Flora –

1. Status of collection, conservation, trade, and potential for growth in sustainable use of major medicinal plantspecies found in the Great Himalaya National Park and its environs in Kullu District of Himachal Pradesh. Consultant Report. Wildlife Institute of India. Dehra Dun.
   V. Tandon (1997).

   Study concluded that herb collection is the most important income related activity based on use of natural resources for most HHs in the GHNP's Eco-development zone. Cultivation of medicinal plants commercial or otherwise in the area is not done. Trade in medicinal plants is the most important (and biggest) component of NWFP trade in the area. Estimated at Rs 112 lakhs per annum for the eco-zone alone. At least upto 70 % of the 1600 HHs in the Eco-development zone, including women & children, in the eco-zone are involved in herb collection for some time in the year. There is substantial unrecorded illegal collection and trade in medicinal plants in the area. Many of the species collected in large quantities are threatened in the wild with threat categories ranging from Critically Endangered to Vulnerable. Herb collection being the biggest pressure on the park also becomes the source of the biggest disturbance and adverse impact on the park's ecosystem.The village communities, especially the collectors, are unorganised, without any stable village level organisation or groups.

2. Taming the wild plant trade in Great Himalayan National Park, India. Forest Research Education and Extension Project-Great Himalayan national Park (FREEP-GHNP), Research project Wildlife Institute of India, Dehradun.
   M. DeCoursey (1997).

   Study discuss a strategy for sustainable management of the wild plant trade in GHNP including the following key recommendations:
   - Reduce the number of collectors by determining who are the legitimate users and granting them exclusive access in exchange for management and protection.
   - Improve the sustainability of the current trade through improvements in harvesting, processing and marketing.
   - Focus on areas with a history of intensive use (Thaches and villages forests) to reduce dependence on high quality sites and critical habitats.
   - Legitimize the current trade in order to make it more transparent and easier to manage. Involve all the primary stakeholders as partners in participatory management.
   - Catchment-based & Careful Species Selection.

3. Assessment of Herb and Mushroom Collection in Great Himalayan National Park Conservation Area, Kullu District, H.P.
   V. Sharma (1998).

   The list of herbs collected was identified by interviewing the key resource persons . Estimates of the quantity collected per household in one season was also studied. Each household collects only 1 or 2 specific herbs in a given season . Data about the use of various herbs and methods of local processing were also collected. This list includes both herbs that are sold as well as herbs that are used in making local medicines or for religious purposes. Herbs are collected in two areas : One from forest and areas around the village and the other from alpine pastures [Thaches]. The herbs from around the village are usually collected by all family members while thaches are visited for fixed periods by only the young men. The thaches from where the herbs are collected and the months during which collection takes place are given in Table 2 and 3. The herbs collected from the thaches and those collected from nearby forest / villages are given in Tables 4 & 5 respectively. Herbs are available and can be collected only in specific seasons. The seasonality of availability and collection of herbs in the Sainj valley is also given.

4. Long Term Monitoring of Vegetation in Great Himalayan National Park. Report, FREEP-GHNP Research Project, Wildlife Institute of India, Dehra Dun.
   S.K. Singh and G. S. Rawat (1998).

   Based on the floristic inventory made so far (Singh & Rawat, unpublished), authors have confirmed the occurrence of 816 species belonging to 402 genera and 125 families and the breakup of these are given in the report. Circular plots, Nested plots & Four-square plots are used for monitoring the vegetation. Monitoring of Population Structure of Tree Species, Monitoring Bamboo, Monitoring of Medicinal Plants, Monitoring Endemic Plants & Mushroom Monitoring was done in the study.

5. Assessment of Floral and Habitat Diversity, and Collection of Base line data to Monitor Vegetation of GHNP Conservation Area.
   Sarnam Singh (1999).

   Satellite data provide synoptic coverage of the land features. Therefore, it had advantages over traditional method of vegetation mapping. Vegetation maps provides locational information and area can be estimated. Interpretation of images has been using standard methods of visual interpretation as per the classification scheme mentioned above. The map was available for the other researchers for their use.

6. Floral Diversity and Vegetation Structure in Great Himalayan National Park, Western Himalaya, Final Report, FREEP-GHNP Research Project, Wildlife Institute of India, Dehra Dun.
   S.K. Singh and G.S.Rawat (1999)

   The vascular flora and vegetation, along with the factors affecting them, were studies in Great Himalayan National Park. This investigation gives first-hand information on the floristic structure, community composition, anthropogenic pressure and status of various rare, endemic and valuable plant taxa of GHNP. Surveys of vascular plant species (Angiosperms, Gymnosperms and Ferns) were conducted in different habitats and seasons. Importance Value Index (IVI) of trees were described calculated to describe community structure of trees. A total of 832 species belonging to 128 families and 427 genera of higher plants were recorded Within the Park.

7. Lichen Flora of Great Himalayan National Park. Final Report, FREEP-GHNP Research Project, Wildlife Institute of India, Dehra Dun.
   Upreti D.K. (1999).

   *Paper not found

8. Contribution to the bryoflora of Great Himalayan National Park, Kullu, Himachal Pradesh IV: Genus *Porella* (Porellaceae)
   S.K. Singh and D. K. Singh (2006).

   Eleven species of the genus *Porella* L. have been described from the Great Himalayan National Park, Kullu, Himachal Pradesh. *Porella hattorii*Udar&Shaheen and *Porella variabilis* (Kashyap) Kachroo are new records for the state of Himachal Pradesh. A conspectus of the species under the genus in India has been provided.

9. Structure and composition of woody vegetation along the altitudinal and human use gradients in Great Himalayan National Park, North-western Himalaya.
   G.S. Rawat and S.K. Singh (2006).

   Objectives of the study were to characterize the broad physiognomic units in term of community structure and composition along the altitudinal gradient and to assess the impacts of anthropogenic pressure on the vegetation. Dominance, diversity, richness

and evenness of woody species have been compared among varies eco-climatic zones and suggestions for monitoring the vegetation have been given.

10. Diversity in Liverworts and Hornworts of Great Himalayan National Park, Western Himalayan, India
D.K. Singh and S.K. Singh (2008).

Systematic taxonomic studies carried out in the park since March 2001 revealed the occurrence of 92 species in over 39 genera and 23 families of liverworts and 5 species belonging to three genera and two families of hornworts from the study area. This accounts for about 11.3 per cent of the total Indian liverworts and hornworts in just about 0.04 per cent of its geographical area. This includes 27 species recorded for the first time from Himachal Pradesh during the course of these studies. The Sainj valley, with 86 species shows maximum diversity, whereas Tirthan valley accounts for only 63 species.

11. Hepaticae and Anthocerotae of Great Himalayan National Park and its environs (H.P.), India.
S.K. Singh and D. K. Singh (2009).

The book provides the taxonomic account of 99 taxa belonging to 42 genera and 25 families of Hepaticae and five taxa belonging to three genera and two families of Anthocerotae. This includes three species and one variety described as new to science, four species and one sub-species recorded as new to India, one species new to Himalayan region, 12 species new to the Western Himalaya and 27 species recorded for the first time from the state of Himachal Pradesh during the course of these studies.

