INTERNATIONAL INDIAN SCHOOL DAMMAM

MODEL EXAMINATION 2013-2014- SET (A)

SUB: GEOGRAPHY **CLASS:XI** **TIME:3.00 Hours** **MARKS: 70**

General Instrucutions:

- All the 23 questions are compulsory and marks are indicated against each questions.
- Questions from 1 to 9 are of very short type and carry 1 marks each.
- Questions from 10-16 are short type and carry 3 marks each
- Questions from 17 - 20 are long type and carry 5 marks each.
- Question 21 is related to Open Text Material(OTBA), read abstract and answer .
- Outline map of the India and world is provided to you must be attached with your answer.
- Question number 22 and 23 are related to map ,locate and identify features for both maps.

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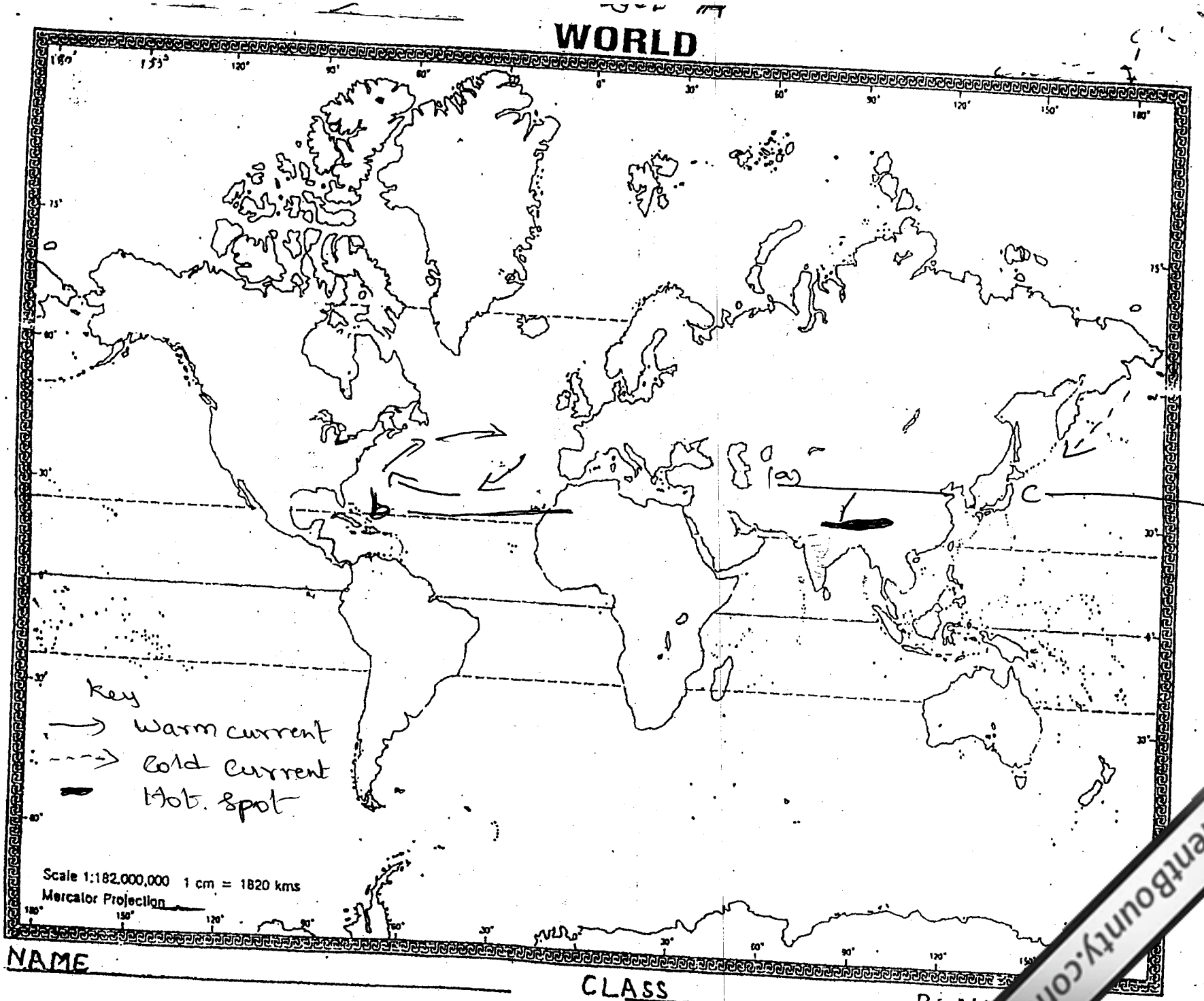
1. What are Karewars? (1mark)
2. What is Geography? (1mark)
3. Name the terrestial planets. (1mark)
4. Define the term monsoon burst. (1mark)
5. Name the hardest mineral. (1mark)
6. What are the elements of weather and climate? (1mark)
7. What is a Disaster? (1mark)
8. What do you underatand by the term ecology? (1mark)
9. What is a thermocline? (1mark)
10. Name the three major types of rocks and write a short note on any one of them? (3marks)
11. What is a food chain? Give one example of grazing food chain identifying the levels. (3marks)
12. Which is the standard meridian of India? Why it has been choosen and state its significance. (3m)
13. Write a note on tropical thorn forest? (3marks)
14. Distinguish between eatern coastal plain and western coastal plain. (3marks)
15. What are tides? How are tides useful. (3marks)
16. Define the term drought? What are the variuous types of drought? (3marks)
17. What are the evidences in support of the continenetal drift theory? (5marks)
18. Discuss the process through which the earth atmosphere system maintains heat balance or heat budget. (5marks)
19. What is soil conservation? Suggest some measures to conserve soil? (5marks)
20. Distinguish between Himalayan and Peninsular rivers? (5marks)

