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Vision and Action Programme for All Round Socio-Economic Development of Hilly and Mountainous State Uttarakhand

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Abstract: ***The local inhabitants lag behind in the field of education, health care, tourism, horticulture, and agriculture, or in other words its own Socio-Economic development. More than 60 percent of the hilly and mountainous Uttarakhand state, including rivers valleys, forest land and snow-covered high mountains that are landlocked belong to the Government. The local inhabitants are left with less than 40 percent of land, only for their domestic use for settlements, agriculture and horticulture. In view of this bottleneck, the policies regarding its use, as well as public expenditure to create infrastructure facilities, affect growth and distribution of income. The climate and physiography of this Uttarakhand State are prime determinants of socio-economic development of plain areas due to following reasons: 1) A "Habitable Trinity" that involves: i) a co-existing atmosphere, ii) perennial source of water and iii) about more than 60 percent hilly and mountainous and forested landmass with continuous material circulation between three of them that is driven by the Sun. This setting has been one of the minimum requirement for the life to survive (on the basis of elements: - C, H, O, N, and nutrients -K & P) since early days of evolution to development. Uttarakhand State provides elements consisting of life body (C, H, O, N and nutrients - K & P), which are provided from the three components: atmospheres (C & N), water (H & O), landmass (nutrients, e.g., K and P), and forest (O). 2) The thick snow-cover on the high mountains of Uttarakhand State has sufficient water to irrigate the land and quench the thirst of the people of plane areas of our country even when there are no monsoon-rains, at least, for some monsoon seasons. 3) The perennial rivers of Uttarakhand have been of great help right for the people of plain areas to quench their thirst and irrigate their land and other day-to-day purposes. 4) The forests and high snow covered mountains. The author suggests the following measures to stop the migration of locals: a) To make some education centre at one place in the hilly and mountainous area where all the children of the local inhabitants would get free education, including tourism and hotel management, right from primary level to higher education, beside food and other facilities. The higher free education (medical and engineering) should be provided only to those children who would, willingly, offer to serve in this hilly and mountainous region. b) To shift some of the Govt. Departments in the hilly and mountainous area of Uttarakhand state. c) To establish hill station/tourist spot/ideal village, similar to Mussoorie and Nainital, in each district of Uttarakhand State which should be equipped by: i) Development of industries such as electronics which do not pollute the atmosphere and lead to high value addition. ii) Evolution of appropriate technology and scientific inputs which would suit local conditions and harness local resources. d) The health and medical facilities be also provided free at the village level, block level, and district level Health and Medical Centres to these locals along with highly duty conscious ambulance services. e) The Govt. must provide solar energy, safe drinking water based on gravitational flow to the locals. f) Govt. should also provide free its unused barren-land and the open-unused land within the forest, on lease basis, to the locals for practicing Horticulture and agriculture. g) The locals need to be educated for their skill development in the field of agriculture, rearing of livestock, doing handiwork which they possess. h) The children of locals of this remotest area that is mostly landlocked, right from Main Boundary Fault/Thrust to the main Himalayan Mountains must be informed well in advance about all the recruitments of all the posts and examinations in different Govt. and Private sectors, so that they too can apply well in time for selection. The examination and recruitment centres must be in the hilly and mountainous area that is very near to the children of the local inhabitants of this remotest area. The suggestions as suggested by the author are required by the very efficient team of executives who love the inhabitants of this hilly and mountainous Uttarakhand so as to assure no time and cost over runs.***

Keywords: education, healthcare, tourism, horticulture, agriculture

1. Introduction

1.1. Why there was need of a separate state Uttarakhand?

The term Uttarakhand, meaning "northern tract" or "higher tract," refers to the Himalayan districts of India. The state is located in the northern part of India, bordered by the Indian state of Himachal Pradesh in north-west, by the Autonomous region of Tibet (China) in north-east, by Nepal in south-east, and by Uttar Pradesh in south-west (Fig. 1 & Fig. 4). So, by virtue of its borders being with other neighbouring countries its **position becomes very strategic**. The Uttarakhand movement was motivated by regional factors along with economic factors stemming from its particular geography. The inhabitantants of this present hilly and mountainous state Uttarakhand, which consists of 13 districts (Fig. 1) at present, had felt themselves lost in the large state of erstwhile Uttar Pradesh and their needs ignored by the politicians more concerned with wider regional issues (some times it matters who are the policy makers at the top of the Govt.). There were almost no development in the field of higher education, tourism, and industry, although the 1962 border war with China resulted in some infrastructure development, particularly roads, which also were extended to make the more remote pilgrimage sites more accessible during its being part of Uttar Pradesh state.

As a result of above shortcoming it is to be recorded that during its being in Uttar Pradesh the men of this hilly and mountainous region were forced to leave their families in the hills and seek employment in the plains, where they mostly find menial positions as domestic servants. On the other hand, the adjacent Himachal Pradesh, which consists of Himalayan districts formerly in Punjab or in associated princely states, became a state in 1948. Himachal Pradesh is geographically and culturally quite similar to Uttarakhand and has enjoyed satisfying progress in education, power

generation, tourism, and cultivation. Keeping this aspect in mind some administrators observed that small states such as Himachal Pradesh can make more rapid progress just by virtue of being smaller, so that the problems are less overwhelming and local needs are not lost. This observation was the most important turning point for carving out this hilly and snow-covered mountainous part of Uttar Pradesh state to create a new state called Uttarakhand.

1.2. When were voices raised for a separate state?

The demand to make Uttarakhand a separate state was first raised at a special session of the Indian National Congress held in Srinagar on 5-6 May 1938 followed in 1952. Under the aegis of the, *Samyukta Morcha* on 2 October 1994 the massive demonstrations and protests for the support of statehood took place in the national capital Delhi. Thousands of Uttarakhand activists marched to Delhi to participate in this struggle (Ref. 16).

1.3. When the Uttarakhand state was finally carved out of Uttar Pradesh

After a long struggle and many sacrifices it finally resulted into the formation of Uttarakhand as a 27th independent separate state of India from undivided state of Uttar Pradesh on 9 November 2000 (Ref. 4 & 16).

1.4. What is the geography and geological set up of Uttarakhand State?

This state which consists of thirteen districts (Fig. 1), is a hilly and mountainous area that is made up of rocks of Siwalik Hills, Lesser Himalaya and Higher Himalayas, except some fluvial/ alluvial plain land that exist south of the Main Boundary Fault/Thrust and Himalayan Frontal Thrust (Fig. 2).

1.5. In what extremes the inhabitants of this hilly and mountainous state live?

a) Frequent landslides/land subsidence in the active and dormant slide mass in the area of settlements and agricultural land.
b) The environmental extremes which are associated with changing weather conditions/cloud burst and earthquakes in the higher altitudes.
c) As more than 60 percent of forest land being with Govt., the locals have to struggle for fuel, fodder and timber (Fig. 3 a Fig. 3 b).

Figure 1: Map showing all thirteen districts of Uttarakhand State. Retrived on 31st March, 2023 from Source: http://www.mapsofindia.com

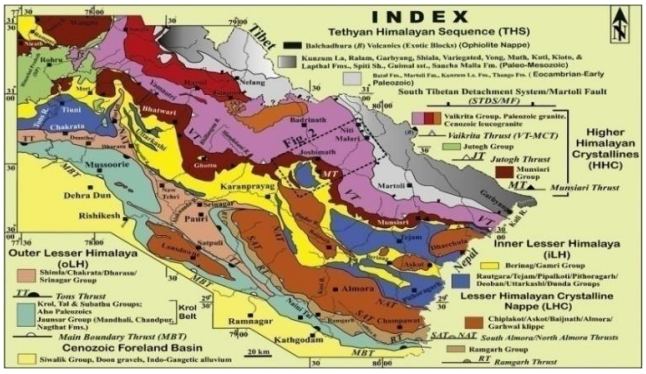

Figure 2: Geological map of Uttarakhand Himalaya between Tons and Kali Rivers, showing distribution of main tectonic units. Modified after Valdiya (1980), Celerier et al. (2009), Webb et al. (2011), Jain et al. (2014), and others. (Source: Google search engine)

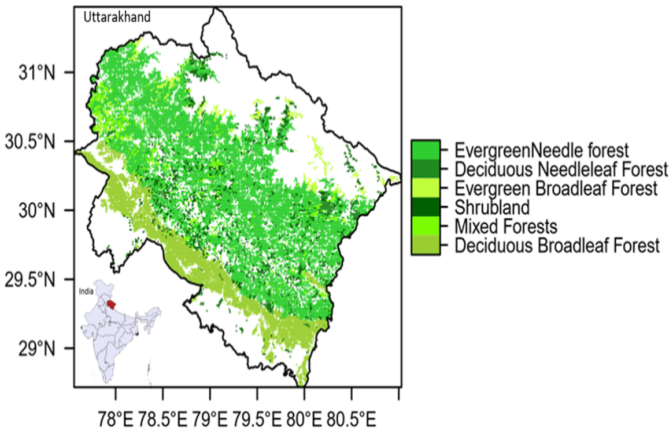

Figure 3 (a): Forest map of Uttarakhand Himalaya extracted from Decadal LULC – 2005 (Roy et al. 2015). Retrived on 31st March, 2023 from: http://www.mapsofindia.com

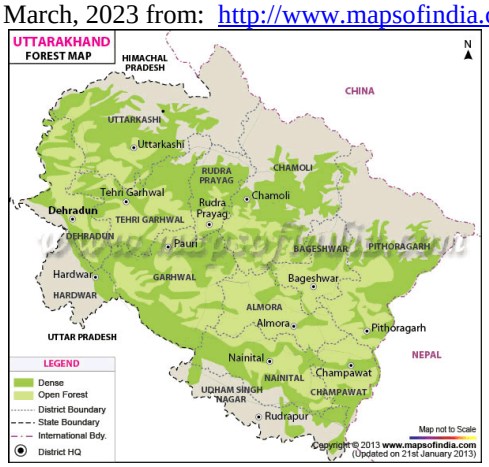

Figure 3 (b): The Map showing open and dense Forest in Uttarakhand. Retrived on 31st March, 2023 from Source: http://www.mapsofindia.com).

