

## Land Use Change and its Impact on Terrestrial Biodiversity of Surrounding Areas of Jim Corbett National Park

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### Abstract

Located at the Shivalik Himalayas' foothills, near the worldwide popular hill-station of Nainital, the beautiful park is famous for being home to a huge number of Bengal tigers, the highest among any Indian national park. So many other mammals, including tigers, leopards and elephants (wild), roam in this park. On the edge of the Western Ramganga Reservoir, the Sonanadi zone is habitat to elephants and leopards, along with more than hundreds of species of fowl. Also CNP is a prime protected area of Uttarakhand forest as it provides ecological viable, profitable and sources of different income for local people. Dense forest cover is one among the most natural resources for every animal (Including human) directly and indirectly. But rapid excessive exploitations of the different vegetation, woods, shrubs species for human development here are now under the threat of biodiversity loss and uncovering forests. Present study focused on significance of terrestrial biodiversity, reason of land use changes and threats to terrestrial biodiversity (TB) because of land use change, terrestrial biodiversity of the local area is influencing by various ways. For continuous use of the forest ecosystems, it is very important to find the land use land covers changes and its negative impacts on biodiversity and surrounding environment. Forest resources are the full of vital material, base of direct and indirect human's continuous progress and it needs to monitor the status and change of forest resources timely for logical exploitation of forests and its renewal. Present study focused on monitoring the changes in the forest areas, surrounding barren land, build-up area and natural resources.



### Article History

Received: 09 Jan 2024  
Accepted: 24 July 2024


### Keywords

CNP; Ecosystem;  
Habitats; MWC;  
Sustainable;  
Terrestrial Biodiversity.

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Doi: <https://dx.doi.org/10.12944/CWE.19.2.35>

## Introduction

### Literature Review

Present study is primarily focusing on that dense protected forest covers, i.e., Jim Corbett National Park (CNP), where impacted on terrestrial biodiversity due to heavy usages of forest resources and forest cover area reduce for economic source. The significance of terrestrial biodiversity because it support the functioning of ecosystems and affords numerous facility to people together with flood prohibition, soil conservation, water purification, crop pollination, meals provision, tourism, convenience, and human wellbeing. Anthropogenic interferences are earlier weakening the flow of ecosystem services from the different kind of forest product uses on a huge scale. The deprivation of jungle cover area has given adverse effects on anthropoid and animals life such as loss, i.e., employment, agriculture and food, wood, fuel, etc. gathered from forest. The reductions in dense forest cover area direct relation declining the carrying capacity of mountain environment. Significant impact perceives and identified by ecotourists such as- litter, erosion and flora are damaged by the excessive tourism in the CNP. Present study is carried out to judge the current conditions of CNP for impact of jungle ecosystem services on source of income security.

