



Socio-economic impact of hydropower projects in dzongu region of North Sikkim

Binod Bhattarai*, Department of Humanities and Social Sciences, Sikkim Manipal University, 5th Mile, Tadong, Gangtok, Sikkim, India.

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Abstract

The increasing global demand for energy combined with the ongoing quest for clean, renewable energy has been a topic of perceived interest among countries of developed and developing world. Construction and operations of dams have always been associated with changes in the physical, biological and social environment. No doubt electricity generation is the need of the hours for development, but the large projects do involve the submersion of large track of land and the displacement of people. Socio-economic and cultural impacts arising from project construction and environmental transformations are rooted in the complex interactivity between social and biophysical environments. Human communities are integral components of their environment as well as potential agents for environmental change. Hence environmental changes in settled areas are often profoundly interlinked with subsequent changes that occur within society. This paper focuses on the impacts of Hydro-electric power projects in the Himalayan region of Sikkim with special reference to the Dzongu which focus on demographic and Socio-economic changes. While benefits such as employment have accrued to the rural community from these economic development projects, changes in land use and in people's occupations may have adverse impacts on their future livelihoods. The interests of local must be listened to and taken care of during the planning and the policy makers must adopt a model or strategies so that the impacts and effects of such type developmental activities can be minimized and local people who are living in the vicinity as well as who have sacrificed their belongings. To maximize the positive impacts and mitigate the negative environmental, social and economic impacts, sustainability of water resources projects is required.

Keywords: Dzongu, Hydropower, Lepcha, Sikkim, Socio-economic impact.

*ADDRESS FOR CORRESPONDENCE: **Binod Bhattarai**, Department of Humanities and Social Sciences, Sikkim Manipal University, 5th Mile, Tadong, Gangtok, Sikkim, India. *E-mail address:* bhattaraibinod3@gmail.com

1. Introduction

Energy supports all facets of human development, such as providing for basic needs, assisting productive activities, and facilitating effective health care. At present the world is facing serious energy challenges and a turbulent water and the unfolding scenario for water and energy use in many parts of the world is one of increasing concern about access, equity and the response to rising needs and demands. This daunting crisis threatens not only economic progress of many countries, especially that of developing nations but also ecological sustainability of the entire world. This challenge and the serious need for water resources and energy management in the contemporary development of the developing countries has again regenerated renewed interest of the multilateral financial institutions and export credit agencies like the World Bank, International Monetary Fund, Asia Development Bank and other regional banks in large water infrastructure mainly in dams, particularly in Asia and other developing countries after a slight lull in the 1990s and early 2000 (Smith, 2010).

Nesting in the foothills of Eastern Himalaya, Sikkim presents a huge potential for development of hydro power projects. In Sikkim the planning process was initiated in the 1950s; however it was only from 1975* that Sikkim's developmental agenda was placed on a fast track, especially in the field of tourism, communication and Hydro power. Until now the state is not known to many for its plenty of forest, water, minerals and other important natural resources. However the forest resources of Sikkim are to be preserved at any cost for the sake of ecology and environment. Any strategy for development has to be sensitive to the fragile environment of the state. Besides, the prevalent laws preventing felling of trees and destruction of forests are strict and rigid. Considering the fact that Sikkim abounds in swift-flowing streams, the planner and policy makers of the state have focused their attention on the water resources and chalked out an elaborate plan to generate hydro-electric power†. Development planners in Sikkim identified hydraulic gigantism as a panacea for modernizing Sikkim's economy, generating employment for its youth, earning revenue to offset fiscal deficit and servicing its debt, financing human development, and meeting domestic and national energy needs (White Paper, 2009). It has also been widely acclaimed by the state government as the savior of Sikkim, the path to economic independence; for Sikkim is heavily dependent on the central government for funding.

With the onset of the new Economic Policy, the hydro-power juggernaut began to roll in Sikkim. The state plans to produce a gigantic 5000 MW of power annually whereas its domestic needs amounts to only about 100 MW (Choudhury, 2007). According to the 17th Power Survey of India, the peak energy demand in the state is around 83 MW in 2011-12 and in next ten years it is expected to be not more than 150 MW. Much of the water resources of Sikkim flow from the high Himalayas of north Sikkim into the low laying areas of West Bengal, but it was not until the late 1990s that feasibility studies and impact assessments started to take place. As the Indian power sector opened up to private investment in the early 1990s, the Government of Sikkim began trying to attract investors to the state, resulting in a comprehensive hydropower policy in 1998 (McDuie-Ra, 2011). Environmental clearance for the Teesta dams was granted in 1999, and in 2002, 26 companies were chosen to sign agreements with the Government of Sikkim to begin the projects. In the following years the Government of Sikkim and the relevant commissioned companies began to hold community consultations and negotiate memorandums of understanding (MoU) with affected communities. It was during these consultations that the projects began to be questioned and opposed.

Much of the water resources in Sikkim lies in the north district, of which the Lepcha settlement of Dzongu is a part and number of proposed power development sites are located or

* Till 1975 Sikkim was a hereditary monarchy, when it merged with India to become the 22nd state of the country.

