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Conservation and Development in Great Himalayan National Park-Western Himalaya

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ABSTRACT

Great Himalayan National Park (GHNP) located in the western part of the Himalayan Mountains in the northern Indian State of Himachal Pradesh is characterized by high alpine peaks, alpine meadows and riverine forests. Established in 1984 it is a part of Himalaya biodiversity hotspot and includes twenty five forest types along with a rich assemblage of fauna species including approximately 31 mammals, 181 birds, 3 reptiles, 9 amphibians, 11 annelids, 17 molluscs and 127 insects several of which are threatened. Brightly plumed highly endangered and globally threatened pheasant western tragopan or western horned tragopan (*Tragopan melanocephalus*) is endemic to this region. The UNESCO World Heritage Site Committee granted the world heritage status to the park under the criteria of "outstanding significance for biodiversity conservation". Various developmental activities including building of hydro electric projects, over exploitation of forest resources are putting greater pressure on the park there by threatening the fragile ecosystem of the park. Present paper discusses the issues and challenges in conservation and development of GHNP.

Key words: Biodiversity, Western Tragopan, Conservation, GHNP, World heritage site.

INTRODUCTION

Biodiversity means 'the variety and variability among living organisms from all services including inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complex of which they are part, this includes diversity within species, between species and of ecosystems (UNEP 1992). Biodiversity is valuable because humans cannot know what will be an asset in the future, because variety is inherently interesting and more attractive and because our understanding of ecosystems is insufficient to be certain of the role and the impact of removing any component. Also biodiversity is a fundamental condition for life itself.

The increase in depletion and extinction of world biodiversity has led to a greater interest from global community to protect the environment and safeguard natural habitats and thousand of species (Burgess 2012). In developing country like India factors like growth and development of rural and urban areas, industrialization and its effects, along with high population growth rate has added extra pressure to both country's biodiversity and natural environment.

Conserving or preserving biodiversity no longer just means maintaining a given number of species on a particular plot of ground but rather has come to mean 'ensuring that each of these species continue to play its unique role in ecosystem (Wright 1996). Conservationist therefore have concluded that managing the landscape for the greatest good of the greatest number of people require protected areas like national parks and nature reserves as well as more ecologically sensitive management of the landscapes (Wright 1996) . Protected areas have become important and necessary for the protection of entire ecosystem

and the safeguarding of vital ecosystem services. These areas are no longer only a life line for rare and endangered species but they also provide a space where species may live and grow together in their natural habitats. Protected areas like national park therefore have an important role in conservation of areas and safe guarding biodiversity (Rands *et al*., 2010) .With the loss of biodiversity globally more and more ways of protecting their precious resources will be necessary and one of the ways of doing this is establishing protected areas like national parks.

Under the IUCN's category system for protected areas the IUCN lists national Park under category II and describes national park as "protected areas managed mainly for ecosystem protection and recreation (Eagles and Mc Cools 2004). Category II protected areas are large natural or near natural areas set aside to protect large scale ecological processes, along with the complement of species and ecosystem characteristics of the area, which also provides a foundation for environmentally and culturally compatible, spiritual, scientific, educational, recreational and visitor opportunity (Dudley 2008) . The primary objective of national park is to protect natural biodiversity along with underlying ecological structure and supporting environmental processes and to promote education and recreation (Dudely 2008).

Fig. 1 Map of Great Himalayan National Park (GHNP).

The Himalayas have ever since been man's quest for knowledge, peace, adventure and needs. Indian Himalayan Region is repository of biodiversity. The Great Himalayan National Park is situated in Banjar tehsil of Kullu district of Himachal Pradesh, the Himalayan state of India (between 31°38'28''N and 31°54'58''N and 77°20'11''E and 77°45'00''E) and lies between 2000m and 5500m above sea level (Singh *et al*., 1990). The park being a major repository of the western Himalayan biological diversity was constituted as a representative area for the conservation of unique western Himalayan biodiversity. The park was notified by government of Himachal Pradesh under section 3591) of wild life protection act 1972 in 1999. The 754.4Km^2 (75440 hectare) area of the park has high mountain ridges and peaks under permanent snow in northern, eastern and southern sides. Human population exists only on the western and north-western boundaries. The western side is approachable only along bridle path. The park is contiguous with the Rupi Bhaba wild life sanctuary in south east, Pin valley national park in north east and Kanwara wild life sanctuary in north. A 90Km^2 (9000 hectares) Sainj wild life sanctuary divides the park into two equal parts. Tirthan wild life sanctuary 61km^2 (61000 hectares) exists on the southern tip of Great Himalayan National Park. These areas together form the great Himalayan national and conservation area. GHNP is a major source of water with four major rivers Tirthan, Sainj, Jiwa Nala and Parvati originating from the glaciers in the park. These rivers flow in the east west direction and flow into the river Beas (Mehra and Mathur 2001)**.**