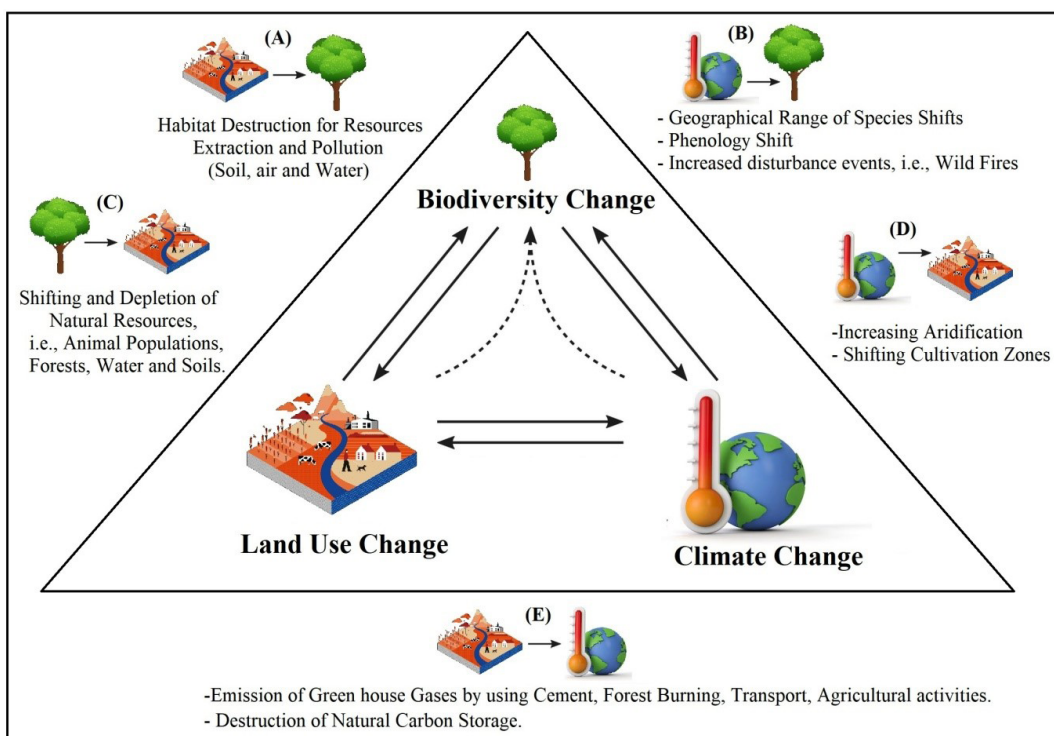
Uttarakhand is a state of India present in the northern part of the country. It is flourished with beautiful hilly area of the Himalaya, Bhabar and Tarai region. It covers total area of 53,566 km<sup>2</sup> of which is covered by mountainous (86%) and forest (65%). Almost of the northern segment of the Himalaya is very highly snow covered mountain peaks and so many icecaps which are source for many perennial rivers, i.e., Kali, Ganga, Dhuli, Yamuna, Alaknanda etc. Uttarakhand is a store house of animal and plant diversity. Due to variation in climatic and geographical conditions it supports a big diversity of flora and fauna. But in last few decades biodiversity gradually reducing which is influenced by of various human pressures.<sup>1</sup> Latest reports of living planet evaluate that osseous 60% population of wildlife have diminished since 1970.<sup>2</sup> Despite the gradual increase in conservation efforts over the last decade, anthropogenic pressure on biodiversity continues to increase.<sup>3</sup> The consequences of this is many species of a region started shifting or getting decreased in number. Present era are characterized

by gradual changes in mankind and environmental ecosystems, referred to as the '*Great Acceleration*'.<sup>1,4</sup> Land use and climate change, among many other threats to the world's biodiversity, are of particular concern.<sup>5</sup> Considering the present land area used by humans, it is estimated that the average ecosystem has lost 13% to 25% of its natural habitat.<sup>1,6,7</sup> CNP as it is a symbol of protective area of wildlife. It is present in the foothills of Himalaya, southern Uttarakhand state and northern India.<sup>6</sup> It is a paradise for tigers with diverse flora and fauna. As in last decade there is an increasing tourist and their activities create a pressure on CNP. At the present time the world faces many problems such as waste disposal, soil pollution, noise pollution, waste problem and soil pollution.<sup>6</sup> Another pressure on CNP is encroachment from human settlement around park such as construction of resort and hotel leading to increase in human and animal conflicts. Over tourism crowding, hiking, large numbers of vehicle uses and jungle camping may also cause stress, disease, anger in wildlife and change in their natural behaviour.<sup>2</sup>

Land use change is an important form of global pressure and key driver affecting ecosystem and biodiversity worldwide.<sup>8,9,13</sup> Human land use activities has transformed the planet.<sup>14</sup> During the last decades, global biodiversity loss has become a major environmental concern.<sup>15</sup> The current patterns of structure development and successive population growth in the fragile ecosystem in mountain range have built increased pressure on environment in the way of LULC alteration.<sup>16</sup> Change in the LULC is the primary variable that affects every biome of earth, socio-economic, ecological, climatic and hydrological system.<sup>17,18</sup> One of the major cause of LULC alteration has been gradual increase and infrastructural development and road construction that in general lead to land degradation, deforestation, spread of invasive species and increase accessibility for direct exploitation.<sup>19,23</sup> Fig. 1 describe relation between impacts of land utilize change and climate alteration on biodiversity change. Land use land cover alteration in Uttarakhand NW Himalaya (India) from 1991-2020 and remarkable climatic change and anthropogenic factor (population and tourism pressure) as possible cause of such changes.<sup>24</sup> In Southeast Asian area, tropical deforestation is chiefly due to change in land

