Chapter 5

Type, Pattern and Morphology of settlements in the Rammam Basin

5.1. Introduction

Type of settlements imparts a clear insight about the relationship between settlements within a definitive space (Doxiadis, 1964). This also reflects the relationship of number of dwellings and number of sites (Singh, 2013, p.135). The study of Settlement Pattern marks out the geometric form and shape of the settlements which may be of different types (Singh, 2013, p.135). Morphology of settlements on the other hand gives clear idea about the layout, ground plan of the villages in relation to the surrounding environment. Study of morphology also provides clear idea about the arrangement of houses or hamlets resided by various cultural or social groups.

In this chapter type of settlements, pattern of settlements and morphology of settlements have been discussed in detail to understand the arrangement of hamlets within a specified administrative boundary called village or mouza, to understand the arrangement of houses and streets on a particular site and to understand the relationship of social groups residing in the hamlets respectively.

In this chapter attempt has also been taken to find out whether there is any relation between Function of Settlements (discussed in chapter 4) and Types of Settlements located in the basin under study.

5.2. Type of Settlements

According to R.Y. Singh (2013), "Generally speaking a settlement consists of two visible elements: (1) the man who is the dynamic one and is wholly responsible for the construction of second (2) the static forms". This static form of the settlements includes their own size, shape, form, layout, types and patterns depending upon physical and cultural background of the settlement (Singh, 2013, p.134). The various elements of the settlements located on various physical backgrounds have been studied by various scholars since the latter half of the twentieth century. Among the above mentioned elements type and pattern have been studied widely by Paul Vidal De La Blache (1926), S.M.Ali (1943), E.Ahmad (1952), R.B.Singh (1969), etc.

The dynamic element of the settlement i.e. man is gregarious in nature and from the dawn of civilization preferred to live in groups which lead to the growth of compact settlements where dwelling units concentrate at one central site surrounded by vast homogeneous fields such as cropping fields or jungles in a percel of land which can be termed as 'mouza' or village. Defense, feeling of security, proximity to central part of settlement, absence of services and facilities outside the built-up area are main reasons behind the growth of these kinds of settlements. On the other end of the spectrum, are completely desolated dwelling units or farmsteads distributed over space. This type is known as dispersed settlements. Thus, Finch and Trewartha et.al. (1957) refer to two primary types of settlements: (1) isolated or dispersed and (2) nucleated. Enayat Ahmad (1952) gives four types of settlements: (1) compact, (2) cluster or hamlet, (3) fragmented or hamlated and (4) dispersed settlement. R.L.Singh discerns four main types (1) compact settlements, (2) semi-compact or hamlated cluster, (3) Semi sprinkled or fragmented or hamlated settlements and (4) Sprinkled or dispersed settlements.

There are various methods of finding settlement types. Settlement type can be obtained either by observation or by statistical analysis. Various statistical methods have been applied to identify settlement types, such as Debouverie (1943), Kant (1950), Houston (1953), Tanioka (1957), K.H.Stone (1962), Inouye (1964), R.B.Sing (1969), R.B.Mandal (1972), A.Prasad (1973).

5.2.1. Type of Settlement Following Scheme Proposed by R.B.Singh

R.B. Singh (1969) has proposed a scheme to identify settlement types taking into account the village and hamlet ratio in an administrative unit. In 1969, R.B.Singh expressed the following formula to measure the compactness and dispersal of rural settlements:

Hamlets	Villages	Settlement Types
Hn=	Vn	= Compact
Hn=	Vn+1 to Vn X 2	=Semi-compact
Hn=	VnX2+1to$\frac{\text{OUnX 2}}{3}$	=Hamletted
Hn=	$\frac{\text{OUnX 2}}{3}+1$ to OUn	=Dispersed

Where,

'Hn' represents the number of hamlets, 'Vn' is the number of villages in an administrative unit and 'OUn' is the number of occupancy units in the same area.

According to R.B. Singh (1969), "In an *Adalat Panchayat* where the number of villages is equal to number of hamlets, the settlements have been designated as compact i.e. the entire village population is concentrated in one cluster. This concentration can have only five houses or it may consist of more than hundred houses. When the number of hamlets is more than the number of villages but is not more than double the number of villages then the settlements have been classified as semi-compact. In the areas where the number of hamlets is more than double the number of villages then the settlements have been classified as hamleted".

In the study area, there are 25 Gram Panchayats, One Notified Bazar Area (Table 1.1). In this study, the above mentioned 26 units have been taken as administrative units which consist of 38 settlement units and 188 hamlets. As per the formula devised by R.B.Singh (1969), three settlement types have been identified in the study area on the basis of village and hamlet ratio in an administrative unit (Gram Panchayat, Notified Bazar Area). There are three settlement types in the study area which have been discussed in the following paragraphs:

A. Compact settlements

Nayabazar Notified Bazar Area and Nayabazar Forest Block located in the North Rammam Basin are examples of compact settlements. These settlements have only one hamlet and all the dwelling units are concentrated at one central site. Among these two settlements, Nayabazar Notified Bazar Area is a classical example of a compact settlement with close-knit houses and a market at the centre of the settlement. The market is the central site of the settlement around which the dwelling units are located. Nayabazar NBA consists of one hamlet (Ward 1); therefore, village and hamlet ratio being one, this settlement has been categorised as compact settlement with 252 households and 1235 persons as per DCHB, Sikkim, 2011.

Nayabazar Forest Block, on the other hand, located under Zoom Gram Panchayat unit, is the only settlement of the GP located within the boundary of the basin. Thus, it can be categorised as compact settlement (when other settlements under the Zoom GP are not considered as these are located outside of the basin).

B. Semi-compact Settlement

Only Samalbong located under Nayanore Gram Panchayat can be categorised as Semi-compact settlement. The village Samalbong consists of six hamlets among which only two hamlets are located within the basin. Thus, in case of Samalbong the number of hamlet is not more than double the number of village (when only the hamlets located under the basin are considered) in the Gram Panchayat unit.

B. Hamleted settlements

Bhareng, Ribdi, Okhery, Tikpur, Siktam, Salyangdang, Longchok, Lower Fambong, Daramden, Upper Fambong, Rumbuk, Burikhop Rumbuk, Burikhop Dodok, Karthok, Tharpu, Timberbong, Soreng, Malbasey, Chumbong, Hilley FB, Sombaria FB, Soreng FB in the northern part and Singalila Forest, Rimbick, Namla, Lodhama, Hatta, Kankibong, Jhepi, Lamagaon, Kaijalia, Kolbong, Murmidong, Karmi, Goke in the southern part of the study area, are the villages in this group. For all the above mentioned villages, the number of hamlets is more than double the number of the villages in the Gram Panchayat units.

In almost all the villages the hamlets are dependent on the central site where the market is located. The market of the central site may consists of one or two restaurants, one grocery shop as can be seen at Okhery to a fully grown market centres with various shops, Bank branches, ATM counter, vehicle stand as can be seen at Sombaria, Soreng in the northern part and Rimbick, Lodhama, Kanijalia in the southern part. Thus, the central site in these villages is characterized by close knit buildings with almost no gap in between. The price of land is also highest in these sites. Other hamlets are grown around the central site keeping the distance as minimum as possible. Though sometimes at distant hamlets one or two shops may emerge and a cluster surrounding it may result as can be seen in case of Maneydara which is a hamlet of the village Rimbick.

Generally the settlements developed in the secondary sites are agricultural in nature and houses in these hamlets are surrounded by agricultural lands. Thus the houses are scattered in nature in order to keep the distance between farm and homestead minimum. The crops produced in these villages are sometimes taken to the market located at the central site with a purpose to sell it or sometimes the agricultural products are directly collected from the farmers and sent to large markets for wholesale trade. Large amount

of green peas are collected from the hinterland of Rimbick Bazar to sell it to Zorethang or to Darjiling. Again in these type of settlements also maximum utilization of land, minimum travel distance from land to homesteads, better utilization of sites with situation facilities, caste hierarchy/segregation are the main causes of emergence of more than one hamlet in the above mentioned villages.

As the study area is a hill area, so it can be assumed that the sites with lower gradient are the first hamlet site of the villages. Later agricultural lands were extended over the hill slopes due to increase in population and thus surrounding hamlets emerged. The central site is very important in these villages as these serve as the main service centre not only to the other hamlets of the village but sometimes to the hamlets of the surrounding village also. The villages in the study area are connected to each other by bitumenous roads whereas the hamlets of the villages in most cases are connected to each other and also to the central site by kucha road or boulder roads. In such villages physically separated hamlets are closely associated with each other by cultural and social ties (Singh, L.R., 1965).

The study area is inhabited by population belonging to various communities such as Lepcha, Sherpa, Limboo and Nepali. In the upper part of Rammam Basin it has been seen that the hamlets are dominated by one or two communities such as Tubun is dominated by Lepcha population, Dilpali is dominated by Nepali (Dilpali Rai) population, Maneydara is dominated by Sherpa population and Gumbadara is dominated by Lepcha population.

In some villages like Singalila Forest there is no such central site which exerts influence on other hamlets. The hamlets in this village are located at distant places from each other and all are purely agricultural in nature. The hamlets in these villages are dependent on Rimbick Bazar for all the services they need.

This type can be further divided in to

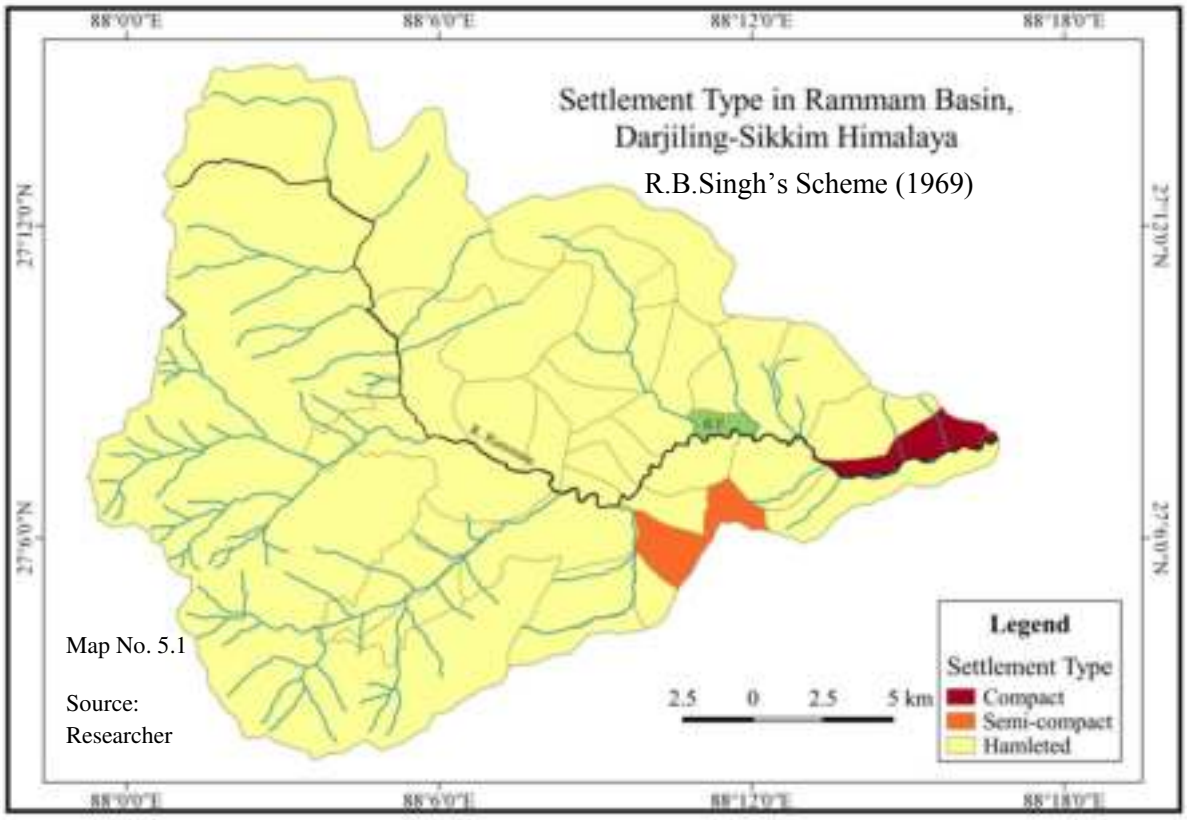
1. Hamleted Settlements with prominent central site

Okhery, Upper Fambong, Timberbong, Tharpu, Daramden, Soreng in the northern part and Rimbick, Lodhama, Kaijalia in the southern part, belong to this group. These villages are characterized by market centre or Bazar of various magnitudes at the central site. Sombaria in Upper Fambong, Soreng Bazar in Soreng, Rimbick Bazar in

Rimbick, Lodhama Bazar in Lodhama, and Kaijalia Bazar in Kaijalia are permanent market centres with more than 50 shops. On the other hand Okhery, Timberbong, Tharpu are also characterized by central sites where few shops are located by the side of the main road. In these villages, other hamlets are generally located in the secondary sites and are agricultural in nature. These hamlets developed on the secondary sites are dependent on the central sites for various services.