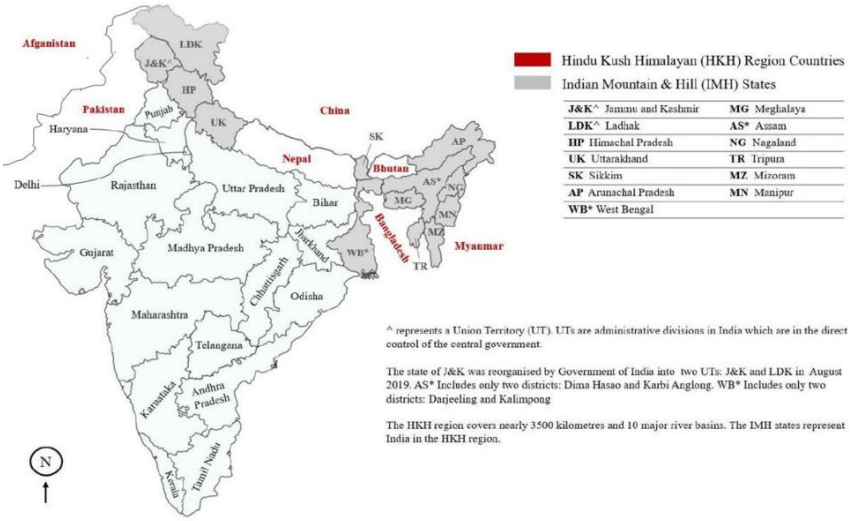

Figure 4: The Map showing Indian Mountain Hill (IMH) States among the Hindu Kush Himalayan (HKH) Region Countries. Source (Ref. 1): Ahmad Mohd Khalid (May, 2022), International Journal of Regional Development, ISSN 2373-9851, 2022, Vol.9, No. 1

The Resources of Uttarakhand State which are contributing for all round development of plane areas of our country

The land of Uttarakhand State is destined by a "Habitable Trinity" that involves: i) a co-existing atmosphere, ii) perennial source of cold and potable water, and iii) about more than 60 percent hilly and mountainous and forested landmass with continuous material circulation among three of them that is driven by the Sun. This setting has been one of the minimum requirement for the life to survive (on the basis of elements:- C, H, O, N, and nutrients –K & P) during early days of our chemical evolution (we know that the RNA macromolecule or biomolecule is called nucleotide, which contains sugar, nitrogen base and a phosphate group, but the phosphate group was a later inclusion in the biomolecule; it means the early biomolecule or macromolecule might have been a nucleoside, which contained a nitrogen base attached to sugar and is called LUCA: Last Universal Common Ancestor or Last Universal Cellular Ancestor) to biological evolution (origin of colloids, microspheres, coacervates, pre-cells or pre-bionts) as well as fully developed at present (Ref. 8, 9 & 11). So, the Uttarakhand State provided elements consisting of life body (C, H, O, N and nutrients - K & P) not only in the early days of civilization from Neolithic, but also is, still, contributing. These elements are provided from the three components: atmospheres (C & N), water (H & O), landmass (nutrients, e.g., K and P), and forest (O). The elements consisting of life are circulated/transported by the atmosphere as well as rivers to the plane areas which, in-turn, help in the evolution, development and longevity of the life: - of both plants and animals. All these components are discussed below:

2.1 Zone of snow (Figure 5a Figure 5 b):

The main glaciers of Uttarakhand which are the source of rivers, such as Yamuna, Bhaghirathi, Mandakini, Alaknanda, and Goriganga/Kaliganga rivers are: Bandarpunch glacier (Fig. 6 a & Fig. 6 b), Gangotri glacier (Fig. 7 a & Fig. 7 b), Chorabari glacier (Fig. 8), Satopanth glacier (Fig. 9 a & Fig. 9 b), and Milam glacier (Fig. 10). There are alpine and sub-alpine in the high mountainous areas that check/arrest the monsoon clouds, which, in-turn, condense and precipitate in the form of snow and rain in this area. The snow is settled on the high mountain tops, whereas the rain-water percolates through discontinuities in the rocks and thus is converted into sub-surface water bodies. Part of the rain-water flows on the surface and is converted into rivers in deep valleys.

The Ganges River system {consisting of Yamuna, Tons, Bhagirathi, Mandakini, Alaknanda, and Goriganga /(Kaliganga)} is the main source of freshwater/potable water for the population of India and Bangladesh (Table 1.). Thus, the snow and ice present in the Himalaya of Uttarakhand has a huge reservoir for fresh-water which makes it a very precious resource. The distribution of Glaciers in Ganga Baisn is given in the following table-1 (Ref. 2). There are about 968 glaciers in the Ganga basin which cover about 2,850 sq. Km. area. Largest number of glaciers- totalling about 407 is in Alaknanda basin, only which occupies about 1, 230 sq. Km area (Table 1 & Ref. 2).

Table 1

S. No.	Name of Sub-basin	Total Area (km^2)	Number of Glaciers	Glacier Covered Area (km^2)	Percentage of the Glacier covered Area (%)	Mean Glaciation Level (masl)
1.	Bhagirathi	7520	238	755	10.06	4120 to 7000
2.	Alaknanda	11132	407	1204	10.81	5154
3.	Kaliganga/Ghagra	8792	271	969	11.02	5169
4.	Yamuna	10688	52	205	1.91	2189
	Total	30612	968	2378	7.77	

The important glaciers of varying lengths of Uttarakhand are: Bundarpunch (about 12 kms in Uttarkashi, Garhwal), Gangotri (about 30 kms in Uttarakashi, Garhwal), Dokriani (about 5 kms in Uttarakahi, Garhwal), Khatling (about 3.717 kms in Tehri, Garhwal), Chorabari (about 7 kms in Rudraprayag, Garhwal), Doonagiri (about 5.5 kms in Chamoli, Garhwal), Nanda Devi group of Glacier (about 19 kms in Chamoli, Garhwal), Satopanth (about 3.820 kms in Chamoli, Garhwal), Tiprabamak (about 6 kms in Chamoli, Garhwal), Kaphini (about 3 kms in Bageshwar, Kumaon), Maiktoli (about 5 kms in Bageshwar, Kumaon), Milam (about 16 kms in Pithoragarh, Kumaon), Namik (about 3 kms in Pithoragarh, Kumaon), Pindari (about 3 kms in Bageshwar, Kumaon), Ralam (about 2.290 kms in Pithoragarh, Kumaon), and Sunderdunga (about 4.320 kms in Bageshwar, Kumaon) (Ref. 2).

It is to be noted that all the rivers {Yamuna, Bhagirathi, Mandakini, Alaknanda, and Goriganga/(Kaliganga)} that flow in the state of Uttarakhand have their origin in the glaciers that are located in the mountains of Uttarakhand only. However, some of the rivers (Ghaghara, Gandak, Kosi, Brahmaputra, Subansiri, Kameng, Lohit, and Dibang) that flow in other Himalayan states have their origin either in Nepal, Tibet and/or China and Indo-China border. The rivers, like Indus and Sutlej too originate in Tibet/China area, whereas the Jhelum, Chenab, Ravi, and Beas originate within India. All these rivers originate from glaciers but don't flow in the major part of India; all these rivers flow to the western part of Pakistan (Figs. 5 a & 5 b). {The Punjab of pre-patrician of India was called the land of five rivers, "Panjnad": - Jhelum, Chenab, Ravi, Beas and Sutlej. At present most part of earlier Punjab is in Pakistan. The rivers such as Beas and Sutlej flow first in Punjab of India and then in Pakistan, where as the Ravi flows just at the border of Punjab (India) and Pakistan and finally to Pakistan (Ref. 12).}

{So, the majority of water flowing in the Himalayan Rivers is due to melting of glaciers, except some percentage of water coming from aquifers within the mountains that are devoid of snow cover. And we know that water makes up about 60 – 75 % of human body weight. A loss of just 4 % of total body water leads to dehydration, and a loss of 15 % can be fatal. Likewise, a person could survive a month without food but wouldn't survive 3 days without water. This crucial dependence on water broadly governs all life forms. Clearly water is vital for survival, but what makes it so necessary? This is because of the reasons: i) the molecular make-up of water, ii) Water is the "Universal Solvent", iii) Water supports cellular structure, and iv) Chemical reactions of water (Ref. 11)}

2.1.1 The status of Indian/Uttarakhand Glaciers

It was estimated that about 33,200 sq. km of the Himalaya is glaciated and glaciers occupy about 17 percent of the total mountainous area of the Himalaya (Ref. 7). The Indian Himalaya glaciers occupy more than 55.81 percent of the entire glaciated area of the Himalaya (Ref. 7). As per the survey by the Geological Survey of India, Indian Himalaya has a total of 9575 glaciers. Out of these, information relate to their length, area and volume are available for about 9040 glaciers, which occupy an area of 18527.79 km^2 and have a volume of 1306.1 km3 (Ref. 7).

River Ganga is fed by 10.1 percent of all the glaciers in Indian Himalaya, totalling 968 glaciers which are distributed among 18 sub-basins. The Ganges Basin which is fed by melting of glaciers in the State of Uttarakhand is supported by Yamuna Basin, Bhagirathi Basin, Alaknanda Basin, and Goriganga/Kali basin) (Ref. 7 and Figs. 5 a & 5 b). The primary estimates show that the Ganges river in Uttarakhand which is fed by Yamuna Basin, Bhagirathi Basin, Alaknanda Basin, and Goriganga/Kali basin have Indian Himalaya Glacier Volume of about 192 cubic kilometres which is about 54 times of Tehri reservoir, which is about 3.54 cubic kilometres (author's estimates). The origin of rest of the rivers of other Indian Himalayan states is in glaciers either in Nepal, Tibet and/or China, or just at the border of India and China. River Ganga after Uttarakhand is also supported by 3252 glaciers of Nepal Himalaya with a glacierised area of 5322 km^2 and ice volume of 481 km^3 (Ref. 7).

So, the thick snow-cover on the high mountains of Uttarakhand State has sufficient water to irrigate the land and quench the thirst of the people of plane areas of our country even when there are no monsoon-rains, at least, for some monsoon seasons. The rivers of Uttarakhand have been of great help right from about 45 to 50 million years ago when the Himalayan foreland basin, where the world's greatest alluvium Ganga plain exists, started to fill up by sediments. The river Yamuna (the river Saraswati before about 8,500 yrs ago) of Uttarakhand which originates from Bandarpunch glacier was instrumental first in converting the depression in the states of present day Haryana, Punjab, Rajasthan, and western part of Pakistan, and later evolution and development of early human civilization from Neolithic, on its banks (Ref. 12).

2.1.2. The causes of melting of Glacier

However, we are noticing there is continuous melting of glaciers. The deglaciation of Himalayan glaciers is primarily because of continuous rise in atmospheric temperature because of: i) permanently covering the vast green land by constructing unplanned concrete structures near and far away from the Himalayan glaciers thus changing the landuse that was responsible for decrease and/or maintain the temperature, ii) relatively high population density near and far away from the glaciers and consequent deforestation, iii) green house gases (Carbon dioxide-CO_2, Methane-CH_4, Nitrous oxide-N_2O, Hydrofluorocarbons-HFCs, Hydrochlorofluorocarbons- HCFCs:- all these gases trap heat in the earth's atmosphere), and iv) forest fire whose temperature rises up to 800^0 C and is generally noticed during summer in Uttarakhand (author's observations). This is to record that the smaller glaciers, obviously, are more susceptible to melting in comparison to larger and thick glaciers due to rise in temperature caused by above reasons. However, the thick glaciers too melt both in summer season as well as winter season because of gravitational pressure at the contact of firm bedrock and the bottom of the glacier pile: **more of the thickness of glacier pile more would be the melting at the bottom**.

