**Human Adjustment to various Environments**

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**Human adjustment** simply means how human beings adjust themselves with various environments of the earth surface. Here various environments means various climatic conditions, terrain, topography, and even in different natural hazard prone areas. The concept of human adjustment applied seventy years ago to floodplains and now to the impacts of climate change. According to Gilbert J. White, *“human adjustment has served as a practical guide to as action, research paradigm, and as aspiration for human coexistence with the natural world”.*

The study about human adjustment to various environments is a major concern of human geography from the beginning; as the definitions of human geography reveals that “*it is the study of man and his adjustment to natural environment”*. There are numerous racial and ethnic groups in the world and geo-climatic conditions of the various parts of the earth and according to that their mode of living also varies in various forms of environment. Human adjustment varies upon different landforms and environments such as mountains, plains, plateaus, hot or cold desert, riverine and coastal lands. Relief exercises a lasting effect on the economic life of man. Indirectly, relief of the land affects the economic life, because the production of raw material is dependent on the soil. It also directly limits the industrial progress of the country, for example the northeastern region of India is industrially not advanced because of its rugged hilly topography. In the hilly tracts, agriculture and industries generally do not flourish. The result is that the production of wealth in these tracts is less and therefore only sparse population can be supported. Depending upon the **terrain** we find various types of **agriculture**, in the hilly tracts we generally found subsistence type of farming and shifting cultivation and intensive farming is practiced in the plain regions. The **density of population** is also determined by the terrain and climate existing on that region, mountainous regions posses sparse population because of lack in transportation facilities, agricultural and industrial growth, medical and educational facilities; on contrast the plain areas are people easily get above mention facilities thus, it supports dense population. It is also seen that **technological development** is more in the countries having a cool and moderate climatic conditions in comparison to countries lying in the extreme tropics such as some of the African countries has very low level of economic development. The people of cold areas are more energetic and hardworking; comparatively people of hot areas are less energetic and less enthusiastic. The **livelihood of people** also varies depending upon various environments, people of plain areas may engaged in agriculture, industries, trade etc; lumbering, tourism, agriculture, plywood industries are the main livelihood of people living in hilly areas; similarly fishing is the main livelihood of people living in the coastal areas and riverine islands. People of the harsh climatic conditions rely upon hunting and gathering for their daily food. Even the **culture** of people influenced by the environment agents; *Bihu* is the main festival of Assamese people, which is being celebrated in relation to the environment depending on the time of rice harvesting, at the time of *Kongali Bihu*, famers do not have rice in their godown, so it is celebrated for a day only by offering *diya* under *tulsi t*ree, *Bhogali Bihu* is the festival of feast, it is celebrated just after harvest time is over, and farmers have full of harvest in their *bhorals* and the *Ronali Bihu*, the festival of joy, it is celebrated for long time. People have much leisure time to celebrate, because at that time farmers do not have to work in the paddy fields. So, it is a good example from our Assamese culture how festivals are influenced by the environment.

In the following we are discussing about various modes of living of human being in varied environments:

**MOUNTAINOUS REGION**

Of the several types of landforms, mountains are the least hospitable to human cultures. The mountain ranges are the hinderance of communication; we do not find good communication in these tracts. In mountainous region life is quite challenging. Therefore, people rarely live on permanent basis in mountains despite it is a source of minerals, rich in forests and possibilities of tourism. The people living in the mountainous regions have been forced by their environment to adapt a particular mode of lifestyle and they have developed appropriate technologies for utilization of their resources and maintain their ecosystem sustainable and efficient. It has been estimated that 12% of the world’s population i.e. about 750 million people living in mountainous areas. The Alps are the most densely populated mountain areas in the world. 13 million people live in the Alps. Nearly half (46%) of 750 million people, live in mountains in the Asia or Pacific region. People of these areas have adapted to living in the mountains. The South American Uru tribe has larger hearts and lungs to breather the thin air at high altitudes.