2. Hamleted Settlements with no prominent central site

Bhareng, Ribdi, Tikpur, Siktam, Salyanhdang, Longchok, Rumbuk, Burikhop Rumbuk, Burikhop Dodok, Malbasey, Chumbong in the northern part; and Hatta, Kankibong, Murmidong and Karmi in the southern part belong to this group. The hamlets of these villages are dependent on the Bazars of neighbouring villages for various services.



Map No. 5.1

Source:
Researcher

5.2.2. Type of settlements following Dispersal Index proposed by R.B.Mandal

In 1972, R.B.Mandal devised a measure of dispersal which is as follows:

Dispersal Index = $\frac{Average\ \ Population\ \ Size\ of\ Settlement}{Average\ \ Spacing\ \ of\ Settlement}$

Average population = $\frac{Population\ \ of\ a\ Settlement}{Number\ \ of\ \ Hamlet}$

Average Spacing= $\sqrt{\frac{Total\ \ Area\ \ of\ Settlement}{Number\ \ of\ \ Hamlet}}$

After plotting the Dispersal Values of the settlements of the study area, three types of settlements can be easily identified.

A. Compact

Only Nayabazar Notified Bazar Area can be termed as Compct settlement in the study area as per the scheme provided by R.B.Mandal (1972). The settlement has dispersal index 3565.14 which is the highest in the basin. The settlement is truly a compact settlement with close knit houses as discussed earlier.

B. Hamleted

Except Nayabazar and the four forest blocks located in the northern part of the basin and Singalila Forest located in the southern part of the basin, rest of the settlements are of hamleted type. The dispersal index of these settlements varies from 173.08 for Karthok to 738.74 for Dhalam. Numbers of hamlets in these settlements vary from two hamlets at Bhareng to 22 hamlets at Rimbick.

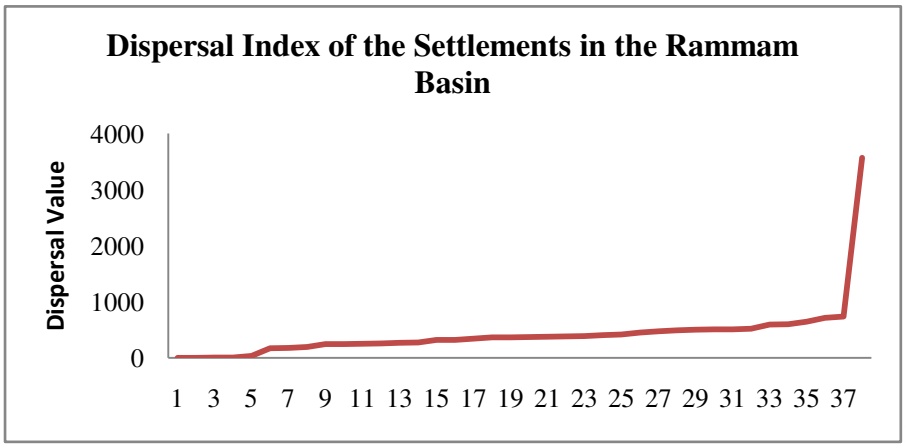
C. Dispersed

The Nayabazar Forest Block, Soreng Forest Block, hilley Forest Block, Sombaria Forest Block in the northern part of the basin; and Singalila forest in the southern part can be termed as dispersed settlements as these settlements have very low dispersal value ranging from 1.26 for Sombaria forest Block to 36.38 for Singalila forest.

Table 5.1: Dispersal Index of Settlements in the Rammam Basin

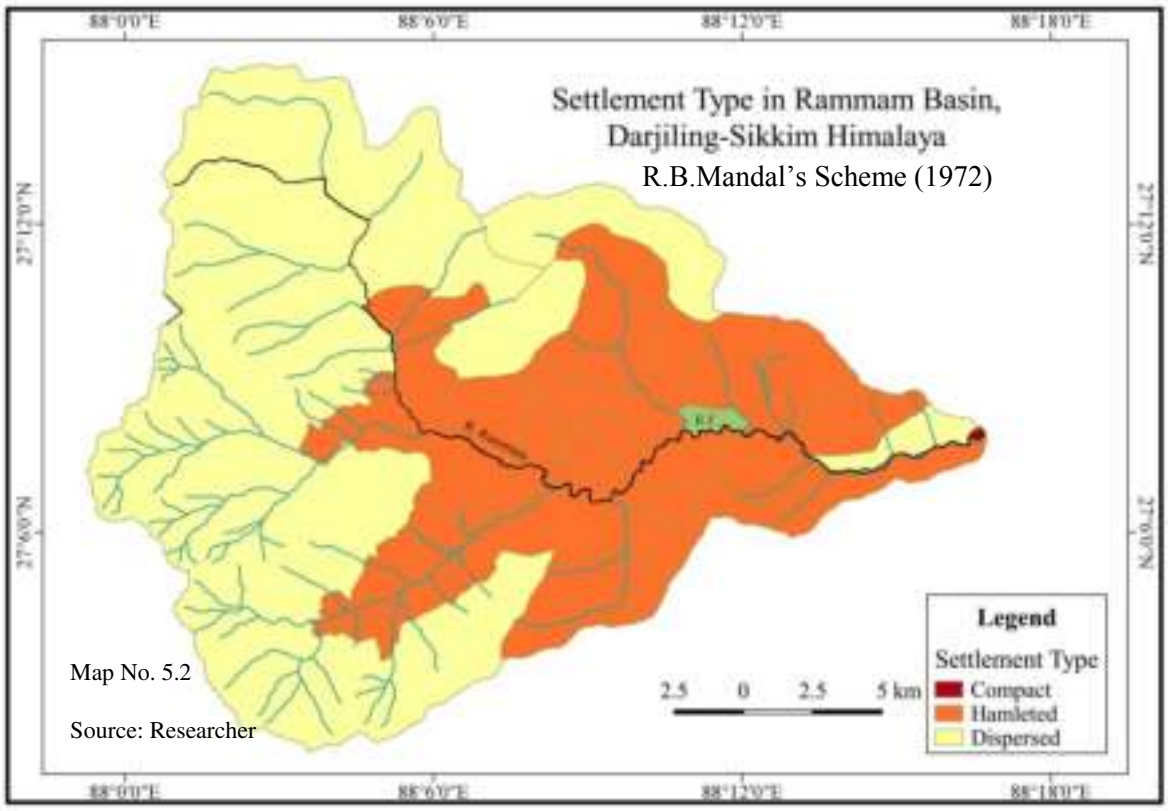
Sl No.	Settlement	Area	No of Hamlet	Population	Average Population	Average Spacing	Dispersal Index
1	Bhareng	1.9439	2	390	195	0.99	197.79
2	Ribdi	3.5591	4	1034	258	0.94	274.04
3	Okhery	6.4176	6	1683	280	1.03	271.22
4	Tikpur	7.2126	5	1911	382	1.20	318.22
5	Siktam	2.0125	2	510	255	1.00	254.21
6	Salyangdang	2.1913	3	963	321	0.85	375.59
7	Longchok	1.7196	3	1023	341	0.76	450.40
8	Dhalam	2.1726	3	1886	629	0.85	738.74
9	Timberbong	4.5658	7	2156	308	0.81	381.37
10	Upper Fambong	4.1795	6	2995	499	0.83	598.08
11	Lower Fambong	1.0497	3	723	241	0.59	407.42
12	BurikhopRumbuk	5.0767	3	1337	446	1.30	342.59
13	BurikhopDodok	7.7962	10	2167	217	0.88	245.42
14	Tharpu	1.7986	5	1117	223	0.60	372.48
15	Soreng	5.9041	7	3818	545	0.92	593.90
16	Malbasey	6.5624	5	2888	578	1.15	504.17
17	Chumgbong	6.0017	8	1796	225	0.87	259.19
18	Rumbuk	4.2046	3	1838	613	1.18	517.51
19	Karthok	2.558	5	619	124	0.72	173.08
20	Nayabazar NBA	0.12	1	1235	1235	0.35	3565.14
21	Nayabazar Forest B.	10.51	1	13	13	3.24	4.01
22	Soreng Forest Block	22.48	1	28	28	4.74	5.91
23	Sombaria Forest Block	10.04	1	4	4	3.17	1.26
24	Hilley Forest Block	33.08	1	36	36	5.75	6.26
25	Singlila forest	167.6907	12	1632	136	3.74	36.38
26	Rimbick	14.78	22	6980	317	0.82	387.09
27	Namla	2.3067	2	1093	547	1.07	508.87
28	Lodhama	5.5968	5	2600	520	1.06	491.49
29	Hatta	4.7591	6	3436	573	0.89	643.01
30	Kankibong	10.623	10	3765	377	1.03	365.29
31	Jhepi	4.7753	5	1576	315	0.98	322.53
32	Lamagaon	5.33	3	1660	553	1.33	415.13
33	Kaijalia	2.59	7	3049	436	0.61	716.08
34	Samalbong	7.0937	2	660	330	1.88	175.22
35	Kolbong	2.9178	2	885	443	1.21	366.35
36	Murmidong	4.2572	5	2181	436	0.92	472.73
37	Karmi	8.5632	2	1012	506	2.07	244.54
38	Goke	8.72	10	4770	477	0.93	510.81

Source: Computed by the Researcher on the basis of Data of DCHB, 2011, Sikkim & Darjiling, and Field Survey



Source: Researcher

Figure 5.1



Therefore, it is clear from the two schemes discussed above that only Nayabazar Notified Bazar Area is a compact settlement in the basin under study. As per scheme of R.B.Singh (1969) Nayabazar Notified Bazar Area and Nayabazar Forest Block are compact settlements, Samalbong is Semi-compact settlement, rest 35 settlements are hamleted type settlements. On the other hand as per scheme of R.B. Mandal (1972), Except Nayabazar NBA, rest 32 settlements are of hamleted type and all the forest blocks including Singalila Forest are dispersed settlements with very low population residing in these settlements.

5.3. Pattern of Settlements

In the present study, settlement types have been identified on the basis of number of hamlets or arrangement of settlement sites within the boundary of a Gram Panchayat or Notified Bazar Area. The patterns, on the other hand, have been determined on the basis of arrangements of homesteads and roads within the boundary of a hamlet/mouza. The pattern or the arrangements of homesteads are generally determined by physical as well as socio-economic parameters of a region. As mentioned earlier, it differs from settlement types as it is identified by qualitative aspects while the type is determined

distinctly by quantitative analysis. Thus, the patterns of settlements are nothing but the geometric impression of that settlement over its site.

It may contain any of the regular geometric figures (such as linear, triangular, rectangular, polygonal, star shaped, etc.) or reflect an amorphous condition. If there any geometric figure exists, then the line or side of that geometric figure is here delineated by the extensions of roads or lanes (ignoring their width) within the settlement and its surroundings, while the covered area of that figure reflects the built-up area of homesteads. In amorphous settlements roads or lanes only play a vital role in connecting all the homesteads of a hamlet without forming any shape.

In the Rammam basin most of the hamlets do not reflect any geometric figure or of amorphous pattern as the dwelling units are scattered over the tract intervened by agricultural fields. The serpentine roads only connect the homesteads and the fields and fail to form any geometric figure. Though there are some hamlets where the following settlement patterns can be seen:

i. Linear pattern

This type of pattern emerges when the homesteads are located in one or both the sides of a road, canal, embankment, etc. Better accessibility, protection from flood, availability of water, these are some of the reasons behind the emergence of this settlement pattern. Also this pattern indicates the earlier stages of evolution of a settlement and with time this pattern may transform into rectangular pattern.

