SETTLEMENT PATTERN IN SWAT VALLEY

BY

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316-

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بسم الله الرحمن الرحيم

In the Name of Allah

The most beneficent,

The most merciful.

D-33

This thesis of Usman Ali is Approved.

EXAMINERS:

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SYNOPSIS

The human settlements which are as old as mankind itself are centres of activities, cultures and civilizations, and are therefore, the basic expressions of man's utilization of space. In the modern era of socio-economic developments it is fully recognized that the spatial aspects of the developments should be given due importance. The settlement, which is an important element of spatial organization, play very important role in socio-economic developments. In order to understand the socio-economic landscape, it is therefore, essential to understand the processes which are responsible for the origin, growth and variation of human settlements and their inter-relationship.

This study is an attempt to assess the inter-relationship between geographical phenomena and human settlements in Swat valley. Its introductory part includes a review of the past work, a discussion on the methodology of the study and description of the study area.

It is followed by a section that traces the origin and diffusion of human settlements in the study area from ancient times to the present. It also analyses the distribution of settlements in relation to their physical environment. The next part focussed on the rural settlements, examines their size, internal characteristics and house types. Following this, there is a chapter on the functional basis of central place hierarchy.

In addition to overall settlement pattern, the study gives a detailed structure of Saidu-Mingora urban complex examining its growth, morphology, landuses and functional characteristics. Further the study has analysed the density gradients in the valley taking Saidu-Mingora as the centre. The spatial activity pattern or spatial interaction (population potential) around Mingora have also been discussed in this chapter. Finally overall problems of human settlements in the valley have been examined in the light of suggestions for future improvements.

CHAPTER I

INTRODUCTION

This chapter is divided into three parts; the first deals with review of the Previous work. The second discusses the methodology adopted for the study while the third part describes the characteristics of the study area.

PREVIOUS WORK: Swat valley has remained an area of major interest for travellers, archaeologists as well as earth, natural and social scientists. As a result, a number of studies have been carried out generating considerable published materials as travel accounts, books, articles, Government reports etc. A number of them have been discussed in the following account:

ARCHAEOLOGY AND HISTORY: The attempt at the earliest reconstruction of proto-history of Swat valley was made by Stacule[1] in his work " Excavations in a Rock Shelter near Ghalagai". The author suggest, that human habitation started in the valley as early as 3rd millennium B.C. A later work[2] by the same author gives chronological sequence of the

proto-historical cultures in the area. In addition to these, Stacule has seven[3] other publications to his crdit; all related to archaelogy. T-usa's work entitled "The Swat valley in the Second and Ist Millenia B.C: A Question of Marginality"[4], also relates to proto-history emphasing the importance of the valley in the 2nd and Ist millennium B.C.

A series of studies on the bones, burials and graveyards also shed light on the archaelogy of the valley. These include the work of Alcialti and Fedeli[5] (1976), Salvatory[6] (1975), Caloi and Compagnoni[7] (1976), Pardini[8] (1977) and Stacule[9] (1972 and 1975). On the basis of his findings, the later author suggests that socio-cultural differences have been the main cause of variation in the structure and design of graves in the proto-historic times. Beside human bones, Azzaroli[10] studied ancient horse skeletons and his findings published in 1975 as "Two Proto Historic Horse Skeletons from Swat, Pakistan", shows that domestication of horse

had already started in the proto-historic period.

In addition to proto-historic settlements and graveyards, studies have also been undertaken on pottery, remains, inscriptions and sculptures obtained from numerous excavations in Swat Valley. Amongst these, the famous work on sculpture are those of Facceena[11] (1962), Gnoli[12] (1963), Tucci[13] (1963 and 1965). Petech[14] investigated the ancient inscription in the area and published his work entitled " A Kharoshti inscription from Butkada I (Swat) in 1966. On the basis of his work on the ancient pottery in Swat valley Stacule[15] suggest similarity of culture in Swat valley with those of Indo-Iranian proto-historic cultures. Stacule[16] has published two other papers on the pottery of Swat valley in 1973 and 1981 respectively.

Amongst other work on the archaelogy of Swat valley are those of Agrawala and Taddei[17] (1966), Rashid[18] (1966) and Rahman[19] (1968). Agrawala and Taddei in a paper "An interesting relief from the Swat

valley" describes the presence of a number of archaeological sites in the Swat valley. Rashid in his article "Swat and its archaelogical remains" review a number of previous work on archaelogy of Swat and tries to asses the impact of past heritage on the cultural pattern of today. Similar work on the excavations and archaelogical findings by Inayatur Rahman also discusses the past excavations and their results.

Extensive work has also been carried out on Buddhist and early historical periods of the area. These include the work of Stein and Serindia[20] (1921) showing the importance of Swat valley during the Gandahara civilization. The same authors have published another book in 1929 antitled "On Alexanders track to the Indus" which traces the route followed by Alexander the great during his compaign. Their third work published in 1930 relates to the ancient remains in Swat Kohistan. Amongst other work on Buddhist period are those of Wright[21] (1940), Tucci[22] (1940 and 1959), Antonini[23]

(1969 and 1973) and Wright and Barger[24] (1941). The later authors have given evidence to show that there were cultural similarities between the Swat and Oxus valleys in historic times. The works of Antonini also provide evidence of similarity between historic cultures of central Asia and Swat valley. The author have also discussed human migrations from Central Asia to Swat valley in the ancient and Buddhist times.

Important work regarding the recent history of the area include those of Yousafi[25] (1961), Hussain[26] (1962) and Roshan[27] (1982). The work of Yousafi, "Yousafzai Pathans" traces the history of Yousafzai tribe who lived in Swat valley. Hussain's book entitled "The Story of Swat" discusses the history of Swat state while the work of Roshan Khan indicate the ethnic history of the pathan inhabitants of the area.

A number of other studies concerning political and strategic history of Swat valley have also been published.

Woosnam[28] (1897), Churchil[29] (1898), Mc, Malan and Ramsay[30] (1901), Spain[31] (1963), Nevil[32] (1910) and Barton's[33] (1939) work fall under this category.

ANTHROPOLOGY AND SOCI@LOGY: Anthropological investigation about the earliest inhabitant of the area were carried out by Genna[34] in 1965, which suggest similarity of ancient inhabitants of Swat valley with those of races along the mediterranean sea.

The anthropology of Swat Pathans have also been discussed by Caroe[35] (1957) in his book "The Pathans 550 B.C. - 1957 A.D". Other works on the anthorpology of the area are those of Tuden[36] (1926), Spain[37] (1963), Ferrier[38] (1858), Bellow[39] (1864), Ashraf[40] (1962), Ahmad[41] (1976), Ridgway[42] (1983), Cobb[43] (1951) and Rahman[44] (1969). The contribution of the last author is an article entitled "The ethnological wealth in Swat" in which he mentions similarities between the present folkways, customs and traditions and those of the ancient

(Buddhist) inhabitants of Swat valley.

In addition to these, a series of work on the anthropology of the area has been published by Barth[45] including his work "Ecologic relations in Swat" in which the author have brought out ecological relationships between the inhabitants of the various parts of the valley.

Amongst other work on the Sociology of the area, the most famous are those of Ahmad[46] (1962), Fautz[47] (1963) and Barth [48] (1971). Ahmad in his work entitled "Social organization in Yousafzai Swat: A study in social change" examines over-all social structure of the area. The work of Fautz gives the unique feature of swat's agricultural land scape and relates it to the social structure of the inhabitants. The last work "The system of social stratification in Swat" discusses the socio-economic structure of the society represented in the existing social stratification of the people.

ECONOMY: The economy and overall resources of Swat valley has been discussed in a government report entitled "Integrated resource survey and Development potential of Swat river water-shed[49]". In addition, a number of other documents written on various sectors of economy of the North West Frontier Province also include sections on Swat district. These include s-uch works as "The agricultural economy of North West Frontier[50]" and the "Industrial profile of N.W.F.P.[51]". In mining sector examples of such work are the studies of Davies[52] (1962) and Moosvi etal[52] (1966).

Economic and demographic statistics on the valley are available from a variety of publications such as "Development Statistics of N.W.F.P.[54]", "Pakistan Census of Agriculture[55]", "Crop Statistics of Pakistan[56]" and population Census publications[57].

GEOLOGY: Geology of Swat valley has been discussed in some detail by Wadia[58] (1957) in his book " Geology of India".

The author attributes the origin of Swat valley to the erosive work of River Swat and its tributaries. In a later work, King[59] (1961) studied fossiliferous rocks providing insight into the geological conditions of the past. Rehman etal[60] (1970) discussed geology of Shahdheri-Kabal area with special emphasis on the economic minerals of the area.

Amongst works on structure and petrology of the area are those of King[61] (1964), Jan and Tahirkheli[62] (1969), Jan[63] (1968) Davies[64] (1965) and Martin etal[65] (1962). A number of studies have also been carried out on mineralogy/petrology and economic geology. These include the work of Tahirkheli[66] (1959) Qureshi[67] (1969), Shah etal[68] (1964) Faroqi etal[69] (1966), Khan[70] (1965), Ahmad[71] (1967), Kemp etal[72] (1970), Saleem[73] (1963) and Sultan[74] (1970).

In addition to above, a number of works have been carried out in Swat in fields which overlap both

Geology and Geography. These include the work on Glaciology, Hydrology and Geomorphology. Examples of such types of work are those of Porter[75] (1970) who published an article entitled "The Quaternary Glacial Records in Swat Kohistan". WAPDA'S[76] work which collects and maintains hydrological records about the River Swat is another example. Finally Said's[77] (1975) work on the geomorphology and land use also falls under this category.

NATURAL SCIENCE: In natural sciences some work has been carried out in Biology. These include studies of Mirza[78] (1963, 1973 and 1974), Nazir[79] (1969) and Khan[80] (1971). The two papers published by Mirza are related to fish culture in river Swat and its tributaries while in the third he discussed the insect fauna of the valley. The work of Nazir published as a paper entitled "Trout in Swat" discusses Trout population in river Swat and its tributaries. The work of Khan is related to Botony and discusses the natural vegetation of the valley. The author mentions a marked altitudinal zoning of natural vegetation in the area.

In addition to these, Champion etal[81] (1965) in their study "Forest types of Pakistan" have discussed the forest type of the area while Mountfort Gay[82] (1969) in the famous work "The vanishing Jungle" describes the habitat and wild life.

GEOGRAPHY: Little work has been done on the geography of Swat Valley so far. Amongst these, earliest work was done by Hay[83] (1934) which was published as an article entitled, "The Yousafzai State of Swat". The article gives a geographical description of the area. Amongst other works that have discussed the geography of the area are those of Ditcher[84] (1969), Spate[85] (1954), Tayyeb[86] (1966), Elliot[87] (1968) and Ahmad[88] (1972). These works are primarily concerned with geography of the province or the country but include sections in which the Geography of Swat has been discussed in some details.

Three studies have been carried out on the geography of settlements. Amongst these, Zaidi's[89] work relate to the marketing system in Saidu-Mingora while Ali[90]

discusses the landuse pattern in Mingora. Israr-ud-Din's[91] work on the other hand is very generalized. Nevertheless, it provides some information into the distribution and location of settlements.

None of the above works provide a detailed insight on the geography or the settlement pattern of the area. This work has tried to fill this gap. The study is oriented primarily to the settlement pattern as a product of the environment or geography of the area.

METHODOLOGY: The study has been based on both secondary and primary sources. The data on the evolution of settlement pattern has primarily been derived from historical and archaeological Sources. In addition, census records and government reports have also been used as important sources. Moreover, Malaria control programme which collects information on population, housing, rooms and the structural conditions of houses is another important source of data for this study. In addition to secondary data, each settlement in the area was visited by the scholar himself and data thus collected by field surveys in 1981 formed the foundation of this work. There are 1109 settlements in Swat valley. Many (95.33%) of these comprise isolated farmsteads and small clusters of houses. Data on varied aspects of these settlements was recorded on a predesigned proforma (Appendex I) during the field study. It was processed and tabulated manually and has been analysed in various sections given in the synopsis. It may be mentioned here that the chapter on central places

in Swat valley included only 232 settlements in the analysis. The reason being that these were the only settlements which had at least one central function, such as a primary school and the like. Similarly, the section on population potential used only 164 settlements because, they were the only with connection by road, a necessary requirement for this analysis. Besides these two, discussion on all other aspects such as evolution, morphology, types of settlements and their problems have been extended to every settlement in the valley. Data for the section on population and settlement density gradients and intensity of cultivated land from Mingora Urban area within the valley was obtained from relevant maps and air photographs. A field check was also carried out where required.

Finally a detailed survey was conducted within the twin city of Saidu-Mingora, which comprised a combination of interviews and land-use study to analyse the growth and morphology as well as the functional characteristics of the only urban complex of the valley.

Like any other work this study has its own limitations. Firstly, the field survey of settlements could not cover them all at a single point in time. The 1109 settlements of the area needed more than twelve months for their coverage during the field study. Secondly, the maps were not available at appropriate scale and had to be adjusted for the study by enlargements and reductions and by phto-graphs which may have introduced some element of exaggeration in scale. Similarly, the map of Saidu-Mingora obtained from its Municipality was not very accurate particularly with respect to scale of roads and streets. Since it was the only available map, the author therefore, had no other option but to rely on the same. Finally, the population and housing census data was not available by individual settlements and therefore, extensive data on this had to be collected from Malaria Eradication Programme.

STUDY AREA : The Swat valley is located between 34°-31′-55″ and 35°-53′-40″ North latitudes and 71°-44′-40″ and 72°-47′-15″ East longitudes (Fig.I). Administratively the valley includes parts of Swat and Dir districts and Malakand Agency of the North-West Frontier Province of Pakistan. Major portion of the valley (2087.11 out of 2374.70 Sq miles) falls within Swat district while a minor part of about 288 Sq miles falls within Dir district and Malakand Agency.

Administrative parts of the valley have been classified in table I and are shown in Fig.2 .

TABLE I

SWAT VALLEY: ADMINISTRATIVE AREAS 1981.

District/ Agency	Tehsils	Area(Sq.miles)
1.Swat District	1. Kabbal	163.22
	2. Matta	256.55
	3. Kalam	841.65
	4. Bahrain	396.48
	5. Khwaza Khela	52.35
	6. Charbagh	42.07
	7. Saidu Sharif	124.67
	8. Barikot	114.45
2.Dir District	1. Adenzai	172.47
3.Malakand Agency	1. Swat Ranezai	115.12
	Total: 10	2374.70

MALAKAND DIVISION

GEOGRAPHICAL LOCATION OF SWAT VALLEY

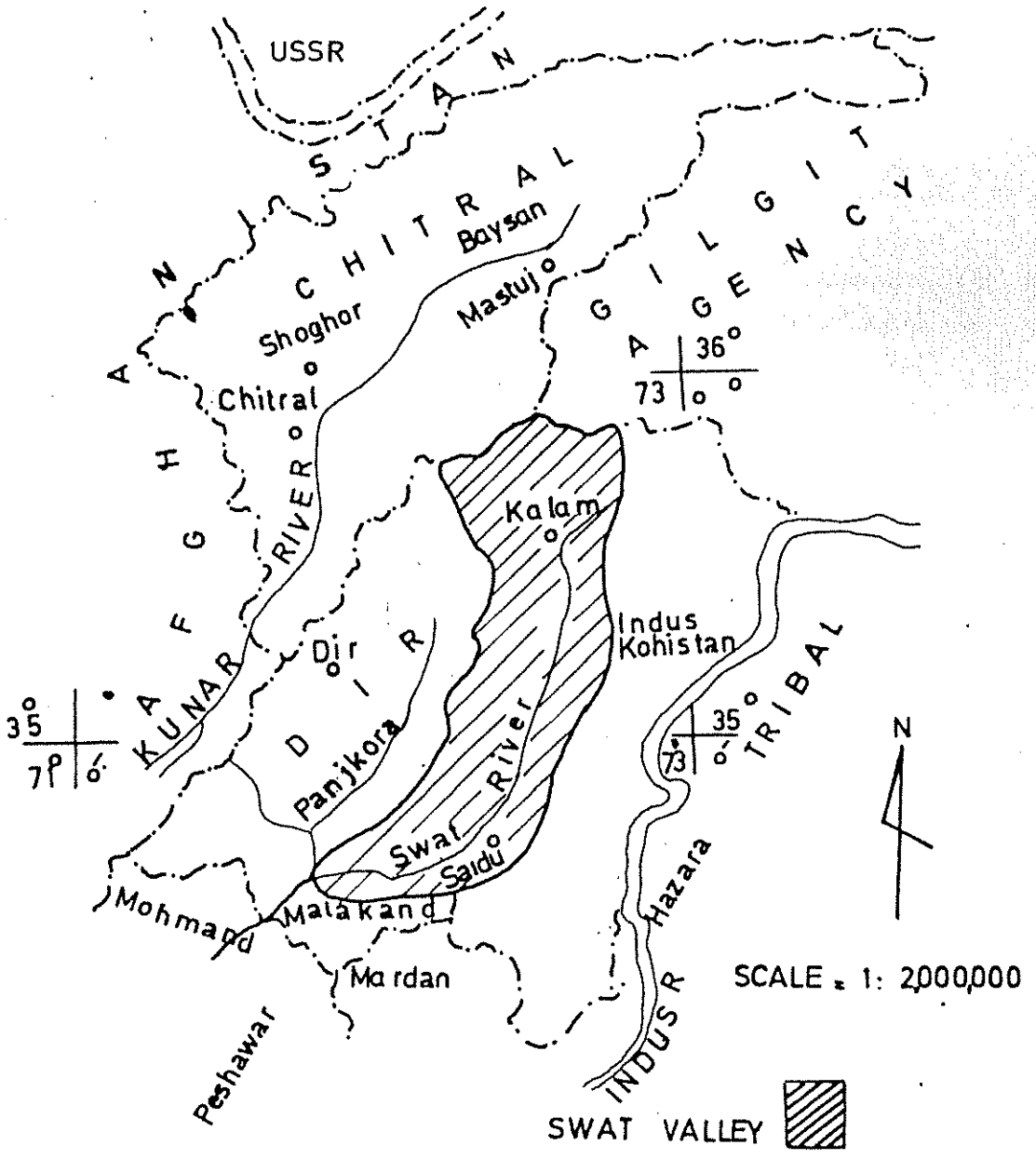


FIG: 1

SWAT VALLEY

DISTRBUTION OF ADMINISTRATIVE AREAS (1981)

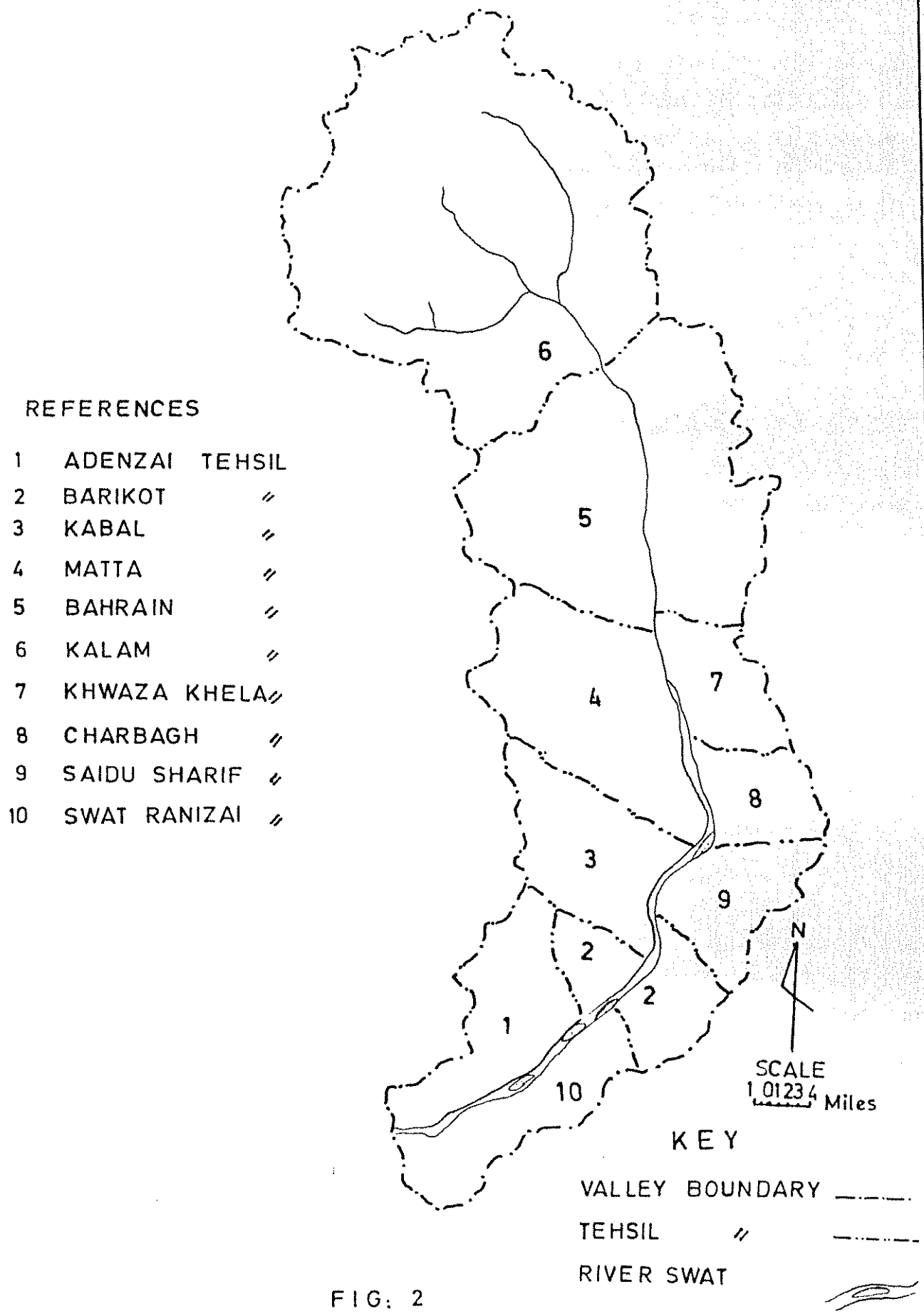


FIG: 2

PHYSICAL ENVIRONMENT:

TOPOGRAPHY: The Swat valley has been formed by the erosional work of river Swat and its tributaries. The river Swat flows through the valley from North-east to South West. The shape of the valley is a broad 'V'. It has a rugged ground surface and is surrounded on all sides by mountains of considerable heights, some of which are 20,000 feet above sea level. There is only one gap in the South-West through which Swat river flows out to join Panjkora river of Dir District.

The valley is broadly divided into the following topographic divisions (Fig.3).

SWAT KOHISTAN: It consists of a rocky, rugged and complex mountains with great heights. Perpetual show and high glaciated peaks are common feature of the area. The limit of this zone is defined by the two principal tributaries of the river Swat i.e. Utror and Ushu rivers in the West and East respectively. These rivers join near Kalam at an elevation of 6800 feet (2073 metres)

above mean sea level. Utror and Ushu rivers flow in narrow steep gorges and so does the river Swat from Kalam to Madyan. Two large supurs project from Swat Kohistan range. The western spur forms the boundary between Swat and Dir Districts. This spur possesses many glaciers in its Northern part. The eastern spur is called Mankial 'ghar' that acts as a watershed between Swat and the Indus Rivers.

SWAT BASIN: It is drained by River Swat and its tributaries. Starting from the Madyan village, where the Swat river leaves its gorge, it extends upto Qulangai village in the Malakand Agency where it joins the Panjkora river of Dir District. Total length of the basin is seventy miles. The valley is from two to four miles wide on average and its widest portion is some fourteen miles.

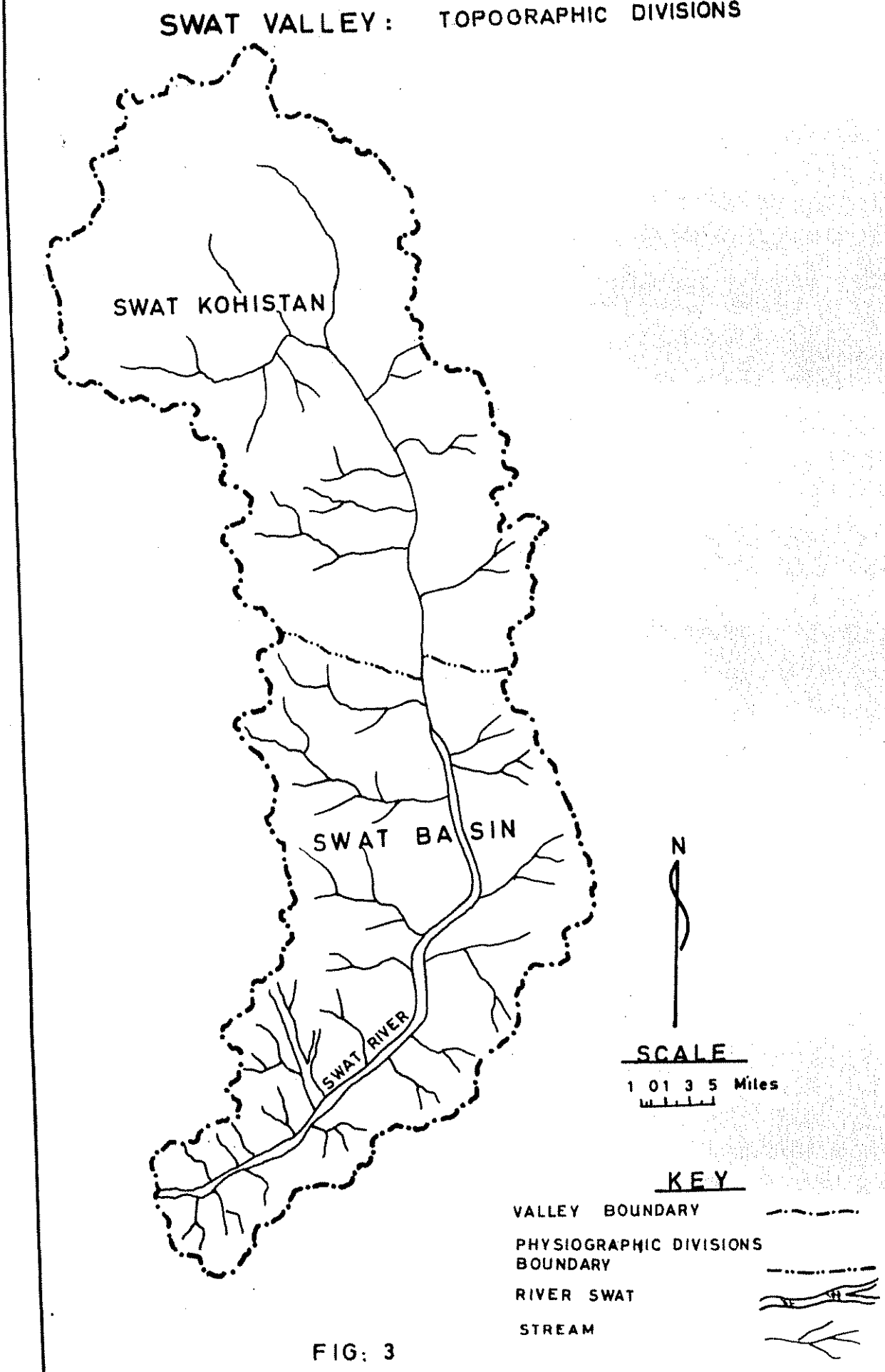

SWAT VALLEY: TOPOGRAPHIC DIVISIONS
SWAT KOHISTAN
SWAT BASIN
SWAT RIVER
N
SCALE
1 0 1 3 5 Miles
KEY
VALLEY BOUNDARY
PHYSIOGRAPHIC DIVISIONS BOUNDARY
RIVER SWAT
STREAM

FIG: 3

CLIMATE: The climate of the valley has been affected by a number of factors: The width of the valley, orography of the area, valley winds, aspect and altitudes of the surrounding heights are all of considerable importance in influencing the climate in different parts of the valley. The overall climate of Swat valley is characteristically extreme and dry and the major part is distinctly continental. It is hot in summers, ranging from very hot in lowlands to warm in the uplands and cool in the higher elevations. The average air temperature averaged over twelve months on the basis of daily recording of mean maximum and minimum temperature is given in the following table on the basis of the observations of the Meteorological stations located in the valley.

TABLE 2

SWAT VALLEY : AVERAGE AIR TEMPERATURE OF SELECTED PLACES.

Months	Chakdara Average from 1960-1969		Saidu Sharif Average from 1963-1966		Kalam Average from 1963-1966	
	Max	Min	Max	Min	Max	Min
January	58.3	34.3	58	6	46	22
February	61.8	40.3	61	42	45	25
March	71.5	46.2	68	47	50	30
April	78.9	45.7	73	53	55	36
May	90.1	61.8	83	60	69	45
June	101.1	72.5	96	70	78	52
July	96.9	74.3	93	72	79	57
August	93.7	72.9	91	70	76	56
September	91.3	67.5	89	57	66	40
October	83.4	55.4	82	57	66	40
November	70.1	43.4	71	45	58	31
December	60.9	36.0	61	38	47	45

Source: Department of Meteorology Karachi.

The table indicates that the highest temperature recorded in the valley is 101.1°F at Chakdara in the month of June. At Saidu sharif and Kalam for the month of June it is 96°F and 78°F respectively.

In winters most of the valley is in the grip of cold winds and blizzards. It is more severe in the uplands than in the low lands. The minimum temperature recorded in the valley is 22°F at Kalam in the month of January (Table 2), in the higher parts it is 15 or 10°F.

The rain-fall in the valley decreases from the Southwest to the Northeast mainly due to the high mountains which block the passage of rain bearing winds from the Southwest. Due to this majority of the forests are confined to the slopes south of these spurs. The rainfall in the valley is mainly in winter and springs i.e. between the months of December and April and are caused by the Western disturbances which come from the Mediterranean Sea. The direction they follow is the zone of frontogenesis

between the cold high pressure of central Asia and the warm sub-tropical anti-cyclone on the Southwest. They pass over Persia and Afghanistan into Pakistan and their average number from November to May is five, according to official data. These depressions make their way into Swat valley along the river Swat and enter at Qulangai village. The rainfall begins to increase in January and reaches its maximum in April. The monthly average rainfall in inches has been given in the following table:

TABLE 3

SWAT VALLEY; MONTHLY AVERAGE RAINFALL

Months	Chakdara From 1960 to 1969	Saidu Sharif From 1962 to 1966	Kalam From 1962 to 1966
January	1.88	1.81	5.73
February	3.58	3.48	5.82
March	5.50	5.10	8.49
April	4.69	5.86	10.52
May	1.75	3.25	3.76
June	0.20	0.32	0.20
July	4.18	5.20	1.68
August	4.47	4.87	0.99
September	1.71	1.36	0.98
October	1.39	0.74	1.40
November	1.07	1.37	2.25
December	2.06	1.98	2.81
Total	32.48	35.34	44.63

Source: Department of Meteorology Karachi.

The winter and spring precipitation comes both as snow and rain is important in many ways. First of all it provides moisture during the Rabi growing season. Secondly, the melting of accumulated snow regulates the flow of spring, stream and river waters throughout the year. The April rain is not important in the lower part of the valley as it delays early harvest and damages the fruit crops which are in full blossom at that time. On the other hand, in the upper parts of the valley, where the ripening time of Rabi crops is later, these rains are curiously awaited.

The small amount of rain that falls between the months of May and November in the lower parts of the valley is the result of thunderstorms or convectional currents. They give torrential downpours and result in floods, and therefore, cause great damage. Very small amount of monsoon rain fall to the north of Bahrain in summers. Dust storms also occur between July and August usually

in the afternoon.They come from the southwest and last for two or three hours. Sometime they bring showers and are extremely harmful to the crops of maize and rice as well as to fruit like apples, peaches etc.

SEASONS IN THE VALLEY: Four seasons are generally recognized on the basis of varied climatic conditions. These include Winter, Spring, Summer and Autumn.

WINTER SEASON: It starts with the winter solstice. At this time the trees have shed their leaves. The snow line has come down. The nights are the longest and dreary. The days are the coldest, the mornings are frosty and the evenings are crisp. In the upper parts the conditions are more severe.

In this season the pressure is the highest and cold winds come from Central Asia through the high passes. The mountain winds also come down from the mountain after the sun-sets. All these winds make the winters more harsh.

January is the coldest month in the whole valley (Table 2). Snow fall starts in December and reaches it maximum in January and Februrary. The tributary valleys and other small valleys entering into the main valley having Eastwest locations, get very little sunshine in this season. It is due to the sun's course which shifts southwards. Such conditions have greatly affected the distribution and size of settlements in the valley. It has also affected the orientation of houses as well as the types and plans of houses in the valley which will be discussed in detail later.

SPRING SEASON: Because of local altitudinal variation, there are differences in the limits of this season from place to place. But it is recognized that this season begins with spring equinox when the almond and apricot bloom in the lower parts of the valley. The season starts from the first week of March. At this time the cold wind ceases and no morning frost occur except on very high altitudes.

At day time it is pleasant and cool and at night it is still cold. In this season there are lot of rains till the end of April when the temperature rises and rains are stopped.

In the month of May the skies are clear and the temperature increases considerably (Table-2). By the end of this month, wheat and barley are harvested in the lower valley while sowing of the Rabi crops begins in the upper valley. The temperature gradually increases and reaches its maximum by the middle of June and thus the summer starts. In the Swat valley the spring season is usually spoiled by rains.

SUMMER SEASON: It starts with the summer solstice. There is a rapid increase in temperature. The highest temperature is reached in the month of June (Table - 2). In the lower valley, the temperature becomes oppressive. In the higher altitudes,it is pleasant i.e. warm. There is a small amount of rainfall in this season often accompanied with thunder-

storms. Some whirlwinds and duststorms also occur in the month of August. It is mainly due to variation in the configuration and altitudes of the valley. In this season the River Swat and its various tributaries are swollen with waters from the snow, melt in the mountains. These streams become a source of floods and cause heavy damages sometime.

Since the economy of the area is mainly based on agriculture therefore, this season is considered to be very busy season of the year for the majority of the people. The people are busy in harvesting, thrashing and storing the Rabi crops on the one hand and sowing, weeding and watering the Kharif crops on the other.

AUTUMNSEASON: In this season the tree leaves begin to turn yellow and the cold dry winds starts. The nights grow colder and the days are still pleasant untill the middle of September, when the autumn sets in. Generally the cold spell stafts at the end of October in the lower parts of

of the valley but in the higher areas it starts by the end of September. Rainfall is little but is more than that of the summer season. In the higher altitudes it is in the form of snow. This is also a very busy season for the people because they are engaged in harvesting, thrashing and storing the Kharif crops.

NATURAL VEGETATION: The most important natural vegetation of the area are forests which form extremely important and popular economic resource of the valley. The economic importance of forest resources of the area can be briefly summarized as

1. Revenue to Government and private people.
2. It is a major source of timber supply to meet the requirements of constructing Railways and Ship-buildings.
3. To meet the wood requirements of furniture industry, sport industry, pulp/paper industry, farmica, chip-board etc.
4. It is a renewable energy resource and major source of fire-wood and charcoal for smithies.

5. It conserves the precious fertile soils from being washed away.

6. Watershed value i.e. to protect the watershed (catchement area) from accelerated erosion, which causes damage to soils and causes floods.

7. To protect the precious dams from accelerated silting up and thus prolongs the life span of huge constructions like Mangla Dam.

8. To protect the precious wild-life by providing shelters to them.

9. To add to the scenic beauty of the area which cannot be used for other purpose easily. It is a source of attraction for tourists and therefore, it greatly contributes to the development of tourism.

10. It is the Major source of resin, which is used in the making of varnish.

DISTRIBUTION OF FORESTS: The total area under forest in the Swat valley is 3,21,322 acres which is more than the area under the agriculture. It signifies the importance of forestry in the Swat valley. The distribution of forests according to 1980 figures, is given in the following table.

TABLE 4

SWAT VALLEY; DISTRIBUTION OF FORESTS (AREA WISE) 1980.

Tehsil	Forest Area (In Acres)
Barikot	20811
Saidu Sharif	22203
Charbagh	4803
Khwaza Khela	3647
Fatehpur	17185
Madyan	27706
Kalam	65652
Matta	60041
Kabbal	13535
Bahrain	65974
Swat Ranezai	8000
Adenzai	13586

Source: Divisional Forest Office, Swat Mingora.

The table shows that nearly half of the forests occur in the Swat Kohistan area .

TYPES OF FORESTS: On the management and legal basis the forests of the area can be divided into protected and reserve forests.

PROTECTED FORESTS: These are the forests which are maintained for the protection of very steep slopes liable to be washed away by accelerated erosion. Such forests are non-commercial and are confined only to very steep slopes in the Swat Kohistan and other parts of the valley. Settlements are restricted in these forests.

RESERVED FORESTS: These are the forests which are totally free from private rights i.e. such forests are State owned and private people have no rights to interfere with it except tresspassing, use of water ponds etc. Untill now no law exists in the area to declare any piece of forest as reserved. But the forest Department on its own has declared majority of the forests as State owned. In such forests no one can construct a house or cut any tree wihout

obtaining prior permission from the forest department.

LEGAL POSITION OF FORESTS IN THE VALLEY: The forests of the area are managed by the Government through Forest Department. The legal position is that these forests belong to collective ownership of a village i.e. various forests are owned by particular villages. The Forest Department exploits the forests departmentally or through Forest Development Corporation. The revenue thus accrued is divided between the Government and the people to whom the forest belong in the ratio of 40% : 60% respectively and the amount is distributed according to revenue records by the administration.

MAIN SPECIES: Among the confierous (having needle like leaves) trees, the commercial species are chirpine (locally known as Nakhtar), Kail (locally known as Pewuch), Deodar (Locally known as Diyar), Fir (locally known as Kachal) and spruce (locally known as Kundal). These trees are utilized as timbers. Beside these, broad leaved species are also found which are mostly used for fire-wood. Among the common

ones are Oak (locally Banj), Parocia (Beranj), Dadonia (Ghwaraskey) and Olea (Khonu). For furniture purposes, the common trees found in the forests of Swat valley are Walnut hard, horse chest nut and birds cherry.

Fir, Spruce and Kail are comparatively abundant as compared to the rest of the species. Fir and Spruce are found on high altitudes upto the tree limit (11,000 feet). The altitudinal zonation mostly varies from 7,000 to 10,000 feet. However, it may go as high as 11,000 feet and come as far down as 6,000 feet above sea-level. Kail, Deodar, Parocia, Horse-chestnuts and Walnuts grow in the middle zone i.e. mostly from 6,000 to 8,000 feet height.

The other importanttype of natural vegetation of the valley is the grass which occupy more than half of the total area and grows exclusively in the alpine pastures and the range lands. The Alpine Pastures are the continuous meadows, bearing grasses, forbs and herbs. They are found above the tree line generally between 11000 and 16000 feet elevation. These meadows

are visited seasonally by the Gujar nomades who own herds of sheep, goat and cattle. They have constructed temporary, dispersed and isolated settlements (huts) in these areas. The rangeland grasses are found in the lower altitudes usually between 4000 and 10,000 feet elevation. Majority of such grasses are found between 4000 and 6000 feet height. These areas in past were primarily under forests which have degenerated into grass lands due to the interference of the men who have cut the trees and cleared the area for cultivation and growing of grasses for the cattle.

During the summer months because of the monsoon rainfall in Swat Kohistan, grasses grow abundantly which are cut and made into hay for stall feeding in the Winter season and are used as grazing grounds in the summer season by the nomadic people and herdsmen.

