CHAPTER V

DEMOGRAPHIC PATTERN AND SOCIO-ECONOMIC STATUS OF THE SUBANSIRI AND ALAKNANDA BASINS

5.1 INTRODUCTION

Excepting the Tibetan part, most part of the Subansiri basin falls in the Indian states of Arunachal Pradesh and Assam. The basin with its different geographical and socio-economic characteristics comprises of the Lower Subansiri district, Upper Subansiri district and Kurung Kumey district which was created by bifurcating Lower subansiri district in April, 2001 of Arunachal Pradesh while the lower portion of the basin lies in Lakhimpur and Dhemaji districts and a small part in Majuli sub-division of Jorhat districts of Assam. On the other hand the Alaknanda basin of western Himalayas falls in the state of Uttarakhand with its different geographical and socio-economic characteristics carrying small parts of Bageshwar and Pithoragarh districts, whole of Chamoli district and Rudraprayag districts. Its lower basin comprises of parts of Tehri Garhwal and Pauri Garhwal districts of the state of Uttarakhand in western Himalayas.

5.2 ANALYSIS OF SOCIO-ECONOMIC STATUS OF THE SUBANSIRI AND THE ALAKNANDA BASINS

The districts falling in the Subansiri basin of Arunachal Pradesh have 18 blocks, 1185 villages and 1480 habitation in 2012 (Table 5.1). Subansiri basin constitutes 19.79% of the total geographical area of Arunachal Pradesh (Final report of CWC, 2014). The total number of villages in the Subansiri basin is 1158, while in case of the

Alaknanda basin it is approximately 2310. Habitation is comparatively more in the upper part than the lower part of the Subansiri basin (Figure 5.1). Most of the people in the basin live in the rural area (Figure 5.2).

Table 5.1: Human settlement in the Subansiri basin

District	Block	Villages	Habitation
Upper subansiri	Baririjo	31	51
	Daporijo	54	103
	Dumporijo	56	92
	Giba	80	89
	Nacho-siyum	65	80
	Siyum	50	51
	Taliha	86	110
	Sub-total	**422**	**576**
Lower subansiri	Tamen- raga	76	93
	Ziro-I CD	59	80
	Ziro-II CD	122	150
	Sub-total	**257**	**323**
Kurung kumey	Chamber CD	78	85
	Hui damin CD	78	86
	Koloriang- sarli CD	56	61
	Nyapin CD	48	73
	Palin	78	81
	Sangram	51	72
	Sarli	41	46
	Tali CD	76	77
	Sub-total	**506**	**581**
Grand total		**1185**	**1480**

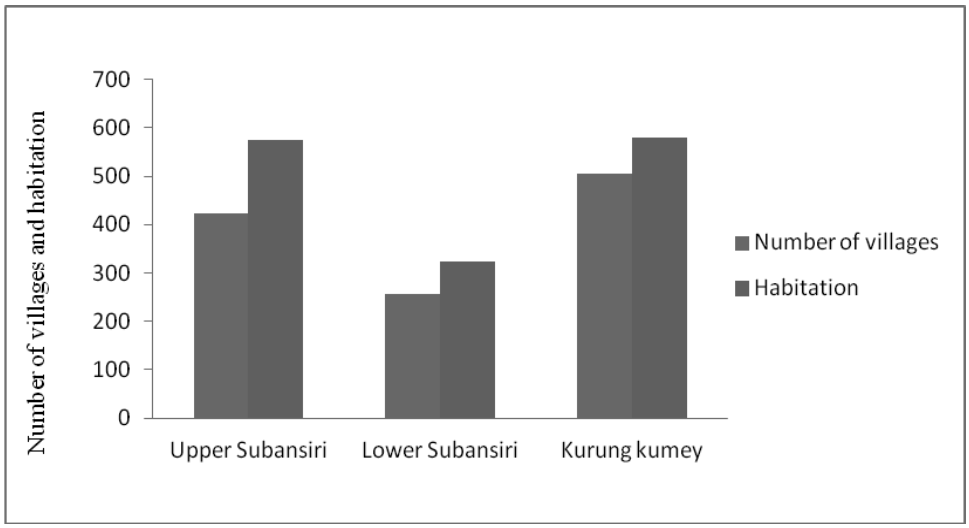

Figure 5.1: Human settlements in the villages of the Subansiri basin

(Source: Adopted from CWC Report, 2013)

Table 5.2: Sources of drinking water in the Subansiri basin

Sources	Upper Subansiri		Lower Subansiri		Kurung Kumey	
	Rural	Urban	Rural	Urban	Rural	Urban
Total number of households	12925	2589	12066	3068	15417	545
Tap water from treated sourc	1876	1839	2197	13289	1477	259
Tap water from un-treated source	7299	698	7613	1693	4763	271
Covered well	52	2	102	14	28	1
Un-covered well	110	2	495	10	951	0
Hand pump	36	0	0	0	0	0
Tube well/Borehole	11	0	142	0	99	0
Spring	902	1	410	15	3611	2
River/Canal	970	8	596	4	2384	1
Tank/pond/Lake	104	2	169	0	390	0
Other source	1592	37	342	4	1714	11
Total	25904	5178	24132	6136	30834	1090

(Source: Compiled from CWC Report, 2013)

Water supply is dependent on stream in the Subansiri basin. Drinking water quality is generally good and fit for drinking purpose after disinfection. The sources of drinking water supply in the basin are given in the Table 5.2. The sanitation system in the Subansiri basin is very poor. It is seen that the people living in urban area of the Lower Subansiri district uses tap water from the treated sources (Figure 5.3) while the people living in the rural area of the Subansiri basin uses untreated tap water (Figure 5.4). The utilization of river and canal water is significant in the rural area (Figure 5.5).