† The central electricity authority after its 2001 preliminary ranking study of the hydroelectric potential of river basins in India lunched a hydro power initiative to produce 50,000 megawatt of electricity. This Initiative was launched by the then Prime Minister of India in May, 2003.

in progress adjacent to Dzongu. Most of the proposed power plants are mega projects involving huge amount of money, manpower, and large-scale construction as well as submergence of land. The proposed projects have raised concerns among the environmentalists and inhabitants regarding the cumulative impact of the project on the landscape and people (Arora, 2009). The River Teesta and its tributaries sustains a host of indigenous communities, including the Sherpas, the Lepchas, the Bhutias and the large sections of Nepali ethnic groups who have their traditional based livelihoods. It is an integral part of the Sikkimese ethos. The River Teesta not only sustains the livelihood of the locals by preserving and propagating the rich bio-diversity which includes the cultivation of the main cash crop of the State - Cardamom, but is also the very backbone of Sikkim's cultural heritage. Much of the folklores and traditional ways of life revolve around the mighty Teesta and the Rangeet Rivers.

The hydroelectric projects here is not only bringing about socio-economic and demographic changes but is also drastically redefining the land use pattern that is often associated with displacement of people from their ancestral habitats, and at the same time is causing large-scale loss of traditional culture that is sometimes resented by the local population and are often not easily acceptable to the local population resulting to turmoil and conflicts in a relatively peaceful area.

2. Objective and Methodology

The present study focuses on the impacts of Hydro-electric power projects on the socio-economic changes in the Himalayan region of Sikkim with special reference to Dzongu. Statistically, various graphs, diagrams and methods has been used for the study. The demographic change and economic change of the state has been analyzed since 1971 census till the recent census data of 2011. Eleven Villages of Dzongu region has been taken up for the study which includes Lingthem, Lingdem, Sakyong-Pentong, Lum, Sangtok, Gnom Samdong, Hee Gyathang, Barfok, Lingdong, Upper Mangshila, Lower Mangshila. The data of these villages from 1991 till the recent has been collected and analysed. Further, the impact has been compared to the overall changes of state.

3. Study Area

Dzongu, the region which has been taken up for the study is located at Mangan Sub-division of North District. Dzongu is a Bhutia term that literally means 'nine districts'. Lying at the close proximity to the Kanchendzonga Biosphere Reserve at an elevation ranging between 3000ft and 20,000ft above sea level, Dzongu is an unpolluted and least trodden territory in Sikkim Himalayas (Gorer, 1967). Dzongu is bounded on the south-east by the river Teesta, on the north-east by the river Talung and on the third side by the mountains south of Kanchenjunga. At present, the enclave of Dzongu covers an area of 15,845 hectares of land. Most part of Dzongu is forested region and fed by two important rivers, the Teesta and Tolung. The area is very remote, and is surrounded by sharply tilted verdant mountains that are stacked on top of each other at a forbidden angle. For the most part, the land is unfit for agriculture because of the precipitous and rocky slopes. About a third of the land is heavily forested. Still uninfluenced of modern civilization the traditional Lepcha Communities in Dzongu live in relative isolation from the outside world with their own traditional practice and believe.

3. Population Crescendos in Dzongu

Dzongu is a Lepcha reserve zone in North Sikkim. It has a population of approximately 7745 people (State Socio Economic Census, 2006). They are distributed in different blocks. Dzongu was declared a special protected area in 1957 by the king of Sikkim in recognition that it is the Lepcha's sacred land through Notification No 3069 of 1958 which prohibits the settlement of Non- Lepcha people in the region. The proclamation regarding the protected area continues

even after Sikkim's merger with India and the land rights in Dzongu are still reserved for Lepchas only. The non-indigenous persons are denied entry in Dzongu without valid permit. Entry restrictions are strict, even Lepchas from other parts of Sikkim are not allowed to settle in Dzongu, and most outsiders can only gain permits for short visits. All land in Dzongu is Lepcha owned and though it can be leased to non-Lepcha labourers, work permits are only given through the invitation of a Dzongu resident and these have to be renewed every year.

4. Demographic Changes in Sikkim

Sikkim is a second smallest state of Indian union and its became a 22nd state on 16th May 1975, with total population of 607688, (321661 males and 286027 females) as per the census of India 2011, which occupies a geographical area of 7096 Sq. km. and having literacy rate 82.40%. Sikkim economy is driven by the secondary and tertiary sector, where tourism sector promote as an economic growth engine (Bhattacharai & Pandey, 2012). Agriculture is practice in an organic process base on terrace farming and cultivation of crops like orange, large cardamom, tea etc. At a Compound Annual Growth Rate (CAGR) of 2010 primary sector contribute 9.9%, secondary 17.2% and tertiary 15% with the growth rate of 19.24%. These growing needs of the Sikkim economy have attracted a large numbers of migration and immigration people in the State; it has also accounted a large number of migration populations which has been coming from nearby States and the neighbouring country. According to State Socio Economic Census (SSEC) 2006, non-Sikkimese (migrants) people constitute 146564 person 25.20% to its total population in Sikkim. In Sikkim migration or migrants were categorized on the basis those, who don't possess COI (certificate of Identification), SSC (Sikkim Subject Certificate) and land registration document (Parcha), this growing migration in Sikkim has impacting the economy.