utilization<sup>25,29</sup> Land use change is a notable indication of biodiversity reduction and alteration in the availability of native resources.<sup>30</sup> Land use change is a extremely connected process and has wide scale impacts on soure of income of rural poor communities.<sup>31,27,32</sup> The biodiversity in agriculture landscape depends largely on the intensity of land use.<sup>33</sup> The relationship between land use and biodiversity are fundamental to understanding the links between their environment.<sup>12</sup> Expansion in biodiversity plentiful region is of global worry while development may often comes associated

with biodiversity reduction and uncovering jungle.<sup>34</sup> Besides of these farming expansion for cropping, plantation and animal nurture is attributed as the prime reason of global land use change.<sup>35</sup> The global biomass of vegetation has halved as a result mammals has dropped by greater than 75% now at most considered for 41% of mammalian biomass, the rest being livestock and human.<sup>36,37</sup> Several study reported that land use alternation substantiall decrease native species wealth, alter species composition and diminishes abundance.<sup>38,43</sup>



**Fig. 1: Relation and impacts between land use, climate alteration and biodiversity change (after Author).**

**Materials and Methods**

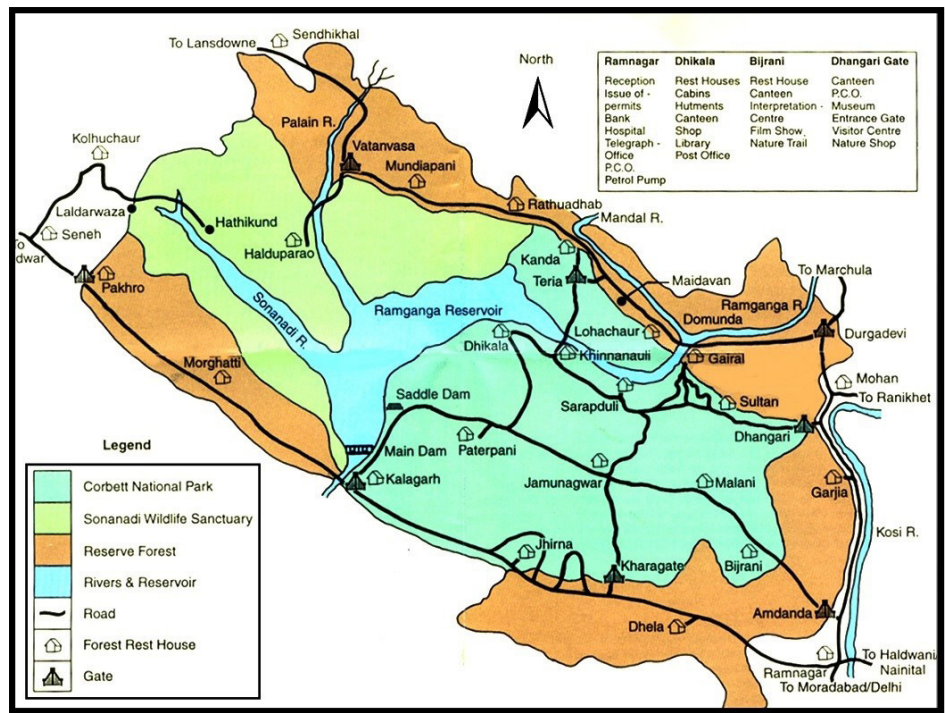
The approach in the present study uses a literature review by employ a broad design. The procedure is to look for journals, magazines and information web sites each locally, nationally and across the world through. Literature evaluation is an organized, express, reproducible approach for recognizing, comparing, arrange studies function. Thoughts, which have been manufactured through fact finder. This article is primarily based on studies outcome totally based on aim suitability of subject. For the

present study authors have selected the nearer area of CNP. It is a dream destination for tourists of all over world. The study shows how the agricultural land is extensively reducing and also changing biodiversity of the region. A large number of studies had been obtained wherein the authors have measured the influence of LULC change due to Global warming, climate alteration and anthropogenic activities for developments surround of CNP, its implication on wildlife, rural livelihoods and environment also.

**Study Area**

The CNP is part of the most important Tiger Reserve mission which lies within side District Nainital, Uttarakhand. The great land of biodiversity CNP is famous for its tiger abundance. Corbett was established in 1936 as Hailey National Park and has the honor of being the first and most famous National Park. It is also revered as the area where Project Tiger earliest released in 1973. Dhikala (largest among the five zones of CNP), One of the

most famous sights after the tourist lodge is located in the Corbett Tiger Reserve bordering the Patil Dun Valley. This is thought for the marvelous landscape and immensely rich in the biodiversity. Which is composed: narrow valleys, various channels of the Ramganga River, sand bars, river islands, dense sal forest and large grassland. This area of the tiger is as the father who started the Tiger Project in India to protect numerous endangered species and the violent animal called tiger.