ECONOMY: The present economy of the area is primarily based on agriculture, which is practiced in the valley since long. On the basis of 1972 census figures, 67.46%

of the population was agrarian. This indicates the importance of agriculture as the basic economic activity of the people in Swat valley. Agriculture in the valley is mainly controlled by the relief and climatic factors. On the basis of 1972 figures, out of the total agricultural lands of 2,49,963 acres, 1,30,497 acres (52.54%) occur below 4,000' ft; elevation and have small slope gradients. Due to the deep soils and flate terrain, the farm sizes of these lands are larger and fertile. They have the available irrigational facilities and favourable climates and therefore, farming is economical.In these areas there are large size (Nucleated), settlements. The cultivated lands between 4,000 and 8000 ft. consists of 1,19,223 acres. They have steep slopes and severe climatic conditions and hence they are less favourable for the production of crops. Above 8,000 ft. height, due to severe climatic condition, extremely steep slopes and thin surface soils the agriculture is absolutely uneconomical and only one crop is grown annually in some parts.

A variety of crops are grown in the area which is self-sufficient in the production of food crops. The important crops of the valley are wheat, onion, Barley, Mustard, Maize, Rice, Tomato and Potato. Data regarding the acreage and production of these various crops has been obtained from the department of agriculture, Mingora, Swat.

WHEAT: Wheat is the most important Rabi crop. It is sown in winter (December) and is harvested in Summer (June). It is cultivated on both the irrigated and un-irrigated lands of the valley. According to 1980 figures the total acreage of wheat in the area is 163778 acres, comprising 54807 acres of irrigated and 108971 acres of unirrigated lands. The total annual production is 65206 tonnes - 34700 tonnes from the irrigated and 30506 tonnes from the unirrigated or Barani lands. The area is self-sufficient in wheat.

ONION: It is another important Rabi crop that is sown in December and harvested in June. It is mainly grown on the irrigated lands of Swat basin. Onion is a cash crop

and it is more economical to grow than wheat. Therefore, it is gradually replacing wheat. The total acreage of cultivated land under onion, is 2189 acres and the total annual production is 13672 tonnes.

BARLEY: Another rabi crop which is mainly sown on the barani or unirrigated lands. The total cultivated area under this crop is 8475 acres and its annual production is3335 tonnes.

MUSTARD: It is sown in winter and harvested in summer and occupies mainly the barani land (non-irrigated). It is a cash crop. It is primarily used as oil seed, a by product of which is oil-cakes for cattle feed. The total acreage of mustard in the area in 10575 acres with 1382 tonnes of annual production.

MAIZE: Maize is an important crop of the area. It is sown in summer (June-July) and harvested in winter (October-November) throughout the valley. It has the largest kharif acreage and yields in the valley. The total area sown under maize in 1980 was 64728 acres comprising 55894 acres of

irrigated and 8834 acres of Barani lands. The total annual production of maize is 76366 tonnes. The area is self-sufficie in maize and the surplus is exported.

RICE: Rice is most popular Kharif crop of the area. It is sown in summer and harvested in winter. Rice is mainly grown in the Swat basin, near the banks of river Swat and its major tributaries where water is easily available. The total area under rice, in 1980 was 50013 acres with a total annual production of 27458 tonnes. The area is self sufficient in rice and also exports it.

TOMATO: It is mainly cultivated in the western and southern portions of the valley-in the frost free zone of the valley. Maize is gradually being replaced by this crop which is more promising economically. The total acreage under tomato in 1980 was 30116 acres with an annual production of 41456 tonnes.

POTATO:The Swat valley is very important for potato cultivation.

Potato is mainly grown in the Swat Kohistan, on commercial basis and exported to areas outside swat. The total acreage of potato in the area according in 1980 was 16012 acres with a production of 42432 tonnes. Due to its high yield and income, the acreage is being gradually increased.

OTHERS: In addition to the major crops mentioned above a variety of other crops are grown on small scale. These include,masoors, Soyabean, Sunflower, Tobbaco, Sugarcane, Pulses etc.

FRUITS: The Swat valley offers favourable conditions for the cultivation of fruits. The area is famous for apples, walnuts, citrus fruits, plums, pears, peaches, almonds, apricots, persimansetc. Most of these fruits are exported and high economic return is res-ulting in increasing acreage under orchards. Amongst fruits, apples and walnuts are cultivated in the Swat Kohistan and mountainous area surr-ounding the Swat basin while the rest of the fruits are grown through out the valley. The total acreage and productior of these fruits is given in table 5.

TABLE 5

SWAT VALLEY: ACREAGE AND PRODUCTION OF MAJOR FRUITS 1981

Fruit	Acreage	Annual production (in tonnes)
Apple	9390	42420
Walnut	2772	10662
Citrus	2085	7123
Plum	860	2842
Peach	42	182
Almond	165	165
APricot	457	1874
Pear	909	6675
Perciman o	3375	17660

Source: Agriculture Department Mingora, Swat.

INDUSTRIES: In Swat valley, there are various types of crafts and industries. The traditional small scale cottage craft of the area are mainly confined to the rural settlements. These include, the making of agricultural implements from iron and wood, handweaving, leather goods, pottery, extraction of oil, embroidery etc.

In addition to these crafts, there are various types of manufacturing industries in the valley. They are located in Mingora and other big settlements which have the advantage of availability of space, water, electricity, transportation and labour. They include; Silk, Food, Soap, Hosiery, Pharmaceutical, Rubber and Plastic, Carpet and Furniture industries. Occurence of industries by number of settlements is given in the following table.

TABLE 6

SWAT VALLEY: FREQUENCY OF OCCURENCE OF INDUSTRIES BY SETTLEMENTS 1981.

Industry	Number of Settlements
Hand weaving	11
Pottery	112
Basket and mate	8
Furniture	44
Marble	2
Timber	2
China clay	1
Flour, Rice & Saw Mills	138
Silk mill & Wool spinning	14
Cape Industry(Small scale)	1
Leather sorting(Small Scale)	5
Arms making (Small scale)	3
Fruit Sorting(Small Scale)	22
Embroidery (Small Scale)	6
Carpet industry	1
Forest complex	1
Others(Pharmaceutical, soap, ice etc)	1

Source: Field survey.

Mining is also important and the products of this activity are marble, chinaclay, feldspar, limestone and emerald, while the others e.g. graphite, iron ore, sulphor and corundum are other minerals which have not been explited so far.

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CHAPTER II

ORIGIN AND DIFFUSION OF SETTLEMENTS

The origin of human settlements in Swat valley can be explained on the basis of its particular position in the Geography of Asia, i.e. it is located near the main passes that link the sub-continent with central Asia. Moreover, it is near the important routes between the east and west and had therefore, been exceptionally exposed to the influence of currents from various parts of the world. The environmental condition of the valley was favourable in the past for the origin of settlements. Swat in the holy book of Hindus, has been referred to as "Odyana[1]" which means park or garden. The dense and thick vegetation cover, fertile agricultural lands, large meadows, plentiful supply of water and building materials attracted people from distant places to live in the area.

On the basis of excavations carried out by the Italian Archaelogical Mission (IsMeo), the existing

historical records and surveys carried out by the author, the number of human settlements in Swat valley originating during four historical periods i.e. ancient and proto-historic, Bhuddhist, Muslim and Modern have been given in table 7 and shown in Fig. 4.

TABLE 7

SWAT VALLEY: ORIGIN OF SETTLEMENTS.

Period of Origin	Number of Settlements
Proto-historic (2500-1300 B.C.)	15 (excavated so far)
Bhuddhist (324 B.C - 1023 A.D.)	29
Muslim (1023-1929)	145
Modern (1929-1981)	920

Source: Field survey.

SWAT VALLEY
EVOLUTION & DIFFUSION OF SETTLEMENTS

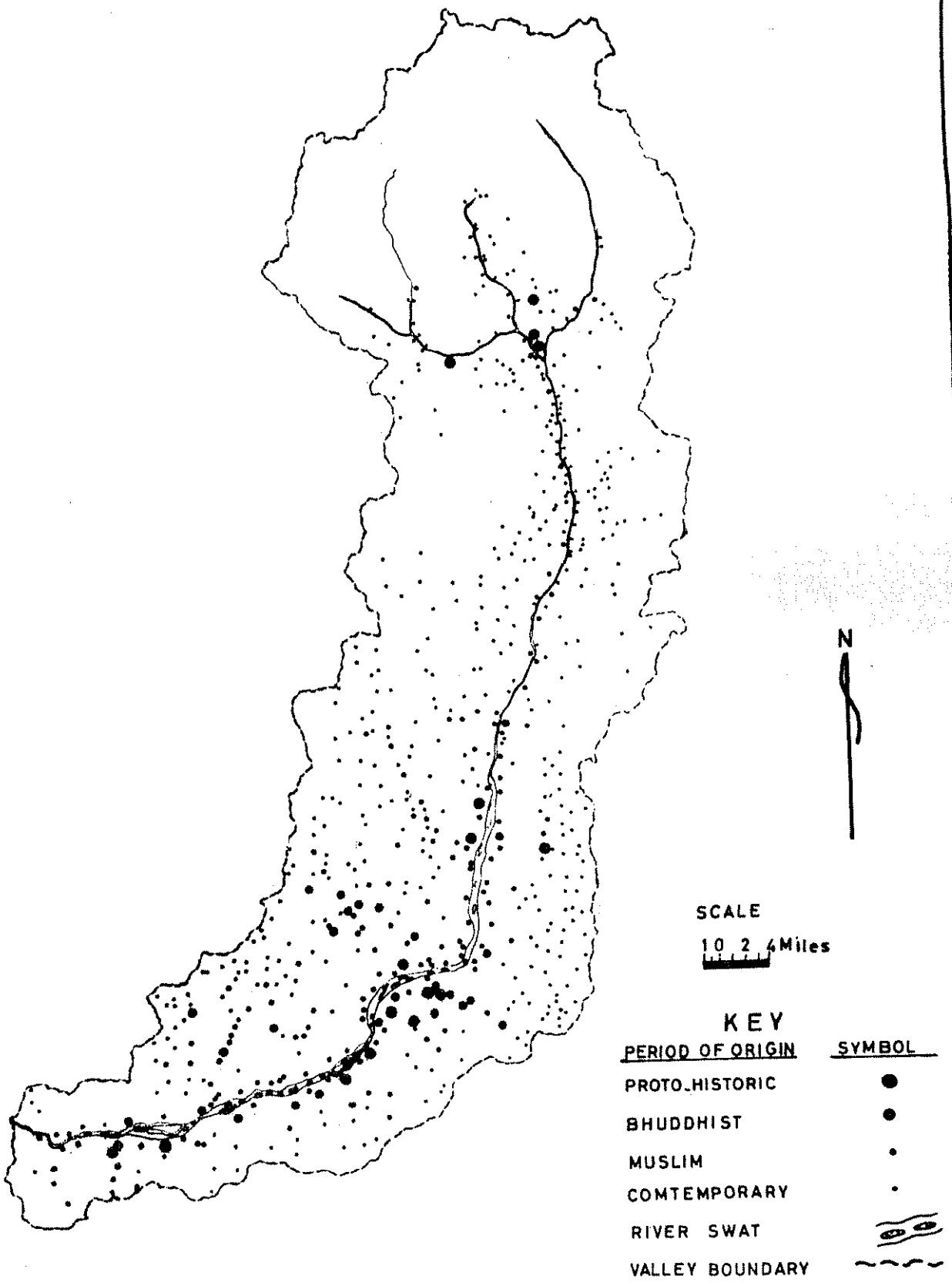


FIG: 4

It is evident that the modern phase is the major period of growth of settlements.

The first period started about 22,000 years ago when man started living in the valley as hunter and gatherer, living in caves[2]. The first known inhabitant of Swat valley lived in the Ghaligai cave in the proto-historic times between 2400 and 2100 B.C.[3]. They lived in caves and the hard rocks provided them with shelters. This was mainly for defence from the new comers to the valley. Later on these proto-historic people started living on the tops of hills. Folks who arrived later preferred to live in plains and developed the villages of Gogdara, Udigram and Aligrama. On the basis of excavations carried out by the Italian Archaelogical Mission (IsMeo) there are 15 settlements (including above 3) of the proto-historic times (2,500 - 1,300 B.C.) excavated so far. They were the flourishing centres in the 3rd millinium B.C. The core of these settlements was the flatter part of the valley, with fertile agricultural lands and a plentiful supply of waters.

However, at least four settlements of this type were located on the plateau of Kalam. It is believed that those were the seasonal grazing settlements of nomadic tribes who lived in the valley of Chitral. Those settlements had also served as starting and stopping points between the two valleys. The physical environment and the socio-economic conditions of the inhabitants played a very important role in the localization of proto-historic settlements in Swat valley i.e. there were two groups of people having different socio-economic conditions - with farming and dairying, dominating the southern parts of the valley and pastoral activity, with nomadic traditions by seasonal migrations which was common in the hilly regions near the plains of Kalam, resulting in the nucleation of settlements in the lower plains and dispersion of settlements in the mountainous regions of the valley.

The second phase of development of settlements in Swat valley started with the introduction of Buddhism

in the area. Just before this period Alexander came to Swat (327 B.C.)[4]. It had three flourishing towns of Massaga Bazira and Ora at that time. Arrian, the historian of Alexander has mentioned about these, in his historical account. These towns were either fortified or protected by natural barriers. Massaga, the capital of Swat at that time is believed to be the modern Minglawar village while Bazira and Ora are the present Udigram and Barikot situated near the bank of River Swat[5].

Buddhism started in the valley at the end of Maurya period (324-185 B.C.) and reached its climax in the Khushan period (2nd century A.D.)[6], making it an important and famous area of Buddhist religion within three hundred years of the death of Budha. The area started, attracting pilgrims from China and Tibet. Hsüan Tsang recorded about 1400 monasteries in the valley during his visit (629-645 A.D.). He also wrote about Ming-Chili, the Modern Mingora City, where he had seen the biggest Buddhist monastery. He also mentions about the huge foot

prints of Buddha at Terah, near Madayn village, some 20 miles from Mingora city[7].

The remnants of Buddhist settlements and monasteries as well as walls and pieces of potteries can be seen at many farflung places throughout the valley. Those people were mainly agriculturists, therefore their settlements were located adjacent to their agricultural fields and water sources (Streams and Rivers), located on raised ground for the purpose of defence. The last Buddhist king of the valley was Raja Gira who was crushed to death by Sultan Mahmood of Ghaznavi (1023 A.D.). Gira had made a fortified settlement as his capital. This was located on top of a mountain along the main route from Mingora to Peshawar near Udigram.

The invasion of Mahmood Ghaznavi had a special importance that marks the begining of the third period in the chronology of development of human settlements.

It resulted not only in the spreading of Islam in the area but also brought about a change in the settlement pattern. Mahmood granted land of the area to two pathan Tribes- Dilazaks and the Swaties who had accompanied the Sultan in his compaign. In 1024 A.D. Swati Tribe expelled Dilazaks from the valley to Peshawar basin. Subsequently Swatis diffused in the area and constructed some 145 new nucleated settlements[8].

In 1515 A.D. another pathan tribe "Yousafzai" poured into Swat valley after their expulsion from Gora and Naushki in Afghanistan[9]. This tribe drove the Swati tribe from the valley to Hazara area by force and instead settled in Swat. Eversince Yousafzai is the main tribe, living in the valley. After their occupation, Yousafzai's made Malak Ahmad as their Ruler. He established his capital at Allahdand Derai (Swat Ranizai of the present Malakand Agency). After the death of this strong-man in the year 1530[10] no single ruler remained in control and Swat became an independent area of combating tribes. These tribes were

controlled by Feudal Lords or local Khans till the middle of 19th Century, when Hazrat Abdul Ghafoor (Saidu Baba), a spiritual leader organized the people of the area into a civilised society. He made Syed Akbar Shah as the Ruler of Swat with its capital at Ghalegai. After the death of Syed Akbar Shah in 1857, Saidu Baba himself Ruled Swat till his death in 1877[11]. After the death of Saidu Baba, Swat again plunged into tribal warfare which ended in 1917 when Mian Gul Abdul Wadood, the grand son of Saidu Baba became the ruler and laid the foundation of Swat State. The first nine years of his ruling were very difficult when Nawabs of Dir and Amb attacked Swat but were defeated. The Britishers after futile efforts to annex the area into their dominion recognized the state in May, 1926. Mian Gul Abdul Wadood not only consolidated his control over the area but also annexed surrounding territories of Buner, Shangla Par and Kalam.

During the course of disturbances and tribal warfares the settlements did not diffuse in new areas.

The limited growth in the number of settlements and trend towards nucleation in this period were mainly due to security and defence against external attacks. The system of redistribution of argicultural lands and villages among the various tribes of the area developed during this period. According to this system the people having lived in a village for 10 years shifted to another village. This system continued till 1929 when permanent settlements took place. This system was a great setback to development of a sound settlement pattern and linkage between them through roads. Key settlements were connected only by mule tracks. Moreover, there was no bridge on the river Swat which flowe through the middle of the valley and divides it into two equal halves. The people used to cross the river with the help of inflated skins. The system of redistribution was abolished by the ruler of Swat in 1929 after which only agricultural land was redistributed every ten years but there was no village or house redistribution.

The end of redistribution of villages and houses

marks the begining of the fourth period in the evolution of settlements. During this period, changes started taking place very rapidly. After the permanent settlement of villages, Swat emerged from the middle ages of poverty to a prograssive and development oriented area. Security increased considerably and the settlements increased in number and also diffused to every corner of the valley. This diffusion of settlements took place in the wake of growing population, improvements in the socio-economic conditions, political stability, improvement in tribal relations, growth of transport and communication system and improvements in the agricultural production.

Though the redistribution of village and house after every ten years was finished in 1929 yet the redistribution of agricultural land within villages continued till 1959. This was a disincentive for making improvements in agricultural practices and was finally finished in 1959. Since when people became land owners. In July, 1969, the state was merged into Pakistan with the status of a District,

resulting in greater interaction between Swat and the rest of Pakistan in terms of trade. New market centres and industries emerged and traffic and transport saw big expansion. Consequently the settlements multiplied in number and a number of them, particularly, twin city of Saidu-Mingora saw tremendous expansion.

At present if one counts even isolated farmsteads and small cluster of houses as settlements, then there are more than a thousand (1109) settlements in Swat valley but if one takes only the main nuclei and its associated neighbouring clusters, then there are about 232 main settlements or central places in the area.

PLACE NAMES: Taking all farmsteads, hamlets and villages into account, there are about 1109 localities in the valley with place names. A classification of these place names has been carried out in table 8.

TABLE 8

SWAT VALLEY: CLASSIFICATION OF PLACE NAMES. 1981.

Category of place Name	Number of settlements
After the name of the founder	209
After some local features	252
After the name of the tribe	58
Changed by some higher authority of the area	27
Holy Names	34
On the basis of the shapes of settlements	81
Local language usage	275
Un-known	184
Total:	1109

Source: Field survey.

Newly constructed settlements have been named after their founders e.g. Faiz Abad, Fazal Abad etc. Some of the new settlements have emerged in the neighbourhood of old settlements and have been named after adding the prefex "new" e.g. New Dawlai etc. Some settlements have been named with reference to local features of the site i.e. village land, canal, water courses, prominent tree and the like. Example of these are Shewa, Asharai, Dagai, Totano Bandi, Bahrain etc. Other settlements have been named after some saint or relegious leader such as Saidu Baba, Ghazi Baba etc. Still other have their old Bhuddhist names e.g. Udigram, Balogram, Kotigram, Nimogram, Dangram etc. (Grama is an old sanskrit word means village).

The present pattern of the distribution of overall farmsteads, hamlets and villages has been very much affected by physical features i.e. Altitude and slope, sources of water supply and distribution of agricultural resources; while social factors have greatly influenced the village structure and house type.

Amongst physical factors the most important are the altitude and slope. A relationship between settlement distribution by vertical zonation and landuse has been given in table 9 and represented in Figs. 5 & 6.

TABLE 9

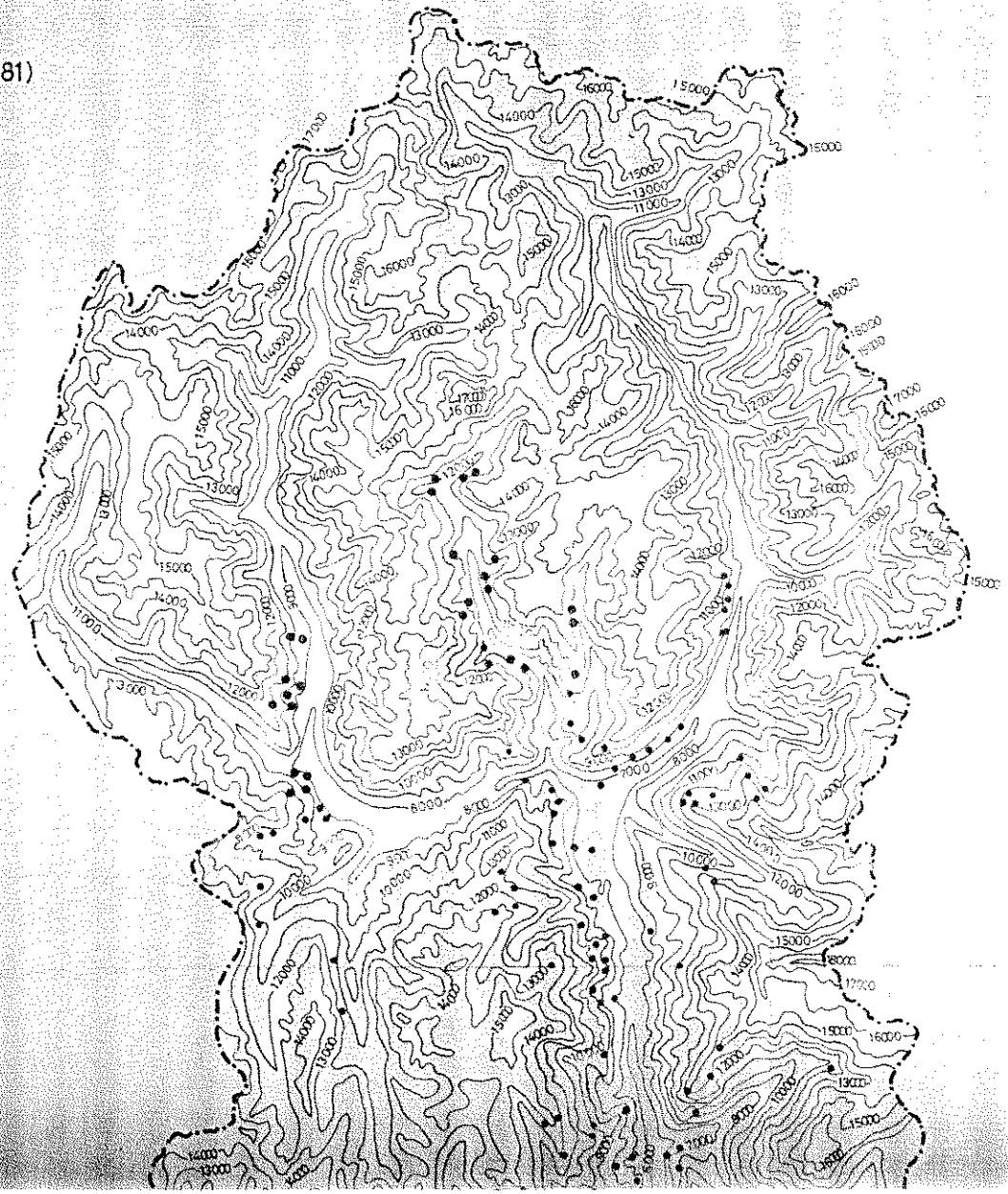
SWAT VALLEY: DISTRIBUTION OF SETTLEMENTS BY ALTITUDE AND LANDUSE 1981.

Altitude (In feet)	Predominant land-use	Frequency of occurence	
		No.	%age
1900-3500	Cultivated land	300	27.05
3500-5000	Cultivated and semi-cultivated land	429	38.68
5000-7500	Coniferous forest	117	10.55
7500-10000	Coniferous forest	111	10.00
10000-16000	Grazing grounds	152	13.70
Above 16000	Snow fields & Glaciers	[illegible]	00.00
	Total	1109	100.00

Source: Field survey

SWAT VALLEY

ALTITUDE AND HUMAN SETTLEMENTS (1981)



N

SCALE 1: 3,946 MILES

SCALE 1: 3,946 MILES

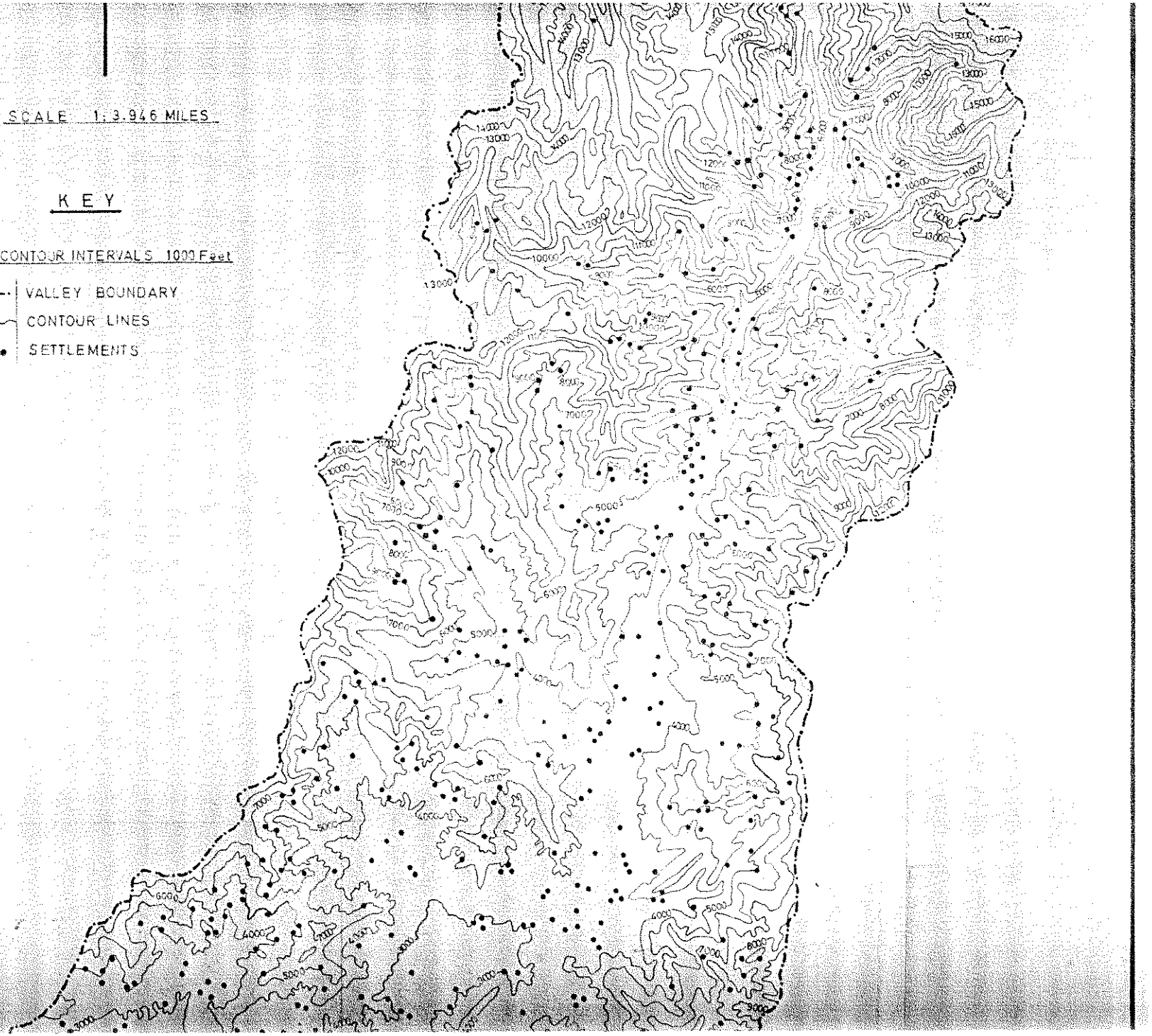
KEY

CONTOUR INTERVALS 1000 Feet

VALLEY BOUNDARY

CONTOUR LINES

SETTLEMENTS



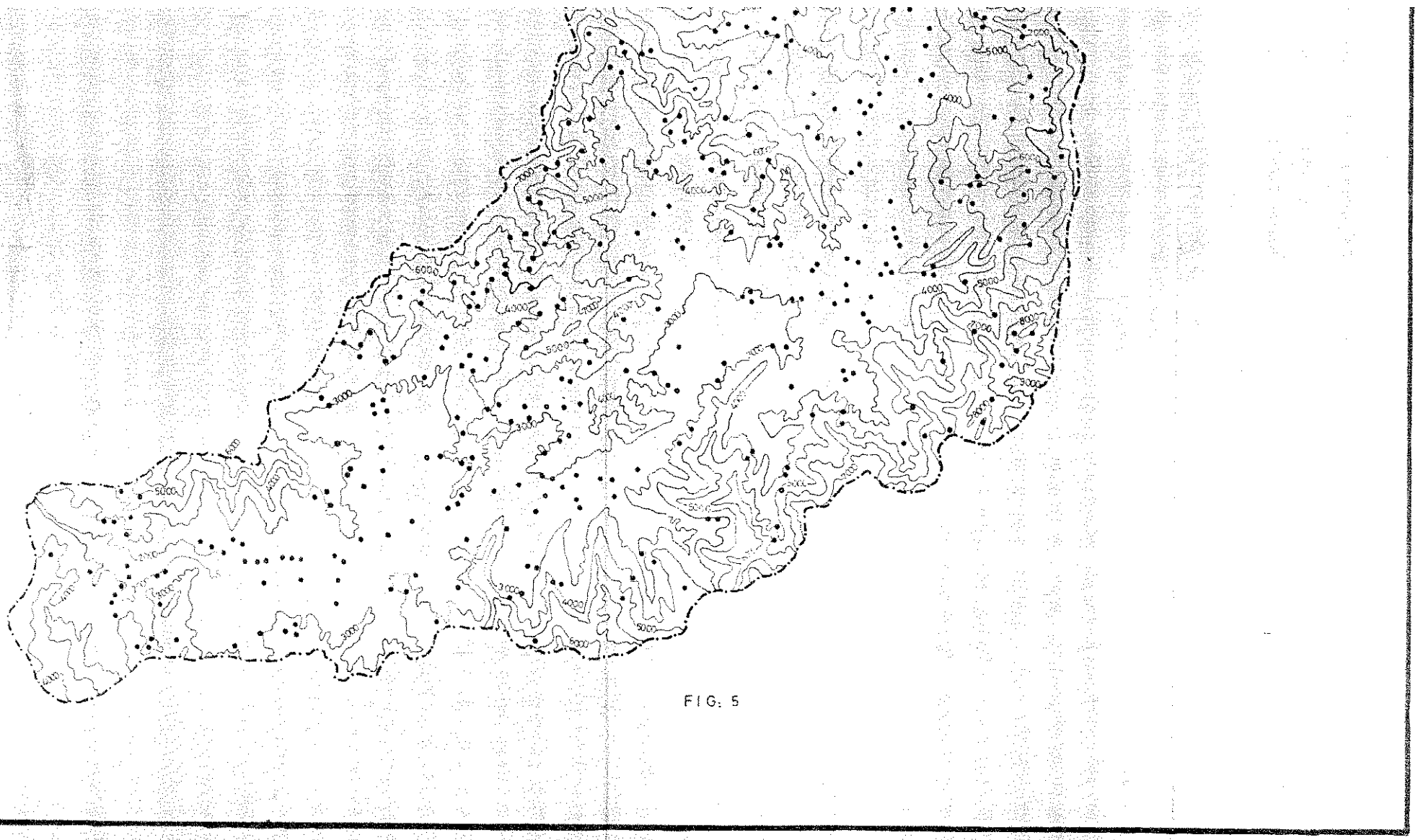


FIG. 5

SWAT VALLEY: LANDUSE (1981)

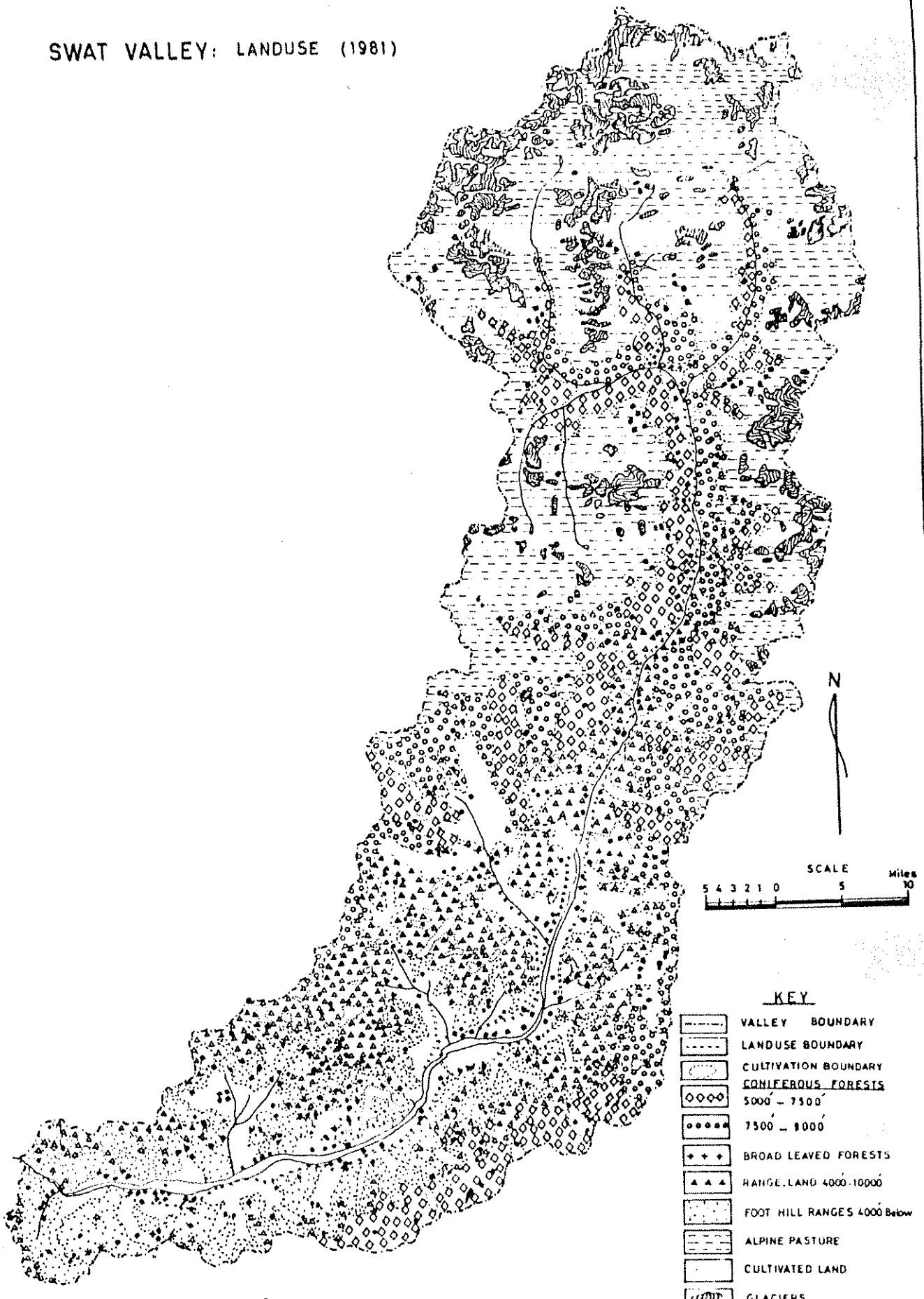


FIG: 6

It is evident that majority (towfifth) of settlements are concentrated between 3500 and 5000 ft. (Figs. 5 & 6). It is a zone where springs are abundant. Settlements, here, are of medium size with a population range of 300 to 4000 persons. The next higher concentration of settlements exists in 1900-3500 ft. altitudinal zone. The settlements, here, are located near the banks of river swat and its tributaries on the raised alluvial terraces. The big town and urban settlements are mainly confined to this region because of fertile and agriculturally rewarding nature of soils and developed means of communication. Here some of the villages have more than 10,000 people. Above 5000 ft: the area is mostly rocky and rugged but still accounts for one third share of human settlements in the valley. The raised sides of the alluvial fans are usually chosen as the main site for the location of settlement here. The banks of the deeper and less dangerous streams are also favourable sites for settlements in this zone. Nevertheless, settlements of this region are of small size, ranging from 45 to 500 persons (mainly dispersed and isolated farm houses).

Agricultural land is scarce in this zone and if available, occurs in patches. Means of cummunications are also poor. The settlements, therefore, do not have much incentive to attain large sizes. The highest settlements are the small temporary settlements (Huts) for transhumants and are used only in the summer by nomads. Even they do not exist beyond 16,000 feet.

Along the valley slopes the sun and shade also exercises a special control on the distribution and size of settlements i.e. the settlements are mainly located on the sunny slopes and the slopes with shades are either devoid of settlements or have few settlements of smaller size (dispersed).

Availability of water has also influenced the distribution and size of settlements. The locational distance of settlements from Rivers and streams has been shown in the following table.

TABLE 10

SWAT VALLEY: LOCATION OF SETTLEMENTS IN RELATION TO STREAMS 1981.

Location (in miles)	Frequency of occurence
<1	398
+ 1	233
1-2	162
2-3	117
3-4	116
>4	84
Total:	1109

Source: Field survey.

The table indicates that the majority of settlements are located near streams. The relationship between settlements and streams are shown in Fig.7.