(OTBA-MATERIAL)

21. Answer the following quetsions using open text book material.
    a. Name the temples which were destroyed by Himalayan Tsunami? (1mark)
    b. How many pilgrims were rescued and what was the death toll? (1mark)
    c. Identify all the districts of Utharakhand which were effected by Himalayn Tsunami? (3marks)
    d."Flooding in Utharakhand Himalayas is a man made and natural disaster", Comment?(5marks)

22. Identify and locate the following features on an outline map of world. (5marks)
    a. Hot Spot b. Warm Current c. Cold Current
    d.Antarctic Plate e. Arabian Plate

23. Identify and locate the following features on an outline map of India. (5marks)
    a. Andaman & Nicobar Island b. Western Ghats c. Luni river
    d. Types of Vegetation e. Types of Soil.



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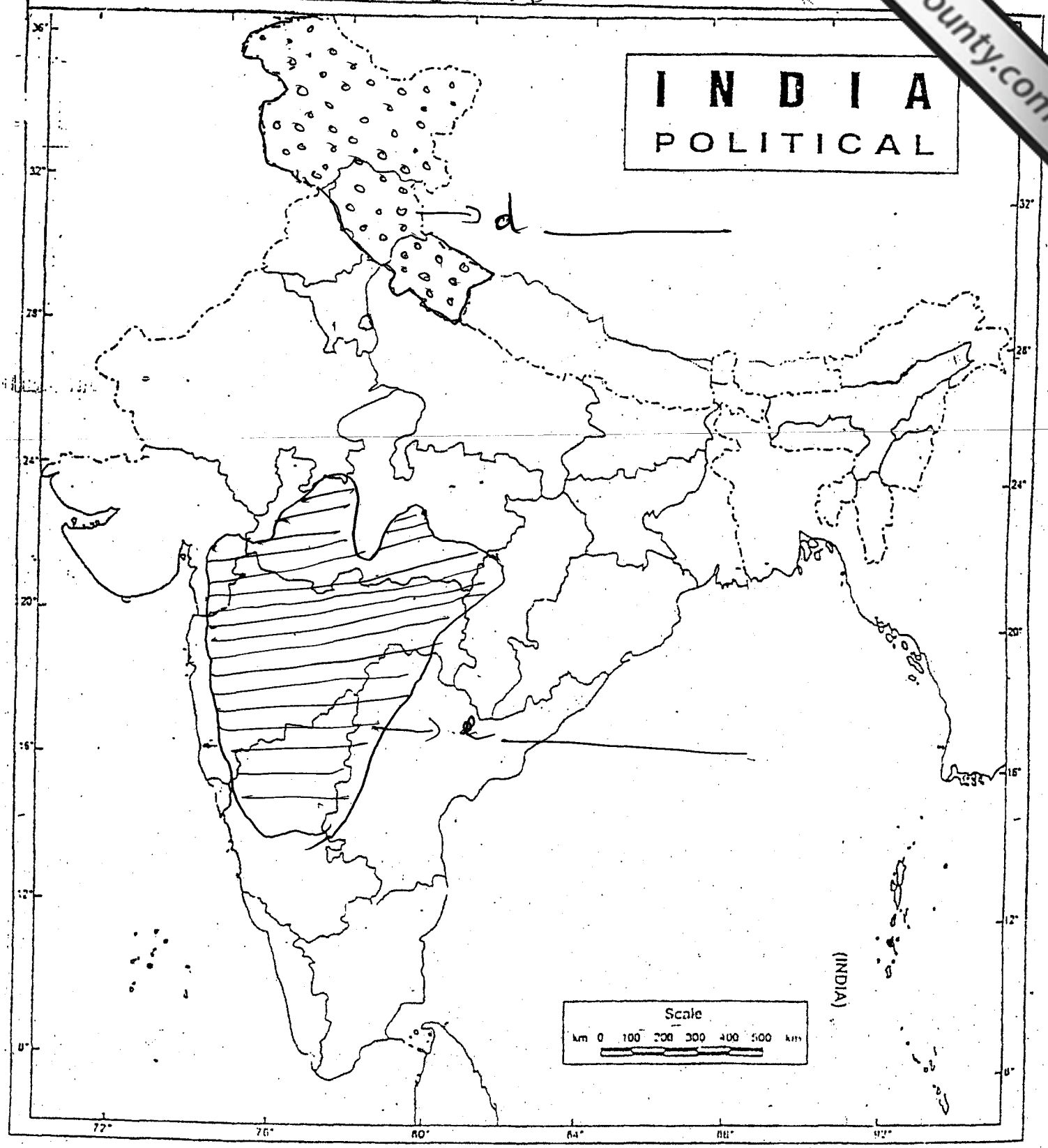