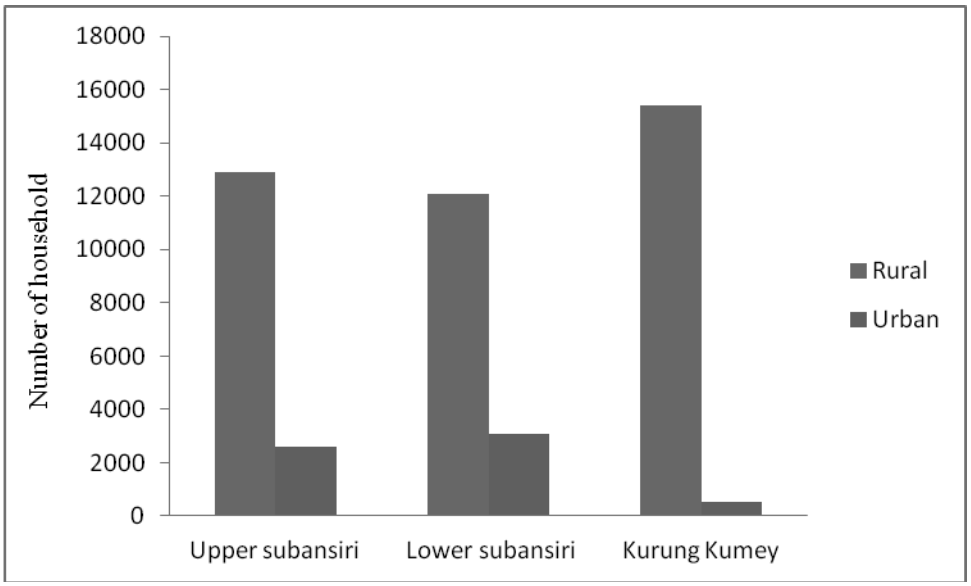

Figure 5.2: Total number of households in the districts of Subansiri basin

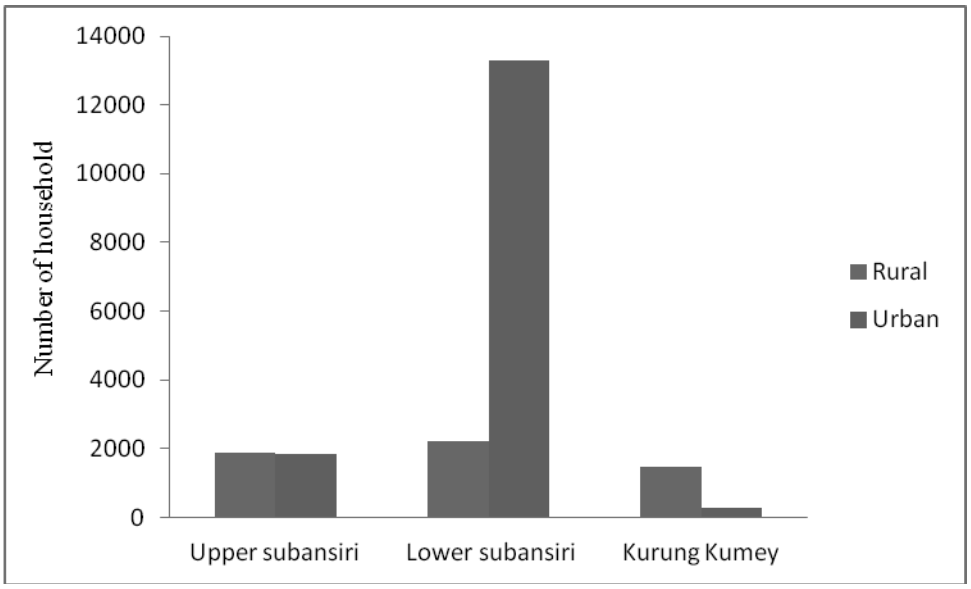

Figure 5.3: Uses of tap water from the treated source in the Subansiri basin

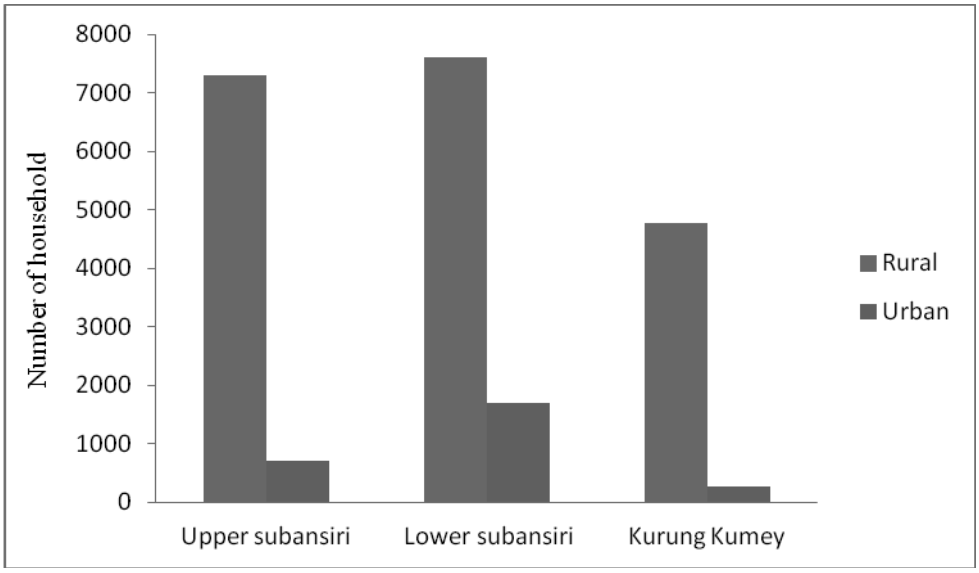

Figure 5.4: Uses of tap water from the untreated sources in the Subansiri basin

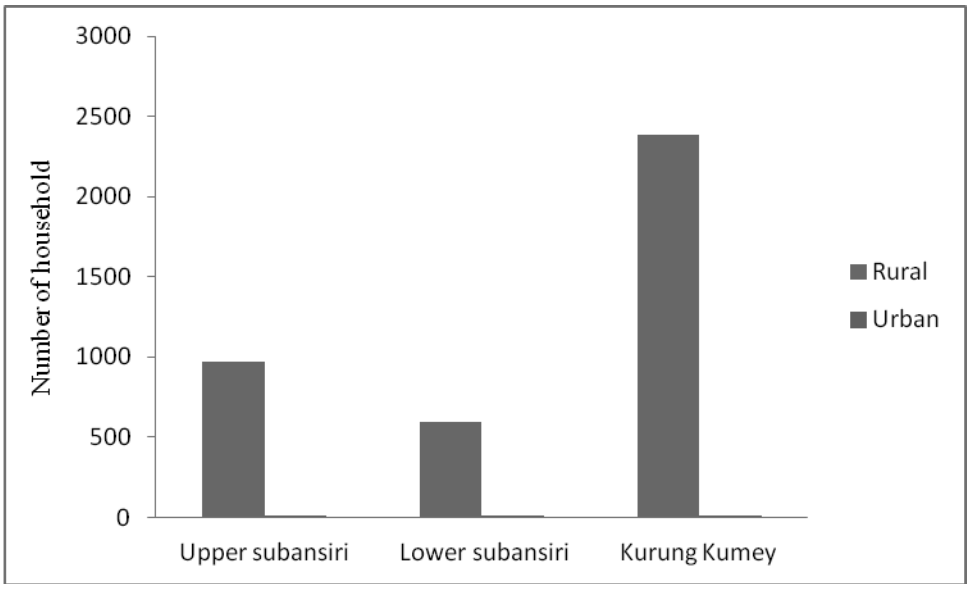

Figure 5.5: Uses of river/canal water by the rural people of Subansiri basin

The main occupation of the people in the plains of the Subansiri subbasin is agriculture. Rice is the principal crop grown there. Besides rice cultivation, mustard, potato, vegetables etc. are also grown in the fertile flood plains of the basin. As the upper portion of the Subansiri basin falls in Arunachal Pradesh, the Apatani people of the state practise wet rice cultivation while the other tribes practise shifting cultivation. Jhum or shifting-cultivation is the most common method of agriculture practised widely by the different tribes throughout the state of Arunachal Pradesh.

Land management is a crucial issue in the Himalayan region. Only 8 % land is cultivable with high population pressure and cropping intensity. It is also used for diverse activities. Economy of the Alaknanda basin is based on cultivation of subsistence cereal crops. Cultivation of fruit on the hilly slopes of Garhwal region has duo impacts on economy and landscape. Agriculture practices are the main occupation of inhabitants of the Alaknanda basin. It is also a main source of livelihood of majority

of the people**.** About 80% population is engaged in the production of cereal crops and livestock farming. Livestock rearing plays a foremost role in the livelihood as it is the second main occupation after farming of subsistence crops. Recent study on livestock farming reveals that the numbers of domesticated animals are decreasing (Sati and Singh, 2010). The main crops of the basin are paddy and wheat. Other important crops of the basin are pulses, barley, millets and oilseeds which are environmentally sound and suitable. In the Alaknanda basin, the production of potato, onion and tomato is noteworthy and the region exports potato to the regional markets. The other vegetables are pumpkin, cucumber, bean, reddish, carrot, coriander and green leafs but these are grown at a domestic level. Among the spices ginger, turmeric, chilli, bay-leaf, coriander and garlic are grown extensively because of the suitable agro-climatic condition.

Livelihood options have also changed in the uplands as outward migration is increasing and this creates a situation where the major source of income is from remittances. As a result of this, the agricultural practices and livestock are showing retardation. The data used for the socio-economic and demographic status of both the basins is shown in the tables (Data in Table I -XXV in Appendix 3).

Plate 5.1, 5.2 and 5.3 show the socio-economic survey and cropping system in the Subansiri and the Alaknanda basins respectively. Figure 5.6 -5.22 are prepared using the data compiled from census India website.