MAP SHOWING DRAINAGE SYSTEM OF SWAT VALLEY
and
ITS RELATIONSHIP WITH SETTLEMENTS
1981

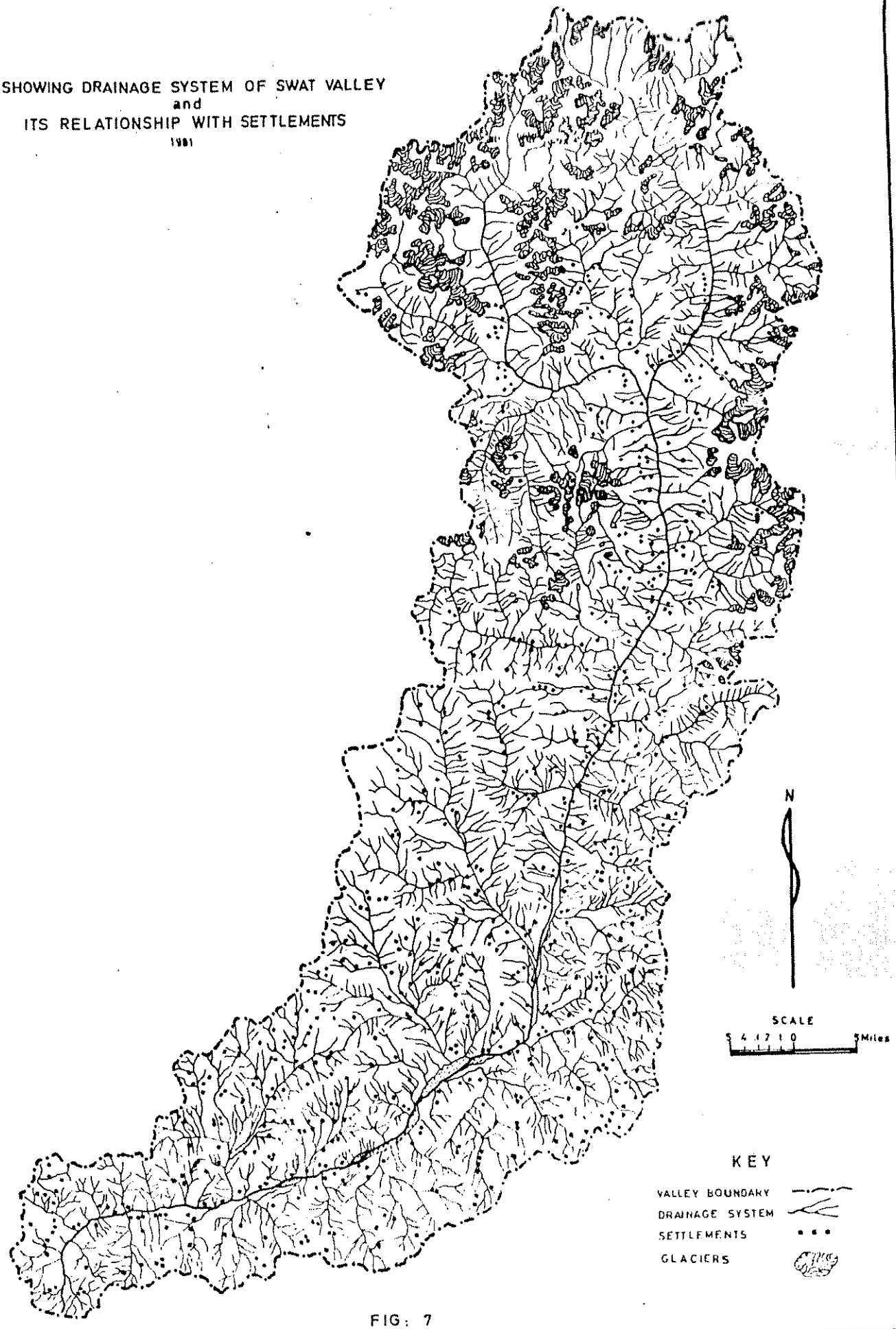


FIG: 7

In the mountainous and hilly regions with high altitude, these streams cut deep and narrows valleys due to rapaid run-off. Here the settlements are dispersed and small in size while in the plains, settlements are larger in size and nucleated.

Water supply is an extremely important factor that influences the distribution and size of settlements. In areas where water is in plenty for irrigation, settlements are of larger size. They are small, where the situation is vice versa. River Swat and its tributaries are the only sources of water supply for irrigation. The irrigation channels and canals usually pass near the settlements and beside agriculture; also, form a major source of water supply for domestic purposes. The location of settlements in terms of distance from canals given in table 11 brings out more clearly the relationship of water supply and settlements location.

TABLE 11

SWAT VALLEY: LOCATION OF SETTLEMENTS WITH RESPECT TO CANALS 1981.

Location(In miles)	Frequency of occurence
<½	687
+ 1	304
1–2	69
2–3	32
3–4	9
>4	8
	Total: 1109

Source: Field survey.

The table indicates that more than half of the total settlements have good access (< 1 mile) to canal water supply. They also have comparatively large size as compared to other settlements in the area.

Availability of agricultural land and pastures have also influenced the distribution and size of settlements. Swat valley has a predominantly agricultural economy. Apart from main valley, the availability of agricultural land on the alluvial fans and terraces has, therefore, played important role in the distribution of population and human settlements. Similarly a good number of inhabitants thrive on pastoral economy. Transhumance is a common phenomenon along hill slopes where people move up on summer pastures for grazing their livestock while they move downward in winter.

SETTLEMENT SHAPES: There is such a wide variety of shapes of settlements that it is difficult to classify them precisely by this variable. Broadly speaking, they can be divided into six types:-

a. Compact Geometrical shape e.g.square, rectangle, circle etc.

b. Ribbon or linear.

c. Fragmented.

d. Twin village.

e. Cross road or cruciform.

f. Irrigular.

The number of settlements in each category is given in table 12 while figs.8 & 9 give examples of their general plan.

TABLE 12

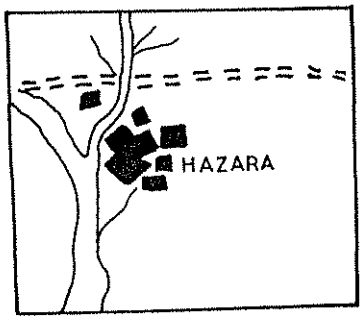
SWAT VALLEY: SHAPE OF SETTLEMENTS 1981.

Shape	Frequency of occurence
Compact geometrical shape	95
Ribbon or linear	60
Fragmented	205
Twin village	286
Cross road or cruciform	48
Irregular	415
Total:	1109

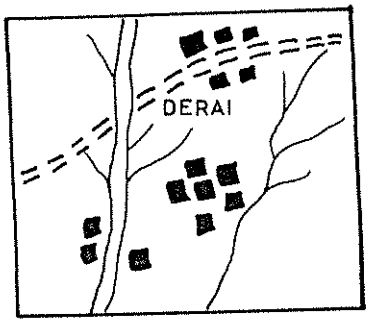
Sourde: Field survey.

SWAT VALLEY: SETTLEMENT TYPES

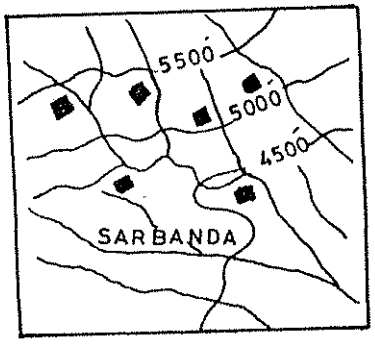
NUCLEATED



FRAGMENTED



DISPERSED





SCALE

1:50,000

KEY

VILLAGE BOUNDARY

SETTLEMENTS

5500 CONTOUR LINE

STREAM

ROAD

FIG: 8

SWAT VALLEY: COMMON VILLAGE SHAPES

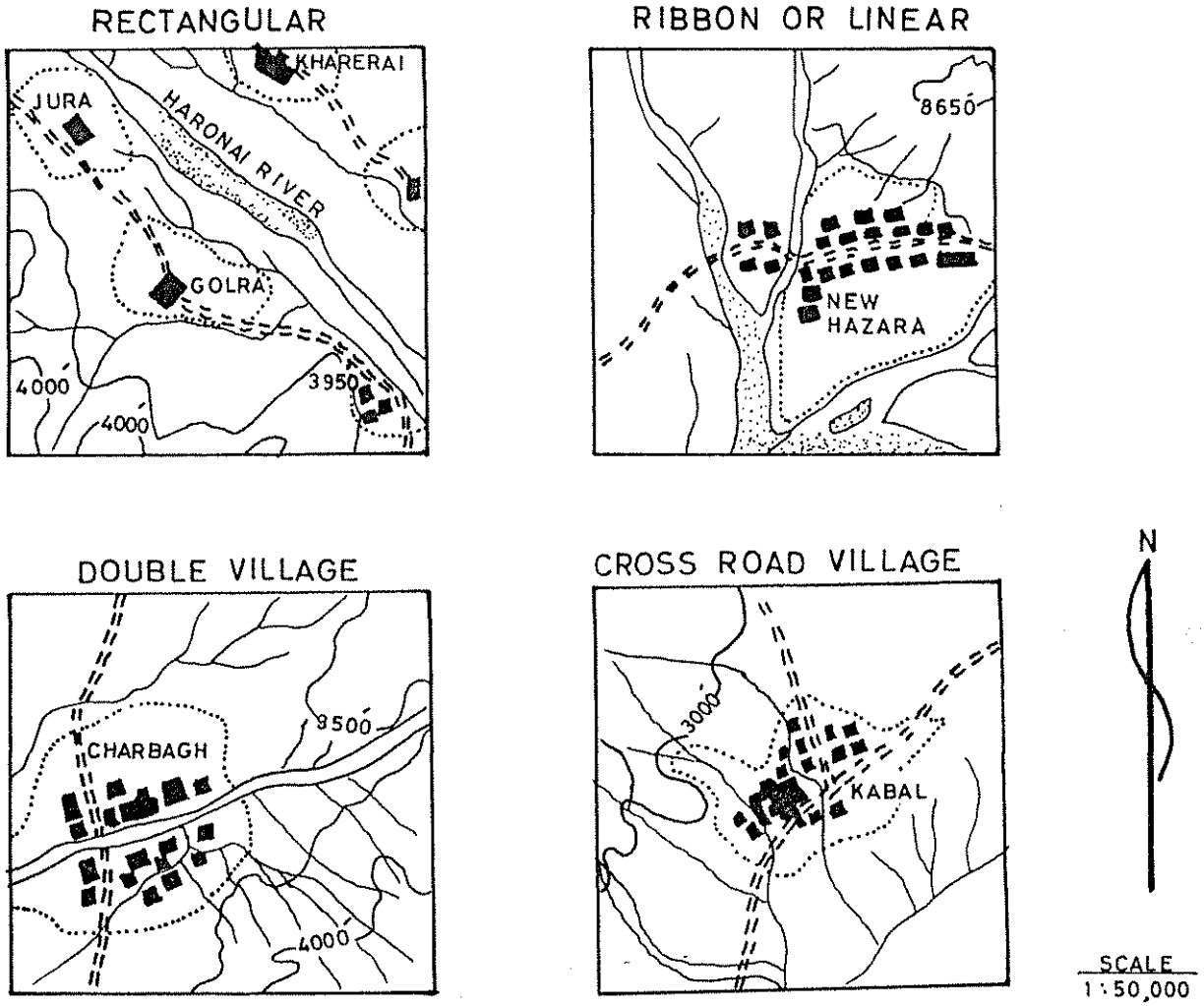


FIG: 9

COMPACT GEOMETRICAL SHAPE: This is the most common type of settlement, found in the area. In these settlements, the buildings are located in compact fashion and are generally surrounded by agricultural fields or other natural features e.g. streams, rivers, hills etc. Because of these features, the settlements have assumed the shape of a rectangle, square or a circle.

RIBBON OR LINEAR: In these settlements the buildings develop along the sides of a road, rivulets or streams. Majority of such settlements are located in a linear fashion.

FRAGMENTED: The settlements in this case have one main site and the buildings stand separately over this vast site from one another. Such type of pattern is found in the settlements of the tributary valleys where the intermountain basins are narrow and the terrain is un-even and broken.

TWIN VILLAGE: These are settlements, standing on either side of a river or rivulets or streams.

CROSS ROAD OR CRUCIFORM: Such type of shapes are the result of route interesections. They result from development of buildings along more than one road. This gives the settlements various shapes e.g. T-shapes, Y-shapes and cruciform.

IRREGULAR OR DISPERSED SETTLEMENTS: In which houses are located at considerebly long distance from one another.

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CHAPTER III

RURAL SETTLEMENTS AND HOUSING

The internal characteristics of rural settlements related to dwelling units, associated buildings and other facilities or functions are a reflection of social, economic, political, cultural and religious norms of the people inhabiting settlements.

Within Swat valley there are variations in the internal characteristics of settlements, particularly with respect to their sizes. The rural settlements of the area may be broadly classified into the following classes by their sizes.

TABLE 13

SWAT VALLEY: RURAL SETTLEMENTS CLASSES BY SIZE 1981.

Settlement type	Population size	Frequency	
		No	%
Huts Bandas	Temporary Below 500	- 825	- 74.4
Villages			
Small villages	500-1000	180	16.2
Medium villages	1000-5000	84	7.6
Large villages	5000-10000	15	1.4
Very large villages	10000-15000	4	0.4

Source: Population census reports 1981.

The internal characteristics of these various categories are analysed as under:

HUTS: Huts are very small purely temporary dwelling units, constructed with thatch and mud. They occur in pastures. They are used only periodically by transhumants in summers when they move up to graze their cattle. In winter season these huts are devoid of inhabitants. These huts are isolated dwellings, widely distributed over the pastures and they do not have civic amenities such as Mosques, Schools, Shops etc. However water supply does play important role in the location of these huts which are usually built around one spring or more to supply water to the inhabitants as well as to their cattle.

BANDAS: They are hamlets or small villages and comprise dispersed houses over the site. A banda in Swat valley usually has less than 500 persons. They are confined mainly to the hilly and mountainous slopes of the valley. The house types are mostly uniform and their monotomy is broken only by the Mosques or Primary Schools. Maktab Schools

are also present which are usually set up in Mosques. Houses in banda are widely spaced and open directly into agricultural lands. They are also located near the streams or springs. They are usually located away from the main roads. Bandas also do not have any common place for community gethering or "Hujra". Lanes or streets are non-existant. Some time, however, they have one common lane to be used by all the people of the bandas. These usually pass by the side of the terraced fields. There are a few mixed shops inside the houses which provide extremely limited goods e.g. tea, kerosine oil, matches, gur, grocery etc. Usually four or five bandas share one common graveyard.

VILLAGES: Villages vary in size and structure. They are;

SMALL VILLAGES: They usually contain a population which varies from 500 to 1000 persons and are cut-off from the main roads. Located near the streams or springs, majority of the houses, here, are made of local building materials-mud, stone and wood. They have terraced houses in a back

to front manner i.e. each house opens into the street, attached to the back of another house. The attached blocks of houses are separated from one another by the village streets or lanes. There are one or two special purpose buildings such as Masques and "Hujras", located centrally or at the periphery of the settlements. In these villages there is no separation of houses and shops. The shops are usually established inside the house or are attached to the houses and open into village lanes or streets.

Some of these small villages are fragmented parts of the larger villages. Many of these villages have pools of dirty water, especially in the spring season. These pools are the places where dung and domestic refuse is dumped, thereby creating extremely un-hygienic conditions. In winter the dung is carried to the fields. There is also a common well or spring located at the fringe of the village or a common canal (vala) brought off from nearby stream. Usually they have independent graveyards for burial.

MEDIUM VILLAGES: Medium villages have population, ranging from 1000 to 5000 persons. They are usually connected by roads and shops in these villages, are located along roads and streets and form a distinct commercial area. These villages are located near the big streams. They are the nucleated villages with dense core of buildings at the centre and loose sprawl of buildings at the periphery. The houses are single storied, built of mud and stones. The lanes usually open into roads but sometimes in the surrounding cultivated lands of the village also. Lanes are of two types: Large and small. The large lanes are centrally located and small lanes open into them. The houses of the elites are usually concentrated along the main lanes and are architecturally some-what attractive. Inside these villages, there are square courtyard type of factories of rug weavers. Marshes and Pools of stagnant water for dumping dungs are also common in these villages. The cattlesheds for pinning and feeding the cattles (Akhwar) is another common feature of these villages.

A village of this type has culturally identifiable segments, inhabited by different groups or sections of society (Cham or Tal in Pashto). Each section has its own hujra (Meeting Place) mosque, graveyard, common well or spring, common place for the gathering of cattles before going for grazing, water mills etc. The society in these villages is, therefore, complex. Most of these villages possess ubiquitous as well as higher order functions i.e. Primary Schools, Middle Schools, High Schools, Dispensaries, Post Offices, Polic Posts, etc. Almost all such villages have electricity connection. In some cases common lyratorines are also built on communal basis near village streams. There is also a common fair ground, attached to these villages. In addition, most of these villages also possess play grounds for such outdoor sports as football and volley balls. Shrines also form a common feature of these villages.

LARGE VILLAGES: They are the bigger villages with more complex societies, organised over the landscape. They have a

population ranging from 5000 to 10000 persons. This group comprise only fifteen settlements which are all located in flat plains. They include the villages of Wuch, Derai-Julagram, Madyan, Charbagh, Minglawar, Chuprial, Dewlai, Kabal, Koza Bandai, Kanju, Nawikili, Ghalegai, Zara Khela, Udigram and Chakdara. All of them are connected by metalled roads. They have well developed "bazars" and are therefore, centres of trade and commerce. The shops are located along the main roads or bigger village lanes. These villages are similar in many ways to medium villages but their primary difference is linear expansions along the arterial roads as a result of which many neighbouring settlements are being absorbed. Also, cultural segments in these villages are more strongly stratified and prominent. Each segment of the society, thus, has its own "Mohallah" with Mosques, Hujras, Water mills, common wells and the likes. In some of them there are silk weavingmills, rice and flour mills, as well as bus and wagon stands.

VERY LARGE VILLAGES: These settlements have more complex societies and their population range varies from 10,000 to 15,000 persons. This group comprises only four settlements i.e. Batkhela, Thana, Alla Dand Deri and Saidu Sharif, the last of which has now been merged into Mingora City. All of them are located on the raised alluvial terraces of river Swat and are adjacent to the fertile cultivated flat plains. They perform more speciallized functions, have large markets and many more Mohallas than any other size of rural settlement.

Even in these settlements houses are typically built of stone and mud. However,in the fringe areas new construction varies in construction material and plan of dwelling units. They are usually "pucca" made of burnt bricks, cement, steal and sheets of copper. The design and architecture is also aesthetically pleasent in the houses on the outskirts. The Government offices and industry in these settlements are also located on arterial roads in the fringe. These settlements also have some

rudimentary forms of sewerage and drainage systems.

Assesment of overall situation of housing characteristics by tehsils in Swat valley has been carried out in table 14

TABLE 14

SWAT VALLEY; HOUSING CHARACTERISTICS BY TEHSILS (1981)

Tehsil	Population	Houses	"Kutcha" houses	"Pucca" houses	Total rooms	Average number of rooms per house	Average number of persons per house	Average number of persons per room
Adenzai	50565	9189	8927	262	24617	2.6	5.5	2.0
Azikhel	61797	10234	9690	544	30702	3.0	6.0	2.0
Barikot	39377	9460	8659	801	29179	3.0	4.1	1.4
Bahrain	56611	9225	8689	536	27675	3.0	6.1	2.0
Charbagh	30485	5001	4057	944	15003	3.0	6.3	2.2
Kalam	18576	3770	3756	14	13016	3.5	4.4	1.3
Kabbal	99929	19163	17421	1751	61243	3.3	5.2	1.6
Matta	117142	19946	19339	607	64187	3.2	5.9	1.8
Swat Ranizai	86457	13515	13103	412	40869	3.0	6.4	2.1
Saidu Sharif	158561	31264	16175	15089	87539	2.8	5.0	1.8
Total:	719500	130767	109807	20960	394030	3.0	5.5	1.8

Sources: 1. District census reports 1981.
2. Malaria control Programme, District Swat.

It can be seen that "Kutcha" houses which are made of mud, stone and wood are predominant in the area and account for 83.98% of the total houses. The rest of the houses (16.02%) are "Pucca" made of bricks, cement, steel, marble etc and indicate the higher living standard of the people. Majority (71.98%) of the "Pucca" houses are situated in Saidu Sharif tehsil which houses the twin city of Saidu-Mingora, that is, the largest commercial and religious centre of the area. The table also indicates that the overall houses are small, having an average number of three rooms.

Due to differences in physical, social and economic conditions, there are differences in house types which vary from Howels to aristocratic dwelling of "Khans" or Nawabs i.e. Chieftains. There are also variations in areas, occupied by different tribal groups e.g. Kohistani houses are different from those of Gujars or Pathans. Similarly square houses with flat roofs and courtyards are more common in flat plains while there are no courtyards

in houses, located on hill slopes.

In the plains, the walls are very high and are made of irregular shaped blocks of stones often exceeding one foot in thickness. The practice of reusing stones, removed from old buildings, seems very common in Swat Valley. While making walls with irregular shaped blocks of stones the gaps are sometimes filled with pebbles and small pieces of stones. Mud usually constitutes the plastering material in majority of cases. However, use of cement is now also becoming common. This is so particularly in larger settlements where walls of new houses are built with bricks and cement or stone and cement. The use of stone is popular because it is found in abundance in beds of dry streams as well as on mountains and hills.

The roofs of houses are made of wooden beams on which small pieces of wood have been spread. Above those pieces the branches of olive trees are put and above

it the needle shaped leaves of pines are placed. Above pine leaves, mud is placed. This mud is pressed by feet during rainy days to harden it. Some people, especially the mountainous people , plaster their roofs with mud in which the straw is mixed. This is because they use their roofs as thrashing grounds. In most of the settlements the height of the roof from the ground is about eight feet.

Having discussed the general characteristics; it would be appropriate now to discuss the characteristics of different types of houses, occuring in varied socio-economic milieu of Swat valley.

HOMEL TYPES: They are box-shaped with one or two rooms. The walls are made of mud and the roof with wood and mud. They have verandahs for cooking and sleeping in the summer seasons. Cattle are also pinned inside these houses. These houses are found in the rural and mountainous areas where the economic condition of the people is not good.

With changes in the socio-economic conditions of the people, one or more rooms have been added to serve as guest rooms or parlours. This is due to the independent attitude of the people to have their own "Battacks" or parlours rather than a common "Hujra.

ARISTOCRATIC TYPE OF DWELLINGS: These are the houses of "Khans" and "Nawabs" with large premises, many rooms, verandahs and one or two storied building. They are made of stones in the hilly areas and burnt bricks in the plains. Cement and lime have also been used. The roofs are flat in the plains with concrete and steel used.

HUTS: These are box-shaped, single room houses, found in the alpine pastures and other meadows of the mountain and hill slopes. They are temporary seasonal settlements of nomadic tribes and are only used in the summer season. They have a purely temporary building conditions. Beside the above types, the house type in Swat valley is the result of different cultural groups, living in different physical

and economic environments.

Broadly speaking, Swat valley can be divided into three cultural groups, inhabiting in three broad classes of settlements. These groups are:

KOHISTANI: As the name signifies, Kohistains are the people, living in the mountainous areas of Swat valley above 3000 ft., from sea level. They are distributed in two tehsils i.e. Bahrain and Kalam. They speak Kohistani language which is "Dardic" in origin. They have red and white complexions with greenish eyes and reddish hair. Due to diverse physical and economic conditions of the area, these people have constructed different types of dwellings. As stated earlier the area is mountainous with rugged and steep slopes and agriculture is practiced on hill slopes by b terracing which is uneconomical due to soil erosion. This is especially the case in Bahrain tehsil. In Kalam tehsil the valley is comparatively wide. Forest grow on the slopes. Agricutlure is practised on the plains of the river terraces. The communication

system of the area is not fully developed. Education, here, is not so, common and people show an independent attitude towards living. Due to the above mentioned factors, majority of the settlements are dispersed i.e. out of the 112 settlements in both Kalam and Bahrain tehsil, 77 have dispersed houses while 35 shows partial compaction. In Kalam tehsil only 7 are compact and 28 are dispersed. Similarly, in Bahrain tehsil 28 are compact and 40 are dispersed.

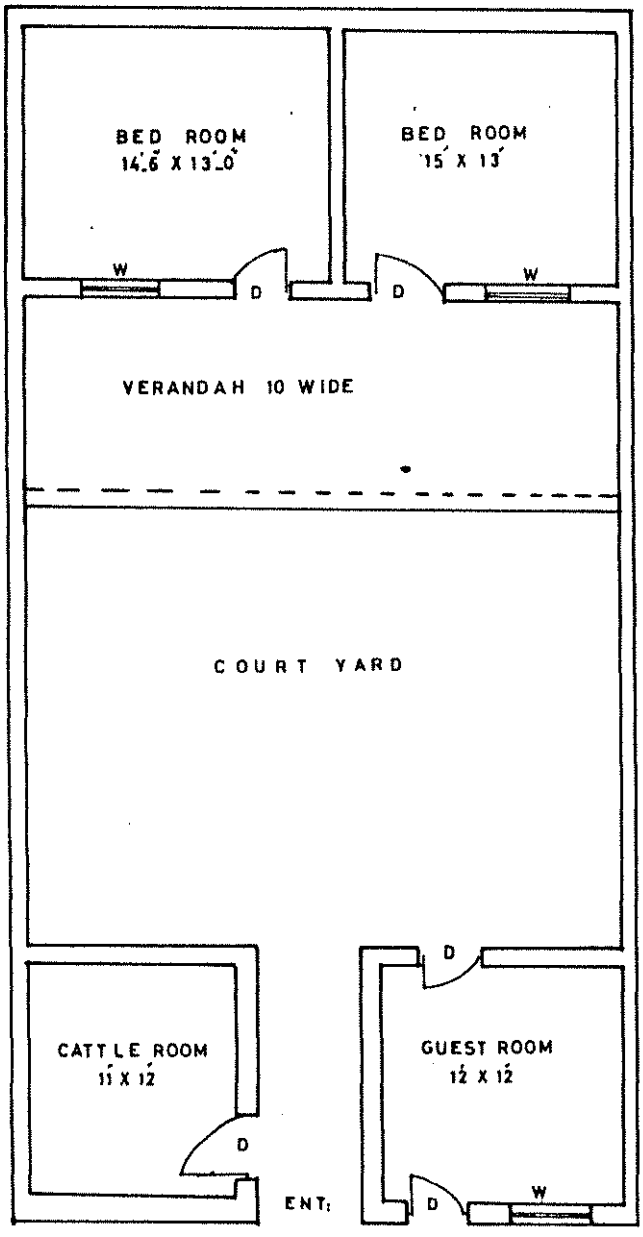
The most important and common type of houses evolved in this Kohistani region may be summarised below. Before summarising the common type of houses, one point should be remembered about the cultural heritage of the people, living in these tehsils. Basically all the people are Kohistanis but the people inhabiting Bahrain tehsil, are called "Torwalls". They speak "Torwall" dialect which is nothing but "Dardic" and is different from the Kohistani language. They are Kohistanis due to their location in the mountains.

In Kalam tehsil there are two bandas (Jalban with 613 population and Gahil with 45 population) who speak "Pashto" language. They know little kohistani. They are called "Mullakhel". They had migrated to Kalam from Kabal tehsil in the past.

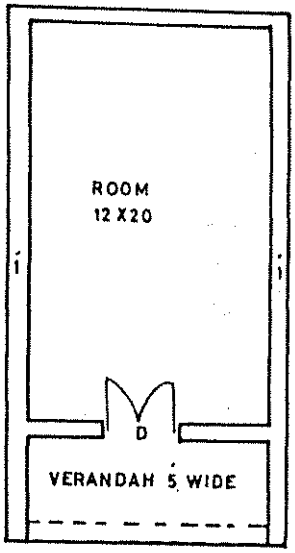
The most common house type here consists of isolated and dispersed houses. Each house has three or two rooms, joined together with a door as shown in (Fig.10). In winter season, cattles are pinned in room III and the people live in room II. In summer season the cattle are pinned in the verandahs and the people live in room I. On the roof of room III two other small rooms have been constructed. Their doors open to the back of the house where descent has been provided by stone stairs. One room is used as a guest-room and the other for keeping straw and cattle feed. In the flat roof of room II immediately above the hearth a chimney has been constructed (Fig. 11). The roof is almost flat and overhangs the walls to protect it from rain and snow. The placement of Beams and

SWAT VALLEY: COMMON HOUSE TYPE & HOUSE PLAN

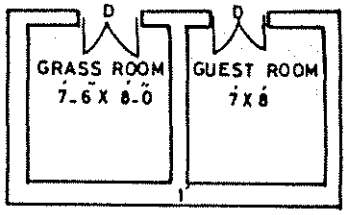
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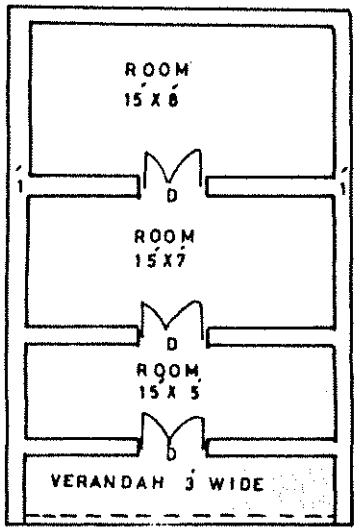
PLAN
PATHAN HOUSE TYPE



PLAN
GUJAR HOUSE TYPE



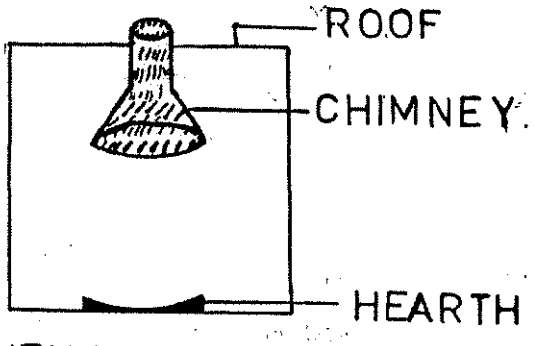
FIRST FLOOR



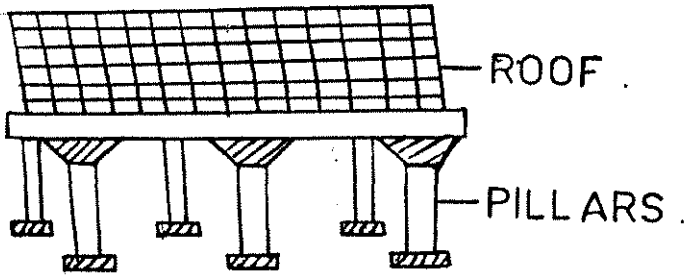
PLAN
GROUND FLOOR
KOHISTANI HOUSE TYPE

FIG: 10

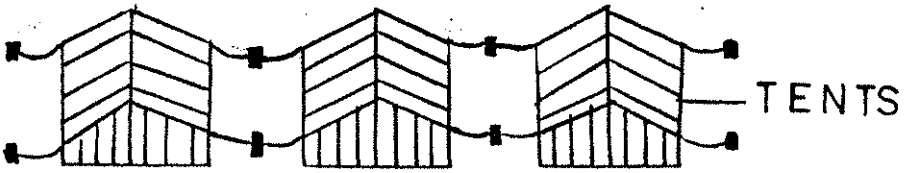
SWAT VALLEY: TYPICAL HOUSING STRUCTURES



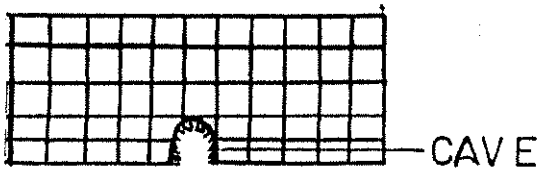
CHIMNEY IN A KOHISTANI HOUSE



ROOF AND PILLARS OF A KACHA HOUSE



AFGHAN REFUGEES CAMPS.



AFGHAN REFUGEES CAVE TYPE HOUSE

FIG: 11

Beamlets is done in such a way as the rain may easily drain towards the outlet, located at the edge of the roof.

So far as the building materials are concerned, we have abundance of wood and stone in this area. The roofs are made of heavy and big beams of wood on which beamlets are placed and above it the leaves of pines are placed to protect the mud from dropping beneath the roof. On these leaves, mud mixed with straw has been placed and have become plastered with it.

The walls are made of stones, collected from nearby areas. They are 2 to 3 feet thick and eight to nine feet in height. In many houses, the walls are thickly plastered with straw and cowdung mixed mud. It is done to protect walls from falling in the rainy and snowy seasons as well as to keep the house warm and to avoid cold winds.

In many settlements, walls are made of wooden beams, placed one above the other. It is due to the

abundance of wood in the area. In Gahil and Bayoon bandas of Kalam tehsil majority of house walls are made of wood. This is due to availability of wood and non-availability of stones. Majority of mosques are also made of wood. The beams and pillars of Kalam mosque are considered as the biggest wooden structure in Asia.

In addition to the above house type, there are some rich people who have constructed "Pucca" houses in which steel, cement and burnt bricks have been used in the roofs as well as in the walls. Some have used copper plates on the roofs instead of mud. The most beautiful, modern and "Pucca" structure in the whole area is the Utroar mosque completed in 1980. In this mosque, steel, cement, burnt bricks, marble chips and lime have been used.

THE GUJAR TYPE OF HOUSES: The Gujar is also very important cultural group. They speak Gujari language which resembles Hindko and Punjabi. These people are semi-nomadic. They live in well-wooded valleys and mountainous areas of

Swat valley. They build simple houses or huts which are similar to the living rooms of their cattle. The house generally consists of one room and in few cases two adjacent rooms, one for animals and the other for human beings. They are without lawns and in some cases without doors. The branch of a tree is put in the door section of a wall.

The walls are made of irregular and rough stones without mud plastering. The walls are not straight and have no regular height or width. Some stones have bulged out and the other are bulged in. This means that these people have not developed technical skill of massonry and construction.

The roofs of the Houses consist of irregular wooden beams on which wooden beamlets are arranged haphazardly. Above it, branches of trees and shrubs are put and above it, leaves of pines are placed. The pines leaves are then covered with mud. There are no chimney holes in

the roofs. In some cases there is a chimney hole. It is open or broken water pot and is put in the roof.

There are no windows in the houses. The smoke comes out through the unplastered walls. The roofs are flat. The houses are mainly used for night. At day time the households are busy in their fields and grazing their cattle.

THE PATHAN HOUSE TYPE: It is the most dominant cultural group in Swat valley. They speak phasto, are educated, social and skilled people. Basically they live in river plains and are agriculturists. The houses of pathans consist of one or more rooms, with verandah and lawns. The walls are mostly made of regular shaped stones with pebbles and are plastered with mud or cement. The walls are usually 1.5 feet wide and 9 feet high from the floors and one or two feet inside the earth. The roofs consist of wooden beams on which beamlets are arranged regularly, and on it the branches of trees and shrubs are put and above it

the pine needles are placed to avoid the mud from falling down. The mud is then pressed with feet during rainy days. The roofs are flate. The wooden beams are arranged in such a way as to allow the drainage of water easy from the roofs during rains.

The rooms are used as property storages, enhancing its reuse in winter season. In summer, verandah is used for living purposes. There are hearths in the rooms as well as in the verandahs. Ovens are also there in each house. In some modern houses "angeti" or fire places are used instead of hearth. It is situated in the walls of the rooms. There is a lawn, mostly in each house. The lawn is used by the cattle and people in summer months. Near the main gate of the house, there are two rooms, one is used as a "battack" and the other as a cattle room (Fig. 10).

Some of the houses are "Pucca" in nature. In such type of houses the building materials used, consist of

burnt bricks, chips, cement, lime, steel etc. The roofs are made of steel role covered with bricks and then cemented. The pillars are also made of steel-bars filled with concrete made of sand, pebble, and cement. The floors are also cemented. Such type of houses can be found in the urban areas of the valley like Mingora and Saidu Sharif as well as larger villages of Thana, Batkhela etc. The Government buildings, Hotels, Rest Houses, big shops etc are of this type.

THE AFGHAN REFUGEES HOUSE TYPE: About twenty thousand Afghan Refugees have migrated from Afghanistan and settled in various parts of Swat valley. These people have settled at short distances from the main settlements. Some people are living in large camps supervised by the Government of Pakistan e.g. Chakdara. Most of them live in tents but some of them also live in cave houses, dug in soft soils of the raised earth (Fig. 10).

HOUSE PLAN: A house plan basically deals with various sections or segments of the house as well as its functional nature. In Swat valley, most of the houses are multi-functional. They serve as storage places for grains and implements of the occupants and also perform commercial functions as things like pottery etc are sold in them. Sometimes, also containing a workshop where agricultural implements are made.

Depending upon the socio-economic condition of the occupants, a typical house in Swat valley is generally divided into three parts(a) The human sections) (b) The animal section or "ghoojal" and (c) The guest room or "Battack" (Fig. 10). These sections are attached to each other though in some cases the animal section or Cattle shed (Ghoojal) is separately built. In others, (Gujars) men and animals live in the same room. The above three sections are generally met with-in the Pathan houses in the lower main valley. In this case the number of rooms depends on the social and economic status of the

owner as well as the size of household. Generally the house has one or two rooms, attached to a verandah (Mandow). The verandah ends into a courtyard (Ghoolay). In the courtyard plants are grown. This courtyard is enclosed by walls with a main gate in the wall. Near the main gate one or two rooms are built for the guests on one side of the gate. The back of the guest room ends into the courtyard. Its outer door opens into the street. On the other side of the main gate, one room, big or small, depending upon the number of cattle, is built. The back of this room (Ghoojal) also ends into the courtyard while its gate opens inside the house. The main gate is used both by the animals as well as the men. The "Ghoojals" or animal sections are made in the same house due to fear of theft, indoor feeding and to keep animals warm during the winter season .

As apposed to house plan of Pathans, where one finds a combination of the three sections mentioned above, the Gujar house plan has living rooms where men

and animal live together.

A study of house types and plan in Swat valley shows that the building materials, which are a product of the environments, indicate the spatial characteristics while the size, height and general looks of the house highlights the economic and cultural conditions of its inhabitants.

CHAPTER IV

CENTRAL PLACE ANALYSIS

This chapter attempts to analyse the central place pattern in the Swat valley which would be exteremely important from the planning point of view. The bases of the central place theory were laid before world war II by two German scholars, geographer Walter Christaller and economist Alexender Losch. A number of authors applied the theory after them to analyse the size, spacing and functional structure of centres. Berry[1] contests that whatever may be the purchasing power and whether in open countryside or within a large metropolis, a hierarchical spatial structure of central places supplying central goods will emerge. Christaller[2] in his pioneer study had used settlements as centres and population as the main variable to measure the importance or centrality of the settlements. But the concept of centrality has undergone considerable change during the course of years. The term centre which was used originally to refer to a settlement

is now also applied to a shopping or service centres within a city, while the term "size" or "centrality" is referred more in terms of the functional equipment of a centre i.e. the total number of shops and service establishments present.

In this study the hierarchy or the ranking of various settlements relative to one another have been made on the basis of centrality score measured by presence or absence of certain functions. Amongst the various types of index features used for measuring centrality, the most important in the area are schools, post offices, dispensaries, Banks, police stations, maternity centres, hospitals, colleges and cinemas. They were assigned score on the basis of their importance as follows:

FACILITIES OR FUNCTION	SCORE
Primary school for boys	1
Primary school for girls	2
Middle school for boys	2
Middle school for girls	3
High school for boys	4
High school for girls	5
Inter college for boys	5
Inter college for girls	6
Degree college for boys	6
Degree college for girls	7
Plice station	4
Police post	3
Post office	4
Bank	5
Dispensary	4
Maternity centre	4
Hospital	6
Cinema	8

There are 232 settlements or localities in the area under study (Fig. 12) which had at least one central function. Each of this locality was surveyed to record the types of functions present within them and assigned score were allocated to these functions. The aggregate scores for each of 232 places (Appendix II) were then plotted on a graph. Distinct breaks identified were used to group settlements into different orders. In all six such groups (Fig. 13) were identified with the following frequency.