The author is of strong opinion that the vast green land/soil covered land replaced by high rise concrete structures in almost all the districts of Uttarakhand, besides forest-fire must be responsible for rise in temperature and consequently melting of glaciers right from covering the green/soil land by concrete structures (this time period may be about 200 years back from the present) to till today, April 2023, rather than green-house gases (this is author's view). (It would be worth recording that the snout of the Chorabari Glacier was almost just upstream of the main temple Kedarnth in the year 1882, or may be earlier to this date.)

2.1.3. Some of the means to check the melting of glaciers

The author emphatically states that as we cannot change the areas where multi-storeyed concrete structures have already changed the landuse that was responsible for decrease and/or maintain the day-to-day temperature. The deglaciation of glaciers due to rise in temperature in Uttarakhand can be checked/minimised, to some extent, by: 1) Afforestation: i) Planting of trees in the denuded forest land and unused land/barren land, and ii) On either side of the major rivers, streams, and nalas (particularly in the city and town areas) with species which can provide both fuel and fodder to the local inhabitants. 2) The roofs and walls of the concrete buildings must be designed in such a way so that they don't get heated up and in-turn reflects the heat. 3) There should be arrangements for early checking/controlling the forest-fire in this hilly and mountainous Uttarakhand State, particularly during summer.

Figure 5 (a): Snow map of Uttarakhand, uploaded by Pranab Kr. Das. Retrived on 31st March, 2023 from: http://www.mapsofindia.com

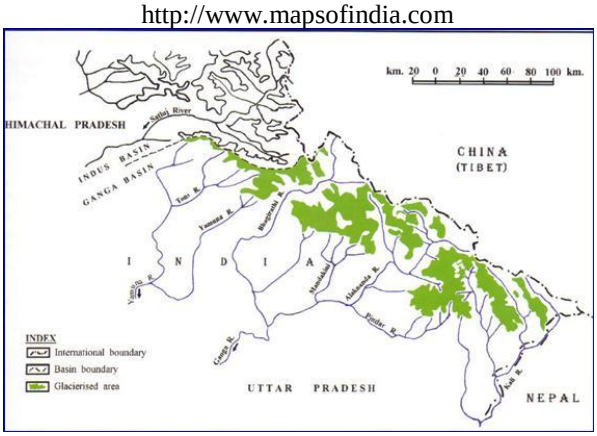

Figure 5 b: Glacier covered area of Ganga Basin within Uttarakhand Himalayas.
Source: Glaciers in Ganga Basin in Glacier Atlas of India, Geological Society of India, and http://www.euttaranchal.com/uttarakhand/glaciers- in-uttarakhand

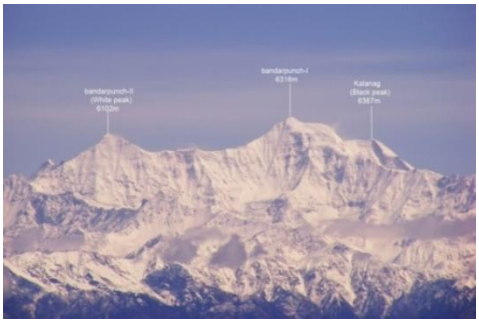

Figure 6 (a): Bandarpunch Glacier: The source of Yamuna River.
Source for both figures: Glacier atlas of India, Geological Society of India, and http://www.euttaranchal.com/uttarakhand/glaciers-in-uttarakhand

Figure 6 (b): Bandarpunch Peak
Source for both figures: Glacier atlas of India, Geological Society of India, and http://www.euttaranchal.com/uttarakhand/glaciers-in-uttarakhand

Figure 7a: Gangotri Glacier: The source of Bhagirathi River.
Source: Glacier atlas Geological Society of India & http://www.euttaranchal.com/uttarakhand/glaciers-in-uttarakhand

Figure 7 b: Gomukh in Gangotri glacier.
Source: Glacier atlas Geological Society of India & http://www.euttaranchal.com/uttarakhand/glaciers-in-uttarakhand

Figure 8: Chorabari Glacier: The source of Mandakini River. Source: Glacier atlas of India, Geological Society of India, and http://www.euttaranchal.com/uttarakhand/glaciers-in-uttarakhand

Source: Glacier atlas of India, Geological Society of India, and http://www.euttaranchal.com/uttarakhand/glaciers-in-uttarakhand

Figure 9 (a): Satopanth Glacier: The source of Alaknanda River

Source: Glacier atlas of India, Geological Society of India, and http://www.euttaranchal.com/uttarakhand/glaciers-in-uttarakhand

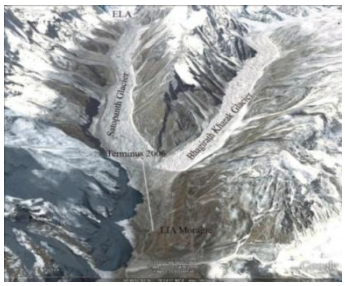

Figure 9 (b): Satopanth Glacier: The source of Alaknanda River

Source: Glacier atlas of India, Geological Society of India, and http://www.euttaranchal.com/uttarakhand/glaciers-in-uttarakhand

Figure 10: Milam glacier: The source of the Goriganga River. Source: Glacier atlas of India, Geological Society of India, and http://www.euttaranchal.com/uttarakhand/glaciers-in-uttarakhand

2.2. Glacier-fed perennial Himalayan Rivers (Fig. 11)

These are Yamuna (originating from Bandarpunch glacier), Bhagirathi (originating from Gangotri glacier), Mandakini (originating from Chorabari glacier), Alaknanda (originating from Satopanth glacier), and Goriganga (originating from Milam glacier). (Figs. 5 a & 5 b, 6 a & 6 b, 7 a & 7 b, 8, 9 a & 9 b, 10). The small and large rivers are being utilised for producing clean and pollution-free energy:- Hydro-Power/Electricity by constructing the run-of-the-river schemes for removing the darkness of the houses, streets of the villages and cities, running household electrical appliances, trains, and small and big industries in the plain area (author's investigations).

It has been investigated that many numbers of the run-of-the-river schemes along the course of a glacier-fed Himalayan River are constructed in this mountainous state of Uttarakhand which is part of Himalayan kingdom, but not much in rest of the southern area of our country where the rivers are generally monsoon-fed but not the glacier-fed. (The author studied that the rain water during monsoon percolates through vertically oriented discontinuities, like joints, shears and faults particularly in massive and compact basalt rock and in-turn settles at the bottom of it and at the top of the lower massive and compact basalt flow where a tuffaceous rock/red bole horizon generally exists; this water during off monsoon season comes out and flows in the main depression that becomes the main stream/river all along the course of the depression valley. So, most of the rivers located in central part of India, like river Narmada and southern part of India, like Krishna, Godavari, etc have their source in basaltic rock.) This is the reason that a large number of the run-of-the-schemes for hydropower generation that are based on sufficient height and sufficient continuous discharge are located in this hilly and mountainous area of Uttarakhand (author's studies).

In addition, the flood water during monsoon is stored in the reservoir and released during off-monsoon season to irrigate the vast plain land, quench the thirst of the people and also to check the loss of life and property that is caused by the flood water during monsoon in the downstream plain areas. So, the author of this paper records that the run-of-the-river schemes are Noble schemes/steps in eradicating the darkness, irrigating the land, quenching thirst and running small and big industries, which are backbone of our country. These schemes also help in arresting the silt load coming from high mountainous areas (author's view).

The author suggests to the local inhabitants of this hilly and mountainous Uttarakhand State that they should support/come forward in constructing these types of schemes by the Govt. in this hilly snow-bound mountainous area. However, the author strongly supports that these local inhabitants must be benefited due to construction of these projects.

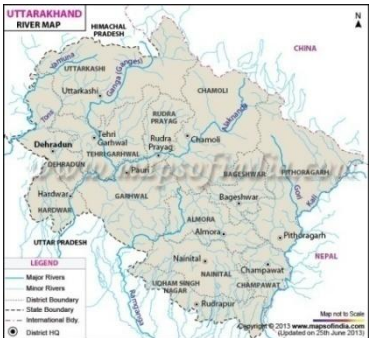

Figure 11: Map showing the rivers of Uttarakhand: Yamuna, Bhagirathi, Mandakini, Alaknanda, Ramganga, and Goriganga (Kaliganga). All the rivers are originating from glaciers in Uttarakhand. Retrived on 31st March, 2023 source: http://www.mapsofindia.com

2.2.1. Pollution in the rivers of Uttarakhand: It is worth mentioning that all the snow-fed mighty Himalayan River, like Ganga remains pollutant and garbage free right from its source and up to 1 km downstream of Shivananda Ashram that is located on the right bank of Ganga River, near Rishikesh (Fig.. 12). The site investigations have revealed that the neat and clean water of river Ganga is being polluted from about 1 km downstream of Shivananda Ashram by the local nala/stream, called Khara Srot (Fig. 13) and also Chandrabhaga river (Fig. 14 a & Fig. 14 b) which are located on the right bank of Ganga River and bring all waste from local habitats. The water of river Ganga is further being polluted by local river/nala/stream in Haridwar area (Fig. 15 a). This stream flows finally in SE direction and joins the river Ganga about 100 m upstream of Kharkhari Ghat (Cremation Ghround), Haridwar. It may be worth mentioning that small white pieces of unburned bones of dead bodies have been observed in the water near Har-Ki-Pouri (Fig. 15 b).

Similarly, the water of river Yamuna is potable, i.e. free from any garbage, pollutants and toxic foam in the area near Kalsi, i.e., upstream of Dakpather Barrage (Fig. 18 a). However, toxic foam white floating at the top of polluted water of the river Yamuna has been recorded near Delhi, the Capital of India and downstream of it (Fig. 18 b).

Since the water of river Ganga is being polluted by burning of dead bodies, garbage and pollutants that is being brought by the rivers/nalas/streams flowing just close to Haridwar city, the author therefore suggests the following ways to stop the polluting the water of river Ganga: i) The dead bodies must be burnt properly, leaving only the ash of dead bodies and the wood that is used. ii) The dead bodies, if possible, must be burnt in electric-furnace. iii) If both of these ways are not possible then in that case an isolated area, away from the burning ghat, of suitable size could be identified where the dead bodies could be burnt and the remaining ash and unburned bones (if left) could be used in agriculture and horticulture fields, and iv) the garbage and pollutants in the nalas/streams that are generally located near and/or in the centre of the cities must be stopped from the source (author's view).

The investigations have revealed that rivers such as Rispina (fig. 16 a) has very crystal clear water fall (named Shikhar Fall) near its source located about 1.5 km u/s of the Tapovan and also about 1 km u/s of the Tapovan district Dehradun, Uttarakhand (fig. 16 b). However, the Rispina which flows more-or-less in NS direction through the middle of Dehradun city contains garbage and polluted water near Vidhan Sabha, Dehradun (fig. 16 c).

The river Bindal which flows more-or-less in NS direction through the middle of Dehradun city (fig. 17) also contains garbage and polluted water near Connaught place, Dehradun. This river along with river Rispina join river Song, which finally carry pollutants and garbage in SE direction to join river Ganga on its right bank, near Gita Ghat Dhyan Kendra Ashram, Haridwar.