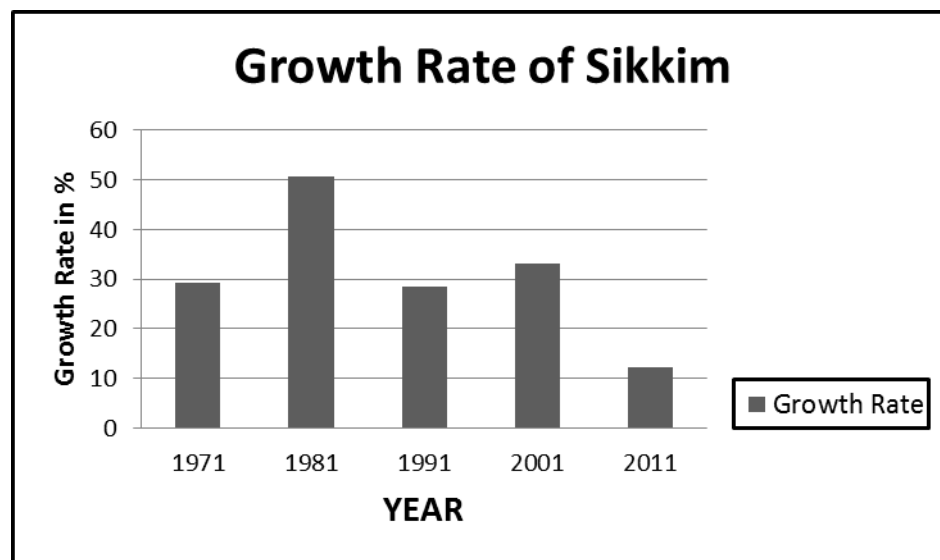
The population of Sikkim has increased to more than 6.07 lakhs in 2011 from 2.09 lakhs in 1971 which is around 190% increase. The growth rate of the state is not static but it goes up and down in each decade. In 1971 decadal growth rate was 29.38% (Table 1), which was lowest in the north eastern India only after Mizoram and 16th in the all India ranking. Between 1971 and 1981 there was a substantial increase of 50.77% at a rate of 5.07 per cent per annum, especially in the urban areas. This could be attributed to the merger of Sikkim with the Indian Union in 1975 and the subsequent influx of population in Sikkim from other parts of the country triggered off by large-scale development activities in the State and it was recorded the highest growth rate in the north eastern states of India and ranked 4th in entire country. Again in 1991 growth rate has fallen to 28.47% which was recorded lowest only after Assam in the North Eastern category. 33.06% of population was added in the total population of 2001 which was the 6th highest growth rate states of India and 2nd highest among the North Eastern only after Nagaland. However, the population of Sikkim continues to account for only 0.05 per cent of the country's population in 2001. The Census data of 2011 shows that the peoples added in the total population of Sikkim is 12.36% (1.24% annually) which was second lowest among the North Eastern states (after Nagaland, lowest in the country) and 29th in the entire country. The growth rate of population between 2001 and 2011 shows that the state might be entering the final stage of the demographic transition. The results may be because of developmental activities and literacy of the state. The density of population of state is increasing since 1971 which has 30 persons per square kilometres in 1971 and gradually increased to 86 persons per square kilometres adding 56 persons per sq. kms in 40 years.

Table 1. Show the Comparative Population, Sex ratio, Density, Growth Rate and percentage of Migration in Sikkim.

Year	Population	Sex Ratio	Density	Growth Rate	% of Migration in total population
1891	30458	938	4	-	-
1901	59014	916	8	93.76	-
1911	87920	951	12	48.98	-
1921	81721	970	12	-7.05	-
1931	109808	967	15	34.37	-
1941	121520	920	17	10.67	-
1951	137725	907	19	13.34	-
1961	158589	904	23	17.76	-
1971	209843	863	30	29.38	35
1981	316385	835	45	50.77	61
1991	406457	878	57	28.47	57
2001	504851	875	76	33.07	34.6
2011	607688	889	86	12.36	-

Source: 1991 census, 2001 census, 2011 census, and SSES 2006.

Figure 1. Growth rate of Sikkim



Sources: Census of India 1971, 1981, 1991, 2001, 2011

5.1. Age sex structure

There is a notable change in the age and sex composition of population of the state. The percentage of population below 14 years which is considered as the dependent population almost remain same in 1971, 1981 and 1991 with little more than 39% of the total population of the state. But in 2001 Census it falls down to 34.93% of the total population. The percentage of population of child below the age group 6 years was 18.37 % in 1991, 14.4 % in 2001 and further falls to 10.05% in 2011 provisional census report. The absolute decrease of population in this age group was 74647 in 1991 to 78195 in 2001 and in 2011 it goes down to 61077. The aged population of more than 60 years is increasing in each decade since 1971. It was 3.31%, 4.39%, 4.55% to the total population in 1971, 1981, 1991 respectively and it increased to 5.78% in 2001, which shows that there will be the huge problem related to the aging in the coming future. The

male female ratio in 1971 was 863 per 1000 males which goes down to 835 in 1981 mainly because of the male migration after the annexation. After that it has increased slowly to 889 females per thousand males in 2011. It is interesting to note that in 1971 the percentage of female to the total population in the age group of 0-14 years was 20.4% and it was less in case of male which was 18.45% in the same group. Sikkim compared to others North Eastern states has lowest sex ratio. In 1971 and 1991 its sex ratio was higher than Arunachal Pradesh but lower than all other North Eastern states. In 1981, 2001 and 2011 it ranks last among the North Eastern states in terms of sex ratio. In all India ranking also it ranked less than 28th in all census year since 1971.