Significance of Great Himalayan National Park

Great Himalayan National (GHNP) was declared national park under wild life protection act 1972 by govt. of HP in 1999. The GHNP is one of the most picturesque areas in the western Himalayas, well known for its equisite floral and faunal biodiversity and harbours the most important gene pool of western Himalayan floral and fauna biogeographically. It is located at the junction of world's two major faunal realms i.e. the oriental to the south and palearctic to the north (MacKinnon *et al*., 1986) making it an important site supporting several endangered mammals and pheasants. The area represents the typical situation of resources and people relationship and varied forestry, wildlife, ecological, socioeconomic and cultural values and practices. Recognizing GHNPs outstanding universal value UNESCO has accorded it world heritage status under the criteria of "exceptional natural beauty and conservation of biological diversity". UNESCO states "The GHNP is one of the most picturesque areas in the Western Himalayas, well known for its exquisite floral and faunal biodiversity. The charismatic Western Tragopan is the most spectacular among the pheasants and aptly named the king of birds. GHNP has one of the best populations of this bird across its range". GHNP is one of the globally important endemic birds area (D02: Western Himalaya) that has been identified by the ICBP biodiversity project (ICBP 1992). This national park is one of the two national parks in the world that is the home to the endangered Galliform- the western tragopan (Collar and Andrew 1988).

Biodiversity of Park

The climate of the Park is typical of the temperate and alpine regions of the Western Himalayas. The area experiences four distinct seasons *viz.*, Winter (December-March), Spring (April-June), Summer (July-September) and Autumn (October-November). Precipitation is generally moderate (1100-1500 mm) with snow fall occurring throughout the Park in winter. Much of the eastern part of the Park is perpetually under snow.The altitude of the area ranges from 1800m to 5200m with the major part of the Park lying above 4000m. The terrain is characterized by numerous ridges, deep gorges and precipitous cliffs, rocky crags, glaciers and narrow valleys.

The GHNP has 17% of its area under forests. The low percentage of forest area is due to preponderance of high altitude meadows beyond tree line and the rocky and snow bound areas in the Park. The vegetation of the Park shows distinct altitudinal zonation and is representative of both temperate and alpine regions. The fourteen forest types of found in GHNP include - (i) Ban-oak forest (ii) Moist-deodar forest (iii) Western Himalayan mixed coniferous forest (iv) Moist temperate deciduous forest(v) Kharsu-oak forest (vi) Western Himalayan upper oak-fir forest (vii) Montane bamboo brakes(viii) Himalayan temperate parkland (ix) Himalayan temperate pasture (x) Western Himalayan sub-alpine fir forest (xi) Sub-alpine pasture (xii) Birch-rhododendron scrub forest (xiii) Deciduous alpine scrub and (xiv) Alpine pastures.

A total of 832 plant species belonging to 427 genera and 128 families of higher plants have been recorded within the Park (Singh and Rawat 1999). Of these 794 species are angiosperms, 11 are gymnosperms and 27 are ferns (Singh and Rawat 1999). The forest consists of extensive stands of Oak (*Quercus semecarpifolia*), coniferous forests of Blue Pine (*Pinus wallichiana*), West Himalayan Silver Fir (*Abies pindrow*), West Himalayan Spruce (*Picea smithiana*) and Himalayan Cedar or deodar (*Cedrus deodara*). The broad-leaf forests contain Horse Chestnut (*Aesculus indica*), *Rhododendron arboreum, Quercus leucotrichophora, Q. floribunda at* the lower altitude, and purepatches of Birch (*Betula utilis*) at higher altitude. Yew (*Taxus baccata*) is an important medicinal tree of the understorey. A rich variety of shrubs and patches of ringal bamboo (*Arundinaria spathiflora*) are found as a dense understorey. The shrubs of *Rhododendron campanulatum* form the Krummholz patch in the sub-alpine zone. Other shrubs that are found above 3700m are *Juniperus communis, J. pseudosabina, Lonicera, Berberis, Cotoneaster, Vibernum and Rosa.*

A preliminary study of herpetofauna of GHNP lists four amphibians *viz*., Himalayan toad *Bufo himalayanus*, *Bufo stomaticus,* Beautiful stream frog *Amolops formosus*, Stolickza's frog *Rana vicina* Stolickza and six reptile species *viz.*, Kashmir rock agama *Laudakia tuberculata,* Himalayan ground skink *Sincella himalayanus*, Karakoram bent-toed gecko or Kashmir rock gecko *Gymnodactylus Stolickzai*, Eastern keelback *Tropidonotus platyceps*, Indian rat snake *Ptyas mucosus*, Himalayan pit viper *Halys himalayanus*.