**Fig. 2: Location map of the study area, i.e., CNP, Uttarakhand.<sup>1</sup>**

The foothills of Himalaya contain CNP (Fig. 2) and it is distributed in Nainital and Pauri Garhwal districts of Uttarakhand in north India. Total area of CNP is about 520.82 km<sup>2</sup> in both districts. The CNP lies in Uttarakhand from 29°25' North to 29°40' North latitude and 78°5' East to 79°5' East longitude. Ramnagar is gateway to CNP and draws part of holiday consideration due to its beautiful geographical area. It is known for its flora and fauna safaris. CNP has more than one lodges set at the riverside which is habitat of greater than 650 species of peculiar and migratory birds, it's far a haven for birdwatcher. The East Domunda block present in the

Kalagarh Tiger reserve is the part of Ramnagar Tiger reserve comes under the administrative control of Corbett tiger reserve. On the edge of the Ramganga reservoir, the Sonanadi area is domestic to elephants and leopards, together with loads of species of aves.

**Results**

**Habitats and Ecosystems**

The whole stretch of the CNP has the huge environmental beneficial state by way of its physiographic place, properties, flora, climate kind and exhibit the vast diversity of biomes. The diversification in geographical property of Corbett has

originated to a uniformly differing set of life colony. Such special habitat, along with the marked flora and fauna forms noticeable ecosystems that can be trained when tourist travel through CNP.

### Flora in Jim Corbett Park

CNP is flourished with awesome plants which accommodate freshwater plants and alpine plants. The distinguished alpine plant life consists of Sal (*Shorea robusta*) forests, Chaur, Khair-Sissoo forests, and lots more. The river plants on other hand have their own distinctive hierarchy. There are over six hundred different variety of vegetation, bush, herbs, bamboos, grasses, ramblers and pteridophytes withinside the CNP. Key species are as follows.

### Forests

#### Sal Forests

The dominant forest type in CNP is the Sal forest. Sal trees (*Shorea robusta*) form dense canopies and provide a vital habitat for numerous animal species, mammals and various bird species.

#### Khair-Sissoo Forests

The crucial terrain of the Corbett is overruled by the Sal jungle but beside that there present additional marked ecosystem near rivers and streams. It composed of Khair (*Senegalia catechu*) and Shisham (*Dalbergia sissoo*) trees which flourished on sandy, gravelly soil areas all through the Ramganga and other bank of river.

#### Riverine Forests

The Park is crisscrossed by several rivers, including the Ramganga, Kosi and Sonanadi. The areas along the riverbanks are characterized by riverine forests, consisting of trees such as Fig (*Ficus racemosa*), Jamun (*Syzygium cumini*) and Mahua (*Madhuca longifolia*). These forests attract a variety of wildlife including deer (*Axis sp.*), monkeys (*Macaca sp.*) and birds.

#### Mixed Deciduous Forests

CNP also contains mixed deciduous forests, which consist of a combination of tree species like Sal (*Shorea robusta*), Khair (*Senegalia catechu*), Semal (*Bombax ceiba*) and Rohini (*Mallotus philippensis*). These forests are home to numerous mammals, reptiles, and birds.

### Other Trees

Many different species of plant that make a contribution to the variety right here are observed scattered at some stage in the place. Chir (*Pinus roxburghi*) is the commonest conifer resented withinside the premises of the ground and is established on ridge-tops as Chin Choti, alevn though at Gajar Sot, its density turns into pretty low. On the extended tiers close to Kanda (*Amorphophallus paeoniifolius*), Banj Oak (*Quercus leucotrichophora*) is effortlessly seen, which a Himalayan species is truly. Prominent Palm species are Date palm (*Phoenix dactylifera*) discovered in open and well-lighted areas. Among Angeospermic plant-Kanju (*Holoptelea integrifolia*), Aamla (*Embllica officinalis*) and Jamun (*Syzygium cumini*) are visible withinside the wet places. Other tree cariety includes- Mahua (*Madhuca longifolia*), Bakli (*Anogeissus latifolia*), Bel (*Aegle marmelos*) and Kusum (*Schleichera oleosa*). Jim Corbett awarded its colour due to beautiful flowering trees, including Semal (*Bombax ceiba*) and Kachnar (*Bauhinia variegata*) with red and white flowers, with large purple blooms, Dhak (common name) or the Flame-of-the-forest (*Butea monosperma*) with lively orange flowers, Madaar or Indian Coral (*Erythrina indica*) accompanied by scarlet crimson plant life and Amaltas (*Cassia fistula*) carry shiny yellow chandelier-like tree. Human implanted trees variety are Jacaranda (*Jacaranda mimosifolia*), Teak (*Tectona grandis*), Eucalyptus (*Eucalyptus teriticornis*), Bottlebrush (*Callistemon*) and Silver Oak (*Grevillea robusta*) etc.