12. Structural parameters of woody elements in Wildlife Sanctuary, Sainj under GHNP, Kullu, Himachal Pradesh.
P. Kaushal, A. K.Gulhati, H. P. Sankhyan, Sunil Kumar, J.P.Sharma (2012).

Ecological status of flora in Great Himalayan National Park (Wildlife Sanctuary-Sainj) was undertaken to evaluate the plant biodiversity of Great Himalayan National Park Conservation Area (GHNP-CA) in Kullu district representing the biogeography zone-24 in North West Himalayan. A total of 832 plant species belonging to 427 genera and 128 families of higher plants were recorded within GHNP. During the vegetation survey of Wildlife Sanctuary, Sainj in different altitudinal zones, 28 species of trees were recorded. Some species of trees viz. *Picea smithiana*, *Pinus wallichiana* and *Abies pindrow*, were dominant species between the altitudes from

1500 m. to 3500 m. whereas, the species, *Prunus cerasoides, Morus alba, Hippophae salicifolia* and *Prunus* species are sparsely present in this area. The altitude from 3000-3500m, showed the highest concentration of dominance and species diversity. The altitude from 1500-2000m showed the highest richness and the highest evenness between altitude 2500-3000 m. It is also concluded that total number of species decreased with increase in elevation and diversity index value was high in lower elevation in comparison to higher elevation.

13. Vegetational analysis of woody elements in Tirthan Wild Life Sanctuary under Great Himalayan National Park (GHNP) Kullu – Himachal Pradesh. **H.P. Sankhyan, P. Kaushal,Sunil Kumar**(2014).

Vegetation analysis of woody elements of Tirthan Wildlife Sanctuary in Dist Kullu was undertaken to study the biodiversity of this area. During the vegetational survey of Wildlife Sanctuary. Tirthan in the different altitudinal zone, 23 species of trees and 18 species of shrubs were recorded. In the various altitudinal zones, the altitude 2500-3000 m, showed highest concentration of dominance, highest species diversity and also showed the highest evenness. The species *Celtis tetrandra* and *Taxus baccata* are the dominant species, whereas the species Abies pindrow, *Cornus macrophylla* and *Cedrus deodara* are sparsely present in altitude from 1500 to 3000 m.

14. Additions to the Flora of Great Himalayan National Park, Western Himalaya
G. Singh, Ishwari D. Rai, G.S. Rawat, G.S. Goraya& J.S. Jalal (2015).

A floristic survey was conducted in the Great Himalayan National Park (GHNP), Himachal Pradesh during in 2010-11. The survey resulted in addition of 66 species of Angiosperms belonging to 55 genera under 32 families. These belong to 1 tree, 13 shrubs, 2 climbers and 50 herbs. The information related to the flowering, altitude, habit and uses are also provided.

15. A contribution to the flora of Great Himalayan National Park, Himachal Pradesh, India
D.S. Das, D.S. Rawat, N. Shrivastava, K. Ambrish, B.K Sinha,P. Singh& S.S. Dash (2017).

The study deals with new addition to the flora of the Great Himalayan National Park (GHNP), located in Kullu district of Himachal Pradesh. A total of 39 unreported species under 26 families were recorded during the recent plant exploration from the Great Himalayan National Park. A brief description based on the field character, phenology, a note on distribution and ecology has been provided here for each species.

16. Status,distribution and conservation of Orchid in Great Himalayan National Park of Himachal Pradesh, North Western Himalaya.

V. Kumar, O. Prakash, A. Singh, M. Lal, S. Marpa, S.S. Samant & M. Bodh (2017).

Study finds a total of 21 species of Orchids representing 16 genera were recorded. Among the genera, *Cypripedium, Epipactis, Habenaria, Herminium* and *Platanthera* (2 species, each) were dominant. These species were found between 2428-3820 m amsl and represented the shady moist, alpine meadows/thatches, grassland, riverine, rocky, shrubbery and dry habitats. Of these, 08 species of orchids were recorded in temperate zone (1801-2800 m amsl), 07 species in sub-alpine zone (2801- 3800 m amsl) and 02 species in the alpine zone (>3800 m amsl).

17. Contribution to the Flora of Great Himalayan National Park,Himachal Pradesh, Western Himalaya-II.

D.S. Das, D.S. Rawat, B.K Sinha,P. Singh, D. Maity & S.S. Dash (2018).

This account of contribution is a sequel of additions to the flora of the Great Himalayan National Park (GHNP), Western Himalaya communicates additional 48 species of seed plants that are newly reported from the Park. All the species are enumerated alphabetically with brief description based on field character, phenology and local distribution pattern.

18. Addition to the Pteridophytic Flora of UNESCO World Heritage Site, Great Himalayan National Park, Kullu, Himachal Pradesh, Western Himalaya.

K. Kharkwal, S. Nautiyal, Rajnikant, K. Ambrish & B.K. Sinha(2019).

The study was conducted in the UNESCO declared world heritage site, the Great Himalayan National Park (GHNP), Kullu, Himachal Pradesh (India), during the years 2016-2018. The surveys resulted in additions of 14 new species of Pteridophytes belonging to 11genera under 07 families. The information related to the distributional status, habitat and an altitudinal ranges are also provided.

19. Ecological Assessment of Sub-Alpine and Alpine Orchids of Great Himalayan National Park in Himachal Pradesh, North WesternHimalaya.

A. Singh, S.S. Samant, S Naithani, V. Kumar, T. Barman (2019).

A total of 14 species representing 09 genera were recorded from the sub-alpine and alpine ecosystems of the GHNP, of these, 14 species of orchids were recorded between 2800-3200 m, 11 species between 3201-3600 m, 07 species between 3601-4000 m and 02 species above 4000 m. The inhabitants largely depend on forests for grazing and collection of fuel, fodder, timber, medicine, wild edible, and other economically important plants. Some of the orchid species namely, *Dactylorhiza hatagirea, Malaxis muscifera, Platanthera edgeworthii,* and *Gymnadenia orchidis* are extensively used in Traditional System of Medicine and are commercially exploited in the area. If over exploitation and habitat degradation continues, these species may become extinct from the wild in future. Therefore, long term habitat monitoring using standard ecological methods is essentially required to understand the response of the orchid species under anthropogenic and climate change scenarios.

20. Three new records for lichen biota of Himachal Pradesh, India.
Rajnikant, K. Kharkwal, B.K. Sinha, K. Ambrish, K. Bisht& G.P. Sinha (2019).

Three species viz. *Parmotrema saccatilobum* (Taylor) Hale, *Pyxine cocoes* (Sw.) Nyl and *Ramalina inflata* (Hook.f. & Taylor) Hook.f. & Taylor are reported new to lichens of Himachal Pradesh based on surveys conducted in GHNP. They are described with diagnostic characters, ecology and photographs to facilitate their identification.

21. Altitudinal variation of woody vegetation in Tirthan valley of Great Himalayan National Park at Kullu,Himachal Pradesh.
S. R. Mohapatra, HP Sankhyan, Sanjeev Thakur, SB Naik& K. Samantara. (2020).