The Park falls within one of the globally important Endemic Bird Areas (D02: Western Himalaya) identified by the ICBP Biodiversity Project (ICBP 1992). The world conservation monitoring Centre has identifies western Himalayas as one of the centres of plant diversity and endemism in India and in need of urgent protection (WII 1999). A total of 183 bird species including 51 non passerines and 132 passerines have been recorded from this area [13]. This accounts for 72% of non passerines and 88% of passerines recorded in elevations above 1500m in the rest of the State. GHNP being one of the two homes in the world to Western tragopan, is also home to four species of pheasants, *viz.*, Cheer pheasant (*Catreus wallichii*), Himalayan monal (*Lophophorus impejanus*), Koklas (*Pucrasia*) and Kalij (*Lophura leucomelana*). The Western tragopan and the Cheer pheasant are endangered and the park has sizeable populations of the former. Other distinct bird species of the area includes Snow Partridge (*Lerwa lerwa*), Hill Partridge (*Arborophila torqueola*) and Himalayan Snow cock (*Tetragallus himalayensis*). Thirty-one mammal species, including two primate species, twelve carnivora, seven artiodactyla, three insectivora, six rodentia and one lagomorpha have been recorded from this area. This includes endangered species such as Snow leopard *Uncia uncia,* Asiatic black bear *Ursus thibetanus,* Himalayan brown bear *Ursus arctos,* Grey Goral *Nemorhaedus goral, Himalayan Musk* Deer *Moschus chrysogaster,* Himalayan tahr *Hemitragus jemlahicus,* Serow *Nemorhaedus sumatraensis.*

The flora of GHNP shows affinities with Mediterranean, Tibetan and Himalayan region. For example, *Valeriana jatamansi, Dactylorhiza hatagirea, Taxus baccata, Leycesteria formosaare typical taxa which* extends up to Afghanistan and west China. Other affinities that are met with here are in form of *Hippophae* of palaearctic region; *Cedrus deodara*, *Viola biflora*, and *Poa alpina* of mediterranean region; and *Euphorbia* of Peninsular India. In addition, the Himalayas have evolved a high proportion of their own endemic taxa, for example several species of balsams *Impatience, Androsace primuloides, Hedysarum cachemirianum, Draba lasiophylla, etc.* and Himalayan Tahr *Hemitragus jemlahicus* are well represented in GHNP. Occurrence of least disturbed temperate and alpine ecosystems in a geographical compact area, and inaccessible and rugged terrain representing the ecological, geomorphological and biological values of the North-west Himalaya make GHNP a significant

area for mountain biodiversity conservation (Pandey and Wells 1997, Gaston *et al*., 1981, Gaston *et al*., 1994).

