

# Status of Urbanization and Industrialization

*in Upper Ganga Basin*

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## GRBMP: Ganga River Basin Management Plan

*by*

Indian Institutes of Technology



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## Preface

In exercise of the powers conferred by sub-sections (1) and (3) of Section 3 of the Environment (Protection) Act, 1986 (29 of 1986), the Central Government has constituted National Ganga River Basin Authority (NGRBA) as a planning, financing, monitoring and coordinating authority for strengthening the collective efforts of the Central and State Government for effective abatement of pollution and conservation of the river Ganga. One of the important functions of the NGRBA is to prepare and implement a Ganga River Basin Management Plan (GRBMP).

A Consortium of 7 Indian Institute of Technology (IIT) has been given the responsibility of preparing Ganga River Basin Management Plan (GRBMP) by the Ministry of Environment and Forests (MoEF), GOI, New Delhi. Memorandum of Agreement (MoA) has been signed between 7 IITs (Bombay, Delhi, Guwahati, Kanpur, Kharagpur, Madras and Roorkee) and MoEF for this purpose on July 6, 2010.

This report is one of the many reports prepared by IITs to describe the strategy, information, methodology, analysis and suggestions and recommendations in developing Ganga River Basin Management Plan (GRBMP). The overall Framework for documentation of GRBMP and Indexing of Reports is presented on the inside cover page.

There are two aspects to the development of GRBMP. Dedicated people spent hours discussing concerns, issues and potential solutions to problems. This dedication leads to the preparation of reports that hope to articulate the outcome of the dialogue in a way that is useful. Many people contributed to the preparation of this report directly or indirectly. This report is therefore truly a collective effort that reflects the cooperation of many, particularly those who are members of the IIT Team. A list of persons who have contributed directly and names of those who have taken lead in preparing this report is given on the reverse side.

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## 1. Introduction

The accelerated pace of urbanization and industrialization in the plain/semi-plain districts of Uttarakhand, especially after statehood and implementation of new industrial policy, has serious implication for maintaining environment and carrying capacity of the river system. Since, urbanization, industrialization and the water pollution are inter-related issues; these are required to be addressed in an integrated manner. There are several anthropogenic and socio-economic factors associated with the growth of urbanization and industrialization that affect the quantity and quality of water resources. For example, growth and composition of GDP, household consumption expenditure, pattern of industrialization, production and consumption practices, occupational structure, rural-urban migration and other socio-demographic outcomes are some of the important indicators of water demand as well as its pollution. Therefore, in order to prepare a holistic GRBMP, it is important to understand the trends and pattern of urbanization and industrialization along with the associated factors. Keeping these aspects in view, this report concentrates on the pattern of urbanization and industrialization in the Upper Ganga Basin (Uttarakhand).

## 2. Methodology

The present report is based on the secondary data collected from various published sources, which include Statistical Diaries, and Abstracts published by the Uttarakhand and Uttar Pradesh governments, NSSO reports, Annual Survey of Industries (ASI), Population Censuses, CSO, Department of the Economics and Statistics, Ministry of Statistics and Programme Implementation (MOSPI) and other published sources. In this report, analysis of data is done at two levels—districts and State. For analyzing various indicators, time series district-wise data have been used. Further, the districts are also classified into plain and hill regions to know the difference in the pattern of urbanization and industrialization in two regions. Region-wise analysis is done to draw meaningful inferences from planning point of view.

Map 1 depicts the geographical location of the state of Uttarakhand with all its 13 districts. The state shares the international boundary with Tibet in the wide northeast and with Nepal in the southeast. The state is also bounded by state of Himachal Pradesh in the north-west and Uttar Pradesh in the south.



**Map 1: Location and district map of Uttarakhand**

### 3. A Brief Profile of the Upper Ganga Basin (Uttarakhand)

Uttarakhand is located between latitudes 29°5′-31°25′N and longitudes 77°45′-81°E covering a geographical area of 53,485 sq.km of which 93 percent is mountainous. The region comprises of two administrative units viz., Garhwal (northwest portion) and Kumaon (southeast portion). Its capital is located at Dehradun. About 34,650 sq. kms area is under forest cover. The recorded forest area constitutes 64.8 percent of the total reported area, though the actual cover based on remote sensing and satellite imagery information is only 44 percent. Uttarakhand is a valuable fresh water reserve, having over fifteen important rivers and over a dozen glaciers. The state has 13 districts, 78 tehsils, 95 development blocks, 671 Nyaya Panchayats, 7,227 Gram Panchayats and 15,761 inhabited villages (Government of Uttarakhand, 2011). Figure 1 presents a location and district map of the state.

According to Population Census 2011, the state accounts for 8.49 million population with 4.33 million males and 4.16 million females. SC and ST constitute 1.52 million and 0.26 million respectively. The decennial growth rate of the population in the state has declined from 24.2% during 1981-91 to 19.2% during 2001-2011. It has sex ratio of 963 and literacy rate of 79.6 percent with 88.3 percent literacy among males and 70.7 percent among females. Literacy rates among SCs and STs are relatively lower at 63.4 percent and 63.2 percent respectively (Population Census 2011). As per the 2011 census, population density is 189 persons per square kilometres. The workforce constitutes 37 percent of total population, of which 74 percent are main workers and 26 percent are marginal workers. Out of the total workforce, 1.57 million are cultivators (including main and marginal cultivators), 0.26 million are agricultural labourers, 0.07 million people work in household industries and 1.23 million workers are engaged in other activities.

Agriculture covers 7.81 lakh hectares of land, out of which 57% is in hill region, while the plain

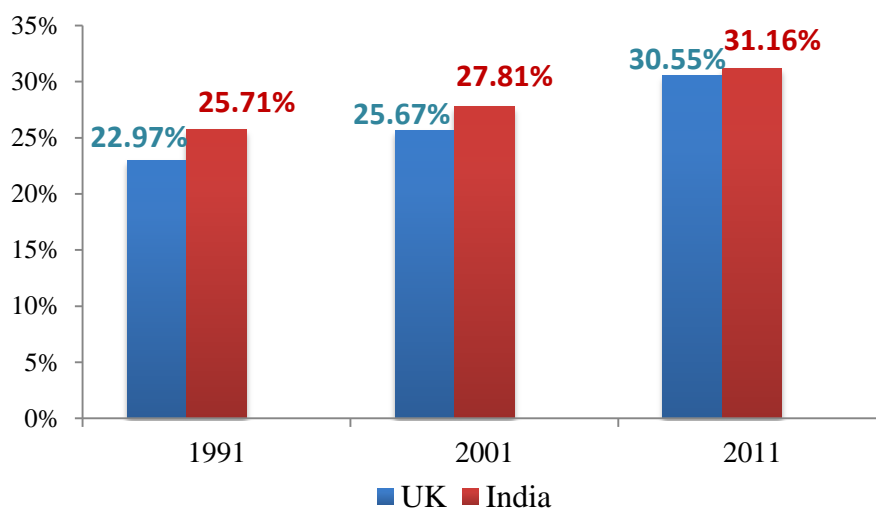


region constitutes 43%. About 55 percent of the cultivated land is rain-fed. In the hill area irrigation coverage is only around 10 percent whereas in the plain areas it is around 85 to 90 percent. The average size of land holding is around 0.68 hectare in the hills and 1.77 hectare in the plains. Of the total 9.26 lakh farmers of the state, small and marginal farmers constitute around 88 percent (Government of Uttarakhand, 2011). The subsistence nature of agriculture in the hill districts provides nothing but a low and unstable annual income to the people, causing a sizeable out-migration of male members, leaving behind a large number of female-headed households.

## 4. Urbanization: Growth and Dimensions

### 4.1 Urbanization in Uttarakhand

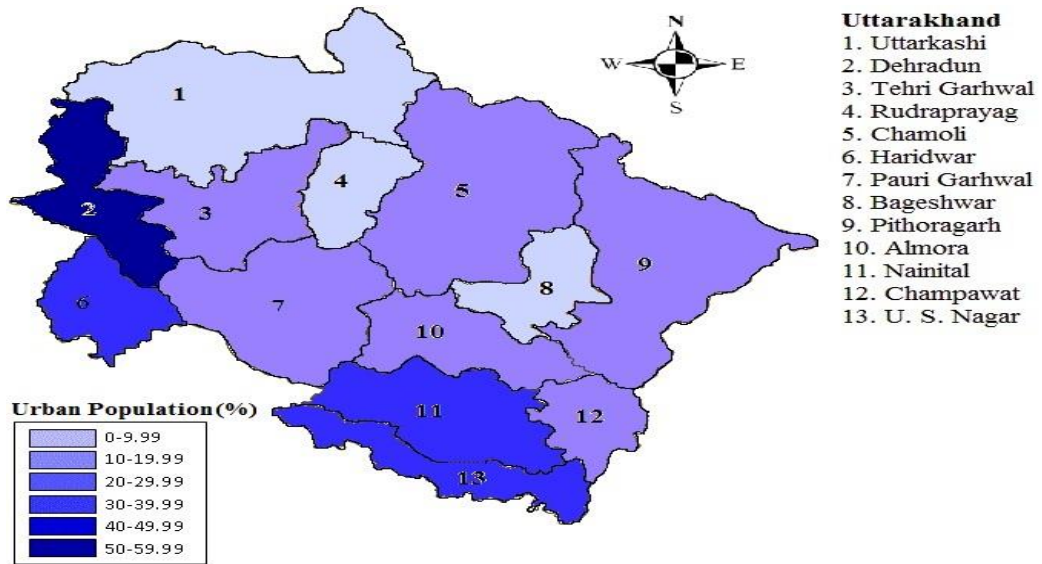
Despite hilly topography and difficult setting, as shown in Figure 2, over the decades, the level of urbanization in Uttarakhand at 30% is found to be very close to that of the national average and it has been rising almost in synch with the latter. In fact the rise in the percentage of urban population in the state from 1991 to 2011 is slightly more than that recorded across the country (7.58 % versus 5.45%).



**Figure 2: Urbanization trend in Uttarakhand**

However, the level of urbanization in the state varies significantly across regions and districts. Initially, urbanization was largely concentrated around the major pilgrim towns and administration headquarters; however, with the spread of trade & commerce, industry and agribusiness, it gradually and swiftly spread in the plain/semi plain regions of the state. Figure 2 presents graphical illustration of variation in the level of urbanization across 13 districts in year 2001 while Table 1 presents estimates since 1971. It is noticed that urbanization is mostly a phenomenon in four districts of the state, namely, Haridwar, US Nagar, Dehradun and Nainital, which are by and large in the plains and which together constitute more than 80 per cent of the urban population of the state. Highest urbanization is observed in Dehradun district (50-60%), followed by Haridwar, Nainital and U.S. Nagar (40-50%). Three hill districts, namely Uttarkashi, Rudraprayag, and

Bageshwar given their hilly topography have less than 10 percent urbanization, while in the rest of the hill districts it is between 10- 20%.



**Figure 2: Level of Urbanisation across Districts of Uttarakhand, 2011**

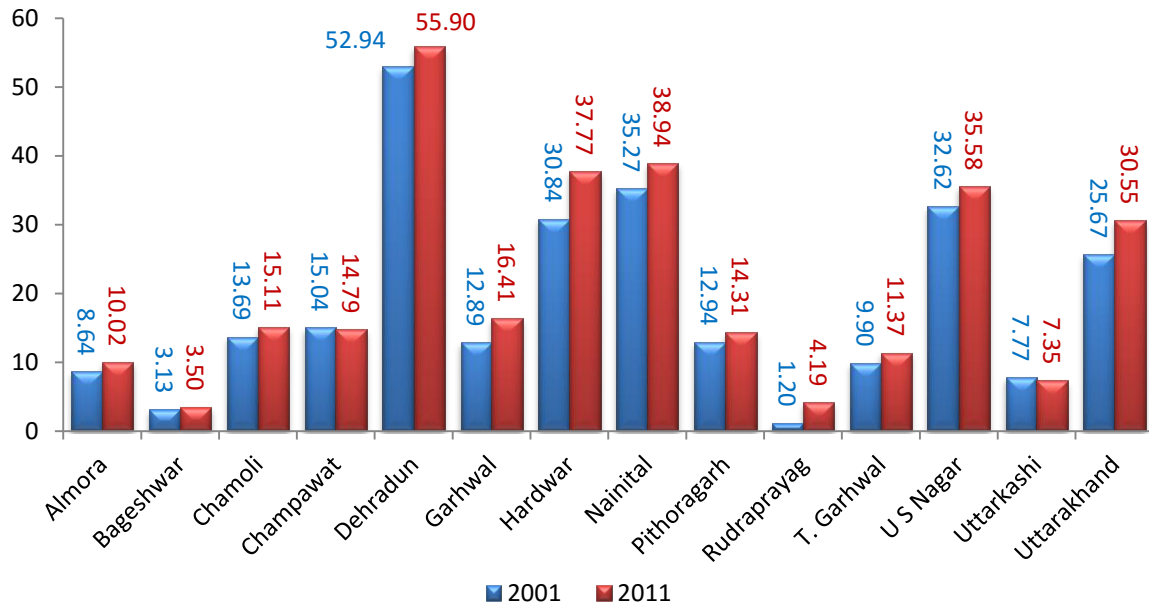
At the state level (excluding Haridwar district), urban population went up from 14.7% in 1971 to 23% in 2011. However, the growth in urban population was limited to only new districts, located in the plain/semi plain region. Table 1 clearly shows that the level of urbanization in 2011 was lowest in Bageshwar (3.50%), followed by Rudraprayag (4.19%) and Uttarkashi (7.35%); while it was found highest in Dehradun (55.90%), followed by Nainital (38.94%), Haridwar (37.77%), and U.S. Nagar (35.58%) – the latter four districts comprising the plains. Figure 3 presents district-wise urbanization trend over the last two decades which again establishes that the process is concentrated in the four plain/semi plain districts of the state.

