

## Climate change, population Drift and Violent Conflict over land Resources in Uttarakhand

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**Abstract:** In the recent time Himalayan state Uttarakhand is facing so many natural problems like cloud- burst, landslide, extreme rainfall. Changing climatic condition is expected to affect farming and non farming activities both as this could lead to extreme weather conditions. Climate change is expected to have serious environmental, economic, and social impacts on Himalayan state uttarakhand, where livelihood depend on the use of natural resource particularly in the rural areas. Uttarakhand being the most densely populated Himalayan state have high vulnerability to the impacts of climate change. Climate Change is the result of imbalance between easiness of atmosphere Uttarakhand state is divided in two type of lifestyle and environment Hill areas and Foothill areas Hill areas are full of difficulties and problems there is very difficult environment to survive for human being limited options and possibilities, there has been continuous population drift foot hill areas where there are more possibilities and easy to survive. So this type of situation is giving birth to conflict over land resources and other natural resources also. Population, when unchecked, increases in a geometrical ratio. Subsistence increases only in an arithmetical ratio. So if we gave so much load to land resource to provide facilities we will face a conflict between natural resources and population ratio. In this article we will discuss about the conflict between natural resources and human in foot hill areas of Uttarakhand state.

**Keywords:** Climate Change, Population Drift, Violent Conflict, Temperature;

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### I. Introduction:

Climate change is not about changing visibilities, its about change in natural aspects like our environment is changing day by day due to our deeds. If we are facing lots of natural hazards in a year like floods, dry, landslide, avalanches, earthquakes it means there is something going wrong. For Example in Uttarakhand state arable land is very much wet cause of its natural conditions but from the last few years Uttarakhand state is also facing the drought problem just because of climate change on the other hand in 2013 Uttarakhand has faced a horrible flood in that Uttarakhand has faced a big loss. So we are trying to say here that it is climate change result that we are facing two types of worst condition Drought and flood both parllely.

According to this condition people are moving from one place to another in search of better conditions. Uttarakhand state is basically rural state and the main occupation here for people is agriculture so exceed condition is harm full for agriculture. Mostly rivers are originated from this state and so many hilly districts are situated on the bank of rivers here. We can see so many hotels and resorts here which are river facing. Some times river extends its banks that time it can give harm to these infrastructures. We can not blame to nature for our every harm if we will come in its way nature will remove everything.

Due to this drift climate of Uttarakhand is effecting badly. David Hopkins who has been monitoring weather data in a village in the mountains of Uttarakhand for the last 25 years said that ,” Recording temperatures over more than two decades I have observed that during prolonged hot weather temperature still rarely rise much above 30<sup>0</sup>C and 35.5 in the first decade and 30<sup>0</sup>C and 34<sup>0</sup>C in the second decade.” The weather data provides important confirmation of the nature of changes occurring in the central Himalayan region.

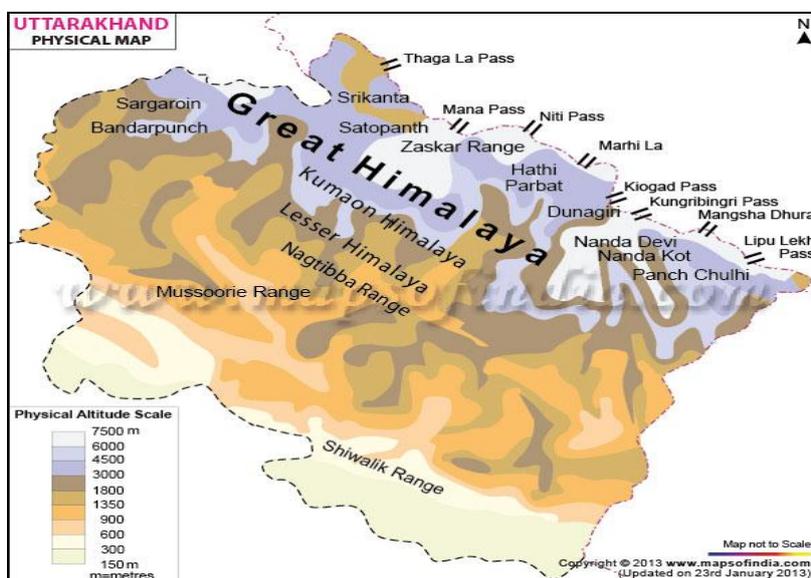
Population drift in Uttarakhand state has started in the Garhwal region in the second half of the 20<sup>th</sup> century, population drift now is from rural areas in hilly districts to urban centres in the plains. As per the census 2011, of Uttarakhand 16,793 villages,1,53 have no inhabitants and another 405 have a population of less than 10. The number of such ghost villages has reportedly risen particularly after the earthquake and flash floods of 2013. Resent media reports put the numbers at 3,500.

