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Role of anthropogenic intervention in degradation of vegetation and soil in Shiwalik foothills of District Ropar, Punjab

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Abstract

The purpose of this paper is to emphasize on the degree of environmental degradation being caused by anthropogenic intervention in the natural region of Shiwalik foothills and save the region from further deterioration. The study in this paper is conducted in district Ropar of Punjab, covering hilly to sub hilly regions of Anandpur Sahib, Kiratpur Sahib, Bharatgarh and Ropar. Survey was conducted to investigate the vegetation pattern and soil profile particularly erected from the base of hills to the height of 250-550ft. from foot of hills covering base camps. Himalayan regions are under high degree of pressure due to excessive exploitation of natural resources above the carrying capacity of the region. Deforestation is being carried out at a much faster rate than natural regeneration process of these trees. Large scale erosion, loss of biodiversity, construction of roads and dams, industrialization and siltation further intensify the problem. Moreover these factors lead to many natural disasters in the region like landslides, floods, forest fires etc. which leads to crores of loss of country in form of life and property. So, these problems are to be seriously dealt with before it is too late.

Key Words: Biodiversity, Conservation, Deforestation, Floristics, Forests, Shiwaliks, Vegetation, Siltation.

Introduction: Shiwaliks posses irregular height and shape and considered to be newly evolved. Hill tops are uneven, possess friable soil and vegetation systems. Steep slopes and clefts are also the significant features of these hills (Malik, J. N. *et. al.* 2014)[8]. These hills continue from north-west to south-east direction in India and expand upto a length of about 1000 km between the east longitudes of about 72°-30' to 81°. Longitudinally, the Shiwalik hills can be divided into Punjab Shiwaliks and Kumaon Shiwalik. Punjab Siwaliks extend from Indus to Sutlej whereas Kumaon Shiwaliks covers the region from Sutlej to Kali. Shiwalik belt differs in girth from about 280-650 km between north latitudes of about 29°-37' and spans from west to east mainly in the states of Jammu & Kashmir and Himachal Pradesh and the hilly to sub-hilly regions of Punjab, Haryana and the Uttar Pradesh (Dogra, A.S., 2000)[5].

Punjab shiwaliks comprise of only a few districts out of which District Ropar, also known as Roopnagar occupies a prime position due to its badly depleted and mutilated natural forests.

District Ropar, also known as Rupnagar, lying on the South- East part of the state, comprises of four forest ranges, i.e. Rupnagar, Chamkaur Sahib, Anandpur Sahib and Nurpur Bedi.

Nurpur Bedi and a small portion of Anandpur Sahib is on the right side of river Sutlej whereas the remaining major part of Anandpur Sahib, Rupnagar and Chamkaur Sahib are located on left side of Sutlej river. (Agarwal *et. al.* ,2002)[1]. Vegetation of the area can be divided into two major forest types i.e. the Scrub Forest in hill and foot hill areas. (Champion & Seth, 1968)[4].

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Majority of the forest areas of this district lie in the ecologically feeble Shiwalik belt and are under various stages of land degradation. Due to its crumbly and brittle constitution, the area suffers from frightful soil-erosion caused by biotic intervention and paucity of natural regeneration. The forests of this area quite important from the point of view of conservation and constant attention and efforts are needed to conserve the vegetation and soil of this area (Jerath *et. al.* 2006)[7].

Practical Implications of the Study:

Biodiversity conservation and management can be considered as a most important concern of this Himalayan region. Conservation of biodiversity is the utmost need of the hour. A management strategy should be prepared for the area which contains three regional level obligations:

(1) To reduce the extent of human interference, which is galloping the indispensible natural resources of this ecologically rich region.
(2) To use biodiversity in sustainable manner, and
(3) To save our forest wealth and share the benefit of biological diversity.

Materials & Methods

The present study is conducted in Punjab covering hilly to sub hilly regions of district Ropar of Punjab in the total length of about 80 km covering upto 5 to 20 km interior of hills. The low hills of, Anandpur Sahib, Kiratpur Sahib, Bharatgarh and Ropar were surveyed to investigate vegetation pattern and soil profile particularly erected from the base of hills to the height of 250-550 ft. from foot of hills covering base camps.

