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Effect Of Climate Change On Himalayan Regions

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ABSTRACT

The climate change is one of the biggest challenges in the whole world. According to current situation the temperature of world can be anything between 1.5-5.8^{0}C.The warming rates of Himalaya is higher than rest of world. The rate of retreating of Himalayan glacier is six times greater than retreating rate of other glaciers of the world. The water supply the Asian countries like India, Bangladesh, Bhutan, China ,Pakistan, Nepal, Afghanistan is done by the rivers which originate from Himalaya and the life circle, economic growth, agriculture and other requirement of life which is related to water of these countries is effected to the rivers which comes from Himalaya so it effected with any changes if happen in glaciers of Himalayas. The population of these countries is increases mainly of china and India at very fast rate ,so in future their requirement in future will increase and the pressure on Himalayas will increase which is affected with continuing change climate change. Change climate has affected the Himalayas from various sides its glacier rate has accelerated, ecosystem and biodiversity has disturb in continuing pattern the flora and fauna is effected the species which were founded in low elevation regions in past decades is shifting towards upper elevation because of increase temperature this will create the problem of resources where they are shifting and competition is start for spacing we have no idea how long they will survive .Climate change also affected the alpine ecosystem this is most important by the point of view of medicine because 62%of medical plants are found from these parts. If this will continue affected then it will create great problem in the field of medicine. The increase temperature is favourable for female and transgender which is danger for their future production. The agricultural activity of above mention Asian countries is dependent on rivers which come from Himalaya due to retreating

rate of glaciers of Himalayas there is chances of flood in future and due to change pattern of monsoon drought condition will come in future both drought and flood will create problems of live, diseases, food etc.

Key words: Climate change, Himalayan regions, Glacier, ecosystem, lakes.

1. INTRODUCTION

The Himalayas is known as water tower of Asia. The glaciers of Hindu Kush Himalaya is the largest body of ice in the world except pole. It passes through east to west in Asia. This is the main source of water of Asian countries like Afghanistan, Bangladesh, china, Bhutan, Nepal, India. The ten major rivers of Asia originate from it and major part of the population of these Asian countries live in the basin of these rivers. The maximum part of these population live in villages and their main occupation is farming which is dependent on water from these rivers and monsoon also. The agricultural product has a major contribution in GDP of these Asian country like It has contribution of 17.4% 2015-16 in GDP of India. It has contribution about 80% in GDP of Nepal. Continuous changing climate has adversely afffected the glaciers. The area EH region is 524,190 square kilometre. The retreating rate of glaciers of Hindu Kush Himalayas is six times greater than average rate of retreating of glaciers of world. High retreating rate leads to flood condition in rivers which creates a lots of problems in downstream side. Continuing change climate has also adversely affected the monsoon now it become shorter up to15days and high intensity of rainfall occur which also creates problems. Disaster in Uttrakhand in 2014 is an example of high intensity rainfall. The rivers originate from Hindu Kush Himalaya not provide water only but they also provide soil and nutrients to downstream areas which makes its more fertile. The HKH is made up of 39%of grassland, 20%of forest, 15%shrup and 5% of agricultural land. The remaining 21% made up of Barron land, rock out crops, snow cover and water bodies. The ecosystem and biodiversity of mountains are affected by various factors such as human activities, timber harvesting, agricultural expansion, air pollution etc .The 52.03% area of EH region present in India and 17.90% in China which is most populated and their demand is very high to support their people and economic so the stresses on this part of Himalayan region is continuing increases.

2. GLOBAL CLIMATE CHANGE PATTERN

According to IPCC, the average surface temperature of world has increased between 0.3-0.6°cover past hundred years while in India average surface temperature rises by 2-4°C. The rate of warming of 20th century is greatest among the last thousands of years. In next hundreds of years the global average temperature can be anything between 1.4-5.8°C.

3. EFFECT OF CLIMATE CHANGE ON GLACIERS OF HIMALAYAS

Every year 10-60 meter glaciers of Himalayan region are melting. Due to continuing changing climate the Glacial lakes are formed in Himalayas regions. The changing of climate is also responsible for glacier shrinking which is directly related to formation of Glacial lakes. According to ICIMOD there are 9000 lakes and 200 potentially danger glacial lakes present in Himalayan region. The size of these lakes has increased at rate of 800%. Major of these have formed in last five decades. Lake Imjatsho is an example of it which was non-existent in 1960, now it covers 1 square of area. There are 1466glacial lakes present only in Nepal and out of which 21 are potentially dangerous and 6 are defined as high priority requiring extra care. In this region between 3-10 years one GLOF is recorded which creates destruction of live, bridges, forest, hydropower. So we have to do extra care of these glacial lakes otherwise it will creates disasters.

Climate in HKH region is not uniform. The eastern and western areas of HKH is differ in point of view of their climate they differ due to timing and type of precipitation. The eastern part of it is affected by monsoon activity in summer on other hand western part of it is affected by mid-latitude westerlies in winter. In eastern Himalayas, the summer monsoon dominates march to October. July-August in western Himalayas while June-September in central Himalayas. In India the effect of change climate can be seen by change monsoon pattern, there is decline of rainy days by more than 15 days, an increasement in strength and occurrence of cyclonic storm and reduction in snow cover.