**Table 1 : Percentage of Urban Population in Uttarakhand and India, 1971-2011**

District	1971	1981	1991	2001	2011
<b>Plains</b>					
Dehradun	47.08	48.86	50.19	52.94	55.90
Hardwar	---	---	30.96	30.84	37.77
Nainital	22.13	27.49	32.66	35.27	38.94
Udham Singh Nagar*	---	---	---	32.62	35.58
<b>Hills</b>					
Almora	5.21	6.28	6.45	8.64	10.02
Bageshwar*	---	---	---	3.13	3.50
Chamoli	4.17	8.01	9.01	13.69	15.11
Champawat*	---	---	---	15.04	14.79
Garhwal	6.3	9.82	11.86	12.89	16.41
Pithoragarh	3.8	5.52	7.42	12.94	14.31
Rudraprayag*	---	---	---	1.20	4.19
Tehri Garhwal	2.65	4.13	5.68	9.90	11.37
Uttarkashi	4.07	6.95	7.08	7.77	7.35
<b>Uttarakhand</b>	---	---	<b>23.17</b>	<b>25.67</b>	<b>30.55</b>
<b>Uttarakhand exl. Hardwar</b>	<b>14.69</b>	<b>18.3</b>	<b>21.7</b>	<b>24.51</b>	<b>23.35</b>
<b>India</b>	<b>19.91</b>	<b>23.31</b>	<b>25.72</b>	<b>27.78</b>	<b>31.16</b>

*Note:* \*The districts of Rudraprayag, Bageshwar, Champawat and U.S. Nagar have been carved out from the districts of Chamoli, Almora, Pithoragarh and Nainital, respectively. Hence, the figures for urban population are included in the respective parent district for 1971, 1981 and 1991.

*Source:* Registrar General of India (2001), Census of India, 2001, Provisional Population Totals of Uttarakhand, Paper 1 of 2001, Series 6, New Delhi.

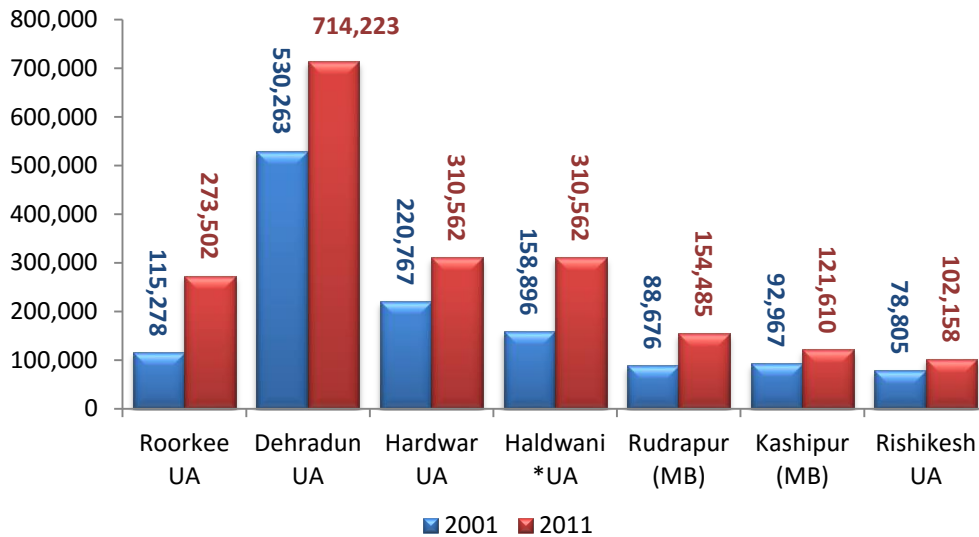


**Figure 3: District-wise Percentage of Urban Population in Uttarakhand**

Notwithstanding lower urbanization in the hill districts, it is noteworthy that these are the areas which witness significant inflow of pilgrims and tourists in the summer seasons which leads to spikes in urban population and puts significant stress on the limited municipal infrastructure. Such spikes lead to the problems of water pollution and waste disposal and are emerging a major area of concern. Unfortunately there are no reliable estimates of the number of tourists visiting different centres of pilgrimage / tourist attraction.

## 4.2 Trends and Pace of Urbanization in Uttarakhand

For the two latest Census' the population trends in the seven main cities in the state are presented in Figure 4 below. It is noted that none of these cities falls in the category of metropolitan city. Dehradun, the capital, is the largest city in the state with a population of 7.2 lakh in 2011. Second largest towns are Haridwar and the urban agglomeration of Haldwani-Kathgodam each having population of around 3.1 lakh in 2011. The well known town of Roorkee with over a century old technical university (converted into an IIT in the late nineties) has population of 2.74 lakh (2011) and during the last decade it recorded growth of 13.65% which is highest among all the cities in the state. Rudrapur is another town which is witnessing significant investments in industrial and urban sectors and has registered significant population growth during the last decade. In line with the urbanization trend, evidently all the seven major cities/towns of the state are located in the plain region. Barring two, all the other five towns are emerging as urban agglomerations – indicating uncontrolled urbanization in adjoining rural settlements.



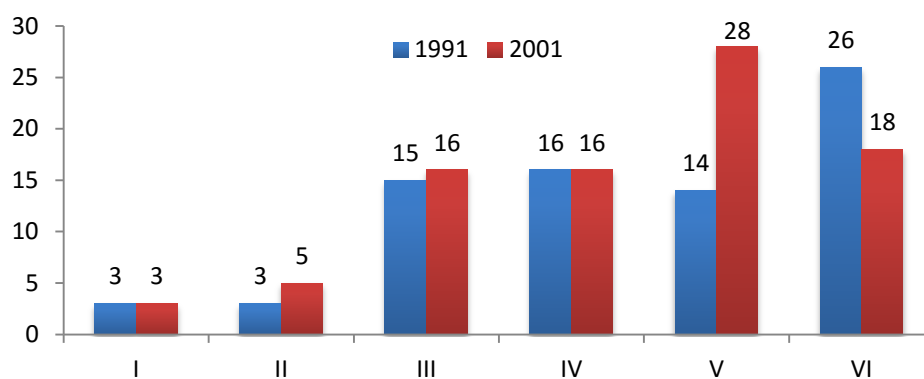
**Figure 4: Population Trends in Urban Agglomerations and Cities in Uttarakhand (2001 & 2011)**

As per the Census 2001 in all there were 86 towns across the state. As per the Census norms on population size these towns are classified into six categories, as presented in Table \* below and in Figure 4. Between 1991 and 2001, nine new settlements were added as Census towns. Among various categories, for Class-V corresponding to population size 5000-10,000 a 100% increase was recorded between 1991 and 2001. On the other hand there was a sharp decline in number of Class-VI towns, which is attributed to graduation of hitherto smaller towns to the next higher category.

**Table \*: Number of Towns under Population Categories**

Category	Population Range	Number of towns (Census 1991)	Number of towns (Census 2001)
I	> 1 Lakh	3	3
II	50,000-100,000	3	5
III	20,000-50,000	15	16
IV	10,000-20,000	16	16
V	5,000-10,000	14	28
VI	< 5,000	26	18
	Total	77	86

Source: Census of India 2001 and 2011, Government of India



**Figure 4: Increase in Number of Towns from 1991 to 2001, Uttarakhand.**

Table 2 shows district-wise and category wise number of towns in the State. All the largest towns are found only in the plains viz., in the three districts of Dehradun (Dehradun City), Haridwar (Haridwar City) and Nainital (Haldwani city). All the second order cities are also located in the plain region. It is evident that the hill regions account for most of the small size towns which are classified under Class-VI.

**Table 2: Class-wise No. of towns in different Districts of Uttarakhand**

Districts/ Uttarakhand	I		II		III		IV		V		VI	
	1991	2001	1991	2001	1991	2001	1991	2001	1991	2001	1991	2001
<b>Plains</b>												
Dehradun	1	1	0	2	3	2	4	3	2	4	3	2
Hardwar	1	1	1	1	2	2	3	4	1	2	--	--
Nainital	1	1	--	--	2	2	--	--	1	4	4	1
U S Nagar	--	--	2	2	3	5	3	2	6	6	1	2
<b>Sub-total</b>	3	3	3	5	10	11	10	9	10	16	8	5
<b>Hills</b>												
Almora	--	--	--	--	1	1	1	1	--	--	2	2
Bageshwar	--	--	--	--	--	--	--	--	1	1	--	--
Chamoli	--	--	--	--	--	--	2	2	1	2	3	2
Champawat	--	--	--	--	--	--	1	1	1	2	2	1
Garhwal	--	--	--	--	2	2	1	1	1	2	1	1
Pithoragarh	--	--	--	--	1	1	--	--	0	2	2	1
Rudra Prayag	--	--	--	--	--	--	--	--	--	--	2	2
Tehri Garhwal	--	--	--	--	1	1	0	1	0	3	4	2
Uttarkashi	--	--	--	--	--	--	1	1	0	1	2	1
<b>Sub-total</b>	0	0	0	0	5	5	6	7	4	13	18	12
<b>Uttarakhand</b>	3	3	3	5	15	16	16	16	14	29	26	17

Source: Census of India, 2001

Apart from Dehradun which is the capital of the newly created state, the towns of Haldwani, Kashipur, Rudrapur, Jaspur, Ramnagar, Haridwar, and Roorkee have grown rapidly during the last two decades. This growth has taken place as a result of impetus to expansion of industries and services in the state. This growth is invariably going to create more pressures on urban amenities, leading to implications on the environment.

## 5. Urban Amenities

### 5.1. Sources of Drinking Water

Lack of access to safe drinking water causes morbidity and many times contributes to high mortality rates due to diarrhea, cholera, typhoid and other water-related diseases, especially among vulnerable groups like women and children. Therefore access to safe drinking water and good sanitation facility are two key indicators of a healthy society. Accordingly district-wise distribution of urban households by sources of drinking water is presented in Table 3. As per this information it is noted that at the state level, slightly over two third of the urban households have access to tap water as the source of drinking water. Hand pump with 22% coverage occupies second position while wells, tube wells, ponds/lakes constitute a very small fraction. Contribution from 'other sources' in the last column comprising springs, rivulets, etc. is high in the hill districts, however their share varies significantly across districts. Over the last decade of 2001-2011 slight increase in piped water supply has been made in almost all districts and it is noted that a number of districts both in the plains and the hills have achieved coverage in excess of 80%.