Dr. Dhruv Sen Singh from the centre of advanced study in Geology University of Lucknow, Presented research paper based on the Uttarakhand flood tragedy. He said, ”The valley and channels of rivers are shrinking and vacated land is getting available for human settlement. Which are mostly unplanned, and therefore obstructing the original path of rivers leading to high risk of Uttarakhand(2013) and Kashmir (2014) type of rain-lewd devastation.” He said that veery heavy rainfall and cloud bursts had occurred in the past as well but loss of human life wan less. However, now it is going due to haphazard growth of population in the vacated river beds. He questioned the claims of climate experts and the existing theories and stated that earth has seen the global warming cycle since its origin and in fact the earth’s temperature had seen the highest rise during the

cretaceous period when humans didn't exist. He also said that we have not learnt any lessons from the previous disasters because in India there is no contact between researchers and policy makers.

### Area of Study:

Uttarakhand is one of the hilly state in the Indian Himalaya. Formally a part of Uttar Pradesh, Uttarakhand was created as the 27<sup>th</sup> state of the Indian Union on 9 November, 2000 by carving out the 13 hill districts of U.P. It lies in the Northern part of India between the latitude 28°43'N and 31°27'N and longitudes 77°34' E and 81°02'E, having a maximum dimensions of 301km in the east west direction and 255 km in the north south and covering an area of 53,483km. The elevation ranges from 210 to 7817 m. The state shares its border with china (Tibet) in the North, Nepal in the East, inter-state boundaries with Himachal Pradesh in the West and North-West and UP in the South.



The state has two distinct climatic regions: the predominant hilly terrain and the small plain region. The climatic conditions of Uttarakhand vary greatly due to variations in altitude and proximity towards Himalayan ranges. Owing to its largely mountainous regions, the state is endowed with unique ecosystems. The Northern region of the state is part of the great Himalayan range, covered with snow and glaciers. Two of the Indian sub-continent's major rivers – the Ganga and the Yamuna – also originate from the glacier of Uttarakhand. Other parts of Uttarakhand are covered with dense forests that make up the bulk of the natural resources base.

## II. Methodology:

The present report is preliminary based on desk study, involving compilation and analyses of information and data from official documents, research papers/ reports, media reports and articles. This report investigates the chain of interactions between climate change, population drift and pressure, and conflict over land resources. Specifically this article addresses the nature of communal civil violent conflicts in the Uttarakhand state, the extent to which continuous climate change has contributed to the scenario, the patterns of the climatically induced violent conflicts. In present article we will present a brief study about population drift and its impact on climate change with the help of population data of density, distribution, gender balance etc. By the help of data we will explain how population drift is effecting the climate of Uttarakhand state and also natural resources.

## III. Result and Discussion:

Uttarakhand is a basically hilly state but it also has some foothill districts during this study we will see that comparatively hilly districts foothill districts have more population than hilly districts. Population distribution is not equal in this state. This is an ancient situation that civilizations always developed in suitable atmosphere and weather also where human being can find food to eat, shelter to live, easy atmosphere to survive. Hilly districts of Uttarkhand state is full of difficulties that's why population is drifting towards foothill districts. Comparatively hilly areas foothills have high density of population, to feed this population farmer needs more arable land to produce food grains and vegetables.