OPEN TEXT MATERIAL

1. Theme – *Indian Summer Monsoon and The Himalayan Tsunami*

Abstract:

Indian summer monsoon has always remained vital for the economy and people of the country. The anomalies and variability in Indian summer monsoon is resulting in frequent disasters such as the fierce floods of Uttrakhand Himalayas. The recent flash floods in Uttrakhand have caused damages to calamitous proportions. Nature's fury has been magnified by mindless anthropogenic activities and irresponsible tourism. Cloud burst events combined with geophysical dynamics have become a serious threat for the region. Lack of proper understanding and knowledge about recent climatic events in the region and absence of efficient post-disaster response mechanism has increased the vulnerability of those living in such ecologically fragile areas.

The torrential rainfall in Uttrakhand Himalayas of June, 2013 resulted into huge death and destruction. It left hundreds dead; thousand marooned and washed away scores of villages, inundated the eight century *Kedarnath* temple. The famous *Manikarinika* temple on the banks of *Bhagirathi* was swept away by swirling waters of the river. Houses and small apartment blocks on the banks of *Bhagirathi, Alaknanda* and *Mandakini* have been toppled into the rushing, swollen waters and been swept away along with cars and trucks. The extent of damage due to flash floods in many parts of the seven districts of Uttrakhand ***(see table no. 1.1)*** is mind numbing. Single-storey houses simply disappeared, many double-storey houses crumbled due to the weakening of its foundation. Many people managed to flee to safety but animals got trapped under the silt. The area now stinks with rotten bodies. Drinking water has got contaminated; at many places electricity has not been stored and now there is fear of epidemics. The unusually early and immensely heavy rains in Uttrakhand devastated the hill state to such an extent that it will take months for the government to restore normal life. The disaster stuck when the *Chardham Yatra* was going on with a congregation of around 75,000 pilgrims from all over the country. The Central government, along with Indian Army, Indian Air Force (IAF), Indo-Tibetan Border Police (ITBP) and Border Roads Organisation (BRO) rescued around 33,000 stranded pilgrims. The flooding was so fierce and disastrous that people named it Himalayan Tsunami.

	Rudraprayag	Chamoli	Uttarkashi	Tehri	Pithoragarh	Bageshwar	Almora
No. of Villages Affected	>60	39	28	15	10	08	08
No. of Persons Missing	>10,000 (including pilgrims)	>2,500 (including pilgrims)	-	-	Approx 100	-	-
No. of Houses Damaged	600-700	120-130	150-160	50-60	20-25	-	-

Table 1.1

Many environmentalists termed this event as a ***man-made disaster***. According to them human actions leading to environmental altercations have aggravated the problem and reduced the natural defense system. In the last three decades the region has witnessed demographic changes, deforestation, rapid urbanisation and expansion of roads. The environmentalists emphasised that mountains have a certain carrying capacity that should never be exceeded at any cost. Uttrakhand and Himachal Pradesh are the two Himalayan states that were worst hit by monsoonal flash floods in June 2013. Manmade factors compounded the scale of the disaster. Unabated expansion of hydroelectricity power projects and construction of roads to accommodate ever increasing tourism, specially religious tourism, are the main reasons of unprecedented devastation. The number of vehicles on roads is also rising in the entire state of Uttrakhand ***(see table no.1.2).*** According to many experts, the roads and transport, due to prevalence of excessive landslides, are bringing the mountains down. Mindless illegal construction of resorts, guest houses, roads has taken place in this ecologically fragile region to accommodate tourists. Buildings have been constructed over flood ways, old drains and streams blocking the natural pathway of the water. On June 15-16, 2013, the Alaknanda River and its tributary Mandakini occupied their flood ways and started flowing along the old courses where human habitation has come up with the passage of time.