**Table 3: Urban Households by Sources of Drinking Water in Uttarakhand**

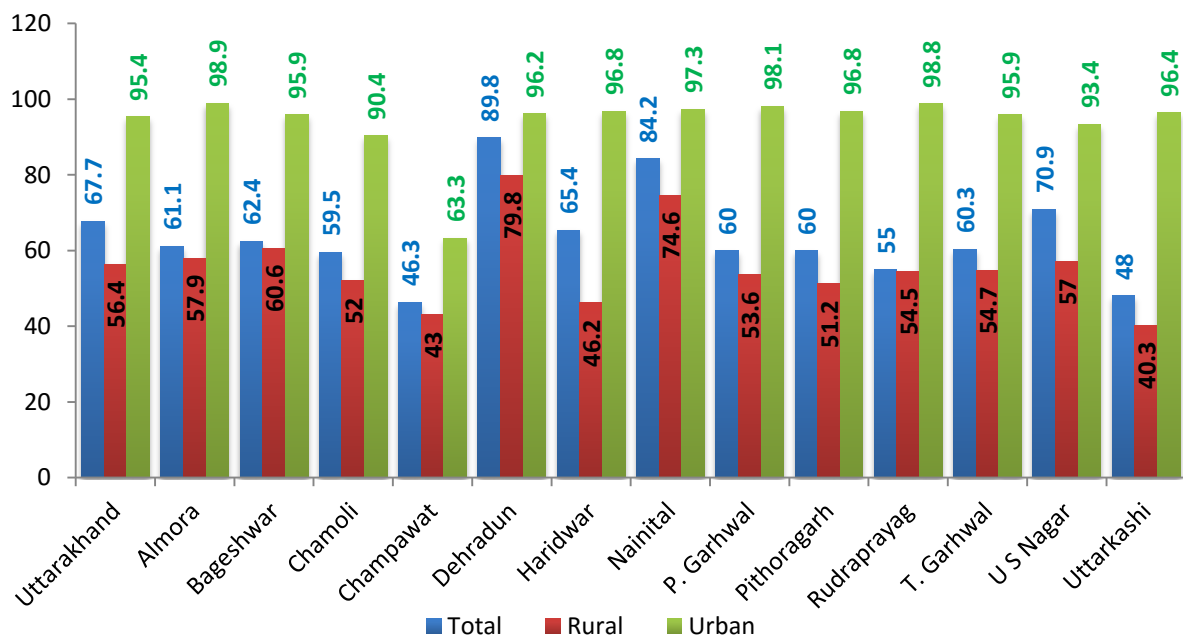
Districts	Tap		Well		Hand Pump		Tube-well/ Borehole		Tank/ Pond/ Lake		Other Sources	
	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011
<b>Plains</b>												
Dehradun	83.10	84.67	0.80	0.31	10.80	11.11	—	2.04	0.70	0.34	1.20	0.91
Hardwar	40.60	40.47	0.40	0.19	58.00	54.05	—	3.84	0.00	0.15	0.60	1.21
Nainital	73.20	80.05	0.50	0.60	7.30	8.36	—	4.15	1.70	0.54	6.50	4.23
U S Nagar	32.40	36.76	0.20	0.20	64.40	58.46	—	3.28	0.20	0.10	1.10	1.16
<b>Hills</b>												
Almora	75.90	80.46	2.50	2.76	1.30	4.18	—	0.03	1.40	1.40	15.60	8.56
Bageshwar	57.10	79.42	2.90	3.97	1.30	3.22	—	0.05	2.50	2.00	28.10	8.57
Chamoli	82.80	85.88	1.40	1.32	0.60	1.12	—	0.01	1.10	0.69	7.70	7.74
Champawat	63.60	65.29	2.20	3.97	11.90	16.65	—	1.15	4.20	2.16	11.70	7.81
Garhwal	79.70	85.94	1.00	0.93	0.90	2.85	—	1.24	1.80	1.17	9.50	5.65
Pithoragarh	75.50	79.74	2.60	2.94	2.10	4.57	—	0.01	2.50	1.60	13.00	8.24
Rudraprayag	83.60	88.07	2.90	1.86	0.80	2.22	—	0.01	2.00	0.94	6.80	4.86
T. Garhwal	74.80	77.28	2.50	2.23	2.20	5.59	—	0.04	2.10	1.58	7.40	4.96
Uttarkashi	75.60	80.50	0.80	1.79	0.60	1.89	—	0.01	0.90	0.80	13.30	8.84
Uttarakhand		68.22		1.13		22.02	—	1.97		0.73		3.97

Source: Census of India 2001, 2011

All values are in %.

## 5.2. Access to Toilet Facilities

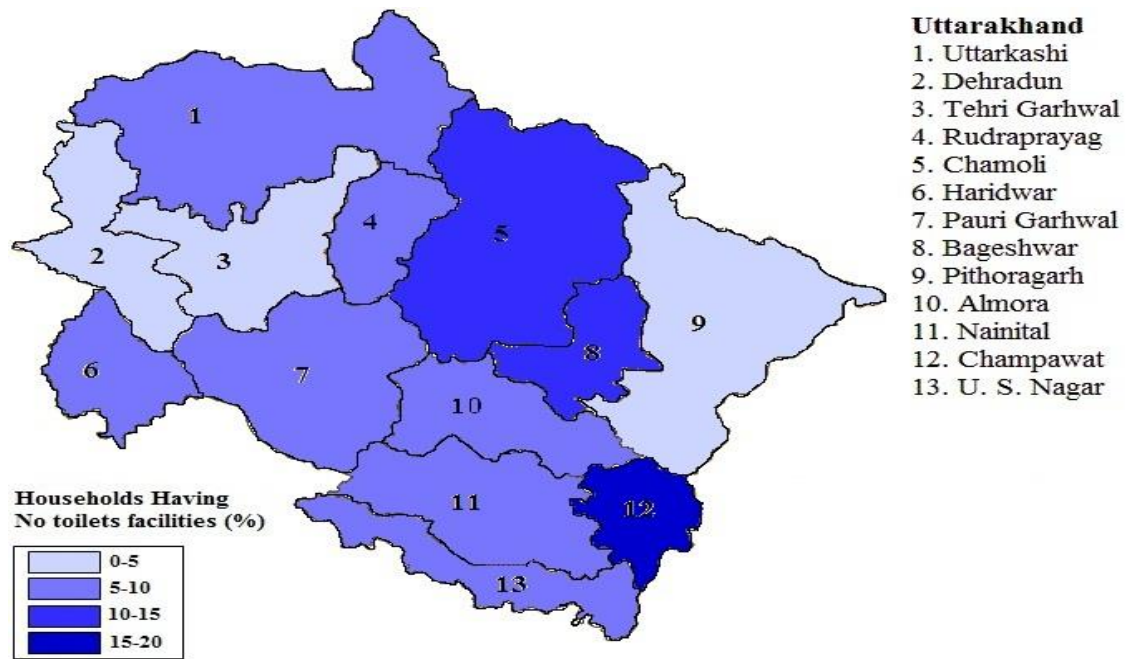
Access to toilet facility here refers in relation to an improved household sanitary toilet which does not have potential to spread faecal contamination or affect public health. As per the latest available data, percentage of urban households without an individual toilet has declined from 21% in 2001 to under 7% in 2011. In the urban areas, as shown in Figure 6, the coverage is well in access of 90% while in the rural areas it varies from 40-80% while the average statewide coverage is reported to be around 68%. Among the districts there are significant variations which can be attributed to, among others, difficult topography and access; however lower average coverage in selected districts in plains, particularly in Haridwar and US Nagar could be due to usual challenges of unreformed behavior.



**Figure 6: Households having Access to Toilet Facility (%), Uttarakhand, 2010**

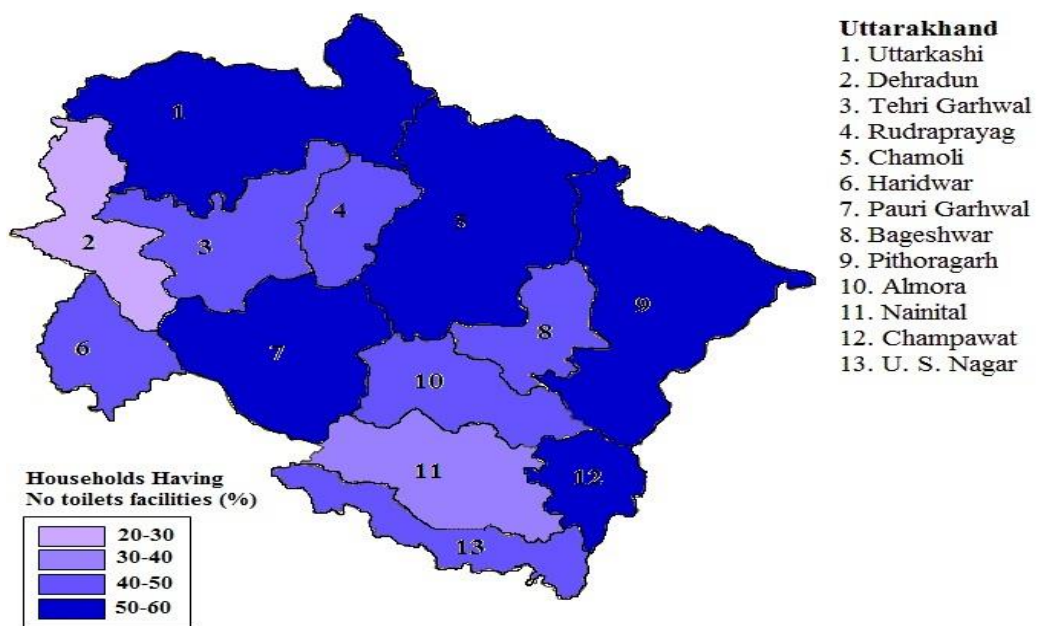
Figure \*5 presents district-wise sanitation deficit scenario in the urban areas. The district of Champawat has the highest deficit with 15-20% households not have individual latrines/toilets. Chamoli and Bageshwar districts have a deficit of 10-15%. In the three districts of Pithoragarh, Dehradun and Tehri Garhwal urban sanitation deficit is the least – falling in the range of 0-5%. In the rest of the districts in the plains and the hills the deficit is between 5-10%.





**Figure \*5: Urban Households without Toilet in Uttarakhand, 2011**

On the other hand on the rural landscape, it is noted from Figure \*6 that in a majority of the hill districts household sanitation deficit is between 40-60% and therefore there is a long way to go. On this front even in one of the districts in the plains viz., Haridwar the deficit is rather low at 40-50%. Only Dehradun and Nainital districts have reported better situation where the deficit has come down to 20-30%.



**Map 6: Rural Households without Toilets in Uttarakhand , 2011**

## Types of latrines

Generally there are three types of household toilets, viz., pit latrines (twin pit pour flush), water closet toilets (linked to septic tanks) and other toilets. As shown in Table 6, it is noted that sanitation coverage with pit latrines has increased significantly across all the districts. This can be attributed to the impetus to sanitation under the Total Sanitation Campaign during the decade of 2001 – 2011. On the other hand, considering higher cost of construction of septic tanks, coverage of WC toilets has remarkably declined in all except two districts.

**TABLE 6: URBAN HOUSEHOLDS WITH INDIVIDUAL TOILET FACILITIES**

District	2001				2011			
	Pit Toilet	Water Closet toilet	Other Toilets	No Toilet	Pit Toilet	Water Closet toilet	Other Toilet	No Toilet
Almora	26.56	57.81	3.13	12.50	85.56	5.87	0.46	8.11
Bageshwar	47.46	0.00	49.15	3.39	85.54	4.43	0.00	10.03
Chamoli	43.43	22.66	7.94	25.97	68.22	18.83	0.43	12.52
Champawat	27.37	28.42	23.16	21.05	77.20	2.36	0.34	20.10
Dehradun	34.25	18.54	22.48	24.73	88.76	5.42	1.05	4.77
Pauri Garhwal	47.34	14.79	23.08	14.79	84.57	9.72	0.39	5.32
Hardwar	18.74	31.23	31.23	18.81	81.69	9.95	1.00	7.36
Nainital	29.64	31.52	25.00	13.83	90.00	2.06	2.72	5.22
Pithoragarh	24.70	30.54	31.05	13.71	80.10	16.30	0.12	3.48
Rudraprayag	0.00	20.00	10.00	70.00	73.39	18.12	0.04	8.44
T. Garhwal	21.52	34.18	11.81	32.49	91.25	4.63	0.04	4.08
U S Nagar	16.82	25.14	34.20	23.84	86.61	4.43	1.01	7.95
Uttarkashi	58.18	25.45	7.27	9.09	87.19	4.03	0.26	8.52
Uttarakhand	29.16	24.96	24.70	21.17	85.92	6.54	1.11	6.43

Source: *Indiastat.com*

Between the urban and rural areas there is a wide technology divide. In the case of rural areas, the dominant option is single or twin pit pour flush latrine that was typically provided under the TSC. However in the urban areas the preferred option is septic tank. Sewerage system is not widely available which can be attributed to challenging topography particularly in the hills. However, even in the case of septic tanks also one does not find a robust septage management system in place and it is likely that this could be getting indiscriminately discharged into water course. This has severe implications to drinking water facilities and streams/river water downstream in the hill areas. In this regard there is an urgent need to provide the required infrastructure in small and medium towns for septage treatment.