The density of population according to the 2011 census is 189 persons per asquare kilometer, higher than the 2001 census figure of 150. Districts-wise, there is enormous variation in the density of population with

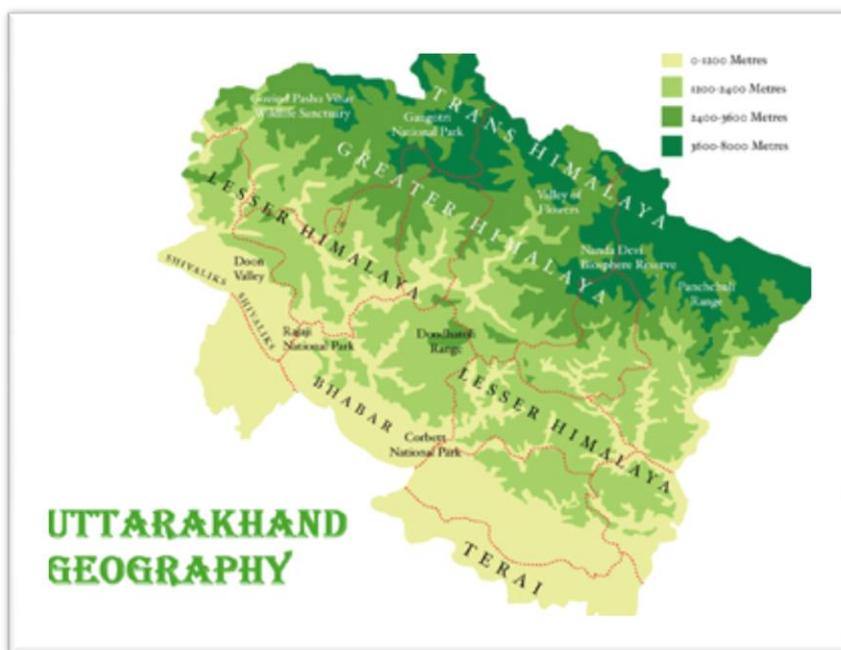
Haridwar, US Nagar and Dehradun having a high density of 817,648, and 550 person per square kilometer respectively ;while on the other hand there are districts like Uttarkashi , Chamoli and Pithoragarh the population density is quite low average of 41,49 and 69 persons per square km. So the population drifting is not equally flow in all regions in this state, that's why the burden of natural resources is not equal everywhere in this state

### **Uttarakhand in Climate Perspective:**

The climate of Uttarakhand state is sharply demarcated in case of its two distinct division: the predominant hilly terrain and the smaller plain region. The type of climate is mainly to be found in the plains closely resembles the corresponding state in the Gangtic plain. Summers are exceedingly hot with temperatures crossing the 40°C mark considerable humidity. Winters can be chilly with temperatures going below 5°C at times. In northern Uttarakhand climate is typical Himalayan. This mountain range itself exerts an appreciable extent of influence on monsoon and rainfall patterns.

The climate of Uttarakhand is touched by Himalayan and plain both. Temperature pattern in uttrakhand state is not very equal. Uttarakhand has glacier area of around 2312 km. The rainfall in Uttarakhand varies from 670 to 2500 mm per annum. The climate in general depends on geographical altitude with zones divided as warm temperate (900-1800), cool temperate (1800-2400m), cold zones (2400-3000m), alpine zone (3000-4000m), glacier zone (4000-4800m) and perpetually frozen zone (above 4800m).

Himalayan state Uttarakhand has a total 53,483sq. Km., of which 86% is mountainous and 65% is covered by forest. Most of the northern parts of the state are covered by Himalayan peaks and glaciers. Most of the state's roughly 150cm of annual precipitation is brought by the south west monsoon , which blows from july through September. Floods and landslides are problem during the rainy season in the lower stretches of the valleys. In the Northern parts of the state, 10-15 feet (3 to 5 metres) of snowfall is common between December and March.