Field photographs related to socioeconomy of the Subansiri and the Alaknanda basins

(a)

(b)

Plate 5.1: Socio-economic survey (a) at Rupohi gaon in the Subansiri basin and (b) at Ganga ghat near Srinagar in the Alaknanda basin

(a)

(b)

Plate 5.2: (a) People washing clothes and taking bath in the river water of the Alaknanda (b) Ganga ghat temple

(a)

(b)

Plate 5.3: (a) Terrace cultivation in Rudrapryag of the Alaknanda basin and (b) Wet rice cultivation in Lakhimpur of the Subansiri basin.

Though the plain part of the Subansiri basin contains high population density i.e. in Lakhimpur and Dhemaji districts, the upper part of it comprising Lower Subansiri, Upper Subansiri and Kurung Kumey districts show relatively lower population size and density. On the other hand, the population is almost uniformly distributed across Garhwal districts of lower elevation to Chamoli district of higher elevation in the Alaknanda basin of western Himalaya (Figure 5.6). Urban population is comparatively less in the Subansiri basin than the Alaknanda basin (Figure 5.7). In case of the female/male population ratio it is significantly high in the Alaknanda basin than the Subansiri basin of eastern Himalaya (Figure 5.8). Temporary and semi temporary types of houses (% of households occupying) are more in the Subansiri basin than the Alaknanda basin (Figure 5.9). Scheduled Caste population (Figure 5.10) is more in the Alaknanda basin while Scheduled Tribe population is more in the Subansiri basin (Figure 5.11). In case of ST population, there exist similarity between Dhemaji and Chamoli districts of the Subansiri and the Alaknanda basins respectively as both of them have a significant number of ST population.

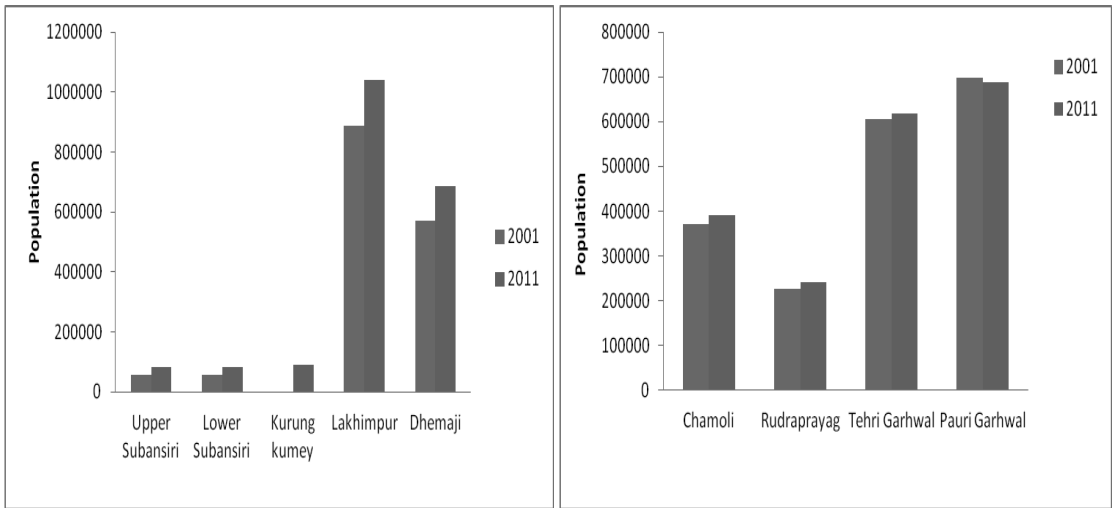

Figure 5.6: Population in the Subansiri and the Alaknanda basins in 2001 and 2011

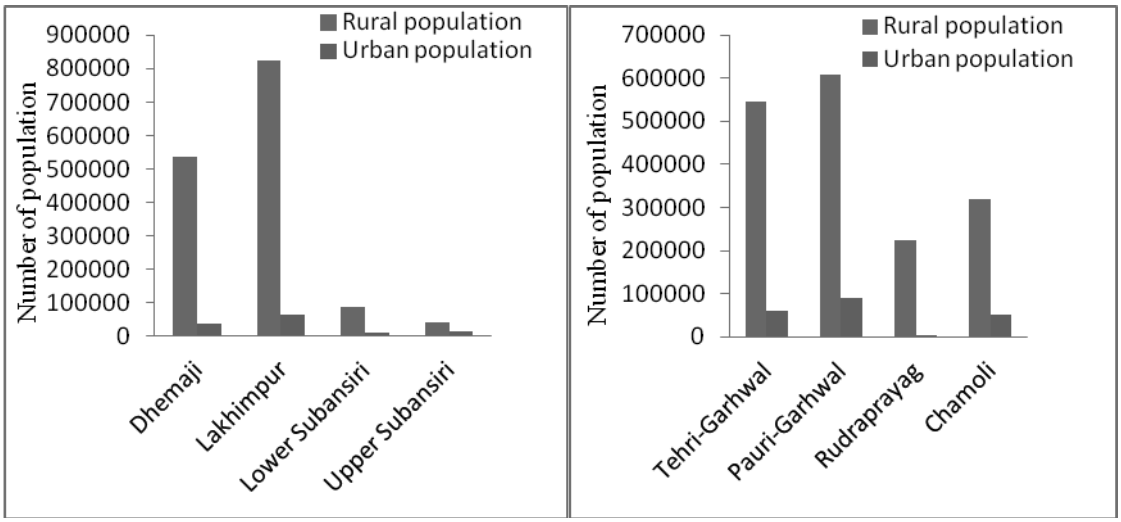

Figure 5.7: Number of rural and urban population in the Subansiri and the Alaknanda basins, 2001

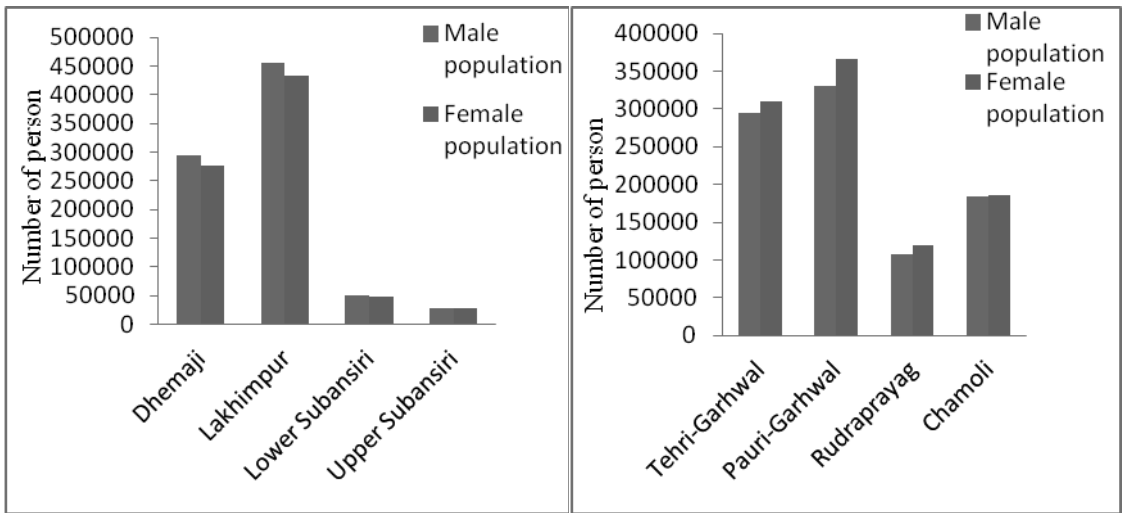

Figure 5.8: Number of male and female population in the Subansiri and the Alaknanda basins in 2001