Table 2. Changes in age structure

Age Group	Census Year			
	1971	1981	1991	2001
0-14	39.2	39.6	39.21	34.93
15-59	57.5	56.01	54.95	59.34
60+	3.31	4.39	4.55	5.7
Age not stated	0.03	-	1.28	-

Sources: Census of India 1971,1981,1991,2001, 2011

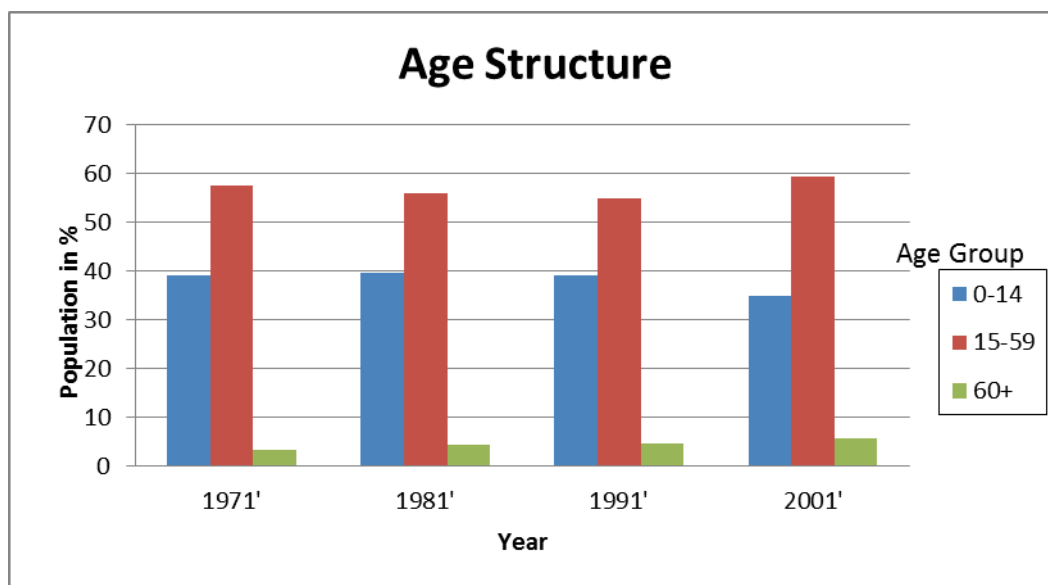


Figure 2. Age Composition

6. Migration in North Sikkim including Dzongu

The Lepchas are mainly concentrated in North district of Sikkim that also in Dzongu. The spread of Lepcha population over the surrounding of the Sikkim is not due to their migratory characters but due to the political history of the region (Roy, 2005). The waves of migration from Tibet in the north, Bhutan in the east and Nepal in west brought thousands of people to the land of Lepchas over the millennium or so. Unable to cope with the changing land use and culture under the influence of immigrants, the Lepchas dispersed either deep inside the forest or assimilated to the new settlers. Political change and corresponding reshuffling of boundaries forced the Lepchas to be ruled by different authorities at different times or at the same time by different authorities at different places. At the time of the 1931 census, the 25,780 registered Lepchas were almost evenly divided between the native state of the Sikkim and the Darjeeling

district of British India, 13,000 being in Sikkim and the rest in Darjeeling (Ibid. 2005). The Lepchas themselves have no tradition of migration and place the home of their ancestors - the people of Mayel - is one of the inaccessible valleys of Kanchenjunga. They do not appear ever to have resisted invasion of their own accord. Sikkim was apparently colonised by the Tibetans at some date prior to the beginning of the 17th century.

In the beginning of 18th century the British colonial government had initiated a drastic process of demographic and economic transformation in the Himalayan region of Sikkim and North Bengal. The immigration and settlement of people from Nepal and other part of the India was encouraged. To provide manpower for the agricultural sector with the newly established tea plantations and for the expanding infrastructural projects such as road construction various labour started migrating Dzongu. The Lepcha villagers of the region were relatively poor, self-sufficient farmers, until they started to cultivate cardamom as a cash crop for export to India and other part in the world. In the 1930s, the income from cardamom was started growing. With this growing wealth, came the opportunity for Lepcha farmers to employ labourers from Nepal to work on the lands, especially on the cardamom fields, as to provide their own children with an education by sending them to school. Bentley (2006) in her study in two Lepcha Village i.e. Nampatan and Lingtem found that most of these Nepali who migrated from Nepal go back to their country when the agricultural season is over and there is a period without work. Then they again return when the sowing begins again. In 1991, 21% of the total population (30437) of North Sikkim was contributed by the migrants, which is highest among the all four district of Sikkim. It has fallen to 16% of the total population (41023) of the district in 2001.