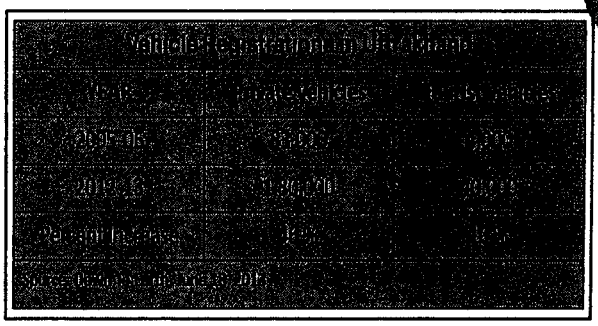

Table 1.2

Figure 1.2 Kedarnath Temple, 1882[2]

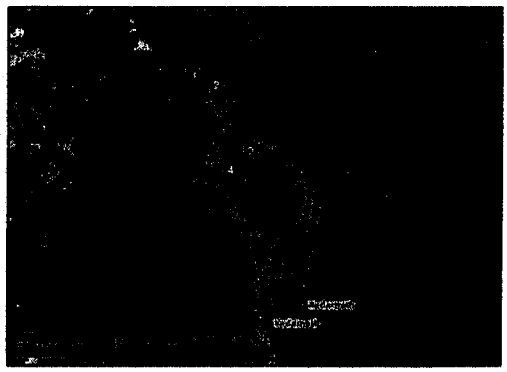

Figure 1.3 New Changed Course of Alaknanda[3]

The Mandakini changed its course to the west. The sediment loaded river washed away shops, guest houses/lodges etc, killing people who were present at that time. *Kedarnath Dham*, a place of serenity and devotion, which was dotted by only few huts in 1882 ***(see figure no. 1.2)*** was mushroomed by haphazard illegal constructions of buildings, shops, hotels/lodges etc ***(see figure no. 1.4),*** blocking the natural flow of the Alaknanda river.

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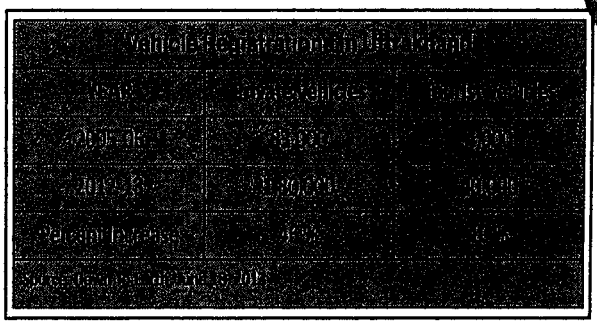

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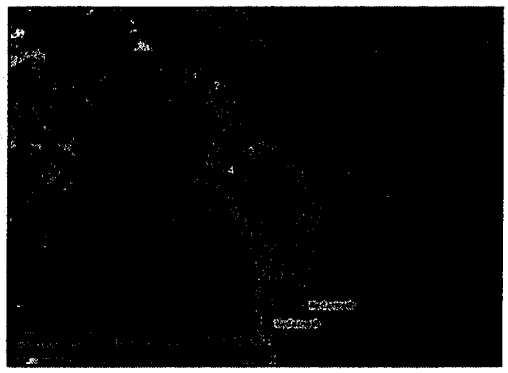

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Figure 1.4 Kedarnath Valley before Flash Floods[4]

Figure 1.5 Kedarnath Valley after Flash Floods[5]

When the river shifted to a new natural course ***(see figure no. 1.3),*** due to excessive rainfall and addition of water on account of lake burst and melting of glaciers perished all the construction ***(see figure no. 1.5)*** along its new path very swiftly and quickly. The experts have pointed out that even in the narrow valleys of the Himalayas, the Alaknanda and Mandakani are the rivers that keep changing their course. Due to morphological settings of the area, the river has high sinuosity and hence, high level of erosive capacity, especially when it is loaded with sediments. It has been estimated that more than 300 multi story buildings, hotels, shops and other business establishments that had been built on ecologically sensitive areas close to Ganga and its tributaries like Alaknanda, Mandakani, Bhagirathi, Kali Ganga, Gauri Ganga, were swept away or excessively damaged due to flash floods.