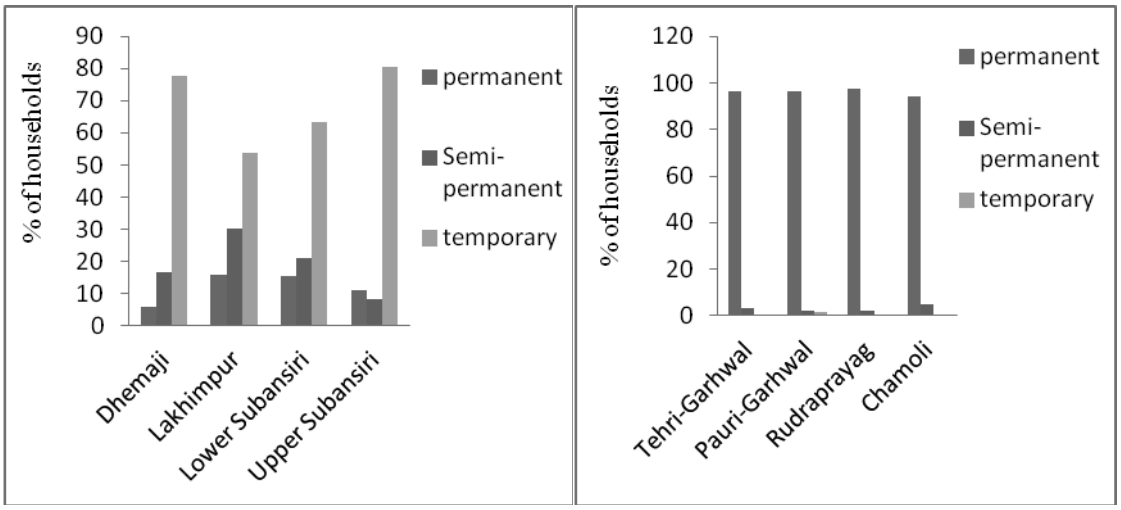

Figure 5.9: Type of house (% of households) in the Subansiri and the Alaknanda basins in 2001

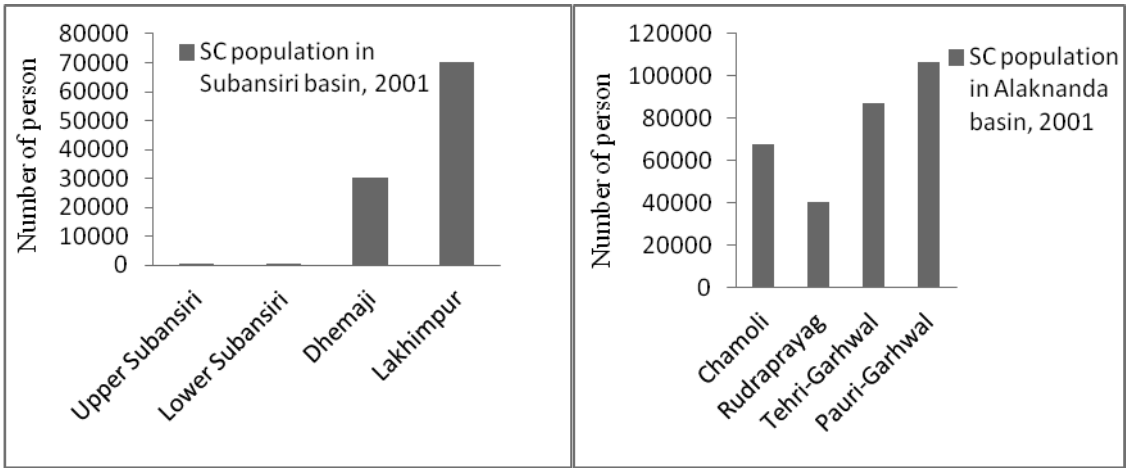

Figure 5.10: Scheduled Caste population in the Subansiri and the Alaknanda basins, 2001

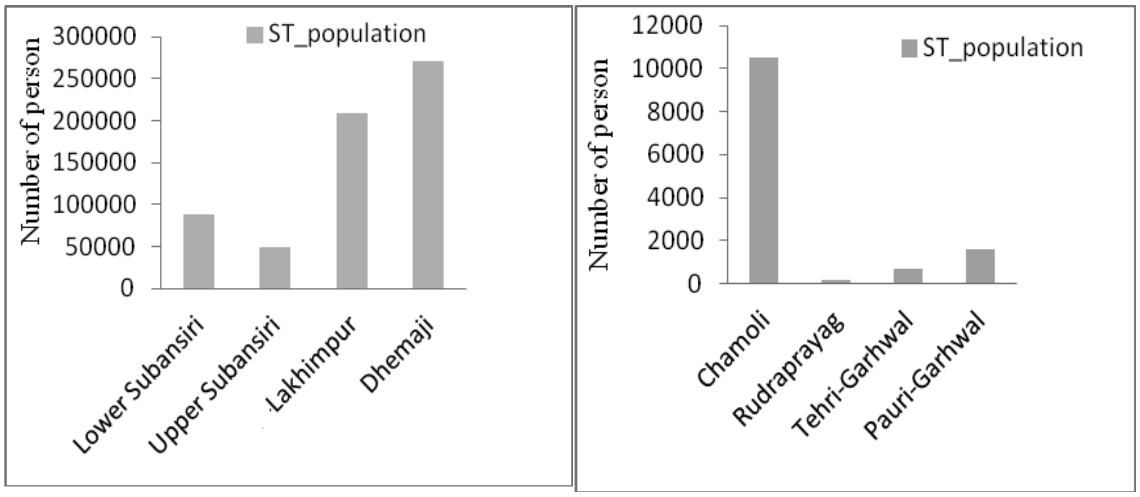

Figure 5.11: Scheduled Tribe population in the Subansiri and the Alaknanda basins, 2001

The numbers of villages having drinking water facilities are more in the Alaknanda basin than the Subansiri basin (Figure 5.12). Figures 5.13, 5.14 and 5.15 show the status of education in both the Subansiri and the Alaknanda basins. The number of villages having primary and middle schools are found to be comparatively more in the lower parts of both the basins than in the higher elevations. It is seen from the graph that the number of villages having primary, middle and secondary/senior secondary schools are comparatively more in the Alaknanda basin of western Himalaya than the Subansiri basin of eastern Himalaya. In case of lower part of the Subansiri basin which includes Lakhimpur and Dhemaji districts, there are more villages having primary, middle and secondary/senior secondary schools than in the upper part of the basin. On the contrary, it is observed that the numbers of villages having schools are distributed from the lower elevation to the higher elevation in case of the Alaknanda basin. A good number of villages having educational institutes are situated in the high altitudes of the Alaknanda basin while it is absent in case of the Subansiri basin.

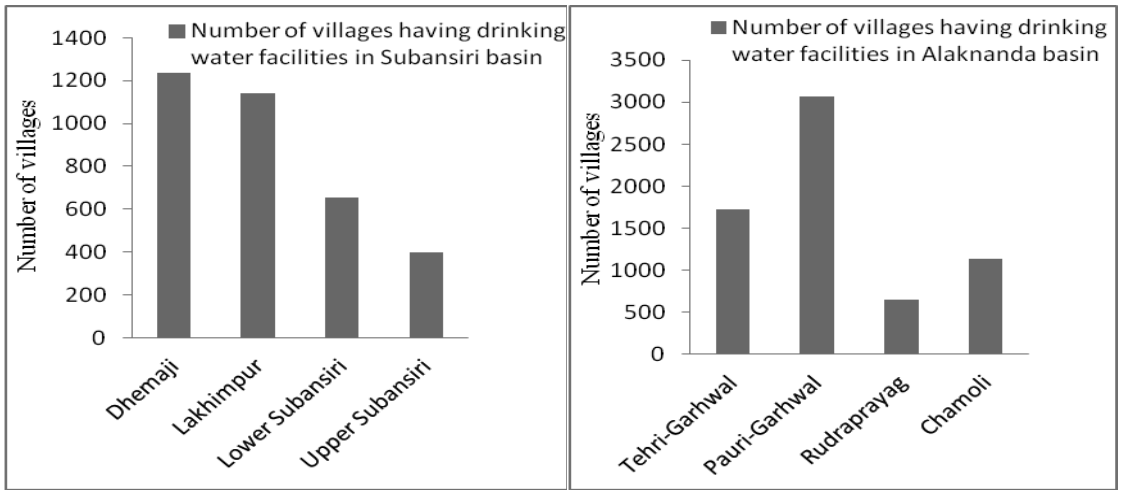

Figure 5.12: Number of villages having drinking water facilities in the Subansiri and the Alaknanda basins, 2001