6.1. Demographic Scenario of Study Area

Demographic characteristics has been analysed for the better understanding of the implications of migration in the study area. As developmental activities in the state has started in 1990s with more Hydropower projects coming up. Therefore, the data has been analysed from 1991 till recent one.

Table 3. Total Population of Study Area

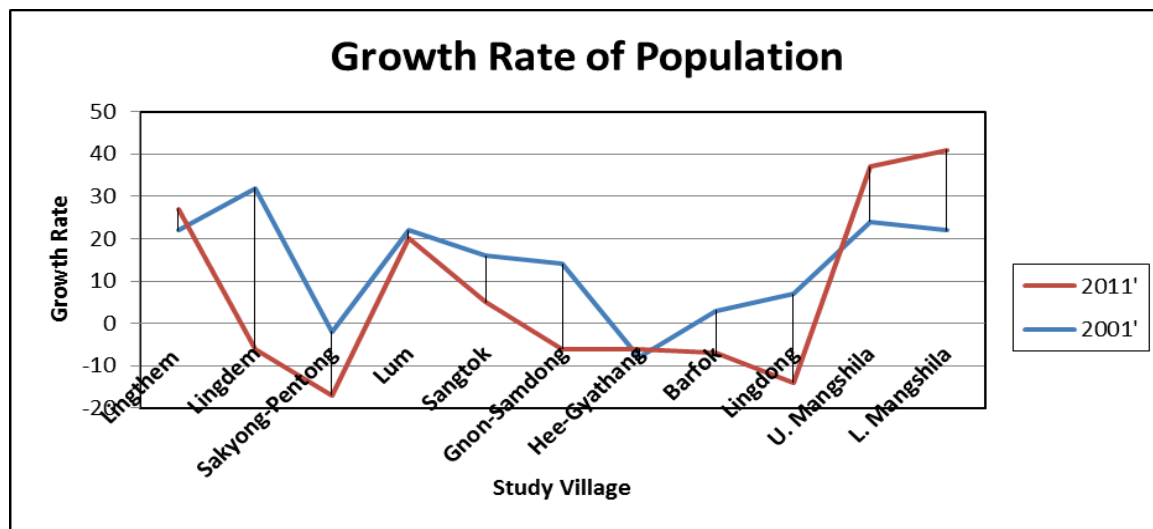
Sl. No	Village	Area in Sq. Km	Census Year		
			1991	2001	2011
1	Lingthem	10	910	1161	1226
2	Lingdem	14	366	542	392
3	Sakyong-Pentong	15	199	196	171
4	Lum	12	265	338	331
5	Sangtok	9	593	708	639
6	Gnon-Samdong	7	344	401	333
7	Hee-Gyathang	19	1252	1162	1180
8	Barfok	8	624	642	586
9	Lingdong	8	746	805	667
10	Upper Mangshila	3	701	922	1057
11	Lower Mangshila	3	739	944	1172

Sources: Census of India 1991, 2001, 2011

6.2. Area and Population

The study area consists of 11 villages of Dzongu Region which has the total area of 108 sq kms. As shown in the Table 3 that in 2011, Lingtem has the highest population followed by Hee-Gyathang. The table shows that the absolute number of population has increased in each village of the study area. Growth rate in the total study area was 14% in 2001 and this is the time when various labour forces has migrated to the region. Again in 2011 the growth rate goes down to -

1% and the reason for the overall decrease in the growth rate may be because of the out migration of the local population in search of their livelihood.



Sources: Census of India 1991, 2001, 2011
Figure 3. Growth rate of Population

6.3. Household

Table shows that the number of households has increased from 1991 to 2001 in huge number in all the villages except Lum, Sakyong-Pentong and Gnom Samdong. Between 2001 and 2011 the same is increasing in slow pace and in half of the total village it has decreased. Number of Families living in the study area has also increased from 1991 to 2011.

Table 4. Number of Households

Sl. No.	Village	1991		2001		2011	
		House holds	Avg. No of Family	Households	Avg. No of Family	Households	Avg. No of Family
1	Lingthem	187	5	210	6	238	5
2	Lingdem	76	5	97	6	98	4
3	Sakyong-Pentong	49	4	41	5	37	5
4	Lum	68	4	60	6	53	6
5	Sangtok	113	5	128	6	128	5
6	Gnon-Samdong	67	5	66	6	64	5
7	Hee-Gyathang	227	6	208	6	227	5
8	Barfok	107	6	109	6	111	5
9	Lingdong	129	6	139	6	119	6
10	Upper Mangshila	134	5	165	6	196	5
11	Lower Mangshila	136	5	162	6	216	5

Sources: Census of India 1991, 2001, 2011

6.4. Density of Population

The density of population in the study area has increased in the area where the constructional activities like Hydro Power Projects are going on. Sakyong-Pentong, Lum and Gnom Samdong has shown the declining Trend in the density of population. Upper and Lower Mangshila are the two village with increase of more than 70% of its density.