4. EFFECT OF CLIMATE CHANGE ON GANGA RIVER

The Ganga river generate from Gangotri glacier which is at elevation of 7010m and it retreating at rate 28m per year. this glacier is one of the largest glacier in the Himalayan region. It has been receding since 1780. In recent years retreating rate of this glacier has been accelerated. Any changes in the flow will directly affected the 477 million people which live in its basin means if the Ganga water reduced is reduced by two third then these 477 million will directly affected. glaciers provide 30-40% of its water supply, Nepal contribute about 40% water supply of average annual flow. The most important thing is that Nepal 70% of the flow in dry season (ALFORD 1992). 265 Species of fish is found in Ganga, 2.54 million fishers (India &Bangladesh) depended on it. Bangladesh is situated at downstream side and works as outlet for draining water in GBM System of area is 12 times the size of Bangladesh , so flood is a common environmental problem of this country which creates a lots of problem in Bangladesh every year. The Gang river is most important by the point of view of medical science because its water is populated with Phage which have a property to kill the harmful bacteria and replicate within them. Phages is also a tool for treating diseases caused by bacteria which have a potential to kill the pathogen neatly without harming natural flora which also found in human body in early of 20th century the America has started this as treatment of diseases but it was stopped due to limited understanding in this field. Due

to over use of antibiotic many strain of bacteria become resistant for antibiotic, this time phage therapy is now on research because it is more proming antibiotic in nature.

5. WATER AVAILABILITY IN INDIA

India has population of 17.5% of world and it has only 4% of the total available fresh water resources. More than 60% of irrigated land is irrigated by ground water resources. In 2001 per capita availability of water was 1820 cubic meter /p/year and it is going to 1341 and 1140 cubic meter/p/year in 2025 and 2050 respectively. The population of India is going to 1.6 billion by 2050 and required food to feed them is going to be 500 million tones./capita availability of land would be 0.14 hectare in 2050. 10-40% of the crop will be lost by 2080-2100,so these way India is going to be water stressed and food stressed country in future if we do not care our water resources this time. For growing 500 million of tones food we require 628-807 BCM and if we include other uses then the total requirement will be 970-1200 BCM and our total storage capacity is 315 BCM by today. Maximum part of river flows goes to sea water we have to connect the river to each other so that there water cannot move to sea we have to also increase our storage capacity we extracted 91% of ground water for agriculture purposes we have to increase our water management so that load on ground water decreases we can increase ground water level by rain water harvesting methods.

6. EFFECT OF CLIMATE CHANGE ON NUTRIENT OF FOOD, SOIL-MOISTURE, QUALITY OF WATER AND COASTAL REGIONS

Continuing change climate also effect the nutrient of the food the warmer climate ,higher co2 is linked with decrease in protein , mineral, lipid composition etc. according to taub.et at 2008wheat barley and rice grain can be reduce by 10-15 % .Change climate also effect in the moisture of soil. The warmer climate will increase the Evatranpotation and thus moisture in the soil will decrease .climate will also effected the quality of fresh water due to high velocity of river the water will be more contaminated .when the runoff will be more then it will erote the soil which is also a problem. Warmer climate will also increase the sea level and by the end of century sea level riseupto80-100 cm and 125 million people will be migrate 75 million only from Bangladesh and rest from coastal regions of India. Change climate will affected the human health because our food nutrient has continuing decreases and fresh water will be contaminated and people will also effected from the flood and drought condition. The Malaria, Dengue, and water related diseases can be increase in future such as Diarrhoea.

7. EFFECT OF CLIMATE CHANGE ON ALPINE ECOSYSTEM

Change climate also affected the alpine ecosystem and this region is important because 62% of medicinal plant species are from Himalayan region. Altitude plants which remains under the snow for long time which have good potential to serve as medicine

of chronic diseases. Due to changing of climate these species are shifting towards higher elevation where they can face competition for space as well as resources for survival of their life circle. Rain fall pattern, landslide, heavy snow fall, ultraviolet radiation, soil erosion etc. has adversely affected these ayurvedic plants. More than 650 temperate species have indicates the avg. advancement of 1.9days/decades in spring events and 1-4 days/decades in autumnal events. Grabherr et al.(1994) estimated that a 0.5˚C rise in temperature /100m elevation is lead for a theoretical shift in altitude vegetation belts at the 8-10m /decade. Out of 17000 species of higher plants 7500 known as medicinal plants.

8. EFFECT OF CLIMATE CHANGE ON BIRDS, AMPHIBIANS, REPTILES

There is an estimate that 600-900 land bird will extinct by 2100.population of reptiles has also affected due to increase temperature they are not surviving at places where they have survived last decades .They are migrating towards higher elevation. Increase temperature has disturb their biased sex ratio, which is not good in the point of view of their future growth. In study of America on painted Turtle it is found that at a 4˚C increase in temperature all females are changed to profound gender if these will actual happen in future then their population will finished. This indicates a serious problem and more researches required on this .advance breading is also a problem in Amphibians this is happening due to after one set of rainfall. Unusual rainfall is occurring at early summer season. Some of them starts breeding and drying of many streams before completion of process of metamorphosis of amphibians is happening so this poses a serious problem to both eggs and larva either they wash by heavy rainfall or finish before completing metamorphosis.

9. CONCLUSION

There is more researches required in the Himalayan region to under the changes in ecosystem and biodiversity. There is need to understand the changes in species which is continuing shifting towards higher elevation we have no idea that how long they will survive these way if they will not necessary changes in their life circle they will come in the category of extinct species . we should also focus on that places these species going and is there problem of resources and spacing arises or not. There is many nationwide programs is running on today to provide the fresh water to every required part of country. We should also accelerate our river linking project these is the only way to provide the water for various purposes in dried regions and we can control our annual runoff which is goes to sea by various rivers which is wastage of water. If we got success in this then stresses which is present on ground water resources. We do focus on rain water harvesting which is help in increase the continuing decrease ground water level. There will be humidity increase in future in air due to increase rate of evaporation due to it carbon content in tress will increase which will affect the animals which is dependent on trees, there is researches required in this field .Now this time medicine field problem due to developing resistant property against

antibiotic there is need to develop knowledge in the field of phages therapy which can be a better solution.

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