In the study area **linear settlement pattern** can be found at some hamlets such as Karmatar of Goke village, at Gumbadara of Rimbick village, at Middle Rimbick or Rimbick Bazar area in the southern part of the basin. The hamlet Karmatar is located on the river terrace of Rammam at 400m altitude. The terrace is 0.28 sq.km in area. Its length in the east-west is 1.53 km and width of the widest part of the terrace is only 0.36km. A road is traversing through the middle part of the terrace running in east-west direction connecting the hamlet with Murmidong village in the west and Jorethang in the east. The homesteads are located on both the sides of the road giving the settlement a linear pattern. The agricultural fields are located next to the built up area. The hamlet Gumbadara is located at an altitude of 1600m. It is the projected part of Rimbick Danra with steep slopes on both the sides of the danra. The length of the hamlet is 1 km whereas width is 0.5 km. In this hamlet also the houses are located on both the sides of the road giving it a linear pattern.

ii. 'Y' pattern

'Y' shaped pattern develops when two roads meet at a point forming the two arms of the letter 'Y' or where a road bifurcates from another at an acute angle and the houses are built on the sides of the roads. Besides, this type of settlement pattern can be found in the hill areas also where a ridge (*danra*) bifurcates in to two parts such as Darjiling town itself. In the study area this settlement pattern can be found at **Tharpu** which is located at the end of Karthok spur at an altitude of 800m.

iii. '**Z' pattern**

This settlement pattern is typical pattern of the hill areas as the serpentine or zigzag roads are built parallel to contours and houses are built on the sides of the roads. Sombaria, hamlet of Upper Fambong village is a typical example of such pattern found in the study area. Both physical as well as cultural factors are responsible for the development of such pattern.

iv. 'U' or Horse-shoe Pattern

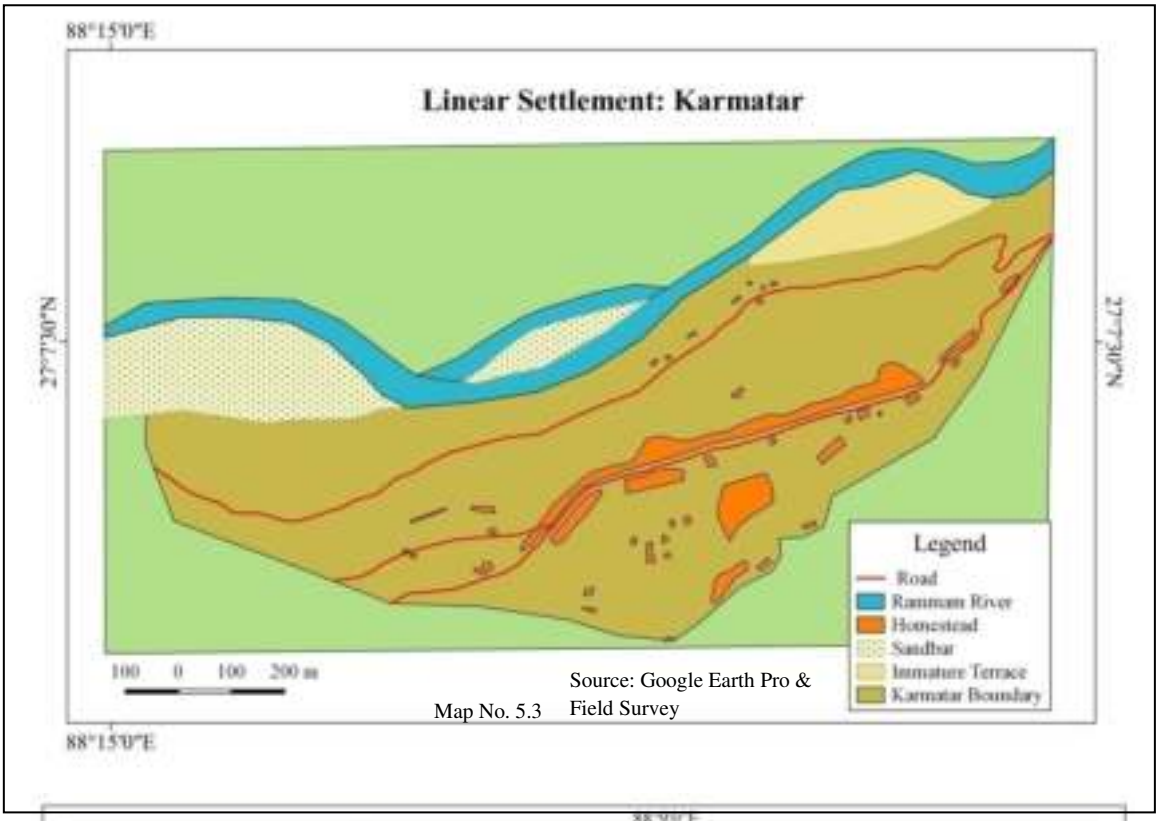
When the homesteads are built parallel to the contours at the end of any *danra* then this pattern develops. The aerial view of such settlements resembles as the wide 'U' letter generally in inclined manner. Rammam Forest village, a hamlet of Singalila Forest is an example where such pattern can be found.

E. Ahmed (1987, p.92) has mentioned this pattern as contour pattern and according to him this pattern "is the result of zonal land-use, the various zones from the valley bottom to the ridge-top being parallel with the base of the hill and therefore with the contour. The shape of settlement accordingly becomes convex towards the valley, when it is situated on a spur and concave when the village is in a re-entrant."

v. Crescent pattern

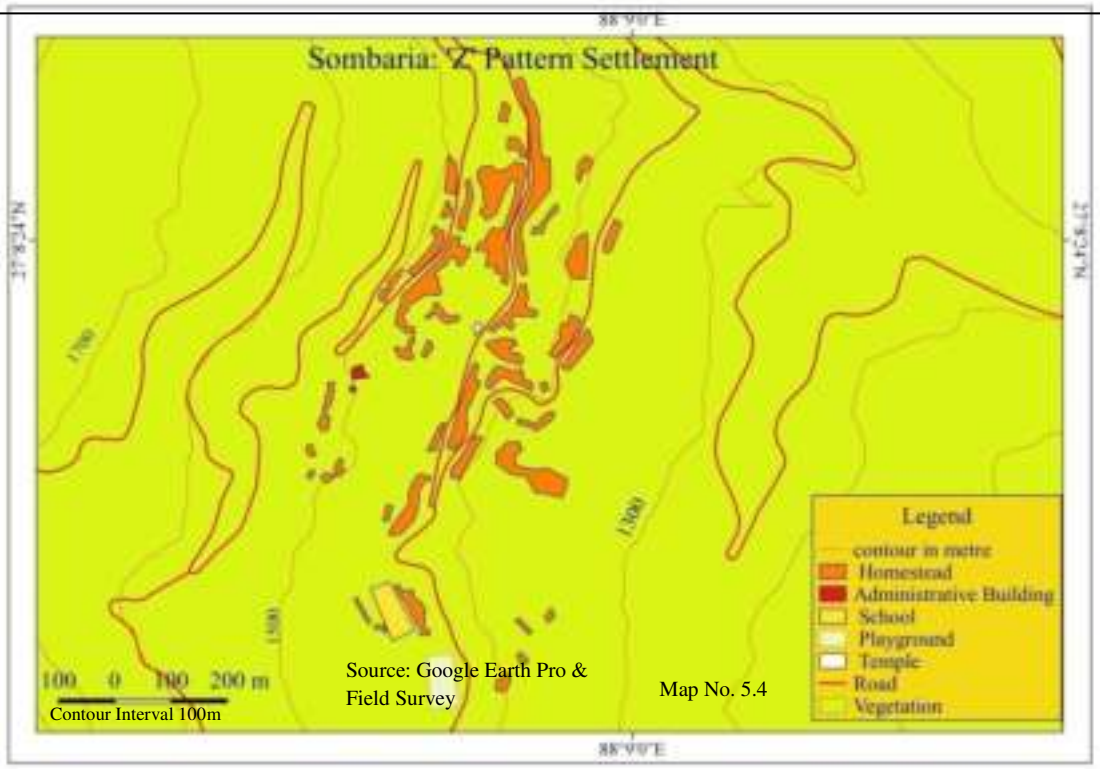
In the plain areas this pattern of settlement can be seen along the bends of rivers or along the meanders (Singh. 2013, p. 168). In the hill areas this pattern can be found at the headstream areas where the contours become semi-circular and thus the roads and homesteads developed parallel to the contours give a semi-circular or crescent view of the settlement. Part of Soreng is typical example of crescent settlement pattern which developed between altitudes of 1300m-1700m encircling the headstreams of the Rani khola.

Setttlement Pattern



Source: Google Earth Pro & Field Survey

Map No. 5.3



Source: Google Earth Pro & Field Survey

Map No. 5.4

vi. Star shaped pattern or Radial Plan

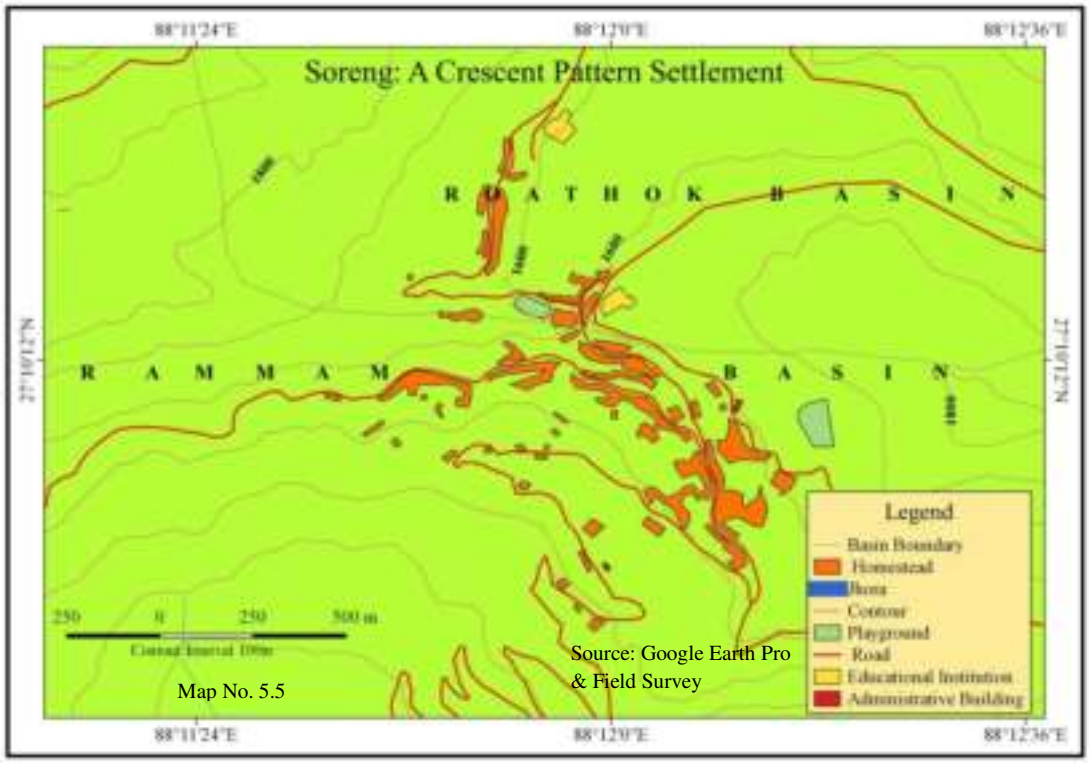
This settlement pattern mainly emerges when the roads coming from various directions meet at one place. According to E. Ahmed (1987, p.90) "This pattern is usually a result of the dominant influence of some features in the centre of the village e. g. sweet water well or the village shop". In the study area generally markets are located in the central part of the settlements exhibiting this pattern. This pattern is found at Dhotrey forest village, a hamlet of Singalila Forest where several roads coming from various directions converged. At this hamlet, the main bituminous road stretches from Manebhanjyang to Hatta, another boulder road stretches downward from Dhotrey to Kaijalia, and one trek path stretches upward from Dhotrey to Tanglu.

Some settlements developed at the *Bhanjyang* (mountain saddle) areas also exhibit such pattern. The hamlet Kaijalia Bhanjyang is an example where this pattern developed due to topographic factor. At Kaijalia Bhanjyang also several roads converged; such as the main road connecting the Chhota (Little) Rangit Basin to Rammam Basin stretching in east-west direction, one road coming from Dhotrey from south, another road heading towards Kolbong in the north.

vii. Rectangular pattern

Rectangular pattern emerge when the linear settlements grow in size and spreads along the width of the settlement thus forming lanes and by-lanes running parallel to the main road. In the study area, there is no such distinguished rectangular settlement pattern developed, though Lodhama Bazar can be considered as an example of such pattern. As mentioned earlier the hamlet has been developed over the terrace of Lodhama khola at an altitude between 1050m to 1090m with width of 250m and length of 800 m. The rectangular pattern of the settlement emerged due to its location at the base of Deorali danra, the slope of which restricted its extension to the south and to the north it is restricted by the river Lodhama itself. As a result the length of the settlement is greater than its width.

