

CHAPTER VI

SPHERE OF INFLUENCE

1. Introduction :

Every city whether big or small, forms the nucleus of its region from which it draws its raw materials and or supplies the necessities. Such a region over which the city has got its vast influence is called its Umland*1, City region*2 or Urban field*3.

There is a reciprocal relationship between the city and its surrounding area as far as the supply of raw materials and demand of the population is concerned. It is rightly said that “the city does not exist by itself but it is the region, which makes it exist”*2.

In these days of rapid means of transport and communication, it is not an easy task to delimit the zones of influence around a settlement, as it may stretch far and wide. For determining such a region, various factors are taken into account. In the Developed Countries availability of detail records and information for retail trade, telephone services, traffic flow etc is a boon for researchers. But, in India and other developing countries such data are often not available and if available may not be reliable. So one has to satisfy himself only with major services, the information is thus based mainly on one's own personal investigations during field survey. In spite of best of efforts, no data regarding telephone calls booked and received could be available for some reason or the other.

2. Anand's position in the region and Regional relationship :

The urban field is that region where the maximum influence of the city is experienced. It is an area of active interaction. The activities and services of Anand are not confined to its

limits alone but reach far beyond it. Anand as it is well connected by roads and railways has easy access and thus is a major distributing and collecting center for the surrounding rural and urban areas even beyond the District and State boundaries.

The tributary area of Anand has close relationship with it as it not only caters and satisfy the needs of the surrounding areas but also depends for its subsistence, in the form of supply of grains, vegetables, milk, tobacco etc for its industries. The urban field of Anand is growing with the increasing supply and demand of the city's population itself. The urban field for different commodities varies as they serve the different areas around the city.

In case of Anand one has to be very careful in selecting the basis for analyzing the limit of the urban field, as these commodities usually come from the neighboring or surrounding villages with which the city has a very close contact. In the case of Anand, milk also gives a correct idea of the urban field because it is an important commodity which is exported and imported to far off places covering very distant villages in the whole of the Kheda district i.e. about 606 villages of different talukas in the District.

Anand is a center for tobacco trade in the district, tobacco is also chosen for analyzing the urban field of influence.

Other criteria like educational facilities, medical services, recreational and political or administrative functions provide a basis for analyzing the limit of the urban field.

The present chapter is an attempt to highlight the influence of Anand on its neighboring areas – both rural and urban. The variation in the degree of influence from the city to its

surrounding areas its accessibility, potentiality in attracting people of the rural economy are some of the core areas of interest as far as the present study is concerned.

3. Delimitation of Zone of influence :

The influence of any urban center on its surrounding areas can be correlated directly to the development of the transport and communication network. "The relations and interaction of a city with its surrounding region is to a large extent a function of the means of transport available."*4

It is normally observed that the intensity of influence of the city on its surrounding is inversely related to the distance from the center. Thus more intense interaction of the city and region is in the area directly in contact with it and closer to it. Market services, wholesaling, retailing, banking, health services, transport, entertainment etc are catered by Anand for the wide peripheral area. Beyond this there lies a much larger area whose people are indirectly, though less tied to the city in many ways.

Thus, there is an area of economic, cultural and political relationship where the city's influence is diffused and limited.

Again the zone of influence in 1971 and 1991 are superimposed on same scale to get a comparative idea of the changing nature of the delimiting zone during the period. As in case

of the railway and road accessibility Anand attracts many people from the surrounding areas thus influencing the urban field from time to time.

Buffer zones using GIS technique were developed to show how roads and railway densities in an area influence the surrounding regions, in the form of Commuters (Fig : 6.1).

4. Method of delimiting zones of influence by empirical observation :

Mathematical calculation fail to depict the correct demarcation of the city – region. Even as the criteria adopted for defining the region widely vary, there is no specific method for accurate demarcation of the city region.*5 This is the reason why one has to depend on the conventional ways to delimit the various complimentary regions as in case of Anand, by using empirical observation and theoretical explanation.

In the present context, the services are divided into three major heads as economic, socio-cultural and political. Under the economic influence come the vegetable supply, milk supply and bus services. Accessibility as far as road and railway network density is concerned, passenger flow to and Anand; Social and cultural influences include the services rendered by the hospital, Educational institution etc; political influence deals with the administrative services of the city*6. Since Anand is a taluka headquarters and also because it is a head-quarter of all the Municipalities in Gujarat. It also has many important Government buildings like the District Court and the GEB main district offices.

5. Economic influences:

Vegetables collecting and supplying zone :

The surrounding villages of Anand grow different types of vegetables in different seasons (Table 4.1). As Anand is the main market of the area due to its connectivity, the individual farmers come to the market for selling vegetables and condiments collected from the rural markets. These vegetables come in carts and by S.T. Buses, tractors, trucks and trains or even as head load. Some of the vegetables, which are not locally produced, are supplied from the neighbouring and distant areas as mentioned:

Table : 4.1.

Winter Vegetables and Condiments	Coming from
Potatoes	- Chaklashi, Boriavi, Ahmedabad.
Ginger	- Boriavi, Bombay
Cauli flower	- Navli, Anand, Napad.
Coriander	- Chaklashi, Boriavi, Chhani
Bulbous root	- Kathial, Cambay, Ahmedabad
Tomatoes	- Sadanapura, Samarkha, Bhalej
Gourd	- Navli
Onion	- Ahmedabad, Saurashtra.
Beans	- Delhi, Jaipur, Kota, Agra, Mathura, Simla
Summer Vegetables	Coming from
Potatoes	- Kanjari, Chaklashi, Ajarpur, Deesa, Patan.
Brinjal	- Navli, Boriavi.
Cabbage	- Navli.
Bitter gourd	- Navli
Giloda	- Navsari, Surat, Billimora.

Gourd	- Thana Navli, Mogar, Adas, Ajarpura, Bakrol,
Onion	- Mahuda, Rajkot, Jodhpur.

Monsoon Vegetables**Coming from**

Brinjal	- Boriavi, Lambhvel, Navli, Vaghasi, Chaklashi, Ajarpura, Adas, Gamdi, Jitodia
Giloda	- Mehemdabad, Kheda, Nadiad.
Govarsing	- Napad, Navli, Anand, Zankharia, Ajarpura, Chaklashi.
Parvar	- Sadhli, Miyagam, Broach, Nabipur, Surat.
Ladies finger	- Napad, Ashi, Dhudhkuva, Dhobikui, Dedarada,, Bakrol, Lambhvel, Adas, Borsad, Surat Boriavi, Vasad.

