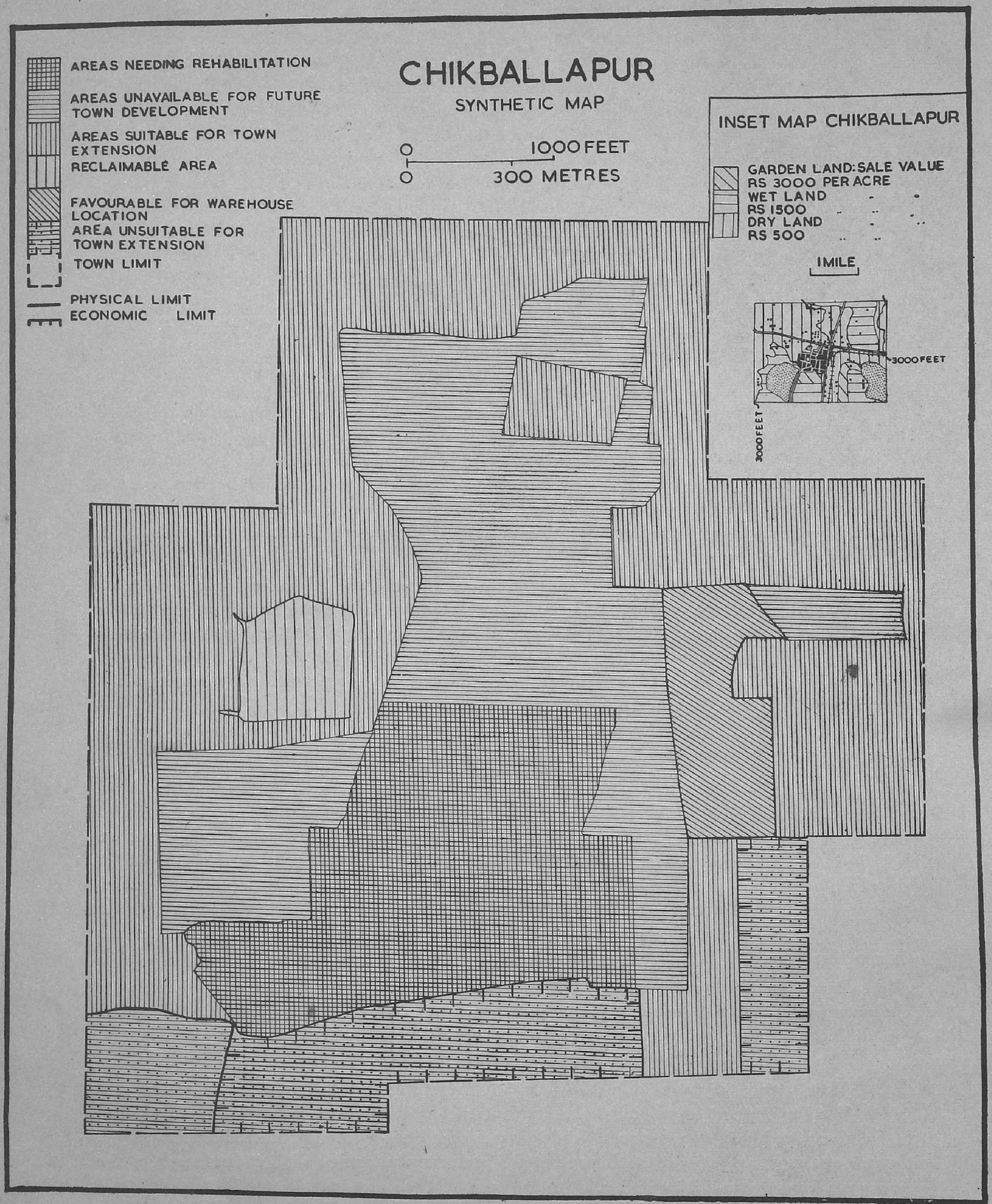
CHIKBALLAPUR
SYNTHETIC MAP
1000 FEET
300 METRES
AREAS NEEDING REHABILITATION
AREAS UNAVAILABLE FOR FUTURE TOWN DEVELOPMENT
AREAS SUITABLE FOR TOWN EXTENSION
RECLAIMABLE AREA
FAVOURABLE FOR WAREHOUSE LOCATION
AREA UNSUITABLE FOR TOWN EXTENSION
TOWN LIMIT
PHYSICAL LIMIT
ECONOMIC LIMIT
INSET MAP CHIKBALLAPUR
GARDEN LAND: SALE VALUE RS 3000 PER ACRE
WET LAND RS 1500
DRY LAND RS 500
1 MILE
3000 FEET
3000 FEET

FIG. 30

recognised desirable minimum of 20 gallons per day. In Bangalore the per capita supply is only 13 gallons, in Mangalore 15 gallons, and in Davangere even lower—8 gallons. Only Mysore and Shimoga supply the minimum per capita. One consequence of urban growth would be a drain on sub-surface water, since in many towns, it is the chief source. To supply the absolute minimum of 16 gallons per capita, the urban population in the whole State needs a minimum of 712 lakhs of gallons per day. When tanks are the source of water supply for a town, the problem of competitive use between agricultural and urban needs has to be faced. To give one specific example, if the Sreenivasa Sagara tank is to be the source of water supply to Chikballapur, the agricultural fields under the tank are deprived of at least 3.2 lakhs of gallons per day. Thus the problem of water supply to towns becomes regional and interdependent with the problem of irrigation, where tanks, streams and channels are involved.

Our general impression is that as a result of rapid growth of urban population, the pressure on urban services is increasing. Probably the new extensions seem to have better services but the 'core' or 'kernel' of the town, occupying a larger area, is becoming more and more a congested area. During the last 20 years, the tax burden on a resident in a town has increased with no significant improvement in services. This is the opinion of the older citizens in the towns, as well. The sharp contrasts in living conditions between the new extensions and the 'kernel', are not a healthy sign, and the kernel needs immediate rehabilitation. Finance will be the bottleneck in the execution of any scheme for rehabilitation. This can be partly solved by the formation of Town-Groups (see p. 95).

Our analysis of the relation between size and services had indicated that there is a lower as well as an upper limit to the economic size of a town. The range of lower limit may be taken as 10,000 to 20,000 and 50,000 to 1 lakh or 1.5 lakhs as the range of upper limit. Here again we would suggest that the Regional Survey Unit should undertake theoretical studies on the optimum size of a town.

Depopulation of the countryside

We can conclude from our sample town studies that in the rapidly growing industrial and tertiary (services) towns, a large-scale influx has taken place, in the last 20 or 30 years, and is still continuing, perhaps on a lesser scale. It has already been observed that in Davangere, labourers emigrated from Dharwar, Bijapur, Malnad and also Madras. By comparing the variability of rural and urban population in different towns and the nearby talukas, we could locate areas where the depopulation of the nearby countryside had taken place during the last 50 years. In Bhadravati and Sagar talukas, rural population increased by 14.2 and 0.3 per cent respectively between 1901 and 1951, while in Shimoga, it decreased by one per cent. The urban population in these talukas increased by 1485, 305 and 503 per cent respectively. Evidently, this indicates the "pull" of these towns on the population of the nearby or farther areas. In the case of Nargund taluka, both the urban and rural population decreased, though at a slow rate. This seems to be anomalous because the agricultural productivity of the tract is high, power is available, and pressure of population on agricultural land is also low. Both the Bhadravati and the Nargund areas should be treated as problem areas, and a detailed survey is suggested. Sakhlespur-Chikmagalur and Shahapur-Gogipet areas are the other two significant areas of rural depopulation. While urban population is increasing at a high or very high rate, rural population is increasing at a low rate, and even decreasing as in Chikmagalur and Belur talukas.

Zonal Capitals

From our brief study of urban services and amenities and urban fields in the Mysore State, at least three conclusions can be drawn that: (i) there is a relation between the size

of an urban centre and the nature and range of services it can provide, (ii) urban fields differ in extent, character and intensity, all the three being related to the population size, function and situation of the urban centre and (iii) the boundaries of urban fields are independent of the arbitrary taluka and district boundaries.

Our map of urban fields and the map of the 'umland' of Bangalore[1] clearly bring out that the north Coastal Region, northern and central Malnad, the Nipani-Chikodi and Shantpur areas of Northern Maidan are located far outside the orbit of the influence of Bangalore. Our analysis of town and city locations also indicated the eccentric location of the cities, and the highly scattered distribution of medium sized towns. Herein lies the need for the development of what we might call Zonal Capitals.