Settlement Pattern



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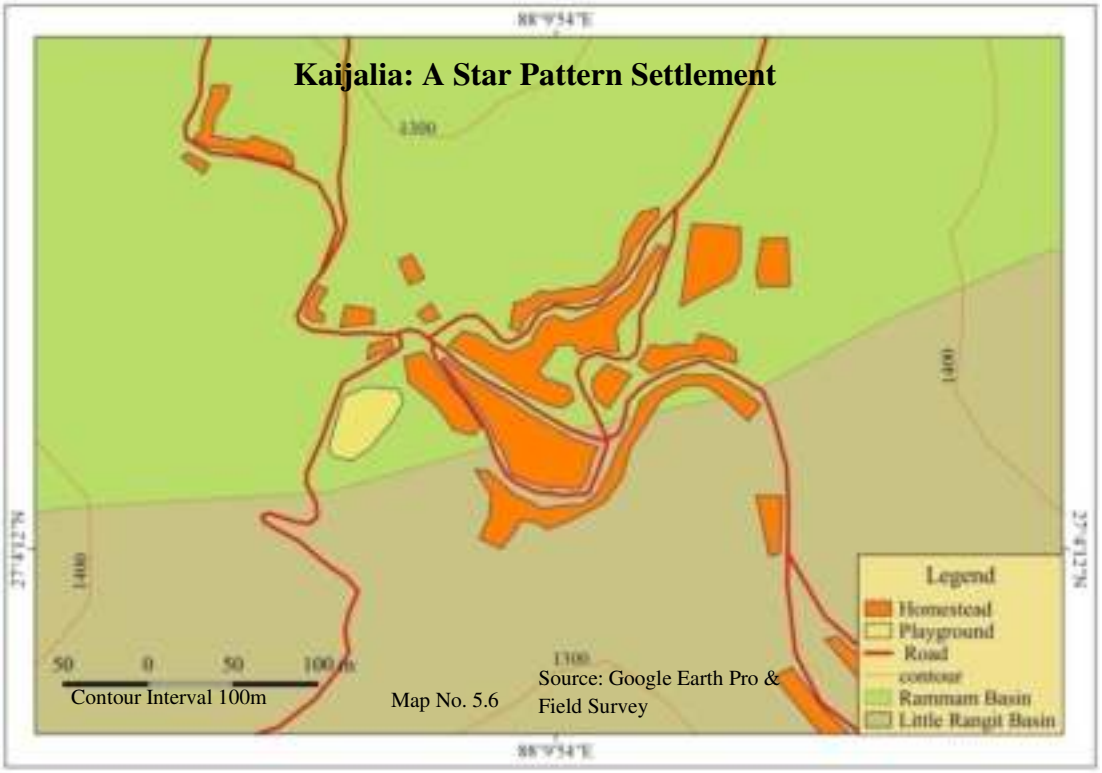

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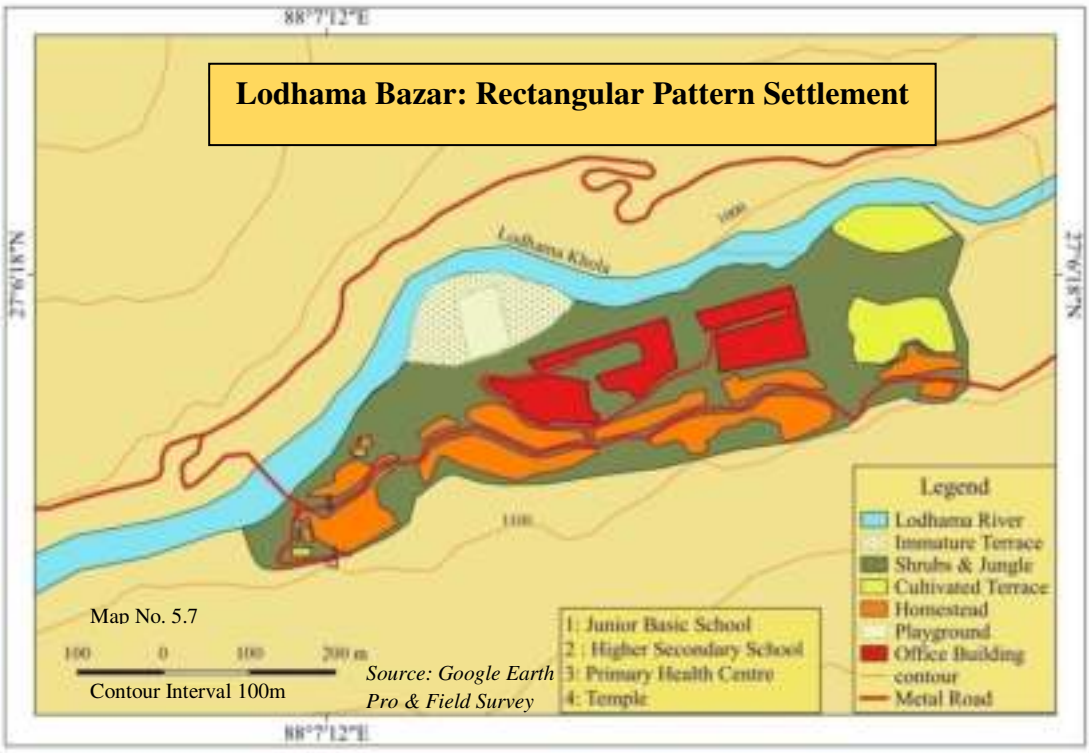
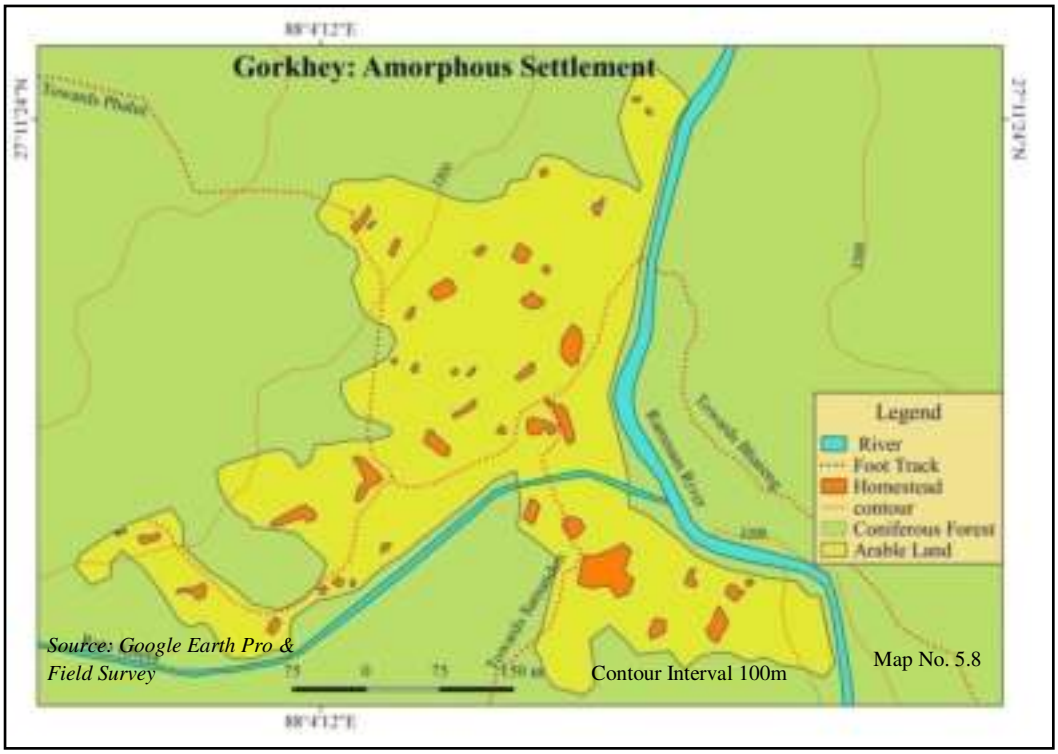
Settlement Pattern





viii. Triangular Pattern

Nayabazar (NBA), located in the northern part of the river Rammam, is example of such pattern. The pattern emerged here due to topographic factor. The market located at the upper part extended downward at places where slope is minimum and thus the triangular pattern emerged. Part of the hamlet Kerabari located at the confluence point of River Rammam and Great Rangit is example of this pattern. This hamlet occupies such a site which is triangular in shape; as a result the triangular pattern emerged. The homesteads are located on the three sides of the land and the middle part is occupied by temple and playground.

ix. Dopple-Dorfer (Double-Nucleation) Pattern

This pattern emerges when two or three settlements are separated by roads, small rivulets, etc. According to E. Ahmed (1987, pp.90-91) "The dopple-dorfer is a group of two villages so near together that it must be admitted that one grew up by colonization upon the edge of the other. Though for the purpose of revenue and administration each segment may be treated as a separate establishment, their geographical unity is unquestionable".

In the study area at the confluence point of river Rammam and Great Rangit, three settlements have been established which are Kerabari, a hamlet of Goke village in the southern part, Nayabazar, a Notified Bazar Area, located in the West District of Sikkim in the north-western part of the confluence point and Jorethang (outside the study area) a municipal area located in South District of Sikkim in the north-eastern part of the confluence point.

x. Amorphous Pattern

Amorphous, meaning without any shape or form, is the most common pattern of settlement in the tract under study. The settlements which are relatively inaccessible, located on the slopes and are mainly agricultural in nature are characterized by this pattern. In these settlements, the houses are located at distance from each other and are surrounded by agricultural fields and therefore giving no particular shape or form to the settlements. Gorkhey Forest Village, Dilpali, Beechgaon are some hamlets which are examples of such settlements.

5.4. Morphology of Settlements

In the previous segments, arrangement of settlement sites within the boundary of a village was discussed under the heading of type of settlements whereas the arrangement of lanes and houses on a particular site resulting in formation of geometric figure when viewed from the sky, has been discussed under the heading of pattern of settlements. In this segment, morphology of settlements will be discussed. According to R.Y.Singh (2013, p.203), "The internal morphology involves analysis of (a) structural morphology and (b) social morphology. The structural morphology deals with the description and interpretation of relationships evolved between lane to lane, lane to house, house to house whereas, the social morphology deals with the varied dwelling group, community structures and land and spaces".

5.4.1. Structural Morphology

The structural morphology of the settlements may be discussed in various phases, as

1. Remote or sparsely populated hamlets where single dwelling units surrounded by agricultural field are scattered over the settlement site. In this type of hamlets, cluster of dwelling units are generally not found though exception can be found at Timburey. The main lane (boulder or cemented), generally narrow, may traverse through the hamlet and the dwelling units are connected to each other by sub-lanes. Gorkhey, Samanden are examples of such hamlets. These hamlets can be uni-caste, uni-clan and uni-religious as Timburey or multi-lineage, multi- caste, multi-clan and multi-religious (Mukerji, 1987) as Gorkhey Forest Village.

2. In the hamlets which are more accessible and where population pressure is a bit higher than the first category it has generally been observed that instead of one dwelling unit, cluster of two to three houses or more locate at a place in most cases around a favourable site or around a cultural or religious building such as any Church or Monastery or any Office building. The cluster of two to three houses at a place are, most of the time, result of family bonding as family members prefer to live together side by side though in separate houses. At some places large clusters of houses have also been found and in that case all the residents may not belong to the same family. These large clusters of houses (more than 10 houses) sometimes result in establishment of one or two shops within the cluster only to serve the residents of that cluster.

Moneydanra, Sirikhola are example of such hamlets. These hamlets are multi- caste, multi-clan and multi-religious in nature.

3. The hamlets which have situational facilities such as junction of various roads have been, in most cases, transformed into Bazar areas. These Bazar areas are characterized by numerous shops on both the sides of the main wide bituminous road. The houses containing the shops are constructed close to each other leaving almost no gap in between and thus giving a congested look to the hamlet. Generally the ground floors of the buildings are used as shops and the upper floors are used for habitation purpose. Sometimes, the Bazar areas are characterized by a religious place such as any temple as can be seen at Rimbick Bazar as well as at Lodhama Bazar. Daramden and Sombaria are also example of such settlements. These Bazar areas attract people from neighbouring hamlets and are thus subject to in-migration. These Bazar areas are resided by people belonging to various communities with faiths in different religions, thus these are perfect examples of multi-lineage, multi-clan, multi-caste, multi-religious settlements.

5.4.2. Social Morphology

The study will remain incomplete if the various social groups residing in a hamlet or village and their internal relationships are not studied properly because this would provide an ideal opportunity to study the village morphology based on social structure.

In the Rammam Basin various ethnic groups reside together and their characteristic traits have been discussed in detail in Chapter 2. As per District gazetteers and other sources, Lepchas are the earlier residents of the whole tract from time immemorial. Later on other communities migrated to the region and outnumbered the Lepchas. In the study area, at present there are few hamlets where the Lepchas are dominant communities such as Tubun, a hamlet of Rimbick village in the southern Rammam Basin and Ronglyang in the Upper Fambong village in the North Rammam Basin. The Sherpas live in the villages of high altitudinal zones especially above the altitude of 2000m in the study area. Besides, Rai, Pradhan, Limbu, Damai, Mangar, Tamang, Subba, Bhutia, Kharka, Kami, Thami, Giri, Sakri, Bhujel are other communities living in the study area. To study the social morphology of the various communities living in the villages of the study area, two Gram Panchayat units have been selected which are

Rimbick Gram Panchayat and Sirikhola-Daragaon Gram Panchayat, located in the southern Rammam Basin.