Due to increased anthropogenic activities and terrain instability, Uttrakhand has always remained prone to landslides. Even during August and September 2010, Uttrakhand Himalayas witnessed large scale slope destabilization, particularly along the roads where widening of the roads work was in progress. The slope destabilization around Rudraprayag was caused due to the widening of NH 58. The Yellow dotted lines indicates ***(see figure no. 1.6)*** the recent movement on the slope. A house was damaged due to the disturbance of the slope during road widening. The catastrophic landslides are associated with floods that mainly occurred in July and August that claimed many human lives. Conventionally, major landslides in Himalayas are located in the transitional zone between lesser Himalayas and greater Himalayas. The reason

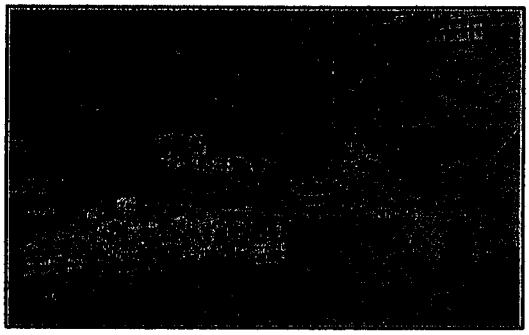
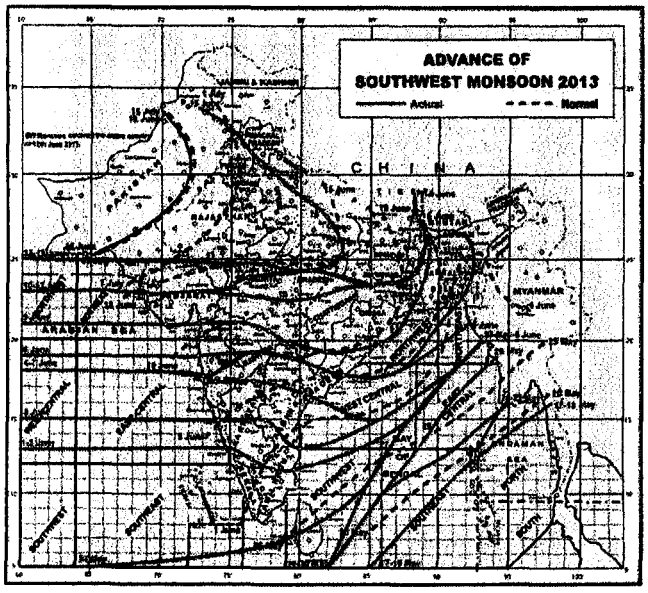


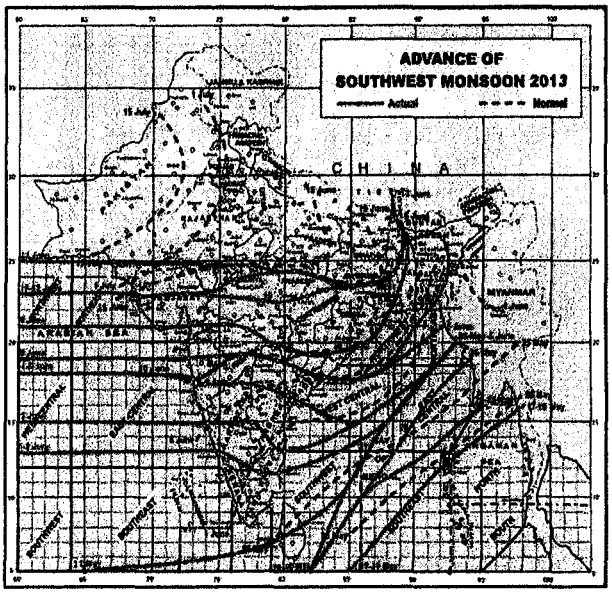
Figure 1.6 Landslide and slope movement in Rudraprayag [6]

being that, this zone is dominated by steep slopes, focused rainfall (cloud bursts) and frequent seismicity. Incessant rains also triggered many landslides in Uttrakhand this year at Uttarkashi and Chamoli, while 30 houses were damaged in Uttarkashi; four settlements were razed in Chamoli district. Landslide also killed six people in Nainital district ***(see figure no. 1.7)*** after heavy spell of rains in Bheemtal area. Flash floods due to water accumulation formation in Uttrakhand, has always been caused by landslides and accompanying debris. The June, 2013 Uttrakhand disaster, also known as Himalayan Tsunami was actually triggered by very heavy rainfall during June 16-18 and unusual behavior of monsoon this year in India. Rainfall measurement for June 16 and 17, 2013, at the Dehradun station was 220 millimeters and 370 millimeters respectively. It indicates the severity of the rainfall. Haridwar received 107 mm and 218 mm of rainfall in two days. Uttarkashi received 122 mm and 207 mm. While Mukteshwar (at the altitude of 2000 m) received 237 mm and 183 mm respectively on June 17 and 18, Nainital, on the same day, received 176 mm and 170 mm rainfall. What was peculiar about the monsoon this year was its advancement. On June 14, the monsoon front was located over eastern India. In fact it was sluggish compared with normal progress of the front. But within a day ***(see map no. 1.1 and 1.2)*** the front advanced right across Uttar Pradesh and western regions to cover the entire country by June 15, exactly a month ahead of its normal date of July 15.