It is necessary that the Zonal Capital should belong to first order in respect of urban services and preferably, though not necessarily, have a central location, in its zone or urban field, or at least it must be accessible. If it is accepted that an urban centre was a lower as well as an upper-limit to function economically, its size should be within these limits. Based on our conversation with the town planning experts in Bangalore and Hyderabad[2], we are inclined to suggest the population size of the Zonal Capital to be between 50,000 and 1 lakh or 75,000 and 1.5 lakhs. Such a capital should not have another equally important centre preferably within a radius of 50 miles. The primary function of such a capital lies in providing central, public utility and also cultural services economically and efficiently to its urban field. Davangere satisfies all these requirements, and we suggest that it should be developed as a Zonal Capital. Likewise Mangalore can be developed as a Zonal Capital for the Coastal Region, provided its accessibility to the northern Coastal Region is improved. No urban centre in the Malnad has these standards suggested for a Zonal Capital. Probably Sagar or Mercara may be developed but their accessibility to different parts of Malnad should be improved. If detailed studies are carried out for the other regions in the State, the Zonal Capitals can be pinpointed. Dharwar or Belgaum may be selected for the north-western section of Northern Maidan, and Gulbarga for the north-eastern section.

The development of such Zonal Capitals not only prevents over centralisation, as we now have in Bangalore but also provides services to their respective areas more economically and efficiently.

Planning Regions

Here four area-levels of Planning Regions are envisaged: (i) National level, (ii) State level, (iii) Urban-Field level, and (iv) Local i.e., Town or Village level.

In the context of Urban-Survey for Regional Planning our contribution lies in the delimitation of urban fields. A physio-agronomic region may have one or more urban fields. Likewise an urban field may include parts of different physio-agronomic regions. This aspect of inter-relations between urban fields and physio-agronomic regions is being studied. Our present attempt has been only exploratory and suggestive, and detailed surveys are needed to exactly delimit urban-fields for action programmes.

An urban field constitutes a rational area for planning chiefly because there is functional link between town and country and different towns within the field. Moreover, the different towns in an urban-field can pool their financial and industrial resources to

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[1] Prepared by Dr. R. L. Singh: Umland and urban-field are more or less interchangeable terms.

[2] March 1958. *Op. cit.*, p. 30.

develop a common plan for the development of the area as a whole and also for the improvement of services[1].

Our enquiries in the sample towns and cities made it clear that town Municipalities, left to themselves, are unable to improve living standards in their towns due to their limited finances, while the Central and State governments are equally not in a position to make liberal grants to all the towns and cities. Some of the Municipalities (e.g., Chikballapur and Mandya) included the neighbouring villages into their jurisdiction and extended service facilities like electricity and conservancy, and thus increased their municipal revenues by taxing the villagers, who are the beneficiaries.

Here we would suggest that different towns, which are closely located or all the towns in an urban field should form into Town Groups[2], and be planned for general rehabilitation and improvement of urban services and amenities. The incidence of taxation per head in Haliyal, a small town, is nearly Rs. 13/-, the same as that in Davangere, a city, while in other small towns like Nargund and Rabkavi, it is Rs. 8/-.

This shows that tax burden in small towns is already high, and Municipalities cannot increase their revenue any further through taxable income. The need for the formation of Town Groups seems to be greater in small towns than cities. Nipani-Chikodi are with its 10 closely located towns of more or less the same size and the Jamkhandi-Rabkavi group with its six closely located towns of different size and type are ideal areas for an experiment in the development of Town Groups. All the towns in the Nipani-Chikodi area, when considered together will have a total population of just above a lakh while the population of the Jamkhandi-Rabkavi group will be just above 71,000.

We are aware of the many shortcomings of this survey, and we welcome constructive criticisms. The methods of analysis and mapping developed in the course of this survey have proved fruitful but will need refinement and modification. If this survey leads to detailed surveys on some of the aspects studied by us, and permanent Regional Survey Units are started by different State Governments, we shall consider that our efforts have been rewarded.

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[1] Of course there are urban-field overlaps, and in some of them inter-town relations are competitive (e.g., between Chikballapur and Bagepalli). By proper planning of the functioning of the towns, inter-town relations can be integrated or made complimentory.

[2] This idea springs from the writer's discussions with Dr. V. V. Ramanadham of Andhra University on the geographic and economic aspects of towns in Andhra. December 1956.

APPENDICES

A. Summary Tables

TABLE 1

serial no.	sample town	town type code	amplitude of relief (in feet)	serial no.	sample town	town type code	amplitude of relief (in feet)
1	2	3	4	1	2	3	4
1.	Bhalki	I′	10	36.	Sagar	I′	70
2.	Rejeswar	Ia	20	37.	Honnali		50
3.	Sahabad	Ii	90	38.	Gokarna	I′	50
4.	Aland	Ib	—	39.	Davangere	I′	40
5.	Bidar	I	20	40.	Haveri	I′	104
6.	Gokak	B	70	41.	Gubbi	B	30
7.	Kudchi	Ia	50	42.	Bagepalli	Ia	50
8.	Kamadolli	Ia		43.	Bhadravati	Ii	30
9.	Borgaon	Ia	10	44.	Arsikere	Ib	50
10.	Hukeri	Ia	50	45.	Kolar	I′	70
11.	Gogipet	Ia	10	46.	Nelamangala	I′	25
12.	Hungund	Ia	60	47.	Shimoga	I′	70
13.	Rabkavi	Ii	50	48.	Tumkur	I′	25
14.	Nipani	Ib	50	49.	Udipi	I′	50
15.	Bijapur	I′	100	50.	Chikballapur	I′	10
16.	Athani	I′	10	51.	Ajjampur	I′	7
17.	Talikote	I′	20	52.	Konanur	B	22
18.	Hadagalli	Ia	50	53.	Periyapatna	Ia	50
19.	Nargund	Ia	50	54.	Talkad	Ia	15
20.	Kustagi	Ia	10	55.	K.G.F.	Ii	200
21.	Ron	Ia	20	56.	Mercara	Is	100
22.	Mulgund	Ia	189	57.	Kollegal	Ib	50
23.	Ilkal	Ii	25	58.	Nanjangud	I′	10
24.	Munirabad	Is	×	59.	Mandya	I′	40
25.	Angol	Ib	34	60.	Bannur	I′	10
				61.	Channapatna	I′	65
26.	Kinhal	I′	10	62.	Chennarayaptna	I′	50
27.	Gadag	I′	125	63.	Puttur	I′	50
28.	Haliyal	I′	100	64.	Gundulpet	Ib	20
29.	Nandgod	I′	40	65.	Chamrajnagar	I′	100
30.	Nyamati	B	20				
					CITIES		
31.	Majali	Ia	5	1.	Belgaum	I′s	200
32.	Manki	Ia	10	2.	Bellary	I′s	350
33.	Tumminkatti	Ii	20				
34.	Karwar	Is	150	3.	Mangalore	I′s	185
35.	Pavagada	Is	70	4.	Mysore	I′s	189

TABLE 2A

serial no.	name of the sample town	3. slums			4. electrification					
		no. of slums	total slum population	chief occupation	% of houses electrified	monthly consumption in k.w.h. industrial	residential	irrigation	total	power capacity of the station
1	2	3a	3b	3c	4a	4b	4c	4d	4e	4f
1.	Bhalki	—	—	—	—	—	—	—	—	—
2.	Rajeswar	—	—	—	—	—	—	—	—	—
3.	Sahabad	2	2000	factory labour	—	—	—	—	—	—
4.	Aland	—	—	—	—	—	—	—	—	—
5.	Bidar	×	×	×	3	—	—	—	—	25 k.w.
6.	Gokak	1	2000	ag. labour and fishing	16	855	2170	—	7552	×
7.	Kudchi	—	—	—	—	—	—	—	—	—
8.	Kamadolli	—	—	—	—	—	—	—	—	—
9.	Borgaon	—	—	—	—	—	—	—	—	—
10.	Hukeri	—	—	—	12	697	1259	—	3349	400 k.w.
11.	Gogipet	—	—	—	—	—	—	—	—	—
12.	Hungund	×	×	×	×	×	×	×	×	×
13.	Rabkavi	3	900	weaving-cooly	×	41	3887	—	3928	35 k.w.
14.	Nipani	1	600	stone breaking	33	8208	8390	144	35366	49225 k.w.
15.	Bijapur	7	×	scavengers & leather tanners.	×	3535	11203	278	42897	325 k.w. (daily)
16.	Athani	7	680	ag. labours coolies	10	—	3110	—	4190	5859 k.w.
17.	Talikote	—	—	—	—	—	—	—	—	—
18.	Hadagalli	—	—	—	—	—	—	—	—	—
19.	Nargund	—	—	—	×	83242	2342	—	86500	×
20.	Kustagi	—	—	—	—	—	—	—	—	—
21.	Ron	—	—	—	—	—	—	—	—	—
22.	Mulgund	—	—	—	—	—	—	—	—	—
23.	Ilkal	×	×	×	14	800	3000	—	7800	200 k.w.
24.	Munirabad	—	—	—	100	—	—	×	×	×
25.	Angol	2	1300	stone breaking	30	—	×	—	×	—
26.	Kinhal	×	×	×	—	—	—	—	—	—
27.	Gadag	2	×	scavengers	×	10092	19230	492	59654	500 k.v.a.
28.	Haliyal	2	200	scavengers	—	—	—	—	—	—
29.	Nandgod	8	1500	labourers	—	—	—	—	—	—
30.	Nyamati	1	150	coolies	38	10308	4819	239	18858	—
31.	Majali	—	—	—	—	—	—	—	—	—
32.	Manki	5	875	coolies	—	—	—	—	—	—
33.	Tumminkatti	1	120	weavers	—	—	—	—	—	—
34.	Karwar	—	—	—	17.1	—	—	—	10000	180 k.v.a.
35.	Pavagada	2	300	weavers	30	11000	2000	4000	19000	22000 k.v.a.