Table 5. Density of Population

Sl. No.	Village	1991	2001	2011
1	Lingthem	95	121	127
2	Lingdem	26	39	28
3	Sakyong-Pentong	14	13	12
4	Lum	23	29	28
5	Sangtok	69	83	74
6	Gnon-Samdong	50	58	48
7	Hee-Gyathang	65	60	61
8	Barfok	75	77	70
9	Lingdong	96	103	86
10	Upper Mangshila	225	296	340
11	Lower Mangshila	256	327	406

Sources: Census of India 1991, 2001, 2011

6.5. Sex ratio

Sex Ratio is one of the major characteristics of demographic scenario. From the study it reveals that sex ratio has decreased between 1991-2001 in most parts of the region, and for such condition influx of people from outside has increased and it starts increasing gradually after that in the study area. Good education followed by family planning could be the reason for grown sex ratio in 2011.

Table 6. Sex ratio of the Study Area

Sl. No.	Village	Census Year		
		1991	2001	2011
1	Lingthem	916	891	977
2	Lingdem	830	801	840
3	Sakyong-Pentong	658	675	819
4	Lum	934	1012	982
5	Sangtok	944	914	960
6	Gnon-Samdong	792	883	850
7	Hee-Gyathang	891	874	990
8	Barfok	944	894	909
9	Lingdong	870	1023	997
10	Upper Mangshila	964	970	936
11	Lower Mangshila	848	919	893

Sources: Census of India 1991, 2001, 2011

6.6. Child Composition of Population

Child Composition of population has been the debate for the policy makers in the recent times. In the study area percentage of population below 6 years of age has fallen rapidly. The percentage goes down by around 200% in every village of Dzongu Region. Gnon-Samdong has the lowest child population in 2001 with only 8%. Migration of People to this reason, Family planning might be the region for the same. The problem of aging would be seen in the near

future. Child sex ratio has increased from 1991 to 2001 and again it drops down in the majority of the village.

Table 7. Percentage of Children below 6 years of Age

Sl. No.	Village	Census Year		
		1991	2001	2011
1	Lingthem	22	17	10
2	Lingdem	30	24	13
3	Sakyong-Pentong	23	18	11
4	Lum	19	24	16
5	Sangtok	24	16	14
6	Gnon-Samdong	24	19	8
7	Hee-Gyathang	22	17	14
8	Barfok	28	22	12
9	Lingdong	22	15	12
10	Upeer Mangshila	23	19	12
11	Lower Mangshila	21	13	13

Sources: Census of India 1991, 2001, 2011

Table 8. Child Sex Ratio

Sl. No.	Village	Census Year		
		1991	2001	2011
1	Lingthem	795	1247	868
2	Lingdem	862	897	581
3	Sakyong-Pentong	667	522	900
4	Lum	962	1382	559
5	Sangtok	1219	1035	957
6	Gnon-Samdong	800	1344	786
7	Hee-Gyathang	1230	1143	905
8	Barfok	851	986	944
9	Lingdong	745	1196	1158
10	Upper Mangshila	1092	1024	768
11	Lower Mangshila	602	935	855

Sources: Census of India 1991, 2001, 2011

6.7. Schedule Tribe and Schedule Caste Population

Schedule Caste population was very low in every parts of the Dzongu Region and it further goes down in 2011. Schedule Tribe Population has increased in almost all parts of the region. In Upper Mangshila and Lower Mangshila. It goes up from 2% and 3% to 87% and 76%. This was because of adding of Tamang and Subba in the Tribal categories.

Table 9. Percentage of Schedule Caste and Schedule Tribe

Sl. No.	Village	Schedule Caste			Schedule Tribe		
		1991	2001	2011	1991	2001	2011
1	Lingthem	3	1	0	70	76	89
2	Lingdem	0	3	3	72	80	82
3	Sakyong-Pentong	1	1	0	90	91	98
4	Lum	0	0	0	72	77	99
5	Sangtok	1	0	0	72	75	91
6	Gnon-Samdong	1	1	0	63	84	93
7	Hee-Gyathang	5	3	0	62	83	93
8	Barfok	2	0	0	53	71	95
9	Lingdong	1	1	0	52	65	81
10	Upper Mangshila	2	1	1	4	2	87
11	Lower Mangshila	14	14	9	2	3	76

Sources: Census of India 1991, 2001, 2011

6. Socio-Economic Implications

The society of a region, its culture, social institutions, beliefs and social structure are all sensitive to the development. Economic activity is referred to as the livelihood pattern, so is the prevalent economic conditions of the people. People of Sikkim engage in different economic activities, prominent among which are Tourism, Industries, horticulture & agriculture etc. which give rise to a definite occupational structure. In other words, economic parameters of a region are the best indicators of the development.