Sample Study

Rimbick Gram Panchayat

The village located under this Gram Panchayat is Rimbick which is the largest village in the study area in terms of population as well as number of households. This village consists of 22 hamlets of which nine hamlets fall under Sirikhola-Daragaon Gram Panchayet area. The Rimbick Gram Panchayet consists of 13 hamlets. During the field survey data has been collected from Rimbick Gram Panchayat Office on the households belonging to various communities in the hamlets under the GP, the details of which has been given in the table 5.2.

In the hamlets located under this Gram Panchaayat, various ethnic groups are living together such as Jawlaygaon (Upper & Lower) is resided by 10 communities, Moneydanra is resided by five communities, Rimbick (four hamlets together such as Upper Rimbick, Middle Rimbick, Lower Rimbick I and Lower Rimbick II) is resided by nine communities together, Dilpali is resided by five communities, Lampati is resided by seven communities, Tubun-Toksar-Gumbadara are resided by three communities and Yakreybong is resided by five communities together, though in most of the hamlets a single community can be considered as dominant community which are as follows:

Hamlets Dominated by Pradhan Community

At Jawaleygaon, Pradhans are dominant, consisting of 44.83 percent households belonging to that community. In the Rimbick Bazar area falling under Middle Rimbick, various social groups reside among which Pradhans household percentage is more than 20 percent

Hamlets Dominated by Rai Community

Lampati is dominated by Rai community as 84.09 percent households in this hamlet belong to the Rai community. Dilpali is another hamlet dominated by Rai community with 71.43 percent households belonging to that community. At Maneydara also Rai community is dominant with 39.74 percent households belonging to the community.

Distribution of Ethnic Groups in the Hamlets of Rimbick Gram Panchayat

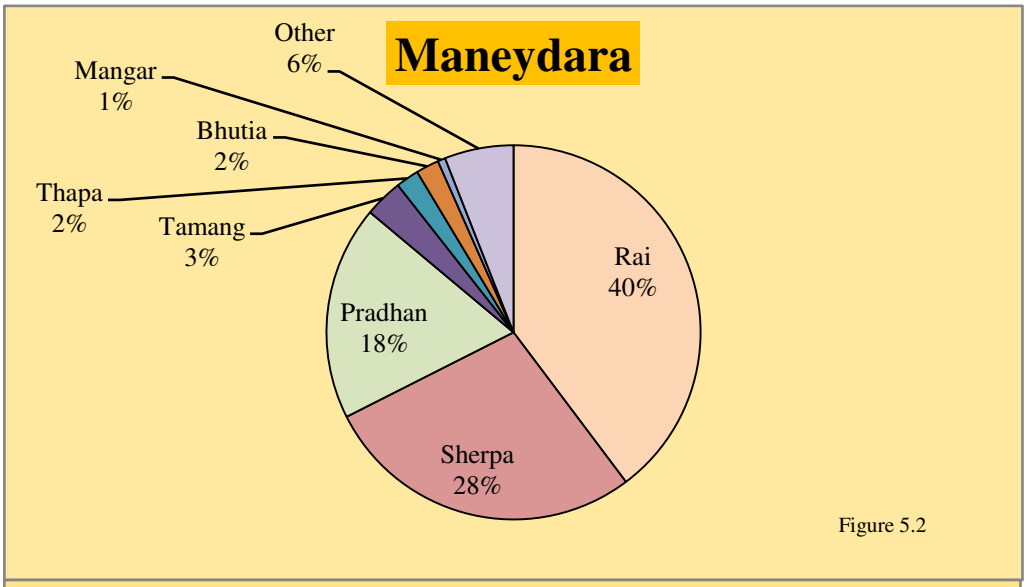


Figure 5.2

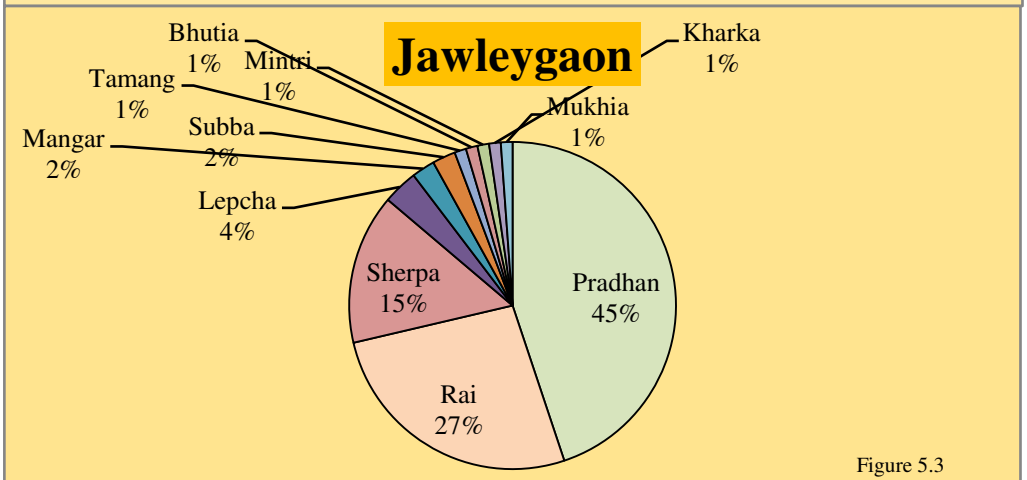


Figure 5.3

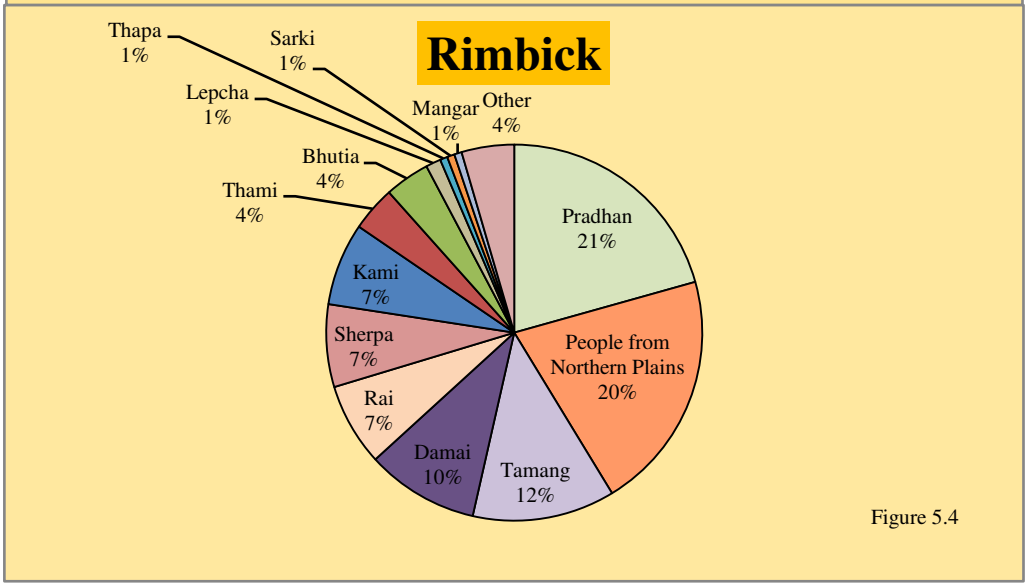


Figure 5.4

Source: Rimbick Gram Panchayat Office

Distribution of Ethnic Groups in the Hamlets of Rimbick Gram Panchayat

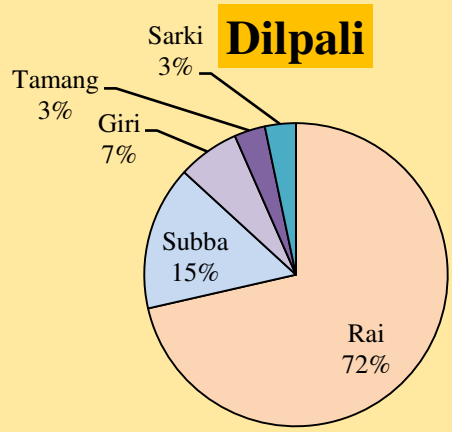


Figure 5.5

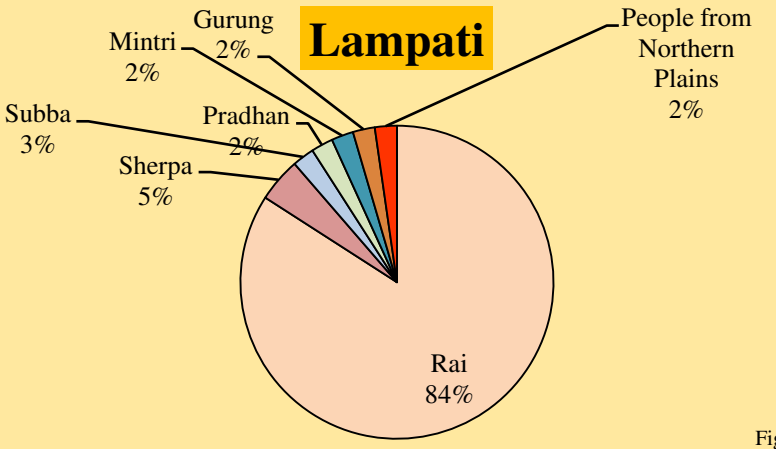


Figure 5.6

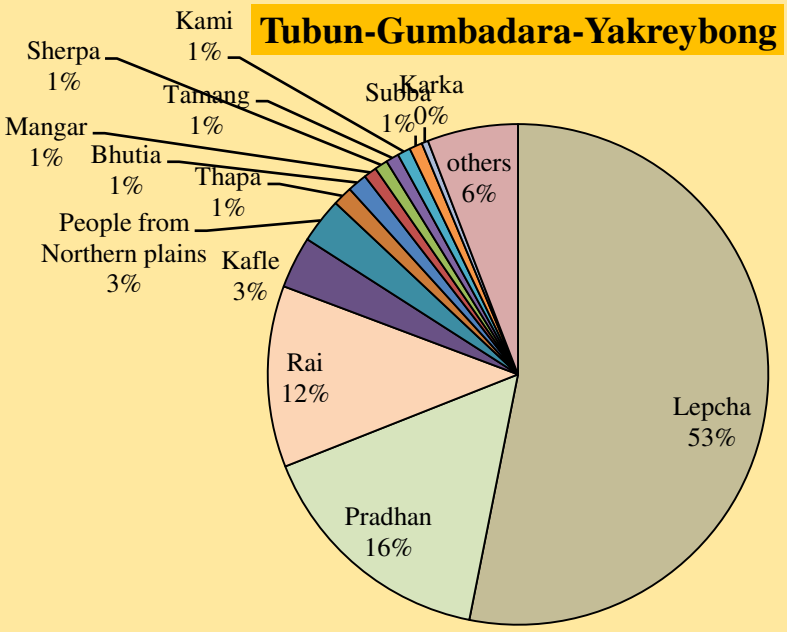


Figure 5.7

Source:Rimbick Gram Panchayat Office

Hamlets Dominated by Lepcha Community

Lepchas are dominant at Tubun-Toksar-Gumbadara area with more than 60 percent household belonging to that community. Lepchas are also dominant at Yakreybong with more than 30 percent household belonging to the community.

Thus, if the village Rimbick is divided into three parts then it can be seen that the front part is occupied by the Lepchas, the southern slopes including the summit area is occupied by the Rai community, and summit area including rear part is occupied by the Pradhans.

From previous records it can be said that the Lepchas are the first to settle in the area. Later, the land was settled by the Nepalese people. With time development occurred and the Bazar area gets settled by various communities among which noteworthy is the concentration of Marwari or other people who migrated to the area from North India solely for business purpose.

Sirikhola-Daragaon GP

Two villages fall under this Gram Panchayat; one is Singalila Forest (Partly) and another is Rimbick (Partly). Singalila Forest is the largest village in the study area in terms of area. The village consists of 12 hamlets which are located under various Gram Panchayet Units such as seven hamlets namely Gorkhey Forest Village, Samanden Forest Village, Rammam Forest Village, Kalyan Forest Village, Beechgaon Forest Village, Sirikhola Forest Village, Gurdum Forest Village under Sirikhola-Daragaon GP, twohamlets namely Namla Forest village, Lingsaybong Forest Village under Lodhama I GP, two hamlets namely Ritu Foktay Forest Village, Lingsaybong Forest Village under Lodhama II GP and one hamlet namely Salaybong Forest Village under Jhepi GP. The hamlets are mostly located in the periphery of Singalila Forest as the middle part of the forest is reserved forest named as Singalila National Park. The altitudes of the hamlets vary from 1500m to 2400m. The hamlets are resided by various ethnic groups but the number of Sherpa's are higher in the hamlets of Singalila Forest compared to the villages located in lower altitudes. On the other hand, the part of the Rimbick village falling under Sirikhola-Daragaon GP consists of eight hamlets namely Lek Kharka, Daragaon-Musaypakha, Daragaon-Bhanjyang, Beechgaon, Sirikhola, Lower Sirikhola, Timburey, Sepi, and Rajavir. Data on various ethnic groups living in

the hamlets under the GP has been collected from Sirikhola-Daragaon GP office in 2017 which has been presented in table 5.3.