TABLE 2A—*Contd.*

serial no.	name of the sample town	3. slums			4. electrification					
		no. of slums	total slum population	chief occupation	% of houses electrified	monthly consumption in k.w.h. industrial	residential	irrigation	total	power capacity of the station
1	2	3a	3b	3c	4a	4b	4c	4d	4e	4f
36.	Sagar	5	5500	labourers	46	30654	14495	—	50521	580 k.w.
37.	Honnali	3	485	ag. labourers	×	10180	3140	1083	16000	×
38.	Gokarna	—	—	—	—	—	—	—	—	—
39.	Davangere	4	11000	mill workers	30	10720181	64218	5832	1209323	4500 k.v.a.
40.	Haveri	×	×	×	35	8878	2142	97	19383	2400 k.w.h.
41.	Gubbi	—	—	—	40	15000	4000	1500	25000	100 k.w.
42.	Bagepalli	—	—	—	15	2750	1000	3500	6000	×
43.	Bhadravati	5	3630	scavengers	60	51384	10790	2006	78887	120000 k.v.a.
44.	Arsikere	×	×	×	50	26252	22278	825	89708	1500 k.v.a.
45.	Kolar	×	×	×	×	25076	21000	13932	93234	6000 k.v.a.
46.	Nelamangala	×	×	×	70	10000	4100	600	17988	24000 k.w.
47.	Shimoga	3	800	sweepers	46	100000	70000	3800	253000	12000 k.v.a.
48.	Tumkur	6	3750	coolies	—	122559	49000	10005	240011	2250 k.v.a.
49.	Udipi	2	200	sweepers	27	12500	26400	700	61866	1000 k.v.a.
50.	Chikballapur	×	×	×	10	7000	32000	8000	62000	2100 k.v.a.
51.	Ajjampur	—	—	—	30	2383	4500	117	7000	350 k.v.a.
52.	Konnanur	4	1390	coolies, fishing	30	5345	1756	969	17849	×
53.	Periyapatna	2	660	sweepers	14	2320	1326	254	6110	—
54.	Talkad	—	—	—	10	1500	1500	750	15000	156 k.v.a.
55.	K.G.F.	×	×	×	×	×	×	×	×	×
56.	Mercara	2	1000	milk suppliers	50	2783	11377	—	26358	×
57.	Kollegal	2	1000	coolies	18	46882	8263	3768	81000	×
58.	Nanjangud	2	1500	sweepers	45	299678	19371	14772	356100	3000 k.v.a.
59.	Mandya	6	4990	×	75	×	3043	×	11140	1500 k.v.a.
60.	Bannur	8	2400	ag. labourer	23	14147	3502	1656	17749	250 k.w.h.
61.	Channapatna	4	1700	ag. labourer	28	40480	14000	1212	86034	450750
62.	Chennarayapatna	1	52	sweepers	30	11687	4226	1601	22614	24000 k.w.
63.	Puttur	4	480	sweepers	10	1500	×	×	×	600 k.w.
64.	Gundlupet	×	×	×	×	×	×	×	×	×
65.	Chamarajnagar	3	840	scavengers, coolies.	25	34857	13287	22095	86439	×
	CITIES									
1.	Belgaum	3	1700	scavengers, stone-breakers	27	150686	100241	7061	329216	1721 k.w.
2.	Bellary	7	3200	scavengers & stone-breakers	51	103524	87548	20778	219730	1000 k.w.
3.	Mangalore	10	2500	fishermen & poor muslims	21	118379	150411	87	363301	3000 k.v.a.
4.	Mysore	9	29000	scavengers &	55	2969632	443315	18000	4324763	15000 k.v.a.

TABLE 2B

serial no.	source	5. water supply: daily consumption	present capacity of the station	full capacity of the station	per capita daily consumption	% of residential house taps	6. drainage: surface	underground
	5a	5b	5c	5d	5e	5f	6a	6b
1.	wells	—	—	—	—	—	—	—
2.	wells	—	—	—	—	—	—	—
3.	Kagne river and wells	—	—	—	—	—	/	—
4.	wells	—	—	—	—	—	/	—
5.	nala	3,00,000	3,00,000	3,00,000	7	18	/	/
6.	wells	—	—	—	—	—	/	—
7.	Krishna river and wells	—	—	—	—	—	—	—
8.	wells	—	—	—	—	—	—	—
9.	wells and tanks	—	—	—	—	—	/	—
10.	fountains	—	—	—	—	—	/	—
11.	wells	—	—	—	—	—	—	—
12.	×	×	×	×	×	×	×	×
13.	wells	—	—	—	—	—	—	/
14.	tanks	2,50,000	10,00,000	10,00,000	10	25	/	—
15.	tank	10,00,000	×	×	15	14	/	—
16.	wells	—	—	—	—	—	/	—
17.	Doni river and wells	—	—	—	—	—	—	—
18.	wells	—	—	—	—	—	/	—
19.	tank and wells	—	—	—	—	—	/	—
20.	wells	—	—	—	—	—	/	—
21.	wells	—	—	—	—	—	/	—
22.	wells	—	—	—	—	—	—	—
23.	wells	—	—	—	5	—	—	—
24.	dam	—	—	—	5	—	—	—
25.	wells	—	—	—	—	—	/	—
26.	Kinhal stream and wells	30,000	—	—	5	—	—	—
27.	wells	—	—	—	—	—	—	/
28.	wells	—	—	—	—	—	/	—
29.	wells	—	—	—	—	—	/	—
30.	bore wells	10,000	—	—	—	—	/	—
31.	wells	—	—	—	—	—	—	—
32.	wells	—	—	—	—	—	/—	—
33.	wells	—	—	—	—	—	/	—
34.	wells	—	—	—	—	—	/	—
35.	wells	—	—	—	—	—	/	—
36.	wells	—	—	—	—	—	—/	—

F.N. Serial numbers denote the Sample towns in Tables 1 and 2 with the same serial numbers.

TABLE 2B—*Contd.*

serial no.	source	5. water supply: daily consumption	present capacity of the station	full capacity of the station	per capita daily consumption	% of residential house taps	6. drainage: surface	underground
	5a	5b	5c	5d	5e	5f	6a	6b
37.	×	—	—	—	—	—	/	—
38.	wells	—	—	—	—	—	/	—
39.	Tungabhadra	6,00,000	6,05,000	6,05,000	8	—	/	—
40.	pond and wells	—	—	—	5	—	—	—
41.	bore wells	—	—	—	—	—	/	—
42.	Chitravati	30,000	30,000	30,000	10	—	/	—
43.	Bhadra	15,00,000	3,51,00,000	3,51,00,000	15	46.6	/	/
44.	bore wells	1,50,000	1,50,000	2,00,000	8	43.5	/	—
45.	tank	—	—	—	—	—	/	—
46.	wells	×	×	×	×	—	/	—
47.	Tunga	9,00,000	9,40,000	9,40,000	18	53.7	/	—
48.	tank and wells	4,00,000	3,50,000	5,00,000	10	—	/	—
49.	wells	—	—	—	—	—	/	—
50.	bore wells	49,000	48,000—50,000	50,000	3	×	×	×
51.	wells	—	—	—	5	—	—/	—
52.	Cauvery river	50,000	×	×	11	10.3	/	—
53.	wells and ponds	—	—	—	—	—	/	—
54.	Cauvery river and wells	—	—	—	—	—	—	—
55.	×	4,00,000	×	×	×	×	×	×
56.	tank	×	×	×	×	×	/	—
57.	wells	—	—	—	—	—	/	—
58.	Kapini river	4,00,000	4,50,000	6,00,000	20	38	/	—
59.	Krishnaraja-sagar	2,40,000	40,00,000	40,00,000	12	—	/	—
60.	Cauvery river	—	—	—	—	—	/	—
61.	river and bore wells	80,000	1,03,000	1,03,800	10	×	/	—
62.	bore wells	49,500	52,600	57,600	7	8.5	/	—
63.	wells	—	—	—	—	—	/	—
64.	×	×	×	×	×	×	×	×
65.	wells	—	—	—	—	—	/	—
	CITIES							
1.	wells	—	—	—	—	—	/	—
2.	Hagari river and wells tanks.	3,50,000	2,30,000	2,30,000	4	—	/	—
3.	Netravati river	×	10,20,000	10,20,000	15	×	/	—
4.	Devaraj channel	53,00,000	53,00,000	53,00,000	20	37	/	/