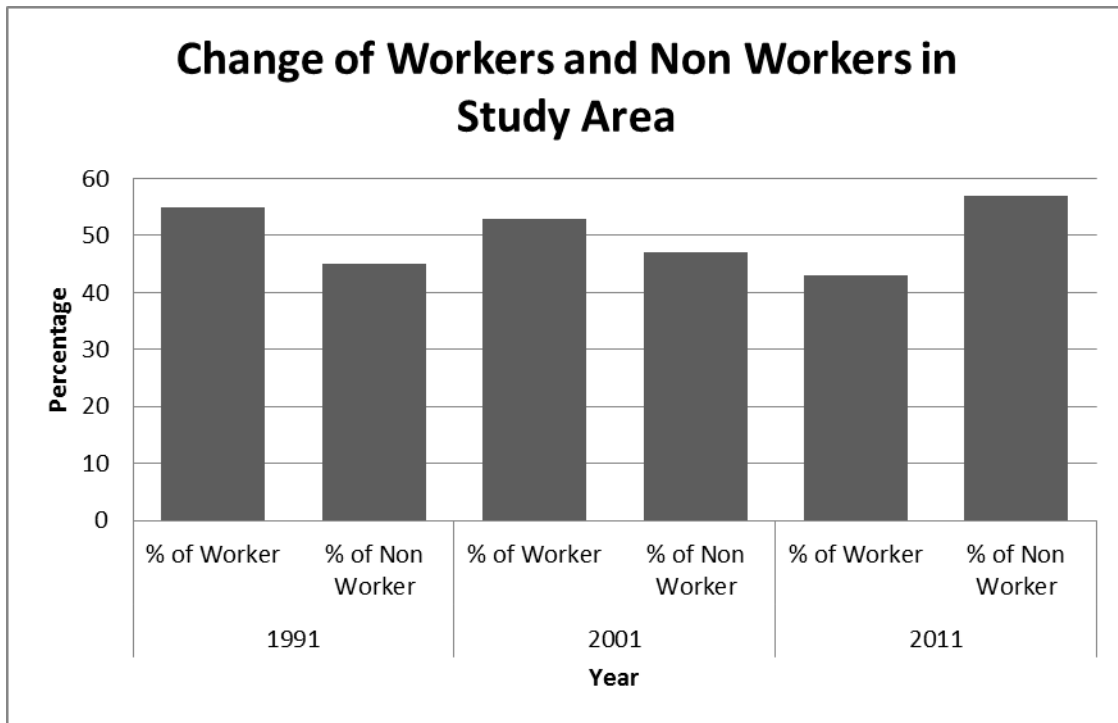
Agriculture is the primary activity of the people of Sikkim. About 11.50 per cent of the total area of the land is devoted to agriculture but the actual area available for agricultural purpose is declining due to diversion of cultivable land for non-agricultural purposes like establishment of industries, township expansion, construction of roads, hydro projects, buildings etc. Farming has been considerably handicapped by small and fragmented holdings, limited irrigation, lack of farm mechanisation and frequent occurrence of natural calamities like landslides. In view of these facts, emphasis is being given to intensive and judicious use of limited land so that the per capita land productivity and overall production are maintained at a desired level.

Agriculture in an entirely mountainous state like Sikkim operates under many constraints resulting into low average yield per unit area for most of the crops. The low productivity is seriously characterised by two important features, viz. land holding size and socio-economic condition of the farmers. The majority of the farming community of the state fall in the small and marginal farmers.

Economic changes go simultaneously with the changes in demography. In census year 1971 in Sikkim, 53.2 % of populations were workers and 46.8% were non workers. Whereas in 1981 the working group decreased to 48.3% and non-workers increased to 51.7%. The reason behind increase in non-working class is the rise in old age population. Again in 1991 non workers increased to the highest 58.5% since 1971. 51% of the populations were in working class which is 10% more than 1991. One of the important changes in the characteristics of workers in Sikkim is that the Marginal workers has increased manifold in the year 2001 to 19.06% of total workers which was only 2.57% to the total workers in 1991.

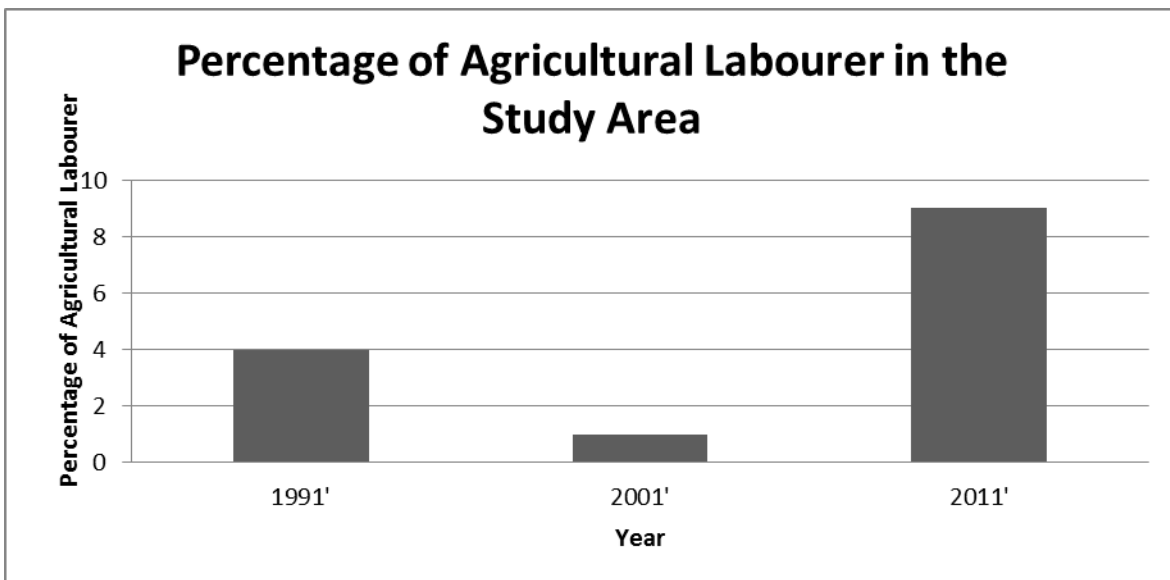
Figure 4 shows that the categorisation of main workers and non-workers. In 1991 and 2001 main workers exceeds the non-workers with above half of the population whereas in 2011 the figure shows that the Non workers has increased showing the aged population are growing. Figure V shows that the agricultural labourers was 4% of total population and has decreased to 1