Figure 1.7 Landslides in Nainital District July, 2013



Map 1.1 *Monsoon Progress on 14th June 2013*[8]



Map 1.2 *Monsoon Progress on 15th June 2013*[9]

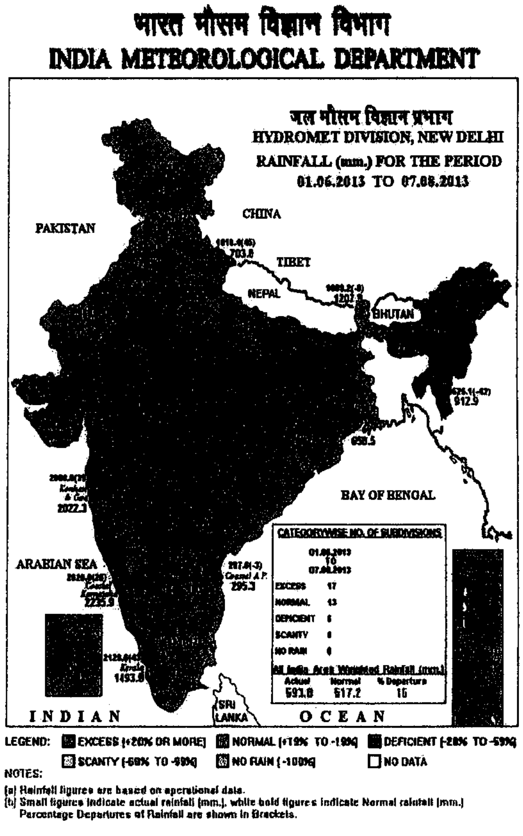
An analysis of the rainfall data for the past five years points to changes in rainfall trends in India, with a greater number of incidence of excess rainfall in Uttrakhand. The areas of Uttrakhand affected by recent floods, particularly Uttarkashi have experienced excess rainfall in June for the past several years. ***Table no. 1.3*** shows that in 2011, Uttarkashi received 146 per cent excess rainfall compared to the long period average (LPA). The corresponding figures for 2010, 2009 and 2008 are 26 per cent, 31 per cent and 98 per cent.

District-wise rainfall trends in Uttrakhand from 2008 to 2012						
	Chamoli		Rudraprayag		Uttarkashi	
	RF	Departure from LPA	RF	Departure from LPA	RF	Departure from LPA
2008	161.6	59	118.9	-38	[illegible]	[illegible]
2009	32.2	-69	17.8	-92	[illegible]	[illegible]
2010	121.8	18	165.6	21	[illegible]	26
2011	170.5	57	368.6	70	[illegible]	[illegible]
2012	[illegible]	-62	95	[illegible]	[illegible]	[illegible]

RF - Rainfall
LPA - Long Period Average

Table 1.3 [10]

Chamoli received 57 per cent excess rainfall in June 2011, 18 per cent in 2010 and 59 per cent in 2008. Rudraprayag received a deficit rainfall in 2008, 2009 but it received 70 per cent excess rainfall in 2011. The advance of the monsoon front right across to the west, just within a day was entirely unexpected. It was the interaction between the well-formed low pressure system of south-west monsoon, from east to west and upper air westerly trough running through north-west Rajasthan to east, that resulted in heavy rainfall over Uttrakhand. In fact, westerly system dragged the monsoon trough, which was present over Rajasthan and Central India until then, towards the north across Haryana. Its rapid movement northwards enabled the low pressure system that was in the eastern part of the country to quickly traverse and locate itself over north-west India. IMD (Indian Meteorological Department) is of the opinion that north-west India became the zone of an unusual confluence of two branches of the monsoon, the Arabian Sea and Bay of Bengal. The abnormally high amount of rain (more than 400 per cent) in Uttrakhand was caused by the fusion of westerlies with monsoonal cloud system. Heavy precipitation swelled rivers, both in the upstream and downstream areas. Besides the