*Source : Vegetable wholesale dealers, Super market – Station road.

There are 45 wholesale and 32 small retail shops of vegetables in the vegetable market, which is located near the Anand Railway Station.

The city not only receives the vegetables from its surrounding and distant rural areas, but it also exports the same to other or same rural and urban areas.

A detailed study of Table 4.1. and Map (Fig. 6.2); suggest that Anand's urban field for vegetables which earlier (1971) was limited to some of the Talukas and villages of Kheda district only, later on due to increased accessibility and traffic movements from as far as Delhi and its surrounding areas like Agra, has increased after 1991 till date. It can however be said that those vegetables and condiments, which are less perishable, like Beans, Potatoes, Onions, Ginger etc travel much longer distances thus increasing the field of influence of Anand. There also is a change in the urban field of influence for vegetables with the change in season.

Urban field for Tobacco :

Anand lies in the fertile belt of the Charotar region that is very famous for its tobacco cultivation, processing and marketing of various products like Snuff, Bidi, and Cigarettes. It also behaves as a raw material supply center by collecting tobacco leaf from the surrounding villages, pack into bags and transport them to far away places like Punjab, Bihar, Uttar Pradesh, Calcutta, Kanpur, Nagpur and even Jodhpur in Rajasthan. Anand has a Tobacco Research Center located in the extreme Southwest portion. This research center experiments and develops many varieties of Tobaccos and it also studies the demand and supply of tobacco marketing.

There are 10 Tobacco processing factories in Anand. The Tobacco is known as 'Red Bukka' mainly used in Bidi manufacturing. The businessmen of Anand purchase the tobacco mainly from the Dalals (middlemen) of the surrounding villages and also directly from the farmers.

Lambhvel, Narsanda, Kanjari, Bakrol, Valasan, Rangipura, Sandesar, Karamsad, Mogri, Gana, Ajarapura, Samarkha, Bhalej, Kasor, Raktalar, Tranol, Kunjaro, Umreth, Thamna, Timba, Vadod, Vasad, Petlad and Borsad are the main tobacco producing villages. Tobacco from these villages are processed at Anand and sent back for the preparation of bidis and snuff in these villages, which are again marketed by Anand. This whole transaction shows the reciprocal relationship of Anand and its surrounding area.

Accessibility and passenger flow :

Of the 2500 Sq.km. area of Kheda district, Anand has the highest railway and road density and hence we can say its urban field of influence is much wider compared to any other urban center of the district (Fig. 6.1.'a' and 6.1.'b'.)

Anand falls in the most accessible zone which lies within 8 km distance from Anand, along the Broad gauge line between Ahmedabad and Mumbai (Fig.6.1.'e'.) and it is located on the National Highway No.8 which touches the Northeastern portion of the city. Thus on the whole Anand is the District's most accessible place (Fig. 6.1.'e')

Location along the main routes led to a more rapid and frequent movement of traffic, goods and passengers. Anand adds about 1,00,000 people' everyday to its population in the form of commuters from far away places like Mehsana, Ahmedabad, Dahod, Godhra, Cambay Baroda and even Surat. However, it gets most of the commuters from Dahod – Baroda region which falls to its Southwest.(Fig. 6.1.'e')

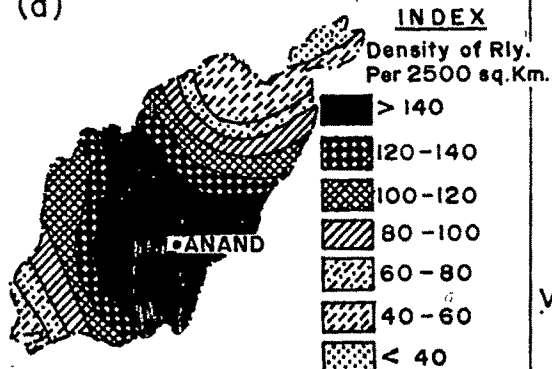
Bus services :

Anand is well connected with the surrounding villages and towns of Gujarat by Taluka and Jilla Panchayat roads, State Highways and National Highway No.8. This influences the role of Bus services which play an important role in connecting the city with the region.

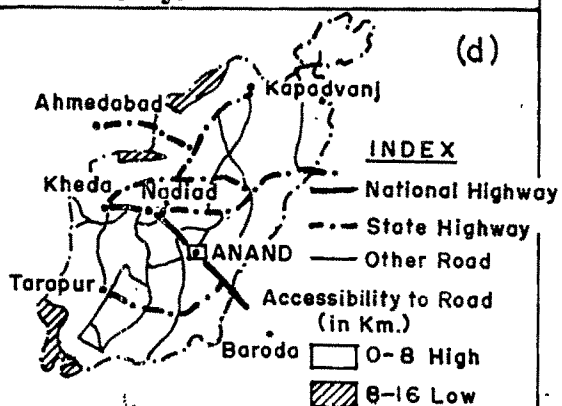
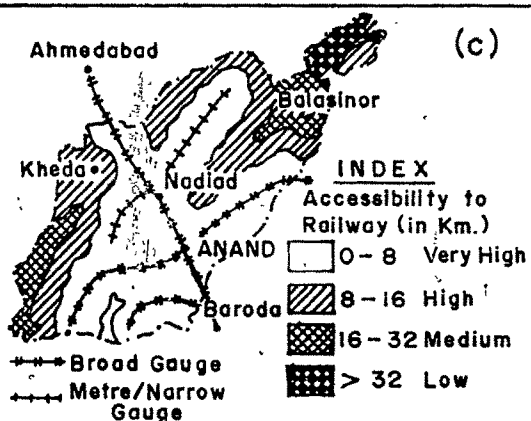
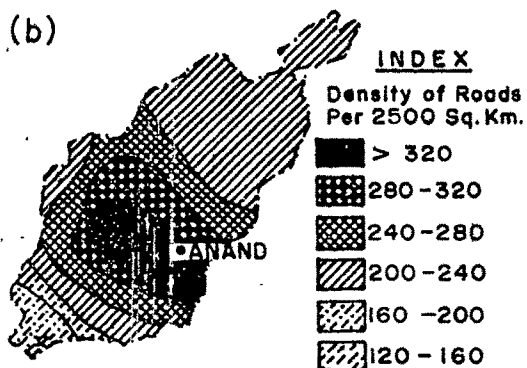
Fig 6.1