The detailed investigations have revealed that the garbage and pollutants in the rivers/nalas/streams, which flow either through the cities or close to them, are added by the inhabitants of the cities. So, practically, the main river water, like Yamuna and Ganga is being polluted by the inhabitants living close to rivers/nalas/streams, which bring all the dumped pollutants/garbage and other wastes from the main habitats/cities, like Rishikesh (figs. 13, 14 a & 14 b), Haridwar (figs. 15 a & 15 b), Dehradun (figs. 16 c & 17) and Delhi (fig. 18 b), etc.

The author of this paper thus suggests that the best way of checking/stopping the garbage and pollutants in the rivers/nalas/streams is to stop/check right from the source to downstream of the cities. For this, necessary instructions could be issued to the inhabitants who are living on either bank of these rivers/nalas/streams right from source to the downstream areas and are cause of polluting the streams/rivers. If it is followed, in principle, then in future these rivers/nalas/streams would be free from pollutants, garbage and other toxic elements and thus would contain fresh and potable water.

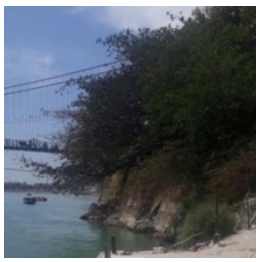

Figure 12: Photo taken by the author on 11-04-2023 which shows clean water of river Ganga on its right bank near Darshan Shanskrit Mahavidhyalaya, close to Shivananda Ashram

Figure 13: Photo taken by the author on 11-04-2023 which shows polluted water of river Ganga by local stream/nala called Khara Strot (near Yoga Ashram).

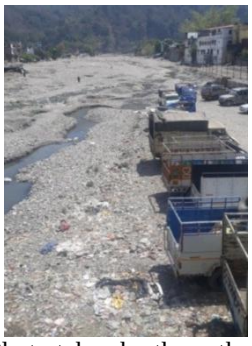

Figure 14 (a): Photo taken by the author on 11-04-2023 showing garbage and polluted water in the entire length of . Chandrabhaga River, Rishikesh

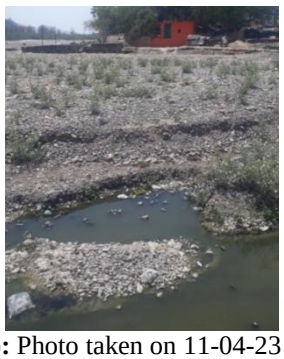

Figure 14 (b): Photo taken on 11-04-23 by the author showing polluted water and garbage in Chandrabhaga River, Rishikesh

Figure 15 (a): Photo taken by the author on 14-04-23 showing garbage and polluted water in Ganga by a local stream close to Haridwar

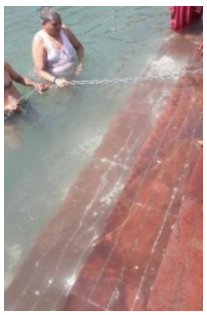

Figure 15 (b): Photo taken by the author on 14-04-23 showing white pieces of unburned bones of dead bodies in the Hari-Ki-Pauri Ghat, which are burnt in open just close to the right bank of Ganga, aridwar and about 1.5 km upstream of the Har-ki-Pouri Ghat.

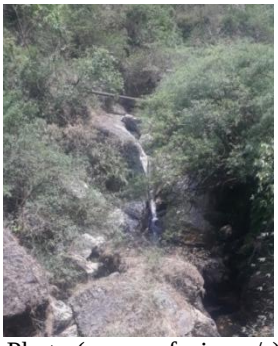

Figure 16 (a): Photo (camera facing u/s) showing very crystal clear water fall (named Shikhar Fall) of the river and velocity was about 0.5 cubic meter per second on 23-05-23) located about 1.5 km u/s of the Tapovan, district Dehradun, Uttarakhand.

Figure 16 (b): Photo (camera facing u/s) showing very clear water in the river Rispina Rispina near its source (the volume on 23-05-23 near its source located about 1 km u/s of the Tapovan, district Dehradun, Uttarakhand.

Figure 16 (c): Photo (camera facing u/s) taken by the author on 27-04-23 which shows garbage and polluted water in the river Rispina, near Vidhan Sabha, Dehradun.

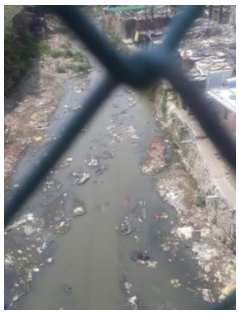

Figure 17: Photo (camera facing d/s) taken by the author on 27-04-23 which shows garbage and polluted water in the river Bindal near Connaught place, Dehradun.

Figure 18 (a): Photo (camera facing u/s) showing very crystal clear water of the river Yamuna flowing near Kalsi and upstream of the Dakpather Barrage, district Dehradun, Uttarakhand.
Source: Wikipedia, the free encyclopaedia and Google search

Figure 18 (b): Photo (camera facing d/s) showing toxic foam white floating at the top of polluted water of the river Yamuna, near Delhi, the Capital of India.
Source: Wikipedia, the free encyclopaedia and Google search

2.3. Forest (Figs. 3 a & 3 b)

Here in this state of Uttarakhand the forests are the source of bamboo, drug, grasses, gums and resins, etc. So, forests are source of raw materials for industries, buildings and railways. It may be noted that Carbon dioxide, for example, is absorbed by so-called carbon sinks such as forests, soil cover and high mountains. Therefore, the forest are responsible for generating a pleasant climate in the State of Uttarakhand (Figs. 3 a & 3 b). We know that the forest with thick vegetation cover and open soil and vegetation covered land generally cools the land after sun set, but once these areas are covered by concrete structures there is very slow release of temperature from these structures. And these concrete structures don't cool down once heated by Sun light in the entire summer season. So, these concrete structures radiate heat throughout the day and night. As a result the nights remain still hot by these concrete structures and ultimately continuous rise in atmospheric temperature that is responsible for deglaciation of glaciers in the Indian Himalayan Mountains (authors view).

The author wishes to record that in Dehradun city there was not much rise in atmospheric temperature before 1974. The coolers and air conditoners were not being used here in Dehradun during summer. The atmosphere was pleasant and suitable for living. At present it becomes almost difficult to manage without cooler and air conditioners. Now, the area between Mussoorie foot hills (Rajpur) and Lachhi wala/Kuwaan wala and Raipur and Mohand, which constituted mostly agriculture soil cover and forest/greenland, has been covered by concrete structures between 1974 and till-today, i.e., April 2023 (that is in about 49 years). So, in the city of Dehradun the green land/soil covered land has been replaced by multi-storeyed concrete structures. Similarly, the construction activities have also been done in Rishikesh, Haridwar, Roorkee, Haldwani and other cities and almost all villages too in the State of Uttarakhand (author's observations).

2.3.1. Suggestions for maintenance of the forest: The forest zones must be conserved and augmented for environmental services and biodiversity managements. The author suggests that the forest in almost all hilly and mountainous districts of Uttarakhand should be handed over to the local villagers, on lease basis, to look after the land and the flora. It is believed that there would not be any room for pilferage and misuse of forest property by these locals when doing the job collectively and in majority. Moreover, the chances of attacks/killing of local inhabitants by wild animals would be almost nil, if the villagers would go to forest collectively to look after the forest. We know that forest-fire burns all: - small and big plants and the wild animals, ants, birds, etc. Therefore, there should be some force to stop this forest-fire immediately. So, these local inhabitants collectively would be of immediate help to stop the forest-fire as soon as it starts. However, the author suggests that the villagers should be permitted to collect dry wood for their personal use and green grass from the forest ground only for their cattle. However, the author is of the opinion that the locals should not be allowed to trim the trees and plants for their benefits.

3. The Importance of the Glacier-fed Himalayans River – Saraswati River (the present-day Yamuna River) in the Evolution and Development of our Civilization from the Neolithic

Let us prove that how important is the role of the galcier-fed Himalayan river in the evolution and development of life - both: - plants and animals. It has been proved scientifically that the areas of Haryana, Punjab, Rajasthan and west part of present-day Pakistan:- the land where our great civilization was evolved and developed, were, once, very fertile and prosperous due to the Saraswati River:- the present-day Yamuna River that rises on the slopes of the Bandarpuch massive in the Great Himalayas near Yamunotri (Jamnotri) in Uttarakashi district in western Uttarakhand, right from about 30,000 years ago to 8,500 years ago from the present which changed its course from SW to SSE, i.e., towards Ganga River basin in about 8,500 years ago from the present (Ref. 12 and Fig. 19 and 20). At present, in the absence of glacier-fed Himalayan perennial river, like present-day Yamuna (the earlier name Saraswati) areas of the states of Haryana, Punjab, Rajasthan and west part of present day Pakistan are dry and thus the people of these areas are facing irrigating their land and quenching thirst.

Figure 19: Palaeocourse of the Saraswati River (the present-day Yamuna River) and the Ganga River
Source: IJSR, Volume 11, Issue 6, June 2022.

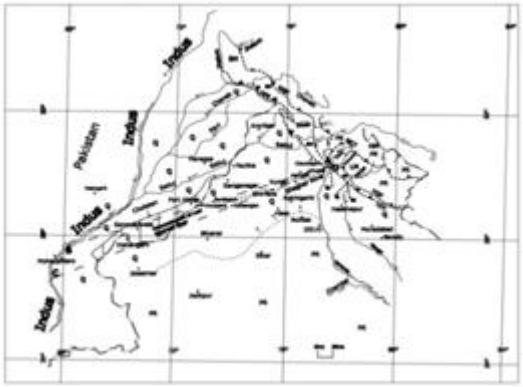

Figure 20: Dry-bed of the departed Saraswati River (the present-day Yamuna River) and present-day course of the Yamuna River and the Ganga River.
Source: IJSR, Volume 11, Issue 6, June 2022.

4. The Natural Resources of Uttarakhand State which are contributing for the benefits of the local inhabitants

As shown in Table 2 all the hill districts have more than 60 per cent of the area under forest (Ref. 4 & Figs. 3 a & 3 b). And, at the same time many of the livelihood options in these regions depend on forest-based products. The barren land can be utilized for such as high-value cultivation. The local inhabitants are benefitted by the following Resources:

4.1 Forest

It adds clean air to the atmosphere and thus the atmosphere here remains clean, pollution free and scerne round the year. However, there is an increase pressure on forest for fuel, fodder and timber requirements that adversely affects the density and productivity of forests (Figs 3 a & 3 b).

4.2 Mountain slopes used for agriculture and horticulture

Most of the area, like forest cover, snow covered high mountains, and river valleys of Uttarakhand State belong to the Uttarakhand Govt., as a result the locals practice the agriculture and horticulture within very confined land. (Figs 3 a & 3 b & Table 2).