TABLE 15

SWAT VALLEY; GRADES OF CENTRAL PLACES 1981

GRADES	RANGE OF CENTRALITY SCORE	FREQUENCY OF OCCURENCE
Ist order	59-147	2
IInd order	40-55	4
IIIrd order	28-38	15
IVth order	15-25	31
Vth order	7-13	49
VIth order	1-6	131

SOURCE: Field survey

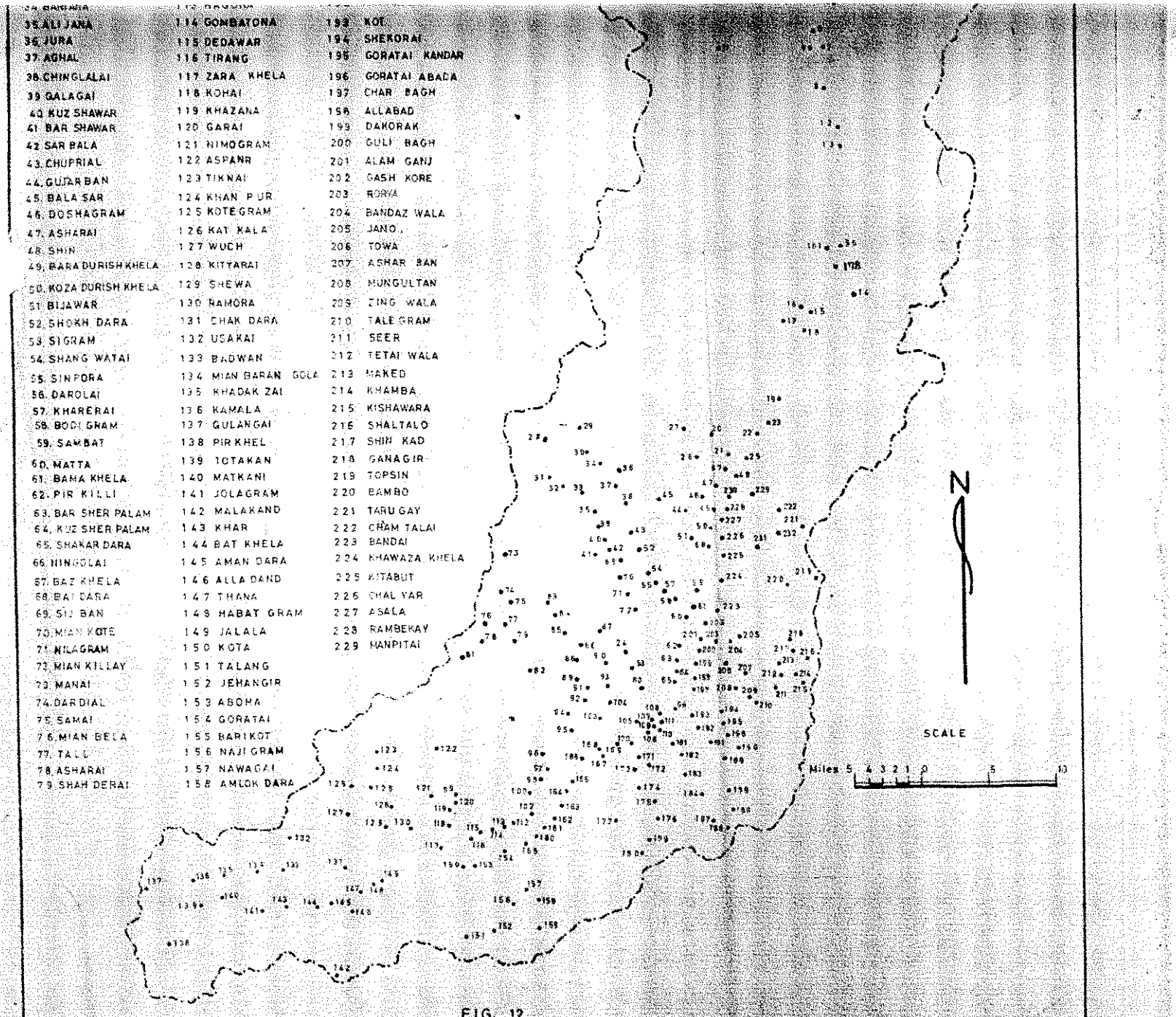

35. ALI JANA
36. JURA
37. AGHAL
38. CHINGLALAI
39. GALAGAI
40. KUZ SHAWAR
41. BAR SHAWAR
42. SAR BALA
43. CHUPRIAL
44. GUJAR BAN
45. BALA SAR
46. DOSHAGRAM
47. ASHARAI
48. SHIN
49. BARA DURISH KHELA
50. KOZA DURISH KHELA
51. BIJAWAR
52. SHOKH DARA
53. SIGRAM
54. SHANG WATAI
55. SINPORA
56. DAROLAI
57. KHARERAI
58. BODI GHAM
59. SAMBAT
60. MATTA
61. BAMA KHELA
62. PIR KILLI
63. BAR SHER PALAM
64. KUZ SHER PALAM
65. SHAKAR DARA
66. NINGOLAI
67. BAZ KHELA
68. BAI DARA
69. SIU BAN
70. MIAN KOTE
71. NILAGRAM
72. MIAN KILLAY
73. MANAI
74. DARDIAL
75. SAMAI
76. MIAN BELA
77. TALL
78. ASHARAI
79. SHAH DERAI
114 GOMBATONA
115 DEDAWAR
116 TIRANG
117 ZARA KHELA
118 KOHAI
119 KHAZANA
120 GARAI
121 NIMOGRAM
122 ASPANR
123 TIKNAI
124 KHAN PUR
125 KOTEGRAM
126 KAT KALA
127 WUCH
128 KITTARAI
129 SHEWA
130 NAMORA
131 CHAK DARA
132 USAKAI
133 BADWAN
134 MIAN BARAN GOLA
135 KHADAK ZAI
136 KAMALA
137 GULANGAI
138 PIR KHEL
139 TOTAKAN
140 MATKANI
141 JOLAGRAM
142 MALAKAND
143 KHAR
144 BAT KHELA
145 AMAN DARA
146 ALLA DAND
147 THANA
148 HABAT GRAM
149 JALALA
150 KOTA
151 TALANG
152 JEHANGIR
153 ASOHA
154 GORATAI
155 BARIKOT
156 NAJI GRAM
157 NAWAGAI
158 AMLOK DARA
193 KOT
194 SHEKORAI
195 GORATAI KANDAR
196 GORATAI ABADA
197 CHAR BAGH
198 ALLABAD
199 DAKORAK
200 GULI BAGH
201 ALAM GANJ
202 GASH KORE
203 RORYA
204 BANDAZ WALA
205 JANO
206 TOWA
207 ASHAR BAN
208 MUNGULTAN
209 ZING WALA
210 TALEGRAM
211 SEER
212 TETAI WALA
213 MAKED
214 KHAMBA
215 KISHAWARA
216 SHALTALO
217 SHIN KAD
218 GANAGIR
219 TOPSIN
220 BAMBO
221 TARU GAY
222 CHAM TALAI
223 BANDAI
224 KHAWAZA KHELA
225 KITABUT
226 CHAL YAR
227 ASALA
228 RAMBEKAY
229 MANPITAI
N
SCALE
Miles 5 4 3 2 1 0 5 10

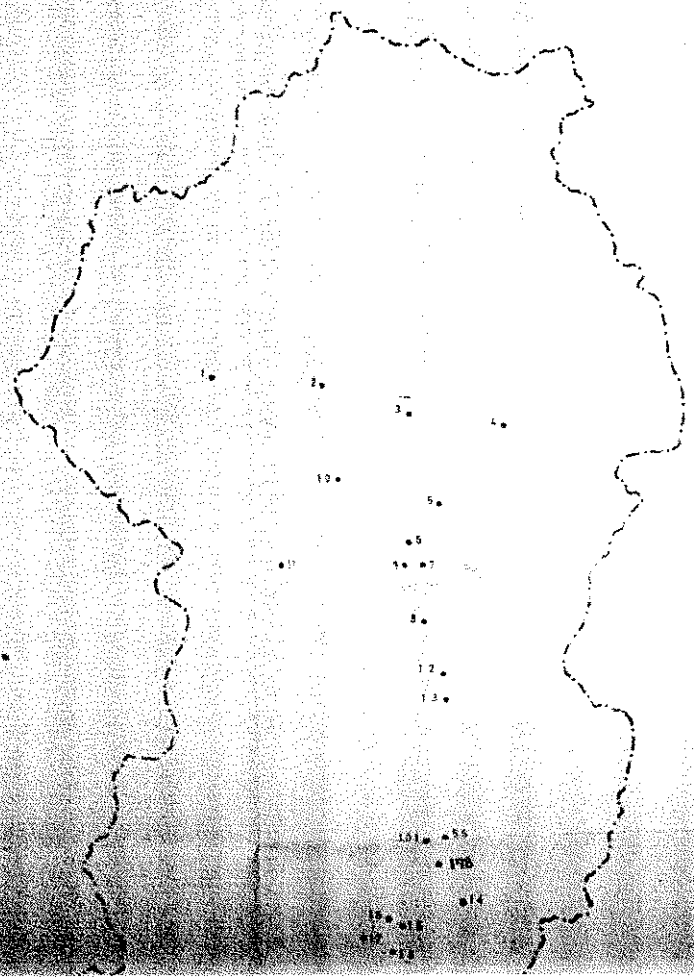
FIG. 12

SWAT VALLEY

MAP OF SETTELMENTS SURVEYED

REFERENCES

1. GABRAL
2. MUSLI
3. GUJARO AMLI
4. USHU
5. BAYOUN
6. USHURAN
7. KALAM
8. PESHMAL
9. KAS KALAM
10. BATANDAR
11. UTROAR
12. MANKIAL
13. KEDAM
14. CHAIL
15. MADAYAN
16. SHAH GRAM
17. TERATE
18. PIYA
19. JARREY
20. DARMAI
21. KALA KOT
22. FATEH PUR
23. BARAM PATAI
24. MALKA
25. NAWAY KILLI
26. LANDAY
27. SAKHRA
28. BANDISAR BANDA
29. BANFAZ GHALAI
30. RORINGAR
31. FAZIL BANDA
32. BIHA
33. GAWALERAI
34. BARIANA
35. ALI JANA
36. JURA
37. AGHAL
38. CHINGLALAI
39. QALAGAI
40. KUZ SHAWAR
41. BAR SHAWAR
42. SAR BALA
43. CHUPRIAL
44. GUJAR BAN
45. BALA SAR
46. DOGHAGRAM
47. ASHARAI
48. SHIN
49. BARA DURISH KHELA
50. KOZA DURISH KHELA
51. BIKAWAR
52. SHAKH BABA
53. BIKHAN
60. LALU BANDA
61. GALAGAI
62. TOTANO BANDAI
63. TARAN
64. BIA KORE
65. SHAL HAND
66. ASHAR BAN
67. MOHAMMAD BEG
68. NASART
69. DEWLAI
90. MAHAK
91. KALA KILLAY
92. GALOOCH
93. MALOOCH
94. SIRSINAI
95. KABAL
96. KOTLAI
97. AKHOND KILLI
98. DAGAV
99. RANGELA
100. SUIGALAI
101. BEHRAIN
102. DADA HARA
103. ALI GRAMA
104. ZUNJ
105. DERAI
106. KANJU
107. KUZA BANDAI
108. BARA BANDAI
109. MAM DERAI
110. GHOREJA
111. DELAY
112. PARAI
113. NAGORA
114. GOMBATONA
115. DEDAWAR
116. TIRANG
117. ZARA KHELA
118. KOHAI
119. KHAZANA
120. GARAI
121. NIMOGRAM
122. ASPANR
123. TIKNAI
124. KHAN PUR
125. KOTE GRAM
126. KAT KALA
127. WUCH
128. KITYARAI
129. SHEWA
130. RAMORA
131. CHAK DARA
132. USARAI
159. MIAN KOTE
160. GHALE GAI
161. MAN YAR
162. TINDO DAG
163. PAJI GRAM
164. GOG DARA
165. UDIGRAM
166. BALOGRAM
167. QAMBAR
168. TAKHTA BAND
169. RAHIM ABAD
170. NAWI KILLAY
171. MINGORA
172. BUT KADA
173. AMAN KOT
174. SAIDU SHARIF
175. BALI GRAM
176. SALAM PUR
177. KUKARAI
178. AIN
179. SAFAL BANDAI
180. MURGHUZAR
181. SANGOTA
182. SHAMILIAI
183. DANGRAM
184. KUKARAI
185. OOGHAZ
186. JAMBIL
187. GARASA
188. GULI KRA
189. KACHAKOT
190. BAN JOT
191. BAN DANR
192. MINGLAWAR
193. KOT
194. SHEKORAI
195. GORATAI KANDAR
196. GORATAI ABADA
197. CHAR BAGH
198. ALLABAD
199. DAKORAK
200. GULI BAGH
201. ALAM GANJ
202. GASH KORE
203. RORYA
204. BANDAZ WALA
205. JANO.
206. TOWA
207. ASHAR BAN
208. MUNGULTAN
209. ZING WALA
210. SALGRAM
211. SEER
230. KOTANAI
231. BABO KILLI
232. SHAL PIN



SWAT VALLEY: HIERARCHY OF SETTLEMENTS 1981

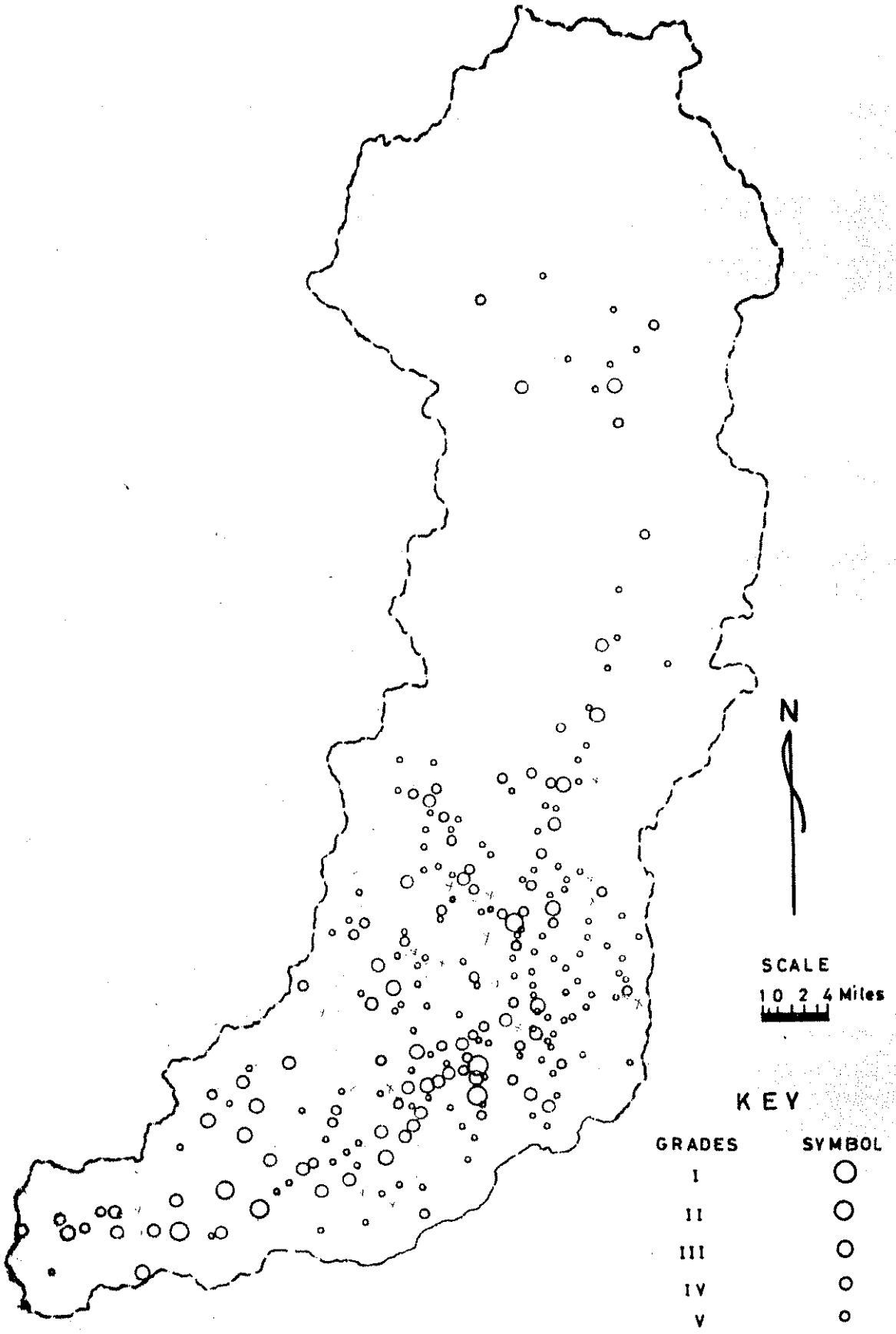


FIG: 13

The table indicate that there are two first order settlements. They are Mingora and Saidu Sharif which due to their historical inertia and administrative functions respectively have become very important focal points. The settlements of grade II, III, IV and V have become important focal points due to their locational advantages, i.e. they are located in the plains of river swat and its various tributaries which have both productive lands and developed means of communication. Sixth order settlements are confined to the hilly and mountainous regions which have small amount of productive lands and poor means of communication. These settlements therefore, are less important both functionally as well as in population size, (Fig . 14 and Appendex III) . The range of population for the varied order settlements has been given in the following table:

TABLE 16

SWAT VALLEY; POPULATION RANGE OF VARIED ORDER CENTRAL PLACES/SETTLEMENTS 1981.

GRADE	POPULATION RANGE
Ist order	12618 - 59336
IInd order	2438 - 19945
IIIrd order	1099 - 6882
IVth order	1625 - 14334
Vth order	378 - 7472
VIth order	45 - 3931

SOURCE: Population census report 1981

It can be observed that overall the settlements of higher grades have relatively higher range of population. Nevertheless, some settlements as indicated by the table have lower population but higher functional importance.

Population growth rate of various order centres have been divided into four categories for the purpose of detailed analysis. These were very high (growing faster

SWAT VALLEY

POPULATION SIZE OF SETTLEMENTS/ CENTRAL PLACES (1981)

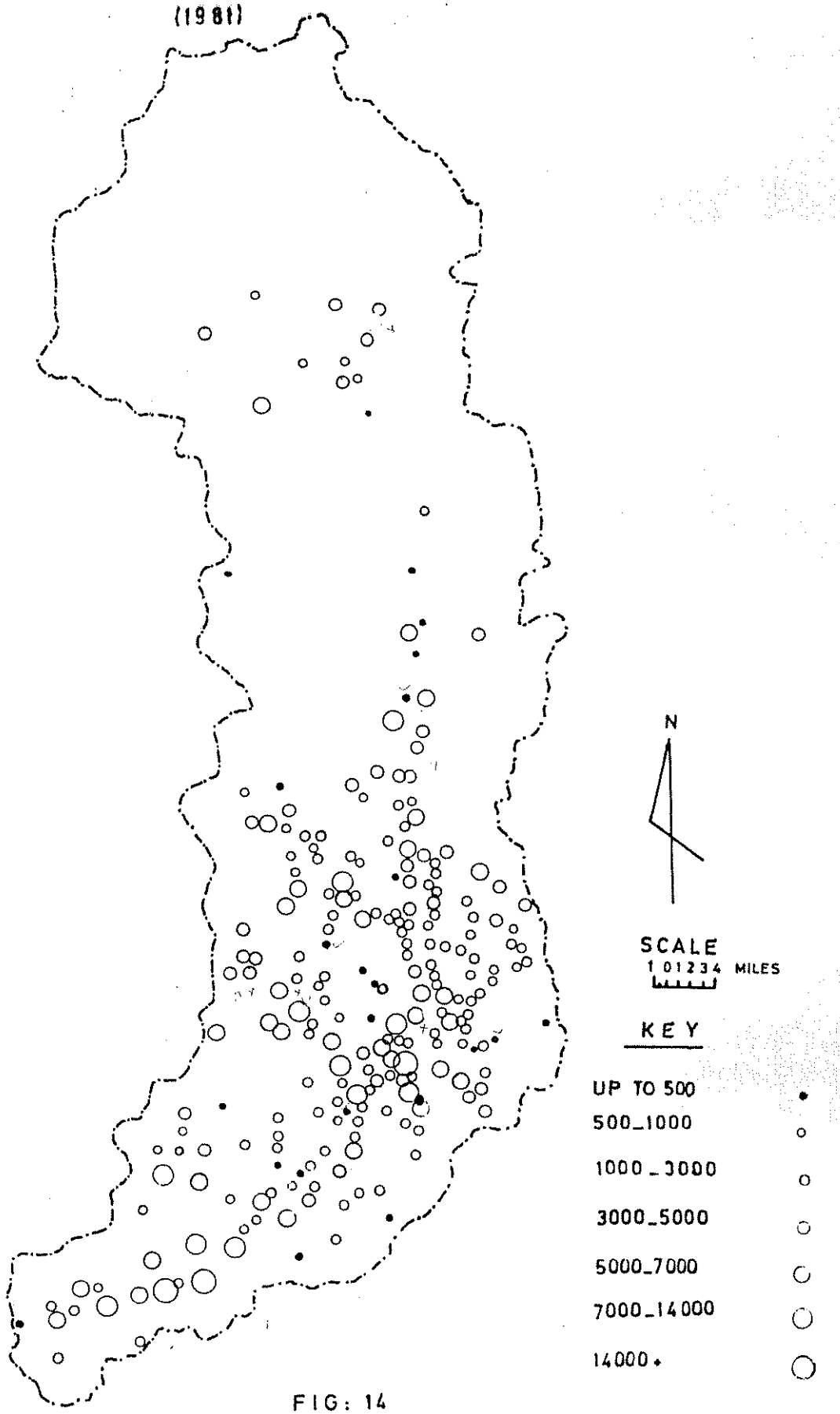


FIG: 14

than national growth rate of 4.38%), high (growing faster than provincial growth rate of 3.98% but lower than the national growth rate of 4.38%), medium (growing faster than the swat valley growth rate of 3.17% but lower than the provincial growth rate of 3.89%), low (growing slower than the growth rate of the swat valley i.e. 3.17%). The number of settlements in each grade category has been cross tabulated against the above classified growth rates in Table 17 and have been shown in Fig. 15.

SWAT VALLEY

ANNUAL GROWTH RATE OF SETTLEMENTS

(1981)

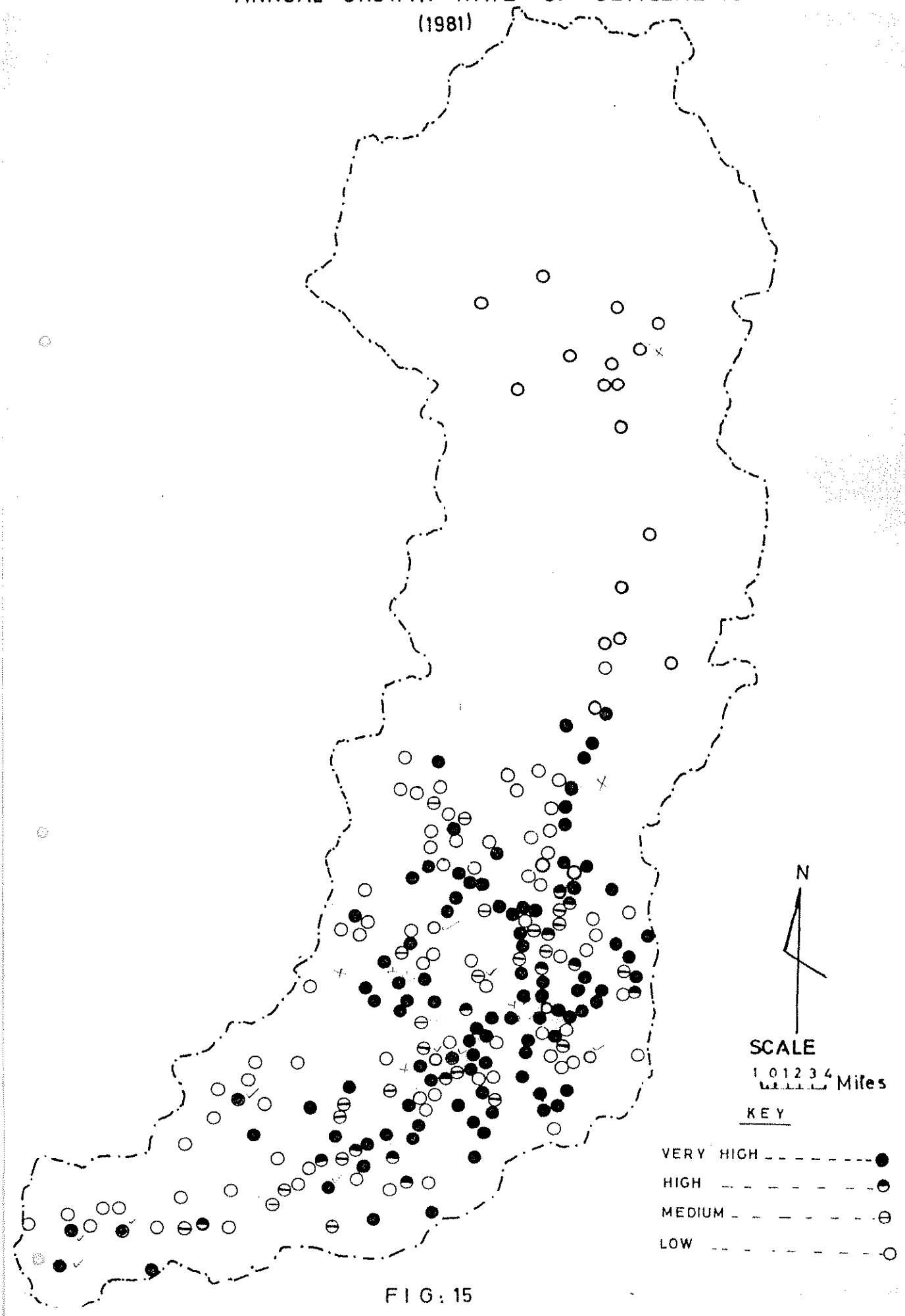


FIG: 15

TABLE 17

SWAT VALLEY; ANNUAL GROWTH RATE OF SETTLEMENTS BY CENTRALITY GRADES 1981.

Grade	Growth			
	Very high (above 4.38%)	High (3.89% to 4.38%)	Medium (3.17% to 3.89%)	Low (below 3.17%)
Ist Order	2	-	-	-
IInd order	3	-	-	1
IIIrd order	10	1	4	-
IVth order	15	2	7	7
Vth order	22	3	6	16
VIth order	44	7	7	73

The table indicates that the growth rates are higher in the higher grade settlements (i.e. I & II). This is due to nodal location and potential employment opurtunities in these centres, which attract people from rural areas in search of job. Only Matta is an exception. This was untill

now a small village but recent introduction of high level functions such as a degree college, hospital and police station has raised it in the functional hierarchy and it is likely to record as fast expans-ion in future as its counterparts have recorded in the past.

The third order centres have no settlements that has grown lower than the average population growth rate of the Swat valley. However beyond third order the number of settlements recording low growth rates increases as one moves down in the hierarchy.

A detailed analysis of range of functions present in each order of settlements (Table 18 & 19) reveals that higher order functions such as colleges, civil hospitals and banks are present only in the higher grade settlements whereas an ubiquitous functions such as primary schools occur in all categories of central places. Details of educational, social and economic functions by grade order has been given in tables 18 & 19.

TABLE 18

SWAT VALLEY; EDUCATIONAL STRUCTURE OF VARIED ORDER CENTRAL PLACES/SETTLEMENTS 1981

Grade	Primary Schools				Middle Schools				High Schools				Inter.Colleges				Degree Colleges			
	Boys		Girls		Boys		Girls		Boys		Girls		Boys		Girls		Boys		Girls	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Ist Order	5	2.05	2	1.78	-	-	1	9.19	6	11.11	2	33.4	-	-	1	50	1	33.5	-	-
IInd Order	13	5.34	-	-	-	-	1	9.19	4	7.40	3	50.0	-	-	1	50	2	55.5	-	-
IIIrd Order	15	6.17	15	13.39	-	-	6	54.54	15	27.77	1	16.6	-	-	-	-	-	-	-	-
IVth Order	31	12.75	28	25.00	1	1.8	2	18.18	14	25.92	-	-	-	-	-	-	-	-	-	-
Vth Order	49	20.16	17	15.17	19	34.54	1	9.19	15	27.77	-	-	-	-	-	-	-	-	-	-
VIth	131	53.90	50	44.64	35	63.63	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	243	100	112	100	55	100	11	100	54	100	6	100			2	100	3	100	-	-

Source: Field survey.

TABLE 19

SWAT VALLEY; DISTRIBUTION OF SOCIO-ECONOMIC FUNCTIONS IN VARIED ORDER CENTRAL PLACES/SETTLEMENTS 198.

Grade	Civil Hospital		Police Station		Police post		Maternity		Dispensary		Banks		Post office		Cinema	
	No	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Ist order	3	21.42	2	15.38	1	1.7	2	9.52	2	2.66	19	26.38	2	4.08	2	100
IInd order	4	28.57	4	30.76	-	-	4	19.04	4	5.33	15	20.83	4	8.16	-	-
IIIrd order	7	50.00	5	38.46	8	14.28	12	57.14	15	20.00	15	20.83	15	30.61	-	-
IVth order	-	-	1	7.69	20	35.71	2	9.52	14	18.66	14	19.44	12	24.48	-	-
Vth order	-	-	1	7.69	12	21.42	1	4.76	13	17.33	9	12.5	8	16.32	-	-
VIth order	-	-	-	-	15	26.78	-	-	27	36.00	-	-	8	16.32	-	-

Having analysed the functional structure of various order settlements, it remain now to analyse their distribution, in space. This has been given on the enclosed map (Fig.16). The size and spacing of settlements of various order in the Swat valley does not confirm with the rigid hexagonal pattern suggested by Christaller in his central place theory. In order to discern the pattern, Dacey's[3] index of nearest neighbour was applied to each of the six grades of settlements seperately and the result have been given in Table 20.

TABLE 20

SWAT VALLEY; NEAREST NEIGHBOUR INDEX OF SPACING AMONGST SIX GRADES OF CENTRAL PLACES/SETTLEMENTS 1981.

GRADE	'R' VALUES
Ist order	0.13
IInd order	0.33
IIIrd order	0.71
IVth order	0.55
Vth order	0.62
VIth order	0.53
All grades	1.73

SWAT VALLEY
SPATIAL SETTLEMENT PATTERN (Nearest Neighbours)
BY CENTRALITY GRADES (1981)

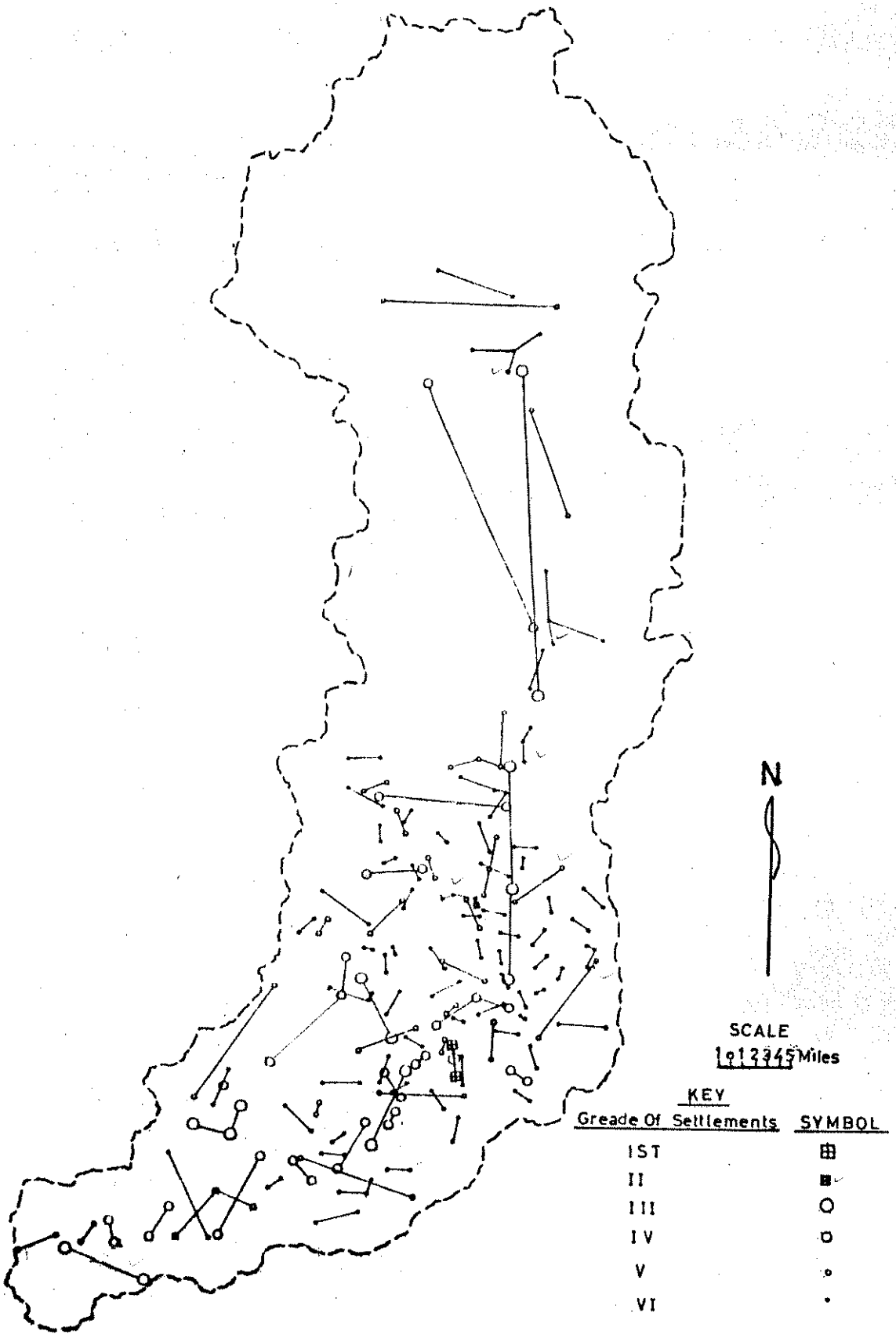


FIG: 16

The nearest neighbour index for all grades of centres was 1.75, indicating an overall dispersed pattern but when applied to respective grades it gives a more clustered pattern with the highest level of clustering in grade I centres of Mingora and Saidu which infact has really become a twin city of Saidu -Mingora.

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1. Brian J.L. Berry and William L. Garrison (1958), "The functional Bases of the central place hierarchy" Economic Geography 34.

2. Walter christaller (1933) "Die Zentralen orte in Süddeutschland" Jena.

3. Davis, P. (1977) "Data description and Presentation" Science in Geography 3" PP 32-35 Oxford University Press London.

CHAPTER V

SAIDU-MINGORA: URBAN SETTLEMENT

The twin city ofSaidu-Mingora has resulted from the coalescence of two nuclei-an administrative town and a religious cum commercial centre. Later, surrounding villages were also engulfed in the growing urban complex. The boundary of the twin city has been shown in Fig. 19. The total area of the city is about twenty square kilometers and its population in 1981 was 88078 persons, giving a population density of 4403 persons per square kilometer.

It is located at a height of 2936 feet above sea level and is situated in a depression, aprroximately one mile wide between (a) kheta (4515 feet) and (b) kosa (4605 feet) mountains which lie towards the east and south west of the city respectively. The sharara mountains are located in the south while swat river flows in the north (fig. 17). .

MINGORA CITY: SITE AND SITUATION

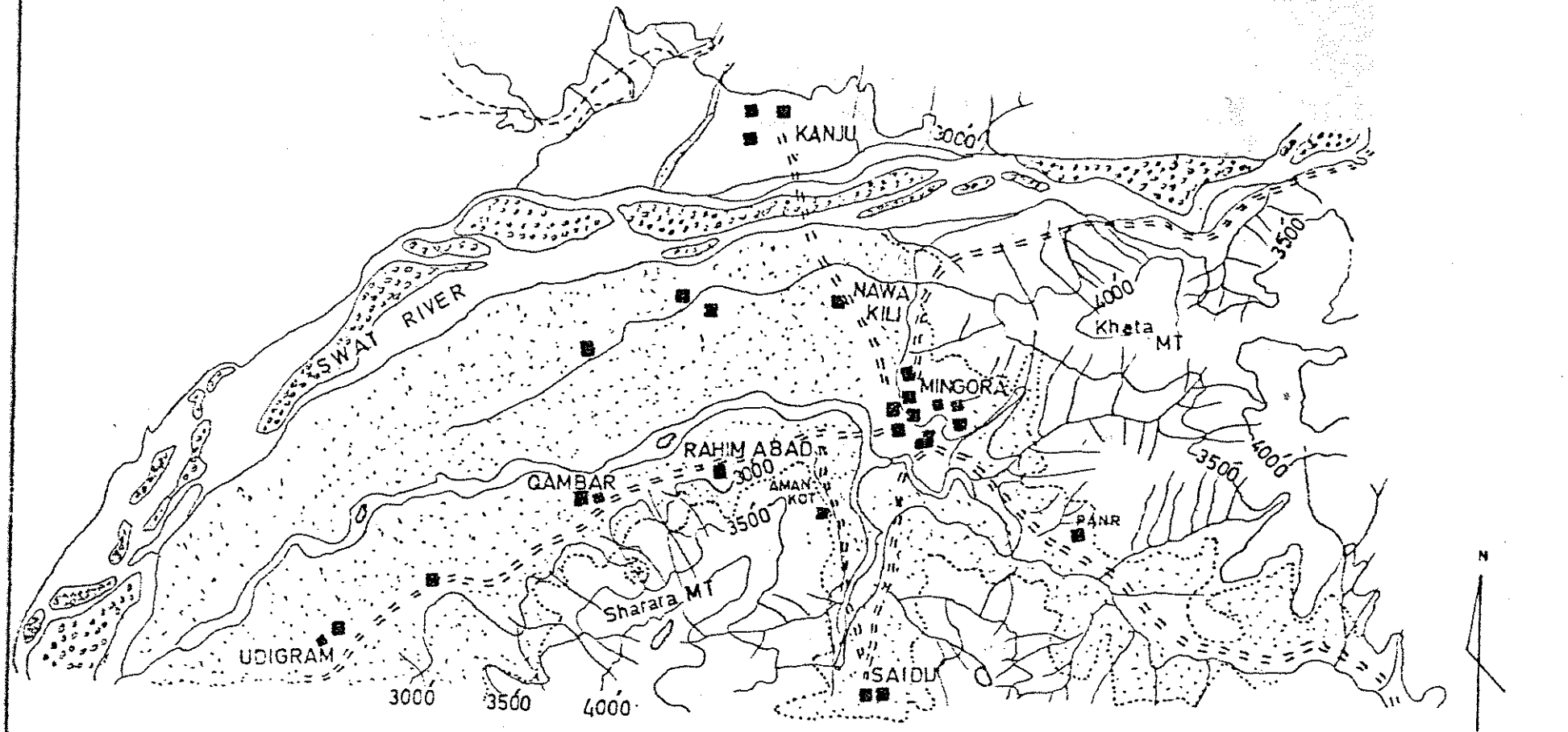


FIG. 17

GROWTH AND MORPHOLOGY: Very little is known about the origin of Mingora city. The archaelogists through radio-carbon dating have estimated the age of the bones excavated in the graveyards of the area (Fig. 18), to be quiet old (between 1520 and 430 B.C.)[1]. Mingora's origin at its present site has been favoured by a number of factors, a strategic location protected by natural features such as mountains, river, fertile soil and availability of water.

At the end of the Mauria period (324-185 B.C.) when Buddhism started in Swat valley, Mingora became an important religious centre of attracting Buddhist pilgrims from different parts of the world. One of the early pilgrims to mention Mingora in his writing is Hsüan Tsang[2] (629 - 645 A.D.), who named the city as "Ming-Chili" a chinese word, meaning bright. He saw the biggest Buddhist monastery of the area in Mingora. With the passage of time, traders and craftsmen were also attracted to the area to meet the demand of thelocal population as well as the pilgrims. The process helped in the areal extension of the city.

A CENTRAL PART OF SWAT VALLEY

(SHOWING LOCATION OF MINGORA IN RELATION TO THE PROTO-HISTORIC SETTLEMENTS.)