ACCESSIBILITY TO ANAND

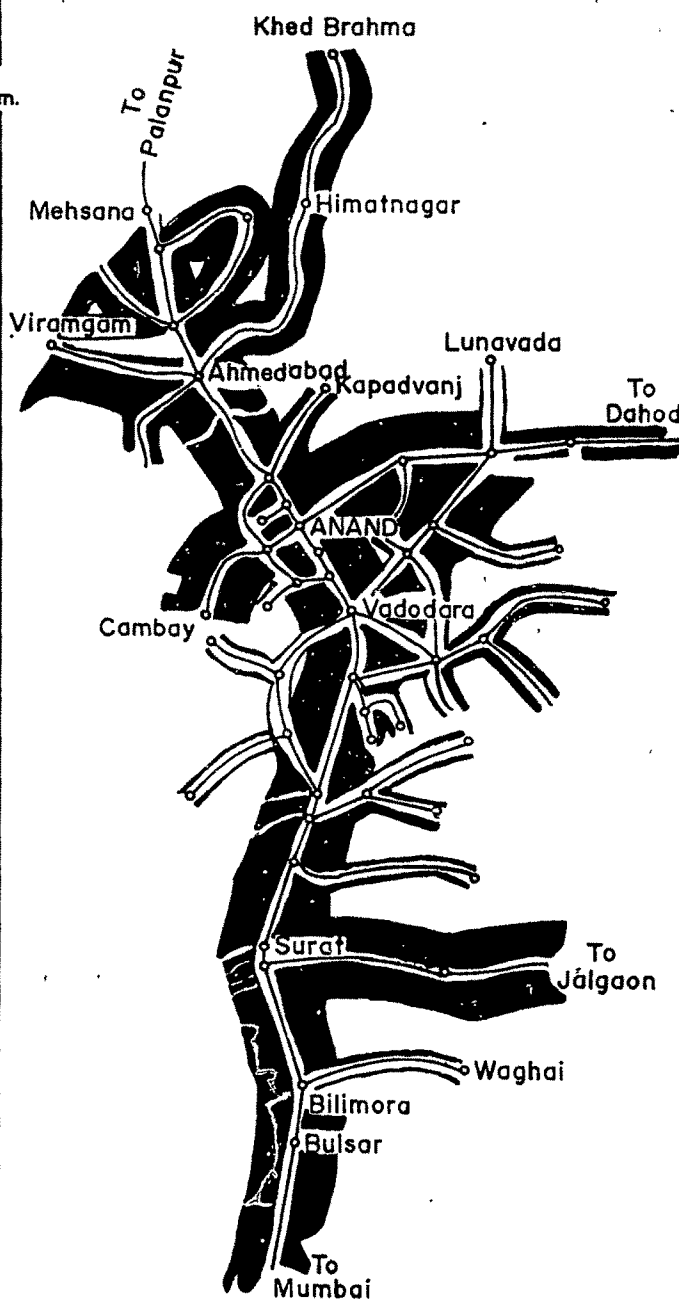
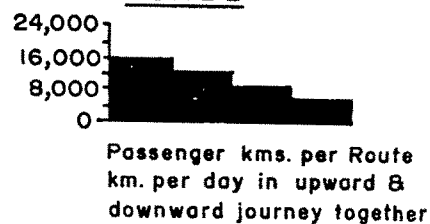
(a)



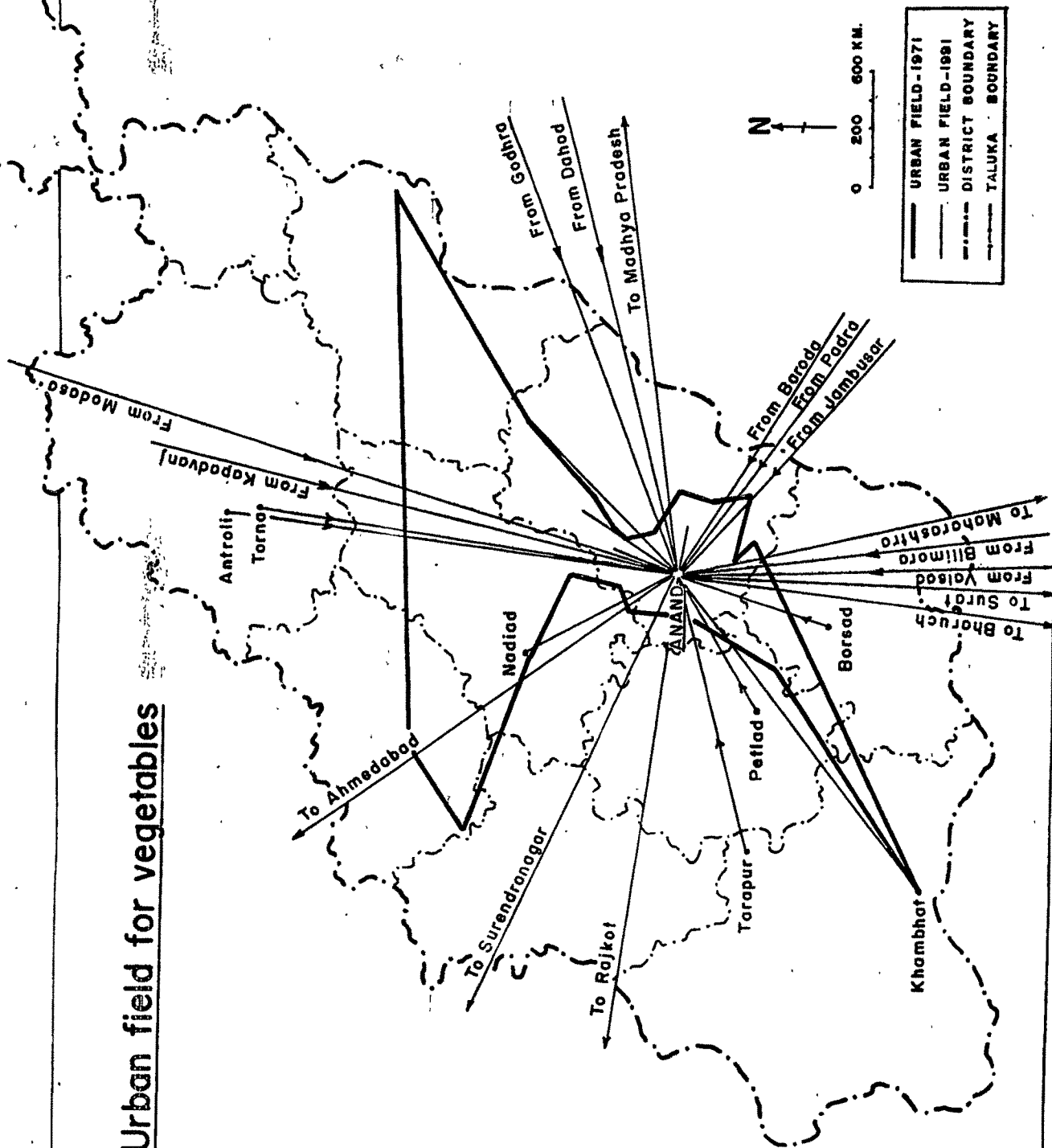
(b)