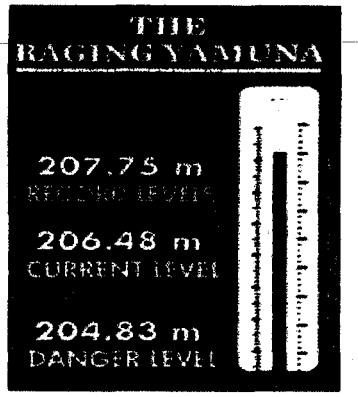


Map. 1.3 [11]

rain water, a huge quantity of water was probably released from melting of ice and glaciers due to high temperature during the month of May and June. The water not only filled up the lakes and

rivers that over flooded but also may have caused breaching of moraine dammed lakes in the upper reaches of valley. The reasons cited by meteorologists and scientists raise our inquisitiveness about the possible cause and the role of Indian summer monsoon, which is generally considered as a blessing for the country and its economy in this entire event. There are many instances of years with flood (strong monsoon) or drought (weak monsoon) during which India as a whole receives excess or deficient seasonal rainfall, respectively. Even within a season, there is considerable variation, both in space and time, in the rainfall over India.

Most part of central and north India, including the state of Uttrakhand has received excess rainfall between the months of June and August, 2013 ***(see map no. 1.3).*** Due to excess rainfall this year, the river Ganga and its tributaries were flowing above or close to danger mark in the region, flooding many villages. In August, 2013, Ganga in Haridwar was flowing at 293.70 metres, whereas the danger mark is 294 metres. Similarly, Sharda River at Tanakpur in Champawat crossed the danger level, Alaknanda at Rudraprayag and parts of Chamoli districts also reached close to the danger mark. Heavy rainfall in June 2013 at higher reaches also resulted in floods downstream. In that period Ganga was flowing near danger mark in Fatehgarh, Uttar Pradesh. Rapti was also near the danger mark at several places. Budhi Rapti was above the red mark at Kakrahi in Siddhartha Nagar. In Delhi, the Yamuna was also flowing near the danger mark, leading to closure of 145 year old railway bridge and evacuation of 2000 families along the river banks. The danger level for Yamuna River stands at 204.83 metres in Delhi, while the water level rose to 206.48 metres. The city was not witness to heavy rainfalls, otherwise there could have been a major disaster in the National Capital. Figure no. 1.8 shows the low lying areas which were submerged due to the swelling of the river and the areas which are prone and vulnerable to flood threat if the water level reaches 207 metres in the city. Many scientists believe that the June 16, 2013 rainfall in Uttrakhand was a result of a cloud burst. Another cloud burst in Himachal Pradesh caused huge loss of property in Kinnaur district at the same time. A **cloudburst** is *an event in which heavy rainfall occurs over a localised area at a very fast rate*. The area typically doesn't exceed 20-30 sq/km, while the rainfall may reach the level of 100 mm per hour, resulting in flash-floods as was witnessed in Uttarkashi and Ukhimath this year and in Leh in 2010. Typically, a cloudburst in India occurs during the monsoon season over the Himalayan region, northeastern states and the Western Ghats. It can also occur over the plains, but such occurrences are rare. Cloudbursts become frequent during the monsoon season. It is believed that



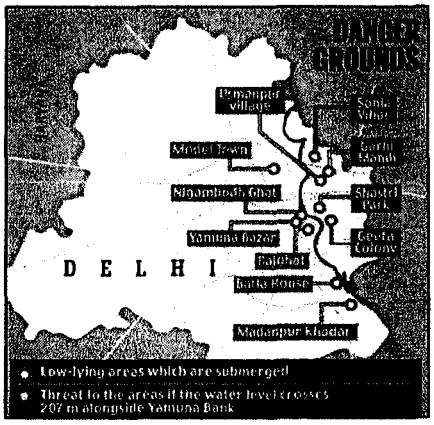


Figure 1.8 Floods Vulnerable Zones in Delhi [12]

rivers that over flooded but also may have caused breaching of moraine dammed lakes in the upper reaches of valley. The reasons cited by meteorologists and scientists raise our inquisitiveness about the possible cause and the role of Indian summer monsoon, which is generally considered as a blessing for the country and its economy in this entire event. There are many instances of years with flood (strong monsoon) or drought (weak monsoon) during which India as a whole receives excess or deficient seasonal rainfall, respectively. Even within a season, there is considerable variation, both in space and time, in the rainfall over India.