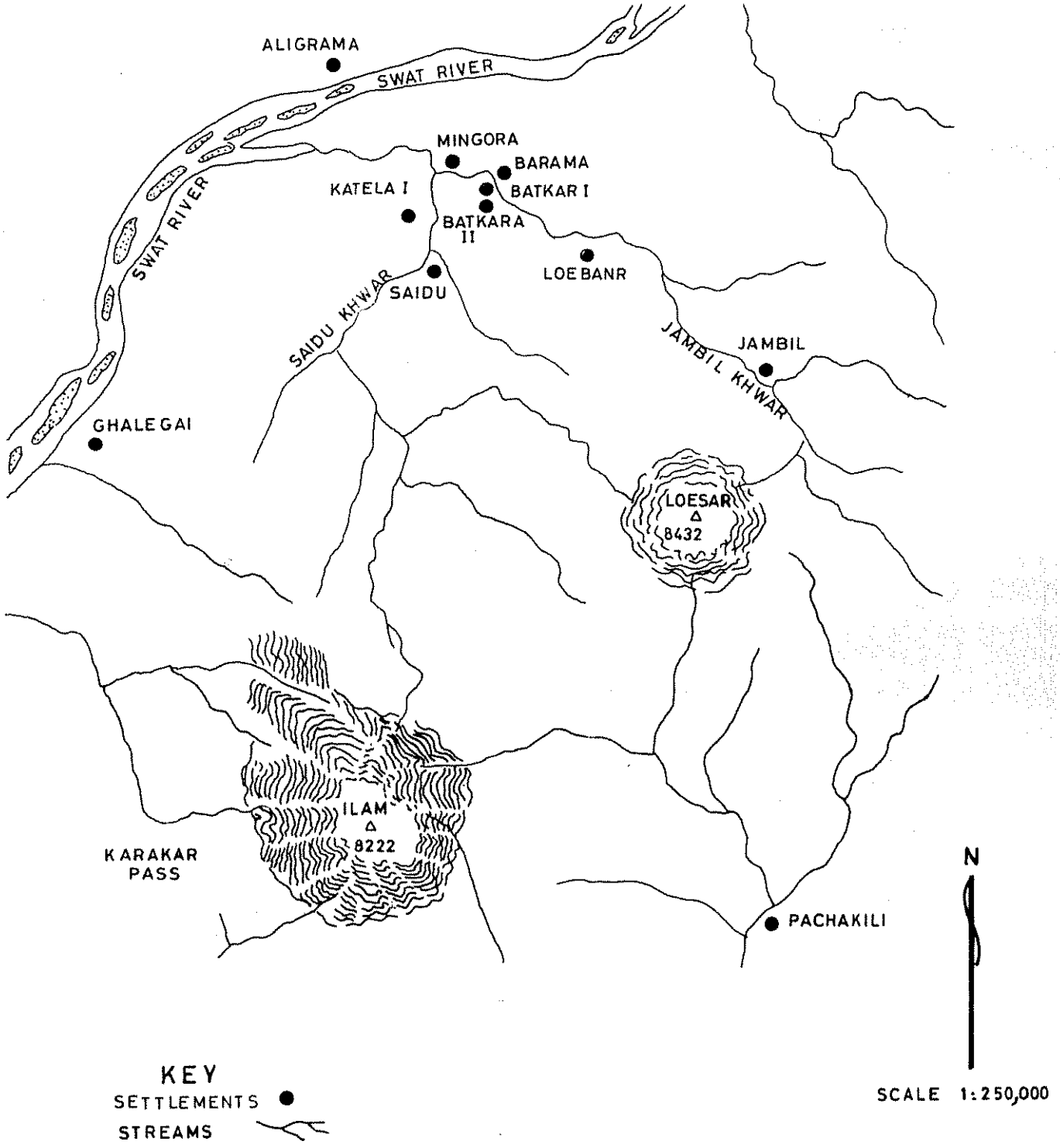


FIG: 18

After Buddhist period. Mingora lost its importance and declined to become a modest village. The situation prevailed for about nine hundred years i.e. 1023 to 1917 A.D. The year 1917 marked a turning point in the growth of the twin city when the foundation of Swat state was laid by the ruler Mian Gul Abdul Wadood with its capital at Saidu Sharif, about 2.6 Kilometers South of old Mingora. Subsequent improvements in transport connected the city to other settlements and gave it a nodal position in the network, a privilege still enjoyed by the city. Improved communication considerably enhanced Mingora's commercial importance. Manufacturing industries of various types also emerged gradually in the city. With the increase in functions, twin settlement of Saidu (Administrative Centre) and Mingora (Religious cum commercial centre) started expanding both in population and area, ultimately resulting in their merger.

During the course of its expansion, Mingora was raised to the status of a town committee in 1962. The

creation of Malakand Division enhanced administrative functions of the city which became the divisional head querter. Menawhile, the built up area started extending along the main roads radiating in all directions in the form of tentacles. The areas between tentacles were filled in by expanding villages including Butkada, Amankot, Rahim Abad, Panr and Nawi Kili. Subsequent administrative change raised the status of Mingora town committee to a Municipal committee in 1976. This was also accompanied by the extention of town boundary (Fig. 19). The city is still increasing rapidly both demographically and spatially. According to 1951 population census the city had 13648 persons. Since then the urban area has multiplied almost six times in population.

MINGORA: EXTENSION OF ADMINISTRATIVE BOUNDARIES
1917 — 1981

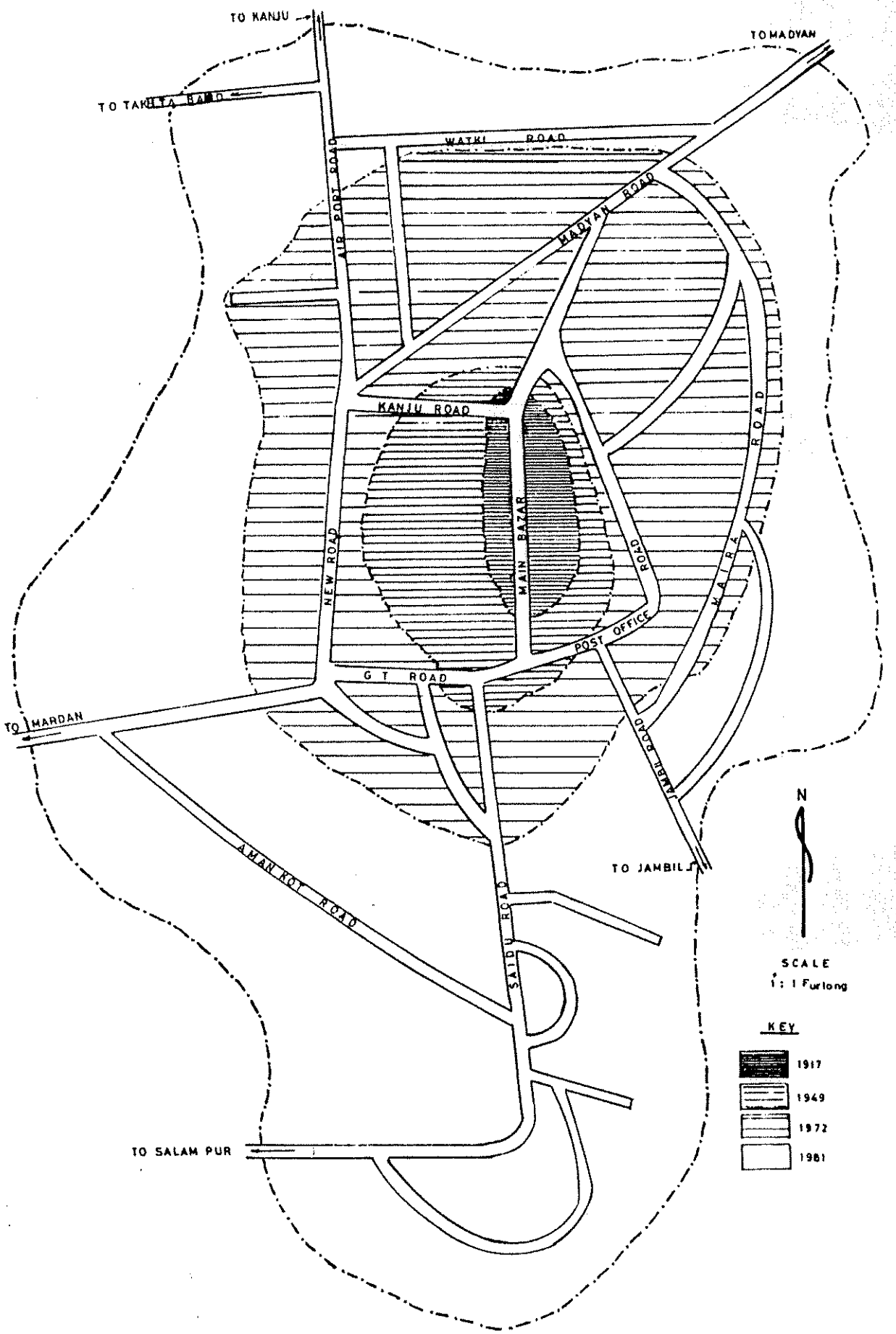


FIG: 19

TABLE 21

MINGORA: GROWTH OF POPULATION 1951-1981.

Year	Population	% change
1951	13648	-
1961	19830	45.29
1972	38499	94.15
1981	88078	128.78

Source: Population census reports 1951, 1961, 1972,& 1981.

The population more than doubled during 1972-81, with an average annual growth rate of 10.26%. This growth rate is enormous as compared with the urban growth in the province (3.89%) and the nation as a whole (4.38%). The city is growing almost three times faster than the urban areas

of the province, aggregated together, and more than double the counterpart rate recorded in the nation. A further comparison of Mingora,s growth has been made with the growth recorded in twelve major cities of Pakistan during 1972-81 period in table 22.

TABLE 22

MINGORA: GROWTH OF POPULATION COMPARED TO MAJOR CITIES OF PAKISTAN.

City	Population 1972	Population 1981	Growth	
			Absolute	Percent
Karachi	3515000	5103000	1588000	45.18
Lahore	2170000	2922000	752000	34.65
Faisalabad	823000	1092000	269000	32.69
Rawalpindi	615000	806000	191000	31.06
Hyderabad	6290000	795000	166000	26.39
Multan	539000	730000	191000	35.44
Gujranwala	324000	597000	373000	84.26
Peshawar	273000	555000	282000	103.30
Sialkot	204000	296000	92000	45.10
Sargoda	200000	294000	94000	47.00
Quetta	158000	285000	127000	80.38
Islamabad	77000	201000	124000	161.04
Mingora	38499	88078	49579	128.78

Source: Housing & Population census of Pakistan 1980 - 1981, census Bulletin I, Govt. of Pakistan Islamabad.

This data shows that Mingora is comparatively a small city (below one lac) but its population has shown much faster growth which is about 2.85 times greater than the growth rate of Karachi and about 3.71 and 3.93 times that of Lahore and Faisal Abad respectively. The national average increase of population in Pakistan is about 3% per annum and it is illogical to assume that the growth rate of 10.26% in Mingora is all due to natural increase. Obviously in-migration and extension in the city boundary were the two major factors causing this increase.

SPATIAL AND ADMINISTRATIVE GROWTH: The spatial and administrative growth of the city for the various historical periods has been shown in Figs. 20 and 19 respectively. Mingora, a small village of 1917 became a town in 1962 with its own town committee, and in 1976 it gained the status of a Municipal committee. As a town committee of 1962, its total area was only about 7 Square Kilo-Meters which multiplied three times (20 Sq.Kilometers) by the year 1981.

MINGORA: SPATIAL GROWTH 1917 - 1981

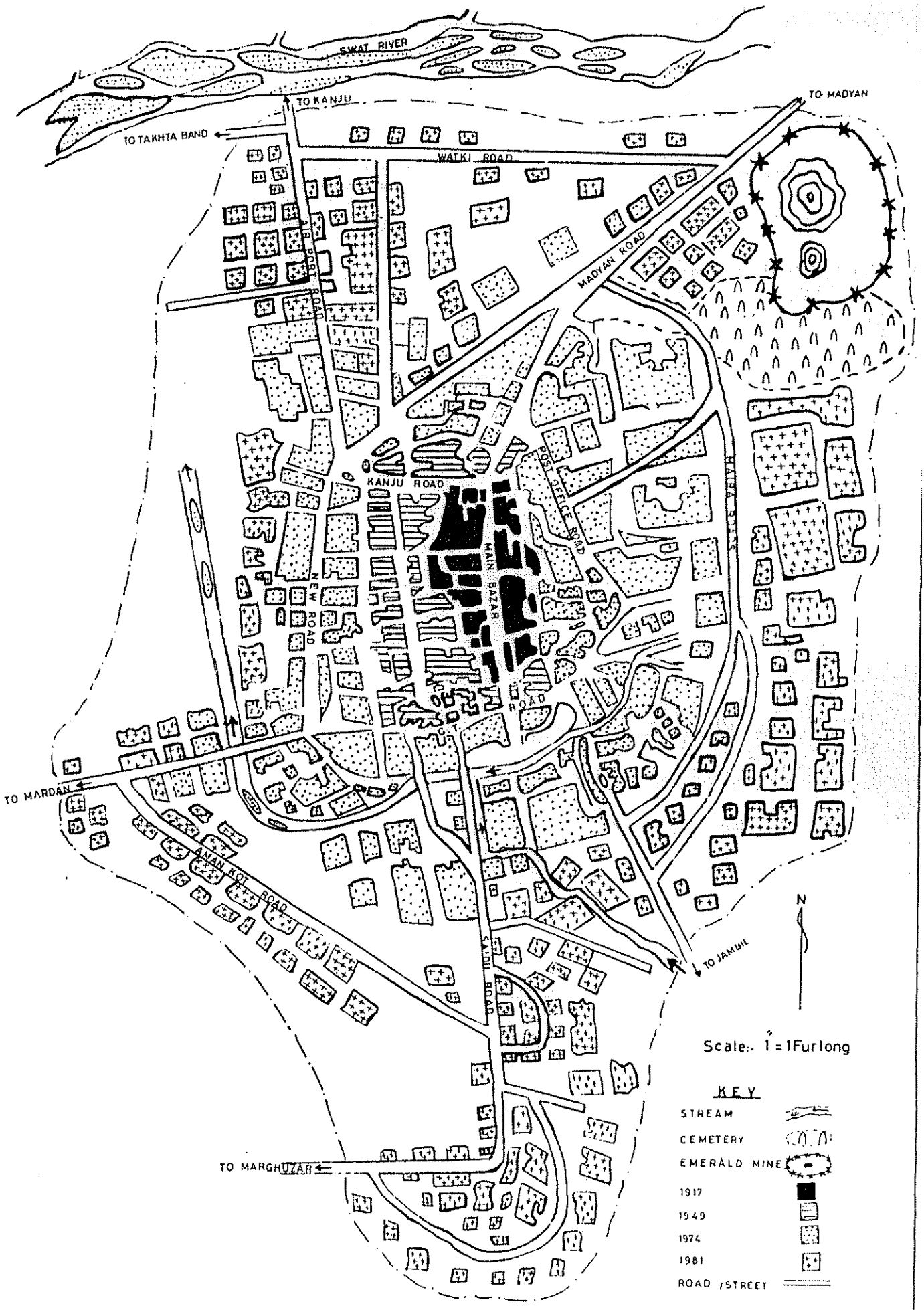


FIG. 20

LAND USE AND FUNCTIONAL CHARACTERISTICS: This section not only describes the existing land use in Mingora city but also analyses the evolution of present patterns during the last sixty five years. These changes have been shown in a series of maps (Figs. 21, 22, 23 & 24) ranging from 1917 to 1981 while the statistical details on these have been given in table 23. It may be mentioned here that the boundary of 1981 has been used as standard throughout this historical analysis.

MINGORA : LAND - USE (1917)

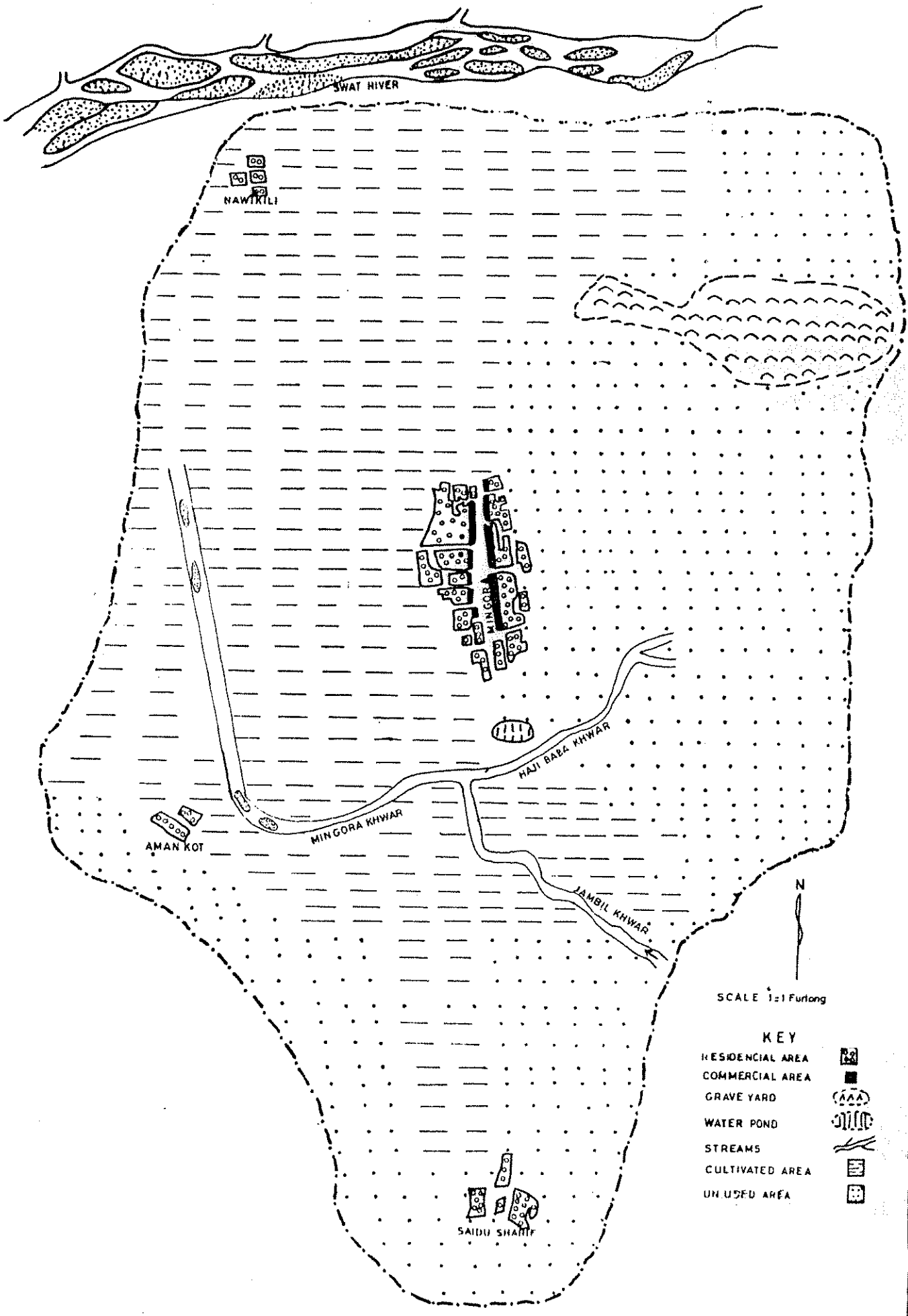


FIG: 21

MINGORA: LAND_USE 1949

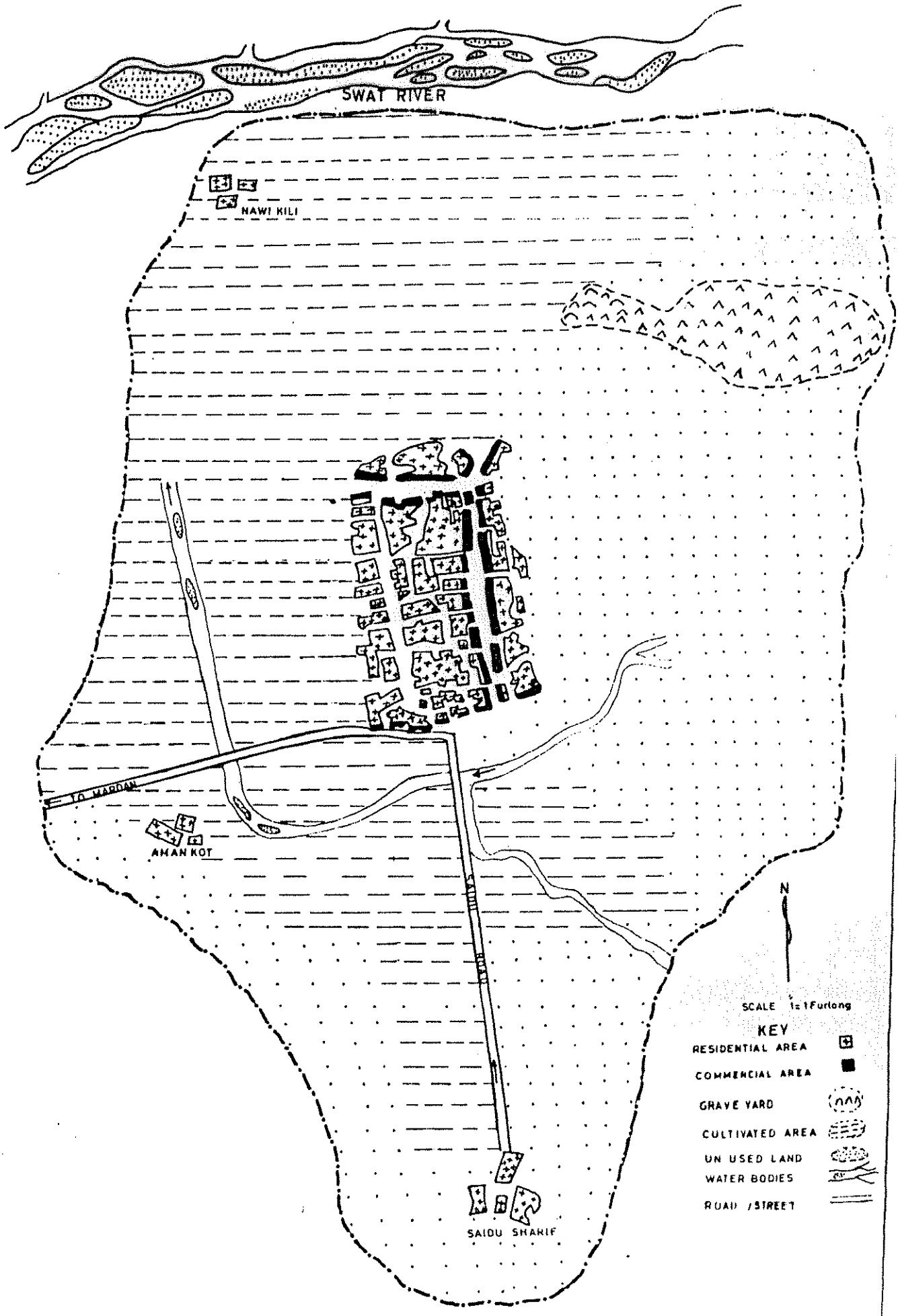


FIG: 22

MINGORA: LAND USE 1974

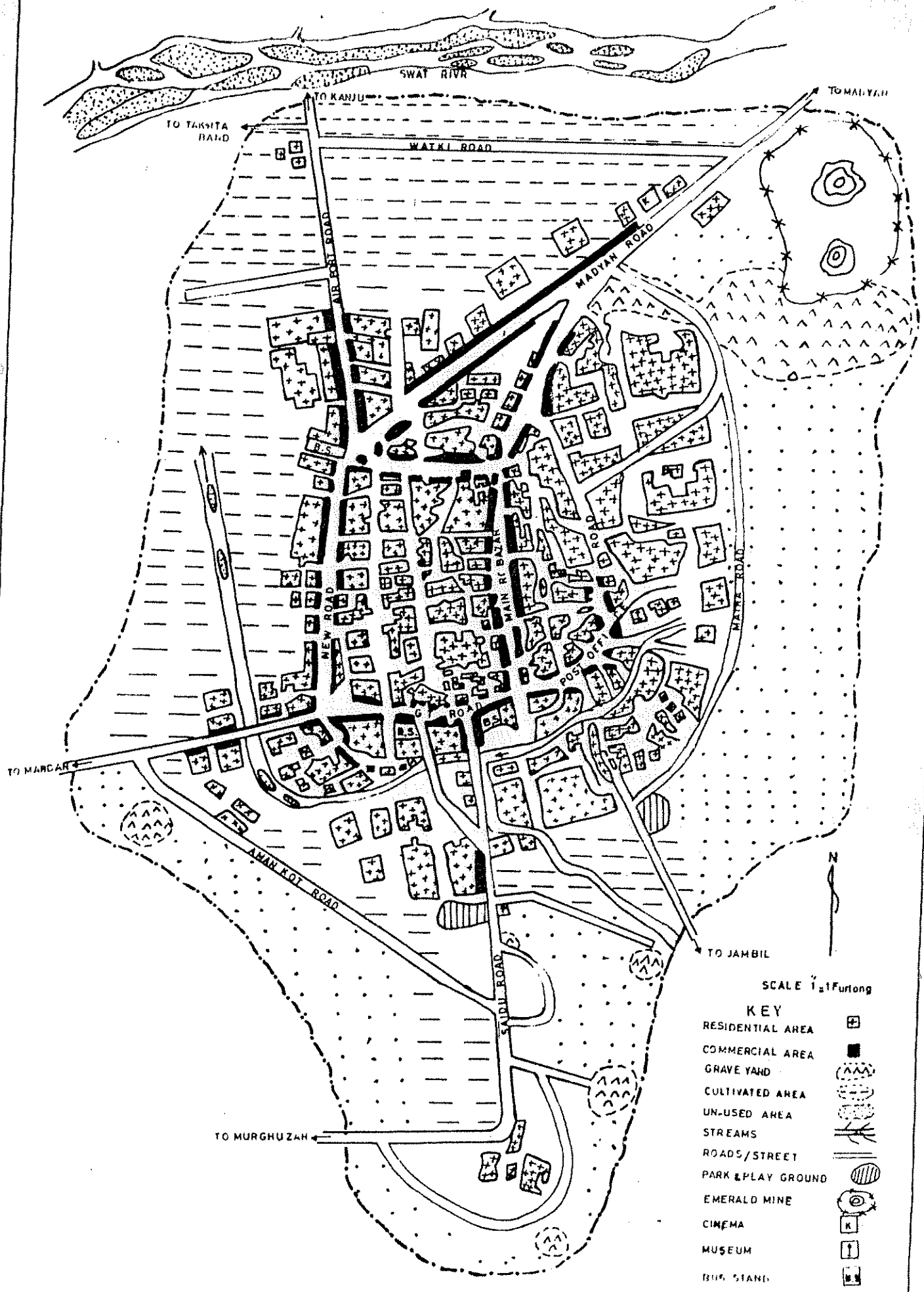


FIG: 23

MINGORA: LAND_USE (1981)

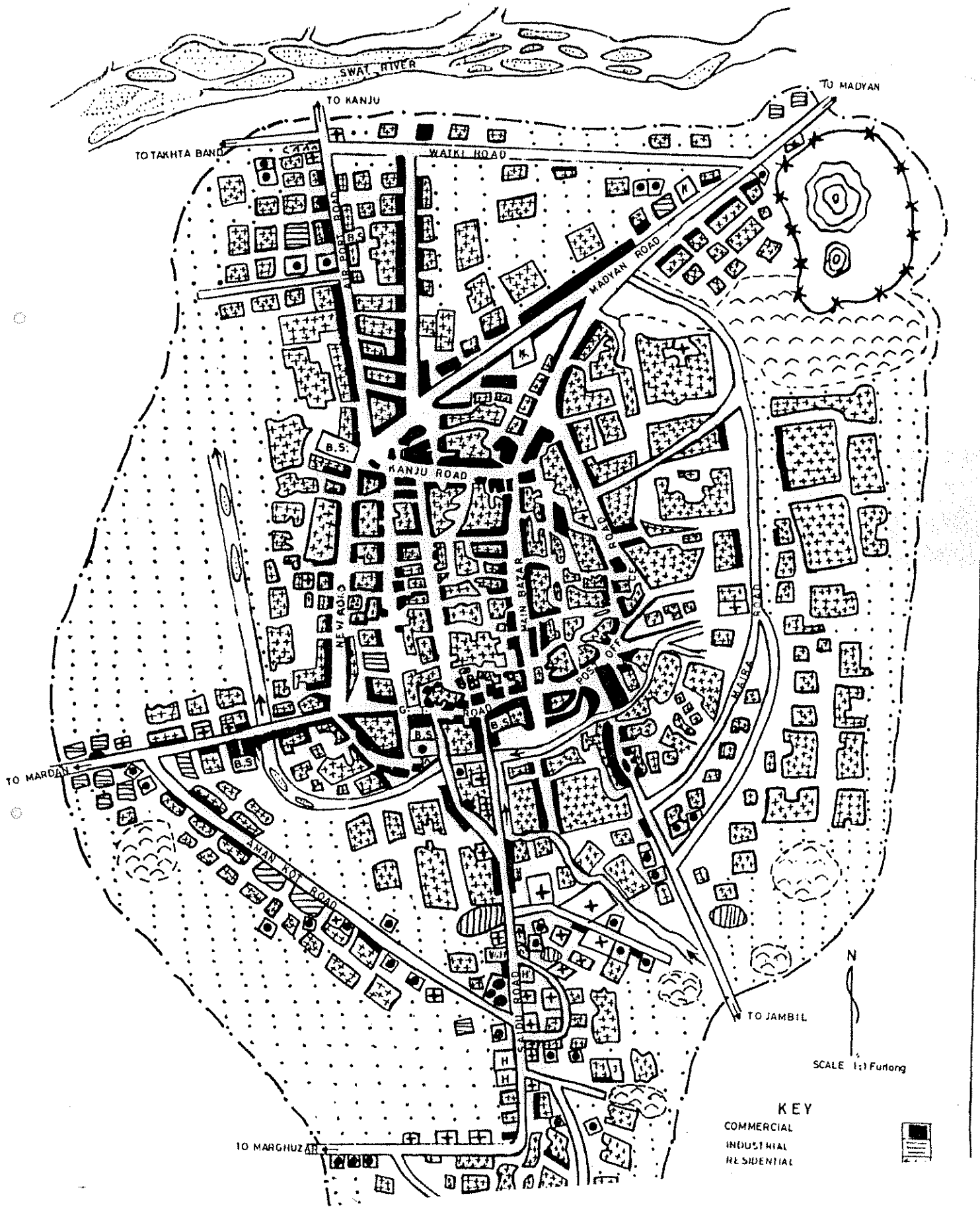


TABLE 23

MINGORA: LAND USE CHANGES 1917-1981.

Type of land use	1917		1949		1974		1981	
	Area (sq.Kms)	%	Area (Sq.Kms)	%	Area (Sq.Kms)	%	Area (Sq.Kms)	%
Residental	0.49	2.45	0.82	4.1	5.00	25.00	8.00	40.00
Commercial	0.10	0.5	0.25	1.25	1.19	5.95	2.00	10.00
Industrial	-	-	-	-	1.00	5.00	2.00	10.00
Green space	-	-	-	-	1.00	5.00	1.00	5.00
Civic & Administrative	-	-	-	-	1.00	5.00	1.50	7.50
Roads/ streets.	0.01	0.05	0.03	0.15	0.81	4.05	1.00	5.00
Agricultural area	12.00	60.00	11.50	57.5	6.00	30.00	2.50	12.50
Vacant land	7.10	35.5	7.10	35.5	3.60	18.00	1.40	7.00
Graveyard	0.30	1.5	0.30	1.5	0.40	2.00	0.60	3.00
Total:	20.00	100.0	20.00	100.0	20.00	100.0	20.00	100.0

Source: Field survey.

From the maps and table, it becomes clear that before 1917, Mingora was a small settlement. The total built up area then was only 0.60 sq.kilometer comprising 0.49 sq.kilometer of residential, 0.01 sq.kilometer of streets and 0.10 sq. kilometer of commercial area. There was hardly any regular road in the settlement in 1917. The settlement at that time was surrounded by cultivated fields on three sides i.e. North, East and West while in South were Ponds and marshes. The agricultural area occupied 12.00 sq.kilometers (60%) of land while the rest of the area with present city limit was vacant land (7.10 sq. kilometers) or graveyards (0.30 sq.kilometer). This is a fair indicator of the fact that the economic base of the settlement in early 20th century was primarily agricultural. Within built up area, there were approximately three hundred houses, fourteen shops and six mosques. The shops were concentrated in the middle of the settlement along both sides of the central street- the present main Bazar (Fig. 24). The structure of houses

being temporary, were Kutcha because of "wesh system" of redistribution of land and villages which has already been discussed earlier in chapter II.

The period from 1917 to 1949 recorded expansion in both population and houses of Mingora. The built up area extended in the North and West where flat land was available in abundance. The total built up area in 1949 was 1.07 sq. kilometers comprising 0.02 sq. kilometer of residential and 0.25 sq.kilometer of commerical area. Roads and streets occupied 0.03 sq. kilometer area. The remaining territory within the present city limits comprised vast tract of agricultural (11.50 sq. kilometers) and vacant land (7.10 sq. kilometers) as well as 0.3 sq. kilometer under graveyards.

A comparative study of land use in 1917 and 1949 reveals that the residential area nearly doubled in that period. The most conspicuous event of the time, however, is the phenomenal increase in the commercial

area which has more than doubled. This increase in the commercial area was mainly due to development of roads. Two most significant amongst them were those which linked the settlement with Saidu Sharif and Malakand. The improvement in roads enhenced the marketing function of the settlement with a parallel increase in the commercial land use. The maps and table also suggest that the new constructions of the period were housed on the agricultural fields, adjacent to the settlement. No change occured in the area under vacant land and graveyards.

During the next twenty five years period between 1949 and 1974 new construction began to amass in the centre of Mingora along both sides of the roads/streets. The total built up area increased to 8.19 sq.kms with residential area commprising 5 sq.kilometers, commercial area 1.19 sq.kilometers, Industrial area 1.0 sq.km and civic and administrative area 1.0 sq.km . The rest of the land remained agricultural (6.0 sq.kms) or vacant land (3.60 sq.kms) or under graveyards (0.4 sq.km).

A comparative study of the various land uses for the years 1949 and 1974 reveals substantial changes. Thus the residential area increased more than five times while the commercial area increased more than four times during this period. The most dominant change in 1974 land use pattern was the dramatic increase in the area under roads and streets which increased more than 26 time that of 1949. Nearly half of the agricultural area and more than half of the vacant land were brought under construction. The area under graveyards also increased considerably. Industrial land use was also introduced and green spaces (play grounds) were developed. The expansion in the built up area occured mainly in the East and South West where low cost vacant land was available. The commercial land use developed in linear fashion along the existing roads/streets.

Since the merger of Swat State into Pakistan in 1969, Mingora's growth has entered a new phase of rapid expansion. Land use map of the city is not available for 196

However, a comparative study of land-use in 1974[3] and 1981 clearly reflects this pattern. The built up area during this period increased from 8.19 sq.kms to 13.5 sq. kms. The built up area in 1981 comprised 8.0 sq.kms of residential, 2.0 sq.kms of commercial, 2.0 sq.kms of Industrial and 1.50 sq.kms of civic and administrative land uses. The agricultural and vacant lands were reduced from 9.60 sq.kms to 3.90 sq.kms, while the land under graveyards increased from 0.40 to 0.60 sq.kms. During this short span of seven years, the residential and the industrial area also increased substantially. A detailed analysis of land-use types in areal dimension has been carried out in the following account:

COMMERCIAL LAND USE: This land use occupies a small part of the central city along main roads from where it extends radially along major roads, leading out side the city.

Richard Hurd[4] and Homer Hoyt[5] argue, that cities tend to expand along with various exes e.g. along certain

thoroughfares that offer the best travel facilities. As can be seen from fig. 24, this argument seems to hold true for Mingora city where shopping extensions along various axes are quiet prominent. Nearly all the commercial establishments are concentrated on both sides of the roads and major lanes of the city. The retail trade is the most important function in the commercial zone both in terms of number of shops as well as floorspace. It is also the function, commanding the highest land value areas. A historical survey, conducted in the city[6] shows that the retail trade and services dominated the commercial zone as far back as 1969 and constituted more than 68% of the total value of all functions, measured in terms of persons employed in each category of functions (Table 24).

TABLE 24

MINGORA: EMPLOYMENT BY FUNCTION 1969.

Function	Total number of persons employed	Percent of the total employment.	Employment as percentage of the total population
Retail trade	1339	27.5	6.8
Services	1092	22.4	5.5
Govt. Services	953	19.5	4.8
Miscellaneous	759	15.6	3.8
Industry	721	15.0	3.6
All functions.	4864	100.0	24.6

Source: Pakistan Geographical Review Vol. 24.

A comparative study of Mingora and other cities of Pakistan with respect to employment in retail trade for 1961 has been given in table 25.

TABLE 25

MINGORA; POSITION OF RETAIL TRADE COMPARED WITH OF OTHER CITIES OF PAKISTAN.

S.No.	City	Population 1961	Per 1000 population employed in retail trade
1.	Mingora	19830	68
2.	Karachi	1912598	49
3.	Lahore	1296477	46
4.	Hyder Abad	434537	53
5.	Faisal Abad	425248	52
6.	Multan	359201	54
7.	Rawal Pindi	340175	46
8.	Peshawar	218690	58
9.	Sialkot	164346	46
10.	Sargoda	129291	56
11.	Gujran Wala	196154	57
12	Quetta	106638	42
13.	Sukker	103216	61
14.	Pakistan	9654000	81

Sourse: Pakistan Geographical Review, Vol.24, 1969.

It can be seen that Mingora dominates the scene. Zaidi (1969)[7] described the contributing factors for this to be site and situation as well as frontier location of the city. These advantages, are said to have resulted in the development of the city into a popular shopping centre.

The current situation in respect of retail trade assesed from the field survey of 1981 has been given in table 26. It is apparent that the share of retail employment has gone up by four percent.

TABLE 26

MINGORA: PERSONS EMPLOYED IN VARIOUS FUNCTIONS 1981.

Function	Total number of persons employed	Percent of total employment	Employment as percentage of the total population.
Retail trade	6695	31.5	7.6
Services	3276	15.4	3.7
Govt. Services.	3812	17.9	4.3
Miscellaneous	4554	21.4	5.2
Industry.	2884	13.5	3.3
All functions.	21221	100.0	24.0

Source: Field survey.

Retail trade being the dominant function require further analysis by the type of establishments. Historically, a survey conducted in 1964[8], there were 1500 shops in Mingora. Many of these were establishments which required large threshold population. For example one hundred and thirteen of these were cloth shops, forty-four were the shops of foreign manufactured electrical goods, cosmetics and perfumes etc. The field survey conducted in 1981 shows 4000 shops in the city-an almost three times increase. About 1380 of these were specialized shops, requiring larger threshold population. They have been listed in table 27.

TABLE 27

MINGORA: SPECIALIZED SHOPS 1981.

Types of shops	Frequency of occurence
Shoes	50
Barbers	200
Tailors	112
Chemists	70
Goldsmiths	35
Cloth	425
Cosmetics	280
Photographers	32
Opticians	13
Book stores	26
Garages & Service Stations	73
Dry cleaners	42
Seed shops	18
Total:	1380

Source: Field survey.