**PASSENGER FLOW ANAND**

(e)

**SCALE**

Urban field for vegetables



(Fig 6-2)

The State Transport Buses run on these roads. There are about 44 different Bus routes connecting the city and the region. The S.T. Bus Station of Anand has a higher number of buses coming and going, to and from Anand respectively, as compared with that of Nadiad and even Baroda.*7 (Table : 4.2).

Table : 4.2

Bus routes	Via – important stations	Number of trips	Extra casual trips
1	Anand – Ratanpur (via Dakor, Kapadvanj, Modasa)	1	-
2	Anand – Ambaji (via Dakor, Modasa)	1	-
3	Anand – Ambaji (via – Himmatnagar)	1	-
4	Anand – Bhalej	1	1
5	Anand – Boriavi	1	1
6	Anand – Vastikulia	2	-
7	Anand – Navli	7	1
8	Anand – Anklav	3	2
9	Anand – Umeta (via Napad – Anklav)	4	-
10	Anand – Napad	13	2
11	Anand – Mogari – Gana	8	1
12	Anand – Bakrol	8	-
13	Anand – Valasan	1	-
14	Anand – Kunjarao (via Bhalej)	7	-
15	Anand – Rasnol (via Chikhodra)	10	1
16	Anand – Thasra	2	-
17	Anand – Demai	3	3
18	Anand – Khambholaj (via Sarsa)	7	-
19	Anand – Chikhodra	3	-
20	Anand – Sarsa	10	-
21	Anand – Shilia (via Sarsa)	2	-
22	Anand – Vaghasi	2	2
23	Anand – Balasinor (via Karamsad)	1	-
24	Anand – Changa (via Bandhani)	8	-
25	Anand – Mahelav (via Bandhani)	1	-
26	Anand –Bandhani (via Karamsad)	4	-

27	Anand – Alina (via Bhalej)	1	-
28	Anand – Chunel (via Bhalej – Lingda)	2	1
29	Anand – Saiyadpura (via Samarkha – Ajarpura)	3	-
30	Anand – Samarkha	10	-
31	Anand – Chaklashi (via Bhalej – Ajarpura)	12	-
32	Anand – Vansol (via Lingda – Pansora)	2	-
33	Anand – Dharmaj	1	-
34	Anand – Badalpur (via Kalu – Kathana)	3	-
35	Anand – Dhuleti	2	-
36	Anand – Nadiad	10	-
37	Anand – Godhra (via Dākor)	1	-
38	Anand – Dhuvaran (via Borsad)	8	-
39	Anand – Karamsad	12	-
40	Anand – Sunar	2	-
41	Anand – Sojitra	10	-
42	Anand – Tarapur	4	-
43	Anand – Lotia Bhagol	2	2
44	Anand Government colony	2	2

6. Socio – Cultural influences :

Urban field for Education :

Anand is an important city for education in the region as we have seen in Chapter V. Many students come to the city for primary as well as secondary education from the surrounding villages of Anand. However, Anand shows a decline in the number of students who used to come to Anand for secondary education. This is due to the establishment of High Schools in the neighboring villages and towns after 1971.

Presently the urban field for education has grown (1991) towards the eastern villages of the Taluka. (Fig.6.3.'c') which again goes to the credit of accessibility due to better roads and railways in the eastern parts. However still the urban field for education in Anand has not crossed the taluka boundaries. This may be the result of the establishment of Vallabh

Vidhyanagar's famous Sardar Patel University in the West and Karamsad College in the Southwest respectively.

Urban field for Medical services :

Anand provides an important service to its region and that is medical services. This is an important indicator to delimit the city's zone of influence just as educational and recreational zones.

For its people and its surrounding region, the most important hospitals are : The Emery Hospital, Municipal Hospital and Darbar Gopaldas Kshaya Nivaran Kendra for T.B. patients of Anand as well as for patients coming from all over Gujarat.

However, to delimit the zone of influence addresses were collected from various Hospitals like Emery Hospital, T.B.Hospital, Municipal Hospital and other Private Clinics and Hospitals. The Municipal hospital was established in 1927. Since then it has acquired all the latest technology. There are about 150 Beds and on an average daily 150 patients daily and 54,000 patients yearly taking treatment here come from the surrounding villages and towns. There are separate divisions for special disease and specialist from each branch of medical science is available, round the clock.

The Emery Hospital was established in 1904 handled by the Salvation Army. Rave George Tire and his wife started the I.P. Mission in 1868 and they established a hospital in 1905 which still functions as one of the important medical services, in the city. Anand Municipality is very keen on the development of better medical services. This can be

observed from the expenditure (Table : 4.3) on medical facilities by the Municipality over years.

Table 4.3*

Expenditure In Rupees	1980-81	1981-82	1983-84	1984-85
Health Department	6,95,135	9,94,251	8,37,905	14,32,591
Malaria eradication Project	67,908	2,10,111	2,25,318	2,97,359
Hospitals	9,41,436	10,09,907	11,60,640	14,68,458

Expenditure In Rupees	1985-86	1986-87	1987-88	1988-89
Health Department	16,70,604	16,57,976	19,16,934	18,56,002
Malaria eradication Project	3,05,141	3,36,124	4,01,704	4,34,225
Hospitals	19,30,513	21,87,007	20,20,498	19,46,223

*Source : Souvenir Anand municipality Centenary year 1989.