TABLE 2C

serial no.	7. conservancy			8. health		9. education				
	number of pit latrines	number of d.c. latrines	other types flush and hand flush	total number of hospitals	total number of beds	number of schools and colleges	primary	secondary (middle)	high schools	colleges
	7a	7b	7c	8a	8b	9a	9b	9c	9d	9e
1.	75	100	—	1	4	4	3	—	1	—
2.	—	—	—	1	—	2	1	1	—	—
3.	—	500	—	1	4	3	2	—	1	—
4.	—	1000	—	1	4	4	3	—	1	—
5.	×	×	×	1	×	×	×	×	×	×
6.	349	—	—	1	9	11	10	—	1	—
7.	—	—	—	1	—	5	5	—	—	—
8.	—	—	—	—	—	3	3	—	—	—
9.	—	—	4	1	—	5	5	—	—	—
10.	100	80	—	1	6	5	—	4	1	—
11.	—	—	—	1	—	3	2	—	1	—
12.	×	×	×	×	×	×	×	×	×	×
13.	50	—	—	2	8	12	10	—	2	—
14.	—	524	4	3	18	15	13	—	2	—
15.	—	1500	20	4	6	52	35	8	8	1
16.	79	—	—	1	8	11	10	—	1	—
17.	—	—	—	1	8	6	5	—	1	—
18.	×	—	—	1	—	5	×	×	×	—
19.	×	—	—	1	—	4	3	—	1	—
20.	—	2	—	1	4	5	4	—	1	—
21.	×	×	×	1	2	5	4	1	—	—
22.	—	—	—	1	—	4	3	—	1	—
23.	—	103	—	1	7	15	13	1	1	—
24.	—	500	—	1	×	—	—	—	—	—
25.	300	35	—	1	—	4	4	—	—	—
26.	—	—	—	—	—	1	1	—	—	—
27.	—	1675	20	2	50	34	29	—	4	1
28.	900	—	—	1	6	6	5	—	1	—
29.	950	—	—	—	—	6	5	—	1	—
30.	—	30	13	1	—	8	5	2	1	—
31.	—	—	—	—	—	15	14	3	1	—
32.	—	—	—	1	—	13	10	3	—	—
33.	40	—	—	1	—	4	4	—	—	—
34.	597	—	—	1	×	×	×	×	5	—
35.	—	50	35	1	25	5	2	2	1	—
36.	1200	700	200	1	15	15	10	3	2	—

F.N. Serial numbers denote the Sample towns in Tables 1 and 2 with the same serial numbers.

TABLE 2C—*Contd.*

serial no.	7. conservancy			8. health		9. education				
	number of pit latrines	number of d.c. latrines	other types flush and hand flush	total number of hospitals	total number of beds	number of schools and colleges	primary	secondary (middle)	high schools	colleges
	7a	7b	7c	8a	8b	9a	9b	9c	9d	9e
37.	—	30	6	1	2	8	5	2	1	—
38.	100	—	—	1	4	14	11	3	—	—
39.	—	2387	—	3	76	54	34	8	5	2
40.	57	100	—	1	8	10	9	—	1	—
41.	—	150	5	1	2	10	7	2	1	—
42.	300	15	—	1	4	5	2	2	1	—
43.	100	—	5000	4	190	35	21	11	3	—
44.	—	2930	70	1	40	9	6	2	1	—
45.	269	—	23	×	×	25	18	7	—	—
46.	2000	—	—	1	8	5	—	4	1	—
47.	—	5600	860	1	250	48	35	8	5	—
48.	200	1731	171	2	126	44	29	10	4	1
49.	2263	—	—	1	22	21	16	—	5	—
50.	×	×	25	4	106	×	×	×	1	×
51.	50	120	25	—	—	7	4	2	1	—
52.	200	—	90	1	5	8	5	2	1	—
53.	50	—	30	1	6	7	5	1	1	—
54.	—	—	—	—	1	3	1	1	1	—
55.	×	×	×	×	×	19	5	10	4	—
56.	×	—	100	2	90	8	4	—	3	—
57.	—	303	—	2	50	15	10	3	2	—
58.	20	1500	—	8	74	14	10	3	1	—
59.	×	×	×	1	80	×	×	×	×	×
60.	60	125	—	1	—	6	3	2	1	—
61.	—	600	135	2	4	27	21	4	2	—
62.	2000	—	250	1	7	8	5	2	1	—
63.	150	—	300	1	33	11	6	2	3	—
64.	×	×	×	×	×	×	×	×	×	×
65.	450	300	25	1	12	20	12	6	1	1
	CITIES									
1.	5579	—	—	14	105	77	(60)		12	5
2.	4	6817	35	3	375	70	47	12	7	1
3.	15086	—	5	2	×	×	×	×	×	×
4.	—	8983	14539	7	×	137	83	23	18	8

TABLE 2D

serial no.	total number of post offices	total number of radios	total number of banks	total number of hotels	total number of picture houses	15. mode of local movements			
						foot	cycle	jutka	bus
	10	11	12	13	14	15a	15b	15c	15d
1.	1	12	—	10	—	/	/	—	—
2.	1	4	1	4	—	/	/	—	—
3.	1	13	1	30	1	/	/	—	—
4.	1	21	—	15	1	/	/	—	—
5.	1	—	1	51	3	/	/	/	—
6.	1	113	4	52	2	/	/	—	—
7.	1	2	1	11	—	/	—	—	—
8.	1	1 (Public)	—	8	—	/	—	—	—
9.	1	10	—	8	—	/	/	—	—
10.	1	44	2	27	—	/	—	—	—
11.	1	4	—	13	—	/	/	—	—
12.	×	×	×	×	×	×	×	×	×
13.	3	107	6	47	2	/	/	—	—
14.	3	400	6	67	2	/	/	/	—
15.	7	630	10	90	3	/	/	/	/
16.	2	76	4	30	2	/	/	—	—
17.	1	49	1	19	1	/	—	—	—
18.	1	12	—	1	—	/	—	—	—
19.	1	34	3	35	—	/	—	—	—
20.	1	18	1	16	10	/	—	—	—
21.	1	15	2	25	—	/	—	—	—
22.	1	13	1	10	—	/	—	—	—
23.	2	84	2	35	1	/	/	—	—
24.	1	100	—	5	1	/	/	/	—
25.	1	125	×	8	—	/	/	—	/
26.	1	7	2	18	1	/	—	—	—
27.	4	×	×	156	3	/	/	/	—
28.	5	101	3	19	—	/	/	—	—
29.	1	15	3	20	—	/	/	/	—
30.	1	20	—	16	—	/	—	—	—
31.	1	2	—	10	—	/	—	—	—
32.	1	1	—	11	—	/	—	—	—
33.	1	5	—	8	—	/	/	—	—
34.	×	×	×	×	×	×	×	×	×
35.	1	20	2	10	—	/	/	—	—
36.	1	204	4	65	2	/	/	—	—

F.N. Serial numbers denote the Sample towns in Tables 1 and 2 with the same serial numbers.

TABLE 2D—*Contd.*

serial no.	total number of post offices	total number of radios	total number of banks	total number of hotels	total number of picture houses	15. mode of local movements			
						foot	cycle	jutka	bus
	10	11	12	13	14	15a	15b	15c	15d
37.	1	25	—	18	—	/	/	—	—
38.	1	5	1	17	—	/	—	—	—
39.	4	600	6	163	4	/	/	/	—
40.	2	152	3	36	2	/	/	—	—
41.	1	—	—	30	1	/	/	—	—
42.	1	16	—	8	1	/	/	—	—
43.	2	288	3	76	4	/	/	—	—
44.	3	221	2	36	1	/	/	—	—
45.	×	×	×	×	×	×	×	×	×
46.	1	49	×	12	—	/	/	—	—
47.	4	×	8	63	3	/	/	—	—
48.	4	588	2	99	3	/	/	/	—
49.	8	218	5	113	1	×	×	×	×
50.	2	255	×	43	4	×	×	×	×
51.	1	35	—	7	—	/	—	—	—
52.	1	13	—	8	—	/	—	—	—
53.	1	27	1	15	—	/	—	—	—
54.	1	25	—	6	—	/	—	—	—
55.	7	314	×	×	×	×	×	×	×
56.	2	383	6	29	1	×	×	×	×
57.	1	184	3	35	1	/	/	/	—
58.	3	190	2	40	2	/	/	/	—
59.	×	450	3	55	1	×	×	×	×
60.	1	24	—	25	1	/	/	—	—
61.	1	171	×	28	1	/	/	—	—
62.	1	44	—	19	1	/	/	—	—
63.	2	51	8	20	1	/	/	—	—
64.	×	×	×	×	×	×	×	×	×
65.	1	177	5	34	2	/	/	/	—
	CITIES								
1.	10	2100	9	266	9	/	/	/	/
2.	9	×	7	104	5	/	/	/	—
3.	×	×	24	—	—	/	/	/	/
4.	16	5545	15	384	12	/	/	/	/