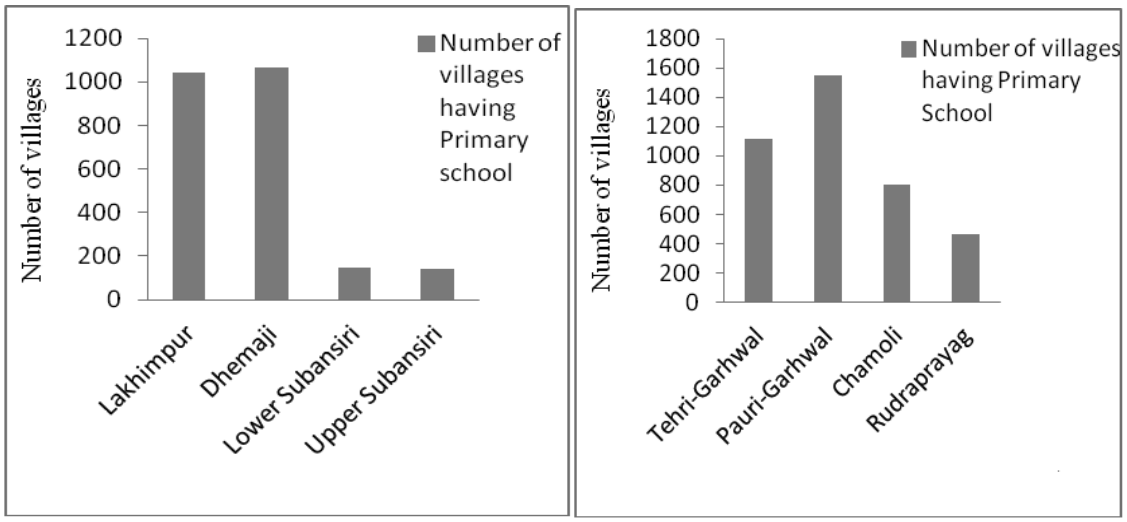

Figure 5.13: Number of villages having primary school in the Subansiri and the Alaknanda basins, 2001

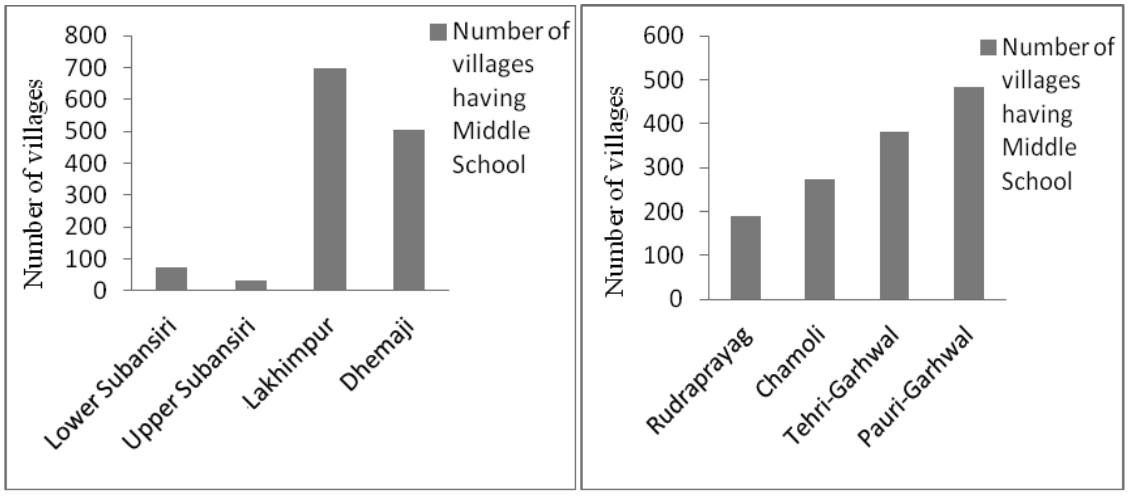

Figure 5.14: Number of villages having middle school in the Subansiri and the Alaknanda basins, 2001

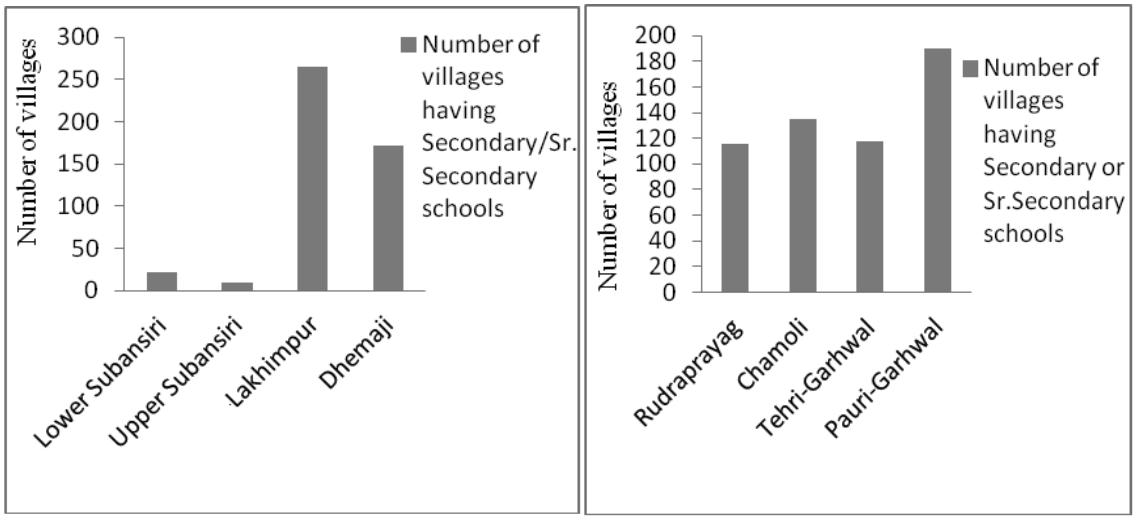

Figure 5.15: Number of villages having secondary/sr. secondary school in the Subansiri and the Alaknanda basins, 2001

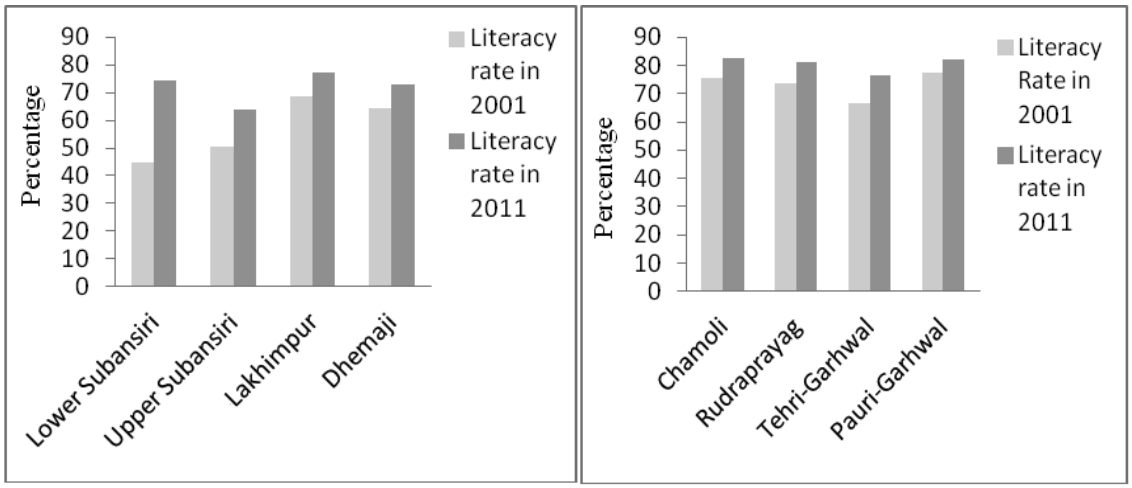

Figure 5.16: Literacy rate in the Subansiri and the Alaknanda basins in 2001 and 2011