### Vegetation

#### Chaur

Chaur is the maximum precise plants habitat of Corbett. It bureaucracy is the essential flora and fauna habitats that have been as soon as utilize for farming. Patil Dun place of the park administration is the main Chaur of Corbett. Other pivotal place of the park includes: Dhikala, Phulai, Bijrani, Mohanpani, Paterpani and Khinanuli etc.

#### Bamboo (*Bambusa vulgaris*)

It is pretty exciting to discover the flora form of CNP. We locate a number of the Corbett vegetation is secured with bamboo jungle. Chief species is called as Male bamboo, having grouped heavy stems and radiant papery stem covering.

### **Terai Grasslands**

The Park features vast expanses of grasslands, known as the Terai region. These grasslands are rich in grass species and gives a supreme house for vegetarian such as wild boars (*Sus scrofa*), elephants (*Elephas maximus*) and deer (*Axis sp.*) etc.

### **High Altitude Ecosystems**

As the park extends into the foothills of the Himalayas, it encompasses excessive altitude ecosystems as well. These regions include temperate forests, alpine pastures and snow cover mountains. They offer habitat to species just like the Himalayan black bear (*Ursus thibetanus*), Serow (*Capricornis sumatraensis*) and several bird fauna.

### **Fauna in CNP**

#### **Mammals**

Chital Deer (*Cervus axis*), Leopard (*Panthera pardus*), Sambar Deer (*Rusa unicolor*), Elephant (*Elephas maximus*), Rhesus Monkey (*Macaca mulatta*), Wild Boar (*Sus scrofa*), Tiger (*Panthera tigris*), Langur (*Semnopithecus entellus*), Hogg Deer (*Axisporcinus*), Barking Deer (*Muntiacus muntjak*), Jackal (*Canis aureus*), Rabbit (*Oryctolagus cuniculus*), Otters (*Aonyx cinereus*) and Yellow Throated Martin (*Martes flavigula*) etc.

#### **Birds**

More than 600 species of birds are found in Corbett.

#### **Reptil**

Crocodile (*Crocodylus palustris*), Russel Viper (*Daboia russelii*), King Cobra (*Naja naja*), Monitor Lizard (*Varanus salvator*), Gharial (*Gavialis gangeticus*), familiar Krait (*Bungarus caeruleus*) and Rock Python (*Python molurus*) etc.

#### **Fish**

Mahseer (*Tor putitor*), Trout (*Barilius bola*), Rohu (*Labeo rohita*), Katla (*Catla catla*), Kalimuchi (*Clarias batrachus*), Kalabasu (*Labeo calbasu*), Silver mahaseer (*Tortor*) and Goonch (*Bagarius yarrelli*) etc.

Leopards (*Panthera pardus*) may be without difficulty placed withinside the hilly regions however also can be visible round withinside the lowland jungles. The Smaller-length pussycat populace accommodates: Wild Cat (*Felis chaus*), Fishing Cat (*Prionailurus viverrinus*) and Leopard Cat (*Prionailurus*

*bengalensis*). Other mammals inhabiting CNP include deer species are-Barking deer (*Muntiacus muntjak*), Sambhar (*Rusa unicolor*), Hogg (*Axis porcinus*), Elephants (*Elephas maximus*), Chital (*Cervus axis*), Sloth bears (*Melursus ursinus*) and Himalayan Black Bears (*Ursus thibetanus*), Indian Grey Mongoose (*Urva edwardsii*), Otters (*Lutra lutra*), Yellow-throated Martens (*Martes flavigula*), Ghoral (*Boselephus tragocamelus*), Indian Pangolins (*Manis crassicaudata*) Langur (*Semnopithecus entellus*) and Rhesus Monkeys (*Macaca mulatta*). Tourists also can spot Owls (*Bubo bengalensis*) and Nightjars (*Caprimulgus asiaticus*) for the duration of the night. Local crocodiles (*Crocodylus palustris*) (alongside the banks of the Ramganga river) Indian Python (*Python molurus*) and King Cobra (*Naja naja*) are common snakes may also be visible withinside the CNP.