Challenges in Conservation and development in GHNP

Conserving the biodiversity is a global challenge. For developing nation like India the confronting challenge is how to continue to develop the economy without having a negative effect on the environment. Protected areas like the GHNP can be the answer for the protection, preservation and propagation of the biodiversity. The young and fragile mountains of the Himalayas of which GHNP is a part command high conservation significance due to their floral, faunal, geo hydrological, ecological, socio-cultural and aesthetic values. Developmental activities adjacent to park boundaries can dramatically and significantly impact the environment in the park thereby affecting the flora and fauna of the region. Construction of hydro electric projects (Parvati hydro project stages I, II and III and Sainj hydro power project) in the area are a challenge to the conservation strategies. Energy is world widely acknowledged as a major and essential component for the economic progress and well being of people and country but loss of biodiversity cannot be compensated by economic growth. To meet the ever increasing water demand for energy and irrigation it must be ensured that it does not become a cause for decimation of forest areas, receding wildlife habitat and loss to biodiversity resources. Dams have significant and complex impact on the ecosystem of and area. Available literature worldwide, on the consequences of dam development have revealed that the impact of construction of dams on the environment are profound, complex, varied, multifaceted and mostly negative (Berkamp 2000, Graf 1999). By storing, diverting river or water dams alter the natural distribution and timing of stream flows, which changes the sediment and nutritive regime besides altering water chemistry and temperature resulting into profound impacts on the biodiversity and ecology of the area and also on the socio economic aspect. Long term changes in the environment raises concern. Development and construction of hydro projects especially in such biodiversity rich areas have great direct and indirect adverse effects on both the ecosystem and socio economic and cultural aspects. The construction of such dams require land clearing, anthropogenic disturbance in landscape, diversion and alteration of river having major effect on fish and aquatic life specially in case of migratory species, where they act as barriers. The other important impacts include change in sediment transport and water quality. From biodiversity conservation point of view filling of dam/reservoir result in permanent flooding of riverine and terrestrial habitat and the loos of these terrestrial habitats due to flooding are usually much more valuable than the aquatic habitats created by the reservoir (McAllister 1999). Number of changes right from diverting the course of river or water through large hydrant tunnels into the mountains, variability in discharge of water after construction and various other changes directly or indirectly influence a myriad of dynamic factors that affect the diversity of the area (Berkamp 2000). Construction of such hydrant tunnels have resulted in massive landslides in Sainj valley of the area in April 2017 due to massive leakage in the power project tunnel thereby resulting in evacuation of the families from the area. Apart from providing life's basic needs change in river flows influence livelihood, income and local migration. The dynamite blasting in the fragile mountains in the Sainj valley for the construction of dam and the tunnels has resulted in water to change its course through the rock crevices in the mountains thus adversely affecting the water aquifers causing natural water springs to dry up. These natural springs are the only source of water for drinking, irrigation and for their animals of the people living high up in the mountains in the Sainj valley and their drying up has adversely affected their lives and agriculture. Developmental activities in such protected areas should be allowed to a point only with limits. Further building of the zig-zag roads in the highly seismic zone (zone IV) of these fragile hills has eased the access to the national park of migrant labourers, people and adventure tourists and destroying the fragile ecosystem with no interest in conservation, exploiting the resources and sometimes causing irreparable damage.

Conservation strategy

Ever increasing population along with development has resulted in over exploitation of natural resources thereby having an immense impact on biodiversity. Development in its various forms is the biggest challenge in protecting environment and biodiversity conservation. Increasing threat to biodiversity has led to formation of number of protected areas –national parks, wild life sanctuaries, botanical gardens, biosphere reserves to enhance, conserve biodiversity and protect environment. Conservation is need based planned use of recourses. Conservation strategies need to involve integration of social and ecological considerations. National parks have a crucial as natural environmental protectors for natural growth and life of ecological processes and habitat but they also act as places of tourist attractions. With the hydroelectric projects in GHNP area and change in land use pattern for developmental activities, it has greatly affected the conservation strategies in the park. With huge influx of outside people in the area has put a pressure on the park. The effects both immediate and long term on the park due to the developmental activities have not been evaluated in

detailed by any agency nor has any comprehensive study been carried out (Pandey 2008). With no villages been displaced in GHNP its conservation represents a case of people's participation in eco development. The economy of the peoples living in and around GHNP is linked with its forests which plays a very crucial role in lives affecting their agriculture and livestock. The people are totally dependent upon these woods for their cash earning by selling the medicinal herbs which they have carried out for generations. The much priced and in demand morel mushroom locally called guchhi (*Alichela esculerta)* is a major commercially exploitable specie of medicinal herbs. With ever increasing demand of these herbs in market today the collection and selling of these products has increased in last decade. With influx of labourers and outsiders due to hydro electric project in the area has resulted in over exploitation of these valued herbs by these peoples for quick economic gains thus posing a great threat to their existence as some of these herbs are un-scientifically uprooted from the soil. In order to conserve, protect, minimise the loss to plant and also increase revenue of the native people there is a dire need to regulate the commencement and termination of the herb collection season. The encroachers and non right holders should be restricted from these activities to conserve the biodiversity of the park. For the eco development of the GHNP government and people participatory approach is required. The inclusion of real stake holders in the park resources will lead to better and effective management of the national park. The land settlements rights also need to be addressed by the government for the protection of the park else it will remain an area of open access, vulnerable to intrusions and developmental activities (Saberwal and Chhatre 2001). People awareness and local peoples participation is imperative in conserving the GHNP biodiversity that will lead to better monitoring of all such activities that are prohibited in the park.

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