Man’s adjustment to his environment may be cited from the mountainous areas of the world. In the hilly and mountainous areas, the life of people is closely being controlled by terrain, geo-climatic conditions and the isolation from the rest of mankind. The mode of living of mountainous people can be traced in the following ways:

1. **Occupation and livelihood**
2. **Grazing of domestic animals:** In the young folded mountains, like Himalayas, Alps, and Caucasus, transhumance is practices to utilize the winter and summer pasture: in the summer, when snow melt, result into green pastures, the transhumance ascend in the Alpine pastures while in the winter season, when temperature goes below freezing point, they descends to the winter pastures situated in low altitude.
3. **Agriculture:** In the hilly tracts, mountain people practice terrace cultivation or shifting cultivation with traditional agricultural technologies. They used bamboo irrigation (draining out water from distant located streams through bamboo to the fields) during the winter season. The agricultural products are generally produced in subsistence form.
4. **Lumbering and supplier of forest products:** People of mountainous areas used wood as fuel to cook food and make fire to save from cold in the winter and to protect themselves from wild animals. They also used to supply forest products as raw materials to paper, pulp, matchbox and furniture industries.
5. **Sources of minerals:** Mountains are the store house of many minerals such as coal, clays, certain building stone, iron petroleum etc. The great mining regions of the world are located in the mountainous region. USA and Germany are the good example of showing relationship of mining with mountains. West end of Lake Superior has the most important iron mining industries of the world, and it is one of the leading copper deposit belt. Mountains are also home to many medicinal plants.
6. **Source of power:** Mountains have thepotentiality to produce a huge amount of hydro-electricity from its streams. It provides electricity to many industrial and urban population rims such as Risen Range in Silesia. Many manufacturing units located near the mountain stream, for example industries of northern Italy and Switzerland are located at the base of Alps.
7. **Tourism:** It is a main source of income to many mountain dwellers. The fresh air, grand scenery, mountain climbing, fishing, unique culture, traditional handicrafts etc attracted huge population to mountains. In Switzerland, tourism is the greatest source of money for Swiss people.
8. **Adjustment with extreme climatic conditions:** Mountain people have to adjust themselves with the harsh climatic conditions. In high altitudes, temperature goes on decreasing and oxygen level becomes low. To cope with such situations, they have 20% more blood than a lowlander, 60% more weight of hemoglobin, larger red blood cell which have a greater surface area for oxygen absorption and comparatively larger heart and lung to lowlander.
9. **Food Habits:** It is usually seen that mountain people prefer to take boiled food in their diet by making less use of oil as for example people of hilly areas of northeast India generally used to cook their food without oil. As oil is not easily available in some remote mountainous areas. They eat food what easily available in the forests and products gained from their fields especially corn and potatoes. They mainly rely on animal proteins. They used various types of herbs in their food.
10. **Culture:** The people of mountainous regions preserved a unique culture as they isolated from the mainland. They have multi culture and traditions within them. They varied in their languages, dress forms, festivals, rituals etc. Many of them worship nature god.
11. **Lack of basic facilities:** Because of rugged hilly topography, mountain ranges are lack of proper transport and communication, educational and medical facilities. It results in low industrial and economic growth. People living in high altitudes of Tibbet, use yaks their mode of transportation.

The life of mountainous people is very challenging and they have to face many **environmental problems** such as:

1. **Climate Change** has become a major problem before the mountain dwellers. Climate of mountains becomes more extreme. The water requirements of mountain people are mostly get from the rivers feded by mountain glaciers and from waterfalls and streams. Melting of glaciers due to rising temperature pose huge problem to this community. Climate change also affects mountain ecosystem which is their source of income from tourism; many national parks such as Nandadevi National Park, Kanchunjunga National Park are located in the mountains.
2. **Scarcity of Water:** It is a major problem faced by the mountain dwellers during the winter seasons. In the summer, they used rain water for their various use but, during winter, water sources are drying because of decline in rainfall. They have to walk long distance of hilly tracts to collect water.
3. **Unfavorable to agriculture:** Mountains are less suited for agriculture. Because of hilly topography they have to practice either terrace or shifting or jhum cultivation. But jhum cultivation has been done by clearing and burning of forests which is a major environmental issue. In many areas government banned such types of practices.
4. **Land degradation and risk assessment**: Mountains are very much susceptible to landslides and mass wasting. Young folded mountains like Himalayas, are prone to earthquake also. People living in Himalayan region of northeastern India frequently experience earthquakes.
5. **Mountain as barrier**: It acts as barrier to many developmental activities because of its topography and harsh climatic conditions. It also keep mountainous people isolated from the rest of the world.

\*Example of mode of living of people living in mountainous areas

**Nagas of North East India**

Nagas are the largest tribe of North East India who predominantly occupy the territory of Nagaland. It has an area of 16,579 sqkms and has a population of about 20 lakhs with an average density of 120 persons per sqkms. The habitat of Nagas is mountainous, characterized by elevated ridges, spurs and peaks of Naga and Patkai hills. The terrain is highly complex. Nagaland has a monsoon climate which favors growth of dense forests in the area. Over most of the slopes, the Nagas have left deleterious effects by way of shifting cultivation. The abandoned *jhum* lands get infested by secondary vegetative growth, consisting of grass, reeds, bushes and fast growing broad-leaved softwood trees.

Nagas provide a good example of how people adjust themselves in a mountainous environment in the following ways:

1. **Society:** Most of the Nagas are still close to the nature and their life is strongly controlled by the prevailing environmental conditions. In each of the Naga villages they have a social institutions called *morung*, which is used to train the young boys to provide various services to the villagers and it is the hub of the villagers cultural activities.
2. **Food:** The Nagas are known as ferocious eaters. Nagas may eat almost everything. Rice is the staple food. Fish, pork, mutton, beef, rat, dog, bird, crabs, beetles, ants, spiders are also eaten. They eat whole of an animal including skin, intestine, eye, blood except hair and bone are thrown away. Black dog is delicacy. They half dried the meat and fish in the fire for future consumption. They considered milk and milk products as impure food.
3. **Settlements:** The Nagas are generally small in size and spatially scattered. Almost all the houses are thatched huts and constructed on the top of the steep hills, spurs, cliffs and sharp slopes. The primary consideration for the selection of site is the basic need of defense.
4. **Tools:** The main weapon of offence is the *dao* (a large chopping knife). *Dao* is the friend and companion of Naga throughout his life. They used cross bows and arrows for hunting.
5. **Religion:** At present most of the Naga people belong to Christianity. But, some worshipped nature god. Naga do not believe in image or idol worship.
6. **Economy:** The Naga’s economy is essentially agrarian in character. They largely depend on jhum land and forests for their sustenance. Shifting cultivation is widely practiced in Nagaland. They usually grow potatoes, corn, and rice in their fields.
7. **Occupational Structure:** Nagaland is essentially an agrarian state. Most of the Nagas are engaged in agriculture (78 % of total population) and forestry and followed by tertiary and secondary activities. Industrial sector is almost missing in Nagaland. Nagas’ handicrafts are famous in the markets, from which also they earn some sort of income.

The life of Naga people is not so easy; in a complex rugged topography, where agriculture, transport and communication, education and medical facilities are very difficult to avail. Their environment forced them to eat everything whatever else is available.

**COLD DESERT**

Cold deserts generally have the hot summer and extremely cold winters. These deserts are found in high, flat areas, called plateaus, or mountainous areas in temperate regions of the world. Like the other desert, they get very little rainfall throughout the year. Greenland is the world’s largest cold desert; Gobi, Atacama, Namib, Arctic, Antarctic, Ladakh etc. are also some of the cold desert of the world. The climate of the cold deserts is very extreme, very intensive cold which made less hospitable for human habitation, because of which there one will found a rare human population. And in most time of the year, the earth surface is covers with thick layers snow which made the soil unfit for growth of trees especially in Arctic and Antarctic regions, agriculture and obstruct the growth of industry. In these types of deserts people have to rely on hunting and gathering for food and some proportion of trade of animal products to nearby areas.