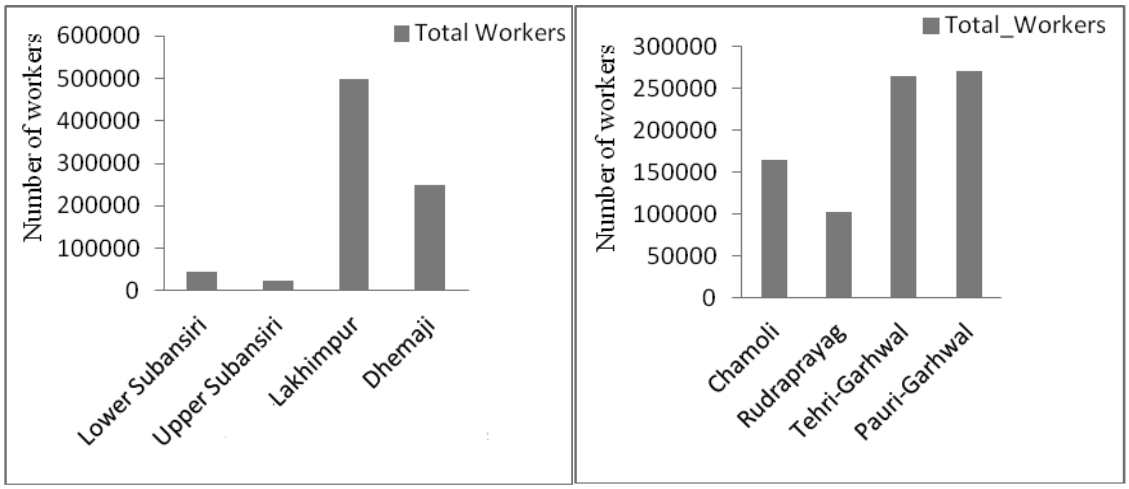

Figure 5.17: Total workers in the Subansiri and the Alaknanda basins in 2001

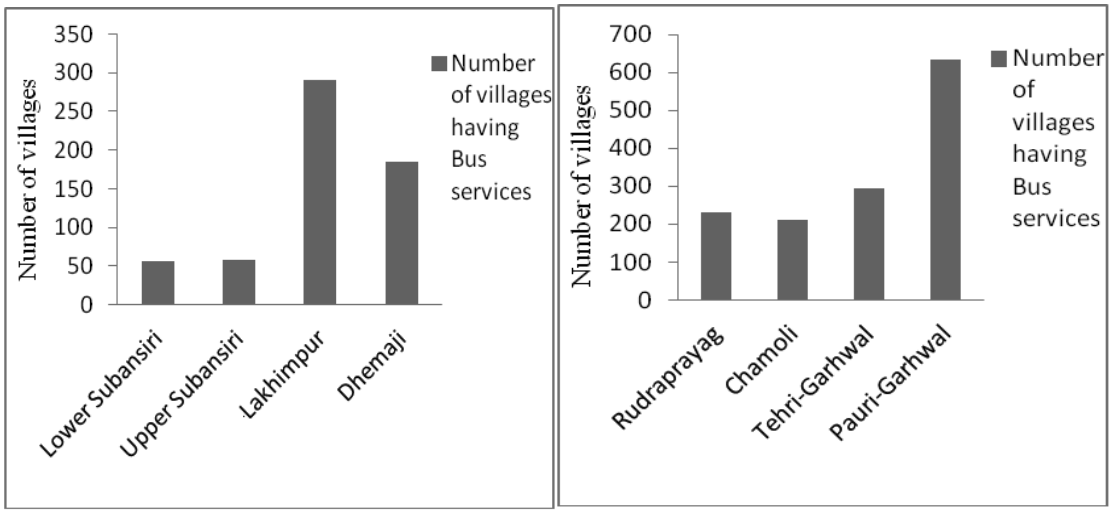

Figure 5.18: Number of villages having bus services in the Subansiri and the Alaknanda basins in 2001

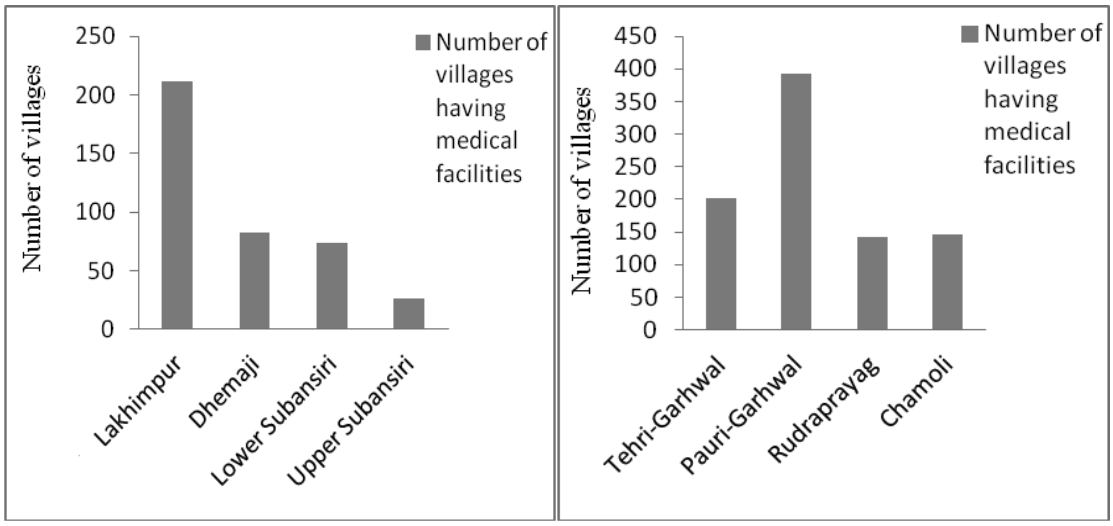

Figure 5.19: Number of villages having medical facilities in the Subansiri and the Alaknanda basins in 2001

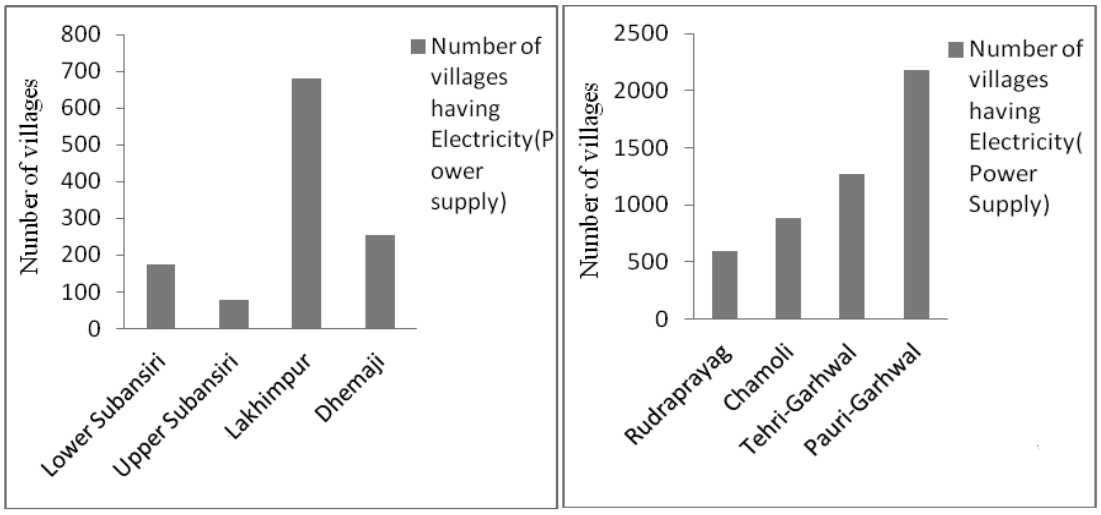

Figure 5.20: Number of villages having electricity (power supply) in the Subansiri and the Alaknanda basins in 2001