TABLE 2E

serial no.	16. sale value of land peri-urban			16. daily wage rates					
				urban			peri-urban		
	wet	dry	garden	skilled	unskilled	females	skilled	unskilled	females
	16a	16b	16c	17a	17b	17c	17d	17e	17f
1.	—	250	500	2– 0–0	1– 0–0	0– 8–0	2– 0–0	1– 0–0	0– 8–0
2.	—	200	1000	2– 0–0	0–12–0	0– 6–0	2– 0–0	0–12–0	0– 6–0
3.	—	300	500	3– 0–0 to 4– 0–0	1– 4–0	0–12–0	×	1– 4–0	0–12–0
4.	×	500	1000—1500	3– 0–0	1– 0–0	0– 8–0	1– 8–0	0–12–0	0– 8–0
5.	×	×	×	3– 0–0	1– 0–0	0–12–0	×	0–12–0	0– 8–0
6.	—	400—500	800—1000	×	×	×	×	0–12–0	0– 8–0
7.	500	300	—	1– 4–0	1– 0–0	0–12–0	—	—	—
8.	—	500—1000	—	1– 0–0	—	0–10–0	—	—	—
9.	2000—7000	1000—2000	2000—3000	3– 0–0	1– 0–0	0– 8–0	1– 4–0	1– 0–0	0– 8–0
10.	850	500	—	1– 4–0	1– 0–0	0– 8–0	—	0–12–0	0– 8–0
11.	—	100	500	3– 0–0	1– 0–0	0– 8–0	3– 0–0	1– 0–0	0– 8–0
12.	×	×	×	×	×	×	×	×	×
13.	×	×	×	×	1– 0–0	0– 8–0	×	1– 0–0	0– 8–0
14.	3000—5000	1000	2000—3000	3– 0–0	1– 4–0	0–12–0	2– 0–0	—	1– 0–0
15.	—	100—200	300—500	3– 0–0 to 5– 0–0	1– 0–0 to 1– 8–0	0–12–0 to 0–14–0	1– 0–0	1– 0–0	0–12–0 to 0–14–0
16.	—	200	500	×	×	×	×	1– 0–0	0–12–0
17.	—	100—400	—	2– 0–0	1– 0–0	0–10–0	1– 8–0	1– 0–0	0–10–0
18.	—	1000	3000	1– 0–0	0–12–0	0– 8–0	1– 0–0	0–12–0	0– 8–0
19.	—	×	×	×	×	×	×	×	×
20.	—	200—400	—	2– 0–0	1– 0–0	1–12–0	2– 0–0	1– 0–0	0–12–0
21.	—	1000	2000	1– 4–0	1– 0–0	0–10–0	1– 4–0	1– 0–0	0–10–0
22.	—	800—1000	2000	1– 0–0	0–12–0	0– 8–0	1– 4–0	0–12–0	0– 8–0
23.	—	500—800	1000—1500	3– 8–0	1–12–0	1– 0–0	3– 8–0	1– 0–0	0–12–0
24.	1000	300	300	1– 8–0	1– 4–0	1– 2–0	1– 8–0	1– 2–0	1– 0–0
25.	2500	1000	3000	3– 8–0	1–12–0	0– 8–0	1– 0–0	0– 6–0	0– 4–0
26.	300—400	200—300	—	3– 0–0	1– 0–0	0–12–0	3– 0–0	1– 0–0	0–12–0
27.	×	×	×	3– 0–0	1–12–0	1– 4–0	×	×	×
28.	2000—3000	—	1500—2000	2– 0–0	1– 0–0	0–10–0	—	2– 0–0	1– 0–0
29.	1500—3000	500—1000	—	3– 0–0	0–14–0	0– 6–0	1– 4–0	0–14–0	0– 6–0
30.	—	300—2000	3000	3– 0–0	0–14–0	0–10–0	×	1– 0–0	0–12–0
31.	1000—1200	200—300	1500—2000	×	2– 8–0	2– 0–0	×	×	×
32.	800	300	1000	2– 8–0	1– 8–0	0–12–0	2– 8–0	1– 8–0	0–12–0
33.	—	800—1000	1000—1500	1– 0–0	0–12–0	0– 6–0	1– 0–0	0–12–0	0– 6–0
34.	×	×	×	3– 0–0 to 6– 0–0	2– 0–0	1– 8–0	1– 4–0	1– 4–0	1– 0–0
35.	1000—2000	500	—	3– 0–0	1– 4–0	0–12–0	3– 0–0	1– 4–0	0–12–0
36.	×	×	×	3– 8–0 to 5– 0–0	2– 0–0	1– 0–0	×	1– 8–0	1– 0–0

F.N. Serial numbers denote the Sample towns in Tables 1 and 2 with the same serial numbers.

TABLE 2E—*Contd.*

serial no.	16. sale value of land peri-urban			17. daily wage rates					
				urban			peri-urban		
	wet	dry	garden	skilled	unskilled	females	skilled	unskilled	females
	16a	16b	16c	17a	17b	17c	17d	17e	17f
37.	×	1500	—	×	1– 8–0	1– 0–0	×	1– 8–0	1– 0–0
38.	800—1000	500	2000—4000	×	1– 4–0	0–12–0	×	1– 4–0	0–12–0
39.	2000	1000	4000	3– 0–0	1– 4–0	0–12–0	×	×	×
40.	1000—1500	250—1000	1000—1500	2– 8–0	1– 4–0	0–14–0	×	1– 4–0	0–12–0
41.	×	×	×	×	1– 4–0	0–14–0	×	1– 2–0	0–12–0
42.	3000	200—500	—	×	0–10–0	0– 8–0	×	0–10–0	0– 8–0
43.	1000	3000	5000—6000	3– 0–0	1– 8–0	1– 0–0	2– 8–0	1– 0–0	0–10–0
44.	600—800	400—500	1000	3– 0–0	1– 0–0	0–12–0	1– 4–0	1– 0–0	0–12–0
45.	×	×	×	×	×	×	×	×	×
46.	1000—3500	250—1000	3000	3– 0–0	1– 0–0	0–10–0	—	0–12–0	0–12–0
47.	1300	450	4000—6500	3– 8–0 to 5– 0–0	1– 0–0 to 2– 0–0	1– 4–0 to 1– 8–0	2– 8–0	1– 8–0	1– 0–0
48.	1500—2500	350—800	3000—4500	2– 0–0 to 4– 0–0	1– 0–0	0–12–0	2– 0–0 to 3– 0–0	1– 0–0	0– 8–0
49.	×	×	×	3– 0–0	2– 0–0	1– 0–0	3– 0–0	2– 0–0	1– 0–0
50.	×	×	×	×	×	×	×	×	×
51.	—	500—1000	—	2– 0–0 to 4– 0–0	1– 0–0 to 1– 8–0	0–12–0	—	—	—
52.	2000—4000	500—1000	3000—6000	3– 0–0 to 5– 0–0	1– 0–0	0–12–0	3– 0–0	1– 0–0	0–12–0
53.	380	3000	1000	×	1– 4–0	0–14–0	×	1– 4–0	0–14–0
54.	1000—4000	—	—	2– 0–0	1– 0–0	0–10–0	×	×	2– 8–0
55.	×	×	×	×	×	×	×	×	×
56.	1000—1500	500	—	1–14–0	1– 8–0	0–14–0	1–14–0	1– 8–0	0–14–0
57.	1500—2000	5000	800	3– 0–0	1– 4–0	0–12–0	×	1– 0–0	0–12–0
58.	3000	600	5000	3– 0–0	1– 0–0	0–12–0	×	1– 0–0	0–12–0
59.	2000—4000	1000	—	4– 0–0	1– 8–0	1– 0–0	1–8–0	×	1– 0–0
60.	2000—5000	1000	2000—2500	2– 0–0	1– 4–0	0–14–0	×	1– 4–0	0–10–0
61.	4000—5000	3000	4000—5000	3– 0–0	1– 0–0	0–12–0	×	×	×
62.	2000	200	1000—2000	3– 0–0	1– 0–0	0–12–0	1– 8–0	1– 0–0	1– 0–0
63.	2000	1000	1000	2– 4–0	1– 8–0	1– 0–0	1– 0–0	0–10–0	0– 6–0
64.	×	×	×	×	×	×	×	×	×
65.	3000—4000	200—1000	5000—10,000	3– 0–0	1– 4–0	0–14–0	1– 4–0	1– 0–0	0–12–0
	CITIES								
1.	5000—6000	—	5000—6000	3– 0–0 to 3– 8–0	1–12–0	1– 4–0	×	1– 0–0	0–12–0
2.	—	1000	1000—3000	3– 0–0 to 5– 0–0	1– 6–0	1– 0–0	2– 0–0	1– 0–0	0–12–0
3.	3000	5000—8000	—	×	×	×	×	×	×
4.	×	×	×	×	×	×	×	×	×