Table 2: Geographical indicators, 2006

Indicators	India	Uttarakhand
Total Geographical area (sq. Km.)	3287240	53483(1.63%)
Area under forest (sq. Km.)	765210	34651(4.53%)
Area under agriculture (ha)	183016000	5671704 (3.10%)
Area under irrigation (%)	40.3	43.6
Area under annual rainfall (mm)	1432	1547

Sources: Surabhi Mittal, Gaurav Tripathi, Deepti Sethi (July, 2008), Development Strategy for the Hill Districts of Uttarakhand. Retrieved on 31st March, 2023 from: https://www.researchgate.net/publication/32253064_Rural_Development_Approaches_and _Strategies

As seen in the following combined forest and agricultural map (Fig. 21 a) of Uttarakhad, most of the land is covered by the forest land (Refs. 4 & 14). As a result the agriculture land/crop land that are shown within the hilly and mountainous area have been developed as terraced cultivation by the early migrants/locals in this area in the glaciated and scree material resting on the mountain slopes, on either abutment slopes between about 100 m and up to a height of 1000 m from river bed level. Other agriculture lands/crop lands that fall in the plain area, i.e., South and SW part of the map (fig. 21 a) are in the river terraces that are located within the river bed level and up to a height of 100 m and up to 150 m on either banks of the river.

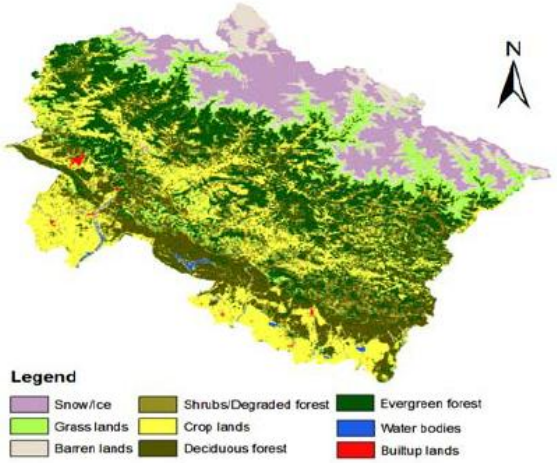

Figure 21 (a): Map showing agriculture land (Landuse /Landcover) map of Uttarakhand for the year 2010 on reduced scale. Retrived on 31st March, 2023, Source: Uploaded by Sandeep Kumar Patakamuri.

Figure 21 (b): Map showing agriculture land (Landuse /Landcover) map of
Uttarakhand. Retrived on 31st March, 2023, Source: *http://www.mapsofindia.com*

4.2.1. Agriculture and Horticulture crops: The locals practice agriculture in the terraced lands. The agricultural crops can be classified into two categories: i) Food crops, and ii) Cash crops (Ref. 3, 4 & 14). The food crops are: Mandua, Jhangora (millet: - small grain of Indian cereal), Rice/Paddy, Wheat, Maize, Sava (course millet); all these are important cereal crops of the State. Soyabean in Kharif and mustard and Toria/Til in the Rabi season are important oil crops. Urad, Bean, Garath, Rajmah in karif season and Gram and Lentil in Rabi are the important pulse crops of the State. The cash crops are: Tea, Ginger, Cinchona etc. The wet temperate high hill and mountainous areas are good for cash crops, like Potatoes, Tomatoes, Cabbage, Cauliflower, Brinjals, French beans, and Cucumbers. The fruits are: Apples, Peaches, Walnuts, Apricots, Citrus fruits, Pears, and Plums (fig. 21 b).

4.2.2. Medicinal herbs: Medicinal herbs include: kuth, kuttki, sarpgandha, jatamasi, chiraita, and tagar. However, these products are not commercially produced by the locals, except apples and potatoes in some area (Ref. 3, 4 & 14).

4.2.3. The pathetic condition of the locals: The local inhabitants of this hilly and mountainous area have been struggling right from their early days of settlement here when they were not left any piece of land for practicing the agriculture and horticulture in the plain area by the early humans. However, when these locals came in this hilly and mountainous area their struggle started right from the beginning when they were not left any other option but to make terraced fields in the uneven glaciated and scree material on the mountain slopes for practicing agriculture and horticulture. Here in the mountainous area the retaining walls and the breast walls that are made for retaining the soil of the terraced land generally collapse/slide down during rains. People still have to climb the mountain slopes for their daily livelihood. They have to lift everything related to agriculture and household things on their shoulder and back, that too, on the mountain slopes. Although the local inhabitants put their maximum efforts/hard work in their day-to-day work, yet they don't get maximum benefit out of it due to technical guidance in related field. As a result of this their life becomes miserable and thus the short lifespan (author's observations).

On the contrary the people of plain areas of our country are using vast unrestricted land surrounding them free from forest cover, river valleys, and snow-covered mountains for their agricultural, horticulture and other things for their overall progress. Moreover, the agriculture land is well connected by rail, foot-path and motorable roads. In the plain areas everything is machine driven. As a result the areas of reserves and the market are well connected. So, these people could sell their produce easily for their earnings. This is the reason these people are economically better in comparison to the locals of this hilly and mountainous area (author's investigations).

5. The Resources of Uttarakhand state which do not contribute/add in the Socio-Economical development of the local inhabitants.

The Govt. of Uttarakhand contains about 4.53 per cent of India's forest area and about 3.1 per cent of India's agricultural area (Table 2 and Figs. 3a & 3b). There are snow-covered high mountains and also glacier-fed perennial mighty Himalayan Rivers that belong to the Govt (Figs. 5 a & 5 b). Therefore the local inhabitants are restricted to perform their activities within their land only to meet their day-to-day requirement and livelihood (Table 2 & Figs. 3a & 3b).

6. Areas where all round development of the local inhabitants of this mountainous area is possible

The author points out that the demand of a separate Uttarakhand State was due to the reason that there was not much improvement in the field of educational institutions, agriculture, livestock rearing, dairy, poultry, fisheries, plantation & horticulture, conservation of wildlife, infrastructure development, health and medical facilities even its being part of Uttar Pradesh for about 53 years from 1947 to till 8th November, 2000.

The State of Uttarakhand was formed on the 9th of November, 2000 as the 27th State of India when it was carved out of northern Uttar Pradesh, so that special and exclusive attention could be given to the development of its remote hill districts located north of Main Boundary Fault where from main hilly and mountainous districts start. The State of Uttarakhand located at the foothills of the Himalayan mountain ranges is largely a hilly and mountainous State was part of Uttar Pradesh for about 53 years right from independence in 1947 to till 8th November, 2000. The present Uttarakhand State, while being part of Uttar Pradesh from 1947 to 8th November, 2000 was also under HADP (Hill Area Development Programme), which was identified in 1965 by a Committee of The National Development Council – NDC (the districts under HADP of present Uttarakhand were:- Dehradun, Pauri Garhwal, Tehri Garhwal, Chamoli, Uttarkashi, Nainital, Almora and Pithoragarh). Thus, this State of Uttarakhand was in the State of Uttar Pradesh for about 35 years under HADP from 1965 to 8th November, 2000 (Refs. 3, 4, 14 & 16).

Now, our purpose should be to full-fill all the requirements needed for improvement of overall standard of the inhabitants of this hilly and mountainous State Uttarakhand, otherwise the very purpose of carving out from the state of Uttar Pradesh remains as earlier.

The author classifies the main areas/features, in accordance of prominence and benefits, into main four divisions, which may render a significant contribution towards the Socio-Economic development of the local inhabitants of this hilly and mountainous State.

6.1 Education

Reading, writing and numeracy are the basic literacy skills for any human whether employed in agricultural sector or in any other Govt. and/or private sector owned areas. The education is learning of the fundamental language by which one can communicate with rest of the society and the details about the objects surrounding us all humans. As a result all the information about the objects surrounding us humans is stored in the computerised programme of our mind. So, in this way the human mind is trained and thus becomes capable to think and act as per his/her wishes. So, education is: "Knowing all about the language and the things surrounding us all which is learnt and stored in the mind and thus helps in taking actions by recollecting and connecting all the information in the mind at some given point of time in our day-to-day life". Without knowledge of the language and the things surrounding us all we cannot explain anything. So, learning the means of communicating language and knowing the details about the things surrounding us all is only a powerful fundamental tool for the development and growth of our mind that compares, synthesizes, and generates abstractions in the language that is learnt, based on the information stored in the microscopic electrochemical switching elements: - neurons, and thus becomes capable of taking right action. By this way the mind makes effective all progressive achievements, from health point-of-view to tourism sector to horticulture/agricultural innovations to efficient public administration and private sector growth. So, to reap the aforesaid benefits fully, the potential of the mind is to be unleashed by a strong tool called: - the education (the author and Ref. 3).

It has been investigated and observed that the children of the local inhabitants who were forced to migrate and settle in this remotest area during early days of civilization, like north of Main Boundary Fault/Thrust such as Lesser Himalayan and Higher Himalayan regions, are not getting, still, proper education due to land-locked in this mountainous area. On the contrary the children of the people of the plain areas get best education right from primary/nursery level to Post-graduate level in the field of Medical, Engineering, Scientific, Administrative and other professional jobs. Here in the plain areas at times, all the educational institutions are located very close to each other within one city, like Dehradun, Lucknow, Allahabad, Delhi, Calcutta, Chennai, etc. So, the children should be provided the best possible education which will only benefit the local inhabitants and in-turn the state, and the country in future. By this way we would harness the inherent potential of the children living in the remotest and difficult areas of this mountainous state.

It would be a noble work by the Govt. of Uttarakhand State if there is creation of an Institute of Social Sciences in one place/centre only which would provide food, accommodation, health care and all the basic necessities of life, absolutely free, to all the children of poor families residing between main Higher Himalayan Mountain and the Main Boundary Fault/Thrust to pursue their studies here from K.G.to Post - graduate. (In this direction the author is suggesting a suitable area free from land slide and land subsidence located in the ridge area of Lesser Himalayan rocks between the village Jalai and Falai, which are located in the depression area in Augustmuni Block, Rudraprayag district of Uttarakhand. The daily necessity need - water could be solved by lifting it from the Mandakini River. This place is more-or-less in the centre of all hilly and mountainous districts of Uttarakhand, similar to Garsain the Capital of Uttarakhand state which is airily very near to it. It would be a noble work if Institute of Social Sciences is opened in this recently created, very backward and neglected district, which doesn't come under the backward category in the list of the Govt.)

It is suggested that for making the above proposal successful the Govt. of Uttarakhand, besides its own resources, could make an appeal to all the people who were either born in the area falling between Main Boundary Fault/Thrust and Higher Himalayan mountains and/or whose roots are from this hilly and mountainous Uttarakhand State and, now, are either permanently settled in the plain area and/or other cities of this country- India, like Dehradun, Delhi, Mumbai, Chennai, etc.etc or settled elsewhere in some foreign countries, to donate some minimum amount, every month, through some recognized Bank towards this noble cause. This way this noble work could run smoothly and uninterruptedly for the benefit of the locals of this hilly and mountainous Uttarakhand State.

However, this system would be successful only if managed by a very sincere, devoted and efficient team of executives who would surrender themselves for this noble cause throughout their life.