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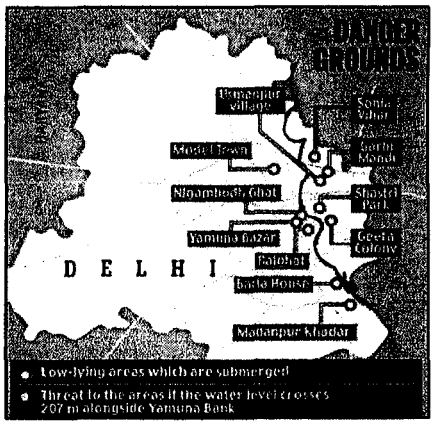

Figure 1.8 Floods Vulnerable Zones in Delhi [12]

June cloud bursts were far beyond anything recorded in the preceding years. Several major cl bursts were reported from Uttrakhand in 2012 (see table no.1.4).

Details of Cloudburst in Uttarkhand, 2012

Date	State	District	Effected Villages
05/07/12	Uttarkhand	Uttarkashi	Assi ganga ghat, Charaghani, Andiyarakala, Phaniyarakala, Ravada
05/07/12	Uttarkhand	Chamoli district	Beriya area
04/08/12	Uttarkhand	Uttarkasi	Dayara bhugyal , Joshiyada, Gangori bridge
19/08/12	Uttarkhand	Uttarkasi	Nuranu village, Mori area
14/09/12	Uttarkhand	Rudraprayag	Timada, Sansari, Giriya, Chunniand, Mangali ,Premnagar and Jantok villages in Ukhimath area
14/09/12	Uttarkhand	Bageshwar district	Kapkot near Almorah

Table 1.4 [13]

Even though the cloud bursts have been increasing, many say that due to climate change, India does not have a system like the one for cyclones to predict a cloud burst, resulting in flash floods. On the basis of images from the remote sensing satellites of Indian Space Research Organsation (ISRO) and the U.S.

Figure 1.9 Kedarnath Satellite pictures Pre and Post Floods [14]

Figure 1.10 [15]

Landsat, it is evident from the post-event image of Cartosat-2 (see figure no. 1.9) that massive destruction was the result of large scale debris carried by huge volume of water from the upper reaches above the town. According to images released by NRSC, the landslides and subsequent lake formation occurred in the aftermath of the June 15-17 rains, that led to unprecedented devastation in the state. The bulge in the river just downstream of Alaknanda's source, is visible in the Indian Remote Sensing (IRS) image taken on June 21 ***(see figure no. 1.10)***. The spot was around 8 km from Badrinath. The approximate area of blocked river was 2,550 sq m. It led the government to issue an alert around Badrinath due to the partially blocked passage of water, leading to the formation of a 450 metre long lake that could have busted and flooded the river. Like other disasters, the only institution that managed to get most praise and credit is the Indian armed forces, trained in the idiom of action, organised in a way that is purposeful and acting without a trace of self-interest.

It was the army personnel who worked tirelessly and put their lives in danger to help and rescue stranded locals and pilgrims affected by flash floods. They provided people essential materials such as food, blankets and medicines. The Indian Airforce (IAF) put to use some of the best military skills to help people in flood ravaged zones of Uttrakhand and rescued hundreds of fatigued and exhausted, stranded pilgrims and locals. Operation 'Rahat' was the biggest ever helicopter based rescue operation in history. 45 choppers made sorties day in and day out despite bad weather and hazardous conditions. It mobilized the resources, evacuated people to relief and base camps and carried out extensive search and rescue operations creating a world record. The unusual advance of summer monsoon, combined with cloud bursts (still not confirmed) and geophysical dynamics (loose soil, landslides and lake bursts) had channeled huge devastation through massive flash flooding in Uttrakhand, which turned into a major disaster due to the combined impact of anthropogenic activities and breaching of the carrying capacity due to irresponsible tourism.

Figure 1.11 Indian Army Rescuing Flood affected people at Uttrakhand [16]

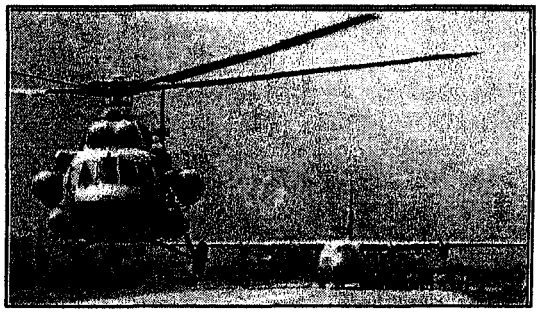

Figure 1.12 Operation Rahat of Indian Air Force (IAF) [17]

☆ It has now become essential for us to carry out some intensive and focused research on monsoon and its variability, since the exact dynamics between upper air westerly trough and the low pressure system of south-west monsoon have been recorded.