## 5.3. Urban Drainage System

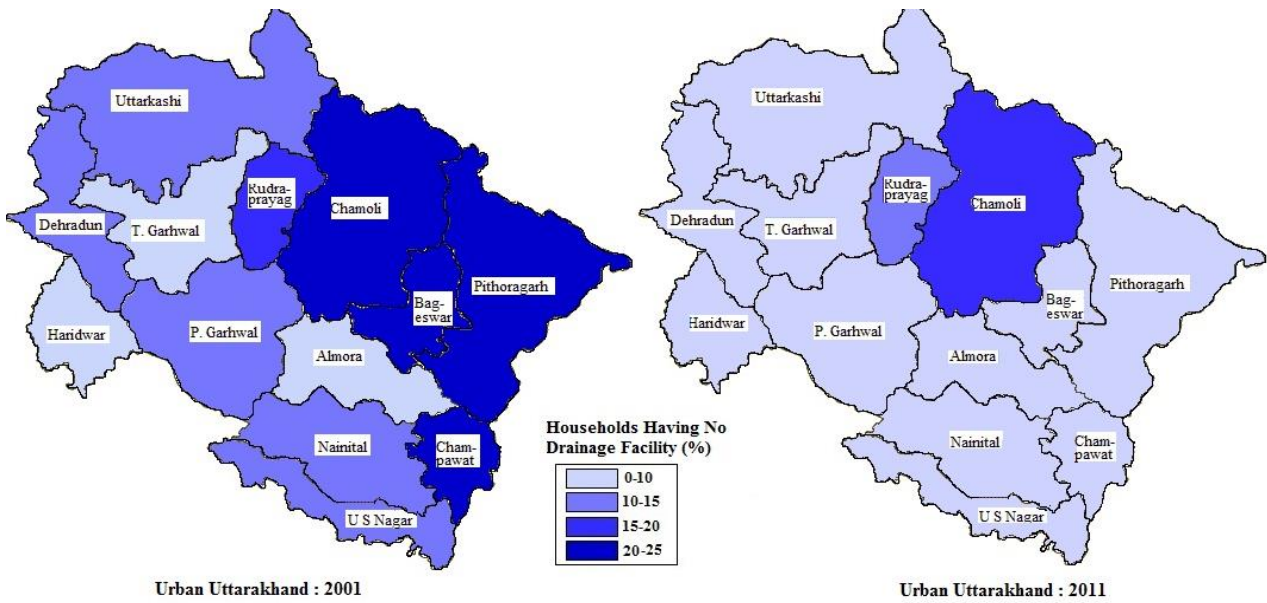
In this section drainage refers to conveyance system for sullage i.e., brown water generated from households and commercial establishments. This does not refer to sewerage system or to storm water drainage system.

As per the data presented in Table 7 it is noted that over the last decade of 2001-2011 a considerable progress has been made in improving the coverage. By 2011 almost 93% households are reported to have drainage and a majority has moved from open drainage to closed drainage system, thereby offering improved aesthetics and better quality of life. While the extent of improvement varies across districts there is not much difference between hill and plain regions. However, between 2001 and 2011, drainage facilities have improved faster in the hill than the plain region of the State. For instance, percentage of urban households having closed drainage system in hill region has increased from 27.05 in 2001 to 48.32 in 2011, a net increase of 21.27% point, whereas the corresponding increase in plain region is only 10.46% point. This implies that infrastructure strengthening in hill towns has received greater attention.

**Table 7: Distribution of urban households with drainage facilities**

District/Region	Closed Drainage		Open Drainage		No Drainage	
	2001	2011	2001	2011	2001	2011
Dehradun	34.58	53.57	51.13	36.81	14.30	9.62
Hardwar	37.29	39.27	57.60	56.47	5.10	4.26
Nainital	35.67	48.57	53.54	45.46	10.79	5.98
U S Nagar	12.05	15.62	77.04	78.05	10.91	6.33
<b>Plain Region</b>	<b>30.55</b>	<b>41.01</b>	<b>58.56</b>	<b>52.00</b>	<b>10.89</b>	<b>6.99</b>
Almora	9.83	60.55	82.00	36.26	8.17	3.18
Bageshwar	31.91	65.02	42.52	30.50	25.58	4.48
Chamoli	6.74	24.32	69.90	56.32	23.35	19.35
Champawat	8.36	18.39	68.94	71.76	22.70	9.85
Pauri Garhwal	15.25	40.32	72.46	53.01	12.29	6.67
Pithoragarh	32.31	54.95	44.63	38.37	23.07	6.68
Rudraprayag	16.46	46.38	67.63	40.20	15.91	13.43
T. Garhwal	39.23	76.22	54.25	20.75	6.51	3.03
Uttarkashi	28.36	47.11	59.88	46.64	11.76	6.25
<b>Hill Region</b>	<b>27.05</b>	<b>48.32</b>	<b>60.61</b>	<b>44.07</b>	<b>12.34</b>	<b>7.62</b>
Uttarakhand	<b>13.53</b>	<b>42.26</b>	<b>75.01</b>	<b>50.65</b>	<b>11.47</b>	<b>7.10</b>

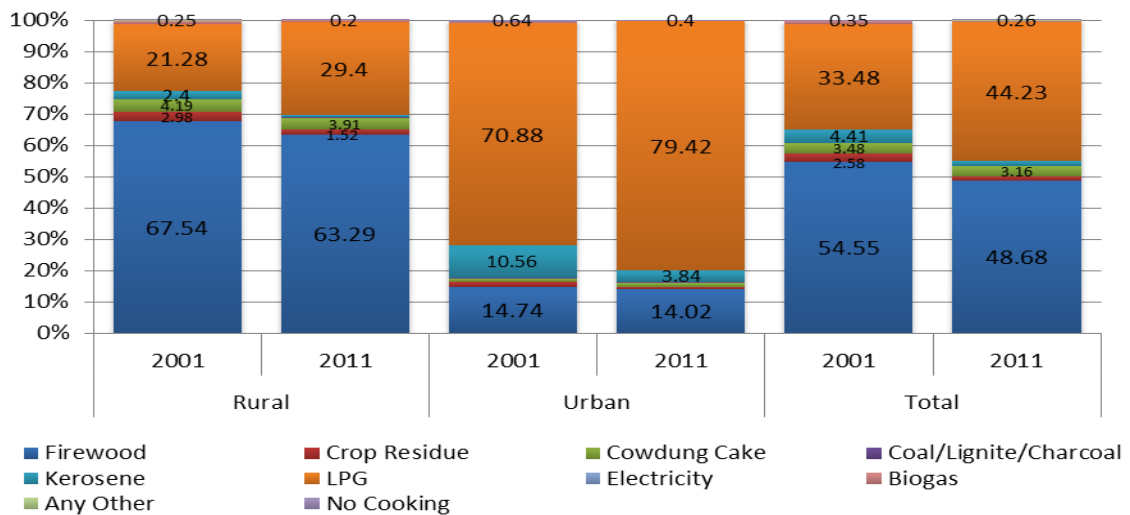
Figure \*7 presents the significant improvements in drainage facilities for the urban households. Except for Chamoli and Rudraprayag, in all other districts, only less than 10 percent urban households in 2011 did not have access to drainage facilities, while in 2001, more than 10 percent urban households in most of the districts of the state did not have any kind of drainage facilities.



**Map 7: Urban Households without drainage facility**

### 5.4. Cooking Fuel options

Figure 7 shows the percentage distribution of households in the State by sources of cooking fuel. In rural areas, firewood is the major source of cooking fuel in both the censuses. It is followed by LPG and cow-dung cakes. Contrary to this, LPG is the major source in urban areas, followed by firewood. The percentage shares of households having LPG as cooking fuel in both rural and urban areas have significantly increased in 2011 over the 2001, while the share of households using cow-dung and kerosene has declined. Table 7 also indicates that firewood in rural areas and LPG in urban areas are the main sources of cooking fuel. Percentage share of households having other fuels such as biogas, electricity, coal, etc. is quite low both in rural and urban area.



**Figure 7: Percentage Distribution of Households by Sources of Cooking Fuel in Uttarakhand**

Table 8 highlights the region-wise percentage distribution of households by sources of lighting. Electricity is the major source of lighting in the state. It is followed by kerosene. However, the percentage of households having access to electricity as a source of lighting varies across rural and urban areas. On an average, percentage of urban households having electricity is much higher than their rural counterparts. Region-wise percentage distribution of households having access to electricity shows that percentage of such households is slightly higher in the plain than the hill region. The percentage of households having electricity as a source of lighting has increased in 2011 over 2001 in both the regions, while the share of households using kerosene has declined. Households using solar energy, other oil, and any other source of lighting comprise a negligible fraction.

**Table 8: District-wise Percentage of Households by Source of Lighting in Uttarakhand**

Region	Location	Electricity		Kerosene		Solar energy		Other oil		Any other		No lighting	
		2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011
Hills	Total	59.63	84.08	34.04	12.93	5.17	2.44	0.14	0.17	0.68	0.10	0.34	0.29
	Rural	51.63	82.25	40.77	14.41	6.28	2.75	0.17	0.18	0.75	0.11	0.40	0.31
	Urban	93.15	97.81	5.82	1.83	0.53	0.08	0.04	0.09	0.37	0.05	0.08	0.14
Plains	Total	59.40	89.28	38.44	9.67	1.26	0.29	0.11	0.15	0.28	0.26	0.51	0.35
	Rural	54.16	84.00	43.68	14.68	1.41	0.44	0.10	0.21	0.18	0.30	0.39	0.37
	Urban	84.67	96.21	13.19	3.10	0.16	0.08	0.15	0.08	0.75	0.22	1.08	0.31
Uttarakhand	Total	59.46	87.04	37.38	11.08	2.20	1.22	0.12	0.16	0.37	0.19	0.47	0.32
	Rural	53.56	83.05	43.00	14.53	2.62	1.69	0.12	0.19	0.31	0.20	0.39	0.34
	Urban	86.90	96.49	11.26	2.88	0.26	0.08	0.12	0.08	0.65	0.19	0.82	0.28

Source: Compiled from Indiatat.com

## 6 Nutritional Status of Households

Table 9 presents trend in MPCE (monthly per capita expenditure) on food and non-food items in rural and urban areas. At current market prices, average MPCE in rural areas has increased from Rs.647.15 in 2004-05 to 1694.67 in 2009-10, while in urban areas, it has increased from Rs.978.26 to Rs.1643.16 during the same period. This shows that net increase in MPCE is much higher in rural than the urban areas. For instance, the ratio of MPCE in urban areas to rural areas has

declined from 1.51 in 2004-05 to 0.97 in 2009-10, suggesting that disparity between rural and urban areas with regard to average MPCE has declined during this period. Another important conclusion that can be drawn is that the percentage share of food items in the total MPCE has declined in both rural and urban areas. However, decline is much faster in rural than urban areas. This implies that consumption pattern in rural areas of the state has shifted significantly towards non-food items; while in urban areas the shift is not so dramatic.

**Table 9: Trend in per capita monthly consumption expenditure on food and non-food items in Uttarakhand (nominal values)**

Year	Average MPCE (MRP) (Rs)		Percentage share of Food in MPCE		Percentage share of Non- food in MPCE	
	Rural	Urban	Rural	Urban	Rural	Urban
<b>2004-05</b>	647.15	978.26	53.45	47.13	46.55	52.87
<b>2009-10</b>	1694.67	1643.16	41.11	42.6	58.89	57.4

Source: 61<sup>st</sup> and 66<sup>th</sup> NSS round.

Table 10 presents details of per capita intake of calories, protein and fats in rural and urban households in Uttarakhand and India. The data reveal that in 2004-05, per capita calories intake of rural households was higher than that of urban households in India, while in Uttarakhand, it was just reverse. However, in 2009-10, per capita calories intake of rural households of the state exceeded that of the urban households. On the basis of per capita calorie intake, it can be concluded that the nutritional status of households in the state is far better than the all-India average. However, as far as protein intake is concerned, it has registered a decline in both rural and urban areas of the state, while it has increased across India.

**Table 10: Trends in per capita intake of calories, protein and fats in Rural and Urban Households in Uttarakhand**

Year	Calorie (K.cl)				Protein (MG)				Fat (MG)			
	Uttarakhand		India		Uttarakhand		India		Uttarakhand		India	
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
<b>2004/05</b>	2160	2205	2047	2020	61.6	62.8	57	57	41.3	48	35.5	47.5
<b>2009/10</b>	2271	2141	2147	2123	58.6	55.5	59.3	58.8	48.9	48.4	43.1	53

Source: 61<sup>st</sup> and 66<sup>th</sup> NSS round.

Per capita intake of fats in rural and urban areas both at Uttarakhand and all-India levels have increased. However, the increase was higher in rural areas than the urban areas. For instance, in rural Uttarakhand, it has increased from 41.3 milligram in 2004-05 to 48.9 milligram in 2009-10, while urban areas with an average of 48 milligram recorded an insignificant increase.

It is also relevant to note that the percentage share of cereals in the total calories intake has declined between 2004-05 and 2009-10 in rural and urban areas both. In Uttarakhand, the share of cereals has declined from 62.46% in 2004-05 to 52.96% in 2009-10 in rural areas and from 56.62% to 55.91 in urban areas (Table 11). At all-India level, the percentage share declined from 67.541% to 60.38% in rural areas and from 56.08% to 50.37% in urban areas between the same years. This implies that share of non-cereals food items in the total calories intake has increased. The increase was significant in rural areas of the state. In 2009-10, about 47% and 44% of total calories requirements, respectively, in rural and urban households are met from consumption of non-cereal food items, such as milk & milk products, meat, fish & eggs and fruits & vegetables, etc. This indicates significant changes in food preferences and general improvement in affordability of rural and urban population.