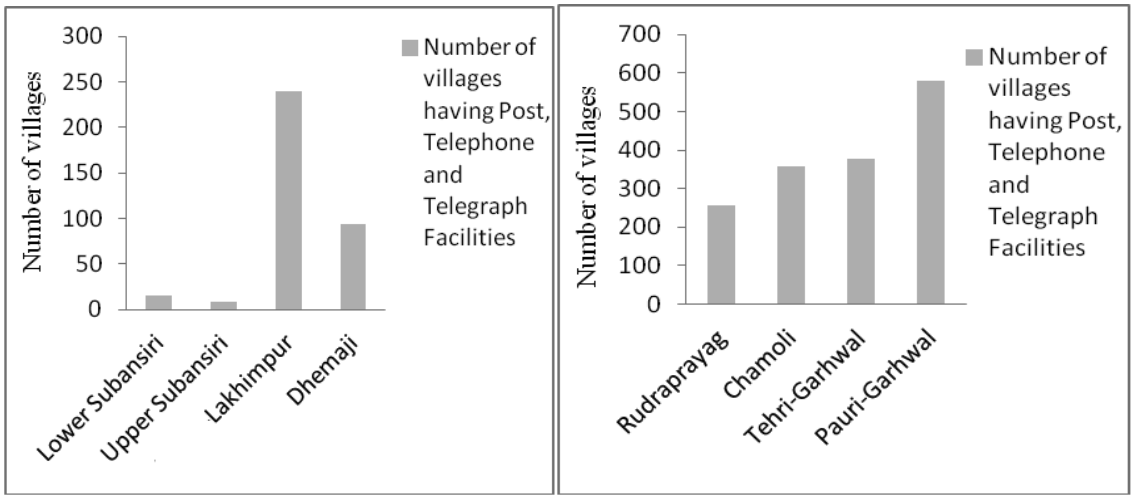

Figure 5.21: Number of villages having post, telephone and telegraph facilities in the Subansiri and the Alaknanda basins in 2001

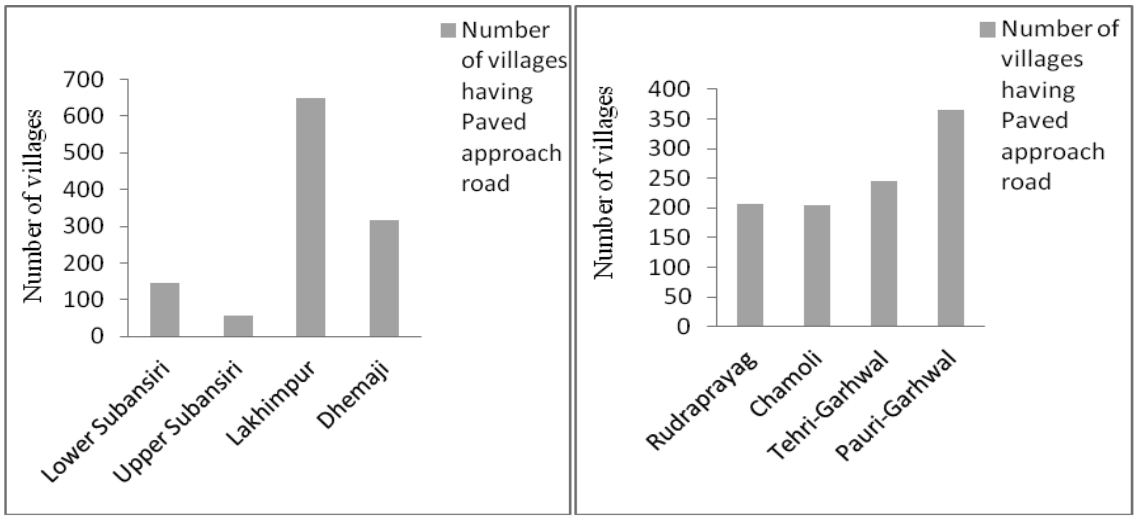

Figure 5.22: Number of villages having paved approach road in the Subansiri and the Alaknanda basins in 2001

It is revealed that the literacy rate is more in the Alaknanda basin of the western Himalaya than the Subansiri basin of eastern Himalaya (Figure 5.16). Though the literacy rate is seen growing higher in 2011 than 2001 in the Subansiri basin, still it is comparatively less than the Alaknanda basin of western Himalaya. Hence the number of total workers is much more in the Alaknanda basin than the Subansiri basin (Figure 5.17). Number of villages having bus services (Figure 5.18), medical facilities (Figure 5.19), power supplies (Figure 5.20); post, telephone and telegraph facilities (Figure 5.21) and paved approach roads (Figure 5.22) are also seen to be comparatively more in the Alaknanda basin than in the Subansiri basin.

5.3 DAMS IN THE SUBANSIRI AND THE ALAKNANDA BASINS

In modern times, dams are constructed in rivers to harness energy or generate electricity. There are a large number of hydel projects that are in operation, proposed

and under construction in both the river basins, Subansri and Alaknanda of eastern and western Himalayas.

The Subansiri River originates in the high Himalayas in China. It flows east and southeast into India, then south to the Assam Valley, where it joins the Brahmaputra River in Lakhimpur district. Subansiri has tremendous potential for hydropower development because of its topography, rainfall and significant discharge. Out of 19 hydel projects planned in the Subansiri basin, seven pre-feasibility study reports and two detailed project reports are available, of which the 2,000MW Lower Subansiri project (Plate 5.4) is already under construction.

Nineteen (19) hydro electric projects are envisaged in the Subansri basin which are as follows- Oju I (700 MW), Oju II (1000 MW), Niare (800 MW), Naba (1000 MW), Mili (75 MW), Sape (38), Chomi (80 MW), Chela (75 MW), kurang I & II (330 MW), Tamen (175MW), Tago-I (55MW), Subansi lower (2000 MW), Subansiri Middle (1600 MW), Subansiri Upper (2000 MW), Nalo (360 MW), Dengser (552 MW), Tammu (55MW), Nyepin (32 MW) and Hiya (41 MW).

Geological features in the Subansiri Basin show marked variation raging from Higher / Lesser Himalayas, foothills and plains falling in Bomdila group, Miri Group, Gondwana Group and Siwalik Group as well as Alluvium. As the basin has different geological formations with very significant slopes, the river has the tendency of bringing down large volumes of debris material for deposition. There are historical records of earthquake of magnitude 8.7 in 1897 and Assam earthquake, 1950. Since the basin is of fragile geologic nature and falls under highly active seismic zone (V), so the basin warrants strong safety factor in any proposed project intervention.

There are 14 hydel projects on the river Alaknanda currently in operation. These are as below- Badrinath (1.25 MW), Tapovan (0.80 MW), Tharali (0.40 MW), Tilwara (0.2 MW), Urgam (3 MW), Vishnuprayag (400 MW - Plate 5.5), KaliGanga-I (4 MW), KaliGanga-II (6 MW), Koti Bhel IB (320 MW), Koti Bhel II (530 MW), Madhamaheshwar (10 MW), Tapovan VishnuGad (520 MW), Shrinagar (330 MW), Singoli Bhatwari (99 MW).

There are 23 other proposed projects in the Alaknanda River Basin through which the power-potential of the Alaknanda and its tributaries can be harnessed. The proposed 23 Hydel-Projects are as follows -

Alaknanda (Badrinath) (300 MW), Bagoli (72 MW), Bowla Nandprayag (132 MW), Chuni Semi (60 MW), Deodi (60 MW), Devsari Dam (255 MW), Gaurikund (18.6 MW), Gohana Tal (60 MW), Jelam Tamak (60 MW), Karnaprayag (160 MW), LakshmanGanga (4.4 MW), Lata Tapovan (310 MW), Maleri Jelam (55 MW), Nandprayag Langasu (141 MW), Padli dam (27 MW), Phata-Byung (10.8 MW), Rambara (24 MW), Rishiganga I (70 MW), Rishiganga II (35 MW), Tamak Lata (280 MW), Urgam II (3.8 MW), Utyasu Dam (860 MW),Vishnugad Pipalkoti (444 MW).