The Municipal Hospital is a maternity hospital, while the Emery Hospital has well-equipped laboratories, physiotherapy department, X-ray and deep X-ray facilities, Electro-Cardiographs, Maternity, Surgical and Medical-Orthopedic wards. The persons of middle income group take advantage of this hospital, while the higher or richer class people go to private hospitals for quick and efficient services.

Anand has 3 important blood banks and about 10 Surgeons who are at the top in the list. About 42 private clinic run in the city. The figure 6.3. 'a' shows the comparison of the urban field for medical services of Anand. It can be concluded therefore that the urban field

for medical services has more or less the same pattern as in 1971 however since 1971 the field of influence has expanded towards south east direction thus crossing the taluka boundary in 1991.

The surrounding villages and towns take full advantage of the medical services in Anand and patients come from Gamdi, Sadanpura, Hadgood, Lambhvel, Boriavi, Kanjari, Uttarsanda, Vadtal, Samarkha, Ajarpura, Chaklashi, Bhalej, Tranol, Kanjarao, Vaghasi, Navli, Adas, Vasad, Napad, Khadodhi, Mogari, vallabh Vidyanagar, Vitthal Udyognagar, Valasan, Borsad, Chikhodra, Vasnol, Lingda, Umreth etc. Apart from these villages within the walk limits, patients also come from far away places like Ahmedabad, Panchmahal, Kutch and even from Bombay for treatment particularly in the Kshyaya Nivaran Kendra (T.B.Hospital) for its specialized services and good treatment. This shows how Anand becomes an important urban center as far as medical services are concerned (Fig : 6.3.'a').

Urban field for Recreation :

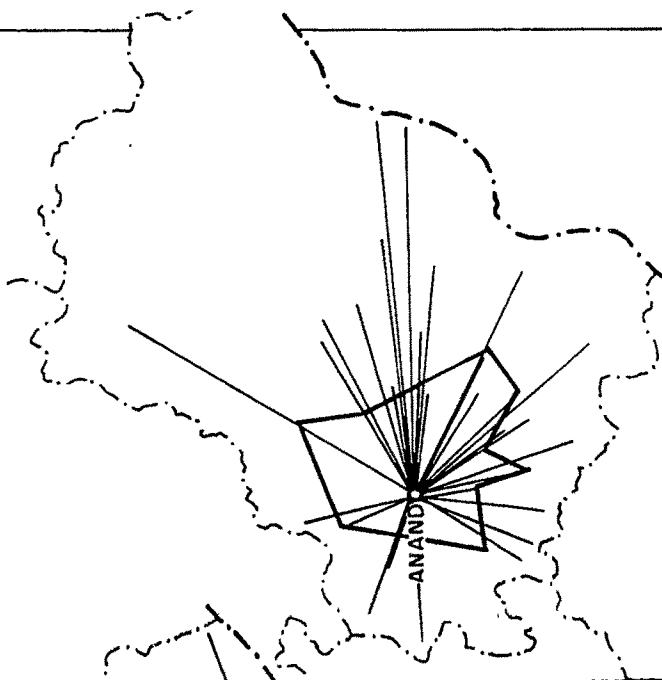
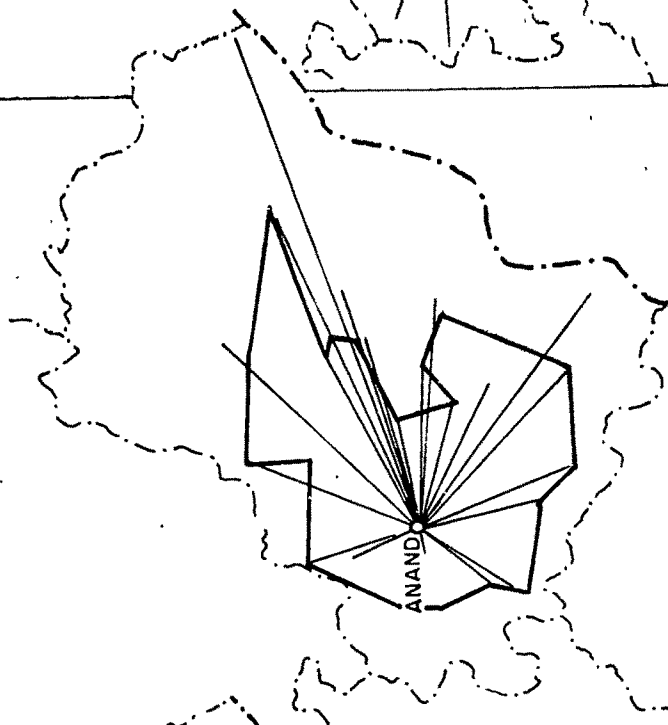
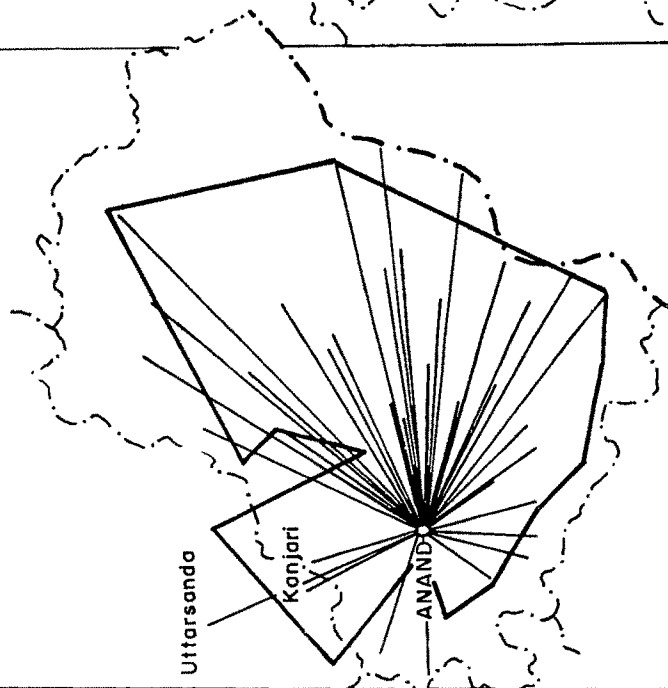
The surrounding village and town folk frequently visit Anand's places for entertainment. This includes the seven talkies, which the city has, as mentioned in the Table 4.4. Rajashree, Tulsi and Kalpana talkies are newly built whereas rest all i.e. Gopal, Swastik, Laxmi and Kalpana exist since 1971. Almost all of them lie, along the main roads and in the outskirts, away from the old city (core) so as to satisfy the needs of surrounding villages which are very close to Anand.