**Table 11: Trend in the percentage share of cereals and other food items in the total calories Intake**

Year	Uttarakhand				India			
	Rural		Urban		Rural		Urban	
	Cereals	Others	Cereals	Others	Cereals	Others	Cereals	Others
<b>2004-05</b>	62.46	37.51	56.62	43.38	67.54	32.31	56.08	43.84
<b>2009-10</b>	52.96	47.04	55.91	44.09	60.38	39.5	50.37	49.55

Source: 61<sup>st</sup> and 66<sup>th</sup> NSS round.

Percentage share of different food items in the total protein intake in rural and urban areas in Uttarakhand and India is shown in Table 12. In rural areas of the state, the share of cereals and pulses in the total protein intake has declined and so is the case with the share of meat, fish & eggs. On the other hand the share of milk and milk products and other food items have registered an increase in their share in total protein intake. Similar pattern is also observed in rural India. Only difference is that in rural India, share of meat, fish and eggs in the total protein intake has increased, while it has decreased in rural Uttarakhand.

**Table 12: Percentage share of different food items in the total protein intake**

Source of Protein	Uttarakhand		India	
	2004-05	2009-10	2004-05	2009-10
<b>RURAL</b>				
Cereals	64.05	57.52	66.37	60.18
Pulses	12.03	10.06	9.47	8.28
Milk & milk Products	14.88	15.89	9.28	9.37
Meat, Fish & eggs	1.75	1.57	3.98	5.85
Others	7.28	14.95	10.84	16.25
<b>URBAN</b>				
Cereals	59.18	59.34	56.16	51.25
Pulses	13.87	12.12	11	10.14
Milk % milk Products	13.86	16.28	12.33	12.53
Meat, Fish & eggs	2.49	2.73	5.47	7.57
Others	10.6	9.52	15.04	18.46

Source: 61<sup>st</sup> and 66<sup>th</sup> NSS round.

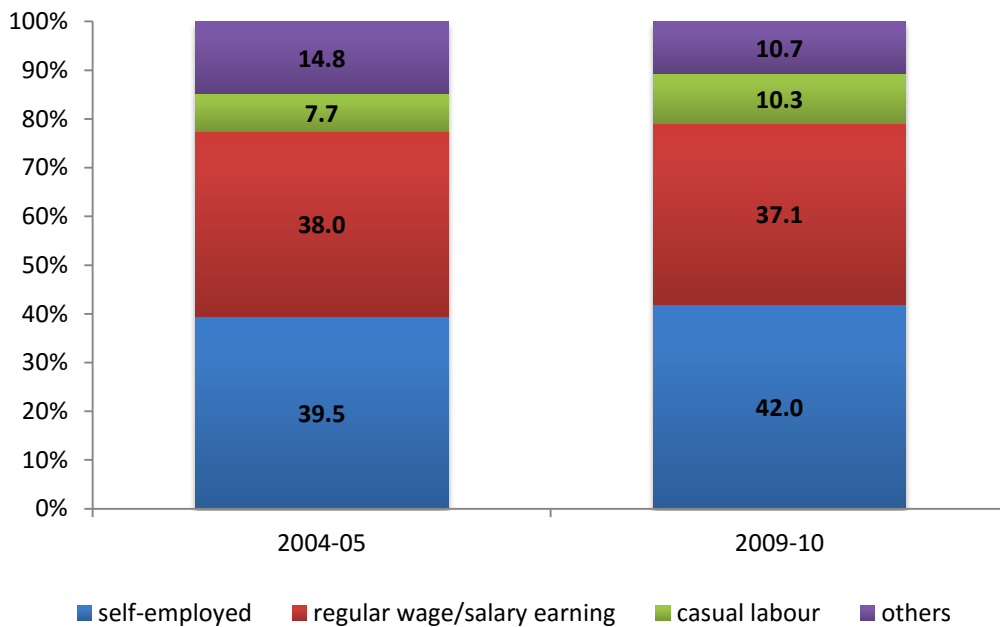
In urban Uttarakhand, the share of cereals in the total protein intake has almost remained stagnant between 2004-05 and 2009-10, while at all-India level, it has declined. In case of pulses, the share has declined in the state as well as in India. As far as milk & milk product group is concerned, it is observed that its share in the total protein intake has increased significantly in the state, while at all-India level, it shows only a marginal increase. No major increase in the percentage share of meat, fish & eggs in the total protein intake is observed in urban Uttarakhand, while in urban India, the increase was found significant. Share of other items has declined in the state, while it shows an increase in India. It can be concluded that distribution pattern of protein intake across different food items is slightly different in Uttarakhand when compared to the all-India pattern. For instance, share of milk and milk products in the total protein intake in both rural and urban households in Uttarakhand was much higher than that in India, whereas, share of meat, fish and eggs in the total protein intake in both rural and urban households in India was much higher than that in Uttarakhand.

## 7.0. Urban Occupational Structure

Occupational patterns of urban workforce in the state for 2004-05 and 2009-10 are presented in Figure 8. Self-employment constitutes the largest share, followed by regular wages/salary and other employment. Share of self-employment in the total employment has increased slightly, whereas wage/salary employment had registered a slight decline. However the data do not offer insight whether increase in self-employed was due to increase in distress kind of self-employment



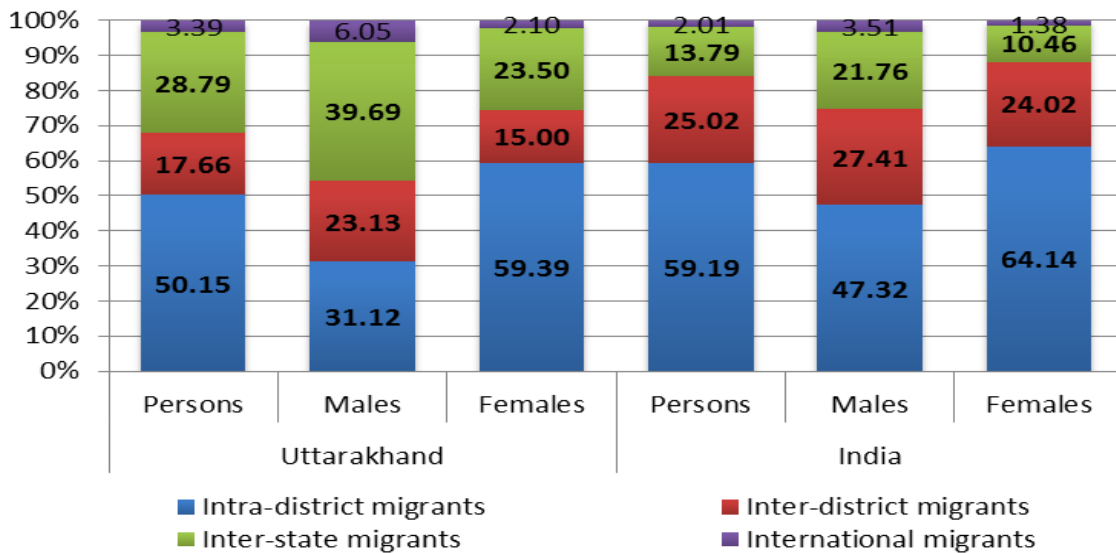
or a growth-induced self-employment. For instance, if workers do not get regular salary or wage-employment due to shrinking of jobs in the organized sector, they would be forced to undertake petty and lesser gainful self-employment in the informal sector. Contrary to this, if well-educated and trained workers initiate self-employment activities in the emerging sectors, this kind of employment would be desirable for the economy as these activities would also generate gainful wage employment for other workers as well. A slight increase in the share of casual employment indicates deterioration in the quality of employment in the state. Other kind of employment has also declined in the state.



**Figure 8: Household Main Occupation (%) in Urban areas, Uttarakhand, 2004-2010**

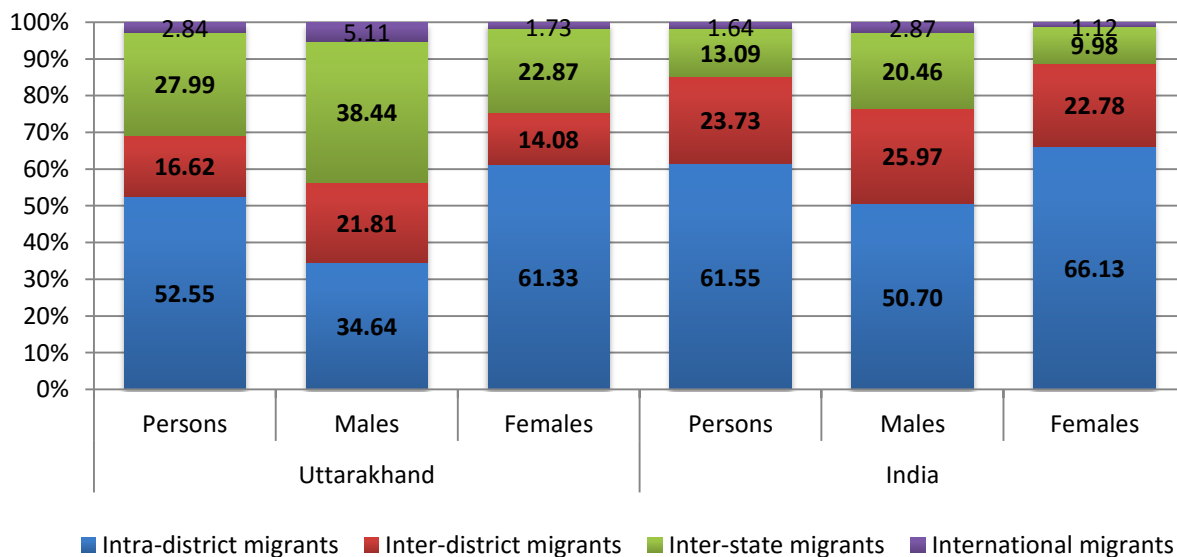
## 8.0 Migration

Urbanization depends on three factors—natural growth of population, rural to urban migration and reclassification of rural areas as urban in course of time. Figure 9 shows the intra-district, inter-district, inter-state and international migration by place of birth in Uttarakhand and India. About 50% of total migration in the state is within the district (31.12% males and 59.39% female), whereas, percentage of intra-district migration in India was 59.19% (47.32% males and 64.14% female). Higher proportion of females in intra-district migration is mainly due to marriages. Inter-district migration of population was much lower in Uttarakhand than that in India. Contrary to this, percentage share of inter-state migration in the total migration was much higher (28.79%) in Uttarakhand than in India (13.79%). Further, percentage share of inter-state migration was much higher among males than females. Out-migration is the major issue in Uttarakhand. In absence of adequate employment opportunities in the state, especially in hill districts, the workforce of the state move outside the state to earn livelihood. International migration was also observed higher in the state than in India.



**Figure 9: Migration (%) by Place of Birth in Uttarakhand and India, 2001**

Figure 10 shows migration by place of residence in Uttarakhand and India under four categories as shown in the Figure. It is evident from the Figure that while share of intra-district and inter-district migration in the total migration by place of last residence was much higher in India than that in Uttarakhand; share of inter-state and international migration was much higher in Uttarakhand than that in India. For example, as against 27.99% share of inter-state migration in the total migration of the state, the corresponding percentage in India was only 13.09%. This again testifies that a majority of people of the state out-migrate to get better employment opportunities.



**Figure 10: Migration (%) by Place of Last residence in Uttarakhand and India, 2001**

Table 13 shows share of male and female migrants in total migrants by migration streams in Uttarakhand and India. Share of female migrants in total intra-district migration was much higher than their male counterparts. In Uttarakhand, females constituted 88.54% share in the rural to

rural; 63.23% in urban to rural, 53.13% in rural to urban, and 50.67% in urban to urban intra-district migrants. Share of female migrants in the total inter-district migrants was also found higher than male migrants. However, percentage share of female migrants varies across migration streams. For instance, proportion of female migrants was as high as 65.33% in case of rural to rural migration and as low as 47.64% in case of rural to urban migration. Similarly, proportion of female migrants in total inter-state migrants was found highest (61.09%) in case of rural to rural migration and lowest (47.47%) in case of rural to urban migration. One of the main reasons of relatively higher percentage share of females in total migrants is marriage. Moreover, females also migrate with the males as housewives when males migrate for employment. At all-India level also, similar pattern of migration was observed. The percentage share of female migrants was observed much higher than their male counterparts in India under all the streams, except for inter-state rural to urban migration.