From table 5.3, it is clear that like the hamlets of Rimbick GP; here also the hamlets are resided by various communities though the numbers of communities living together in the hamlets under the GP are less compared to Rimbick GP as the area under the Sirikhola-Daragaon GP is less accessible. The Hamlet Lek kharka-Baisakhey is resided by five communities, Upper Daragaon-Musaypakha is resided by five communities, Daragaon Bhanjyang is resided by only one community, Beechgaon is resided by two communities, Upper Sirikhola is resided by seven communities, Lower Sirikhola-Timburey is resided by six communities, Rajavir is resided by three communities, Sepi is resided by six communities, Gorkhey is resided by five communities, Rammam is resided by ten communities, Samanden is resided by four communities, Kalyan FV is resided by two communities, Sirikhola FV is resided by four communities, Beechgaon is resided by three communities, Gurdum is resided by eight communities.

Though various communities live together in the hamlets under the GP but most of the villages are dominated by a single community. Some of the hamlets dominated by single community in the hamlets under the GP are discussed below:

Hamlets Dominated by Tamang Community

Timburey, meaning Timbur tree in Tamang language, is a hamlet of Rimbick village located by the side of river Sirikhola at an altitude of 2000m. The hamlet is resided by seven families of Tamang community; all belonging to the same clan and is thus uni-caste, uni-clan and uni-religious in nature. The settlers are residing there for four to five generations and all the seven families are descendants of one person who, according to the villagers, migrated to the place about 100 years ago and selected the site for settlement purpose. Now the picturesque hamlet Timburey consists of built up area surrounded by agricultural fields spread over the lower terrace of river Sirikhola. The built up area consisting of houses of the settlers is closely knit leaving almost no gap between the houses. The walls of the houses are built of wood or brick and the roofs are mostly of corrugated iron sheets. One narrow foot track is traversing through the houses of the hamlet and connects it to the bitumenous road connecting the hamlet to Lower Sirikhola towards down and Sirikhola hamlet on the upward side.

Hamlets Dominated by Sherpa Community

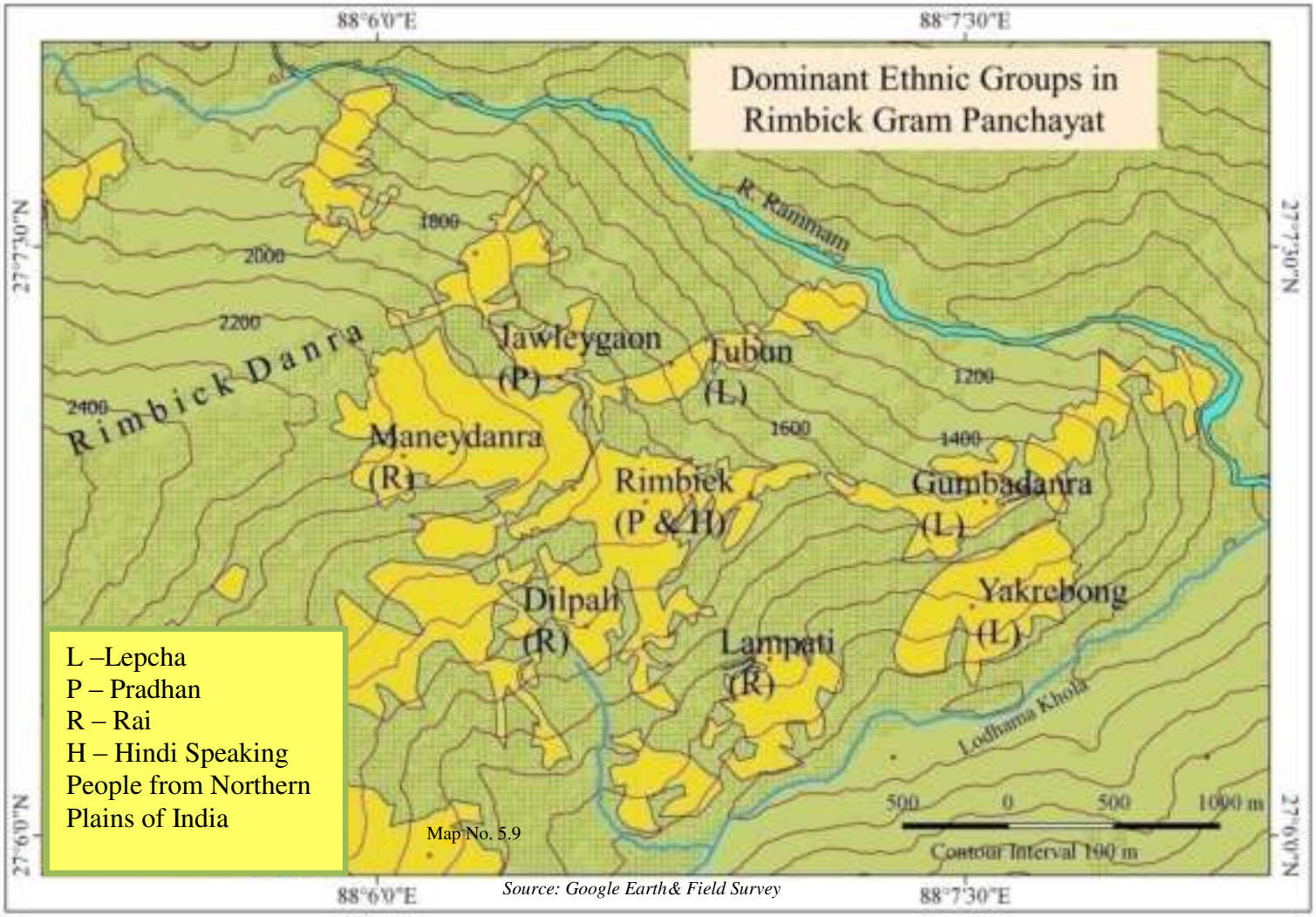
Kalyan Forest Village located under the GP of Sirikhola-Daragaon is a hamlet of village Singalila Forest. The altitude of the hamlet is 2300m. This hamlet is resided by 136 persons as per GP data of 2012. Out of 136 persons 131 persons are belonging to Sherpa community and only 5 persons are belonging to Gurung community. Beechgaon FV is resided by Sherpa, Mukhia and Gurung community of which proportion of Sherpa population is 69.41 percent.

Hamlets Dominated by Rai Community

Lekh kharka/Baisakhey is hamlet under Rimbick village, is abode of 488 persons as per 2012. Out of 488 persons 443 (90.78 percent) persons belong to Rai community. Thus the hamlet is also an example of single community hamlet. Upper Daragaon/Mushaypakha, a hamlet under Rimbick village, is also dominated by Rai Community as 259 persons (80.43 percent) out of 322 residents belong to the Rai community. Daragaon Bhanjyang, another hamlet of Rimbick village is completely resided by the persons belonging to Rai Community (100 percent). Rajavir and Sepi are also two hamlets of Rimbick village which are resided mainly by people belonging to Rai community the percentage share are 96.21 percent and 88.93 percent respectively.

5.5. Correlation between Function and Type of Settlements

In the previous chapter, the settlements are classified into three functional groups on the basis of percentage of persons engaged in primary activities, such as Settlements with Primary Activity, Settlements with Mixed Type of Activity and Settlements with Tertiary Type of Activity. On the other hand settlements have been categorized into three settlement types, such as Compct, Semi-compact and Hamletted on the basis of village and hamlet ratio as proposed by R.B.Singh and Compact, Hamleted and Dispersed on the basis of Dispersal index proposed by R.B.Mandal.



Map No. 5.9

Source: Google Earth& Field Survey

Table 5.2.: Percentage of households belonging to different communities in the hamlets under Rimbick Gram Panchayat, 2018

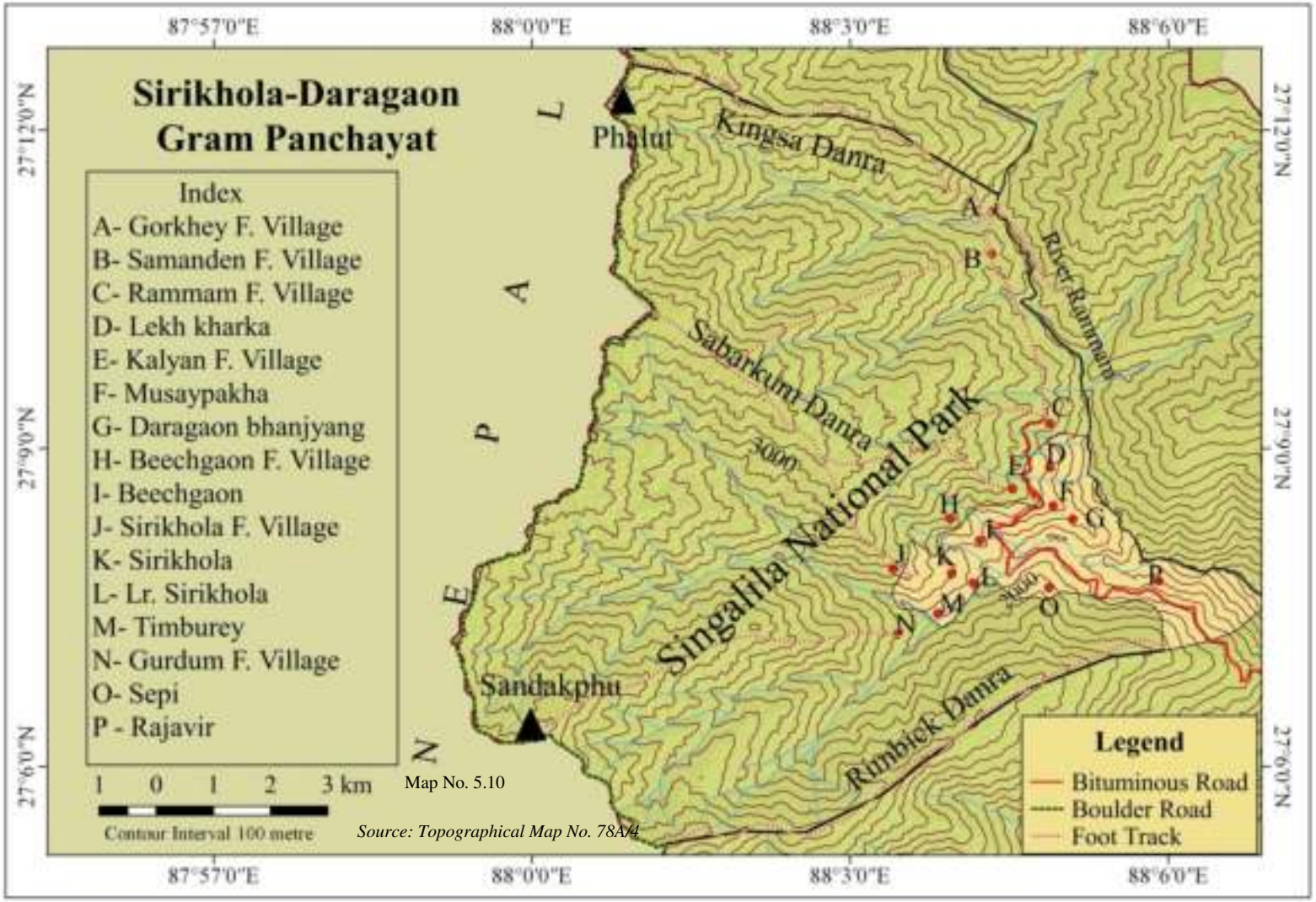
Hamlets	Total Household	Giri/ Thapa	Rai	Sherpa	Tamang	Subba	Thami	Pradhan	Kami	Limbu	Bhutia	Lepcha	Agarwal/Marwari/Bareili/Behari	Kafle/Mintri	Sarki/ Kharka	Mangar	Damai/ Mukhia	Other	Total
Jawleygaon	87	0	26.44	14.94	1.15	2.29	0	44.83	0	0	1.15	3.45	0	1.15	1.15	2.30	1.15	0.00	100
Maneydara	151	1.99	39.74	27.81	3.31	0	0	18.54	0	0	1.99	0	0	0	0	0.66	0	5.96	100
Rimbick	155	0.64	7.1	7.1	12.26	0	3.87	20.64	7.1	0	3.87	1.29	20.65	0	0.64	0.64	9.68	4.52	100
Dilpali	91	6.59	71.43	0	3.3	15.38	0	0	0	0	0	0	0	0	3.3	0	0	0	100
Lampati	44	0	84.09	4.56	0	2.27	0	2.27	0	0	0	0	2.27	2.27	0	0	0	2.27	100
Tubun-Gumbadara-Yakreybong	239	1.26	11.71	0.84	0.84	0.84	0	15.89	0.84	0	1.26	53.13	2.92	3.35	0.42	0.84	0	5.86	100