The remaining 2620 were miscellaneous shops, selling grocery mixed with other items. Cloth shops were by far the largest single group of shops, followed by cosmetics.

Among the commercial offices, Banks had the most Central location (Fig.25). The frequency with which their services are required by the general public and their association with the retail establishments are the two obvious factors for their centrality. Cinemas also derive great benefit from their location near retail areas but they also require large space. One of the cinemas in Mingora is located in the heart of the city while the other is located at the fringe (Fig. 24).

RESIDENTIAL ZONE: The residental area comprises two types of residences i.e. transient and permanent. The transient include hotels whose distribution has been shown in Fig.26. The distribution is peripheral to the main centre i.e. Main Bazar, showing that hotels do not require very high degree of centrality and prefer their location in the fringe of the central shopping centre.

MINGORA: DISTRIBUTION OF FINANCIAL OFFICES (1981)

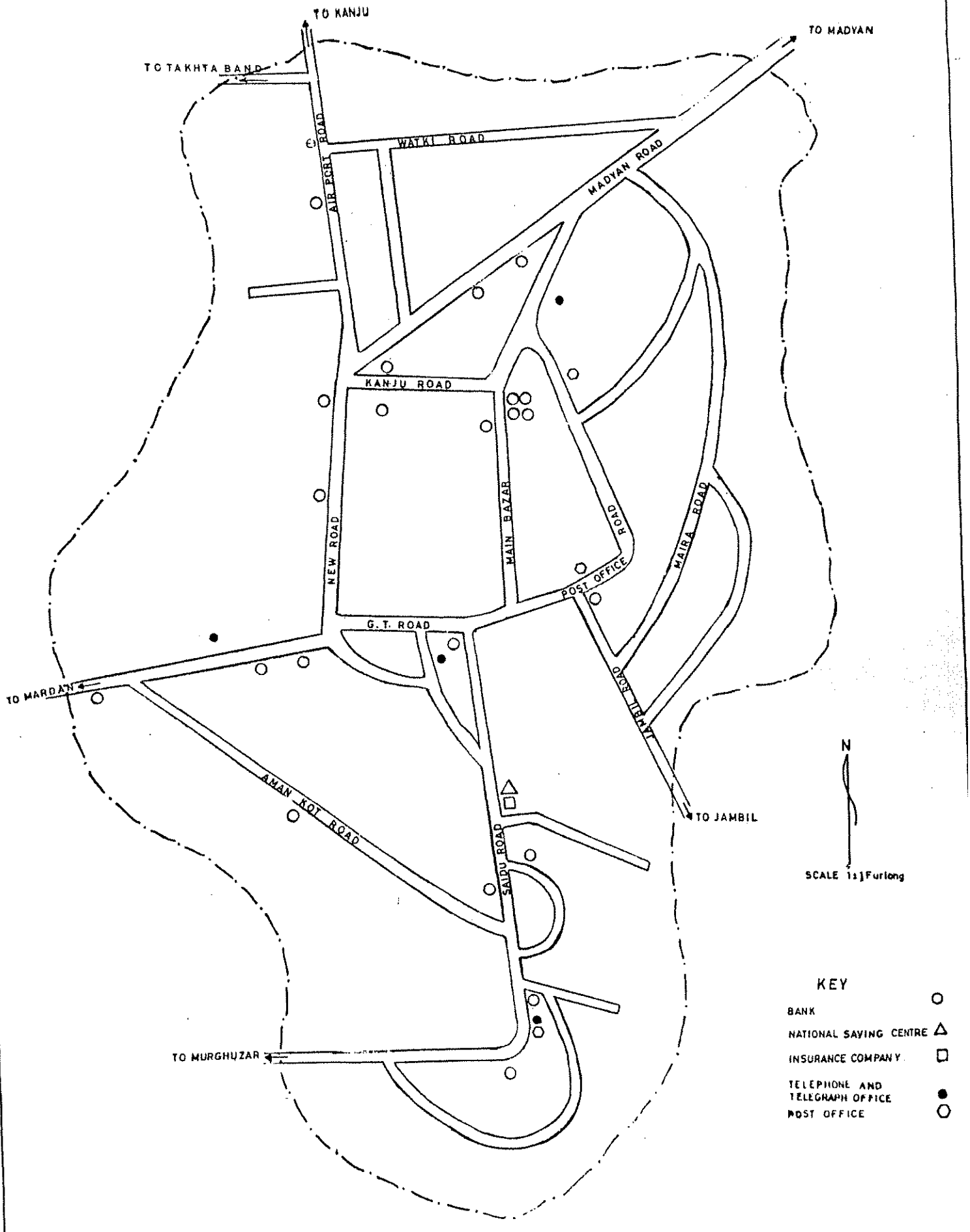


FIG: 25

MINGORA CITY: HOTEL & RESTAURANTS (1981)

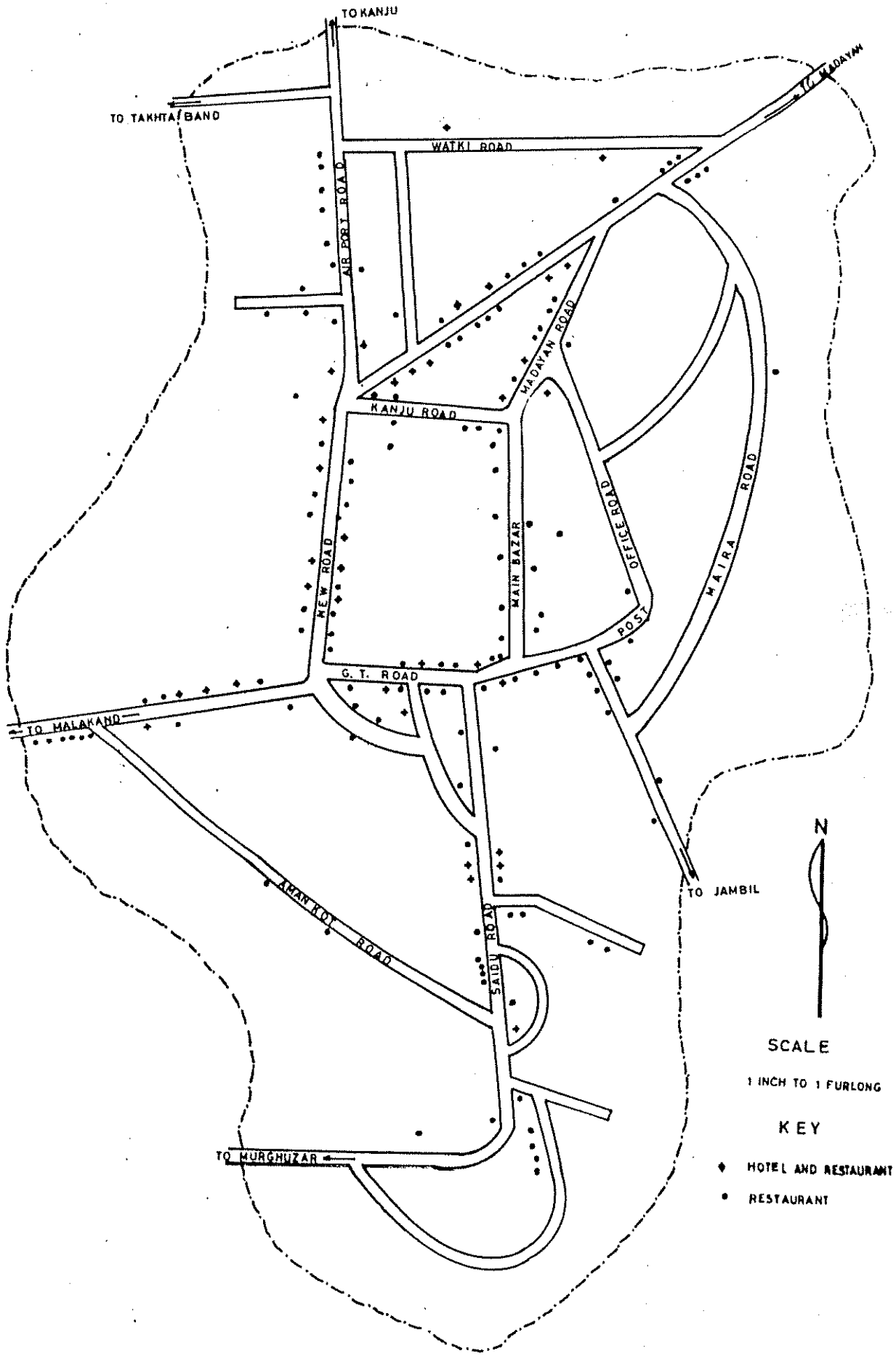


FIG: 26

The permanent residence comprise house
have some variety in Mingora. Their growth patt
some characteristics have been given in table 2

TABLE 28

MINGORA: GROWTH OF HOUSES 1951 - 1981.

Year	Popul-ation.	No. of houses	%	Avera-ge Hou-se hold size	"Kutcha" No	
1951	13648	4650	-	2.9	4500	9
1961	19830	7580	63.2	2.6	6100	
1972	38899	15868	109.4	2.4	7544	
1981	88078	19430	22.5	4.5	8678	

Source: 1. Population census reports 1951, 19

2. Malaria control Programme, distri

The table shows that housing stock has recorded a very high growth in Mingora since 1961. The number of pucca houses has increased faster than the kutcha houses, depicting an improvement in the socio-economic condtions of the residents. The table also indicates an increase in the house-hold size obviously due to higher rate of growth in population as compared to that of stock housing. Consequently backlog in housing is on increase. Room densities have also been computed in table 29 indicating a decline between 1951-1972 period beyond which it started increasing doubling itself in nine years period between 1972-1981.

TABLE 29

MINGORA: ROOM DENSITY 1951 - 1981.

Year	Population	Total number of rooms	Room Density
1951	13648	11625	1.2
1961	19830	18950	1.1
1972	38499	39678	0.9
1981	88078	48570	1.8

Source: 1.Population census reports 1951, 1961, 1972 & 1981.
2.Malaria controll programme district Swat.

The present room density however is still less than the National Urban Room density of 3.5.

Concening tenure of residential premises, about twelve percent of the total population is living in rented houses. According to a survey conducted for this study, the predominance of rental occurs in small houses with one or two rooms, indicating a gross shortage of houses in the lower occupational groups (Labourers on daily wages). The situation regarding tenurial status in Mingora city however is better than Pakistan where 22% persons are living in rented premises.

The land use map of Mingora city (Fig.24) suggests that the central housing area is the oldest and mostly "kutcha" in structure. The central low income residential area, comprising the three blocks between Kanju road in the North, G.T. road in the South, Post Office road in the East and New road in the West is surrounded by a better quality of residential area. Here the housing stock is pucca with relatively better lay out. They are more spacious

and the drainage system is also much better in this area.

The third residential zone comprises sub-urban areas which occurs in Pockets around the second zone. The living conditions are the best in this zone with very good quality residences.

Within each of these residential zones in Mingora, there are "Mohallahs" or neighbourhoods with their own mosques, common places of gathering (Hujras). The city as a whole had 93 mosques and 150 "Hujras" in 1981.

CIVIC AND ADMINISTRATIVE LAND USE: There is a fundamental difference in the location requirement of a civic and administrative functions and those of retail trade. The latter are highly competitive for central position and display frontage along roads or streets inorder to attract and utilize high pedestrian flow. The former deals with the pedestrian but do not need to attract a flow as they represent a service which the public has to use[9]. The civic and administrative zone therefore, lies at the southern edge of the central Business District of Mingora. As stated earlier,

the Mingora of today has emerged from twin nuclei, a commercial cum religious nucleus and an administrative nucleus. The administrative nucleus emerged in Saidu which became the state capital in 1917. It was later engulfed within Mingora during its growth and subsequent expansion. The zone has all the offices of tehsil, district and divisional administration. Besides, it has a boys Post graduate and a girls intermediate college, a technical college and four public schools as well as two civil hospitals and a veterinary hospital. The general post office, a telephone exchange, a telegraph office, police station and the district central jail are also present here. Federal and provincial government offices e.g. passport office, registration office, directorates of agriculture, education, health etc are also located within this zone (Fig.27). Further the zone houses a museum, office of the Pakistan tourism development corporation and also parks and play grounds. Some of the civic functions such as mosques are well distributed throughout the city. Likewise education and health facilities located outside

MINGORA: DISTRIBUTION OF GOVT. OFFICES 1981

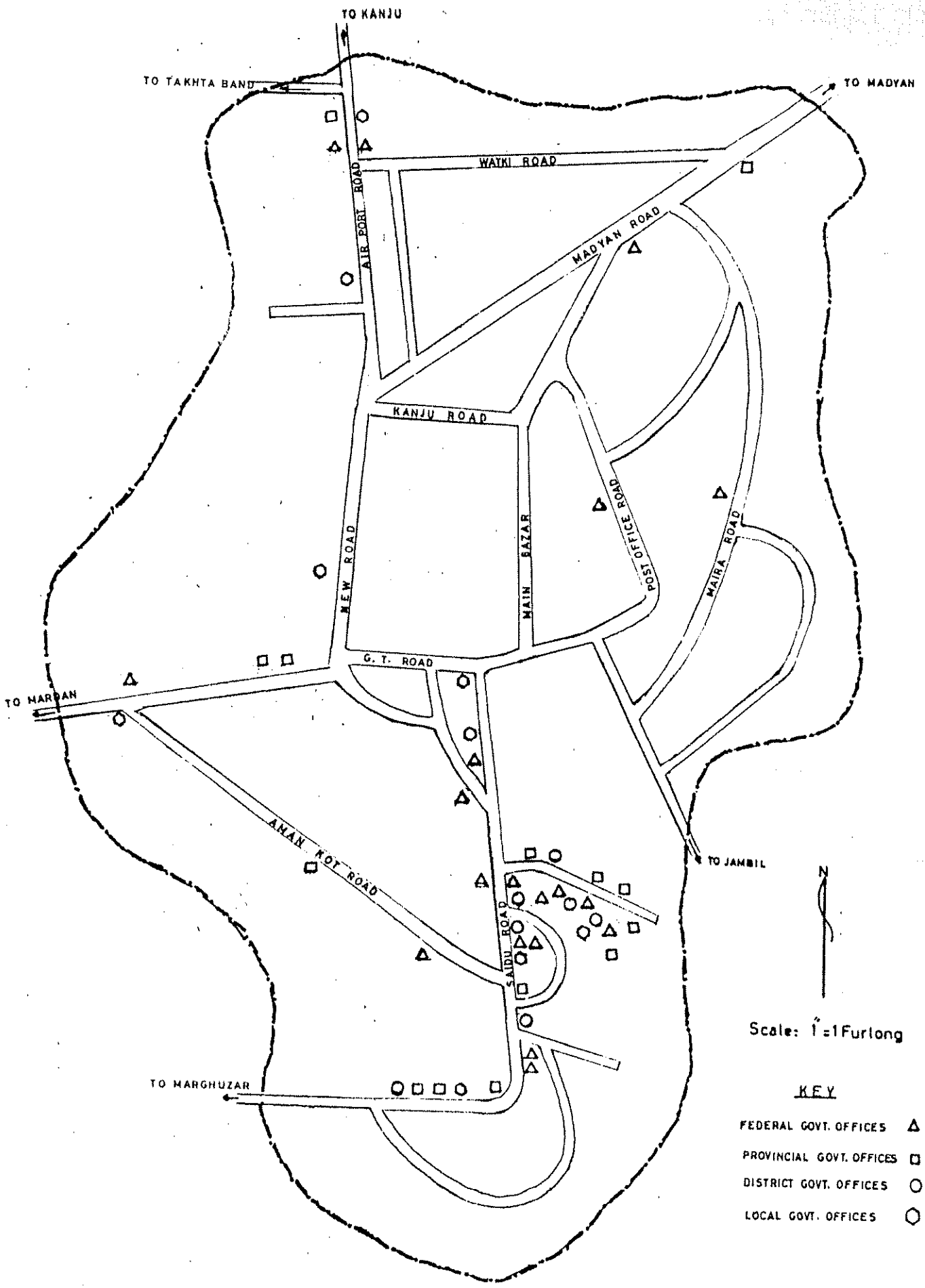


FIG. 27

the civic zone also need further discussion.

The city has about thirty one educational institutions. They form a hierarchical order-ranging from primary school to a Post graduate college. The Post Graduate College for boys and intermediate college for girls have central locations within the civic zone. The high school for girls (two) also have relatively central location while the seven high schools for boys are distributed in different sectors. Amongst nineteen primary schools, thirteen are for boys and six for girls. They are all located in residential areas. However, the absence of educational institutions from central Mingora is very obvious from the accompanying map (Fig.28).

The health facilities in Mingora include two hospitals within the civic zone and a dispensary in the extreme northeastern sector of the city on Madyan road. In addition to this, there are two maternity health centres located on the post office and Naira roads respectively. The two

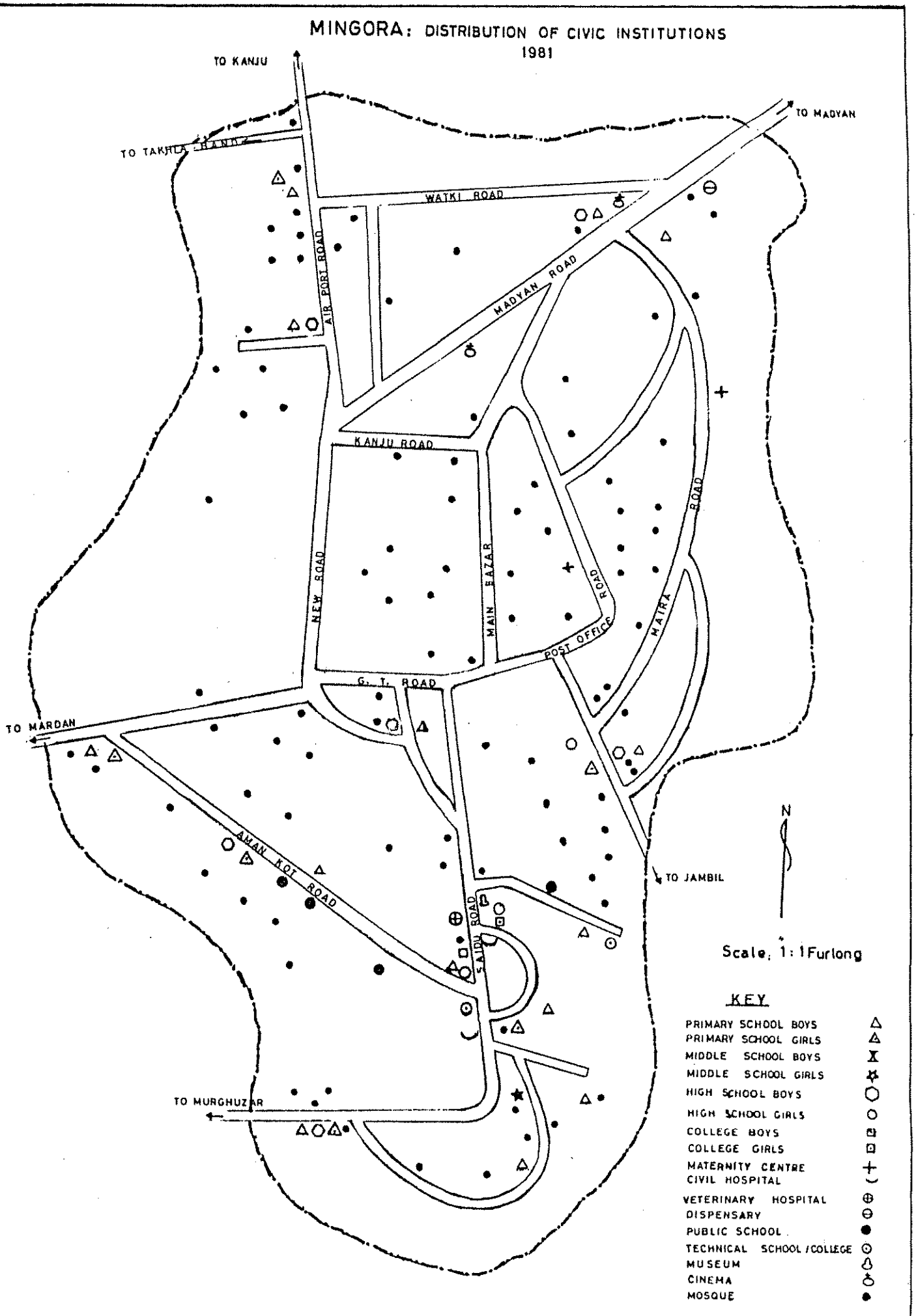

MINGORA: DISTRIBUTION OF CIVIC INSTITUTIONS
1981
TO KANJU
TO TAKHTA BHAI
TO MADYAN
WATKI ROAD
AIR PORT ROAD
MADYAN ROAD
KANJU ROAD
NEW ROAD
MAIN BAZAR
POST OFFICE ROAD
MAIRA ROAD
G. T. ROAD
TO MARDAN
AMAN KOT ROAD
SAIDU ROAD
TO JAMBIL
TO MURGHUZAR
N
Scale, 1: 1 Furlong
KEY
PRIMARY SCHOOL BOYS
PRIMARY SCHOOL GIRLS
MIDDLE SCHOOL BOYS
MIDDLE SCHOOL GIRLS
HIGH SCHOOL BOYS
HIGH SCHOOL GIRLS
COLLEGE BOYS
COLLEGE GIRLS
MATERNITY CENTRE
CIVIL HOSPITAL
VETERINARY HOSPITAL
DISPENSARY
PUBLIC SCHOOL
TECHNICAL SCHOOL / COLLEGE
MUSEUM
CINEMA
MOSQUE

FIG: 28

hospitals in the civic zone are saidu and central hospital. Both these are specialized hospitals and they not only serve the city population but also most of the people living in the Malakand division, are benifited with these hospitals. There are approximately 18 doctors and 124 beds in Saidu Hospital and 12 doctors and 156 beds in central hospital.

INDUSTRIAL LANDUSES: Mingora city has not developed any compact industrial zone. There are numerous industrial establishments of various sizes but they are interspersed with other uses throughout the city.

The Cottage industries within the city include hand woven woolen cloth (patti), leather goods, wood works, smithies, extraction of oil, pottery, cotton ginning etc. The city also has some large industrial units. These have been shown in the accompanying map (Fig.29) and have been discussed below:

SILK INDUSTRY: They deal with the weaving of cloth from imported silk. There are ninety silk mills in the city with

MINGORA: LOCATION OF INDUSTRIES (1981)

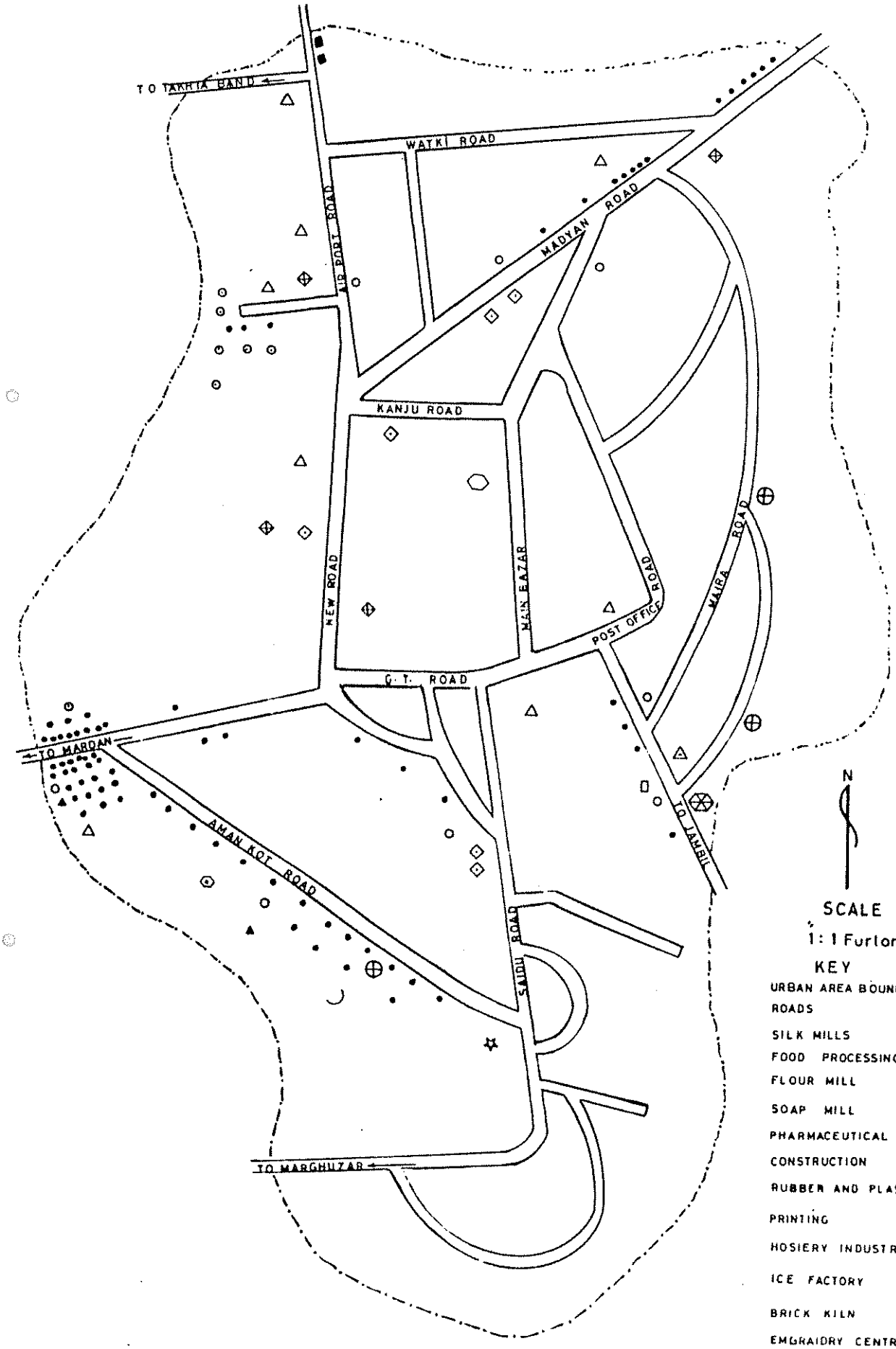


FIG: 29

million. Its total employment is 47 and annual production is 150 metric tonnes.

PHARMACEUTICAL INDUSTRY: The lone pharmacentical industry of Mingora is located in Amankot. It was established in 1961. The current capital investment in this factory is 6.830 million rupees. Its total employment is 43 and annual production of drugs is as under.

Tablets	30 Lacs.
Capsules	3 Lacs
Syrup	300 Liters
Ointment	600 Kgs.
Injection-	
Ampules	240 Lacs.

Source: Field survey.

PRE-FABRICATED CONSTRUCTION INDUSTRY: A small industrial unit was established in 1978 with a total capital investment of Rs:0.078 million to manufacture cement blocks, bars and other pre-fabricated material. It has a total employment

of seven and it can produce 1000 bricks per day in addition to other pre-fabricated material.

RUBBER AND PLASTIC INDUSTRY: The first rubber and plastic industry was established in 1978, at Mairs. The total capital invested in this industry was Rs: 0.630 million. Employing eight workers, its total annual production is 56,532 pairs of shoes. The second industry of this type established in 1981. However, it went out of producation the very next year and has been closed since then.

PRINTING INDUSTRY: The city has six printing establishments. The total money invested in these presses add upto Rs. 0.525 million. Their total capacity is 5400 impressions per day. They employ 12 workers in addition to the owners who also work on their respective premises.

HOSIERY: The Hosiery factory of Mingora was established in 1978, with a total capital investment of Rs: 9.264 million. Its total employment is 124 and daily production is 400 dozen of hosiery items.

ICE FACTORIES/ICE CREAM INDUSTRIES/COLD STORAGES: There are two Ice factories/Cold storages in Mingora. One of these the Mingora Ice factory was established in 1970 with a total investment of 0.500 million rupees. It has four workers and produces 10 tonnes of ice daily. The Nawakili ice factory located in Nawakili was established in 1977 with a total capital investment of 0.300 millions rupees. Its employment is three and production capacity is 8 tonnes of ice per day. In addition to these, there are eight ice cream factories in the city. Their total employment is 16 with a production capacity of eight tonnes of ice cream daily. The total money invested in these factories is 0.610 million rupees.

BRICK KILNS: Mingora has seventeen brick kilns with a total investment of Rs: 5.300 millions. Their total production capacity is 1,15,00000 burnt bricks per annum. All these kilns are located in the outskirts of the city.

OTHER TYPES OF LAND-USE: Other uses occupy about a third of the city's gross floor-space. A major part of this is occupied by the agricultural and vacant land (20%) which is being converted rapidly into builtup area. However, some people are still keeping their lands as agricultural or vacant, waiting till such time that the price of their land reaches their maximum. The agricultural land is utilized mainly for the cultivation of vegetables which are consumed within the city. Graveyards cover three percent land of the city and transport and communication has consumed another five percent of the city land .

To conclude, the land use in the city of Mingora does not represent any specific pattern i.e. concentric zone or sector or multiple nucleation which one finds in the western city. Although at places definite nuclei are discernible but at many other places the land use is still of mixed character.

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CHAPTER VI

DENSITY GRADIENTS AND POPULATION POTENTIAL.

DENSITY GRADIENTS AROUND MINGORA CITY: The city of Mingora, due to its nodal location, is a leading centre of transportation, circulation and interaction in the region. This has led the city to act as a collecting and marketing centre of the agricultural and industrial products of the valley on the one hand and distribution of goods from various parts of the country to the tributary areas of the city on the other. This link between the city and its surrounding regions makes it important to study the spatial structure of the region around the city and the impact of city's location on this structure. The spatial structure of the surrounding region has been studied in terms of population density, Settlement density and intensity of cultivated land. The methodology adopted involved construction of maps of swat valley showing the distribution of population, settlements and cultivated lands. Concentric circles at the interval of five miles radius

were drawn around the city of Mingora on these maps (Fig. 30, 31 and 32) and respective analysis of gradients have been given in the following account.

GRADIENT OF POPULATION DENSITY: It can be seen from the map (Fig. 30) that there are twelve concentric circles drawn around the city. The area, population and densities of population for these circular zones are given in the following table.

SWAT VALLEY

POPULATION DENSITY GRADIENTS FROM MINGORA CITY (1981)

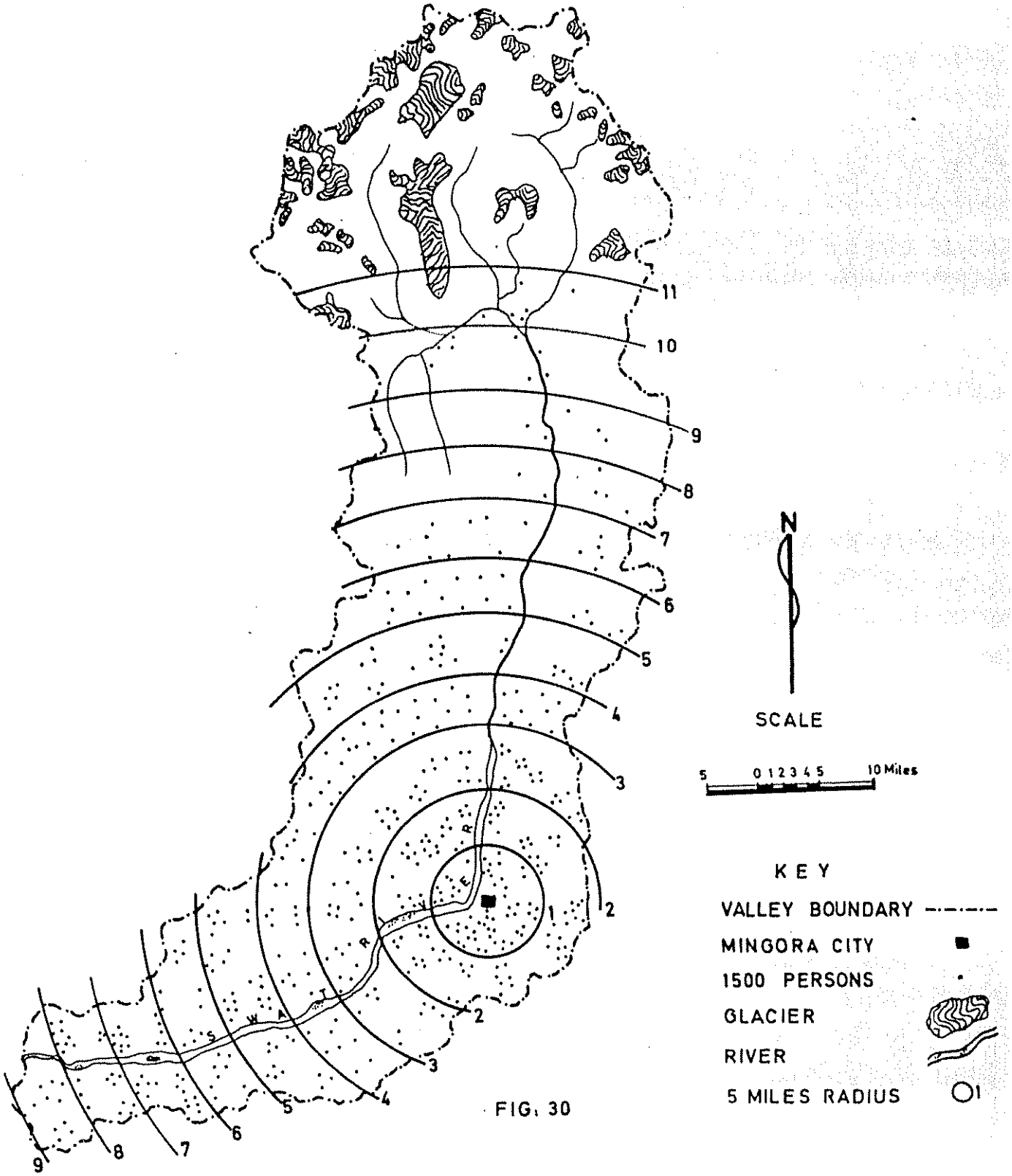


FIG. 30

TABLE 30

SWAT VALLEY: POPULATION DENSITY GRADIENTS AROUND MINGORA 1981.

In concentric zones around Mingora (in miles)	Area (Sq.miles)	Population 1981	Population density
0-5	75.89	1,00000	1317.7
5-10	182.68	1,10000	602.2
10-15	199.20	95000	476.9
15-20	231.67	1,15000	496.4
20-25	220.81	86,500	391.7
25-30	187.96	70,500	375.1
30-35	158.13	50,500	319.4
35-40	168.79	47,000	278.5
40-45	153.63	23,000	149.7
45-50	109.82	11,500	104.0
50-55	117.74	9,000	76.4
55-60	568.37	1500	2.6
Total:	2374.70	719,500	302.9

The overall gradient/slope of the population density has been worked out with the help of regression coefficient expressed by the formula:

$$Y = a + bx$$

Where Y = the sume of population densities

X = the sum of distances

a = constant

b = gradient or slope.

Using the above formula, the overall density gradient or slope calculated comes out to be -16.73. The negative value of "b" shows that the population density is inversely proportional to distance from the point of origin (Mingora city). The relative changes in density gradient by circular zones drawn at five miles interval from Mingora city have also been analysed, using both fixed base and chain base methods. Fixed base method has compared the population densities in different zones with the population density at the central zone by using the following formula:

$$X_n = \frac{P_n}{P_i} \times 100$$

Where X_n = gradient

P_i = population density of the central zone.

P_n = population density of nth zone.

Contrary to the fixed base method which compares the population density of all circular zones with the central zone, the chain base method compares the density of each circular zone with its respective inner zone e.g. zone II with zone I, zone III with zone II, zone IV with zone III (Fig. 31) and so on. It is calculated as:

$$X_n = \frac{P_n}{P_x} \times 100$$

Where P_n is the population density of the nth zone.

P_x is the population density of zone that falls inside the nth zone.

The results obtained from the use of above methods have been shown in table 31.

TABLE 31

SWAT VALLEY: COMPARATIVE DENSITY GRADIENTS AROUND MINGORA BY FIXED BASE AND CHAIN BASE METHODS.

In concentric zones around Mingora(in miles)	Population density	Comparative gradient by fixed based index method	Comparative gradient by chain based index method
0-5	1317.7	100	100
5-10	602.2	45.7	45.7
10-15	476.9	36.2	79.2
15-20	496.4	37.7	104.1
20-25	391.7	29.7	78.9
25-30	375-1	28.5	95.9
30-35	319.4	24.2	85.2
35-40	278.5	21.1	87.2
40-45	149.7	11.4	53.8
45-50	104.0	7.9	69.5
50-55	76.4	5.8	73.5
55-60	2.6	0.2	3.4

The table indicates that there is an obvious spatial relationship between the population densities and distance from the centre of the city. The densities gradually decline as one moves out from the central zone.

These changes in the population densities around Mingora city can be attributed to a number of factors; the two most important of which are the settlement density and intensity of cultivated land. Therefore, in the onward analysis, gradient of settlement density and intensity of cultivated land has been related to the gradient of population density as:

SETTLEMENT DENSITY: The spatial changes in respect of the density of settlements around the city of Mingora have been studied in this section. As in the previous section, equidistant concentric circles were drawn on settlement map of swat valley around the city of Mingora at five miles interval. The settlement density was computed for each circular zone on the map (FIG: 31) and the results are given in the following table.

TABLE 32

SWAT VALLEY: SETTLEMENT DENSITY AROUND MINGORA 1981.