6.2 Horticulture

Climatically the area of Uttarakhand state for horticulture and agriculture can be divided into: i) Subtropical, Low hills or the Terai foot hill slope, ii) Sub humid, mild hill or the sub-temperate belt, and iii) wet-temperate high hills or the upper hills or the temperate belt. So, the rich diversity of agro-climatic conditions, topographical variations and altitudinal differences coupled with fertile, deep and well drained soils favour cultivation of temperate to sub-tropical fruits in this State of Uttarakhand. There is sufficient scope of development of horticulture and plantation crops in this state (Refs. 3, 4 & 14).

The fruits, vegetables and medicinal herbs and flowers are already being grown in small scale in this mountainous State. It is suggested that the areas of wet temperature high hills may be used for apples. (It takes 3 to 8 years to grow and produce apples. It likes lots of sunlight hours especially when developing. It can tolerate winter temperature as low as -40 degree Fahrenheit or 4.444 degree centigrade.)

{Apple was introduced by Britishers in the latter half of nineteenth century after accession of this area in 1815 because of cool climate of this region (Uttarakhand). In Kumoan Division apple was introduced in 1850 in Jalna by Christian Missionaries. The first apple orchard was established in Ramgarh in Nainital district followed by in the area of Bhowali and Hartola. The apple was also established in Ranikhet, Binsar, Dunagiri, and Syahi Devi area of Almora district. In Garhwal Division the apple was

first introduced by Mr. F.E. Wilson in 1859 in Harsil area of Uttarkashi district. The apple cultivation was also started in Dehradun district, bordering Himachal Pradesh during early part of twentieth century. In present-day Uttarakhand the orchards are mainly in the area of Ramgarh, Mukteshwar (Nainital), Chaubattia, Lohaghat, Binsar, Jalna (Almora), Kanatal (Tehri), and Harsil (Uttarkashi). The first fruit belt was developed on newly constructed Mussoorie – Chamba road of Tehri Garhwal district in 1964-65. Three big orchards located at Chaubattia, Dunagiri (Almora) and Bharsar (Pauri Garhwal) were established during 1955 to 1975 (Ref. 15 & Fig. 21 b)}.

So, apple tree grows best in climates where it's cold in winter, moderate in summer, and has medium to high humidity. All these climatic variations exist in this state of Uttarakhand at an attitude of about 1500 m to about 2700 m above m.s.l. in the snow bound Himalayan range which experience about 1000-1500 hours of chilling (Ref. 15 & 16).

So, the hill slopes of Lesser Himalaya and Higher Himalaya ranging in height from about 1500 m to 2750 m and having wet temperature should be identified for growing apples as a major source of income in this Himalayan Uttarakhand State. The open space/land within Govt land/forest land should be given to local inhabitants, on lease basis, who can manage the horticultural activities and the earnings on the products can be shared among them. This would also need in the creation/improvement of livestock.

6.3. Tourism

A tourist attraction is a place of interest that tourists visit, typically for its inherent or an exhibited natural or cultural value, historical significance, natural or built beauty, offering leisure and amusement. The ultimate primary purpose of attractions is to attract the customer's attention so that they can come to a specific location and explore the various attractions on vacation (Ref. 3, 4, 13 & 14). We know that living in the mountains is a great way to get away from the stress and busyness of city life, particularly in summer. The mountains are a great way to beat the summer heat, with much milder temperatures at higher elevations. The scenery is breathtaking. There is always circulation of fresh air, and the investigations/studies have shown that living in higher elevations can have positive health benefits, such as improved cardiovascular health, weight loss, and longevity of life. There is privacy of life in the mountains and plenty of fun activities year round, such as observing nature/sightseeing, rock climbing, bird and wildlife watching,

The author records based on his personal investigations that people of the states of Punjab, Haryana, Rajasthan, Gujarat, Madhya Pradesh, Uttar Pradesh, Bengal, Orissa and Maharashtra face very hot climate from almost first week of April to last week of June. The people of these states wish to visit the state of Uttarakhand that is destined by a "Habitable Trinity":- high Rocky Mountains covered by snow, glacier-fed mighty Himalayan Rivers and lush green forests. Uttarakhand provides a suitable climate during summer season because of above characteristics. So, the mind and overall physic of the people visiting the high altitude of this hilly and mountainous state becomes serene, quite and positive. Similarly, the people of these states visit the state of Uttarakhand to see and have the fun during snow fall in high altitudes from December 1st to February 28 (and Feb. 29 in a leap year).

6.3.1. Locating new Tourist spots in the hilly area: We know that the Glaciers play a role in regulating global temperature and weather patterns by reflecting solar radiation back into the atmosphere and influencing air currents. In addition many cultures around the world have a spiritual or cultural connection to glaciers and their retreat or melting can have significant impacts on their cultural and spiritual practices. So, the Glaciers are a major tourist attraction and provide economic benefits through tourism and recreation. This is the reason that most of the religious places are located near Glacier in the high snow covered mountains, like Gangotri, Yamunotri, Kedarnath, Badrinath, and Hemkun Sahib in Uttarakhand.

So, the author, therefore, suggests that the State of Uttarakhand should also have some new places of tourist attraction in all districts of Uttarakhand state in addition to what already exist. (In this endeavour, to start with, the author is suggesting the Chirbatiya area in Jakholi Block of district Rudraprayag, Uttarakhand the site of a new Hill station where the site specific characteristics similar to that of Nainital Hill station have been observed. In this area not only the hill station could be established, but also a lake could be constructed by checking the seasonal water flow in the adjacent stream. This site is free from land slide and land subsidence. Similarly, the new site of tourist spot could be located in other districts of Uttarakhand state.) These places may be with all hill station facilities, like Mussoorie and Nainital. We know that these two hill stations- Mussoorie (it, as a resort, was established in 1825 by Captain Young, a British military officer) and Nainital (it was established by British sugar merchant P. Barron in 1841) attract tourists in all four seasons: - Spring (March 1 to May 31), Summer (June 1 to August 31), Fall or Autumn (September 1 to November 30), and Winter (December 1 to February 28; February 29 in a leap year) from within the country and abroad (Refs. 5 & 6). Thus, both the hill stations are contributing in the revenue of the Uttarakhand State. Moreover, these hill stations also generating employment to thousands of locals, not only in the area of main hill station, but also all along the route right from main nearby city to the place of hill station.

So, there is an urgent need to develop new tourist locations/ideal villages in all hilly and mountainous districts of Uttarakhand State and connect them by the net-work of roads and rails. It is also suggested that there should be development of industries such as electronics which do not pollute the atmosphere and lead to high value addition in this hilly and mountainous area. In addition there should be evolution of appropriate technology and scientific inputs in these areas which would suit local conditions and harness local resources.

6.3.1.1. Investigating the proposed tourist spot from stability point of view: As more than 60 percent of land covered by forest, snow-covered high mountains, and glacier-fed mighty perennial rivers belongs to the Govt., there is little space/area left for practicing agriculture and developing tourist destinations/spots for the benefit of the locals. So to develop tourist destinations the new stable and firm sites are to be located. All the new proposed tourist spots in this hilly and mountainous area should be first thoroughly investigated. This study will reveal: i) sensitive and active slide zones that are unstable/dangerous for settlements and other purposes, ii) dormant slide zones, where, again, there may be problem of land subsidence and sliding in course of time, particularly during cloud burst, so this type of land can be used for horticulture purposes, only, iii) partly slide zones, where settlements could be possible after making local treatments in the slidr area, and iv) almost nil slide zones where settlements should be preferred first. Generally, the nil slide zones that are free from any slide/subsidence zone are the ridge areas located between two depressions along the mountain slopes. These areas are suitable for establishment of safe civil structures. So, this area must be searched and investigated in detail and developed for settlements for the local inhabitants and tourist destinations.

So, there is urgent need to relocate the unstable/dangerous sites of existing habitats/settlements and the new sites to be located for tourists spots in the firm and stable area, so that the tragedy like Kedarnath in May 2013 (the temple, including its Shivlinga that is made up of a granite rock is a plutonic body of tourmaline-bearing leucogranite, is constructed in glaciated debris material brought by the Mandakini river that originates from the springs fed by melting of Chorabari glacier located about one km above Kedarnath temple; as the temple is just in the centre of the flood plain of the Mandakini river, therefore the damage to the temple is not ruled out in future due to any unforeseen calamity) and Joshimath in January 2023 (the whole Joshimath town is located in a huge old slide mass consisting of glaciated material mixed with soil and sand that came down from the mountain top; any treatment of subsidence and the total slide mass in its top material would be a temporary feature and thus any movement in this slide mass, which is resting along a failure plain on the parent rock mass, and in turn in the manmade structures in it during cloud burst followed by earthquake in future cannot be ruled out) could be avoided.

6.3.1.2. Locating a suitable site for constructing a Lake near the Tourist spot: In the hilly and mountainous region of Uttarakhand state there are a number of streams, which come into existence not only during monsoon rains, but also flow during off-monsoon seasons on the mountain slopes and ultimately add their total runoff in the local large streams. These streams are called the tributaries, which ultimately join the main Himalayan River, like Tons, Yamuna, Bhagirathi, Mandakini, Alaknanda, and Goriganga /Kaliganga. A catchment area survey of such surface water sources in a new Tourist Centre could be done by remote sensing technique in which marking of catchment and pounding area could be marked and the capacity of impounding calculated with the help of necessary tools. A detailed study of rainfall, average annual rainfall and runoff in the catchment could be calculated with the help of rainfall data. After knowing the desired volume/amount of water for impounding in the proposed lake near and or within the proposed tourist place the whole surface run-off of all the streams could be collected in a local depression within the mountain slope which ultimately would be converted into a single big pond that would form a natural lake, like Nainital in Nainital district Uttarakhand. The author records that these types of lakes would not only fulfil the daily needs of the tourists and the locals, but would also help in reviving/recharging natural spring in the downstream area.

6.3.2 Food, Hygiene and some instructions for the tourist: The author suggests that diverse products have to be designed for various categories of people visiting in this area as a tourist for different motives. There would be large inflow of tourists in this State due to its rich natural beauty with unique mountainous environment as well as rich historical and cultural assets. The large inflow of tourists will also result in exacerbate/make worst water scarcity, worsen air-water quality and lead to forest and land degradation. So, necessary steps would have to be resorted to in keeping the environment neat and clean. However, the author suggests that strict rules should be there for tourists to maintain the neat and clean environment of the area where they would be visiting in this hilly and mountainous area of Uttarakhand state.

The excess water used in the tourist places may cause water problem that may lead to landslides and/or land subsidence (as was the case of recent Joshimath slide and subsidence of January 2023). Therefore efficient sewage and municipal waste management systems should be mandatory in these areas. The waste management if not properly addressed, may pollute the major river water that flows to the plain areas. The waste of all types should not be burnt as it would cause pollution and warming the localized air and climate which may add in deglaciation. The dry waste should be re-cycled and re-used, whereas the wet waste should be used as manure.

6.3.3. Guidance for local tourist operators: In this connection skill development and training of local tourist operators and professionals, quality audit and certification of services, increased government partnership and property ownership in tourism sector can bring a large transformation in the tourism sector in this Himalayan state.