Source: Rimbick Gram Panchayet office

Table 5.3: **Percentage of Population belonging to different communities in the hamlets under Sirikhola-Daragaon Gram Panchayat, as per Socio-Economic Census, 2012**

Hamlets	Total population	Gurung	Rai	Sherpa	Tamang	Subba	Thami	Pradhan	Kami	Chhetri	Bhutia	Bhujel	Agarwal	Bengali	Mukhia	Mangar	Darji	Total
Lekharka/Baishakl	488	0.61	90.78	0.61	7.79	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
UpperDaragaon/M	342	0.58	75.73	11.40	0.00	5.85	0.00	0.00	6.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
DaragaonBhanjyar	320	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
Beechgaon	225	0.00	28.00	72.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
Sirikhola	269	0.00	36.80	49.07	0.00	5.20	0.00	1.49	0.00	1.86	0.00	0.00	2.23	0.00	0.00	0.00	3.35	100.00
Lower sirikhola/Ti	238	0.00	0.00	51.68	33.19	1.26	0.00	0.00	0.00	7.98	2.52	0.00	0.00	0.00	0.00	0.00	3.36	100.00
Rajavir	264	0.00	96.21	0.76	0.00	3.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
Sepi	488	0.00	88.93	4.92	0.00	0.00	0.00	0.00	0.00	1.02	3.28	0.00	0.00	0.82	1.02	0.00	0.00	100.00
Gorkhey F. Villag	157	0.00	29.94	36.94	10.19	0.00	0.00	0.00	0.00	19.11	0.00	0.00	0.00	0.00	0.00	3.82	0.00	100.00
Rammam F. Villag	261	0.00	24.14	20.31	27.59	1.92	6.51	1.92	2.68	8.81	0.00	1.15	0.00	0.00	0.00	4.98	0.00	100.00
Samanden F. Villa	127	0.00	28.35	52.76	0.00	6.30	0.00	0.00	0.00	12.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
Kalyan F. Village	136	3.68	0.00	96.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
Sirikhola F. Villag	46	30.43	10.87	23.91	0.00	0.00	0.00	0.00	0.00	34.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
Beechgaon F. Villa	85	9.41	0.00	69.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.18	0.00	0.00	100.00
Gurdum F. Village	218	0.00	17.43	47.25	4.59	11.01	8.26	3.21	5.96	2.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
Total	3740	0.86	56.23	26.07	6.18	2.33	0.94	0.59	1.12	3.18	0.59	0.08	0.16	0.11	0.61	0.51	0.45	100.00

Source: Sirikhola-Daragaon Gram Panchayet office



Map No. 5.10

Source: Topographical Map No. 78A/4

Distribution of Ethnic Groups in the Hamlets of Sirikhola-Daragaon Gram Panchayat

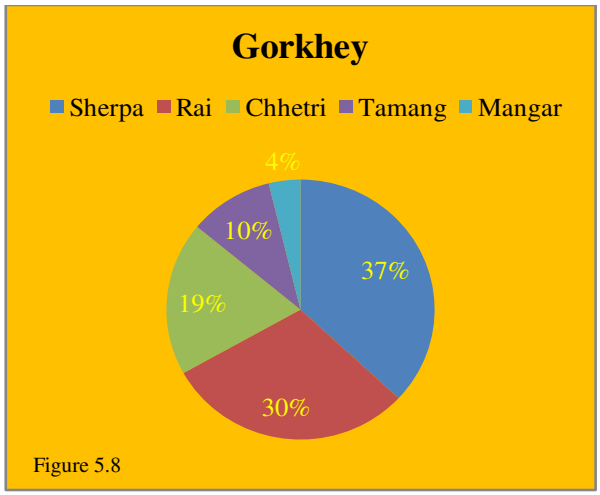
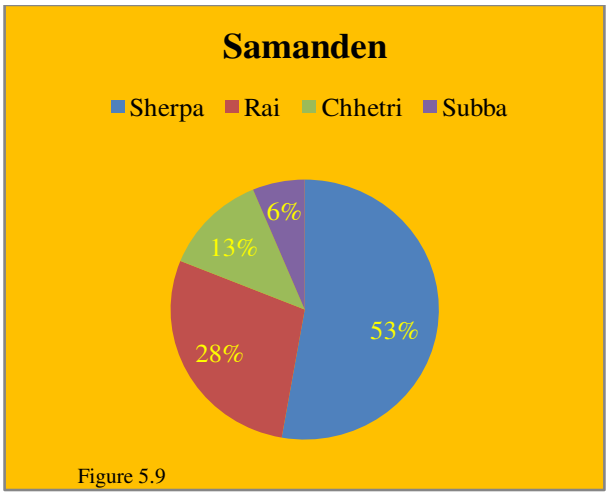


Figure 5.8



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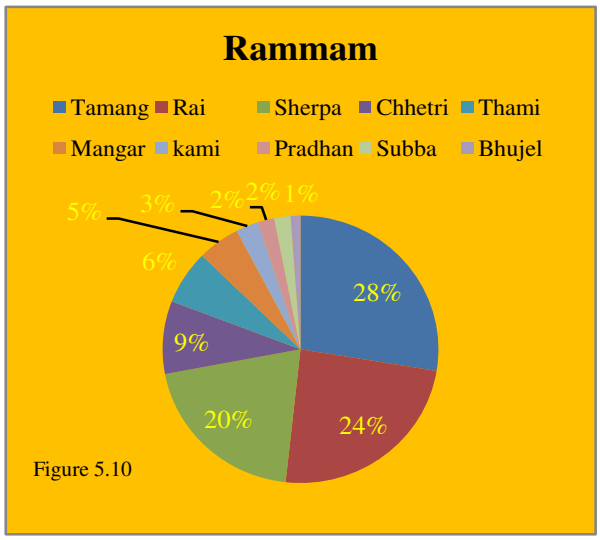

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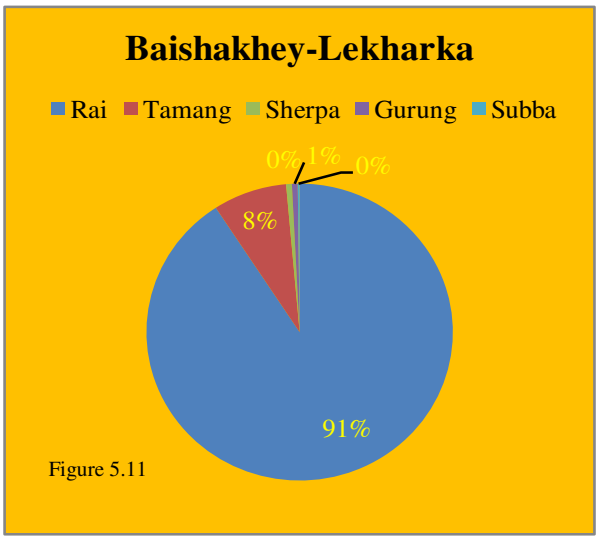

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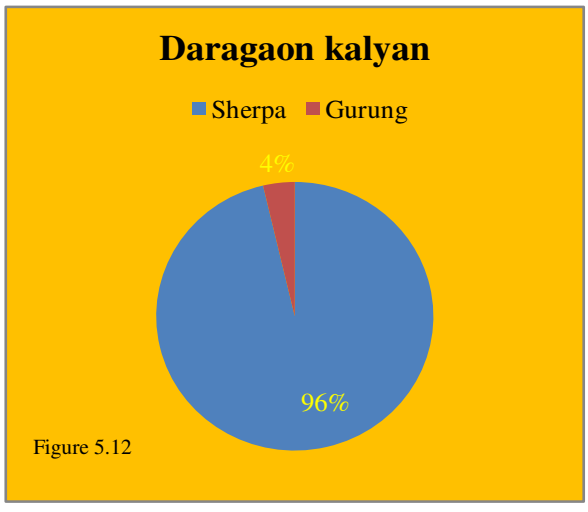

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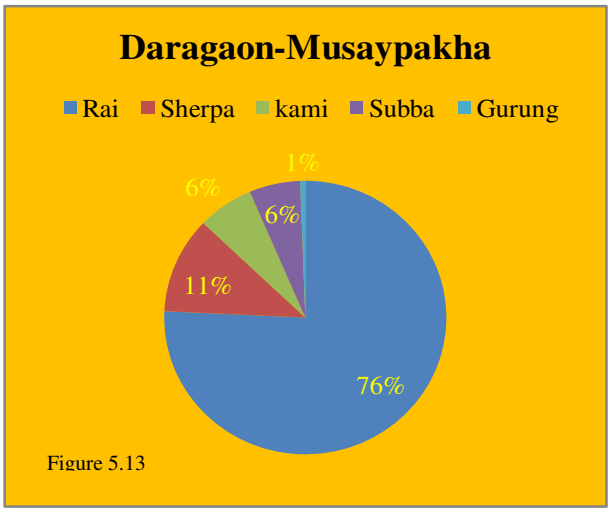
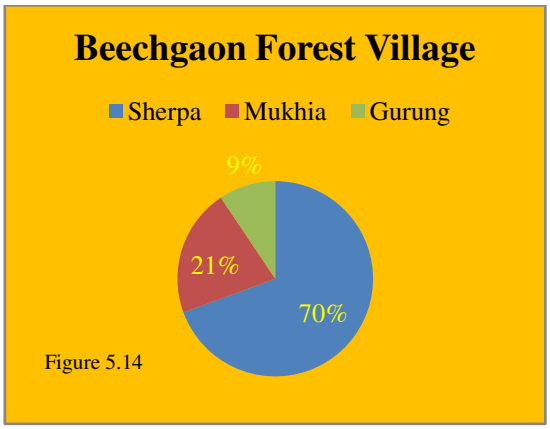


Figure 5.13

Source: Sirikhola-Daragaon Gram Panchayat Office

Distribution of Ethnic Groups in the Hamlets of Sirikhola-Daragaon Gram Panchayat



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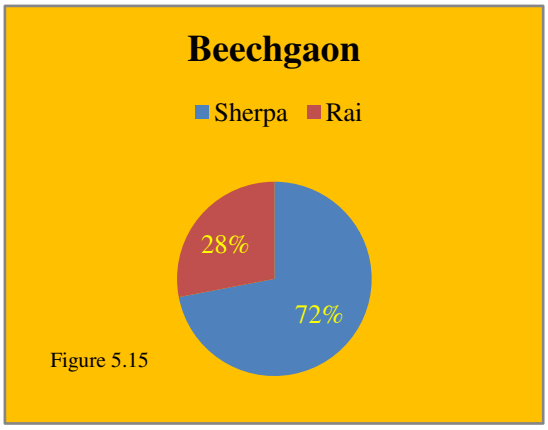

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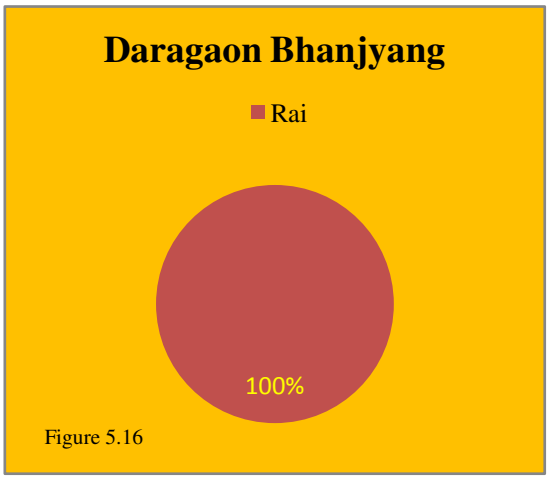

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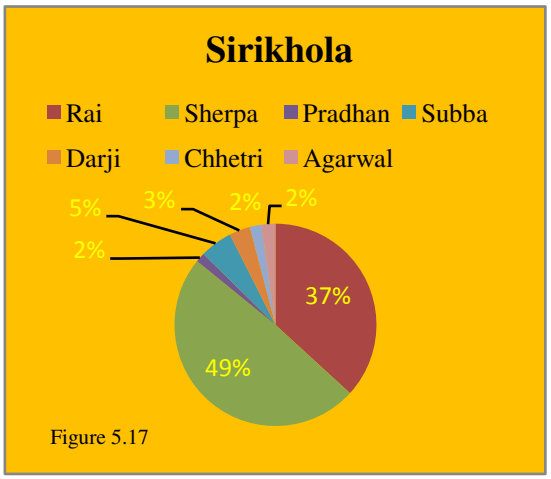