In concentric zones around Mingora (in miles)	Area (Sq.Miles)	Number of settlements	Settlement density
0-5	75.69	32	0.42
5-10	182.68	167	0.91
10-15	199.20	193	0.96
15-20	231.67	229	0.98
20-25	220.81	146	0.66
25-30	187.96	100	0.53
30-35	158.13	65	0.41
35-40	168.79	57	0.33
40-45	153.68	49	0.31
45-50	109.82	32	0.29
50-55	117.74	25	0.21
55-60	568.37	14	0.02

SWAT VALLEY : SETTLEMENT DENSITY GRADIENT AROUND MINGORA CITY (1981)

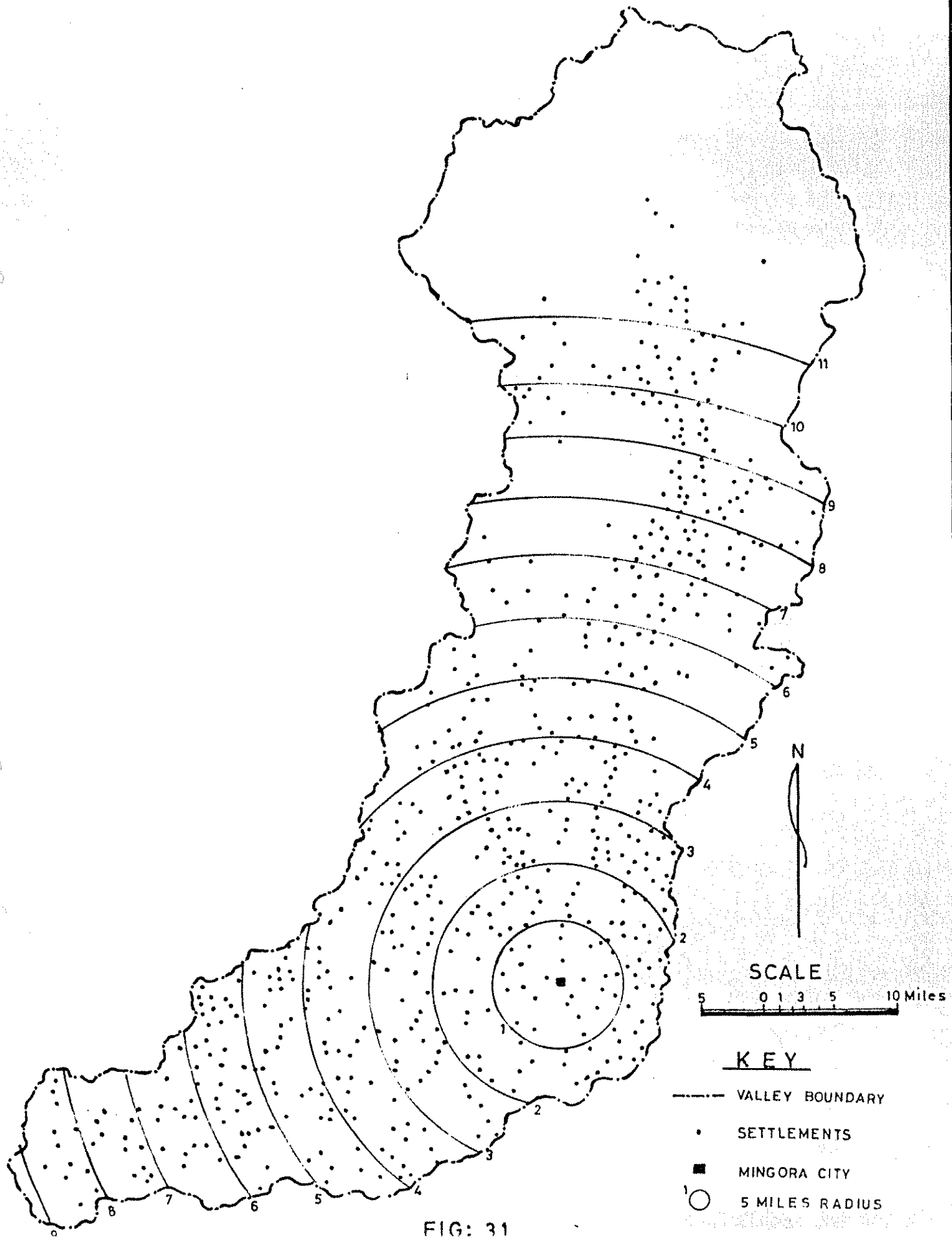


FIG: 31

It can be seen that like population, the settlement density also decreases as one moves away from Mingora upto the third zone. The pattern is disturbed in the fourth zone where it increases to reduce further in the fifth circular zone and then gradually declines. The high density of the fourth zone is due to concentration of large number of settlements. This is due to the availibility of large tract of cultivated land as can be seen in the analysis that has been given in the next section.

DENSITY GRADIENT OF CULTIVATED LAND: The gradients in intensity of cultivated land from Mingora has been worked out in this section and compared with the density gradients computed in the previous two sections. The analysis is based on the same concentric circular zones which were maintained previously. The proportion of cultivated land in total area (percentage) as well as the population/ cultivated land density have been calculated from the map (Fig.32) for all the zones and tabulated below:

TABLE 33

SWAT VALLEY: CULTIVATED LAND AROUND MINGORA 1981.

In concentric zones around Mingora (in miles)	Cultivated land (acres)	Proportion of cultivated land in total area(%age)	Population (1981)	Population/ cultivated land density
0-5	27353.6	7.4	1,00000	3.6
5-10	52076.8	13.9	1,10000	2.1
10-15	61651.2	16.6	95,000	1.5
15-20	62720.0	16.8	1,15000	1.8
20-25	51328.0	13.8	86,500	1.6
25-30	43436.8	11.6	70,500	1.6
30-35	23161.6	6.3	50,500	2.1
35-40	27980.8	7.6	47,000	1.7
40-45	16211.2	4.4	23,000	1.4
45-50	2438.4	0.6	11,500	4.7
50-55	3379.2	0.9	9,000	2.6
55-60	627.2	0.1	1500	2.4
Total =	372364.8	100%	719500	1.9

SWAT VALLEY

AGRICULTURAL LANDUSE GRADIENTS FROM MINGORA CITY (1981)

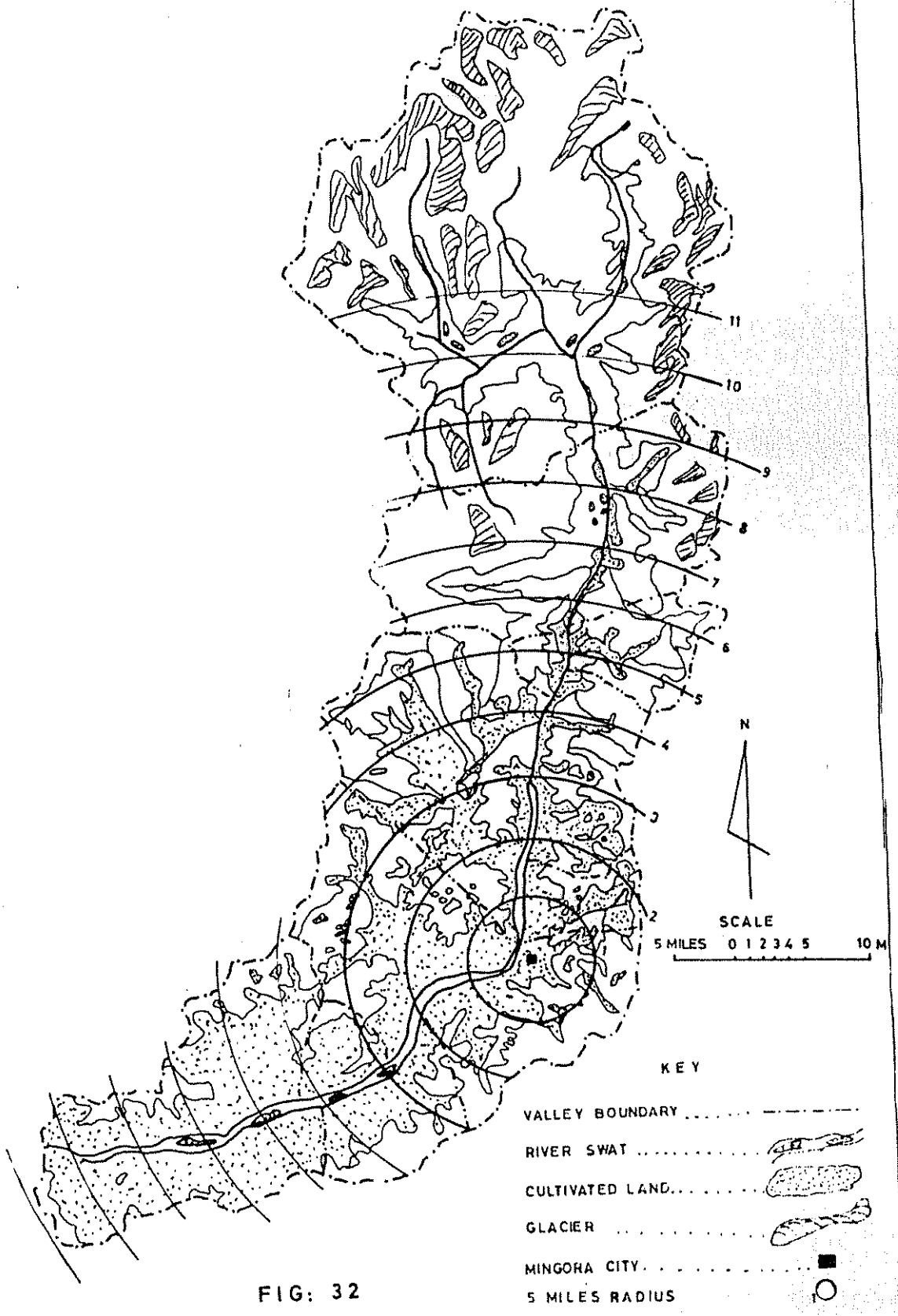


FIG: 32

It is apparent that the amount of cultivated land increases away the central zone till one reaches the fourth zone beyond which it gradually declines. Due to variation of population in the various zones, there is also variation in the population/cultivated land densities. The population/cultivated land densities have been further analysed by using chain based and fixed based methods and the results are given in table 34.

TABLE 34

SWAT VALLEY: DENSITY GRADIENTS AROUND MINGORA 1981.

In concentric zones around Mingora (in miles)	population/ cultivated land density (persons/acre)	comparative gradient by fixed base method	comparative gradient by chain base method
0-5	3.6	100.0	100.0
5-10	2.1	58.3	58.3
10-15	1.5	41.6	71.4
15-20	1.8	50.0	120.0
20-25	1.6	44.4	88.8
25-30	1.6	44.4	100.0
30-35	2.1	58.3	131.2
35-40	1.7	47.2	80.9
40-45	1.4	38.8	82.3
45-50	4.7	130.5	335.7
50-55	2.6	72.2	55.3
55-60	2.4	66.6	92.3

The table indicates that there is variation in the population/cultivated land density. This variation has been compared with the gross density gradients of population, settlement densities and proportion of cultivated land by each zone in the following table.

TABLE 35

SWAT VALLEY: GROSS DENSITY GRADIENT AND PROPORTION OF CULTIVATED LANDS AROUND MINGORA 1981.

In concentric zone around Mingora (in miles)	Gross population density	Gross settlement density	Proportion of cultivated land in total (%age)
0-5	1317.7	0.42	7.4
5-10	602.2	0.91	13.9
10-15	476.9	0.96	16.6
15-20	496.4	0.98	16.8
20-25	391.7	0.66	13.8
25-30	375.1	0.54	11.6
30-35	319.4	0.41	6.3
35-40	278.5	0.33	7.6
40-45	149.7	0.31	4.4
45-50	104.0	0.29	0.6
50-55	76.4	0.21	0.9
55-60	2.6	0.02	0.1

The table suggests some relationship between population density, settlement density and intensity of cultivated land for all the concentric zones around the city. The precise correlation between these variables has been given in table 36.

TABLE 36

SWAT VALLEY: CORRELATION VALUES BETWEEN DENSITY GRADIENTS AROUND MINGORA CITY, 1981.

	Population density	Cultivated land ratio	Settlement density
Population density	1	-	-
Intensity of cultivated land	0.45	1	-
Settlement density	0.42	0.94	1

The table indicate a much closer relationship between settlement density and intensity of cultivated lands compared with other variables.

The F test[1] used for finding the significance of correlations between the variables revealed the results given in the next table.

TABLE 37

SWAT VALLEY: F-CALCULATED VALUES FOR CORRELATIONS, BETWEEN DENSITY GREDIENTS AROUND MINGORA CITY 1981.

	Population density	Cultivated land ratio	Settlement density
Population density	-	-	-
Cultivated land ratio	2.53	-	-
Settlement density	2.14	75.91	-

These calculated values have been compared with F-tabulated values of 4.96 and 10.04 at .01 (1,10) and .05 (1,10) levels of significance respectively. The larger value of F (75.91) suggest that the correlation between settlement density and intensity of cultivated land is much more highly correlated than the rest of variables.

POPULATION POTENTIAL: The study of population potential provides insight into the spatial activity patterns in the context of potential surfaces; which are an important tool in the analysis of areal distribution. It is also a valuable indicator of Geographical variations of socio-economic phenomena and can also serve as a basic tool in various types of plannings.

The population potential of a settlement may be defined "as the measure of the nearness of people to a settlement". It can also be defined as a measure of general accessibility or as a measure of human influence at a distance. In population potential, the accessibility

is inversely proportional to distance^2. The population potential has no spatial direction and is, therefore, a scalar quantity. At a given settlement, the population potential is the sum of the reciprocals of the distances of all settlements from the settlement. With the help of population potential, the discrete distributional data is generalized by converting it, at an abstract level, into a continuous distribution. The highest potential of a settlement indicates the core of activity of a settlement. The population potential Pj of a settlement "J" is calculated by the following formula.

$$\sum_{i=1}^{N} \frac{M_i}{d_{ij}}$$ Where M_1 is the population at the ith settlemer

$i = 1$ ($i = 1,2,3,4, \_\_\_\_\_ N$) and d_{ij} is the distance between settlement 'i' and 'j'.

The population potential P_j of a settlement can also be calculated by the following formula which is an

adoptation of the above formula.

$$P_j = \sum_{i=1}^{n} \frac{(P_i)}{(r_i)}$$

OR

$$P_j = \frac{P_1}{r_1} + \frac{P_2}{r_2} + \frac{P_3}{r_3} \ldots\ldots\ldots\ldots \frac{P_n}{r_n}$$

This technique has been used to analyse the spatial interaction of settlements in the Swat Valley. For this purpose a generalized accessibility matrix was prepared for all the settlements which are linked with roads . The population potentials for all these settlements have been calculated and given in appendix IV, while the isopleths of potential (equipotantial lines) have been given in the Fig. 33 .

The results of potential surface indicate a highly localized spatial activity with most of the interaction concentrated at a few priviliged settlements. Mingora, due to its locational advantages as a central point and its

SWAT VALLEY

SPATIAL ACTIVITY PATTERNS: POPULATION POTENTIAL SURFACE (‰)

GENERALISED ACCESSIBILITY

(1981)

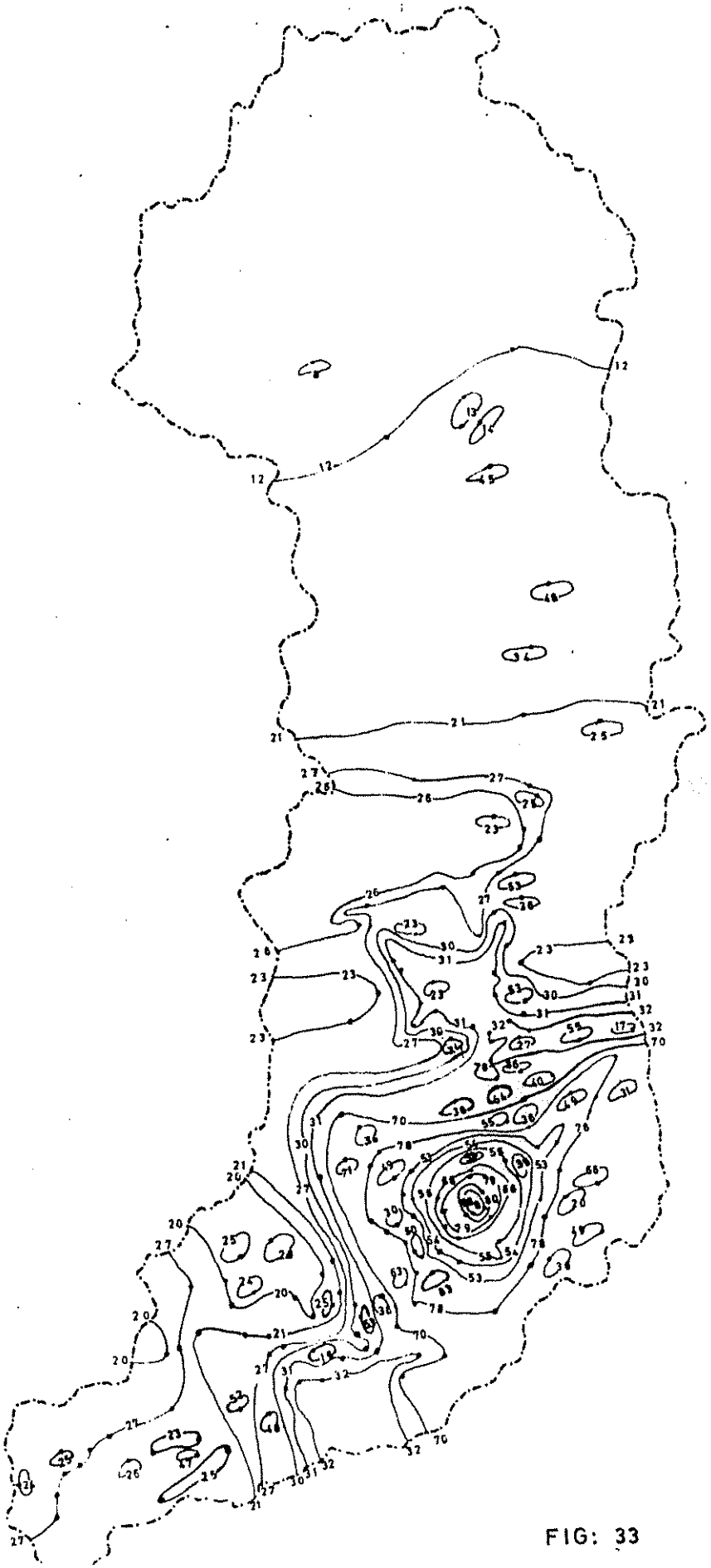


FIG: 33

SWAT VALLEY
EXISTING ROADS (1981)

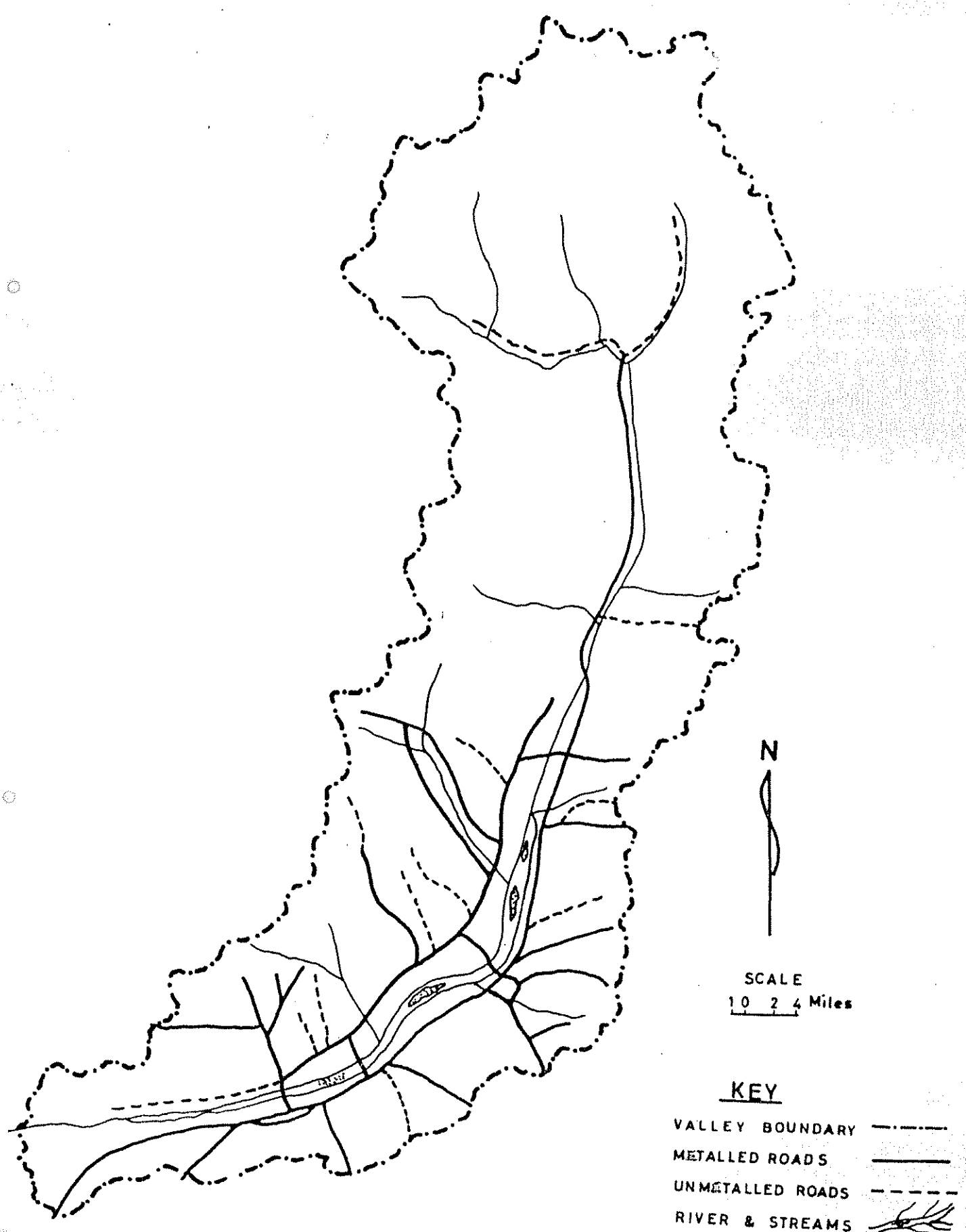


FIG: 34

functional characteristics has the highest population potential in the area and, therefore, maintaining a highest order of spatial activity around itself. Away from Mingora, the spatial activity (population potential) decreases and a stage is reached where the activity is the lowest, beyond which there is no spatial interaction.

The population potential or spatial activity pattern in Swat valley is largely influenced by physical and socio-economic environments. The physical environment of the mountainous parts has resulted into lack of an effecient transportation system which has consequently reduced the spatial interaction (Fig. 34).

Variation in the socio-economic environment of the valley has caused variation in the distribution and densities of population which has greatly in-fluenced the spatial interaction (Fig. 35).

SWAT VALLEY

POPULATION DENSITY BY TEHSIL (1981)

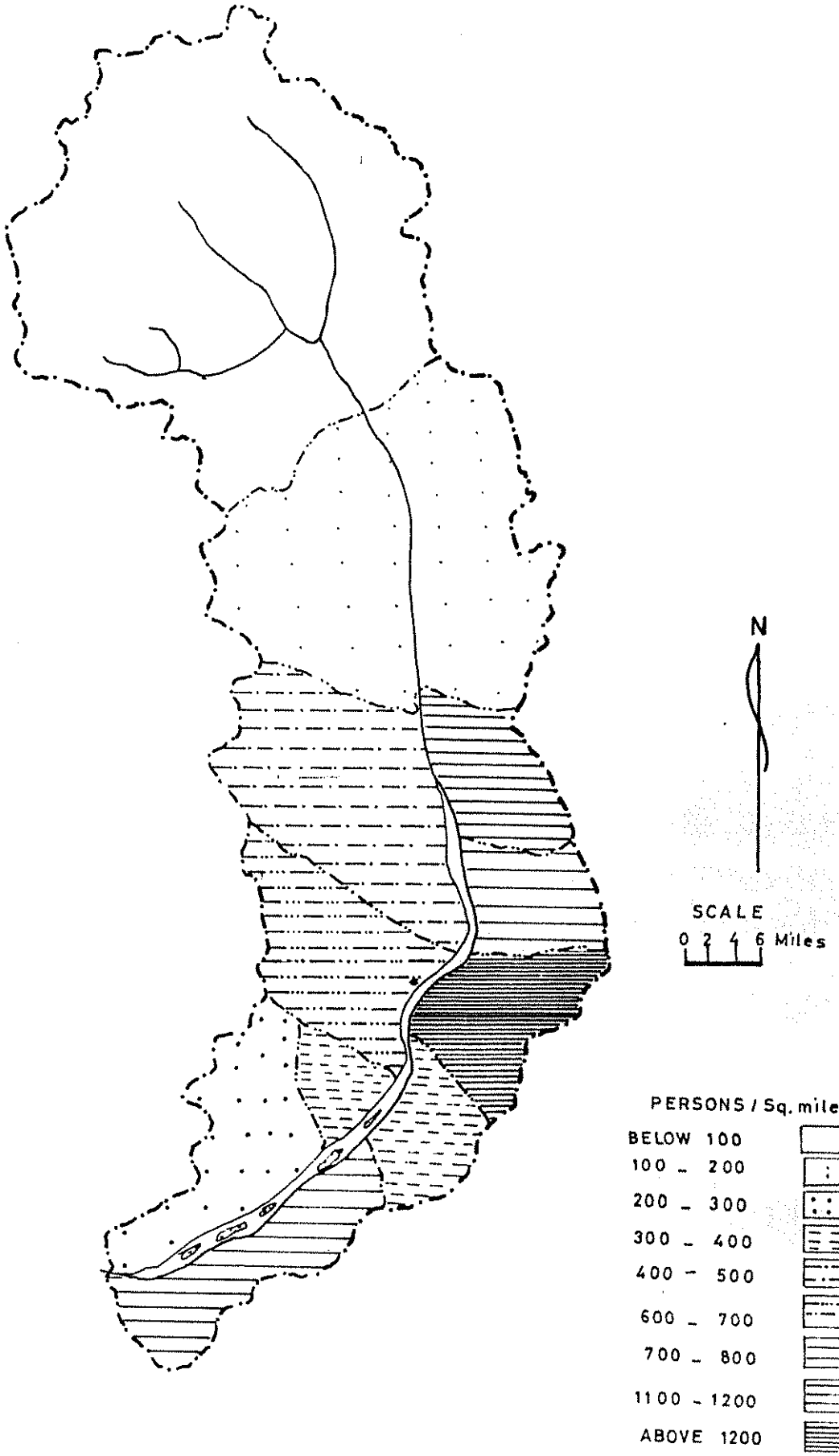


FIG. 35

From the map it is apparent that densities of population varies which is due to variation in relief and resources. The highest densities are concentrated to the lower middle of Swat valley, owing to the large amount of agricultural land and developed means of transport and communication.

REFERENCES: 1. Sher Mohammad Chaudhry (1982) "Introduction to statistical theory part II" PP.197-207. Ilmi Kitab Khana, Urdu Bazar, Lahore(Pak.).

2. John I.Clark,(1969); "Population Geography" p.36 Pergammon Press, Ltd. Headington Hill Hall Oxford 4 and 5 Fitzory square, London W I.

CHAPTER VII

PROBLEMS OF HUMAN SETTLEMENTS

The human settlements of Swat valley like any other area of Pakistan suffer from a number of problems. They are more acute in fural areas which suffer from poor housing conditions, lack of utilities and services, difficulty of access and poverty.

HOUSING: The rural houses are the product of their physical and socio-economic conditions. Out of the total 1,30,767 houses surveyed in the study area, 109807 or 84 percent were "Kutcha". Due to bad structural conditions, these buildings do not give good protection from vagaries of weather and in a number of cases they are unsafe for human living. Rainy season is particularly hazarduous for "Kutcha" houses and collapse of walls during rain is a common phenomenon. Seepage from roof also occurs frequently. Many a times, the termite ridden wooden beams used in roofs or supporting columns collapse, causing fatal accidents

and loss of human life.

Due to poverty, a major part of the population cannot afford to construct big houses and five in rooming or single room houses. In winters cattle ~ live under the same roof with human being and the prevailing unhygienic condition results in such type of diseases, as tuber-culosis.

LACK OF SERVICES: The necessary services which are required in rural settlements are; schools, dispensaries, hospitals, banks, post offices, recreational facilities etc. The nature of availability of these and other services in the settlements of the area as assessed from a field survey has been given in table 38.

TABLE 38

SWAT VALLAY: FREQUENCY OF OCCURENCE OF SERVICES IN HUMAN SETTLEMENTS, 1981.

Type of service	Availability by number of settlements
Primary School for Boys	230
Primary School for Girls	106
Middle School for Boys	55
Middle School for Girls	10
High School for Boys	48
High School for Girls	4
College for Boys	2
College for Girls	1
Post Offices	47
Civil Hospitals	11
Telephone Offices	14
Police Posts	55
Police Station	11
Dispensaries	73
Maternity Homes	19
Offices of the Deptt. of Agriculture	17
Co-operative Offices	17
Banks	53

Source: Field survey.

The table shows that the lower order services are present in large number of settlements but higher order and even some of middle order services exist in a very few settlements. Thus high and middle schools for girls, are present in only fourteen settlements. Like-wise, only forty eight settlements have high schools for boys. Similarly post offices exist in only forty seven villages. The situation, over all gives a dismal picture of services that exist in the human settlements of the valley.

UTILITIES: The position of utilities is no better. Water supply, sewrage and drainage as well as domestic energy supplies offer acute problems. About half of the settlements get their water supply from canals or streams and another twenty percent get it from springs. Less than three percent of the settlements have domestic connections by tap although not in each house (Table 39).

TABLE 39

SWAT VALLEY: WATER SUPPLY SOURCES BY SETTLEMENTS, 1981.

Water supply source	Settlements	
	No.	%
Taps in houses	22	1.9
Community taps	29	2.6
Community wells	116	10.4
Wells in houses	234	21.2
Canals/Streams	480	43.3
Springs	226	20.4
Total	1107	100.0

Source: Field survey.

Water of these streams/canals is extreamely muddy and unhealthy due to release of demestic waste into it. It is suggested that storage tanks may be constructed in the settlements and water should be brought from the streams to these tanks for ensuring continuous and clean supply of water throughout the year.

Drainage and sanitation is almost non-existant. Only three percent of the settlements have a drainage system. Even here most of the drains are "Kutcha". In majority of cases, the waste water is released directly to the streets. Similarly many a times dung is dumped on the streets in front of the houses. The conditions become worse during the rainy season when the streets become heaps of mud.

The principal source of fuel is the biomass while the main source of illumination is kerosine oil. Electric supply exists in about one third of the settlements. The whole of Kalam tehsil and major part of Bahrain tehsil, quiet attractive from tourism point of view, lack in hydro-electricity.

In some villages of Bahrain, Kalam and Matta tehsils, people have small hydel power plants, installed on the nearby streams. Some people use generaters, run by petrol for getting electricity. The data regarding electric supply to settlements is given in the following table.

TABLE 40

SWAT VALLEY: ELECTRIC SUPPLY SOURCE 1981.

Electricity source	Number of settlements
Transmission from main grid	389
Small hydel plants	6

N.B: In Kalam a high powered electric generater is nearing completion.

ACCESSIBILITY: It has already been stated that if one counts even isolated farmsteads and small cluster of houses as settlements, then there are a total of about 1109 settlements in the study area. Out of these, only 164 are connected by metalled roads while 945 or about 85% are without metalled roads. One can get a good idea of their respective distances from the metalled road from the following table.

TABLE 41

SWAT VALLEY: DISTANCES OF HUMAN SETTLEMENTS FROM THE METALLED ROAD, 1981.

Distance from mettaled road (in miles)	Number of settlements
1-2	358
2-4	273
5-6	110
7-8	86
9-10	60
11-12	20
Above 12	38
Total	= 945

Source: Field survey.

The table indicates that majority of the settlements are not very far from the metalled roads and by paving short strips of the existing "Kutcha" roads they can be linked with the net work of metalled roads .

The problems of the city of Mingora are also common with other medium size towns of Pakistan. They include:

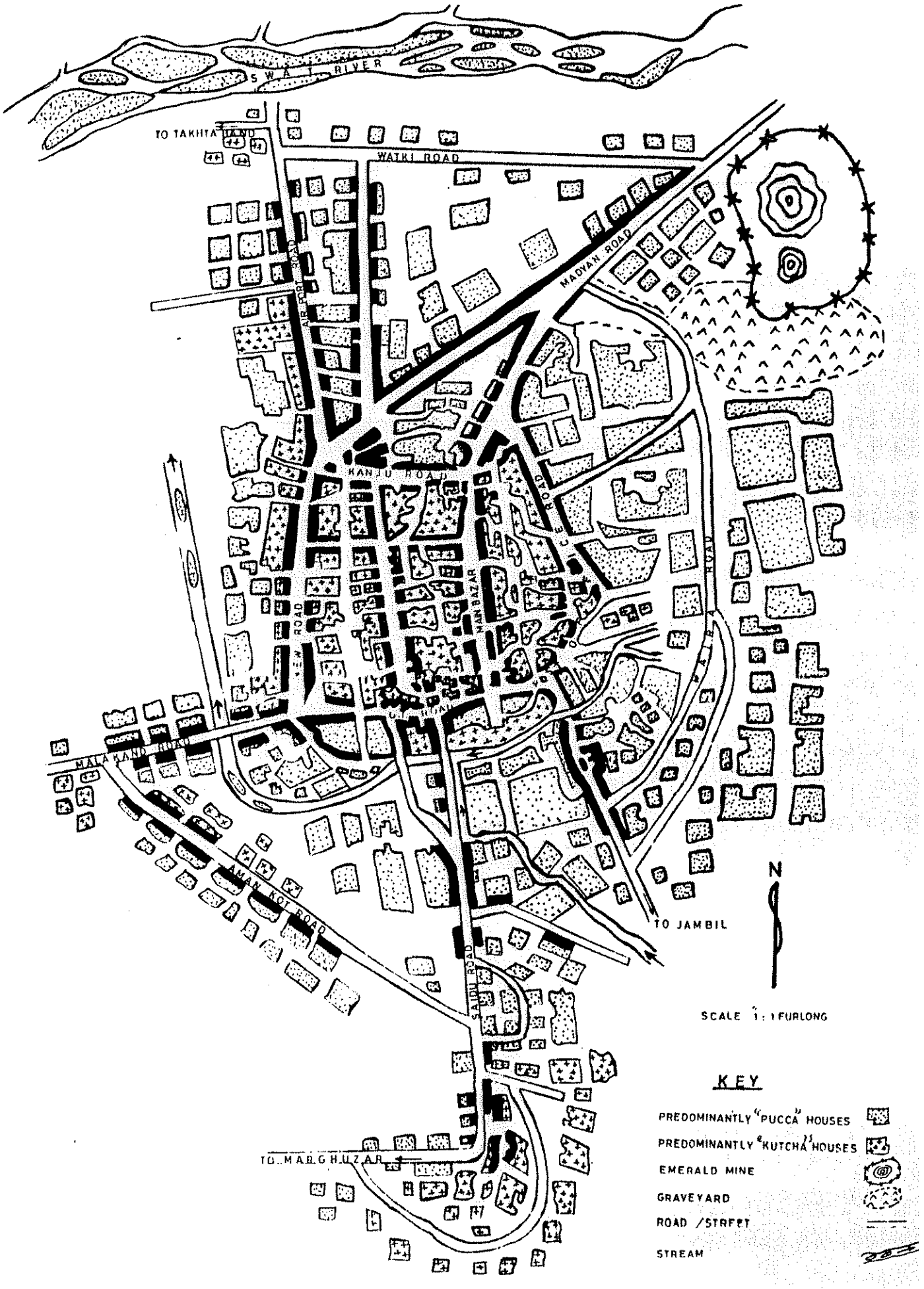
STRUCTURAL CONDITION OF BUILDINGS: As pointed out earlier Mingora was in the form of a small agricultural village in 1917. It contained 300 houses, 6 Mosques and 14 Shops and occupied both the Western and Eastern portion of the present main bazar. The Eastern portion between the main bazar and the present post office road belonged to the Ex-ruler of the state and his dependents while the Western portion was owned by the local population. The "Wesh System" of re-distribution of land and villages and ownership of the housing units of the ruler had therefore, resulted into the "Kutcha" structural conditions in the

majority (80%) of these houses which are more than 100 years old.

From 1917 to 1951, the housing units increased from 300 to 4650 and comprised 4500 (96.81%) "Kutcha" and 150 (3.2%) "Pucca" houses. The pucca houses are those of the elites and are situated towards the West of the Main Bazar. In the next 10 years between 1951 to 1961, the houses increased to 7580 (63.2%) and comprised 6100 (0.05%) "Kutcha" and 1480 (19.5%) "pucca" housing units. In this period the Pacca houses increased comparatively and occupied the fringe of the 1951 built-up area. The period between 1961-72 saw tremendous increase in housing stock of Mingora from 7580 to 15868 (109.4%). They comprised 7544 (47.5%) "kutcha" and 8324 (52.5%) "pucca" houses. The new construction occupied the peripheral site of 1961 built-up area. From 1972 to 1981 the housings units increased to 19430 (22.5%) and comprised 8678 (44.7%) "kutcha" and 10752 (55.3%) "pucca" houses. The new construction occured in the form of nuclei surrounding the 1972 built-up area. All this indicate that

the original residential area of the city has predominantly "kutcha" houses which are more than one Hundred years old. Similarly the settlements or nuclei of Saidu, Nawakili, Butkadda (Gulkada), Panr and Rahim Abad which has been merged into the city in 1976, also possess predominantly kutcha houses which are also more than a Hundred years of age (Fig. 36). All these oldest and "kutcha" houses in the central part of the dity as well as in the surrounding nuclei present a miserable picture of poverty, decay and poor maintainance. These kutcha houses are mostly made of stone, mud and wood and due to decay and poor condition, have turned to be very dangerous to live in. The inhabitants of these areas are poor and mostly rental (e.g. Saidu Sharif and Bacha Sahib Mohallah in Mingora) and therefore, unable to maintain their kutcha houses. The situation is therefore, getting on deterioration day by day. Many people from these areas, who can afford to build new houses, prefer to leave the site and settle at or near the newly developed business or commercial centres along with the

MINGORA : STRUCTURAL CONDITIONS OF HOUSING 1981



radiating road. It is obvious that, if the condition prevails, the core as well as the merged nuclei of Mingora would turn into the worst localities in the area. Therefore, these houses should be demolished and re-constructed according to the modren needs. As the Owners are poor, the schemes can be undertaken through some co-operative housing society, subsidised by the Government. Such a scheme is long need for an overall renovation and immprovement of Mingora City.

OVER POPULATION: The population of Mingora city is increasing at a tremendous rate of 10.26% annually. It is due to the functional characteristics of the city which play a major role in the economic developments and therefore, the people are migrating to the city primarily for response to economic motives. The city also offers the specialized public utility services to attract people from various parts of the valley and the country. The increasing growth of population has created the varied moral and social problems and greatest housing shortage. This increase in the population

has resulted into increase in the household size from 2.4 in 1972 to 4.5 in 1981 as well as increase in the room density of the city from 0.9 persons in 1972 to 1.8 persons in 1981. Therefore, the rural-urban migration should be checked so that the city is saved from the population in-flow at the present alarming numbers.

UTILITIES: An urban settlement should be provided with sufficient facilities of health, education and recreation. Mingora city, though possess some of these functions but they are on the one hand insufficient and on the other, they are placed in a haphazard manner. For example, the schools are confined to the old city and old nuclei recently merged into the city. They are lacking in the newly developed nuclei. Similarly, the health services and play grounds are concentrated in the south of the city while in the rest of the city, they are almost nonexistant. The two Cinemas are also located in the Northern part of the city near each other. Like-wise, all the offices of administrative machinery for the district, provincial and national levels

are concentrated in the Southern part of the city. Therefore, these functions should be developed according to the needs of the city in the light of modern planning principles.

The poor supply of fresh drinking water is another problem in Mingora city. There are seven tube wells which are not sufficient for its population. On the basis of the field survey, it has been found out, that 60% of the households have the facility of piped drinking water, 30% inside the house and 30% obtain it from outside the house from the common stand posts. Only 3% of the households obtain water from hand pumps which are mostly within the houses while the rest of 37% households obtain it from well, spring, or stream. For this purpose more tube wells should be constructed by the Government for the continuous and regular supply of water to the increasing population.

The sanitary and hygenic conditions are unsatisfactory inside the city. According to field survey, only 10% houses have lyvatorines with flush systems and

2% houses have lyvatorines with deep pits. The rest 88% houses dump their refuse in the open places (Derans) in front of their houses. Therefore, there are heaps of garbage and disposal in front of each house and near the edges of the streets because of lack of proper arrangements for the disposal and collection of these wastes. Therefore, the inhabitants should be educated and motivated to construct deep pits in their houses for the garbage and refuse disposals.

The drainage and sewrage conditions are very poor in the city of Mingora. About 70% of the drains are "Kutcha", open and form the dirtiest lines throughout the city. The sewrage from houses is mostly "kutcha", open, and come to the streets freely and creating huge problems for pedestrians. In some areas they have caused the problem of water logginge.g. central part of the original city where stagnant pool of water can be found frequently.