Urban field of influence

(a) For Medical services

(b) For Recreation

(c) For Education



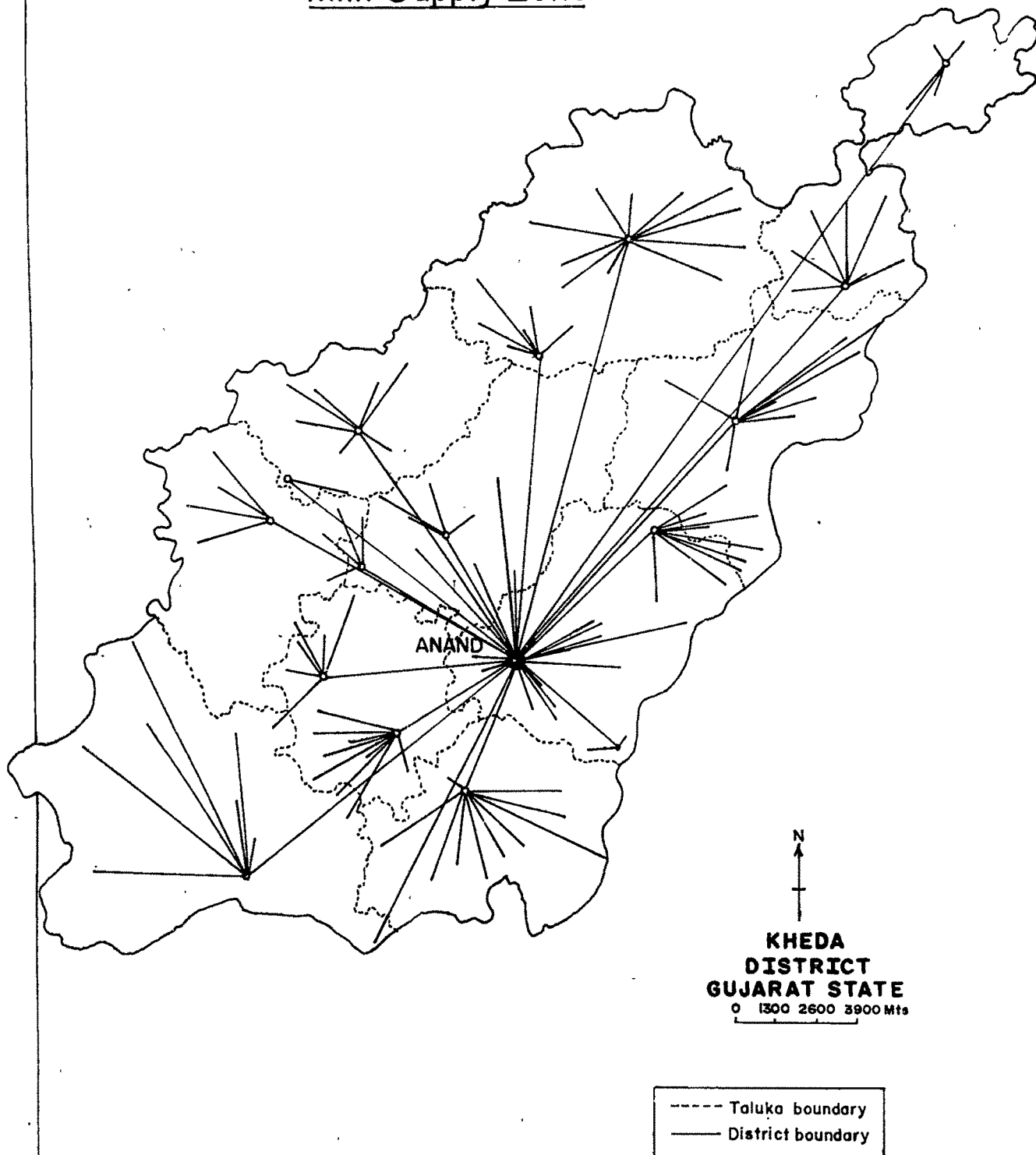
(Fig 6.3)

--- District boundary
— Taluka boundary

— 1971
— 1991

Legend

Milk Supply Zone



(Fig:6-4)

Even the students of Vallabh Vidyanagar and employees of Vithal Udyognagar visit the theatres for 3rd and 4th shows. Marginal workers and construction workers who come to Anand from the surrounding villages, stay overnight and on Sundays make a rush to these Cinema halls. Students of Vallabh Vidyanagar and Karamsad come on bicycle since they are easily accessible.

Places of entertainment like J.K.Park where a horse ride, boat ride, some folk dance, mimicry, orchestra, puppet shows are latest developments to attract population from the surrounding areas & also the highway passenger traffic.

Besides some of the villages also take advantage of the recreation facilities in the city. They are Samarkha, Tranol, Kunjarao, Sadanapura, Mogari, Chikhodra, Vaghasi, Ajarpura, Balej, Kasor, Bakrol, Ode, Bedva, Sarsa, Khadol, Napad, Khandhli, Navli, Adas, Vasad, Gana, etc.