#### **Wetlands**

CNP incorporates numerous wetland areas, together with lakes, marshes and swamps. These wetlands are essential for preserving the parks ecological stability and functional breeding grounds for waterfowl, reptiles and amphibians. The numerous habitats and ecosystems in CNP help a wealthy biodiversity, consisting of several mammal species, i.e. sloth bears (*Melursus ursinus*), tigers (*Panthera tigris*), leopards (*Panthera pardus*), deer (*Axis sp.*), elephants (*Elephas maximus*) and many of wild hen (*Gallus sp.*) species. The park is likewise domestic to reptiles, amphibians, and limitless insect species, making it a sizeable conservation location and a famous vacation spot for natural world fanatics and nature lovers.

#### **Man and Wildlife Conflicts (MWC)**

MWC takes place while the wishes and behavior of wildlife (undomesticated animal species) effect negatively on people or while people negatively have an effect on the wishes of wildlife. The mainly causes of conflict are largely due to habitat loss of wildlife from agricultural, settlement, road networks, hotel and resorts and other human development activities that reduce prey populations and force wildlife into closer contact with humans. Clash occurs frequently because animals of the same species have very indistinguishable requirements for their wellbeing, survival and reproduction, yet their need for those resources exceeds what is available. Major effects

of MWC, often, wild animals are injured in these conflicts, which can lead to long-term suffering or even death. Predatory animals can also additionally kill livestock, inflicting monetary complication for folks who depend on those animals for his or her livelihood.

steadily rising trends. In the period of 1991-2020 total no. of conflicts (Table-1) in CNP and Ramnagar urban buffer zone is 1259 (average 43.41 events per year) where attacked by mostly Snake 445 (average 15.34), by Tiger is 255 (average 8.79), by Leopard 220 (average 7.59), by Elephant 171 (average 5.90), by Boar 86 (average 2.97) and by other animals 82 (average 2.83).

Table-1 contain some most MWC from 1991 to 2020, which is digranetically illustrate in Fig. 3 and Fig.4

**Table 1: MWC events in CNP and Ramnagar urban buffer zone from 1991 to 2020 (after Rawat et al., 2022).<sup>49</sup>**

Years	Tiger	Leopard	Elephant	Snake	Boar	Others	Total
1991	4	2	3	7	1	2	19
1992	5	4	3	8	0	1	21
1993	5	2	4	9	1	1	22
1994	4	4	3	10	2	3	26
1995	6	5	2	6	2	2	23
1996	4	5	4	8	3	2	26
1997	8	5	3	9	2	1	28
1998	6	5	2	9	1	2	25
1999	6	5	4	7	1	3	26
2000	4	6	5	10	2	3	30
2001	5	5	4	9	2	2	27
2002	8	7	5	8	2	0	30
2003	8	6	4	9	3	3	33
2004	6	7	6	10	3	4	36
2005	8	9	6	9	2	2	36
2006	7	4	6	11	3	4	35
2007	8	5	5	14	3	3	38
2008	7	7	6	18	2	3	43
2009	7	6	5	20	3	4	45
2010	9	8	4	17	3	4	45
2011	10	11	8	19	3	3	54
2012	10	13	9	18	4	3	57
2013	12	12	7	22	3	2	58
2014	11	13	6	19	4	3	56
2015	11	11	7	21	5	4	59
2016	15	9	9	20	4	4	61
2017	13	10	8	24	6	4	65
2018	14	10	10	28	5	3	70
2019	16	11	11	31	5	4	78
2020	18	13	12	35	6	3	87
Total	255	220	171	445	86	82	1259
Average	8.79	7.59	5.90	15.34	2.97	2.83	43.41