Review of Literature:

Forest form an indispensible part of our nation's wealth and ways should be devised to (i) make utmost use of these natural assets for the maximum benefit of maximum number of people. (ii) Judicious use of remaining forest wealth; (iii) Proper usage of land and utility according to the prevailing climatic condition. Due to indiscriminate and chaotic forest operations in the past, much could not be achieved for human welfare or for establishment of ample forest resources. Forest research needs to be taken up in a gigantic way (Sehgal, J. *et. al.* 1992)[11].

Now the Shiwalik Foothills are found to be faintly forested but according to Puri (1949)[9] they apparently carried a lush green vegetation in the preglacial times as evident from the luxuriant flora and fauna discovered from broad and distant localities in them. The present day status of flora and fauna reveals that much has been depleted more so in the last 200 years (Randhawa, 2015)[10].

Fertility of soil, climate of hills and water availability are all dependent on forests and its type. Large amount of fertile top soil is eroded, much of which reaches the nearby streams and rivers. A good fraction of this silts up irrigation networks and rivers. Nutrients equivalent to about 5.4 millions tons of nitrogen, potash and phosphate are lost annually in the country and their monetary value is predicted as Rs. 700 cores (Bennet 1999; Bhutani, S. and Goel, S., 2011)[2],[3].

The rivers rising in the Shiwalik foothills in the Ropar district carry a large volume of soil material and other detritus especially during monsoon period. The amount of soil and detritus carried differs depending on the land use pattern in each catchment. The silitation data recorded at the Bhakra reservoir shown an annual loss of capacity of Bhakra reservoir as 4,41,99,700 cube meters. (Ethertington 1976)[6].

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Findings:

The population of the region is almost entirety rural and about 95% of the people live in villages. They are predominantly agriculturists. Their wants with respect to agricultural pursuits consists principally of wood for implements, lopping for fodder, litter, for grazing of their cattle. Timber is required for houses and fuel for domestic requirements. Consequently, the forests form an integral part of the economic fabric of the population. In the hilly tract of their region, particularly in Talwara, Anandpur Sahib, Kiratpur Sahib and Bharatgarh, the soil especially, at higher attitudes, is poor and stony and the slopes are too steep for economic farming. In certain areas of Anandpur Sahib , Bharatgarh and Kiratpur Sahib, agriculture is being carried out even at higher attitudes which is without any sources of irrigation and totally dependent on rain. The natural consequences is that the food produced locally is insufficient to meet the local requirements in spite of the fact that almost all cultivated land has been brought under plough. Population cannot live on agriculture alone and they are rearing and depend upon large herds of cattle and flocks of sheep and goats. The pressure of grazing is increasing day by day. Unrestricted heavy grazing in village waste lands, adjoining habitations and cultivated lands has rendered them unstable and liable to erosion.

A glance at Dashmesh Academy road, Anandpur Sahib and nearby historical places both at Anandpur Sahib and Kiratpur Sahib reveals high level of deterioration of vegetations due to cutting and overgrazing. On Academy Road, the overgrazing has increased to such an extent that the vegetation has eventually disappeared. People of area forced their old unproductive cattle into forests near to them. Hungry animals eat young herbs and grasses, often eradicate whole plant from their roots destroying their life span and in turn leading to high level erosion. This erosion in turn leads to a number of landslides in these areas. Such landslides are a common view on Nakian projects, Daroli, Academy road, Anandpur Sahib Road and Guru Ka Lahore area of Anandpur Sahib.

Choes have become seasonal and dry up during summer season. Himalayan foothill has undergone irreparable damage due to human interference in the recent years, as a result of which number of disastrous effects such as degradation of vegetations, degradation of land due to soil erosion, scarcity of drinking and irrigation water, flooding of rivers or drought, siltation of dams, scarcity of firewood and fodder, landslides and floods etc. are being experienced.

The protective cover of forests and the humus absorbs rain water and release it slowly over a long period. Now, as this protective forest cover and its humus is disappearing in this regions, no protection mechanism prevails, and the entire rain water is swept away to the stream and rivers in one long gush carrying with it millions of tonnes of silt. As a result soil fertility in this region is going down drastically. The once perennial streams now dry up soon after the monsoon ends as is being experienced by the people of Ropar District. In several villages, even now women have to walk miles to get drinking water during May-June. As we move from Anandpur Sahib to Ropar through Kiratpur Sahib many riverlets on the way have completely dried up and they remain dry almost throughout the year, which is quite unprecedented. In Ropar district too, the river carry much less water during the summer month and most of them remain dry for longer period as in Sarsa Nangal, Mindwa, Ranginpur, Brahampur, Jindwari, Daroli siphon etc.