**Table 13 : Migration (%) by Streams in Uttarakhand and India, 2001**

Migrants	Migration streams	Uttarakhand		India	
		Males	Females	Males	Females
Intra-district migrants	Rural to Rural	11.46	88.54	13.57	86.43
Intra-district migrants	Urban to Rural	36.77	63.23	39.20	60.80
Intra-district migrants	Rural to Urban	46.87	53.13	33.76	66.24
Intra-district migrants	Urban to Urban	49.33	50.67	44.75	55.25
Inter-district migrants	Rural to Rural	34.67	65.33	17.15	82.85
Inter-district migrants	Urban to Rural	50.50	49.50	46.91	53.09
Inter-district migrants	Rural to Urban	52.36	47.64	33.39	66.61
Inter-district migrants	Urban to Urban	47.76	52.24	43.34	56.66
Inter-state migrants	Rural to Rural	38.91	61.09	28.14	71.86
Inter-state migrants	Urban to Rural	49.16	50.84	58.20	41.80
Inter-state migrants	Rural to Urban	52.53	47.47	42.77	57.23
Inter-state migrants	Urban to Urban	44.18	55.82	48.01	51.99

Source: Census of India, 2001

Table 14 shows the reasons for international and inter-state migration from Uttarakhand and India. In the case of international migration, 29.4% of total migrants from the state were due to work/employment. About 31% of migrants moved with the household and about 10 percent moved due to marriage. Further, 27.6 percent of international migration from the state was due to other reasons. As far as inter-state migration from the state is concerned, 30.4% of total migrants from the state moved with the household. Next to it was migration due to marriage which constituted 29% of total inter-state migrants. About 24 percent inter-state migration took place due to employment outside the state. Business and education had insignificant share in the total inter-state migration from Uttarakhand.

**Table 14: Migrants identified by Reasons for Migration in Uttarakhand (U.K. ) and India, 2001 (in %)**

Place of last residence	Work employment		Business		Education		Marriage		Moved after birth		Moved with household		Others	
	UK	India	UK	India	UK	India	UK	India	UK	India	UK	India	UK	India
International migrants	29.4	8.8	0.4	1.1	1.8	0.8	9.8	12.3	0.2	0.6	30.8	39.9	27.6	36.4
Inter-state migrants	23.7	26.4	0.7	2.0	1.8	1.3	29.0	29.7	1.1	3.9	30.4	23.6	13.3	13.1

Source: Census of India, 2001

## 9.0. Condition of Slums

One of the major issues associated with urbanization is the growth of slums. As per the 2011 census, slums in Uttarakhand accounted for 89,398 households. Out of them, about 63% were reported to be in good condition. As far as source of drinking water is considered, 74% of total households had access to tap water for drinking. Next to tap is hand pump for which 23% households had access. All other sources together accounted for less than 4% of total households (Table 15). Further, out of 74,628 households which had sources of drinking water within their premises, 76% had tap water and 22% had hand pump. Table 15 shows that a majority of households had access to drinking water through tap and hand pump. However, about 17% of the total households living in slums did not have any source of drinking water within their premises.

**Table 15: Access to water among slum households, Uttarakhand (2011)**

Location of source of drinking water	Total Households	Tap	Well	Hand Pump	Tube-well	Others Sources
Total	89398 (100)	73.77	0.20	22.83	2.17	1.03
Within the premises	74628 (100)	75.67	0.15	21.82	2.36	0.0
Near the premises	10383 (100)	67.71	0.46	25.97	1.29	4.57
Away	4387 (100)	55.64	0.57	32.73	1.07	9.99

Source: Census of India, 2011

Other sources include spring, river, canal, pond, lake, etc.

As far as access to sanitation in slum households is concerned, as shown in Table 16 almost 92% has one or the other form of facility. About 28% of households had flush toilets connected to piped sewer system while about 53% of households had flush toilets connected to septic tank. Rest of the households had other types of facility, including pit and services toilets.

About 80% of the slum households have proper bathroom and drainage facilities (with or without enclosure and roof) while only about 30% households has underground drainage facility. Thus, access to sanitation was fairly high, however considerable improvement in drainage was required.

As shown in Table 16 about 94% of total households had electricity supply while about 5% used kerosene for lighting.

As regards cooking, it is noted that kitchen facility was available with only 75% of the slum households while the rest cooked in open. Interestingly with 67% households, LPG was the main source of cooking fuel followed by fire wood (22%), and kerosene (7%).

**Table 16: Characteristics of Slums Households, Uttarakhand (2011)**

<b>BY MAIN SOURCE OF LIGHTING</b>											
Electricity	Kerosene	Solar energy	Other oil	Any other	No lighting						
83,847	4,461	165	90	413	422						
(93.79)	(4.99)	(0.18)	(0.10)	(0.46)	(0.47)						
<b>BY AVAILABILITY OF TRAINING FACILITY</b>											
No. of households having bathing facility within the premises	Type of latrine facility within the premises								No. of households not having latrine facility within the premises	No latrine within premises	
	Flush/pour flush latrine connected to			Pit latrine			Service Latrine			Public Latrine	open
	Piped sewer system	Septic tank	Other system	With slab/ventilated improved pit	Without slab/open pit	Night soil disposed into open drain	Night soil removed by human	Night soil serviced by animal			
81977 (91.70)	24742 (27.68)	47778 (53.44)	1719 (1.92)	5,873 (6.57)	567 (0.63)	1,080 (1.21)	166 (0.19)	52 (0.06)	7421 (8.30)	2000 (2.2)	5421 (6.1)
<b>BY BATHING FACILITY AND TYPE OF DRAINAGE CONNECTIVITY FOR WASTE WATER OUTLET</b>											
No. of households having bathing facility within the premises						Waste water outlet connected to					
Yes			No			Closed drainage		Open drainage		No drainage	
Bathroom		Enclosure without roof									
71334 (79.79)		8086 (9.04)	9978 (11.16)			26661 (29.82)		57555 (64.38)		5182 (5.80)	
<b>BY TYPE OF FUEL USED FOR COOKING</b>											
Availability of separate kitchen	Total	Fire-wood	Crop residue	Cow dung cake	Coal/Lignite / Charcoal	Kerosene	LPG/PNG	Electricity	Biogas	Any other	No cooking
Total	89398	19737	953	1944	85	5872	60202	24	127	92	362
Cooking inside house	85815	17968	884	1510	64	5673	59497	23	107	89	-
Has Kitchen	64624	7919	560	561	38	2609	52799	11	84	43	-
Does not have kitchen	21191	10049	324	949	26	3064	6698	12	23	46	-
Cooking outside house	3221	1,769	69	434	21	199	705	1	20	3	-
Has Kitchen	1553	743	51	168	13	97	473	1	7	-	-
Does not have kitchen	1668	1026	18	266	8	102	232	-	13	3	-

No Cooking	362	-	-	-	-	-	-	-	-	-	362
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Table 17 presents town-wise distribution of slum population along with number of workers living in slums in 2001. With 59% of total urban households living in slums Rudrapur ranks highest while Dehradun 20% ranks a distant second. In the hill towns the issue of slum is not as significant for obvious reasons. Interestingly Haridwar has very low fraction of slum households.

**Table 17: Identified/Estimated Slum Population in Uttarakhand (2001)**

Slums locations	No. of Households	Total Population	Total Workers	Main Workers	Marginal Workers	Non Workers
Dehradun (M.Corp)	16863	91939	25872	22499	3373	66067
	(20.07%)	(21.55%)	(21.25%)	(20.28%)	(31.19%)	(21.67%)
Haldwani-cum-Kathgodam (MB)	1065	6344	1795	1741	54	4549
	(4.61%)	(4.92%)	(4.98%)	(5.16%)	(2.35%)	(4.89%)
Kashipur (MB)	2829	18192	4425	4089	336	13767
	(18.11%)	(19.57%)	(18.26%)	(18.46%)	(16.15%)	(20.03%)
Rudrapur (MB)	9582	53477	15258	13457	1801	38219
	(59.04%)	(60.31%)	(58.83%)	(57.10%)	(76.06%)	(60.92%)
Roorkee (MB)	2827	18158	4566	4333	233	13592
	(16.05%)	(18.62%)	(17.95%)	(17.64%)	(26.51%)	(18.86%)
Hardwar (MB)	1263	7360	2063	1931	132	5297
	(3.93%)	(4.20%)	(4.28%)	(4.44%)	(2.76%)	(4.17%)
<b>Total</b>	<b>34429</b>	<b>195470</b>	<b>53979</b>	<b>48050</b>	<b>5929</b>	<b>141491</b>
	<b>(18.24%)</b>	<b>(19.35%)</b>	<b>(19.17%)</b>	<b>(18.59%)</b>	<b>(25.55%)</b>	<b>(19.42%)</b>

*Note: Figures in Parentheses are percentages from population of cities/towns reporting slums*

*Source: census of India, 2001*

## 10.0. Status of Industrialization in Uttarakhand

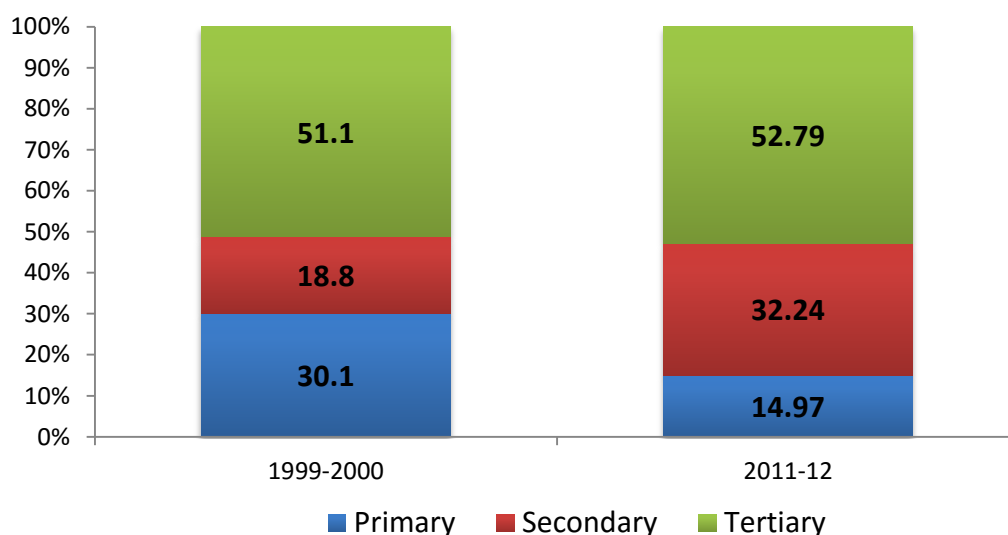
One of the main concerns of Uttarakhand after getting the status of a separate state was to accelerate the pace of economic development so that more income and employment opportunities could be created for its people. As agriculture would not be able to sustain livelihood of large number of people; the policy focus was oriented towards development of industries, services and construction activities. Efforts are being made to remove various development constraints, including those related to physical and economic infrastructure; connectivity; raw material availability; market access, and, education & skill. The Government of Uttarakhand announced its Industrial Policy 2003 which offer a large number of fiscal and financial/tax incentives to prospective investors for setting up industrial units. To facilitate the process it has also set up State Industrial Development Corporation of Uttaranchal (SIDCUL) in 2002 for industrial development and transferred around 6,200 acres of land free of cost. SIDCUL in turn has set up several industrial estates at Haridwar, Pantnagar, Sitarganj and other places. The industrial policy focuses on modernization/ expansion/revival of existing SSIs; IT Park and specialized industrial estates for biotechnology; accords industry status to tourism; public-private

partnership for infrastructure development and development and maintenance of specialized estates.

Subsequently, the Government of Uttarakhand announced new integrated industrial development policy in 2008, with special focus on development in backward and remote hill districts. As a result of wide ranging incentives Uttarakhand has emerged as one of the fastest growing states of India and over the last decade the share of secondary sector in the NSDP has increased significantly (Figure 13). Fast growth of industries, especially in the plain also has several implications on land and water pollutions. According to Central Pollution Control Board, the state has 17 industries in highly polluted categories, such as Sugar, Pulp & Paper, Pesticides, Cement, Pharma, Distilleries, Iron & Steels, etc. Most of the polluting industrial units, such as sugar, pulp & paper, distilleries, are located at the bank of river Ganga or its tributaries releasing effluence into the river system. This report makes a detailed analysis of industrialization in the state.

### 10.1 Growth Trends in NSDP from Secondary and Tertiary Sectors

A comparison of average percentage shares of the primary, secondary and tertiary sectors in the NSDP for 1999-2000 and 2011-12 is presented in Figure 11. It is noted that by 2011-12 the share of secondary sector has registered a significant increase while that of the primary sector has declined. This indicates that during the last one decade, after formation of the separate state of Uttarakhand, there was impetus in the areas of industry/manufacturing, infrastructure, electricity & water supply and construction activities, etc. However, it is intriguing to note that the primary sector comprising agriculture has registered a concurrent significant decline.