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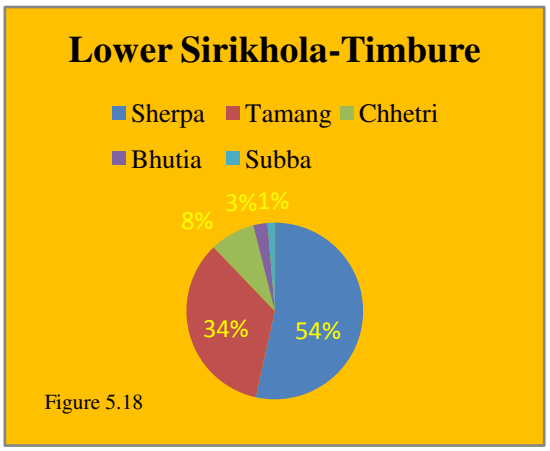

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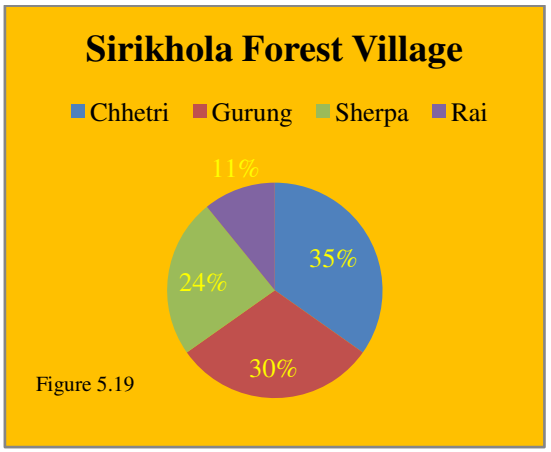


Figure 5.19

Source:Sirikhola-Daragaon Gram Panchayat Office

Distribution of Ethnic Groups in the Hamlets of Sirikhola-Daragaon Gram Panchayat

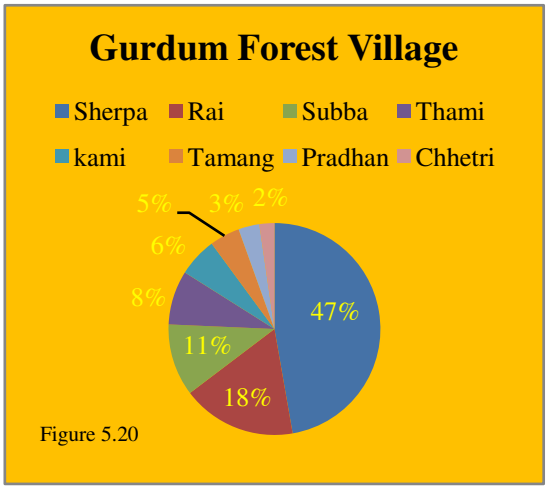
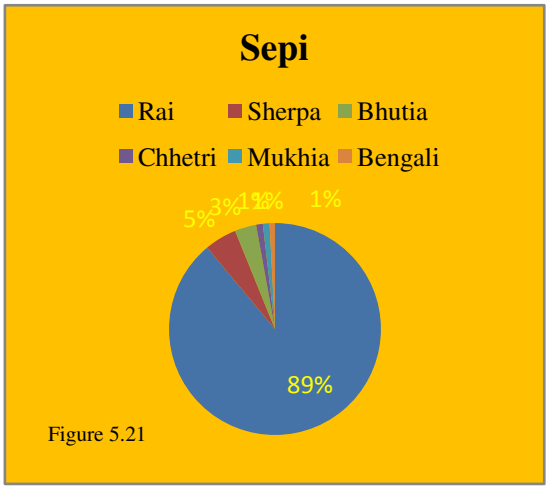


Figure 5.20



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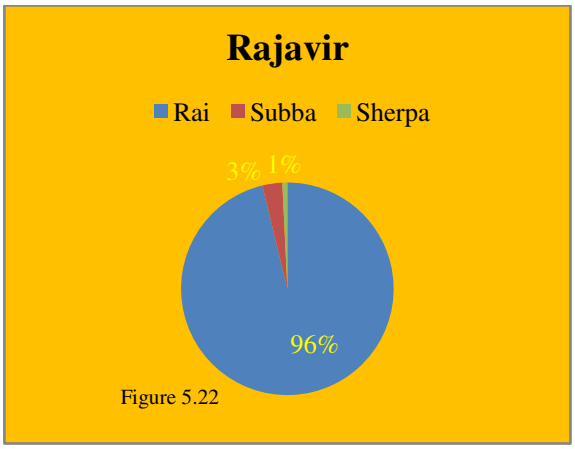

Figure 5.22

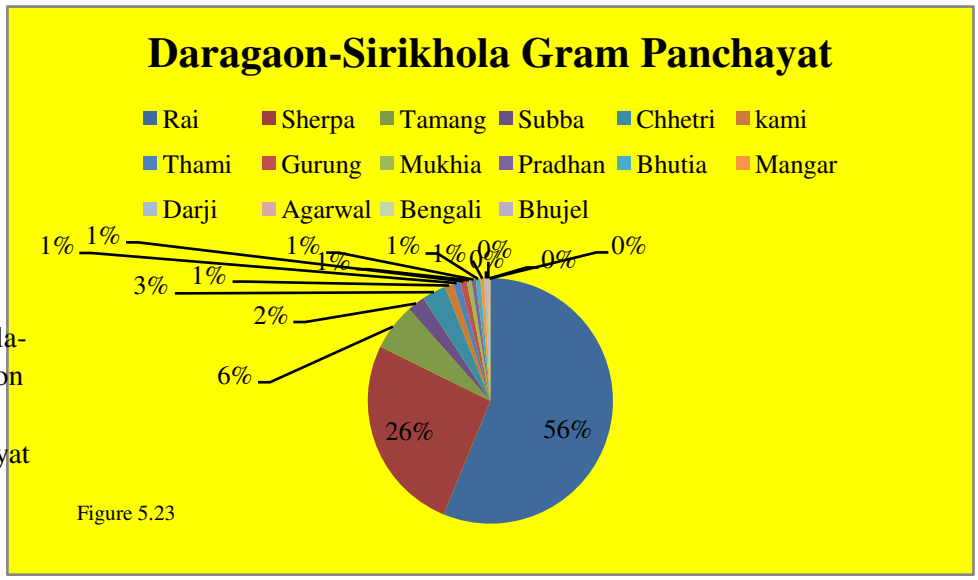

Figure 5.23

Source: Sirikhola-Daragaon Gram Panchayat Office

In the present chapter, attempt has been taken to find out the relation between types of settlement and function of settlement as the second hypothesis taken is 'the types of settlements depend on the functional characteristics of settlements in the study area.' As both the variables, settlement function and settlement types are qualitative/categorical variables so Chi ($\chi 2$) square test has been exercised. The formula for Chi ($\chi 2$) square test is as follows:

$$\chi 2 = \sum \frac{(Oi-Ei)2}{Ei}$$

Where,

$\chi 2$ = Chi-square

Oi = Observed Value

Ei = Expected Value

Here the Null and Alternative **hypotheses** are:

H_0: P = 0 (there is no variation between observed and expected value/ there is no relation between function and type of settlements)

Ha: P ≠ 0 (There is variation between observed and expected value/ there is relation between function and type of settlements)

Table 5.4: Number of Villages under various Functional Groups and Settlement Types

As per R.B.Singh's Scheme (1969)				
Function/Type	**Compact**	**Semi-Compact**	**Hamleted**	**Total**
Settlements with Primary Activity	0	0	14	14
Settlements with Mixed Type of Activity	0	1	18	19
Settlements with Tertiary Activity	2	0	3	5
Total	02	01	35	38
As per R.B. Mandal's Scheme (1972)				
	Compact	**Hamleted**	**Dispersed**	**Total**
Settlements with Primary Activity	0	14	0	**14**
Settlements with Mixed Type of Activity	0	18	1	19
Settlements with Tertiary Activity	1	0	4	5
total	1	32	5	38

Source: Compiled by the Researcher

Table 5.5: Settlements under various Functional Groups and Settlement Types

Sl. No.	Settlements	Primary (%)	Secondary (%)	Tertiary (%)	Total	Group	Group on the Basis of Raffiullah's Method	Type of Settlements	
								R.B singh's Scheme	R.B.Mandal's Scheme
1	Bhareng	94.76	0	5.24	100	**P**	**1 (P)**	H	H
2	Ribdi	77.88	1.95	20.18	100	**P**	**1(P)**	H	H
3	Okhery	79.08	1.26	19.67	100	**P**	**1(P)**	H	H
4	Tikpur	75.2	2.64	22.17	100	**P**	**1(P)**	H	H
5	Siktam	63.3	0.34	36.36	100	**M**	**2 (P+T)**	H	H
6	Salyangdang	29.64	2.06	68.3	100	**M**	**2 (T+P)**	H	H
7	Longchok	35.98	0.2	63.82	100	**M**	**2 (T+P)**	H	H
8	Dhalam	32.65	4.39	62.97	100	**M**	**2 (P+T)**	H	H
9	Timberbong	61.93	1.56	36.51	100	**M**	**2 (P+T)**	H	H
10	Upper Fambong	29.74	4.43	65.83	100	**M**	**2 (T+P)**	H	H
11	Lower Fambong	45.15	4.1	50.75	100	**M**	**3(T+P+S)**	H	H
12	BurikhopRumbuk	83.55	0.29	16.16	100	**P**	**1(P)**	H	H
13	BurikhopDodok	67.16	1.11	31.73	100	**M**	**2(P+T)**	H	H
14	Tharpu	72.45	1.22	26.33	100	**M**	**2 (P+T)**	H	H
15	Soreng	36.4	2.7	60.9	100	**M**	**2 (T+P)**	H	H
16	Malbasey	56.49	10.65	32.86	100	**M**	**3(P+T+S)**	H	H
17	Chumbong	68.58	1.26	30.15	100	**M**	**2 (P+T)**	H	H
18	Rumbuk	74.8	1.18	24.02	100	**M**	**2 (P+T)**	H	H
19	Karthok	67.28	2.45	30.28	100	**M**	**2 (P+T)**	H	H
20	Nayabazar	0.23	2.57	97.2	100	**T**	**1(T)**	C	C
21	Nayabazar F. B.	0	0	100	100	**T**	**1(T)**	C	D
22	Hilley F. B.	3.7	0	96.3	100	**T**	**1(T)**	H	D
23	Soreng F. B.	21.43	0	78.57	100	**T**	**1(T)**	H	D
24	Sombaria F. B.	0	0	100	100	**T**	**1(T)**	H	D
25	Singlila forest	63.66	27.69	8.65	100	**M**	**2 (P+S)**	H	D
26	Rimbick	68.94	9.57	21.49	100	**M**	**2 (P+T)**	H	H
27	Namla	73.53	1.32	25.14	100	**M**	**2 (P+T)**	H	H
28	Lodhama	41.32	0	58.68	100	**M**	**2 (T+P)**	H	H
29	Hatta	81.61	0.55	17.84	100	**P**	**1(P)**	H	H
30	Kankibong	91.94	1.43	6.63	100	**P**	**1(P)**	H	H
31	Jhepi	92.87	0.68	6.45	100	**P**	**1(P)**	H	H
32	Lamagaon	83.21	2.58	14.21	100	**P**	**1(P)**	H	H
33	Kaijalia	75.14	1.19	23.67	100	**P**	**1(P)**	H	H
34	Samalbong	47.69	0.73	51.58	100	**M**	**2 (T+P)**	S	H
35	Kolbong	89.84	2.72	7.44	100	**P**	**1(P)**	H	H
36	Murmidong	84.1	5.39	10.51	100	**P**	**1(P)**	H	H
37	Karmi	87.47	0.67	11.86	100	**P**	**1(P)**	H	H
38	Goke	76.17	0.83	23	100	**P**	**1(P)**	H	H

P: Settlements with Primary Activities; M: Settlements with Mixed Activities; T: Settlements with Tertiary Activities; C: Compact Settlements; S: Semi-Compact Settlements; H: Hamleted Settlements, D: Dispersed

Source: *Computed by the Researcher on the basis of data of District Census Handbook of Darjiling and Sikkim, 2011*

Result

The calculated χ^2 value between settlement type and function of settlements are 14.877 while following R.B.Singh's method and 31.166 while following R.B. Mandal's method. In both of these cases the calculated values are greater than the critical value of 13.277 at.01 level of significance with 4 degrees of freedom; therefore, the null hypothesis can be rejected, and the alternative hypothesis is accepted.

Therefore, it can be said that the function of settlements in the study area and settlement types are closely related. Hamleted settlement type can be found in all the Settlements with agricultural activity in the study area; on the other hand, all the settlements with tertiary activity are compact type of settlements meaning all households are concentrated at one central site.

5.6. Conclusion

From the above discussions, the following conclusion can be drawn:

1. Apart from the forest blocks and Nayabazar, all the villages in the basin are characterized by semi-compact and hamleted settlement types.
2. The settlement patterns found in the Rammam basin depend to some extent on the topography of the site and to some extent on the stage of socio-economic development.
3. The hamlets are resided by various social groups though the dominance of few can be observed in the settlements under study.
4. The types of settlements depend on the functional characteristics of settlements in the study area.

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