The study was carried out in three different elevation i.e. lower zone (1500-2000 m.), mid zone (2000-2500 m.) and upper zone (2500-3000 m.) of Tirthan valley at Great Himalayan National Park. In every elevational zone, 12 quadrats of 30 m X 30 m (900 sq. m) size determined by species area curve method were randomly laid to study tree species. In each quadrat, a sub-quadrat of 5m X 5m (25 sq. m) size for study of shrubs was laid. The generic spectrum of vegetation in Tirthan valley of Great Himalayan National Park comprised of 113 woody elements which included 58 tree species and 98 shrub species. In Tirthan valley, number of forest species decreased periodically from lower elevation to upper elevation and mean density (Individual/ha.) of tree vegetation increased along elevation. Tree density (Individual/ha.) in Tirthan valley was 683.33, 758.34 and 816.67 for lower zone, mid zone and upper zone respectively. Whereas, shrub density (Individual/ha.) in valley was 2866.67, 1900, 1233.33 for lower, mid and upper zone respectively. In valley, *Pinus wallichiana* at lower zone (IVI 58.7), *Picea smithiana* at mid zone (IVI 50.43), *Quercus semecarpifolia* at upper zone (IVI 70.79) were the dominant tree species. In shrub layer of Tirthan forest,

dominant species at lower zone was *Desmodium triflorum*, at mid zone was *Indigofera heterantha* while at upper zone it was *Rosa sericea*.

22. Species richness patterns of different life-form along altitudinal gradients in the Great Himalayan National Park, Western Himalayan, India.
D.S. Das, D.S. Rawat, D. Maity, S.S. Dash, B.K. Sinha (2020).

The study was aimed to assess the distribution patterns of different life-forms along the altitudinal gradients in the Great Himalayan National Park (GHNP) situated in Kullu district of Himachal Pradesh (Western Himalaya, India). We prepared a checklist of flowering plants of the park (945 taxa, 470 genera, 188 families) using both primary (field surveys) and secondary data (earlier published literature) sources. The entire altitudinal range was classified into seven altitude classes. The presence/absence (1/0) species data matrix was prepared using local altitudinal distribution range of each species to investigate the similarity in species composition and patterns of life-forms across the seven altitudinal classes. The Cluster analysis classified the seven altitudinal classes into four distinct plant communities at different altitudes. Maximum similarity (43.77%) in species composition was recorded between 3000–3500 m and 3500–4000 m altitude classes. In terms of number of species, Asteraceae (101 taxa) and Potentilla (11 taxa) revealed as dominant family and genus respectively. The species richness peaks at middle altitude (1500–3000 m) in the GHNP. The phytoclimate of GHNP can be termed as 'phanero-therophytic' (4000 m) at different altitudes.

23. Marketing channel of medicinal and aromatic plants (maps) in the Great Himalayan National Park (GHNP), Kullu, Himachal Pradesh India
Manisha Gularia and Pankaj Gupta (2020).

The paper is based on the primary and secondary data collected from the selected pockets of Great Himalayan National Park (GHNP), where an effort has been made to study the marketing channel of MAPs trade in the villages of GHNP. In addition to this, comparative analysis has been done to analyse the market price discrepancy over the years mainly after restrictions imposed on collection of medicinal and aromatic plants and to assess the percentage market price change in some special status species of medicinal plants in the area

Fauna –

1. Preliminary observations on the Diversity of Butterflies (Lepidoptera : Insecta) in High altitude Grazing Pasture in Great Himalayan National Park.
   V.P. Uniyal and B.S Mehra (1996).

   Nine species of butterflies representing two families of order Lepidoptera, namely Pieridae and Nymphalidae, were recorded from different high-altitude pastures and adjoining forest areas in the Great Himalayan National Park during the post-rainy season. These pastures have been heavily grazed by the migratory flocks of sheep and goats prior to the field observations. Implications of seasonal livestock grazing resulting in lower butterfly diversity have been discussed.

2. A Study on the Species Diversity Among Selected Insect Groups, Technical Report, FREEP-GHNP Research Project, Wildlife Institute of India, Dehra Dun.
   V.P. Uniyal and P.K. Mathur (1998).

   The GHNPCA due to its strategic location, and large altitudinal variations (>1,500 m to 6,000 m) provide a diversity of habitats and associated flora and fauna. Thirty-two surveys of an average 10 days each during July 1995 to December 1997 covering different watersheds, 18 intensive study sites in three different seasons were carried out. Hand picking, aerial netting and light trap methods were employed for collection of specimens. Only six insect orders viz. Coleoptera, Hymenoptera, Diptera, Hemiptera, Odonata, and Lepidoptera were selected for the present study. Presently, the insect collection is housed at the Research Base Camp, GHNP, Banjar, Distt. Kullu. The selected six orders represented 37 families, 108 genera and 125 species among the specimens identified so far. The order Lepidoptera represented higher diversity in terms of 55 genera and 61 species among the six (6) orders investigated. This was followed by the order Coleoptera which had 41 genera and 47 species. Studied six (6) orders can be arranged in a descending diversity order as Lepidoptera - Coleoptera - Hymenoptera - Odonata - Hemiptera - Diptera. Out of 37 families, seven (7) families were found in wide altitudinal range (1,500- >3,500 m) while seven (7) families had a narrow distribution (1,500-2,000 m)

3. Conservation of Galliformes in the Great Himalayan National Park: A Review of Monitoring and Research Activity. Final Report, FREEP-GHNP Research Project, Wildlife Institute of India, Dehra Dun.
   P J. Garson. (1998).

A review of monitoring and research activity with the species of concern Western Tragopan *Tragopan melanocephalus*, Koklass Pucrasia macrolopha, Himalayan Monal *Lophophorus impejanus*, Cheer *Catreus wallichi* and White Crested Kalij*Lophuraleucomelanoshamiltoni.*

4. Diversity of Butterflies in the Great Himalayan National Park, Western Himalaya.
   V.P. Uniyal and P.K. Mathur (1998).

   About 50 species of butterfly belonging to 5 families and 13 subfamilies were recorded in this study. Habitat preference of various families were also studied in different forest types *viz.* broad leaved, conifer, mixed conifer and alpine area of Sainj sub-watershed of the Great Himalayan National Park.

5. Insects Monitoring in the Great Himalayan National Park, FREEP-GHNP Research Project, Wildlife Institute of India, Dehra Dun.
   V.P. Uniyal and Mathur, P.K. (1998).

   *Paper not found

6. Monitoring Mammals in Great Himalayan National Park, FREEP-GHNP Research Project, Wildlife Institute of India, Dehra Dun.
   T.R. Vinod and S. Sathyakumar (1998).

   Thirty-one mammalian species were recorded in the area by Gaston et al., 1981, out of which only 27 species were sighted during the study period. Monitoring of goral, Himalayan Tahr, musk deer and blue sheep might be helpful in assessing the habitat quality, provided direct effects such as poaching, and disease outbreaks have been minimal. The result obtained from this study indicate that encounter rate based on direct sightings and the scan method are feasible for monitoring gorals. The scan method is best for Himalayan Tahr and Blue Sheep, and silent drive count is most suitable for musk deer.