The comparison of 1971 and 1991 figures shows that the urban field for recreation has expanded over years towards eastern part of Anand Taluka. However, still it has not crossed the Taluka boundary. (Fig. 6.3. 'b')

Urban field for Milk Collection and Supply :

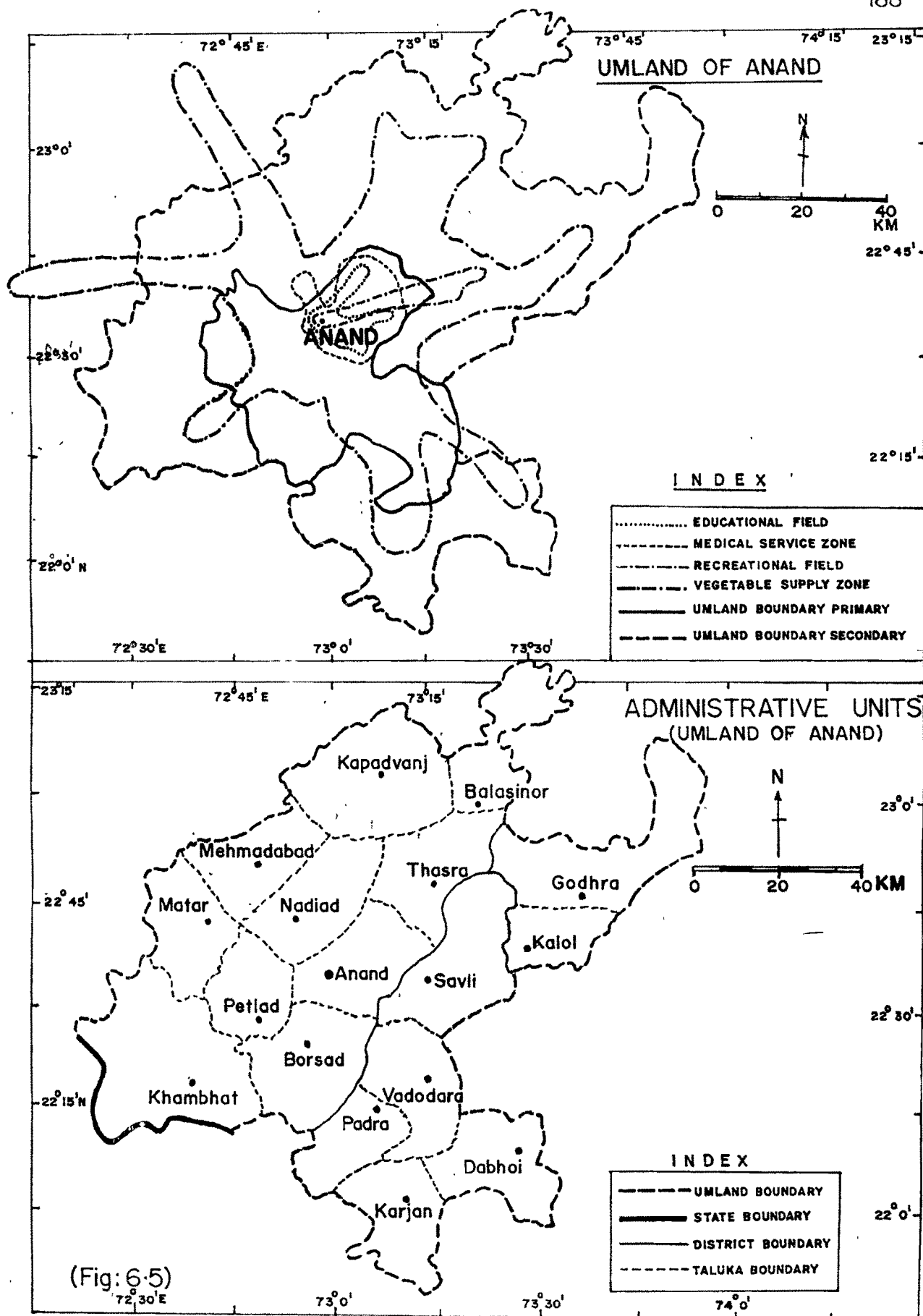
Anand popularly known as the Milk Capital of India, is greatly dependent on the villages and towns of the surrounding talukas of the Kheda district. Thus milk as a commodity to show the urban influence of Anand becomes very important. There were 606 milk collecting centre in the Kheda district which supplied milk to the Amul dairy in 1971.

However now the number of collecting centre has increased to more than 925 villages. Out of these 16 places are the main collecting centres including Anand which cover almost 83% of the total villages of Kheda district. Thus it was a difficult task to show the zone of influence as far as milk as a commodity is concerned (Fig : 6.4).

7. Administrative Sphere :

The administrative set up of Anand is very important, since it is the state Capital for the Municipalities and occupies an important position as far as its location is concerned in the taluka as well as in the district. Many private firms have established their head offices here because of its favourable location. This resulted in an enormous increase in the population of the city, both by natural increase and by mobility (Chapter III). Many Graduate, Post Graduate College and Research Institutes like Tobacco Research Center, Veterinary and Animal husbandry College, Ayurvedic College, Homeopathy college and Agricultural University which is a unique feature of Anand giving a distinct function to it, from administrative point of view. So also are the Engineering, Law and Science, Arts, Commerce Colleges.

Though Anand does not have any airport, Air – India authorities have their booking office at Anand. This is to enable the NRI'S and other officials visiting the city frequently to book their tickets and save their time and money by not going to Ahmedabad. The highest numbers of Air – India seats are booked in Gujarat from Anand. All these definitely increase



the importance of the city as a service center and as such help is extending its service area widely.

Anand, situated on the direct route to Ahmedabad – Delhi in the North and Mumbai – Pune in South, attracts heavy volume of traffic and this has an additional influence by the Khambhat – Godhra broad gauge railway line passing from Anand in a West to East direction. Yet, the centripetal pull of some cities as Vadodara, which is 38 km South of Anand by being so near, neutralizes, to some extent its influence mostly in such services as newspaper, telephone calls etc.

In the Southeast, Mahi River and the railway line crossing stand as a barrier for easy communication. Hence, a large area in the North, Northwest and west are taken over to social institutional uses. It is predicted that its umland boundary may expand in these areas in future. At present the expansion is towards east and Southeast directions. (Fig : 6.5)

8. Position and extent of the Umland :

The umland of Anand extends from $21^{\circ}45'$ N to $23^{\circ}15'$ N and $72^{\circ}15'$ E to $74^{\circ}0'$ E of Greenwich meridian (Fig : 6.5). It covers an area of 11515.17 sq.km and a North – South length of 150 km, while east – West expansion of 152 km.

Table : 4.4 shows the list of administrative units coming under the Umland zone during 1871 and 1991; respectively.