Precipitation falling over wide catchments and drained through river Sutlej and Ghaggar create frequent flood hazards in the Punjab and Haryana Plains plains and there is hardly a year that went without floods before 2009. But 2010 onwards the rain become scattered throughout the years. A flood was experienced in Nangal in 2008 which led to huge loss of life and property in the area. Frequency of floods is increasing year after year. Even in2009, choes in foothill region of Hoshiarpur were in spate and caused huge loss.

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Forest Fires are also a very common occurrence in the area. A number of forest fires were experienced in various areas like Kiratpur Sahib, Bela, Anandpur Sahib, Nangal and Bhatoli in May- June 2017.

The consumption of natural resources such as fuel wood, fodder and timber has increased highly as compared to the regeneration rate of these resources. Extensive clearances of forests, expansion of agricultural land, built-up land and road network have become a major problem in the region. This has resulted in severe loss of biodiversity in the region.

Altogether, it has caused disappearance of many floral species and some species are facing various degrees of threat of extinction. This drastic loss of biodiversity further leads to a number of ecological disasters.

Young trees have been axed for firewood, which further deteriorates vegetation because juvenile trees could not approach reproduction system. It has been determined during previous years that large scale degradation of vegetation was carried out in open places and enclosed areas in particular among hills beds. Situation even worsened due to removal of trees even by theft. Moreover, due to less recorded rain fall during previous years there was an overall fall in vegetation of forests. Although trees of *Accacia. Delbergia, Eucalyptus, Mangifera* and *Delbergia* in certain pockets of Talwara, Daroli, and Bharatgarh persist their growth but open hill slopes still support scrubs spiny and non-spiny plants.

There is natural regeneration of *Delbergia, Adina, Acacia* over the period. But human interference continuous unabated, unplanned and unorganized for firewood in Talwara, Bhakra road, Una, Zindwari, Nainadevi area, Nakian, Gaj, Thalugh, Gardley and afforested trees of *Acacia, Adina , Cassia* etc, leads to marked change in vegetation pattern. It is most important cause for fast depletion and serious degradation of natural forests near Una, Guru ka lahore, Kotla, Gambirpur, Suraval and Anandpur Sahib. Inspite of forest area under deforestation due to biotic interference and failure of afforestation or reforestation schemes situation is still alarming as far as stable forests are concerned. Before start of rainy season locals liberately set fires dry vegetation presuming that it will grow much faster.

Protection cover of forests and the humus absorb rain water and due to this humus disappear, no regulatory mechanism remains, and rain water is swept away to the sea in one long gush, carrying millions of tons of silt. Soil fertility in the hills goes down drastically the once perennial streams dry up soon after the monsoon ends, as is increasingly experienced in Ropar district. In several villages, men now walk far away to get their drinking water. Many streams choes have dried up which is something unprecedented. In the plains the rivers carry much less water during the summer months.

The rivers rising the North West Himalayan Foothill region carry a large volume of soil material and other detritus particularly during the monsoon period, in each catchment. The siltation data recorded at the Bhakra reservoir has shown that 26,51,98,200m^3 of silt has been deposited during the first six years of its installation, giving an annual loss of capacity of the Bhakra reservoir as 4,41,99,700m^3.

Precipitation falling over wide catchment and draining through the rivers created frequent flood hazards. Earlier such floods left behind an annual legacy of over Rs. 300 crores of damage to crops, animals, houses and public works. The problem of protection and proper land use of Himalayan catchments, therefore, assumes a very important significance.

Not only this, the persistent pressure of the ever increasing population on the forests is posing a serious problem in the region. There is a demand for felling of *Acacia modesta* and *Dalbergia sissoo* forests for starting orchards and the heavy lopping of *Acacia modesta Dodoneae viscosa* and *Dalbergia sissoo* for the large number of unproductive cattle are serious problems. Extensive areas have been rendered bare and reduced to waste land especially in Bharatgarh,

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Dashmesh academy road and religious places of Anandpur Sahib and Kiratpur Sahib and soil erosion is rampant in these areas. Grazing grounds have deteriorated in quality and hunger for more land for cultivation and pasture continues especially in Bharatgarh areas.