7. Assessment of Herpetofauna: Diversity, Distribution, Ecological Requirements and Responses to Human Activities in GHNP and WLSs.
   S.K. Dutta (1999).

   For the first time, the present study provides a preliminary list of species observed at the GHNP and other ecodevelopment areas. Due to short duration of study, it has not been possible to record all the species from GHNP. Hence, a compiled list of species which

are supposed to occur in the GHNP has been included in the present report. In addition, all the species known to occur in the Western Himalayan region has also been listed in the report. Photographs of some of the species obtained during the study period provides a visual clue to future identification of species.

8. Ecology and Conservation of Mountain Ungulates in Great Himalayan National Park, Final Report, FREE-GHNP Research Project, Wildlife Institute of India, Dehra Dun.
   T.R. Vinod and S. Sathyakumar (1999).

   Study on the ecology and conservation of ungulates namely goral (*Nemorhaedus goral*), Himalayan musk deer (*Moschus chrysogaster*), Himalayan Tahr (*Hemitragus jemlahicus*), in Great Himalayan National Park, Kullu district, HP, was conducted from January 1996 to November 1998. An intensive study area of ca. 90 km2 was selected in the Southwestern region of the Park, which represents various ecological zones of the Park. The objectives of the study were (i) to determine the status, relative abundance and distribution of mammals in GHNP, (ii) to estimate the abundance and density of goral, Himalayan musk deer & Himalayan Tahr in relation to human use, (ii) to determine the group size, composition & sex ratio of these animals, (iii) to study the habitat use pattern and (iv) to identify and discuss conservation issues, mitigation measures and to develop a long term monitoring programme. Thirty-one mammalian species, which are representative of six orders viz., Primates (two species), Carnivora (12 species), Artiodactyla (seven species), Insectivora (three species), Rodentia (six species) and Lagomorpha (one species) were recorded in the area. Current status, distribution and abundance of all the species have been discussed.

9. Ecology and Conservation Status of the Pheasants of Great Himalayan National Park, Western Himalaya. Final Report, FREE-GHNP Research Project, Wildlife Institute of India, Dehra Dun.
   K. Ramesh, S. Sathyakumar and G.S. Rawat. (1999).

   The present study focussed the old gaps and aimed to help the managers with adequate scientific information needed for management and conservation-oriented actions. This study was conducted from April 1997 to June 1999 with the major focus on ecology and conservation status of the pheasants. Although data were collected on all the pheasant species that occur in the Great Himalayan National Park (GHNP), intensive work was concentrated on only three species viz., Western Tragopan (*Tragopan melanocephalus*), Himalayan Monal (*Lophophorus impejanus*) and Koklass (*Pucrasia macrolopha*)

10. The Parvati and the Tragopan: Conservation and development in the Great Himalayan National Park. HIMALAYA

V. K. Saberwal and A. Chhatre(2001).

In 1999 villagers in the Kulu valley in the state of Himachal Pradesh in northern India lost their ancestral rights to graze animals and collect medicinal plants in the area. This blow to their livelihood resulted from the creation of the Great Himalayan National Park, which carved out a vast area for wildlife conservation at the expense of resource use by local residents. However, after excluding villagers from the Park, a part of this protected area was released for the construction of a hydro-electric power project. In this paper we first document the seeming contradiction in the government's apparent conservation agenda; local livelihoods appear expendable in the interests of biodiversity conservation, but biodiversity may be sacrificed for national development. In the latter half of the paper we explore the nature of conservation and development politics, particularly as mediated by electoral considerations of the ruling government.

11. New and significant records from the Great Himalayan National Park Himachal Pradesh, India.
H.S. Sangha (2005).

The Great Himalayan National Park (GHNP; Himachal Pradesh, India), represents the best example of undisturbed west Himalayan temperate forest and falls within one of the globally Endemic Bird Areas (DO2: Western Himalayas) identified by the ICBP Biodiversity Project (Gaston et al. 1994). But the birds of GHNP have not been exhaustively surveyed. Both Babault (1920) and Whistler (1926) visited Parbati Valley, a day's walk from the park boundary and Wynter-Blyth (1952) passed through Tirthan Valley, not far from the park. There is no published account reporting birds from the actual park area, except by Gaston et al. (1994). The purpose of this note is to update published information on the avifauna of the park with additional records from birdwatching trips to the Tirthan Valley during 16-20.vi.2002 and 13-24.iv.2003. Four birds *viz.* Cinereous Vulture *Aegypius monachus*, Shikra *Accipiter badius*, Plum-headed Parakeet *Psittacula cyanocephala*, House Swift *Apus affinis* were reported as new records.

12. On a collection of Pleurostict Scarabaeidae (Coleoptera) from the Great Himalayan National Park, Himachal Pradesh, India.
K. Chandra and V.P. Uniyal (2007).

The paper incorporates faunistic record of a small collection of Scarabaeidae comprising three species of Melolonthinae, two species of Rutelinae, three species of Dynastinae, and one species of Cetoniinae from Great Himalayan National Park under Forestry Research Education and Extention (F.R.E.E.) Project.

13. Methods of capture and Radio Tracking of Western Tragopan *Tragopan melanocephalus* J.E Gray1829 in the Great Himalayan National Park, India. **K. Ramesh, S. Sathyakumar and G.S. Rawat.** (2008).

Attempts were made to capture and radio track the Western Tragopan (Tragopan melanocephalus J.E. Gray 1829) in the Great Himalayan National Park, Himachal Pradesh, India. Leg-hold snares and automated fall nets were used to trap the birds. During the intensive efforts of 6,694 trap hours, one female Western Tragopan and 12 other bird species were captured. The trapped Western Tragopan was radio-tagged with necklace collar and was tracked for six months. Using 72 radio locations and Minimum Convex Polygon Method, the estimated home range was 31.6 ha, and it was 20.5 ha for summer and 4.7 ha for autumn. The bird showed preference for high tree cover, thick undergrowth of montane bamboo, high litter cover and perennial water sources. In addition, much of the findings on its ecology broadly corroborated with the earlier observations, suggesting that in spite of a very low sample size, credible information could be gathered through radio tracking and data collection at a finer scale. This study still remains the only investigation involving trapping and radio tagging of the Western Tragopan anywhere in the world. We recommend that the approach and methods adopted in this study be taken forward for not only the Western Tragopan, but also for other ground dwelling birds with similar habits, for generating decisive ecological information and subsequent conservation planning for these species

14. Survey of Western Tragopan, Koklass Pheasant and Himalayan Monal populations in the Great Himalayan National Park, H.P, India. **Jennifer R.B. Miller** (2010).