Table : 4.4

1971			
Sr.No.	Taluka	District	Area in Sq.km.
1	Anand	Kheda	676.0
2	Petlad	Do	475.2
3	Borsad	Do	607.4
4	Vadodara	Vadodara	670.0
	From	Total	2428.6
	Subtracted	Anand Municipality	21.13
		Umland Area	2407.47
1998			
Sr.No.	Taluka	District	Area in sq.km.
1	Nadiad	Kheda	662.3
2	Kapadvanj	Do	985.7
3	Petlad	Do	475.2
4	Khambhat	Do	1191.6
5	Borsad	Do	607.4
6	Balasinor	Do	552.3
7	Mehmadabad	Do	502.3
8	Matar	Do	577.0
9	Thasra	Do	659.9
10	Anand	Do	676.0
11	Padra	Vadodara	535.0
12	Vadodara	Do	670.0
13	Savli	Do	792.0
14	Dabhoi	Do	633.0
15	Karjan	Do	602.0
16	Kalol	Panchmahals	395.4
17	Godhra	do	1019.2
	From	Total	11536.30
	Subtracted	Anand Municipality	21.13
		Umland Area	11515.17

9. Delimiting by Theoretical approach :

Some traditional models other than empirical approach have been considered for demarcation of the zone of influence of Anand over its surrounding region.

The Break – point concept :

The Break point concept is a modification of the interaction theory. The break point theory explains the location of the boundary line separating trade areas around two or more towns unequal in size. The formula can be written as :

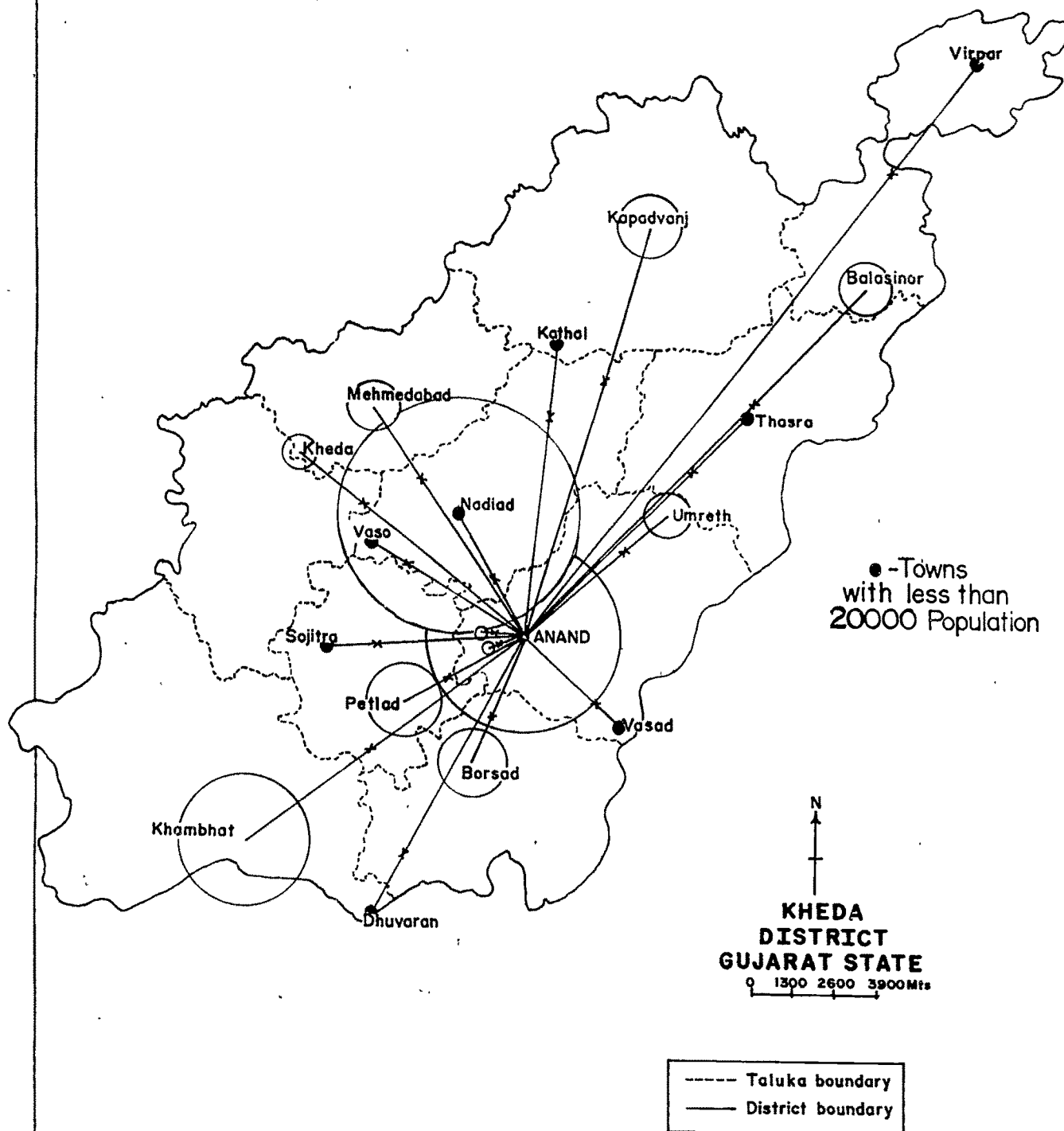
$$Bpd = \frac{dab}{1 + \sqrt{\frac{Pa}{Pb}}}$$

Where Bpd = Break point distance on the line joining two places 'a' and 'b', while dab = distance between two towns 'a' and 'b'.

Methodology :

1. Individual distances of all urban places in the district were listed out and distances from Anand were tabulated along with their total populations.
2. Populations of all urban centers in the district were represented by circle method.
3. The actual route distance is represented in a straight line for individual urban centers. Here we can gauge the relative distance between urban centers at a glance.
4. Since there are number of urban centers lying on the same route, the actual routes were not considered and instead straight line were drawn so as to avoid the problem of

Sphere of influence by break points (Trade relation)



(Fig:6-6)

demarcation of the break points and so the actual method is slightly modified for better cartographic representation and interpretation.

5. In order to calculate the pull effect of Anand the total distance between Anand and other urban places were equal to 100 % then the break point distance from Anand is calculated with respect to the total distance.

For instance the distance of Anand from place X say is 232 kilometers i.e. 100% pull effect. But if break point distance for Anand is 20 kilometers i.e. 8.62 % and for place X it is 91.38%.

Thus, for small centers with lesser population than Anand, Anand's pull effect will be more. The impact of the growing city on its tributary area and its reciprocal relationship has been highlighted with the data available (Fig : 6.6).

10. Reference:

- *1. Singh R.L. "Banaras – A study in Urban Geography"; 1955, P : 116.
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