IRREGULAR DISTRIBUTION OF URBAN SERVICES: Urban services in Mingora like other medium size towns and cities of Pakistan manifest glaring inconsistancies and contradictions. On the one hand, there are pockets of post areas with plots even as big as 10 kanals serviced with high standard of infrastructure and community facilities such as regular water supply, roads, sewrage and refuse disposal and health facilities etc. On the other hand majority of the urban population are forced to live in the most overcrowded condition with oppressive and dangerous living environment with out good water supply, sewrage, drainage and other services which are essential to human existance. There are a number of reasons for the present skewed distribution of services, but most important of these is economic one. In Mingora, there are living two types of peoples, rich and poor. The rich are the industrialists, land lords and businessmen, while the poor are landless labourers and servicemen. Due to this class difference, there are differences in the distribution of urban services i.e. the high class residential areas are concentrated

in the outer fringe of the old city in the form of nuclei. These areas have "Pucca" building conditions and contain abundant of the Municipal facilities.

In Mingora city there is also an irregular distribution of commercial facilities. Some areas (e.g. Main Bazar) have majority of multifunctional shops and Banks, while other (e.g. Rahim Abad, Amankot, Nawakili etc) lacking such facilities. Similarly the wholesale and retail market of furits, vegetables and meat are concentrated at one part of the city (Main Bazar) which creat great problems of accessibility. It would be advisable if these markets and "Mandis" are shifted to the fringe areas where they are easily accessible. The present retail and wholesale shops should be distributed in order of a hierarchy offunctions. If at least the specialized functional shops are shifted to the big villages, then the flow of people to the city would be considerably checked.

PROBLEMS OF TRAFFIC AND PARKING IN THE CITY: The city of Mingora has developed a highest nodality in the area and is linked with most parts of the valley and country by an excellent transport net work. Due to this function, the great bulk of the whole traffic passes through the city. There are tweleve automobile stands from which Buses, Wagons, Suzukie, Vans, Reckshaws go to various parts of the valley and country. On the basis of field survey it has been found out that the frequency of Buses daily running between Mingora and Peshawar, Rawalpindi, Lahore and Karachi are given in the following table.

TABLE 42

MINGORA: BUS SERVICE WITH BIG CITIES OF PAKISTAN, 1981.

City	Number of Buses (Govt. Transport services).	Number of Buses (Public Transport services).
Peshawar	40	80
Rawalpindi	3	10
Lahore.	5	4
Karachi	-	5

Source: Field survey.

In addition to these services, there are 175 buses, 460 suzukies, 98 wagons, 242 reckshaws and 65 tongas which run daily between Mingora and its hinterland in the Swat valley. This creates a great problem for traffic flow and parking in the city. To solve this, alternate roads outside the city should be constructed so that part of the flow can be diverted.

Moreover, inside Mingora there are many streets which are narrow, zigzag and without proper layout. They are mainly confined to the central oldest part of the city. These streets are mostly without lights and plunged into dreadful darkness during the nights. The streets flowing is also "Kucha" and majority (90%) of them lack "Pucca" drains for passing water through them. Thus during the rains these streets turn into pools of mud and cause great difficulties to the local population and tresspassers. Such areas are scars on the face of Mingora.

PROBLEMS OF POLLUTION AND UNDESIRABLE LOCATIONS: As stated earlier different type of vehicles e.g. Buses, Trucks, Wagons, Cars, Rickshaw etc run through the city roads and big streets in thousands every day and release pollutants in the form of fumes,dust etc. Thus the atmosphere is polluted day by day like other cities of Pakistan. Similarly, the free release of horse refuse from tongas, make the roads dirty with dirty smell as well as contribute to tetanus disease during injuries. Moreover, along the streets and unused lands inside the city, there are found a lot of slums which is an undesirable situation. The localization of industries inside the city make the situation undesirable and polluted as they creat noise. In Mingora some of the silk mills, cotton mills and furniture industries are localized inside the city and some along the roads which creat noice and problems for the city. Similarly the automobile stands, located inside residential and commercial areas, are also undesirable as they generate too much traffic and noice. Therefore, it is advisable to shift them into vacant lands occuring in the fringe of the city.

The industries should also be shifted to the fringe of the city, like many others which have recently been constructed away from the central city.

BARRIERS TO SETTLEMENT GROWTH: The settlement of Mingora is growing rapidly both demographically and spatially. It is growing towards the South West and South East, where land for construction is available along the hill slopes. The river Swat towards its north, the agricultural land towards its west, the graveyards and emerald mine towards its North East are at present proving barriers for its growth.

To conclude, it would be advisable if some measures to check these problems are taken before the condition become worse.

PERCEPTION OF PROBLEMS: A survey was conducted to find out peoples perception of pressing problems in human settlements. The priority rating of these problems have been given in table 43.

TABLE 43

SWAT VALLEY: RATING OF SETTLEMENT PROBLEMS BY VILLAGERS, 1981.

Problems	Number of settlements	Percentage
Lack of transport	945	85.2
Lack of electricity	650	58.6
Lack of water supply	734	66.2
Lack of fuel supply	584	52.7
Lack of housing	558	50.3
Lack of sanitation	1091	98.4
Lack of merketing	1007	90.8
Lack of health facilities	790	71.2
Lack of education facilities	616	55.5
Lack of post offices	648	58.4
Lack of telephone facilities	413	37.2
Lack of police station	443	39.9
Lack of employment	412	37.1
Lack of others	14	1.2

Source: Field survey.

A question was asked regarding the satisfaction of people with their living environment. The inhabitants of only 13 settlements were satisfied, while those of 1096 settlements were dis-satisfied. The reasons for their dis-satisfaction are shown in the followingt table.

TABLE 44

SWAT VALLEY: REASONS OF DIS-SATISFACTION WITH RESIDENTIAL ACCOMMODATION, 1981.

Reasons	Number of settlements	Percentage
Non-availability of building material.	144	12.9
Un-satisfactory housing condition	369	33.2
Poverty	104	9.3
Diseases	10	0.9
Un-employment	412	37.1
Others	10	0.9

Source: Field survey.

The table shows that majority of the inhabitants are dis-satisfied due to their un-satisfactory building conditions and non-availability of building materials. This means that majority of the houses are "Kutcha". This is due to the traditional and socio-economic conditions of the inhabitants.

The above mentioned problems require immediate attention, otherwise they will become un-soluble in the future. This can be done by the Department of Regional Planning in consultation with the opinion of the local people and the immediate physical environment of the area. The social welfare department should develope institutions which can be able to improve the sewrage, drainage and sanitation conditions of the Rural Settlements. These institutions should be headed by members from the union or district councils or other important persons of the settlements.

SUMMARY AND CONCLUSION

This study on settlement pattern in Swat valley reveals that the area had been settled since the proto-Historic times (2400 - 1300 B.C.). The evolution of this pattern in the area can be divided into four distinct phases; the incient most, the ancient, the medievel and the modern phase. The first phase began in the year 2400 B.C and lasted till 323 B.C. Human habitation during this period started in caves. One example of such a cave still exists near Ghalegai village. These cave settlements were followed by development of regular villages which perhapes originated due to introduction of agriculture. Overall fifteen such ancient settlements-eleven in the Swat basin and four in the Kohistan area have been excavated so fer.

The second phase in the evolution of settlements started in the year 324 B.C. with the dawn of Buddhism and continued till 1023 A.D. During this period the valley became

a major centre of Buddhism when about fourteen hundred monasteries were established. Many of these attracted pilgrims from far flung areas, a by product of which was the promotion of trade and commerce in the region. It is estimated that about 29 new settlements were established during this period.

The 3rd phase in the evolution of settlements began with the invasion of Swat Valley by Sultan Mahmood Ghaznavi in 1023 A.D. It lasted till 1928 A.D. This phase is important for the initiation of "Wesh" system that involved periodic redistribution of lands and villages amongst the people of the area with mass shift of population from one village to another. The system perpetuated for a long time and contributed greatly to the emergence of nucleated setlements in the area. About 145 settlements originated during this period.

The fourth phase in the evolution and diffusion of settlements marks the abolition of "Wesh" system of

villages in the year 1929 and continues to the present. A strong political administration took shape during this phase with the foundation of Swat State. The peace and tranquility of the period along with progress in economy contributed to a large construction of new settlements which numbered 920. The total number of settlements in Swat valley at present is 1109. This of course includes isolated dwelling units with names, farmsteads, small cluster of houses or hamlets, as well as large nucleated settlements. The last category includes 232 settlements or 20.96 percent of the total.

An investigation of place names show that 24.8% of the settlements have been named as local language usage, 22.5% have been named after some local features of the site, 18.8% after their founder, 7.3% on the basis of the settlements shapes. Among the remaining, 5.2% have been named after the names of the tribe, 13% are the holy names while 2.4% have been named by the ruler or local chieftain. The nomenclature of 16.0% villages is not known.

The study of distribution and size of settlements indicate that small settlements with less than 500 people are predominant in the area accounting for 73.76% of the total settlements. About a fourth of the remaining settlements are large and nucleated. The pattern of distribution and size of settlements in the area has been affected by physical, social as well as economic factors. Amongst physical factors the most important are the altitude, land resources and water supply. The altitude exercise one of the strongest effect. The valley varies in relief from 1900 feet in the south west to 20,528 feet in the North east. Majority of the settlements (65.73%) are confined to areas located below 5000 feet near the banks of river Swat and its tributaries on the raised alluvial terraces and fans. They are of comparatively large size due to fertile and agriculturally rewarding nature of soil and developed means of communication. The remaining 34.25% settlements lie above 5000 feet on less fertile area of mountain slopes occasionally covered with forest or grass-land.

The availability of water is another major factor influencing the distribution of settlements in the area. More than half (56.8%) of the settlements are located at a distance of one mile or less from a stream. Similarly 62.9% of the settlements are located less than a mile from canals which have been taken out from streams to irrigate agricultural land. This indicate that majority of the settlements have access to water supplies from canal or stream.

The shapes of settlements in the valley are quiet diversified. One find varied geometric shapes ranging from compact rectangles and squares to settlement ribbons (linear) as well as cruciform villages. Many settlements have fragmented shape while twin villages are also common.

The settlement typology and size interm of population also display great variation in the area. Accordingly, they have been classified into six categories i.e. the isolated huts, bandas, small, medium, large and very large villages. Huts are very small temporary seasonal

settlements of nomades which occur in pastures at high altitudes. Bandas are dispersed hamlets along the hill and mountainous slopes accounting for 74.5% of the total settlements. Each banda has less than 500 population. Most of these are located away from roads. The small villages are settlements with a population of 500 to 1000 persons. They are also usually located away from roads and near springs or streams. The medium villages have a population range of 1000 to 5000 persons. They are mostly connected by roads and the shops occupy both sides of the roads. These settlements contain water mills, houses of the elites, shrines, graveyards, open cattlesheds and stagnant pools of water. The large villages have a population ranging from 5000 to 10,000 persons. They are all connected by well developed transport net work and have "bazar" along the main road. These settlements are in the continuous process of expansion. The new houses are usually constructed along arterial roads. In some cases these linear expansions are joining the neighbouring settlements e.g. Dewlai and Kalakili villages have joined each other with such expansion.

Sarsenai and Kabal, Aligrama and Hazara, Dheri and Kanju, Amankot and Rahimabad, Rahimabad and Qambar, Qamber and Balogram, Udigram and Gogdara are other examples of the fact. There are four very large villages, each having more than 10,000 population. They are located at nodal points and are the centres of trade and commerce, transport, health, recreation, education and administrative head quarter of tehsils.

The varied physical, social, economic and cultural factors have not only affected the size, form and internal characteristics of settlements but also the type and plan of houses in the area. Five major types of houses are found in Swat valley on the basis of cultural and economic groupings. They includes; Hut, Gujar, Pathan, Kohistani and Chieftan houses. The Huts have box shaped and are single room houses made of stone, wood and mud. They are for seasonal occupation found in the alpine pastures and other meadows. The Gujar houses are inhabited by a semi-nomadic cultural group called Gujars, who live in the mountainous and hilly parts of the valley. Their houses are simple,

usually with one room. The houses have no lawns and frontal boundary walls. The houses are made of stones, wood and mud. The Pathan houses are inhabited by Pathan tribes who live in the plains. These houses usually consist of one or more rooms with verandahs and lawns. They contain a cattle room and a guest room. Hearths and ovens are also found in such houses. These are mainly "Kutcha" building, made of stone, wood and mud. The dwellers of Kohistani houses are occupied by Kohistani tribes living in the hilly slope of Swat Valley above 3000 feet. They usually have double storey with two or three rooms and also have hearths and chimnies for exhaust. The houses of Chieftain are irrespective of the tribe, have their own individuality. They are larger in size, usually with two stories.

The houses in the area show some relationship to environment interms of building material e.g. In southern part of the valley, the walls are made of quartzite found in the vicinity of settlements e.g. Malakand, Batkhela, Chakdara, Thana etc; Walls in the houses of Udigram,

Gogdara, Manyar, Barikot, Ghalegai etc are made of slate. Similarly majority of the walls in Kohistan are made of pure wood or wood mixed with local sand stone.

The house plan which is the product of the natural, social, cultural and economic conditions of its inhabitant, reveals that there are both single and multiple room houses in the area. In single room houses men and animals live together e.g. Huts and Gujar houses are the examples.

Apart from house type some variation were also observed in the functional structure of settlements. The central place analysis brings out six grades of settlements with respective frequency of 2, 4, 15, 31, 49 and 131. The distribution of these centres do not confirm to the rigid hexagonal arrangement of christaller . The pattern of population growth of these settlements indicate faster growth in the higher grade centres.

Most of the central places are rural in character. Only one settlement has been defined as urban in 1981

population census. It is the Saidu-Mingora twin city which has resulted from the coalescence of two separate nuclei-Saidu, administrative town, and religious cum commercial centre of Mingora. The city emerged here due to initial locational advantages. Today, this urban complex is a district and divisional headquarter as well as focal point of commercial and civic functions of Swat district. The urban area got the status of a town committee in 1962 which was further raised to the status of Municipal committee in 1976. The city is growing rapidly both demographically and spatially. It has grown with an average annual growth rate of 10.26% during 1972-81 period, showing much fast growth than the urban growth rate of the North West Frontier Province (3.89%) as well as the nation (4.38%). Amongst other, an important factor contributing to this high growth rate was the extension of the city boundary due to which the area expanded three times from 7.32 to 20.0 square kilometers between 1972 and 1981. The land use study of the city reveals that out of the total 20.0 square kilometers area, 40% is occupied by residential

function, another 10% each by commercial and industrial function, 7.5% by Civic and administrative functions and 5% by green spaces. Of the remaining, 5% is occupied by roads and streets, 12.5% by agricultural land. 7% by vacant land and 3% by graveyards. The space within the city boundary is consumed rapidly by the built up area. This is particularly so in the south east and south west. With this trend continuous further extension in the city boundary is eminent.

The exercise on population potential in the valley brings Saidu-Mingora at the focal point, with concentration of spatial activity in the lower central parts of the valley. It is due to the concentration of large massess or density of population in these areas. Away from Saidu-Mingora, the spatial activity decreases and a stage is reached where there is no spatial interaction. The variation in population potential is the result of variation in relief, resources and transportation in the area. The spatial structure of the valley studied interms of population density, settlement density and intensity of

cultivated land from the focal point of Mingora city indicates that the population density is the highest (4403 persons per square mile) at Mingora and gradually declines with distance from the Urban area. The settlement density and the intensity of cultivated land also decline with distance from the city of Mingora. This indicate a spatial relationship between population density, settlement density and intensity of cultivated land around the city. The correlation between these variables suggest that there is close relationship between them. The test of significance for these variables also shows strong affinity between settlement density and intensity of cultivated lands around the city.

The growth of settlements in the valley untill now has taken place without planning intervention. As a result the settlements face multi-faceted problems and if this situation is not checked, their magnitude would increase several fold. Apart from lack of sanitation,

water supplies and energy sources, majority of settlements lack in basic services. The table 45 gives a general picture of the situation.

Other problems which need immediate attention are the problem of housing, transportation and uncontrolled growth. In order to solve these and other problems it is suggested thata physical planning board may be established to lookafter the human settlements and work for their improvement on modern scientific lines. In addition, it is imperative to create an urban development authority for stream-lining the growth of Saidu-Mingora urban complex, where maize of problems are emerging because of rapid urban sprawl.

TABLE 45

SWAT VALLEY: PRESENCE AND ABSENCE OF SERVICES BY SETTLEMENTS 1981.

Type of service	Present in Settlements		Not present in settlements	
	No	%	No	%
Primary school for boys	262	23.7	847	76.3
Primary school for girls.	112	10.1	997	89.9
Middle school for boys	55	4.9	1054	95.1
Middle school for girls	11	0.9	1098	99.1
High school for boys	54	4.9	1055	95.1
High school for girls	6	0.6	1103	99.4
College Inter/Degree for boys	3	0.3	1106	99.7
Colleg Inter/Degree for girls	2	0.2	1107	99.8
Post office	49	4.4	1060	95.6
telephone office	16	1.5	1093	98.5
Police post	47	4.3	1062	95.7
Police station	12	1.0	1097	98.9
Dispensary	75	6.8	1034	93.2
Maternity centre	21	1.9	1088	98.1
Agricultural office	17	1.5	1092	98.5
Cooperative	17	1.5	1092	98.5
Bank	103	9.3	1006	90.7
Cinema	1	0.1	1108	99.9

Source: Field survey.

APPENDICES

APPENDIX I

UNIVERSITY GRANTS COMMISSION

FELLOWSHIP PROGRAMME

Project Titles: SETTLEMENT PATTERN IN SWAT VALLEY

Adviser: Dr. Mohammad Aslam Khan, Associate Professor, Geography Department, Peshawar University.

Enumerator/Investigator: Usman Ali, Ph.D. Scholar, Geography Department, Peshawar University.

QUESTIONNAIRE*

1. Name of the Village: _____

2. History:

(a) Date of period of origin of the settlement. _____

(b) Reasons for the origin of place name _____

3. Toporgraphy and Growth Potential:

(a) Site _____

(b) Nearest stream i. Name _____

ii. Distance _____

iii. Direction (North, South, East, West)

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*This standard questionnarie was drafted by Project Advisor for settlement survey in Peshawar as well as Swat.

(c) Nearest Canal i. Name _____

ii. Distance _____

iii. Direction _____

(d) What is the level

of underground/
sub Soil water _____

i. Satisfactory _____

ii. Water logged _____

(e) Any other special feature

i. Forest_____ Direction _____

ii. Swamp _____ Direction _____

iii. Paddi _____ Direction _____

iv. Any other _____

(f) Man made barrier to settlement growth.

i. Type of barrier _____

ii. Direction _____

4. Growth pattern:

(a) Physical Growth.

i. Pattern (ribbon, compact etc.) _____

(b) Name of the roads along which expansion of settlement is taking place.

i. _____

ii. _____

iii. _____

iv _____

(c) Type of development.

i. Planned _____

ii. Unplanned but systematic _____

iii. Unplanned & Haphazard _____

5. Economic Base:

(a) This settlement is:

i. An agricultural village

ii. Commercial Centre or Market place.

iii. An industrial centre.

iv. Transportation centre.

v. A military cantonment

vi. A religious centre

vii. Any other

6 Housing.

(a) Total Housing Stock in the settlement_____

(b) Type of structures:

i. Pucca _____

ii. Semi Pucca _____

iii. Kutcha _____

iv Purely Temporary _____

(c) When built

i. Pre 1947 _____

ii. Post 1947 _____

(d) Are the people setisfied with their residential Accommodation.

i. Yes _____ ii. No. _____

If the answer is "NO" then state reason

i._____ ii. _____ iii _____

(e) What is the No. of shelterless persons in the village/mohallah _____

(f) Has there been any Govt; or Institutional help for housing Scheme Yes _____ No. _____

If "Yes" then give the No. of houses constructed under the scheme _____ and state is it.

i. Govt. sponsored scheme _____

ii. Housing scheme sponsored by local body _____

iii. Semi Govt. and Autonomous bodies _____

iv. Self help or cooperative _____

(g) Does the village/mohallah have any future plan for house building:

Yes _____ No. _____

If 'Yes' then give the:

i. No of schemes _____

ii. Sponsoring agencies _____

iii. Total area _____

iv. No of houses to be constructed _____

(h) Give brief discription of the financial Facilities for housing construction:

i. Loan granted by Govt. to the individuals _____

ii. Loan granted by cooperatives _____

iii. Private loans (Banks etc.) _____

(i) How many houses have been constructed during the past five years in your village/mohallah _____

7. Migration Pattern:

(a) How many persons of your village/ mohallah during the last ten years left for (i) Abroad _____

a. Permanently _____

b. Temporarily _____

(ii) Urban employment to other cities or areas _____

a. Permanently _____

b. Temporarily _____

(b) How many persons came to live in your village/mohallah during the last ten years from some other (i) Village _____

(ii) Town _____ (iii) Mohallah in your own city _____

8. Municipal Facilities:

A. (a) Water supply sources.

i. Taps in houses _____

ii. Community taps _____

iii. Community well _____

iv. Any other _____

(b) Quality of drinking water _____

(c) No. of domestic connections of water taps _____

(d) Any further development programmes for water supply _____

B. (a) Electricity source (i) WAPDA _____

ii. Any other _____

(b) Electricity connections or percentage of electrified houses _____

(c) Any future programme for electrification _____

C. Sewerage and drainage.

(a) Present system of sewerage.

i. No system _____

ii. Open drains _____

iii. Close drins _____

(b) Condition of drains:

i. Katcha % _____

ii. Pucca % _____

iii. Good % _____

iv. Bad % _____

(c) Any other development project for sewerage/ drainage _____

9. Commerce:

Type of Markets in the Town:

(a) Whole sale markets (i) _____ (ii) _____

(b) Retail Markets (i) _____ (ii) _____

(c) Mixed Markets (i) _____ (ii) _____

A. COMMERCIAL ESTABLISHMENTS:

	Whole Sale	Retail	Whole sale-cum-Retail
1. Total number of shops in the settlement.	_____	_____	_____
2. Number of shops selling cloth	_____	_____	_____
3. Number of shops making/selling shoes.	_____	_____	_____
4. Number of shops authorised to sell medicines	_____	_____	_____

5.	Number of food shops	_____	_____	_____
6.	Number of shops selling general merchandise	_____	_____	_____
7.	No. of fertilizer shops.	_____	_____	_____
8.	Number of shops making/selling silver/gold	_____	_____	_____
9.	No. of agricultural implement shops.	_____	_____	_____
10.	Number of service establishments in the settlement.	_____	_____	_____
11.	Misc: shops	_____	_____	_____

B. INDUSTRY;

Type of Industry with employment.

i. Weaving _____ ii. Pottery _____

iii. Basket & mats _____ iv. Furniture _____

v. Any other _____

C. CIVIC INSTITUTIONS:

	Institutions:	Number
12	a. Primary school for boys	_____
	b. Primary school for girls	_____
13	a. Middle school for boys	_____
	b. Middle school for girls	_____
14	a. High school for boys	_____
	b. High school for girls	_____
15	a. College (Inter & Degree)for boys	_____
	b. College(inter & Degree)for girls	_____
16.	a. Post office	_____
17.	Telephone office	_____
18	a. Police post	_____
	b. Police station	_____
19.	a. Dispensary	_____
	b. Maternity/child welfare centre	_____
20	Cinema	_____
21	Office of the Dept. of Agriculture	_____
22	Co-operative	_____
23	Banks	_____
24	Any other	_____

D. COMMUNICATION PATTERN:

In the case of absence/inadequacy of certain institutions, where do the paople go for this facility?

			More Frequented:	Less frequented:
	25.	a. Primary school for boys	_____	_____
		b. Primary school for girls	_____	_____
	26	a. Middle school for boys	_____	_____
		b. Middle school for girls	_____	_____
	27	a. High school for boys	_____	_____
		b. High school for girls	_____	_____
	28	a. College for boys	_____	_____
		b. College for girls	_____	_____
	29	Post office	_____	_____
	30	Police post or station	_____	_____
3	31	a. Dispensary	_____	_____
		b. Maternity Centre	_____	_____
	32	Cinema	_____	_____
	33	Office of the Deptt. of Agriculture.	_____	_____
	34	Generally speaking, where do people go for employment outside the settlement:	_____	_____
	35	Where do people go for trading livestock outside the settlement.	_____	_____
	36.	Where do people go for trading agricultural product, Name of Mandi Mandi?	_____	_____

E. ACCESSIBILITY:

37	Is the settlement connected with any other place with any matalled road?	_____	_____
38	If not at what distance the matalled road lies?	_____	_____
39	Is the settlement connected with other places by railway?	_____	_____
40	If not, at what distance the railway station lies?	_____	_____
41	Number of buses touching this settlement daily in all direction?	_____	_____

F. PROBLEMS:

What are the most pressing problems of the village/mohallah? Water supply/Electricity/Fuel supply/Transport/Marketing/Education/Health/Housing/Sanitation/Other.

Signature of the Enumerator/Investigator _____

Dated _____

Appendex II;

SWAT VALLEY: Settlements by centrality scores 1981

Settlements	Centrality score	Settlements	Centrality score
GRADE I:			
Mingora	147	Shewa	31
Saidu Sharif	59	Fatehpur	31
GRADE II:		Charbagh	30
Thana	55	Dewlai	29
Batkhela	40	Hodigram	29
Chakdara	40	Totakan	29
Matta	40	Wuch	28
GRADE III:		Amankot	28
Barikot	38	Kityarai	28
Malakand	35	Kalam	28
Khwaza Khela	35	GRADE IV:	
Madayan	34	Derai Julagram	25
Kabal	34	Minglawar	24

Alladand Derai	24	Aspanr	16
Bahrain	23	Zarakhela	16
Khar	23	Shin	16
Bara Bandai	23	Parrari	16
Ghalegai	22	Mian Barangola	16
Kota	22	Dagai	16
Totano Bandai	22	Jambil	16
Qambar	21	Kokarai	16
Kanju	21	Badwan	15
		GRADE V	
Utroar	21	Rahim Abad	13
Ramora	21	Mutkanai	13
Balògram	20	Sakhra	13
Tindodog	20	Kotigram	13
Sij Banr	20	Ushu	13
Barshawar	20	Salampur	13
Gwalerai	19	Chuprial	13
Manyar	18	Biakore	12
Aboha	17	Chinglalai	12
Khanpur	17	Bar Sher Palam	12
Shahdheri	17	Khadak Zai	12

Tirate	12	Baidara	9
Nawikili	12	Biha	9
Sigram	11	B.Durush Khela	9
Sangota	11	Shalpin	9
Tall	11	Kuza Bandai	9
Khazana	11	Aligrama	8
Piran	11	Sambat	8
Kishamara	11	Ningolai	8
Qulungai	10	Banjot	8
Thirang	9	Shokhdara	8
Mankial	9	Peshmal	8
Dadahara	9	Mian Kote	7
Kamala	9	Gabral	7
Bandai	9	Gayai Mian Kili	7 7
Darmai	9	Kotlai	7
Khareral	9	Kala Kot	7
Bartana	9	Derai	7
Roringar	9	Samai	7
Dangram	9		

GRADE VI:

Alamgang	6	Sirsinai	5
Golikra	6	Jalala	5
Pirkili	6	Asharai	5
Kedam	5	Chelyar	5
Akhand Kili	5	Galooch	5
Dodigram	5	Kotanai	5
		Jura	5
		Shakardara	5
Dedawar	5	Gulibagh	5
Suigalley	5	Bamakhela	5
Usakai	5	Dardyal	5
Takhta Band	5	Qalagai	5
Kukrai	5	Shangwatai	5
		Pia	5
		Pajigram	3
Amlockdara	5	Dakorak	3
Tiknai	5	Butkada	3
Newikili	5	Guratai	3

Kuza Durush Khela	3	Baligram	3
Jarey	3	Gashkora	3
Gogdara	3	Shekhorai	3
Kallakili	3		
Amandara	3	Habatgran	3
Bazkhela	3	Asala	3
Shahgram	3	Nawagai	3
Ghureju	3	Topsin	3
Darulai	3	Manpitai	3
Ain	3	Shalhand	3
Shinkad	3	Baba Kili	3
Bayoon	3	Nasrat	3
Murghuzar	3	Doshagran	3
Batandar	3	Rorya	3
Guratai Abada	3	Alabad	3
Katkala	3	Nilagram	3
Kohai	3	Safal Bandai	3
Shamilai	3	Mangultan	3
Bandanr	3	Banfezghalai	1
Kachakot	3	Gunhatana	1

Qunj	1	Bandaswala	1
Malooka	1	Oghaz	1
Bijawara	1	Ganagir	1
Mian Kotee	1	Garasa	1
Tallang	1	Nagoha	1
Bandaisor Banda	1	Qalagai	1
Mutlai	1	Rambekay	1
Makad	1	Toha	1
Lalo Banda	1	Nimogram	1
Zingwala	1	Guratai Kandar	1
Shaltalo	1	Taleegram	1
Gujar Banr	1	Ali jana	1
Khamba	1	Kot	1
Mahak	1	Sair	1
Malooch	1	Chail	1
Ashar Banr	1	Ushuran	1
Tetai Wala	1	Banboo	1
Dalai	1	Ashar Banr	1
Aghal	1	Kuzsherpalam	1

Balasoor	1	Ketabut	1
Mohd Bagh	1	Mamdherai	1
Mian Bela	1	Kas-Kalam	1
Jehangir	1	Sarbala	1
Tarogai	1	Chamtalai	1
Lundai	1	Asharai	1
Najigram	1	Jano	1
Brampitai	1	Gujaro Amli	1
Mamrai	1	Sindpora	1
Tarran	1	Kuzshawar	1
Fazal Banda	1	Rangeela	1

Appendex III:

SWAT VALLEY: Size of settlements by population 1981.

Settlement	Population size.
Mingora	59336 (T.C.)
Batkhela	14045
Alladand Derai	14334
Saidu Sharif	12618
Thana	12329
Nawi Kili	7472
Chakdara	7283
Kanju	6936
Charbagh	6882
Dewlai	6876
Minglawar	6662
Madyan	6658
Wuch	6626
Derai-Julagram	6370
Koza Bandai	6270
Udigram	5985
Tirate	5628
Zara Khela:	5293

Bara Bandai	5134
Chuprial	5020
Kabal	5006
Khar	4940
Qambar	4911
Aligrama	4903
Shalpin	4798
Badwan	4752
Shewa	4676
Khwaza Khela	4652
Bara Durush Khela	4520
Ghalegai	4507
Kota	4467
Biha	4337
Kokarai	4260
Totano Bandai	4238
Aman Kot	4222
Khadak Zai	2090
Shin	3965

Baidara	3960
Dangram	3939
Sir Sinai	3931
Barikot	3927
Totakan	3905
Fateh Pure	3872
Sambat	3848
Kityarai	3860
Shangmatai	3574
Ghureju	3564
Kuz-Shamar	3524
Qalagai	3418
Bahrain	3376
Utroar	3375
Salam Pure	3347
Malakand	3300
Mingolai	3280
Aboha	3204
Dardyal	3154
Sij Banr	3112

Bar Shawar	3017
Shah dheri	3000
Sind Pora	2988
Dakorak	2926
Roringar	2888
Balogram	2878
Parrai	2872
Gujaro Amli	2860
Bartana	2836
Asharai	2860
Ushu	2800
But Kada	2792
Mian Barangola	2785
Chalyar	2777
Tindo dog	2768
Mian Kili	2760
Kharerai	2749
Galooch	2748
Kotanai	2738
Guratai	2664

Kotigram	2659
Kuza Durush Khela	2656
Darmai	2650
Jano	2645
Sakhra	2640
Jura	2638
Kotlai	2610
Ramora	2560
Shakardara	2556
Kala Kot	2490
Bandai	2483
Jaree	2476
Gwalerai	2470
Gogdara	2461
Manyar	2439
Matta	2438
Kala Kili	2346
Pia	2343
Asharai	2261
Chamtalai	2220
Amandara	2217
Dadav[illegible]	2208

Dherai	2193
Mutkanai	2185
Bazkhela	2180
Sarbala	2155
Samai	2108
Kas-Kalam	2100
Barsher Palam	2093
Shahgram	2067
Keta But	2018
Guli Bagh	1994
Mamdherai	1947
Bama Khela	1933
Shokhdara	1866
Alamganj	1863
Banjot	1840
Fazal Banda	1828
Tarran	1818
Pajigram	1797
Biakore	1770

Safal Bandai	1746
Jalala	1745
Nilagram	1740
Nawi Killi	1737
Tiknai	1725
Aspanr	1718
Chinglalai	1700
Rahim Abad	1668
Alabad	1665
Jambil	1651
Khanpure	1625
Manai	1599
Baram Patai	1592
Naji Gram	1585
Sangota	1570
Landaigarai	1557
Rorya	1556
Dosha gram	1540
Nasrat	1516
Babo kili	1508

Amlokdara	1487
Shal Hand	1484
Kukarai	1477
Takhta Band	1451
Garrai	1450
Tall	1434
Dada Hara	1425
Manpitai	1408
Torugai	1400
Usakai	1393
Pirkili	1391
Jehangir	1388
Mian Bela	1387
Topsin	1380
Khazana	1353
Mohd Beck	1335
Nawagai	1331
Dedawar	1322
Suigallay	1320
Kamala	1319

Balasoor	1300
Gabral	1280
Asala	1275
Habat gram	1261
Kuzsher Palam	1233
Piran	1207
Shekhorai	1199
Rangila	1192
Ashay. Bany	1181
Bamboo	1175
Bodigram	1166
Ushuran	1165
Kishawara	1160
Gashkore	1153
Golikra	1138
Shinkad	1137
Bayoon-Kokhnail	1133
Chail	1127
Sair	1113
Kot	1100

Alijana	1100
Kalam	1099
Taleegram	1073
Guratai Kandar	1069
Nimogram	1067
Thirang	1062
Toha	1060
Rambekay	1057
Qalagai	1037
Murghuzar	1030
Nagoha	1023
Garasa	1006
Ganagir	977
Akhund Kilai	969
Batandar	951
Mungultan	935
Qulangai	925
Oghaz	924
Bandaz wala	912
Aghal	900

Tetai wala	885
Guratai Abada	880
Delai	824
Ashar Banr	816
Katkala	807
Maloock	804
Mankial	755
Mahak	749
Khamba	743
Gujar Banr	720
Shaltalo	708
Zingwala	707
Lalo Banda	689
Makad	662
Kohai	650
Mutlai	635
Shamilai	625
Bandanr	611
Bandi Sar Banda	501

Tallang	475
Miankotee	457
Kacha Kot	440
Baligram	426
Bijawara	420
Malooka	381
Miankotee	378
Peshmal	360
Ain	311
Kodam	264
Sigram	254
Darolai	248
Qunj	244
Gumbatoona	178
Ban Fazghalai	45

Appendex IV;

SWAT VALLEY : Population potential 1981.

S.No.	Name of settlements	Population potential
1.	Mingora	120648
2.	Batkhela	47313
3.	Allahdand-Dherai	25258
4.	Saidu Sharif	55203
5.	Thana	48266
6.	Nawankili	101356
7.	Chakdara	52448
8.	Charbagh	78876
9.	Kanju	79305
10.	Dewlai	36392
11.	Minglawar	53130
12.	Madyan	25959
13.	Wuch	21712
14.	Derai-Julagram	25959
15.	Kuza-Bandai	59537
16.	Udigram	50262

17.	Tirate	23016
18.	Zarakhela	31524
19.	Bara-Bandai	55926
20.	Chuprial	23098
21.	Kabal	54653
22.	Khar	23280
23.	Qambar	79305
24.	Aligrama	66842
25.	Shalpin	23998
26.	Badwan	27128
27.	Shawar	21645
28	Khwaza Khela	31524
29	Para-Durushkhela	30875
30.	Ghalegai	78876
31	Kota	32602
32	Biha	27128
33.	Kukarai	78876
34.	Totano-Bandai	70181

35.	Amankot	80420
36.	Khadagzai	27128
37.	Shin	31524
38.	Baidara	31524
39.	Dangram	53130
40.	Sirsinai	49682
41.	Barikot	70141
42.	Totakan	27628
43.	Fatehpur	53212
44.	Sambat	32602
45.	Kityarai	21645
46	Shangwatai	30875
47.	Kuz-Shawar	23098
48	Bahrain	21645
49	Utroar	12502
50	Salampur	55962
51	Malakand	25959
52	Ningolai	55926

53	Aboha	31524
54	Sijban	31524
55	Bar-Shawar	23098
56	Shah-Derai	70141
57	Sindpora	31524
58	Dakorak	70141
59	Roringar	27128
60	Balogram	66842
61	Parrai	36392
62	Bartana	31524
63	Ushu	12502
64	Butkada	98342
65	Mian-Barangola	27128
66	Chalyar	53544
67	Tindo-Dog	36392
68	Khareral	31524
69	Galooch	78876
70	Kotanai	23098
71	Goratai	30392

72	Kotigram	27128
73	Kuza-Durush-Khela	31524
74	Darmai	26578
75	Jano	53544
76	Sakhra	27128
77	JUra	23098
78	Kotlai	78876
79	Ramora	27128
80	Shakardara	54653
81	Kalakot	27128
82	Bandai	32602
83	Jarray	26578
84	Gwalerai	26578
85	Gogdara	54653
86	Manyar	78876
87	Matta	32602
88	Kalakili	78876

89	Pia	26578
90	Amandara	23098
91	Dagai	78876
92	Derai	66852
93	Mutkanai	27128
94	Bazkhela	32692
95	Kaskalam	13880
96	Bar-Sherpalam	78682
97	Shahgram	27128
98	Gulibagh	40197
99	Bamakhela	31524
100	Shokhdara	31648
101	Alamgang	36392
102	Banjot	66842
103	Pajigram	54653
104	Jalala	32602
105	Nilogram	31524
106	Nawikili	36392
107	Tiknai	25959

108	Aspanr	28980
109	Chinglalai	31524
110	Rahim Abad	80422
111	Allah Abad	36392
112	Jambil	49682
113	Khanpur	20599
114	Pajigram	70141
115	Sangota	66842
116	Doshagram	27068
117	Amlokdara	70141
118	Kukarai	78876
119	Takhta Band	66842
120	Gorrai	20599
121	Dadahara	36392
122	Usakai	20599
123.	Pirkili	32602
124.	Topsin	17855
125	Khazana	25959
126	Nawagai	32602

127	Dedgwar	31524
128	Kamala	25959
129	Gabral	8422
130	Asala	53524
131	Habatgram	31524
132	Kuz-Sherpalam	78876
133	Piran	27128
134	Shekhorai	53544
135	Rangeela	21492
136	Bodigram	30875
137	Ushuran	13840
138	Kishwara	31524
139	Gashkore	27068
140	Ghail	25959
141	Kalam	14824
142	Talegram	53544
143	Goratai Kandar	78876
144	Nimogram	20599
145	Thirang	15482
146	Toha	40197
147	Marghuzar	78876

148	Nagoha	53212
149	Garasa	36392
150	Ganagir	78876
151	Akhund Kili	30875
152	Mangultan	40197
153	Qulangai	24233
154	Titai Wala	78876
155	Katkala	20599
156	Mankial	45442
157	Makad	78853
158	Kohai	20599
159	Shamilai	38019
160	Kalakhot	20488
161	Peshmal	45434
162	Kidam	34498
163	Sigram	38667
164	Gumbatoona	30959