It is seen from the above study that the number of dams planned in the river Alaknanda of western Himalaya is almost double of the dams planned in the Subansiri basin of eastern Himalaya.

The entire Himalayan region is earmarked for widespread dam building, but aggregate effects of these dams on terrestrial ecosystems are unknown. Disturbance due to dam construction would likely reduce free species richness by 35%, tree density by 42% and tree baral cover 30% in dense forests which is projected for 2015, SAR model

(Kumar et al. 2014). Table 5.3 shows the status of hydroelectric potential development in the study area.

Table 5.3: Status of hydroelectric potential development in the study area

Region/ State	Identified capacity	Capacity developed		Capacity under development		Capacity yet to be developed	
	MW	MW	%	MW	%	MW	%
Assam	680	375.0	55.15	0	0	305.0	44.85
Arunachal Pradesh	50,328	423.5	0.84	2600.0	5.17	47,304.5	93.99
Uttarakhand	18,175	2980.1	16.40	1926.0	10.60	13,269.0	73.01

(Source: Adopted from Kumar et al., 2014)

Plate 5.4: 2000 MW Lower HEP on Subansiri

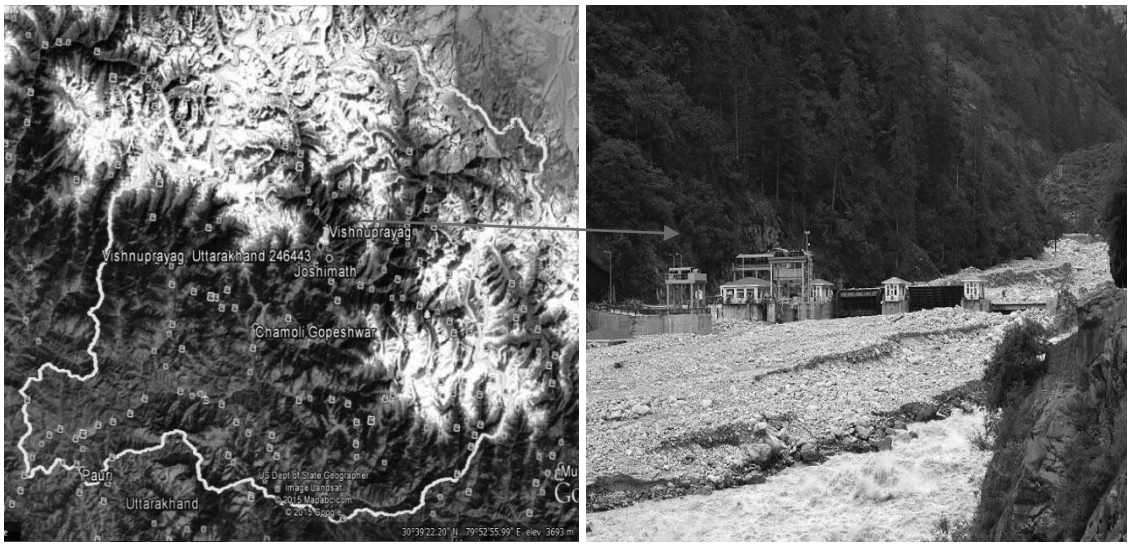

Plate 5.5: 400 MW Vishnuprayag HEP on the Alaknanda basin which was damaged in Uttarakhand disaster 2013

(Source: Photograph of the Vishnuprayag HEP is taken from the website of South Asia Network on Dams, Rivers and People)

5.4 TOURISM POTENTIAL IN THE SUBANSIRI AND THE ALAKNANDA BASINS

Tourism plays a vital role in the socio-economy of a region. It may open a new avenue for the local people to rise above poverty. It helps for augmentation of employment. The entire Himalayan region has diversity in nature of tourism. Modern

mass tourism in the Himalayan region started in the 1950s after Sir Edmund Hillary and Tenzing Norgay climbed the Mt. Everest and made the region popular in other parts of the world that had until then more or less ignored the region (Walder, 2000). Tourism may be of different types such as natural tourism, adventure tourism, wildlife tourism, cultural tourism and pilgrimage tourism etc. Mountaineering, trekking, river rafting, rock climbing, and skiing are the major tourist attraction in the Alaknanda basin. As the Alaknanda basin is a highly elevated snow clad mountain with river valleys, deep gorges, waterfalls of incomparable scenic beauty, it attracts the tourists, both domestic and international. Mussoorie became a major centre of tourist attraction. Adventure tourism is getting popular in the Alaknanda basin, which includes rafting, canoeing, rock climbing and specially skiing in Auli of Chamoli district. The region is famous for national parks, wildlife sanctuaries and biosphere reserves. There is the Valley of Flowers and biosphere reserve like Nanda Devi also in the basin. The basin is woven by a colourful fabric of rich cultural heritage which is also an integral part of tourist attraction. In case of pilgrimage attraction it is famous for Badrinath, Kedarnath, Yamunotri and Gangotri which have tremendous, religious significance. It has Panch Prayags viz. Dev Prayag, Rudra Prayag, Karn Prayag, Nanda Prayag and Vishnu Prayag; Panch Kedars include Kedarnath, Tungnath, Madhyamaheshwar, Rudranath and Kalpeshwar; Panch Badris which includes Badrinath, Bhavishya Badri, Yagdhyan Badri, Adi Badri and Adinath or Bridha Badri. There is noticeable tourist traffic to the shrines of the Badrinath and Kedarnath in the Alaknanda basin. The flow of tourist in this region is not only for its scenic beauty but also for the pleasant and peaceful environment along with better facilities provided for the domestic and international

tourists. The communications was also comparatively good before the Uttarakhand disaster, 2013 which caused devastation and changed the entire landscape.

In Arunachal Pradesh, Gumpa Forests, known as Sacred Groves are attached to Buddhist monasteries. Ziro, located in Lower Subansiri District, is a tourist destination and is known for high altitude fish farm, pine and bamboo groves, trekking and hiking. Talley valley is a sanctuary located in the Lower Subansiri District, 30 km from Ziro. It is known for green paddy fields, paddy cum pisciculture and eco-tourism. Parsi Parlo located in Lower-Subansiri district is known for its scenic beauty, neolithic site, historical/religious sites. Shiva lingam at Kardo forest: It is about 4 Km away from Hapoli township. Millions of devotees offer their prayers, worship and have faith on Lord Shiva in the remote Himalayan region of tribal beliefs and traditions. Menga Mandir is located 22 km North of Daporijo towards Taliha near the confluence of River Subansiri and Mengha River. It is a rock cave temple with two tunnels. Nyokum Yullo is the main festival of the Kurung-Kumey district which is celebrated during the month of February. They also celebrate many different types of fairs and festivals around the year. The lower part of the basin which lies mainly in Assam has famous tourist spots like Majuli and few wildlife sanctuaries and reserve forests. But the communication in the basin is not so developed and tourist friendly. The facilities provided so far are also not so adequet for tourist attraction, except few places. The region has not yet been able to attract mass of tourists from different parts of the world including potentially large internal tourists from within the country not only for the above reasons but further aggravated due to local problems like terrorism and recurrent annual floods, landslides and other disasters.

5.5 RESULTS AND DISCUSSION

From the socioeconomic and demographic study, it is observed that the Subansiri basin is sparsely populated specially in the higher altitude that falls in the state Arunachal Pradesh while a quite opposite scenario is revealed in the Alaknanda basin of western Himalaya. Scattered and sparse pattern of habitation of the state (i.e. Arunachal Pradesh) is indicative of an environment not conducive for rapid economic development. Both the Subansiri and the Alaknanda basins are endowed with the enormous potential of natural resources but due to lack of proper planning and policy, the socio-economic status of the Subansiri basin is still low compared to the Alaknanda basin of western Himalaya.