The people of cold deserts of the world are facing various **environmental problems** in recent decades. The impact of climate change is very prominent in the snow laden areas of the poles, where most of the cold deserts are located; melting of glaciers pose major problem to the existing ecosystem of the polar areas. It poses threat to the sea mammals and many mountain animals in which the people of these cold deserts rely for their food. As for example, the people of Tundra region totally depend upon the sea mammals for their food, clothing and trade of its products as their source livelihood. Loss of mountain and polar ecosystem hampers the life of people living in the cold deserts. Because of all these factors it is seen that the numbers of people residing in cold deserts are decreasing slowly and they are moving towards the city life where all basic facilities are easily available.

The **Eskimos of American, Asiatic and Arctic Tundra** are representative of hundreds of tribal peoples, who have adjusted themselves to harsh Arctic environment. The Eskimos exemplified adaptation to extremely cold climates. The Tundra is low, flat, treeless plains where the ground remains frozen for most of the time. Climate is very peculiar; there is a month of continuous daylight at mid-summer, while continuous night for several months in the winter. It has adverse psychological effect on the body and mind. People suffer from many sleep related diseases, depression and anemia etc. The winter is extremely severe; water remains freezes for seven-eight months of the year. In most of the places, temperature remains below -50˚C; Verkhoyansk lowest recorded temperature is -78˚C. In such extreme physical environment life is very difficult.

The word ‘Eskimo’ means “eaters of raw meat”. *Inupik* and *Yupik* are the main dialects of the Eskimos. They provide a unique example of determinism in which basic needs (food, clothing, shelter and tools) of people, socio-economic structure and cultural ethos have been influenced by the environmental factors. The people in the Tundra region are still in the primitive stage of development, having a semi nomadic life and their sustenance is still being obtained from marine Arctic mammals (whales, seals, walrus etc) which they hunt with greatest skill and some traditional tools.

1. **Society:** Eskimos’ society is a patrilineal society in which oldest man commands the society. He decides on hunting destinations and distributes the hunting among all the people. Before the big hunt they made rituals to make the hunt more successful. War is unknown to them; struggle for life is strong among them. Death by starvation is common during the winters because of scarcity of food. Aged and ill people of the family are non-productive persons, who are a crushing burden to the community. Such persons kill himself or commits suicide. When there is shortage of food, they went outside the igloo in the harsh nights of winter and move to unknown direction with bare until he get exhausted, then he removes his cloth and exposes to extreme weather and within no time he died because of cold.
2. **Food and Tools:** For food they totally depend on the sea mammals which they hunt. In the summer they move away from sea coast to hunt caribou and reindeer and to collect wild fruits and in the winter they hunt seals, walrus. They have to wait in the breathing hole of seals for long hours; when the seal came out for breathing near the hole Eskimos kill it with his small weapons made from ivory or driftwood. Eskimos are capable of consuming the thick layer of fat about 10 inches in seal and walrus, which is not easy for common people. Seal fat is used as fuel in cooking, heating and lighting.
3. **Dress habits:** They use the skin of seal as clothing and furs and hairs of polar bears, caribou and reindeer to protect themselves from cold. To protect themselves from snow blizzards and glare of the sun they used sunglasses made from ivory.
4. **Settlement:** There is nothing building materials is available in these regions except ice. Therefore, Eskimos made houses made of ice which is called as *igloo*. They made an igloo with like engineering skills only with a knife made of ivory within an hour.
5. **Transportation:** Sledge made from walrus bone which is drawn by dog is the main mode of transportation among the Eskimos. They also used skin-covered small boats to paddle across the open water.
6. **Trade:** They practiced some sort of trade with outsiders. They export hides, furs and skin of animals to nearby urban centers. Like Pygmies of Congo Basin they also practiced silent trade with Chuckchis of Siberia.