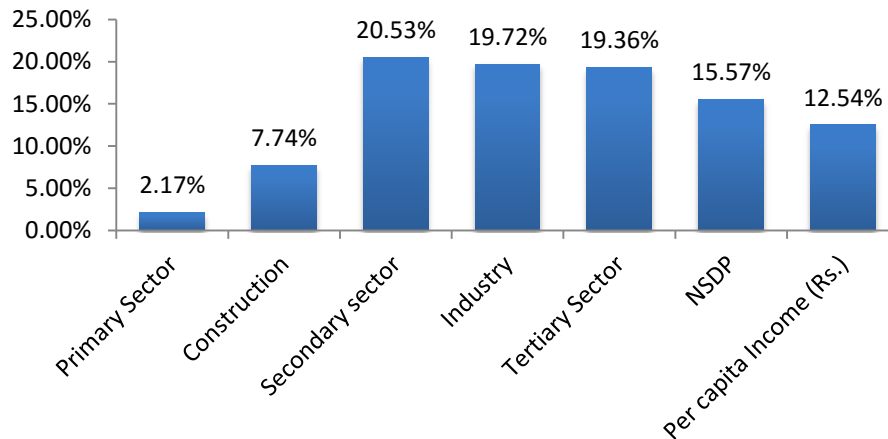
**Figure 11: Sectoral Composition in NSDP, Uttarakhand**

*Source : CSO/Directorate of Economics & Statistics, Uttarakhand*

Figure 12 shows growth trends in NSDP from manufacturing and tertiary sectors along with the growth in total NSDP of the State during 2004-05 to 2012-13. During this period, at an annual



growth rate of 15.57% per annum Uttarakhand was deemed to be the fastest growing economy among all the states in India. This is attributed to significant investments in manufacturing/industry as a result of host of incentives that were offered by the government of the newly created state. It is interesting to note that during this period the per capita income in the state increased by 12.54% per annum.



**Figure 12: Annual Average Growth rate at constant prices (2004-05), 2004-05 to 2012-13, Uttarakhand**

## 10.2:Trends in Number of Factories, FC, Employment, Output and NVA

The data related to investment in industrial sector, employment generation, etc. in Uttarakhand is presented Table 18. It is noted that over the last decade the fixed capital has increased phenomenally by 2660% which led to impressive increase in other indicators of industrial production / outputs. For instance over the same period the number of factories in the state increased by almost 450%, the number of workers increased by 875%, the gross value of output went up phenomenally by over 3300% and the 'net value added' rose by over 5000%. Evidently the attractive policy framework laid out by the government of the newly created state has enabled this shift in industrial landscape and has led to overall growth in the sector. This has also made a significantly positive impact on the share of the state in the overall national scenario and has made it a strongly emerging industrial base in the country.

**Table 18: Trends in capital, employment, output, and NVA in Industries (Factory Sector) in Uttarakhand**

Items	1999-2000	2002-03	2004-05	2006-07	2008-09	2010-11	% change in decade
No. of Factories (No.)	616	715	752	1150	1907	2739	445%
	(0.47)	(0.56)	(0.55)	(0.79)	(1.23)	(1.29)	
Fixed Capital (Rs. Lakhs)	135860	204586	287679	949313	2189841	3614107	2660%
	(0.34)	(0.46)	(0.56)	(1.33)	(2.07)	(2.25)	
No. of Workers (No.)	26743	27815	35349	71115	172861	234079	875%
	(0.43)	(0.45)	(0.54)	(0.90)	(1.97)	(2.36)	
Total Persons Engaged (No.)	34336	41485	51762	95061	229727	288261	840%
	(0.42)	(0.52)	(0.61)	(0.92)	(2.03)	(2.27)	
Value (Gross) of Output (Rs. Lakhs)	314162	603559	1007348	2161728	8292360	10583763	3369%
	(0.35)	(0.53)	(0.60)	(0.90)	(2.53)	(2.26)	
Net Value Added (Rs. Lakhs)	51781	133457	194801	497901	2843285	2634767	5088%
	(0.33)	(0.77)	(0.75)	(1.26)	(5.39)	(3.74)	
Fixed Capital per Factory (Rs. Lakhs)	220.55	286.13	382.55	825.49	1148.32	1319.50	598%
Gross Output Per Factory (Rs. Lakhs)	510.00	844.14	1339.56	1879.76	4348.38	3864.10	758%
NVA per Factory (Rs. Lakhs)	84.06	186.65	259.04	432.96	1490.97	961.94	1144%
No. of Workers per Factory	43.41	38.90	47.01	61.84	90.65	85.46	197%

*Note: Figures in parentheses are percentage share in India's total*

*% Change in the last column corresponds to the data for 1999-2000 and 2010-2011.*

*Source: Compiled from ASI data*

### 10.3 District-wise Pattern of Industrialization in Uttarakhand

Table 19 presents district-wise distribution of number of registered units in the state which establishes a uneven pattern. In 2000-01, just before the new investment started flowing in the share of hills and plains was about the same. However, in the subsequent decade a bulk of investment has coming in the plains which is attributed to better connectivity and availability of raw materials, linkages to markets, etc. Haridwar, Dehradun and US Nagar have relatively achieved higher growth in the number of registered units when compared to other districts.

**Table 19: District-wise Number of Registered Units in Uttarakhand**

Districts	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
Almora	---	---	---	---	---	---	6	7	7	7	7
Bageshwar	21	21	49	50	75	77	55	43	36	50	49
Chamoli	169	14	105	177	183	181	5	16	41	60	47
Champawat	14	16	24	36	48	62	74	52	35	110	60
Garhwal		241	245	250	280	295	200	128	124	155	170
Pithoragarh	44	44	42	116	195	147	126	68	62	71	58
Rudraprayag	60	60	65	65	84	83	91	45	46	50	43
T. Garhwal	---	235	210	215	237	251	253	115	88	103	112
Uttarakashi	159	123	155	155	181	181	192	57	53	62	55
<b>Hills</b>	<b>467</b>	<b>754</b>	<b>895</b>	<b>1064</b>	<b>1283</b>	<b>1277</b>	<b>1002</b>	<b>531</b>	<b>492</b>	<b>668</b>	<b>601</b>
Dehradun	247	219	224	172	244	278	354	202	216	299	290
Hardwar	169	157	369	372	399	409	497	238	241	394	234
Nainital	33	82	77	152	213	245	260	139	95	137	140
US Nagar	32	54	213	253	306	377	414	271	246	372	219
<b>Plains</b>	<b>481</b>	<b>512</b>	<b>883</b>	<b>949</b>	<b>1162</b>	<b>1309</b>	<b>1525</b>	<b>850</b>	<b>798</b>	<b>1202</b>	<b>883</b>
<b>Uttarakhand</b>	<b>948</b>	<b>1266</b>	<b>1778</b>	<b>2013</b>	<b>2445</b>	<b>2586</b>	<b>2527</b>	<b>1381</b>	<b>1290</b>	<b>1870</b>	<b>1484</b>

Source: Directorate of Industries, Government of Uttarakhand

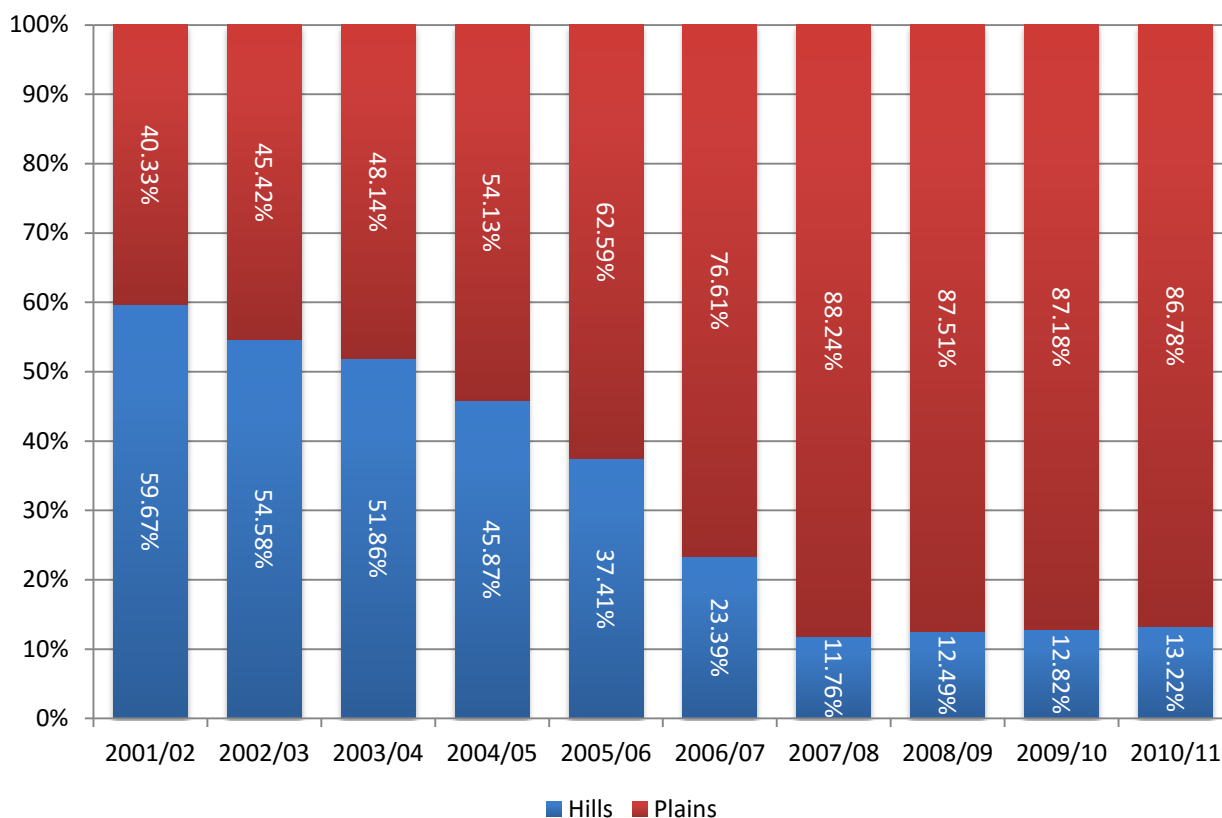
A comparison of Table 19 and Table 20 shows that plain areas of the state account for relatively larger size industrial units compared to the hills. Industrial employment has grown much faster in plain areas than the hill areas. Consequently share of hill areas in the total industrial employment has declined, and this is depicted in Figure 13. This pattern/trend is again attributed to improved connectivity in the plains.

**Table 20 : District-wise Employment in Registered Units in Uttarakhand**

	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Almora	--	--	--	--	--	331	627	641	614	--
Bageshwar	33	29	27	37	41	37	64	230	301	377
Chamoli	243	267	264	281	278	248	80	198	203	236
Champawat	33	51	69	82	127	154	107	66	157	165
Garhwal	513	509	545	544	630	538	298	384	901	581
Pithoragarh	77	86	233	377	303	214	202	165	245	345
Rudraprayag	126	109	187	174	198	-	108	143	125	185
T. garhwal	613	568	507	463	555	528	273	328	335	338
Uttarakashi	180	198	201	252	215	220	87	65	190	247
<b>Hills</b>	<b>1818</b>	<b>1817</b>	<b>2033</b>	<b>2210</b>	<b>2347</b>	<b>2270</b>	<b>1846</b>	<b>2220</b>	<b>3071</b>	<b>2474</b>
Dehradun	561	452	485	950	1421	2298	3811	3023	6013	3025
Hardwar	403	806	920	1077	1721	3383	6304	7181	7333	6928
Nainital	265	254	462	541	505	579	495	568	1291	675

US Nagar	--	--	20	40	279	1177	3239	4776	6244	5616
<b>Plains</b>	<b>1229</b>	<b>1512</b>	<b>1887</b>	<b>2608</b>	<b>3926</b>	<b>7437</b>	<b>13849</b>	<b>15548</b>	<b>20881</b>	<b>16244</b>
<b>Uttarakhand</b>	<b>3047</b>	<b>3329</b>	<b>3920</b>	<b>4818</b>	<b>6273</b>	<b>9707</b>	<b>15695</b>	<b>17768</b>	<b>23952</b>	<b>18718</b>