Surveys conducted in the late 1990's indicated that pheasant populations in the Great Himalayan National Park, Himachal Pradesh, India were declining. In 1999, the government legally notified the park and authorities began enforcing the Indian Wildlife (Protection) Act, banning biomass extraction within park boundaries and reducing human disturbance. Populations of three pheasant species (Western Tragopan, Koklass Pheasant and Himalayan Monal) were subsequently surveyed in the park during the breeding season (April–May) in 2008. Call counts and line transects were used to assess current abundances and gather more information on the characteristics of these species in the wild. Relative abundances of all three species were significantly higher than in previous surveys. Tragopan males began their breeding calls in late April and continued through May whereas Koklass males called consistently throughout the study period. The daily peak calling periods of the two species overlapped, but Tragopan males began calling earlier in the morning than Koklass males. Monals were most often sighted alone or in pairs and larger groups tended to have equal sex composition or a slightly higher number of females than males. This survey contributes to our understanding of the behaviours of these species in the wild and provides a preliminary indication that populations in the Great Himalayan National Park may be recovering from decline.

15. Influence of human disturbance on the abundance of Himalayan pheasant (Aves, Galliformes) in the temperate forest of Western Himalaya, India.
V. Jolli, M.K. Pandit (2011)

Authors conducted field studies in the Jiwa valley (Indian Himalayas) to examine the influence of human disturbance on Himalayan pheasants. We used the "call count" and "line transect" methods to estimate the abundance of pheasants in Jiwa valley. A human disturbance gradient defined by human population, agriculture activity, forest wood collection, grazing, vehicle, use of heavy machines, human settlements, dumping ground, and blasting was prepared. We assessed the pheasant numbers under two conditions (1) a decline in the gradient of human activity during two consecutive years (2009—2010) (2) in the presence of hydroelectric development activities. The numbers of Koklass pheasants, Himalayan Monal, cheer pheasant and Western Tragopan declined significantly with anthropogenic activities. During spring 2010, hydroelectric construction activity was temporarily suspended in Manjhan adit, and a positive response was noted in terms of an increase in the pheasant numbers near the site. The response of pheasants to human disturbance has inferred that large scale development can lead to decline of Himalayan pheasant in Himalayan region.

16. Patch occupancy for cheer pheasant *Catreus wallichii* in the Great Himalayan National Park Conservation Area.
V. Jolli, A. Srivastav, S. Thakur (2012).

Cheer pheasant Catreus wallichii is considered Vulnerable to extinction as its population is fragmented and remaining habitats are contracting due to increasing anthropogenic pressure. However, there is a lack of information about the impact of human disturbance. We conducted field surveys during the spring season (April-May) in 2010, in the Great Himalayan National Park Conservation Area (GHNPCA). We used a detection – non-detection survey to estimate the occupancy probability of cheer pheasant. A total of 21 call count stations were monitored during the study. We modelled the response of cheer pheasant to the site parameters, elevation, vegetation and distance to human settlement. The null model $\psi(.),p(.)$ was the most parsimonious model. Both vegetation and distance models were found to be strong candidate models. The distance model suggested that the probability of cheer pheasant being present at a survey site increased with increasing distance from a human settlement. It indicates that cheer pheasant is sensitive to human disturbance. This study will further help the park managers to plan effectively for the conservation of cheer pheasant in the GHNPCA.

17. Enumeration of Faunal diversity of sacred groves located in the Great Himalayan National Park (GHNP), Kullu, Himachal Pradesh (India).**Manisha Guleria & Pankaj Gupta** (2020).

Despite massive deforestation and land use changes in India, one of the most irrepressible characteristics of the country's landscape is the sacred forests. Owing to their 'divine' protection, a number of floral and faunal species that have otherwise been exploited from the forests continue to exist in the sacred groves. The study is based on the documentation of faunal diversity present in the sacred groves located in the GHNP, Kullu. 75 faunal species were recorded in the study area. The faunal diversity consisted of 16 Mammals, 21 Aves, 6 Reptiles and 32 Arthropods. The mammals and the aves have been enlisted along with their IUCN conservation status.

18. Atlas to Beetles of Great Himalayan National Park Conservation Area. **Amar Paul Singh & Virendra Prasad Uniyal (2020)**

An atlas to the so far documented and known Coleoptera (Beetles) diversity of Great Himalayan National Park.

Ecology& Biological Monitoring –

1. Biological monitoring for Himalayan Ecosystem. **Anthony J. Gaston, Gopal S. Rawat, Sanjeeva Pandey.** (2000).

A scheme for biological monitoring in Western Himalayan protected areas have been discussed in this paper. All the monitoring strategies must be proceeded by clear management objectives and associated research needs. Important steps in monitoring viz. baseline studies, selection of monitoring indices, design and preparation of monitoring scheme, data collection, collation and analysis of observations, archiving of data, and reporting are described in detail to help PA managers. It is stressed that consistency, clarity and simplicity are the keys to successful monitoring over the long term and archiving and reporting are essential components of monitoring and periodic reassessment of the programme is necessary in order to avoid "fossilization of data. For the Great Himalayan National Park, we conclude that monitoring of vegetation communities in alpine and subalpine meadows and monitoring the populations of ungulates susceptible to poaching, and of the endangered Western Tragopan, should be given priority. It is estimated that a simple biological monitoring programme for the Great Himalayan National Park would require approximately 8% of the guards working time, although it may replace some patrol time.

2. Livestock Grazing in the Great Himalayan National Park Conservation Area – A Landscape level assessment. Himalayan Research Bulletin XXXI (2) **B.S. Mehra and P. K. Mathur** (2001).

This study, part of a multidisciplinary research project undertaken in the Great Himalayan National Park Conservation Area (GHNPCA), Himachal Pradesh, India, assesses the overall status of biodiversity in the GHNPCA in relation to livestock grazing using a landscape approach. The GHNPCA is comprised of the Great Himalayan National Park (GHNP), Tirthan and Sainj Wildlife Sanctuaries, and an Ecodevelopment Zone, covering an area of 1,171 km². We use a hierarchical approach to create a systematic understanding of the physical, biological, and social components of the landscape with respect to dependent livestock and the grazing practices of migratory pastoralists. The study reveals that the land scape harbours a rich floral and faunal diversity including several endangered species. We identify and map 161 alpine and sub-alpine pastures (Thatches) and different migratory routes adopted by shepherds. Compared to adjoining areas, the overall grazing pressure in the GHNPCA is quite low and its impact is localised and insignificant at the level of overall landscape. The study also reveals that there is a disproportionate distribution of forests, alpine pastures, and permanent snow cover among four administrative constituents of the landscape. The study calls for a more careful delineation of Protected Area boundaries in this high-altitude landscape based on physical characteristics and the presence of representative natural resources. We recommend that livestock grazing in the region be practised on sound principles of spatiotemporal use of grazing resources instead of overburdening particular parts of the landscape at any given point or time. This requires the appropriate distribution of livestock pressure across different migratory routes, camping sites, sub-watersheds and the landscape.

3. Ecological Monitoring Design for the Conservation of Biodiversity in the Great Himalayan National Park Conservation Area, Western Himalaya. **P. K. Mathur, V. P. Uniyal, B. S. Mehra and S. Pandey.** (2005).