The recent studies show that the traditional lifestyle of Eskimos is changing fast. They tend to move to nearby urban centers and after the discovery of minerals in their territories; they have been using fire arms and began to live in pre-fabricated houses in the settlements adjoining airfields, radar stations and mines. Their life is changing but still the role of physical environment is strikingly significant in Arctic region.

**HOT DESERT**

The hot deserts having a very high temperature throughout the year and a dry biome. The surface of the hot deserts are generally found with stone, sand dunes and low vegetation. Temperature above 50˚C is a common phenomenon of the hot deserts. Sahara is the world’s largest desert. Arabian, Kalahari, Thar are also good examples of hot deserts. The extreme and scorching heat, dusty wind, low vegetative cover, less possibility for agriculture and growth of industries made the life of hot desert dwellers difficult to led. Camel is the lifeline of people of hot desert; for everything from food to cloth, transportation and even the source of livelihood, they have to rely on camels. A very less population of nomadic lifestyle is found in these hot deserts.

The drastic change in the climate affects the life of the desert dwellers. They are totally bound by the nature. The movement of their camels is also determined by the weather elements nor they will stuck on the way by sand storms. Because of climate change storms became more extreme and occurrence of heat waves is increasing. There is already existing scarcity of water in the deserts; expansion of desertification due climate change made it more problematic. It also hampers the food sources of the desert people. These are the some of **environmental problems** faced by the people of hot deserts.

**Bedovins of the Arabian Desert:**

Bedovins (also called Badawin) are the Arab-speaking pastoral nomads of Southeast Asia (Arabia, Iraq, Oman, Syria) and North Africa. They are mainly associated with camel herding in the desert areas, although they also rear sheep, goats, cattle and horses. The life of these pastoral nomads is very different from the other people. They remain in the interior of the arid pastures for nine to ten months of the year. They move from one place to another in search of water and fodder frothier animals. There restricted needs are fulfilled by camel, such as food, shelter, cloth, transportation, source of livelihood etc.

1. **Settlement and Seasonal migration:** Season-wise they migrate from one place to another. And they live in semi-permanent settlements of tents for the season. They move to other area if fodder of their animals is finished on the residing area.
2. **Economy:** The economy of Bedovins is largely dependent on camel. The essential virtues is that it can survive for days without water as it can store water about 15 litres of water in their humps. Camel is a status symbol too. A Rich Shiekh may own a thousand of camels. People even made water bucket from camel hide to store water with them.
3. **Food:** Camel milk is the main food for months. They daily food of a Bedovin is meal cooked in sour camel’s milk. Bread *(roti)* and meats are offered to guests only.
4. **Society:** The Badawin society blood relationship in the male is fundamental. They have a bonding and unity among the community. It is being seen in the time of invasion on them by enemy during the time of migration. In the Badawin society a peculiar thing is that arrival of stranger at the camp is often occasion for great competition in offering hospitability. The guest is welcomed until the sunrise of the forth day after his arrival, that is, until the third daily meal has been eaten and digested; after that time he should not stay, but his safety is guaranteed up to the distance of one hundred miles.
5. **Agriculture:** Besides pastoralism they also practice some agriculture; they grow date palms, barely, maize, melons, beans vegetables in the oasis.
6. **Education:** The daily life of Badawins is a learning school for military organization. In the evening, they learn to breaking of camp, making of tents, herding animals etc.

In the recent years accelerating economic development in most Arab countries has made the Badawin’s way of life increasing sedentary. In the hostile environments of hot deserts, the pastoral economies are highly efficient. Now they tend to do intensive ranches of industrialized countries instead of their traditional nomadic pastoralism. The pastoral mode of life has thus arises out of precise geographical conditions and shows a unique case of environmental determinism.