F. N. Serial numbers denote the Sample towns in Tables 1 and 2 with the same serial numbers.

TABLE 3

serial no.	name of the sample town	area in acres	4. population			5. houses		incidence of taxation per head
			in 1951	% of variation 1901–1951	crude density per acre	total number of houses	crude density per acre	
1	2	3	4a	4b	4c	5a	5b	6
1.	Bhalki	1,280	7458	+ 27	6	1849	1	1– 4–0
2.	Rajeswar	320	5517	+ 16 (1911-51)	17	1278	4	×
3.	Shahabad	720	16550	+224	23	4323	6	2– 8–0
4.	Aland	1,600	17694	+ 54	11	3267	2	1– 8–0
5.	Bidar	5,395	31332	+176	6	5112	1	4– 1–6
6.	Gokak	474	17694	+ 78	37	3672	8	12– 6–0
7.	Kudchi	?	8608	+ 52	×	1727	×	1– 3–6
8.	Kamadalli	66	3472	+ 3	53	758	12	1– 3–0
9.	Borgaon	640	6441	+ 15	10	1600	35	1– 6–3
10.	Hukeri	320	9455	+ 51	29	2873	9	3–13–0
11.	Gogipet	130	6436	+165	49	788	6	5–12–0
12.	Hungund	?	8046	+ 69	×	1418	×	×
13.	Rabkavi	1,120	9136	+ 59	8	3815	3	8– 1–0
14.	Nipani	653	24325	+114	37	4000	6	17–11–3
15.	Bijapur	3,584	65734	+176	8	11,305	18	16–11–6
16.	Athani	870	17089	+ 54	20	3371	4	7– 7–9
17.	Talikote	116	10154	+ 52	88	2800	24	×
18.	Hadagalli	960	7128	+ 18	7	2000	2	3– 0–0
19.	Nargund	3,078	9573	– 88	3	×	×	8–10–0
20.	Kustagi	832	6082	+ 77	7	1550	2	2– 8–0
21.	Ron	140	8978	+ 23	64	2300	16	2– 4–0
22.	Mulgund	?	7924	+ 5	×	1800	×	×
23.	Ilkal	768	20747	+130	27	3496	5	×
24.	Munirabad	500	18555	×	37	500	×	×
25.	Angol	98	5824	+105	59	833	9	2– 0–0
26.	Kinhal	66	5175	+ 48 (1911-51)	78	1490	23	×
27.	Gadag	2,560	65509	+114	26	15000	6	14– 3–2
28.	Haliyal	1,602	8184	+149	5	2200	2	13– 0–0
29.	Nandgod	118	5356	– 21	45	1200	10	2– 0–0
30.	Nyamati	640	5457	+ 58	9	820	1	3– 3–2
31.	Majali	4,800	5861	+ 26	1	1501	0.3	2– 0–0
32.	Manki	12,480	7073	+ 18	0.6	1445	0.1	
33.	Tumminkatte	640	5688	– 10	9	1054	2	1– 0–0
34.	Karwar	3,456	19764	+105	6	3655	1	7– 5–5
35.	Pavagada	186	4480	+ 58	24	695	4	3– 6–0
36.	Sagar	2,656	12537	+304	5	2481	1	7–14–11

TABLE 3—*Contd.*

serial no.	name of the sample town	area in acres	4. population			5. houses		incidence of taxation per head
			in 1951	% of variation 1901–1951	crude density per acre	total number of houses	crude density per acre	
1	2	3	4a	4b	4c	5a	5b	5c
37.	Honnali	320	5883	+ 51	18	1190	4	4–15–0
38.	Gokaran	845	9024	+ 87	11	1500	2	4– 8–0
39.	Davangere	4,800	56018	+380	12	8712	2	12–12–0
40.	Haveri	960	16470	+107	17	4000	4	15– 1–1
41.	Gubbi	640	7145	+ 28	11	1348	2	5–15–0
42.	Bagepalli	36	2914	+ 63	80	665	20	1–14–4
43.	Bhadravati	640	42451	+1488	66	6736	11	×
44.	Arsekere	1,280	14390	+302	11	2000	2	7– 2–0
45.	Kolar	960	27176	+123	28	6100	6	2– 7–3
46.	Nelamangala	544	5897	+ 47	11	1194	2	4– 7–11
47.	Shimoga	2,176	46451	+646	21	7560	4	9– 2–0
48.	Tumkur	4,800	35999	+202	8	5380	1	4– 1–0
49.	Udipi	2,400	20451	+155	9	3728	2	5–14–8
50.	Chikballapur	1,440	20219	+266	14	3959	3	4– 2–3
51.	Ajjampur	100	4817	+122	48	936	9	3– 6–7
52.	Konnanur	1,280	3734	+ 60	3	861	1	5– 7–3
53.	Periyapatna	1,280	4778	+ 23	4	883	1	2–11–0
54.	Talkad	1,280	5872	+ 52	5	1072	1	1– 1–0
55.	K.G.F.	19,200	159084	+125	8	27169	2	×
56.	Mercara	2,982	10117	+ 50	3	1450	1	15– 2–9
57.	Kollegal	5,074	18980	+ 38	4	4000	1	2–12–0
58.	Nanjungud	1,440	21158	+179	15	2379	2	8– 0–0
59.	Mandya	960	21158	+370	22	2500	3	5– 4–0
60.	Bannur	1,280	7885	+ 48	6	1575	1	×
16.	Channapatna	2,560	24041	+131	9	4984	2	4–11–2
62.	Chennarayapatna	422	5784	+ 80	14	1086	3	7– 1–3
63.	Puttur	2,560	11197	+180	5	2501	1	6– 0–0
64.	Gundlupet	160	8857	+118	55	1163	7	×
65.	Chamarajnagar	2,480	16040	+169	7	3959	2	3– 8–0
	CITIES							
1.	Belgaum	1,920	85988	+228	45	11025	6	15– 5–5
2.	Bellary	7,360	70764	+ 21	10	16121	2	6–11–9
3.	Mangalore	5,107	117083	+165	23	16036	3	9– 6–5
4.	Mysore	9,235	244334	+259	26	30641	3	6–11–9

B. Population Growth

TABLE 1: SAMPLE TOWNS: EXPONENTIAL MULTIPLIER IN DESCENDING ORDER

serial no.	name of town	exponential multiplier	type	symbol
1.	Bhadravati	1.738	Ii	
2.	Shimoga	1.495	I′	
3.	Davangere	1.401	I′	
4.	Mandya	1.363	I′	VH
5.	Arsikere	1.322	Ib	
6.	Sagar	1.322	I′	
7.	Chikballapur	1.296	I′	
8.	Gogipet	1.275	Ia	
9.	Sahabad	1.265	Ii	
10.	Tumkur	1.248	I′	
11.	Puttur	1.228	I′	
12.	Nanjungud	1.228	I′	
13.	Bijapur	1.226	I′	
14.	Bidar	1.225	I′	
15.	Chamarajnagar	1.218	I′	
16.	Udipi	1.205	I′	
17.	Haliyal	1.201	I′	
18.	Angal	1.199	Ib	
19.	Channapatna	1.182	I′	
20.	Ilkal	1.181	Ii	
21.	K.G.F.	1.176	Ii	
22.	Kolar	1.173	I′	
23.	Ajjampur	1.173	I′	
24.	Gundlupet	1.169	Ib	
25.	Nipani	1.164	Ib	
26.	Gadag	1.164	I′	
27.	Karwar	1.154	Is	
28.	Haveri	1.150	I′	
29.	Gokaran	1.133	I′	M
30.	Channarayapatna	1.124	I′	
31.	Gokak	1.123	B	
32.	Kustagi	1.121	Ia	
33.	Hungund	1.110	Ia	
34.	Kinhal	1.104	I′	
35.	Bagepalli	1.103	Ia	
36.	Konanur	1.100	B	