According to official statistics, more than 60% of Uttarakhand is under forest cover; in actually however, the coverage is much less. The forest provide not only timber and fuel wood but also extensive grazing land for livestock. Only a small portion of the state's total land area has permanent pastures. Common tree species of the temperate forests include Himalayan cedar (Deodar cedar), Himalayan (Blue ) pine, oak, Silver fir, spruce, chestnut, elm, poplar, birch, yew, cypress, and rhododendron.

Uttarakhand has a rich variety of animal life. Tigers, Leopards, elephants, wild boars, and sloth bears are among the state's large mammals. Common birds include pigeons, doves, ducks, partridges, peacocks, jays, quail, and woodpecker. A number of national parks and sanctuaries have been established to preserve Uttarakhand's wild life.

### **Environmentally Induced Conflict Over Land Resources In Uttarakhand:**

Land is an important economic asset and source of livelihood; it is also closely linked to community identity, history and culture. Communities, therefore, can readily mobilize around land issues, making land a

central object of conflict. The management of land and natural resources is ,one of the most critical challenges at present. The exploitation of high- value natural resources, including oil, gas , minerals and timber has often been cited as a key factor in triggering, escalating or sustaining violent conflicts around the globe. Furthermore, increasing competition over decrease renewable resources, such as land and water, are on the rise. This is being further aggravated by environmental degradation, population growth and climate change. The mismanagement of land and natural resources is contributing to new conflicts and obstructing the peaceful resolution of existing ones.

Uttarakhand state is basically rural based state 75% of the Uttarakhan’s are rural, and most are engaged in farming . Population growth is pressurizing the farmer to produce more and more food grain to feed growing population , due to fulfill this demand farmers are doing deforestation to get more agriculture land All India ranking of Uttarakhand in terms of food grains is 17 while the area under fruit and vegetables is 54000 ha as per land use. The net cultivated area is 5012 lakh ha with 158.89% cropping intensity.

**Table 1:** Land use pattern in Uttarakhand

S. no.	Category	Area (ha)	% of Reported area
1	Total reported area	5670110	100
2	Forest	3465057	61.11
3	Barren & Unculturable land	311817	5.50
4	Land put under non-agricultural uses	152180	2.68
5	Culturable Waste land	386288	6.81
6	Permanent pastures and other grazing land	228944	4.04
7	Land under misc. tree crops and groves etc.	248979	4.39
8	Current Fallows	41683	0.74
9	Other fallows	68432	1.21
10	Net area sown	766730	13.52

Table 1 indicates the land use pattern in Uttarakhand. It is indicated from Table 1 that the net sown area is only about 13.52% of the total reported area. The cropping intensity is about 161%, and the ratio of gross irrigated area to gross sown area is only 44.50%. In the hills the major crops grown include Wheat, Paddy, Mandua, Ramdana and Potato whereas in the plains the major crops are Wheat, Paddy, Pulses and Sugarcane. Uttarakhand is blessed with rare bio-diversity. Over 175 species of aromatic and medicinal plants are found in the state, which gives it a unique opportunity for diversification of activities within the primary sector.

The agricultural needs of a growing population is difficult enough, agricultural puts pressure on land, but also on water system. We already use a staggering 4000 cubic kilometers of water per year, withdrawn from streams, rivers, lakes and aquifers. Of this, 70 percent is used for irrigation. As a result, many large rivers have greatly reduced flows and some routinely dry up. Glaciers in many parts of the Himalaya have undergone significant shrinkage in the last century in response to climatic warming, which in some areas is occurring faster than the global average. A particular problem associated with glacier shrinkage is the formation and catastrophic drainage of large moraine-dammed lakes, causing significant environmental hazards in many Himalayan valleys. In the Himalaya, large ice-contact lakes form in association with debris-covered glaciers, which behave differently to normal, clean glaciers.