India has established a network of 579 biogeographically representative wildlife protected areas (PAs) comprising National Parks and Wildlife Sanctuaries to conserve the country's rich and unique biodiversity. The paper presents an overview on research and monitoring activities to Indian PAs. Research and monitoring have been recognized as two indispensable activities to support and strengthen the PA management. But they have remained on a low priority than protection, management of endangered species and their habitats, ecodevelopment, and ecotourism even in the prominent PAs. The merits of the two broad monitoring approaches viz., traditional "blind data gathering" and monitoring of "vital signs (selected taxa)" based on a comprehensive and integrated strategy are discussed. The later approach has been applied for the first time in India in the case of the Great Himalayan National Park Conservation Area (GHNPCA). The monitoring design developed through the cooperative effort of a multidisciplinary research team and PA

staff is summarized in this paper. 57 taxa were selected for monitoring out of a known diversity of 1,551 floral and faunal species for the conservation area. Details on monitoring site, periodicity and methods employed are provided. The execution of proposed Long-Term Ecological Monitoring (LTEM) programme in its totality is yet to be implemented. However, the baseline information was generated on selected taxa through concurrent multi-disciplinary research.

GIS & Geology –

1. Long Term Monitoring of Landuse/Landcover Through Remote Sensing and Geographical Information System in Great Himalayan National Park, FREEP-GHNP Research Project, Wildlife Institute of India, Dehra Dun, 1-42.
   S. Naithani and V.B.Mathur (1998).

   On the basis of visual interpretation with limited ground checks, the Satellite data FCC (False Colour Composite paper print) on 1: 50,000 scale of IRS IB of 1993 with standard band combination has been used for the study. The season chosen is Sept/Oct, which is appropriate for doing studies in higher Himalayan region. The ancillary data Survey of India toposheets on 1:50,000 scale 53E/5, 53E/6, 53E/9, 53E/10, 53E/13 and 53E/14, Park map, Management plan and existing thematic maps were use to prepare the final vegetation map. The whole park is divided into an Ecodevelopment Zone, Sainj sanctuary, Tirthan sanctuary and main Great Himalayan National Park. Along with a generation of above layers the change detection analysis for the Ecodevelopment Zone has been done on 1961 SOI toposheets and 1993 satellite data paper print on 1:50,000 scale. It reveals that the overall change is about 12.79% and the increased area is about 8.48%. The decreased area is about 4.31% (Naithani & Mathur unpublished). The following layers for all the areas have been prepared with area statistics density classes and are shown in the Appendices.

2. Development of a Spatial Database of the Great Himalayan National Park Conservation Area (GHNPCA) in GIS Domain.
   V.B. Mathur and Suneet Naithani (1999).

A comprehensive spatial database in GIS domain has been developed for the Great Himalayan National Park Conservation Area (GHNPCA), Himachal Pradesh under this task. This database has thematic layers covering the physical, floral, faunal and socio-economic attributes. Additionally, spatial database for the 4 management entities of GHNPCA viz. Great Himalayan National Park (754.40 km2); Sainj Wildlife Sanctuary (90 km2); Tirthan Wildlife Sanctuary (61 km2) and Ecodevelopment Area (265.60 km2) has also been developed. In all, the database has 52 thematic layers.

3. Specialized Mapping using Climatic Zonesfor Habitat Conservation. **S. Naithani and V.B.Mathur** (2014).

Mapping of vegetation strata in Great Himalayan National Park Conservation Area (GHNPCA) was conducted using Remote Sensing and GIS. Mapping of major vegetation communities was done by using satellite imageries (FCC of IRS 1-B LISS II Sept/Oct 1993, scale 1:50,000). Ground truthing was carried out for preparation of interpretation key and classification scheme. Mainly the 11 Forest and 11 Non-Forest classes have been delineated in two density classes, viz., close forest (> 40% Canopy cover) and open forest (< 40-10% Canopy cover) for the entire study area. The total area of GHNPCA is estimated to be 1171 km2 . On the basis of Climate zoning using contours as climate separators, finally the 14 vegetation classes and 11 non-forest classes were generated including Temperate, Sub-Alpine and Alpine forests and grasslands, while slope grasses around habitation occupy 28.13 km2 . Escarpments including exposed rocks with slope grasses and Alpine Exposed Rocks with Slope Grasses are 211.12 km2 . The area under glaciers and snow is estimated to be 18.68 km2 and 183.87 km2 respectively. Grasslands form the highest cover in the GHNPCA and cover about 18.9% of the total area. Temperate Mixed Forests occupy majority of the forests is about 17.01% of the total area. The conservation area is also dominated by Alpine Grassland i.e. about 193, 89 Km2 . The main upper storey species in conifers are *Pinus wallichiana, Abies pindrow, Picea smithiana, Cedrus deodara*while broad leaved species *Aesculus indica*, *Quercus semecarpifolia*, *Quercus dietata*, *Betula utilis* are dominant in the study area. The information generated through vegetation mapping valuable for park authorities and can be correlated with the distribution of fauna and avifauna in different habitats. The specialized vegetation mapping on the basis of climatic zoning is seems to be useful for monitoring, assessing and as database will assist the wildlife managers in conservation of endangered species.

4. Mapping of Natural Hazards and Expected Incidences in Great Himalayan National Park Conservation Area, Himachal Pradesh. **S. Naithani and A. Singh and A. Verma** (2018).

The Great Himalayan National Park Conservation Area (GHNPCA) has been declared as world heritage site by UNESCO in June 2014 which depicts its faunal and floral diversity. One of the main threats to the conservation area includes habitat alteration. So, the major cause; landslide is equally responsible for disturbed ecosystem. The objectives were to assess the impact of landslides on habitat of avi-faunal species and biodiversity. Landslides were identified through multispectral data of IRS IB (LISS-II), 1993 and LANDSAT 8(OLI), 2013 of October, on 1:50,000 scales, correlated with temporal NDVI difference, while slope information was used to further confirm land cover change caused by a landslide and validated with high resolution imagery of Google Earth. The extracted incidences increase from year 1993 (14 landslides) to 2013 (30 landslides), indicating alarming damage by the landslides. Most of the landslides took place in the north western part of the study area. Majority of the landslide polygons lies within the areas of negative change in NDVI values and at the areas where there are conjunction cliffs, and escarpments. The increasing frequencies of landslides correlated with the increased frequencies of earthquake data from 1885 to 2005 and witnessed that the area is also pressurized by tectonics. A continuous monitoring on temporal changes and alterations of habitat is imperative for better planning and implementation of wildlife and forest management plan.

People &Socio-Economy –

1. Eco-development planning at India's Great Himalayan National Park for biodiversity conservation and participatory rural development.
   S. Pandey and Wells M.P. (1997).

   The existing network of Protected Areas (PAs) in India is the major effort aimed at biodiversity conservation at the national level. The sustainability of PAs is heavily influenced by local people who are largely dependent on natural resources (fuel, fodder, minor forest products) for their livelihood. While all PAs are surrounded by historically resource-dependent communities, several of them have villages within their core areas too. This has necessitated an alternative approach to natural resource management which aims to integrate the interests of conservation with those of the nearby resource dependent communities. The case of the Great Himalayan National Park illustrates and incorporates the lessons from Integrated Conservation and Development Projects (ICDPs) implemented elsewhere in the world.