TABLE 1: SAMPLE TOWNS: EXPONENTIAL MULTIPLIER IN DESCENDING ORDER—*Contd.*

serial no.	name of town	exponential multiplier	type	symbol
37.	Rabkavi	1.097	Ii	
38.	Nyamati	1.095	B	
39.	Pavagada	1.095	Ib	
40.	Talikote	1.090	I′	
41.	Athani	1.090	I′	
42.	Aland	1.087	Ib	
43.	Talakad	1.087	Ia	
44.	Kudchi	1.086	Ia	L
45.	Hukkeri	1.086	Ia	
46.	Honnali	1.086	I′	
47.	Mercara	1.085	Is	
48.	Bannur	1.082	I′	
49.	Nelamangala	1.079	I′	
50.	Hadagalli	1.077	Ia	
51.	Kollegal	1.067	Ib	
52.	Bhalki	1.052	I′	
53.	Gubbi	1.050	B	
54.	Majali	1.048	Ia	
55.	Periyapatna	1.043	Ia	
56.	Ron	1.042	Ia	VL
57.	Rajeswar	1.039	Ia	
58.	Manki	1.033	Ia	
59.	Borgaon	1.028	Ia	
60.	Mulgund	1.010	Ia	
61.	Kamadolli	1.007	Ia	
62.	Nargund	0.983	Ia	
63.	Tumminkatti	0.979	Ii	D
64.	Nandgad	0.954	I′	
	CITIES			
65.	Bangalore city	1.370	Is	VH
66.	Mysore city	1.291	Is	VH
67.	Mangalore city	1.214	Is	H
68.	Hubli city	1.167	I′	M
69.	K.G.F.	1.176	Ii	H

TABLE 2: SAMPLE TOWNS: MEAN PERCENTAGE VARIABILITY IN DESCENDING ORDER

serial no.	name of town	mean percentage variability	type	symbol
1.	Bhadravati	42	Ii	
2.	Gogipet	41	Ia	
3.	Mandya	37	I′	
4.	Nelamangala	35	I′	eh
5.	Tumkur	32	I′	
6.	Honnali	31	I′	
7.	Haveri	28	I′	
8.	Arsikere	25	Ib	
9.	Kolar	25	I′	
10.	Karwar	25	Is	
11.	Borgaon	24	Ia	
12.	Mercara	24	Is	vh
13.	Rabkavi	24	Ii	
14.	Gokak	24	B	
15.	Hukkeri	23	Ia	
16.	Bannur	22	I′	
17.	Davangere	22	I′	
18.	Channarayapatna	21	I′	
19.	Nandgad	21	I′	
20.	Nargund	21	Ia	
21.	Pavagada	21	Ib	
22.	Channapatna	20	I′	
23.	Gubbi	20	B	h
24.	Mulgund	19	Ia	
25.	Bidar	19	I′	
26.	Gokaran	18	I′	
27.	Nipani	18	Ib	
28.	Chamarajnagar	17	I′	
29.	Tumminkatti	17	Ii	

TABLE 2: SAMPLE TOWNS: MEAN PERCENTAGE VARIABILITY IN DESCENDING ORDER—*Contd.*

serial no.	name of town	mean percentage variability	type	symbol
30.	Nanjangud	16	I′	
31.	Kollegal	15	Ib	
32.	Bhalki	15	I′	
33.	Kamadolli	15	Ia	
34.	Shimoga	15	I′	
35.	Angol	15	Ib	
36.	Sagar	15	I′	
37.	Periyapatna	15	Ia	
38.	Gundlupet	14	Ib	
39.	Shahabad	13	Ii	
40.	Athani	13	I′	
41.	Bagepalli	12	Ia	
42.	Ron	12	Ia	
43.	Konanur	11	B	
44.	Ajjampur	10	I′	
45.	Majali	10	Ia	
46.	Talikote	9	I′	
47.	Hungund	9	Ia	
48.	Nyamati	9	B	
49.	Bijapur	8	I′	
50.	Talakad	8	Ia	
51.	Kustagi	7	Ia	
52.	Gadag	7	I′	
53.	Kudchi	7	Ia	
54.	K.G.F.	7	Ii	
55.	Chikballapur	7	I′	
56.	Haliyal	6	I′	
57.	Udipi	6	I′	
58.	Rajeswar	6	Ia	
59.	Aland	6	Ib	
60.	Puttur	6	I′	vl
61.	Manki	5	Ia	
62.	Hadagalli	5	Ia	
63.	Ilkal	3	Ii	
64.	Kinhal	3	I′	
	CITIES			
65.	Bangalore city	22	Is	vh
66.	Mysore city	23	Is	vh
67.	Mangalore city	15	Is	m
68.	Hubli city	14	I′	m
69.	K.G.F. city	7	Ii	vl

C. Proforma

A.I : AREA IN ACRES OR SQUARE MILES

municipal area of the town	total built-up area	residential area	area of vacant lands excluding parks					area under parks	area of of agricultural lands within municipal limits				area acquired by the municipality during the last 10 years	area of future town extensions
			municipal	government	public	private	total		dry	wet	garden	ottal		

A.II : HOUSES AND HOUSEHOLDS

total number of households	number of houses					residential	non-residential
	tiled	terraced	thatched	others	total		

A.III : ELECTRICITY

capacity of the power station k.w.	load k.w.	total monthly consumption in the town (k.w.h.)				total number of residential houses electrified	area served by the power station
		industrial	residential	agricultural	total		

A.IV : WATER-SUPPLY

source of water supply	total daily consumption (gallons)				capacity of the pumping station		total number of street taps	total number of residential house taps	number of public wells	number of private wells
	domestic (drinking and household purposes)	industrial	other specific purposes if any	total	present capacity	full capacity				

A.V : HOSPITALS

total number of public hospitals	number of beds in each	type of the hospital						total number of private doctors	total number of mid-wives
		out patient	in-patient	eye	ear, nose and throat	dental	nursing houses		

A.VI : EDUCATION

total number of schools	status of each and strength	total number of colleges: strength in each	technical institutions	
			number	strength

A.VII : POST OFFICES & TELEPHONES

post-offices		telephones	
number	status	public	private

A. VIII :

number of banks
status of each

A.IX :

number of radios	
public	private

A.X : NUMBER OF HOTELS

meals hotels	meals and lodging	coffee and/or tea stalls	all together	total

A.XI: PICTURE HOUSES

permanent	temporary (tented)

A.XII:

total number of clubs

A.XIII:

total number of libraries

A.XIV:

total number of tailors

B.I:

total annual municipal revenue

B.II:

birth and death rates for the last 10 years

DATA FOR EACH WARD

C.I:

total number of wards

C.II:

area of each ward

C.III:

total number of households

C.IV:

number of houses				
tiled	terraced	thatched	others	total

C.V:

residential	non-residential

C.VI:

total population

C.VIII : AREA OF VACANT LANDS

municipal	goverment	public	private	total

D. Questionnaire for Regional Survey (Towns)

I. *Site:*

(A) Is the town located
- (i) on a ridge/(dry land)
- (ii) on a low land/(wet land)
- (iii) on a river bank/stream side or canal side?

(B) Is the land within the town
- (i) flat (estimate degree of slope from the table below)
- (ii) sloping—(in which direction)
- (iii) undulating (estimate degree of slope from the table below)?

3° = Flat
3° = Gentle slope
10° = Moderate slope
30° = Steep.

(C) Does the character of the site limit or facilitate the spread the of town ?

(D) Are there any modifications to overcome limitations imposed by the character of the site?

II. *Situation:*

(A) Is the town situated at a nodal point in respect of communications (road, rail and waterway) —any two or all?
- i. Cross
- ii. Radial

(b) Terminal point

(B) Is the town situated along a contact (or junction) zone?
- i. Natural
  - foothill
  - ridge and plain or
  - dry and wet
- ii. Economic
  - two crop zones
  - two industrial zones or
  - crop and industrial zones

III. *Function:*

A. What are the activities (1) which are concentrated at one place
(2) which are scattered?

Map the different activities of the town—Industrial (mention the nature of important industries); Business—wholesale (nature)—retail (nature)—bazaar street(s)—community service zone (public and Government Offices and law courts)—Mixed functions—any two or more of the above mentioned).

Locate on the maps—Parks and Play-grounds—Market—Picture Houses—Schools—Public Library —T.B.—Social Club(s)—Bus Stand—(important temples—mosques—churches may also be marked).

(This is possible only when the Town Map is available. If a town map is not available, a sketch map of the town can/should be prepared based on 1″ topo sheet).

B. In each zone mention

1. the type of house:

tiled/country, Mangalore	pucca brick walled
thatched	kutcha brick walled
terraced	mud walled
compound houses with or withour garden	corrugated iron sheet
single storey	kerosene tin
more than one storey	

ii. conditions of the houses: (a) good (b) bricks exposed—need repair (c) dilapidated
iii. average density of houses per acre
iv. building materials used and from where they are obtained (mentioned the places)—Granite.
v. condition and type of the streets:

straight	asphalted
winding	metalled
narrow	unmetalled

C. If there are slums in the town—mention
   i. their total number
   ii. number of houses in each slum
   iii. population in each slum (locate the slums on the map)
   iv. the occupation of slum dwellers
   v. a. from where they have come.
      b. when
      c. why

D. Are there vacant (unused for any purpose) lands in the town—if so mention
   i. their number
   ii. total area
   iii. reason(s) for such lands lying vacant.