% in 2001. Further in 2011 it rises to 9% (more than 800% in a decade). It indicates the poverty of people has increased in the region.



Sources: Census of India 1991, 2001, 2011

Figure 4. Change in the Percentage of Workers and Non Workers



Sources: Census of India 1991, 2001, 2011

Figure 5. Percentage of Agricultural labourer to total population

Many Scholars (Arora 2006, 2007; 2008; 2009; Chowdhury 2007; Little 2008, 2010; McDuierra 2011; Bhasin 1990, 2002) their research work shows that intense local resentment against hydro-projects located in Dzongu as the Lepchas fear influx and settlements of outsiders, culminating in the loss of the unique Lepcha identity. Their reports document the level of awareness among the Lepchas about their rights as an indigenous community, including the

rights to self-determination, the right to control their common property resources in the form of land, streams and vegetation and the right to oppose their alienation from the natural resources in the name of Development. Scholars strongly advocates that the Teesta projects should not be implemented by ignoring the local sentiments. They also argue that the projects will bring several thousand workers from outside Sikkim into Dzongu for many years while work is completed who will outnumber the Lepcha population and, since the migrant workers have different customs and beliefs, their dominant presence will soon dilute and destroy Lepcha culture. Apart from that the impact of hydro-electric power project on Dzongu region is on environmental grounds, that the delicate ecology of region, which is partially inside Mount Kanchenjunga national park and part of the Himalaya biodiversity hotspot[‡], is, like the rest of Sikkim prone to landslides and earthquakes[§], and will not survive the development. Already a section of Lepcha population has been affected due to the construction of Teesta stage V of Dikchu dam adjacent to Dzongu. Most of them have been left with no choice but to take up employment of unskilled workers at lowest level and becomes labourers on their own land without any proper appointment letters. There are people still knocking the doors of the National Hydro Power Cooperation (NHPC) for their legitimate right which are still denied for no faults of theirs. Lepchas in Sikkim fear that their rights will be violated if their land is taken, if they are displaced from the safest reserve zone of Dzongu and the rights they exercises as an indigenous tribe will be ignored or even curbed in the name of modernisation and hasty development.

8. Conclusion

Sikkim is geologically a fragile region. In the essence of country's economic progress, the issues of energy demand-supply are the nation's highest priority. Electricity outages are now leading to street protests and demonstrations. Exploration of all indigenous energy resources is today a national priority and all state governments have work towards their development in the shortest span of time.

To conclude it is observed that with the merger of Sikkim with the Indian union and initiation of the democratic process has brought about demographic and economic changes in the state. The study reveals that demographic imbalance will be the main concern for the future. Influx of outsider in the study area not only influences the demographic and economic pattern of the people but also their social and cultural life will be endangered. The results have been seen from the different parts of the states including from the people of Dzongu. The dilemma in the development of the mega projects here is the loss of land, livelihood and the unique culture of the small community of the Lepchas in one hand and on the other hand is the hope of ushering in of the supply of energy and prosperity to the towns and cities located far away from the Dzongu where a large chunk of the Indian population resides. No doubt hydropower projects have made an important contribution to the human development and the benefits derived from them have been considerable, but along with this such developments had altered and diverted the natural river flows, affecting existing rights and access of the locals to water and resulting in significant impacts on livelihood and the environment. The arguments in this paper is not against the installation of power projects but these must be eco-friendly and sustainable in nature and there must be sustainable improvement of human welfare. This means a significant advancement of human development, which is economically viable, socially equitable and environmentally sustainable. Therefore it is the need of an hour for the policy makers and the government that the sentiments of the indigenous tribes should be reckoned with before reaching any decision.

[‡] A biodiversity hotspot is a biogeographic region with a significant reservoir of biodiversity that is under threat from humans.

[§] Recent earthquake of September 18, 2011 with 6.9 Magnitude further creates apprehension among the people of Sikkim and raised questions on the future of India's hydropower development

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