Recently, in august 2017, people of village Talwara, district Hoshiarpur, witnessed the plundering pillaging of this ecologically rich forest land in this foothill region continuously for four months. Unabated mining in the area by earth movers removed the top fertile subsoil , making the region vulnerable to flash floods as well as landslides. As the land mafia plundered the forests in this shiwalik foothill region for cobblestone, the activity of stone crushers between the acclivities swallowed the hills round the clock. Not only this, the tippers and other huge machines, growling day and night, disappeared the link road laid under Pradhan Mantri Swayam Rozgar Sadak Yojna.

Dry spell of Sarsa stream showing stones lie open.

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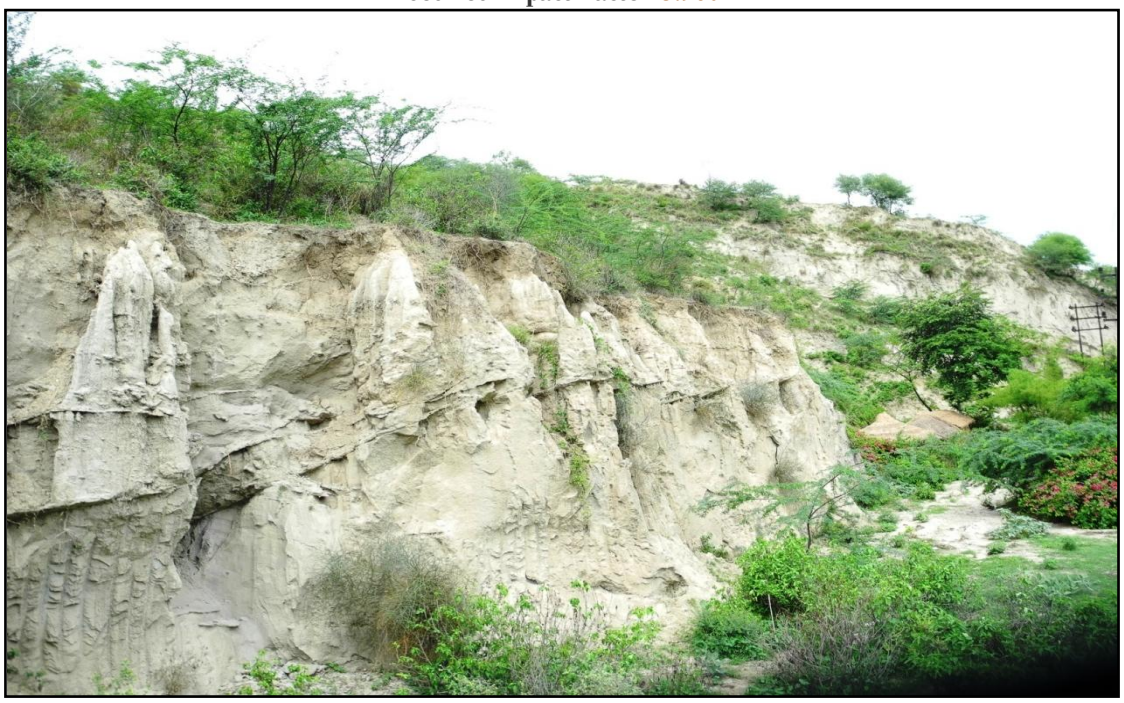

Large Scale Sheet Erosion near Guru ka Lahore Area forming vertical ridges.

View of vegetation at Bela after a Forest fire

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Conclusion & Recommendations:

The cutting of trees for timber, fuel-wood and uncontrolled grazing are mainly responsible for altering the botanical composition of the area and drastic reduction in the forest area. So, the findings of the present study reveal that the soil and vegetation of the shiwalik foothill region is undergoing high level of deterioration due to anthropogenic interference.

The community structure has been significantly disturbed in terms of floristic composition, and tree population structure, which in turn has led to thinning of the vegetation cover in the area.

The devastation caused by human interference has reached to such an extent in this area i.e. low and foot hills of Ropar, that our approach should be not only to save the areas from further deterioration but to adopt reclamation practices like afforestation and grassland improvement.

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