IV. *Services:*

A. Electricity :
   i. is the town electrified?
   ii. is electric power supplemented by thermal power, and if so for what purpose?
   iii. a. what is the total daily or monthly power consumed in the town?
      b. what is the percentage of houses (residential) electrified?
   iv. what is the total daily or monthly power consumed by
      a. industrial units
      b residential units
      c. irrigation pump-sets if any
      d. others?
   v. is there seasonal fluctuation in the consumption of power? If so, mention the duration (months) of peak and slack seasons.
   vi. what is the cost of electricity per unit
      (a) for domestic purpose
      (b) for agricultural purpose
      (c) for industrial purpose?
   vii. what is the daily power consumed in peak and slack seasons?
   viii. what is the daily power capacity of the station?
   ix. what is the area served by the power station?

B. Water Supply :
   i. What are the sources of water supply for
      a) domestic purposes — river or stream (name of the river)
      b) industrial purposes — tank (name of the tank)
      c) other specific purposes—if any? — wells—ordinary tube wells

   Mention the depth of permanent and seasonal water-table.
   ii. what is the total daily consumption in the town?
   iii. a. what is the per capita daily consumption?
      b. what is the required daily per capita?
   iv. a. what is the present capcacity of the supply station?
      b. what is its full capacity?
   v. what is the quality of water (sweet, slightly sweet or slightly saltish)?
   vi. what is the charge per unit of water consumed?
   vii. is the town experiencing scarcity of water supply?
      (a) permanent
      (b) seasonal (months?)
   viii. what is the total number of street taps?
   ix. what is the total number of residential house taps?
   x. are there new schemes of water supply for the town? if so, give details of their location—capacity and cost.

C. Drainage :
   What is the type of drainage
      1. under-ground drainage
      2. surface drainage (a) eastern drains
         (b) stone or cement drains?

D. Sewage Disposal and Conservancy :
1. is there a systematic disposal of sewage in the town?
2. how is the night soil disposed?
3. how is the town refuse disposed?
4. what is the total number of latrines
   (a) pit latrines
   (b) D.C. latrines
   (c) other types—hand flush—flush?

E. Health :
What is the total number of public hospitals?
Type
   (a) out-patient
   (b) in-patient (1) number of beds in each hospital.
   (c) special hospitals—ear—nose—throat (E.N.T.) maternity.
   (d) death rate and birth rate (1952–56).

F. Education :
1. total number of schools
2. status of each
3. total strength in each
3. total strength in each
4. area (radius in miles) from which students come

G. Number of Post-Offices :
Is there a telephone exchange in the town ?

H. Number of Radios : (1) public (2) private

I. Number of Banks :
(1) average monthly or daily turnover in each bank
(2) average size of current deposits in each bank
(3) average size of fixed deposits in each bank
(4) total number of current accounts in each bank
(5) total number of fixed deposit accounts in each bank
(6) are loans taken—if so mention (i) total number in a year
(ii) purpose

J. 1. Number of hotels
2. Number of social clubs
3. Number of parks and area of each
4. Picture houses
5. Public markets

V. *Sphere of influence :*

A. Bus services
1. to the town (a) from which place (b) frequency (c) bus fare (d) time taken
2. from the town
   (a) to which place (b) frequency (c) bus fare (d) time taken

B. Wholesale trade
What are the commodities/articles
   (a) inwards—from which place—mode of conveyance.
   (b) outwards—to which place—mode of convenyance.

C. Retail trade
What are the commodities/articles?
   (a) inward—from which place—mode of conveyance.

D. To and fro Services :

from—to	frequency	bus fare	time taken

VI. What is the general mode of movement within the town (from residence to offices—market—schools) ?
1. by foot
2. by cycle or cycle rickshaw
3. by jutka
4. by bus

VII. 1. What is the total municipal area of the town?
2. What is the total number of houses in the town?
i. terraced
ii. tiled
iii. mud-roofed
iv. thatched
3. What is the total number of houses in each division (ward) (mark the divisions on the map)?
4. What is the area acquired by the Municipality (in the last 10 years) in the adjoining villages? Mention the names of those villages.
5. What is the area that is going to be acquired by the Municipality in the adjoining villages? Mention the names of those villages and the area in each of them (mark out the above areas on the map with the help of the Municipal offices and shanbogues of those villages).
6. What is the annual municipal revenue?
7. What is the incidence per head of population?

VIII. A. Is there any unemployed labour in the town?
1. permanent
2. seasonal
3. skilled
4. unskilled

B. What is the daily wage rate?

	in the town		in the adjoining rural tract	
	per man	*per woman*	*man*	*woman*
1. skilled				
2. unskilled				

C. What is the sale value of an acre of land in the immediate vicinity of the town?
1. wet land
2. dry land
3. garden land

D. What are the agricultural practices in the adjoining rural tract (Informants—Agricultural Demonstrator and the Shanboags of the adjoining villages)?

E. Has there been in the last 5/10 years any movement of people—particularly labour class into the town (if so from which places) or from the town (if so to which places)?

IX. 1. What are the requirements of the town in the next 10/15 years?
2. Mention the main development schemes as proposed in the 2nd Five Year Plan.
3. Is there any attempt to start new industries in or/near the town making use of the local/or imported resources—if so give details?

E. Field workers and schedule of field work

sl. no.	towns surveyed	names of the field workers	dates of survey
1.	Chikballapur	Dr. V. L. S. Prakasa Rao & H. Sathyanarayana	16th & 18th to 19th May 1957
2.	Mandya	–do–	28th to 30th May 1957
3.	Talakad	–do–	1st and 2nd June 1957
4.	Bagepalli	–do–	18th to 19th June 1957
5.	Nelamangala	–do– & Narahari Babu	19th to 20th June 1957
6.	Channapatna	Dr. V. L. S. Prakasa Rao & Narahari Babu	21st to 22nd June 1957
7.	Bannur	Narahari Babu	28th, 29th, 30th June
8.	Nanjangud	–do–	1st, 2nd, 3rd July
9.	Periyapatna	–do–	4th, 5th, 6th July
10.	Channapatna	–do–	8th, 9th, 10th July
11.	Gubbi	–do–	12th, 13th, 14th July
12.	Sagar	–do–	18th, 19th, 20th, 21st July
13.	Honnali	–do–	22nd to 24th July
14.	Nyamati	–do–	25th to 28th July
15.	Kamadolli	–do–	31st July, 1st August
16.	Hukkeri	–do–	2nd to 4th August
17.	Gokak	–do–	5th to 7th August
18.	Kudchi	–do–	8th August
19.	Rabkavi-Banhatti	–do–	9th and 10th August
20.	Athani	–do–	11th to 14th August
21.	Kollegal	H. Sathyanarayana	3rd to 7th August
22.	Chamarajnagar		
23.	Arsikere	–do–	11th to 13th July
24.	Pavagada	–do–	22nd to 25th July
25.	Gogipet		
26.	Shahabad		
27.	Aland	–do–	28th July to 13th August
28.	Rajeswar		
29.	Bhalki		
30.	Davangere	Dr. V. L. S. Prakasa Rao, Balaji Singh & Kanthan	26th, 28th August
31.	Tumminkatti	Balaji Singh & Kanthan	30th July
32.	Mangalore	Dr. V. L. S. Prakasa Rao & Balaji Singh	3rd to 5th August
33.	Manki	Balaji Singh	7th August
34.	Gokaran	–do–	9th August
35.	Majali	–do–	11th August
36.	Nipani	M. S. Kanthan	4th August
37.	Borgaon	–do–	6th August
38.	Angol	–do–	8th August
39.	Haliyal	–do–	9th & 10th August
40.	Nandgad	–do–	11th August 1957
41.	Tumkur	Dr. V. L. S. Prakasa Rao & Das	18th to 20th July
42.	Ajjampur	Das	25th to 27th July
43.	Konnanur	–do–	28th to 30th July
44.	Kinhal	–do–	2nd to 5th August
45.	Kustagi	–do–	6th and 7th August
46.	Ilkal	Das	8th and 9th August
47.	Talikot	–do–	10th and 11th August
48.	Bidar	Dr. V. L. S. Prakasa Rao & Arunachalam	11th and 12th August
49.	Gadag	–do–	8th and 9th August
50.	Haveri	Dr. V. L. S. Prakasa Rao & Sathyanarayana	29th and 30th July
51.	Nargund	S. T. Sathyanarayana	4th and 5th August
52.	Mulgund	–do–	6th August
53.	Ron	–do–	7th and 8th August
54.	Hadagalli	–do–	10th and 11th August