6.3.4. Tourism Tax on tourist: However, there is need of innovations, such as “charging tourism tax” or “leisure fee” for better services and management, performing a comprehensive carrying capacity exercise for various ecological sensitive areas the state can significantly improve Uttarakhand’s image as a mountain leader and environmentally responsible tourism hub. It is worth mentioning that there are already, at least forty countries around the world who charge a tourism tax in some manner to mitigate the effect of over tourism. For an example, Bhutan, our immediate neighbour and key member of the Indian Himalayan Region has recently introduced a “sustainable development fee” for regional and foreign

tourists under its new tourism policy (Ref. 1 & author's view).

6.4 Agriculture

The agriculture that is being practiced in this mountainous state should be continued for the immediate livelihood, since agriculture has an important place in the economy of the state. This provides the immediate daily need and direct employment to almost all the inhabitants of this area. However, although agriculture is considered to be one of the most vital areas of the individual family, yet the agricultural conditions are stated to be extremely diverse, since the agriculture produce have had an impact upon the altitude and mountainous slopes of this area.

The fertile river terraces at lower altitudes between the river-bed level and up to a height of 100 m and up to 150 m and the fertile/nutrient-rich glaciated-debris material on the mountain slopes between 150 m m.s.l. and up to about 1000 m m.s.l. on either bank of the major rivers, where terrace cultivation is being practiced by the local inhabitants, i.e., manmade terraces, should be continued for the livelihood by the locals.

7. What is expected from the Government to the inhabitants of this hilly and mountainous region?

It would be worth mentioning that The Central Government was already giving Special Central Assistance to the designated following hill areas through the Hill areas Development Programme in order to supplement the efforts of the State Govts. in the development of these ecologically fragile areas. These are: the areas of hill districts under HADP, viz., a) two hill districts of Assam:- North Cachar and Karbi Anglong, b) eight hill districts of UP - Dehradun, Pauri Garhwal, Tehri Garhwal, Chamoli, Uttarkashi, Nainital, Almora and Pithoragarh, c) major part of Darjeeling district of West Bengal, d) Nilgiri district of Tamil Nadu, and e) one hundred and thirty two talukas of WGDP comprising of Western Ghats in Maharashtra (51 talukas), Karnataka (28 talukas), Tamil Nadu (23 talukas), Kerala (27 talukas), and Goa (3 talukas). And these areas were in operation from the Fifth Five Year Plan (from 1974 -1979; the plan laid stress on employment, poverty alleviation: - Garibi Hatao, and justice; the plan also focused on self-reliance in agriculture production and defence) in designated hill areas. The programmes implemented during the Fifth Plan period were mainly beneficiary oriented (Ref. 10, 13 & 14).

During the Sixth Plan (1980 – 85), though the emphasis shifted to eco-development, the general tenor of HADP remained substantially the same as that of normal State Plan following the same sectoral approach. The Seventh Plan (1985 -90) laid particular emphasis on the development of ecology and environment, namely eco-restoration, eco-preservation and eco-development. The aim was to evolve plans and programmes which would stimulate socio-economic growth, development of infrastructure and promotion of ecology of the areas covered by HADP (Ref. 14).

During the Eighth Plan (1992 – 97), the approach was substantially the same as that in the Seventh Plan with special focus on involvement of the people and meeting their basic needs through improved management of their land and water resources. The measures outlined towards this end include i) an energy policy which would reduce pressure on forests and provide alternate sources of energy, ii) afforestation of denuded forest land with species which can provide both fuel and fodder, iii) provision of adequate and safe drinking water by development of gravitational sources of water, iv) emphasis on improvement of health facilities including infrastructural facilities in primary health institutions, v) development of skilled manpower, vi) evolving a proper land use pattern keeping the socio-economic and ecological parameters in view, vii) development of horticulture and plantation crops, viii) improvement of livestock, ix) development of industries such as electronics which do not pollute the atmosphere and lead to high value addition, x) development of network of transport and communication facilities with emphasis on feeder paths and roads; and xi) evolution of appropriate technology and scientific inputs which would suit local conditions and harness local resources.

In the Ninth Plan (1997 – 2002), the main objectives of the Programme were eco-preservation and eco-restoration. All development schemes were to be planned within this framework with emphasis on preservation of bio-diversity and rejuvenation of the hill ecology.

We know most of the land in this mountainous area belongs to the Govt. So, for accelerating and promoting the regional development, there is need to identify the basic problems preventing the growth in this State.

7.1 Why the local inhabitants should get free Govt. facilities?

The locals have had been living in this hilly and mountainous area since the dawn of civilization when practically there were no any Govt. to protect and support them. These locals settled, by their own efforts, just near to the natural springs so that the water could be used for drinking for them, their domesticated animals and washing cloths and later made themselves the stepped/terraced agriculture fields for their livelihood. This is to record emphatically that the inhabitants of this hilly and mountainous state Uttarakhand are responsible for generation/creation of a new state from the erstwhile state of Uttar Pradesh after a long struggle and much sacrifice. So, these hilly inhabitants, directly, become instrumental in establishing the State of Uttarakhand and generating the extra jobs at all levels of Govt. departments, which are mostly located, at present, in the plain areas, such as Dehradun, Haridwar, Rishikesh, Roorkee, and Haldwani. The author is suggesting, depending upon the resources that were not harnessed properly, the following areas where, if attempted and accomplished, the overall life standard, i.e., growth of these locals is sure to be achieved.

7.2 Granting free-education

Sometime, it is not possible to open educational institutions in the mountainous regions that are land-locked. So, the Govt. of Uttarakhand State should establish some educational centre in one suitable location which would provide food, accommodation, health care and all the basic necessities of life, absolutely free, to all the children of poor families residing between main Higher Himalayan Mountain and the Main Boundary Fault/Thrust to pursue their studies here from K.G.to Post-graduate level. These children should also be given education in the Medical, Engineering and other Technical Educational and Administrative fields, at free of cost. Majority of the population of Uttarakhand lives in the hilly and mountainous area therefore the free higher education (medical and engineering) should be provided only to those children who would, willingly, offer to serve in this hilly and mountainous state of Uttarakhand: - the area falling between the Main Boundary Fault and the Main Himalayan mountain. Moreover, the children who would get free higher specialized education in the field of Medical and Engineering should not be allowed to apply for other jobs because of two reasons: i) they would block the chance of other candidates in the specialized field, ii) their specialized knowledge would be more beneficial in the field they applied.

7.3 Granting unused-barren land and open free space within the forest

Govt. should provide its barren-land and the open-unused land within the forest, on lease basis, to the locals for practicing Horticulture and agriculture. There are states, like Meghalaya, Arunachal Pradesh and Gujarat, who have given the forest and barren/unused Govt. land, on lease basis, to the local inhabitants for horticulture and agriculture. So, there are already States in our country who have come forward to see the prosperity and eradicating the backwardness of the local inhabitants. So, there are no restrictions in giving Govt. land/forest unused/open land, on lease basis, to the locals for practicing Horticulture and agriculture. For this proper funding and their monitoring in the respective fields - both in the records and at the site specific should be monitored from time to time.

7.4 Constructing the net-work of roads from main-high way to up to the reserves/tourist spots and the settlements

Roads are generally damaged by incessant rains, cloud burst, and landslides in the mountainous area. However, a net-work of roads connected to main National Highways is the only solution for smooth functioning of the day-to-day work of inhabitants of this hilly and mountainous state. As the land in this Hilly State is land-locked with huge/great distances due to hilly and mountainous regions between the site of reserves and tourist spots both: - existing and to be developed, and main road-head, therefore there is need to connect all the sites of reserves and tourist spots by proper metalled road up to 30 feet wide main highway connecting to rest of the country.

7.5 Health and Medical facilities

This is the most important part of facility to be given to the inhabitants of this hilly and mountainous state, because of the time taken from the remote site of the diseased to the place of block level, district level and main Medical Institute is too long. As a result there is every possibility of any unforeseen causalities. So, due to lack of Health Services at the village level the health condition of these villagers is very much miserable.

It is suggested that the locals should also be taught about the human condition: - ‘Health’, which is: "a state of complete physical, mental and social well-being and not merely the absence of disease and infirmity". So, they should know the mental, intellectual, emotional and social health that is referred to a person's ability to handle stress, to acquire skills, to maintain relationships, all of which form resources for resiliency and independent living. They should know mental illness: “the spectrum of cognitive, emotional, and behavioural conditions that interfere with social and emotional well-being and the lives and productivity of people”. The locals should be promoted by encouraging healthful activities, such as regular physical exercise and adequate sleep, and by reducing or avoiding unhealthful activities or situations, such as smoking or alcoholism, and excessive stress. They should be aware about the environment which is often cited as an important factor influencing the health status of individuals. And, this includes characteristics of the natural environment, the built environment and the social environment. They should be aware of the factors such as clean water and air, adequate housing, and safe communities and roads, which have been found to contribute to good health, especially to the health of infants and children. So, they should also know about the sense of healthy communities, healthy villages/towns/environments. They should also know about the main determinants of health which include the social and economic environment, the physical environment, and the person's individual characteristics and behaviours (Ref. 16).

There are following some important guide lines for the well-being of the locals (Ref. 16 & author’s input):

i) Self-care strategies: They should be taught about how to prevent or minimize the effects of a disease, usually a chronic condition, through integrative care. They should also know about the personal hygiene practices to prevent infection and illness, such as bathing and washing hands with soap; brushing and flossing teeth; storing, preparing and handling food safely; and many others.

ii) Healthy diet and Human nutrition: They should know that to maintain one's personal health is to have a healthy diet. A healthy diet includes a variety of plant-based and animal-based foods that provide nutrients to the body. Nutrients help build and strengthen bones, muscles, and tendons and also regulate body processes (i.e., blood pressure). Water is essential for growth, reproduction and good health. They should be taught how the macronutrients are taken in relatively large quantities that include proteins, carbohydrates, and fats and fatty acids. Similarly, the micronutrients – vitamins and minerals – are taken in

relatively smaller quantities, but are essential to body processes.

iii) Exercise: They should be taught how physical exercise enhances or maintains physical fitness and overall health and wellness. Physical exercise strengthens one's bones and muscles and improves the cardiovascular system. There are four types of exercise: endurance, strength, flexibility, and balance. The physical exercise can reduce the risks of heart disease, cancer, type 2 diabetes, high blood pressure, obesity, depression, and anxiety. They should participate in any exercise, whether it is housework, yardwork, walking or standing up when talking on the phone, which is often thought to be better than none when it comes to health.

iv) Medical care: There should be provision of medical care for the benefits of the locals in this hilly and mountainous state of Uttarakhand which is classified into primary, secondary, and tertiary care categories. However, since in this hilly and mountainous area the local inhabitants have their habitats mainly: i) along the main road head at certain distance, and also ii) along higher mountain slopes, at certain distance, therefore it is suggests that, at least, the primary Health Service centres must be located in almost all villages and/or covering utmost three villages that are located along the mountain slope at more than 1/2 km or 1 km above river bed level on either banks of the major river, such as Tons, Yamuna, Bhagirathi, Mandakini, Alaknanda, Goriganga/Kali, etc and also their tributaries. However, the local inhabitants having habitats along the main road head could go to block level and/or district level Health Service Centre for their treatment.