In Uttarakhand , there are many conflicts, which are environmentally induced. These are conflicts over grazing land, over cattle, over water points and over cultivable land. While there conflict over land, and water. There is one ore conflict besides of natural resources this conflict is between men and women in this state. Women who have less holding capacity because they need the resource every day, might be in conflict with men who need the resource now and again. Poor rural women who have no fall back in terms of private land could be in conflict with women who have family land. Groups occupationally dependent on forests for raw material or fuel may be in conflict with those with other livelihood sources. And people who value forests for their intrinsic worth may be in conflict with those who see the forests mainly in instrumental terms.

Uttarakhand state is divided in three types of land surface, first is hilly area and second is dense forest, third is plane. Population distribution is not equal in this state everywhere. People who lives in hilly areas have been migrated according to the season because in winters hilly areas have been covered with dense snow than people come down to the foothill areas. So population is growing in foot hill areas compare of hilly areas. And the result is this that people needs livelihood to survive. To live and to fulfill their needs they need more land to use, for that, they do deforestation. Dehradun is the best example to population drift and the climate change condition. In Dehradun, people are coming here to live better life from hilly areas for settlement they cut the forests. Because of urbanization Basmati Rice Fields are now converting in to settlement.

**Table -2: Land Cover Changes 1974-2001**

District	Forest Cover		Uncultivable Land		Other Un cultivable land		Fallow Land		Sown area	
	EGR	%	EGR	%	EGR	%	EGR	%	EGR	%
CHAMOLI	1.0017	4.8	1.0098	30.15	0.9869	-29.77	0.9833	-36.49	1.0073	21.73
DEHRADUN	1.0037	10.6	1.0105	32.84	1.0023	6.44	1.0249	94.68	0.9976	-6.06
PAURI	0.9978	-5.6	1.0189	66.03	1.0174	59.50	1.0282	111.99	0.9910	-21.47
TEHRI	1.0011	3.2	1.0489	263.15	0.9100	-92.10	1.0251	95.66	0.9929	-17.43
UTTARAKASHI	1.0008	2.2	1.0405	192.75	0.9868	-30.06	1.0263	101.73	0.9970	-7.57
ALMORA	0.9992	-2.1	0.9911	-21.33	1.0026	7.31	0.9924	-18.44	1.0004	1.22
NAINITAL	1.0002	0.7	1.0013	3.68	1.0011	3.05	1.0065	19.41	1.0000	0.20
PITHORAGARH	1.0004	1.7	1.0050	14.47	1.0078	23.52	1.0199	70.36	0.9998	-0.44
UTTARAKHAND	1.0004	1.3	1.0123	39.29	0.9988	-3.01	1.0156	52.14	0.9983-	-4.34

Changing land pattern we can see in table no 2 forest area is continuously decreasing and cultivated areas are converting in settlements and all these things are happen just because of population drift because people want to live in easy states not on those places which are full of difficulties.

**Emerging Pattern of Environmentally Induced Conflict Over Land Resources in Uttarakhand:**

A summary of various conflict in Uttarakhand including those that are climate change induced in the last few years are captured in hill and foot hill districts. According to the table no 3 we can see that the foothill districts like Haridwar, Dehradun, Udham Singh Nagar, Nainital are suffering from high density of population and land conflict also. Hill districts like Bageshwar, Rudraprayag, Chamoli, Champawat, here population is in low rate not because of there is they did not find resources to live, These places are also rich from natural resources but here they can get here only basic things water, food and shelter.

In these districts winter season is from about mid November to March. The rainfall being heaviest in the monsoon from June to September. Life is too tough in these areas some hilly districts in Uttarakhand like Chamoli, Chamoli is one of the county's 250 most backward districts (out of a total 640). It is one of the three districts in Uttarakhand currently receiving funds from the Backward Region Grant Fund Programme (BRGF).