Source: Directorate of Industries, Government of Uttarakhand



**Figure 13: Proportion of Employment in Registered Industrial Units of Hills and Plain, Uttarakhand**

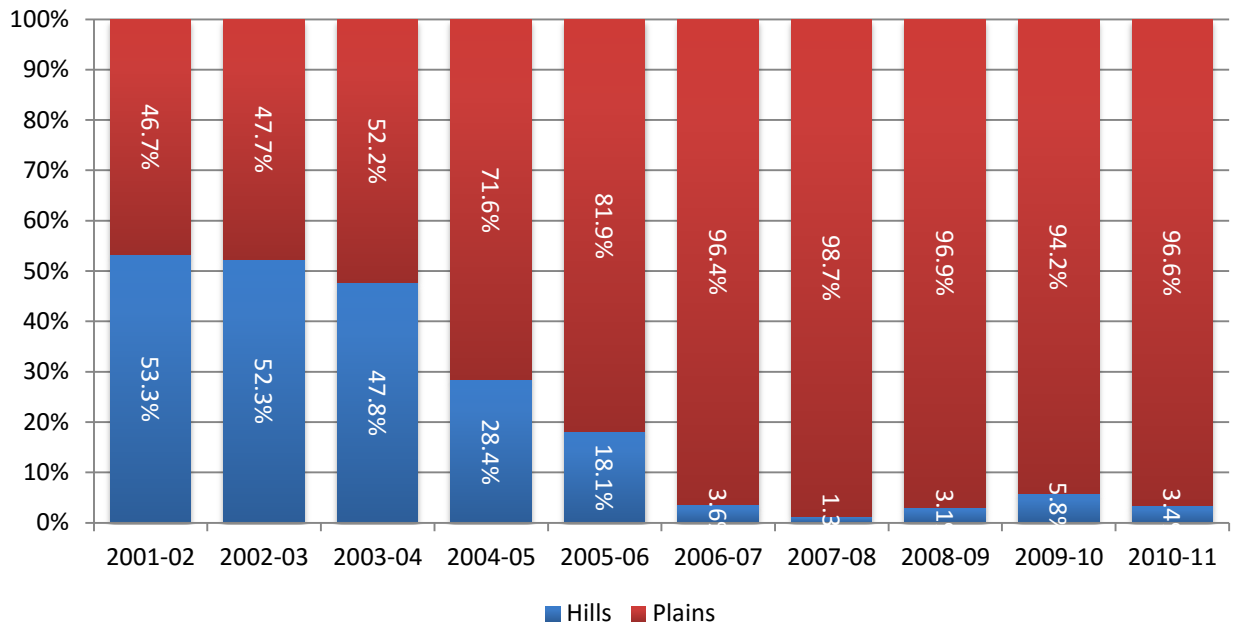
District-wise trend in investment in the registered industrial units are shown in Table 21. As is apparent from the Table, level of industrial investment varies significantly across districts and years. In 2001-02, 9 hill districts together had Rs.581.43 lakhs investment in registered units. The amount of investment went up to Rs.4750.9 lakhs by 2010-11; whereas the corresponding figures in plain districts went up substantially from Rs.509.1 lakhs to Rs. 1,36,081.6 lakhs during the same period. This shows that after the statehood, most of the industrial investment occurred in the plain districts, especially Haridwar, US Nagar and Dehradun. For instance, in Haridwar district, the amount of investment went up from only Rs.153 lakhs in 2001-02 to Rs.61703.4 lakhs in 2010-11.

**Table 21: District-wise trend in Investment in Registered Units in Uttarakhand (in Lakhs)**

Up to										
District	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
Almora	--	--	--	--	--	--	--	--	--	--
Bageshwar	29.38	24.96	26.4	37.43	41.85	42	105.9	46.7	289.08	192.48
Chamoli	77.66	113.04	93.14	87.43	153.34	133.8	80.94	785.42	361.44	737.48
Champawat	15.15	18.58	30.7	33.69	54	110.63	72.39	158.41	235.08	219
Garhwal	140.82	188.12	657.53	685.11	347.19	405.9	273.54	607.53	5919.96	1050.47
Pithoragarh	49.48	22.05	73.64	126.93	161.12	139.64	239.59	170.82	268.59	546
RudraPrayag	46.18	48.05	57.82	68.33	78.75	--	77.04	341.49	197.81	300.87
T. Garhwal	152.04	236.05	141.1	155.94	287.84	165.53	136.72	1394.67	1354.16	1168.68
Uttarkashi	70.72	69.99	73.96	84.46	89.96	101.2	85.55	364.5	248.79	535.91
<b>Hills</b>	<b>581</b>	<b>721</b>	<b>1154</b>	<b>1279</b>	<b>1214</b>	<b>1099</b>	<b>1072</b>	<b>3870</b>	<b>8875</b>	<b>4751</b>
Dehradun	179.83	72.4	249.42	661.02	976.7	2935.65	8795.37	8771.13	14185	15141.1
Hardwar	153	350	693	1983	2940.7	19332.8	43582.1	53927.8	55093.4	61703.4
Nainital	176.27	233.99	282.2	276.25	241.12	403.24	1315.45	2301.67	5390.25	3261.31
US Nagar	--	--	37	306	1336	6869	25359	55447	69617	55976
<b>Plains</b>	<b>509</b>	<b>656</b>	<b>1262</b>	<b>3226</b>	<b>5495</b>	<b>29541</b>	<b>79052</b>	<b>120448</b>	<b>144286</b>	<b>136082</b>
<b>Uttarakhand</b>	<b>1091</b>	<b>1377</b>	<b>2416</b>	<b>4506</b>	<b>6709</b>	<b>30639</b>	<b>80124</b>	<b>124317</b>	<b>153161</b>	<b>140833</b>

Source: Directorate of Industries, Government of Uttarakhand

Plain area of the state witnessed rapid industrialization after the statehood. As a result, share of districts located in the plain areas in the total investment in the registered industrial units has substantially increased during the last 10 years. Figure 14 demonstrates that the share of hill districts in the total investment has drastically declined from 53.3% in 2001-02 to 3.4% in 2010-11; while the corresponding share of plain areas has gone up from 46.7% to 96.6% during the same period. Evidently for the hilly regions of the state which are characterized by difficult topography, climatic conditions, poor connectivity and lack availability of raw material and manpower, it is understandable that the new industrial policy with focus on conventional form of industrialisation may not help in bringing about even distribution of benefits of across the two distinct regions. Evidently for the hill regions to progress on the lines of sustainable development, there is need to identify appropriate factors which are in synergy with the local ecology and other boundary conditions outlined above.



**Figure 14: Proportion of Investment in Registered Industrial Units of Hills and Plain, Uttarakhand**

## 11.0. Sources of Pollution in the River Ganga

Urbanization, industrialization and chemicalization of agriculture are the key factors of river pollution which lead to creation of classified large number of point and non-point sources. Point sources include discharges of domestic sewage from urban areas and trade effluents from industries, while non-point sources comprise, among others, run off from agriculture fields laden with pesticides and chemical fertilizers. Heavy doses of pesticides and chemical fertilizers used in agriculture in the plain areas of the state not only pollute the groundwater but also pollute the river through run-off. Moreover, while the cities in the state have small resident population, they are characterized by large floating population during the season of pilgrimage in summers and which, for want of adequate infrastructure lead to discharge of large quantity of sewage and solid waste into the river and the environment respectively.

### 11.1 Urban Sewage

Most of the towns are located on the banks of Ganga or her tributaries, famous for major destinations of pilgrims or religious tourism. Discharge of raw or mixed sewage into the river makes matters worse because pilgrims take holy dip in these rivers. Unplanned development, together with rapid urban growth and the inflow of tourists and pilgrims has made critical impacts on the urban environment of Uttarakhand. Most of the towns have grown in an unplanned manner causing immense pressure on the urban infrastructure and services resulting in degradation of the urban environment. However, except for a few towns, in most of the cases, sewerage collection system and sewage treatment plants have not yet been installed. Even in those towns where sewage treatment facilities are available, the facilities are inadequate and ill-equipped in treating the ever increasing volume of wastewater. According to Indiatat.com, in

2008, Class-I cities of Uttarakhand generated 177 MLD sewage, while treatment capacity was only 18 MLD. Table 22 presents the details of sewage generated in some Class-I and Class-II cities and the available treatment capacity of STPs.

**Table 22: Waste water Generation and Treatment in Uttar Pradesh**

S. No.	City/Town	Population 2001	Total Sewage generation ( in MLD)	Treatment Capacity ( in MLD)	Percentage covered
<b>Class I</b>					
1	Dehradun	550800	76.1	-	0
2	Hardwar	215260	39.6	18	45
<b>Class II</b>					
1	Rishikesh	59671	10.7	6.3	59
2	Roorkee	97064	11	-	0

Source: TERI (2011)

## 11.2. Industrial Effluents

The fragile ecological nature of the state leaves it particularly vulnerable to the negative environmental impacts of large-scale industrialization. There is limited data on the extent of environmental damage caused by industrial pollution. There are various types of polluting industries located in the state such as aluminium, copper, fertiliser, pesticide, pulp & paper, distillery, sugar, iron & steel, petrochem, refinery, zinc, cement, dyes & dyestuffs, leather, and pharma, etc. As of August 2012, there were 49 industrial units in Uttarakhand which were classified under highly polluted categories as per the Central Pollution Control Board criteria. Out of them it was found that only 27 industries are complying with the discharge/ emission norms and 19 units did not comply while 3 have been closed down for various reasons (Indiastat.com).

## 12.0. Summary and Actionable Points

The findings of the study are summarized in the following paragraphs.

### 12.1 Urbanization

1. During the last two decades, Uttarakhand and witnessed relatively rapid urbanization. Despite a large geographical area characterized as difficult hilly terrain, the overall level of urbanization in the state is almost comparable to the national average.
2. However, urbanization in the state is primarily confined to the four districts in the plains, namely, Haridwar, US Nagar, Dehradun and Nainital, which together constituted about 85% of the urban population of the state.
3. While the urban centres are characterized by limited municipal infrastructure to deal with the rising urban population, the hill regions are also facing serious problems due to the rising loads of tourists and pilgrims in summer seasons.

4. While there has been a significant improvement in access to sanitation in urban areas, there is a large unmet demand in rural areas across the state. The deficit in several districts ranges from 40-60%.
5. Over the years ULBs in the hills and the plains alike have made investments in improving drainage system for collection of sewage, sullage and storm water. However, there are issues with the type of sanitation solutions, sustainability, operation and maintenance and lack of treatment facilities.
6. Household expenditure in rural areas has recorded higher increase compared to the urban areas which indicates a certain degree of fall in disparity between rural and urban areas, however this may be only in the short-term and may not represent a statewide long-term trend. Data also reveal falling share of expenditure on food items in both rural and urban areas - the latter accounting a faster rate.
7. Despite rapid economic growth in the state during the last decade, quality of employment appears to have deteriorated .
8. A majority of people of the state migrate to other states in search of better employment opportunities.
9. As per the 2011 census there are close to 90,000 households residing in slum settlements in the urban centres in the state. Typical of such settlements, they are characterized by significant deficit in water and sanitation infrastructure and services.

## 12.2 Industrialization

10. Uttarakhand has emerged as one of the fastest growing states of India in the last decade, especially driven by growth of the secondary sector – manufacturing and construction activities.
11. During 2004-05 to 2012-13 the real NSDP in the state grew by a remarkable rate of 15.57% per annum (at 2004-05 prices) and per capita income increased by 12.54% per annum.
12. As a result of attractive policy framework, during the last decade the state has been able to record impressive gains in industrial investments, number of factories, industrial outputs, and the net value added. The share of the state in the overall national industrial landscape has made significant improvement.
13. As expected, industrialisation is concentrated in the plains region of the state and the share of hill districts in the total investment has drastically declined. Industrial units located in plain areas of the state are relatively bigger in size when compared to those located in the hill areas. Industrial employment has grown much faster in plain than the hill areas.

## 12.3 Actionable Points



While This report does not intend to offer a comprehensive set of recommendations, however, a set of issues which need to be addressed on priority are listed below.

- In view of the rising urban population and the phenomenal pressure of floating population in several urban and rural areas alike, there is a major need to strengthen the municipal infrastructure for water supply sewerage, sanitation and solid waste management.
- As regards wastewater, sanitation and solid waste management, there is an urgent need to identify and evolve a set of radical paradigms and robust solutions which respond to the difficult boundary conditions in the hilly areas. The usual approaches and solutions which are adopted in the plain areas do not offer sustainable and effective solutions for the hilly areas.
- There also a need to put in place appropriate institutional framework and incentive mechanism to address pollution from hotels and restaurants, the large number of tourists, etc.
- After the statehood, the share of secondary sector in the GSDP has significantly increased, which has critical implication for degradation of river water due to industrial effluents and stone and sand mining. Development strategy of the state needs to be shifted towards encouraging more knowledge intensive services and sustainable farming.
- As it becomes abundantly clear from the floods during 2013, most part of the state has very limited carrying capacity and therefore there is an urgent need for the state government to evolve and embrace a paradigm of sustainable development rather than copy the conventional paradigm of rapid economic development. The state needs to recognize the need to regulate the flood of tourists and pilgrims and evolve appropriate regulatory mechanisms.
- In order to ensure even economic development and distribution of benefits, there is a need to make appropriate policy interventions for the hill region on the lines of appropriate technologies and sustainable development and by taking into account the fragile ecology.
- Training and capacity building programmes should be initiated for urban local bodies so that these institutions may effectively perform their entrusted functions, including water, sanitation and waste disposal related works.
- Due to various push and pull factors, out-migration from the hill areas has been increasing at a faster rate, leading to a further concentration of population in urban centres. As urbanization and industrialization are highly inter-related issues, a high level of urbanization in the plain areas of the state co-exists with a high concentration of industries, thereby generating a high level of pollution, including sewage and industrial wastes. This suggests that for maintaining the wholesomeness of River Ganga, emphasis should be more on four districts of plain/semi plain areas. However, town planning is to be made not only keeping in view resident population, but also the floating population which is quite high in some towns of religious and tourist importance.

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