The author suggests that all the medical centres must be equipped with adequate expert doctors, paramedical staff: - nurses and supporting staff, life saving medicines, and other facilities. Provision of getting Telemedicine, i.e. through net, must also be in all these Health Centres. All the treatments, medicines along with highly duty conscious ambulance services in all these Health and Medical Centres should be provided free to all the inhabitants of this hilly and mountainous state.

As has already been suggested that the majority of the population of Uttarakhand lives in the hilly and mountainous area falling between the Main Boundary Fault and the Main Himalayan mountains, therefore the higher free education (in the medical field) should be provided only to those children who would, willingly, offer to serve throughout their service life in this hilly and mountainous area. The services of the doctors should never be transferred to plain areas, such as Dehradun, Rishikesh, Haridwar, Roorkee, Kotdwar, Haldwani, etc. which are located south of the Main Boundary Fault/Thrust.

Further, the author suggests that for smooth functioning of the medical services there must be a proper colony of residential buildings located at one place for all the medical practitioners, commensurate with the status. The colony must be provided with proper light arrangements and water - both for drinking and general purposes. Moreover, there should be all season pucca metalled roads connected to all the primary, secondary, and tertiary medical centres.

a) **Primary care medical services:** The medical practitioners at the Primary Health Service must be available at the village level so that the patients could be treated/examined in the immediate nearby physician offices, clinics, local community hospitals, nursing homes, schools, home visits, and other places close to patients. However, it is suggested that there should be expert physicians, physician assistants, nurse practitioners, or other health professionals who would have first contact with a patient seeking medical treatment or care.
b) **Secondary care medical services:** These facilities would be provided by the block level medical specialists in their offices or clinics or at local community hospitals for a local patient referred by a primary care provider who first diagnosed or treated the patient. The referrals could be made for those local patients who would require the expertise or procedures performed by specialists. These include both ambulatory care and inpatient services, emergency departments, intensive care medicine, surgery services, physical therapy, labour and delivery, endoscopy units, diagnostic laboratory and medical imaging services, hospice centres, etc.
c) **Tertiary care medical services:** This service must be provided by specialist hospitals or regional centres, which would be equipped with diagnostic and treatment facilities not generally available at district level hospitals. At this Tertiary Health Service Centre the cases of trauma, burn treatment centres, advanced neonatology unit services, organ transplants, high-risk pregnancy, radiation oncology, etc would be solved.

7.6 Encouraging the locals to grow the nutritious grains

The locals must be encouraged and helped to cultivate the nutritious grains (Food crops), like Mandua, Jhangora (millet: - small grain of Indian cereal), in addition to Rice/Paddy, Wheat, Maize, Sava (course millet) (Ref. 3, 4 & 14). Jhangora being the gluten-free, highly nutritious and non-acidic thus is easy to digest and ultimately good for nourishing the human body.

7.7 Encouraging the locals to grow the cash crop

The Govt. must also encourage the locals for cultivating Tea, Ginger, and Cinchona, since the soil and climatic conditions of this hilly and mountainous state Uttarakhand are best for these cash crops. Similarly, the help and encouragement should also be for cultivation of Potatoes, Tomatoes, Cabbage, Cauliflower, Brinjals, French beans, and Cucumbers at commercial level, which generally grow in wet temperate high hill and mountainous areas. The soybean in Kharif and mustard and Toria/Til in the Rabi season which is oil crops should be grown by the local inhabitants at large quantity as their earnings. Similarly, the Urad, Bean, Garath, Rajmah, in karif season and Gram Lentil in Rabi which are pulse crops should be grown in commercial quantity by the local inhabitants (Ref.3 & 4).

7.8 The system of purchasing the food crops and cash crops

It is suggested that the produce of the local inhabitants should be purchased at the reasonable prices, either straight by Govt. and/or Govt. agency or recognized Govt. private agency. This way there will be transparency in income-generation of the locals and also the employment generation and thus would eradicate the poverty and backwardness of the people and check/stop the migration of these people to the plain areas for their livelihood.

7.9 Improvement of livestock

The locals depend upon the livestock for practicing their agriculture, means of transport, manure, and dairy products. Thus, rearing of cattle is regarded to be the main job of these locals. These locals have to make provision of adequate food and water for their livestock. They have to look after their other requirements such as health. So, the locals should be provided all the facilities, including the veterinary services in this field also. The veterinary services should be available at village level and/or clusters of villages.

7.10 Helping the locals to grow Herbal and Medicinal plants on commercial basis

The studies have revealed that the locals of this hilly and mountainous state Uttarakhand, normally obtain medical (these include: kuth, kuttki, sarpgandha, jatamasi, chiraita, brahmi, kirmor, and tagar) care from the forest areas. These locals use medicinal herbs for the treatment of the wounds, burns, cuts, eye problems, stomach upsets and other illness. Some of the herbs, like keerajari are in high demand which generally grow in high altitudes in the forest land. The Govt. should help the locals to grow these herbs in their own lands located near the region of high altitudes so that it becomes the means of their earning.

7.11 Providing solar energy to the locals

We know solar technologies convert sunlight into electrical energy either through photovoltaic (PV) panels or through mirrors that concentrate solar radiation. This energy can be used to generate electricity or be stored in batteries or thermal storage. The benefits of solar energy are: i) this would save the money, time and labour of the locals, ii) this would reduce pressure on forests for fuel thus provide alternate source of energy, iii) this could be used even when the main grid goes down, and iv) this would work in almost all climatic conditions. So, all the houses and the streets of the villages of this hilly and mountainous state need to be electrified by means of solar energy.

7.12 Providing safe drinking water

The water is considered to be the primary requirement for survival of all the life, including animals, including humans. Without water neither the flora nor the fauna could survive. And, this could be accomplished by harnessing the water from nearby stream/waterfall by gravitational flow through pipes for daily purposes, such as preparation of meals, cleaning, washing, bathing, drinking, agriculture and horticulture both in the villages and tourist spots (Ref. 3 & author's view).

7.13 Development of skilled manpower

This could be achieved by educating the locals. The locals who reside in these hilly and mountainous areas along with their families need to be skilled and diligent in different subjects, in order to earn a living for themselves and their families. These locals need to be educated for their skill development in the field of agriculture, rearing of livestock, doing handiwork which they possess. They should be taught what to grow and how to enhance the productivity of different types of soil of the land; for this purpose, socio-economic and ecological parameters are to be taken into consideration.

7.14 Checking/Stopping migration

It has been observed that whosoever (whether a Technocrat: Doctor, Engineer, Geologist, Teacher, and Professor, or a Bureaucrat: - IAS, IPS or a Politician, Lawyer & Judge, and a Industrialist, etc) has borne, brought up, and educated up to primary/secondary level education in this hilly and mountainous area and later higher and practical education in the plain area, never returned and settled here. This is because of the reason that all these personalities wish to have better life for them and similarly better life, education, and job to their children. In addition, all the facilities related to life which are lacking in this hilly and mountainous area are easily available in the plain area, like Dehradun, Rishikesh, Haridwar, Roorkee, Haldwani, etc. At present due to above reasons the Dehradun, Rishekesh, Haridwar, and Haldwani cities are overcrowded after creation of Uttarakhand. So, if the policy and law makers themselves don't return to their hometown in the hilly and mountainous area of Uttarakhand state then how can we expect the inhabitants of this hilly and mountainous area to stop migrating to plain areas for better life? Migration is in human gene. So, the author of this paper believes though the total migration could not be checked/stopped, but if the following measures are taken care of, the migration to some extent of the children those who would get all their education right from nursery level to higher level in this hilly and mountainous area at one place could be stopped as they would get jobs in local hotels, industries, beside could start their own earning means. So, to check/stop/contain the migration of the children of the hilly and mountainous inhabitants it is suggested to:

a) Shift some of the Govt. departments, except revenue and administrative, in the hilly and mountainous area, since it is believed that most of the paper work with other departments and other areas could be done by satellite communication/net services; by doing so the locals in future would get jobs, easily in these departments and thus would not migrate to plains for better earnings,
b) Make some education centre at one place in the hilly and mountainous area where all the children of the local inhabitants would get free education right from primary level to higher education, beside food and other facilities. The children who would get free higher

education in the medical and engineering field should serve in the hilly and mountainous area of this state Uttarakhand throughout their service carrier. (It has been observed that the children who get their higher education in the field of medical and other fields don't like to work in the hilly and mountainous areas.)

c) Establish some hill station/tourist spot/ideal village in each district of this Uttarakhand State which should be equipped by: a) development of industries such as electronics which do not pollute the atmosphere and lead to high value addition, and b) evolution of appropriate technology and scientific inputs which would suit local conditions and harness local resources.

7.15. Informing about all the news regarding professional examinations and jobs - both in Govt and private sector to the locals: Some time, the children of this hilly and mountainous state Uttarakhand fail to appear in some professional examination and/or physical appearance for getting a job in right time. So, the author suggests that the locals of this hilly and mountainous area, right from Main Boundary Fault/Thrust to the main Himalayan Mountains, must be informed well in advance about all the recruitments of all the posts and examinations in different profession, so that they too can apply well in time for selection in concerned departments of Govt. and private sectors. Provisions must be that the individual of the remotest area can apply for all Govt. and private jobs at right time. For this examination and recruitment centres must be very near to the inhabitants of the remotest area.

8. Conclusion

The author points out that most of the State and Central Govt. Depts., State and Central Govt. undertaking Depts. and Industries and even Private sector Industries have been established south of the Main Boundary Fault/Thrust, like in the areas of Selakui, Dehradun, Rishikesh, Haridwar, Roorkee, Haldwani, etc. As a result the local people and their children have access to work as workers right form lower level to highest level in these industries and offices run by these agencies. But, unfortunately, this facility is not available for the inhabitants of hilly and mountainous region of Uttarakhand, because of lack of above departments and industries in these areas. They have to come down to plain areas even for small job and higher studies and the related jobs for their livelihood and their family members.

Therefore, the author believes that the suggestions, if followed as suggested above, then, in future, the local inhabitants and their children of this remotest arduous hilly and mountainous area of Uttarakhand State would not be a burden to anyone in the society, including the Govt. and thus they can lead their normal life with dignity and gracefully in the society in years to come. This way they would come on par with other people of the society. These children would be one-day-or-other, one of contributes in the development of their State and/or country. Thus, these children would be an example for the rest of the people of our society as how to rise from rages to riches by doing hard work with the help/support of the Govts. By this way these children of this hilly and mountainous region would be able to help their families and contribute their part for the benefit of present and future generations of the society; this would be the real purpose of their taking birth on this Earth. By this way we, the humans, would make, collectively, this blue planet – Earth a Heaven: - a place that would be beautiful, peaceful, loving, and harmonious for each and every one of us humans. This would be the ultimate triumph of human reason.

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