2. The Historical Development of Human Impacts on Great Himalayan National Park. Final Report, FREEP-GHNP Research Project, Wildlife Institute of India, Dehra Dun, 1-53.
R.Tucker (1997).

Villagers in the Ecodevelopment Zone are the key to preserving biodiversity in Great Himalayan National Park (GHNP), since their use of natural resources in GHNP and surrounding areas, and their responses to outside pressures largely determine the human impact on the Park. Historically, governments from pre-colonial kingdoms onward, extracted taxes, labour and produce in return for defining and guaranteeing rights of access to resources. The modern administrative system, set in place by the British colonial rulers, carefully codified relations between the state and villagers, in terms of duties and rights. But this was a bureaucratic and hierarchical system, in which decisions were made from the top. Its legacy is a dilemma for today's era when cooperative management is the new approach. The colonial system made the villagers' rights to land and other natural resources (grazing, forest products, etc.) more secure, but in recent years those rights have been slowly eroding, and in some ways are becoming more insecure. This is partly because of increasing penetration of the GHNP area by the market economy. The growing presence of outsiders has brought new opportunities and new pressures to both villagers and biodiversity. Regulating these outside pressures, as a vital dimension of Park management, is very difficult. Protecting the natural heritage entails changing relations: from top-down authority towards cooperative planning. Finally, ecological change must be analysed and monitored in terms of the historically evolving interactions between the natural and social systems of GHNP and the wider region which has influenced it.

3. Community based ecotourism in the Great Himalayan National Park. Forestry Research Education and Extension Project – Great Himalayan National Park (FREE – GHNP), vol. 4. Final Project Report, Wildlife Institute of India, Dehradun
M. DeCoursey (1998).

Great Himalayan National Park (GHNP) and the surrounding Ecodevelopment Zone (EZ) have excellent potential to be developed as a Community-based ecotourism (CBET) destination. CBET ensures that the benefits, both social and economic, are realized by local communities. Discussions with local villagers indicate that community interest in tourism is very high but they lack the skills, knowledge and support to develop it. From a product perspective, the jagged peaks and steep valleys provide breath-taking mountain scenery, the wildlife viewing opportunities are good, the forests are expansive and relatively intact, recreational opportunities are diverse, and local cultures are alive and quite interesting. It is quiet, uncrowded, and unpolluted - in fact it is the only place left in the Kulu Valley that has not been overcome by the rapacious tourist development that has plagued the area as a whole,

one of India's major Himalayan tourist destinations. From a conservation perspective, CBET can engage a wide cross section of people, and given the other factors mentioned above, it is the most promising strategy to reduce plant collection and poaching inside the park.

4. Social context and social–economic conditions of people using GHNP and WLSs.
   S. Nangia, P. Kumar, BMS Rathore (1999).

   The Great Himalayan National Park situated in Banjar Tehsil of Kullu district (HP) India, was notified by the Govt. of Himachal Pradesh under section 35 (1) of the Wildlife (Protection) Act 1972 on 22 April 1994 in supersession of its two earlier notifications under the same section and act issued on 1st March, 1984 and 30th July, 1990 respectively. The park is located on the junction of two great ferunal realms; Palaearctic to the North and Oriental to the South and supports several endangered mammals and pheasants. The area represents the typical…

5. Social Impact Assessment of CoB Project Activities.
   Pardeep Kumar, B.M.S.Rathore andS. Nangia (1999).

   Socio-Economic context of Great Himalayan National Park is important as there are numerous settlements situated on the Western and North Western boundaries of the Park. In addition, a few villages are inside the Park. The economy of these people is mainly based on forests, agriculture and livestock. Agriculture and livestock economy itself are deeply linked with forests. Apart from the economy, the polity, culture, and the religion of these people have evolved an interaction with the woods. Therefore, forests play crucial role in the life systems of these people. According to a study by Richard Tucker (1997) until nineteenth century the pattern of human ecology for the light population of the area was largely subsistence with very limited export of natural resources beyond the area. The sharpest increase came in the form of timber extraction during British Colonial days. Commercial timber trade placed increasing pressure on both forests and subsistence in the hills. Further pressure on these forests from village life grew very slowly until nineteen sixty with the beginning of regional and international markets expanding enormously, giving local people a major new source of income in the sale of medicinal herbs. In short, an increasing pace of population growth coupled with modern market economy has led to mounting pressure on Park resources. While in old time most of the resources were collected for self-consumption, today market demand for medicinal plants and other minor produce has increased tremendously.

6. Population and Environment Interface in the Great Himalayan National Park
   S. Nangia, P. Kumar (2001).

   The Great Himalayan National Park conservation area (it includes national park and two sanctuaries) was selected as one of the first protected area in India to demonstrate the new approach of local people participation rather than enforcement thereby linking bio-diversity conservation with local social and economic development. World Bank floated a five-year duration (December 1994 to December 1999) conservation of biodiversity project for this purpose. The basic strategy has been eco-development which revolves around the participation of local people in the preparation and implementation of micro-plans. In this project certain base-line surveys of natural resources endowments and human dependence on natural resources were conducted. Some eco-development plans were also initiated. This paper is an attempt to assess the impact of population environment and development interface in the Great Himalayan National Park and its eco-development zone.

7. Linking Eco-development and biodiversity conservation at the Great Himalayan National Park, India: lessons learned.
   S. Pandey (2008).

   There are very few actual field experiences of initiatives where fostering a harmonious relationship between conservation and development has been attempted. It is even rarer to find an example of a state-led initiative such as at Great Himalayan National Park (GHNP). The present paper is an attempt to document efforts made at the Park to address the emerging relations between people and the Park. The success of an environmental conservation programme being implemented at GHNP hinges on addressing the imbalances in resource creation or distribution as well as in the allocation of accountability of all the players including the Park management, NGOs, researchers, Friends of GHNP, and community.

8. Livelihood changes in response to restrictions on resource extraction from the Great Himalayan National Park.
   Priyanka Mohan Pisharoti (2008).

   This study, based in areas peripheral to the Great Himalayan National Park in northern India, assessed patterns of reduction in dependence on important sources of cash income in Protected Areas (PAs). The study also investigated the effectiveness of conservation targeted alternate income generation (AIG) schemes in reducing dependence on extraction for cash income from PAs. Questionnaire surveys were used to gather quantitative data on socio-economic attributes of households, dependence on PAs, attitudes towards conservation and benefits from alternate income generation activities. In addition, qualitative data was collected through

interviews and group discussions. Dependence on commercially important resources from PAs decreased if other sources of income were available to people. However, class and caste strongly determined the availability of other economic opportunities and ability to decrease dependence on PAs by households. The prevailing attitude to state-driven conservation may be linked to a sense of alienation because of legal restrictions on access to PAs. Participation in AIG activities improved perceptions towards the national park but their contribution to reducing dependence on PAs was limited. Socio-economic inequality is a larger issue that is not limited to communities living in and around PAs. However, its implications for the success of conservation approaches are significant. Interventions targeted at reducing dependence on PAs must consider class-based differences in order to maximize conservation success.