**Table No- 3: Utrrakhand: Largest Districts By Population As Per Census 2011**

District	Population	Rural	Urban
Hardwar	1,890,422	1,197,328	693,094
Dehradun	1,696,694	754,753	941,941
Udham Singh Nagar	1,648,902	1,062,142	586,760
Nainital	954,605	582,871	371,734
Garhwal	687,271	574,568	112,703
Almora	622,506	560,192	62,314
Tehri Garhwal	618,931	548,792	70,139
Pithoragarh	483,439	413,834	69,605
Chamoli	391,605	332,209	59,396
Bageshwar	259,898	250,819	9,079
Champawat	259,648	221,305	38,343
Uttarkashi	330,086	305,781	24,305
Rudraprayag	242,285	232,360	9925

The history gives evidence of urbanization in Uttarakhand. These towns were originally rural settlements converted in to towns in the later stages. The basic reason behind the conflicts over land resources is urbanization and the cause of urbanization is the tourism because the state is the heart of famous pilgrimages. Originally these small towns were the stoppage centres of the pilgrims during yatra season. Slowly because of number of commercial activities, these stoppage places developed into the small towns, small to medium towns. These towns/cities converted into mega cities in large stage. This is being the regular pattern of urban development in the state. Few cities settled because of some natural calamities foe example Gopeshwar because of the flood in Alaknanda River. In this way the Urban development occurred in Uttarakhand significantly in unplanned manner which results lack of civic amenties according to the population density. Population pressure on the cities not only causing unavoidable burden on the available infrastructure facilities but also hinders the social and economic development process of the cities. On the other side of coin tourism is contributing much in the state's economy. Cities now become the hub of capitalization of the state as well. Thus the urban growth in Uttarakhand if affecting both positively and negatively.

Rapidly increased urbanization is increasing the confliction between peoples due to natural resources. Most of the towns in Uttarakhand have grown in an unplanned manner causing immense pressure on the urban infrastructure and services resulting in degradation of the urban environment and of natural resources. Major environmental concerns associated with such unplanned urban development are depletion of forest area, loss of

bio-diversity, potential urban pollution in the form of air, water, noise, solid and liquid waste discharges and landslide. Some of the major rivers which are drinking and irrigation water sources for the states downstream of Uttarakhand, as well as being religious significance are silted and polluted due to the unplanned urban development and industrial activities. These rivers also act as major drainage outlets for the towns, and are often used as a convenient means of solid waste disposal. Lakes and water bodies which are also attraction for tourists are polluted due to uncontrolled discharge of wastewater and disposal of solid wastes.

All these circumstances are due to the population growth and blindly exploitation of natural resources is the cause of natural misbalance. Population drift and conflict over land use in Uttarakhand has been a historical process. The demography and ethnography of hill regions in Uttarakhand has been influenced by a large in-drift from other parts of the mainland during 11<sup>th</sup> and 12<sup>th</sup> century and later years. Natives as well as drifters cleared jungles and developed farm land for cultivation through their hard labor over centuries. This condition is continuing at present also population is drifting towards plain districts a large number of population out –migrating permanently along with families from Hill Region of the state mainly to eke out their livelihoods and better future of their children. This has become a widespread phenomenon in hilly districts, resulting in absolute decrease in population in few districts such as Almora, and Pauri Garhwal and very slow growth in other hilly districts during recent decade.

#### **IV. Discussion of Findings:**

In the study, after a deep research and Field Survey we come to the finding elements. Uttarakhand state is divided in to conflicts of two regions Hilly region and Plane or Foot Hill Region. Uttarakhand Hilly area is full of natural resources but full of a difficult environment to live, also. Due to its sophisticated environment it is very difficult to create a modern environment here with modern facilities, and for better opportunities and in search of suitable modern and natural environment people migrated from there.

Increasing population in foot hill districts is a result of population drift from hill to foot hill. For instance, the need for more food has led to serious interpersonal conflict over land. The population often clash with one another when there is scramble for possession of arable land near water resources in Foot hill areas. The conflict between permanent and drifted Just cause of drifted population land is bearing more load of settlements and arable land for example Dehradun and Haridwar are two most populated districts of this state, Dehradun has a population of 16,98,560 the second highest in Uttarakhand after Haridwar (19,27,029).The Decadle growth rate has jumped up from 25%(1991-2001) to 32%(2001-2011).