9. Assessment of alternative livelihood development as a strategy for long term conservation of biodiversity at the Great Himalayan National Park, India. (Thesis submitted to FRI)
   S. Pandey (2011).

   There are very few actual field experiences of initiatives where fostering a harmonious relationship between conservation and development has been attempted. It is even rarer to find an example of a state-led initiative such as at Great Himalayan National Park (GHNP). The present work is an attempt to document efforts made at the Park to address the emerging relations between people and the Park. The success of an environmental conservation programme being implemented at GHNP hinges on addressing the imbalances in resource creation or distribution as well as in the allocation of accountability of all the players including the Park management, NGOs, researchers, Friends of GHNP, and community.

10. Community Participation in Conservation of Great Himalayan National Park, India.
    Suman Bhanoo (2015).

    The book has relevance to academics, scholars, administrators, policy experts, anthropologists, sociologists, development scientists, environmentalists as well as anyone interested in the welfare of communities residing in the vicinity of a Protected Area. It stands out as a work that will stand the test of time and should be an asset that many would like to keep. This book is an excellent compilation of the outcome of the intense research work undertaken in the emerging field of Community Based Ecotourism Management at The UNESCO World Heritage Site, The Great Himalayan National Park and it will certainly be useful to provide necessary information, future research, road map and guidelines for all the stakeholders for effective planning and implementation of sustainable ecotourism.

11. Socio-Economic contributions of Homestays: A case of Tirthan Valley in Himachal Pradesh(India).
S. Agarwal and S. Mehra (2019).

The homestay programme has evolved as an instrument for employment generation and economic development of a local community. Economic empowerment is important because it enables the host residents to be rewarded with a significant proportion of the financial benefits from tourism. The study area for the present study is the Tirthan Valley in Himachal Pradesh. It is known as the gateway to The Great Himalayan National Park, which is also a UNESCO World Heritage Site. The case study method will be used for the research purpose. Primary data will be collected using a questionnaire and in-depth interview. Homestay owners, local vendors, and other service providers will be interviewed using convenient and snowball sampling technique. The contribution of homestays will be studied from various aspects like average income earned, number of jobs created, women entrepreneurs involved, reverse migration, development of infrastructure, rise in standard of living, etc. This study contributes to tourism research by exploring the economic contributions of homestay programme.

12. Local Community's Perception about Impact on Ecotourism by UNESCO World Heritage Site Status in Great Himalayan National Park.
V. Kumar, D. Gupta, J. Kumar. (2020).

The Great Himalayan National Park (GHNP) is situated in the Kullu district of Himachal Pradesh. The park has been blessed with distinct biodiversity, flora & fauna; and is inscribed in the UNESCO world heritage site list in June 2014. The Great Himalayan National Park (GHNP), Kullu, Himachal Pradesh is one of the best ecotourism destinations in the state. The GHNP organizes various adventurous activities like trekking, wildlife viewing, bird watching, Rafting, Climbing, Mountain biking, local sightseeing etc. Local community involvement is very important for the execution and development of ecotourism in the destination and they provide the exact feedback about the improvements and developments in the region. This paper tries to analyze the local community's perception about impacts on ecotourism by UNESCO world heritage designation in Great Himalayan National Park. It is concluded in study that World Heritage Designation to Great Himalayan National Park have a lot of positive impacts on the ecotourism growth in the study area. It is also observed from the study that although ecotourism is growing in the study area and people from local community are satisfied with the ecotourism developments, but government needs to work on improving the basic amenities like roads, drinking water, electricity etc. as the number of tourists are increasing day by day.

Agriculture, Soil&General –

1. Assessment of Issues related to soil erosion, landslides and to provide technical support to park management. FREE-GHNP Project Report, Wildlife Institute of India, Dehradun.
   A.S. Negi (1996).

   This project deals with Task 12 (Assessment of Issues related to soil erosion, landslides and to provide technical support to park management) and has following terms of reference:
   1. Assess the extent of soil erosion and landslides in the National Park and surrounding areas.
   2. Prepare maps of soil, water and Landuse features of the study area with the help of existing information with various agencies.
   3. Develop plans for experimental, cost effective approaches (Physical, biological, cultural and traditional) to undertake soil conservation measures and stabilize landslide prone areas and landslide slopes.
   4. Evaluate the merits of such measures, involving local people and park management.

2. Evaluation of crop damage in the Eco-development project area to suggest mitigation measures. Wildlife Institute of India
   N.P.S. Chauhan (1999).

   This report is in the fulfilment of Task 11 (Evaluation of crop damage in the Eco-development Project area to suggest mitigating measures) of the research project titled: ‘ Forestry Research Education and Extension Project: Conservation of Biodiversity Component, Great Himalayan National Park.
   The task has 3 components -
   A. Evaluate current levels and causes of crop depredation by wild animals around the park.
   B. Suggest new and innovative methods of crop protection based on actual field situation e.g. artificial barriers, green fencing, cultural practices, componstation or a combination of these methods.
   C. Besides presenting a formal report of the study, preliminary insights from the study will be shared with the officials of the Great Himalayan National Park and local officials (if any) in meetings. Such meetings will also be part of a process of creating a dialogue aimed at working out solutions and evolving feasible recommendations that can be incorporated expeditiously into the implementation of the Eco-development Project.

3. Cross-scale issues in the Management of Protected Area in India: A Case Study of the Great Himalayan National Park and Manali Sanctuary. **Laura Mckay** (2001).

   The purpose of this research is to locate real or potential cross-scale linkages for involving community-based institutions and organisations in the management of the Great Himalayan National Park (GHNP) and Manali Sanctuary. Institutions and organizations at one level of social organization both influence and are influenced by, other actors in the resource management system. Positive forms of interaction are most likely when a mechanism is in place for linking the mandates and priorities of different institutions and organizations. Linkages may be horizontal, across space, or vertical, across levels of social organization. This research focused on vertical forms of interaction. The specific objectives of the study are:
   1) to identify the institutions , organizations, and stakeholders linked to the management of the GHNP and the Manali Sanctuary.
   2) to analyze thenature of interaction and interplay, among identified institutions, organizations and stakeholders delineated by the framework for protected area management in India.
   3) to locate the mechanisms through which the mandates of diverse stakeholders are, or may be, linked to the management of the areas.
   4) to analyze the extent to which livelihood concerns, including issues of land tenure and resource use, have been included and/or addressed in the management process.

4. The Great Himalayan National Park: The Struggle to save the western Himalayas by Sanjeeva Pandey and Anthony J. Gaston.
   Book Review by**M.L. Hunter** (2019).

   In summary, this book shares many attributes— such as wonderful photographs and writing—with other volumes that have been written to celebrate the natural wonders of the world's special places. It differs from most analogous books in the depth with which it tells the story of all the hard work that underlies protecting such places—from foundational science to pure politics. I particularly enjoyed the distillation of this that is captured nicely in the foreword and afterword, written by Gaston and Pandey respectively, in which they give personal accounts of the decades of work they have devoted to this unique place. All in all, it is a tale that should be of interest to anyone concerned with protected area creation and management, especially in places where the livelihoods of local people are directly and tightly tied to natural resources.