Population drift is the big cause of conflict between nature and human. For the development of any state/ country population plays a brilliant role. Population is also a resource so for development resource I have to support to another resource. For the correct method of utilization we should understand our liabilities and weaknesses natural resource. There have been two majore contributors to the idea of balance between population and resources, pessimistic of Thomas Malthus and the optimism attitude of Esther Boserup. According to the Malthus The population grew geometrically whereas food production and resources provision grew arithmetic rate. So the present Malthus Theory is applying for foot hill districts.

Conflicts between Hill and Foot hill civilization is continuing continuously. For the mountainous people Mountain are the” Backbones of Civilizations”. Hilly Districts are facing so many problems to survive. On average, the families living up the hill are poorer than those on the level lands down below. Their production conditions and access to central services are more limited. Often, especially during bad weather, their children show up at the school which is near the centre. The people from the upper wards pay higher prices for good transported from the road or railway below. At the same time, they find it more difficult their own produce. They do not have very frequent contact with their fellow villagers, and out what is going on among the majority of the villages’ inhabitants.

One reason for this is that many inhabitants of the lower wards are not well informed about the role and life situation of the families higher up. They take it for granted that fields and forests and footpaths in the mountains are maintained. In the eyes of the majority, the upper villagers and its surroundings are to serve as a quarry, to provide timber, to generate electricity and to be used as recreation ground. No thoughts is given to the potential consequences of this limited view.

It is only when floods or avalanches and landslides threaten the homesteads below, or when the families from the upper wards move down in search of better economic opportunities, that the majority in the village centre start to think and ask questions. All too often, however, the current answer are extremely simple. They normally put the blame for any problems in the mountains on the people who live their. Have not the up - landers mis - managed their own environment and created all the problems the rest of the community now have to suffer?

### **Management and Policy Option Recommendations:**

Efforts to address the issue of conflicts resulting from scramble for land resources, which is usually induced by climate change, have to be strengthened. Even as the above complex nature of the difficulties of the mountain region in Uttarakhand state. The Government and various state holders should do some work parallelly Government created some institute like ICIMOD and closer home, GBPIHED, which did have mountains as their central agenda.

Government and NGOs should provide some basic information to hilly people about their atmosphere sensitiveness of their surface area. Yes! Of course they know about it very well but they are not aware government should aware them. Uttarakhand state is one of the very sensitive areas earth crust is very delicate here at this place. Before the infrastructure development government should discussed with Himalayan Geological Research Team in this team government should appointed some researchers who can provide geological information to Government's civil engineers. Government should also appoint some sources who can aware hill people about upcoming hilly activities like earth quake, avalanche, landslides, heavy rain fall, flood so that people can prepare.

### **V. Conclusion:**

In the end of this study we will say that no one want to leave their home if they r leaving, it means they r facing worst conditions. Population drift, and conflicts between two types of natural conditions, are major problem for the development of any country/state. Uncertain distribution between plain and hill of population is a big cause of climate change. Everyone want to see nature's beauty but how many understand their problems. People who are living in hilly areas, helpless to use expensive goods compare of plains. In last few years nature is giving so many surprises time to time in the face of hazards, climate change conditions etc just because of human activities.

Due to this conflicted situation state is facing horrible natural hazards back to back. Heavy and unpredictable rainfall is the major cause of floods and erosions and some areas are suffering from dryness farming land is waiting for water rivers become drier all these situation are giving birth of conflictions. For the development of mountainous regions people had made a Himalayan state Uttarakhand and now situation is as it is we are not saying that, that there is no development but development is worth it only when, it is spread equally in between overall population. But the situation is quite opposite now this state is turn in to two parts hill and foot hill areas. For new population we are cutting forests, shrinking river banks, exposing mountains. We are damaging the ecosystem and we are not in position to compensate it.

Population drift is not illegal but it is worst if resources affected by it. For so many reasons people go from one place to another, and they settled with their families but land resource is limited land resource is not only for human utilization other species also have same right to use it plants, trees, animals ,birds all are also a part of this earth and they have same right to use it. This is true that human being is the superior species in all of them but if only for its selfishness, human will harm to resources nature will do something to balance.

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