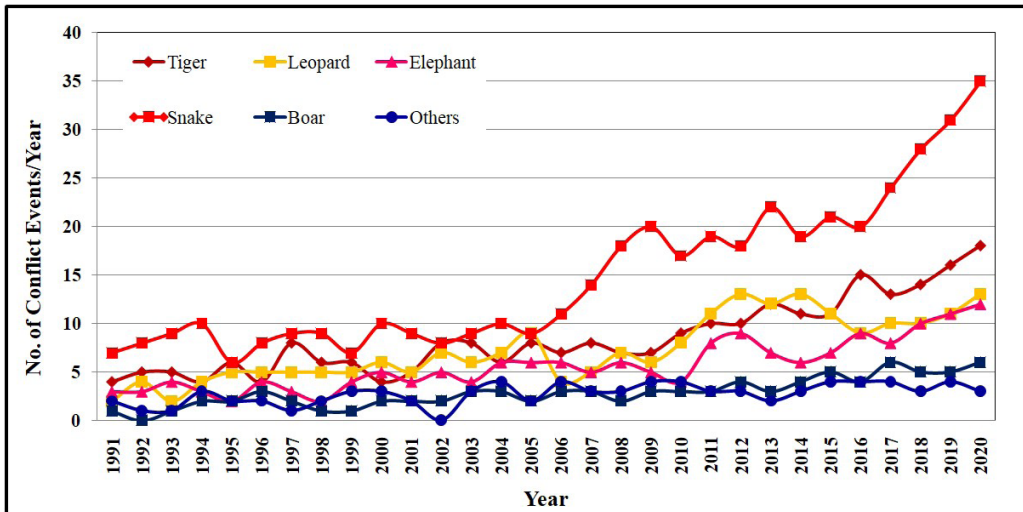


Fig. 3: Major wildlife wise total numbers of MWC per year from 1991 to 2020 in and surrounding of CNP.

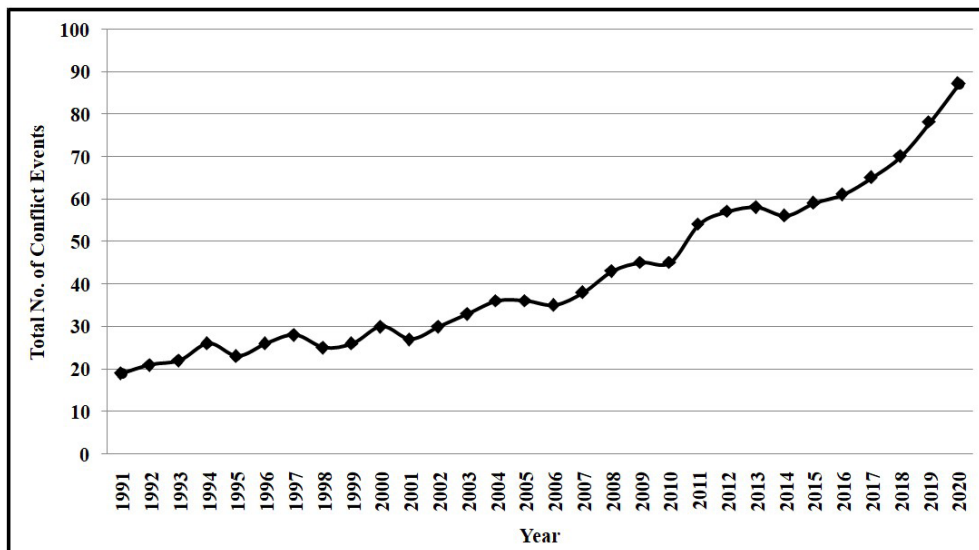


Fig. 4: Total numbers of MWC per year from 1991 to 2020 in and surrounding of CNP.

**Discussion**

**Importance of Terrestrial Biodiversity (TB)**

Biodiversity is critical for the methods that assist lifestyles on earth, i.e., flora and fauna. Without a huge variety of animals, plant life and micro-organisms, we can't have the wholesome ecosystems that we depend directly to offer us with the air we breathe and the meals we eat. TB is the form of lifestyles paperwork at ground floor of the planate. Rich biodiversity is a symbol of a wholesome ecosystem,

that's immediately related to human fitness. Flora and fauna are answerable for lot of critical offerings on which human existence relies on such as: oxygen manufacturing of plants which is crucial for human survival. Terrestrial biodiversity refers back to the form of lifestyles bureaucracy that exists in a selected place. It consists of genetic, species and surroundings variety and all of the interactions among them. Earthly ecosystems are those ecosystems which might be finding on ground, such as-tropical

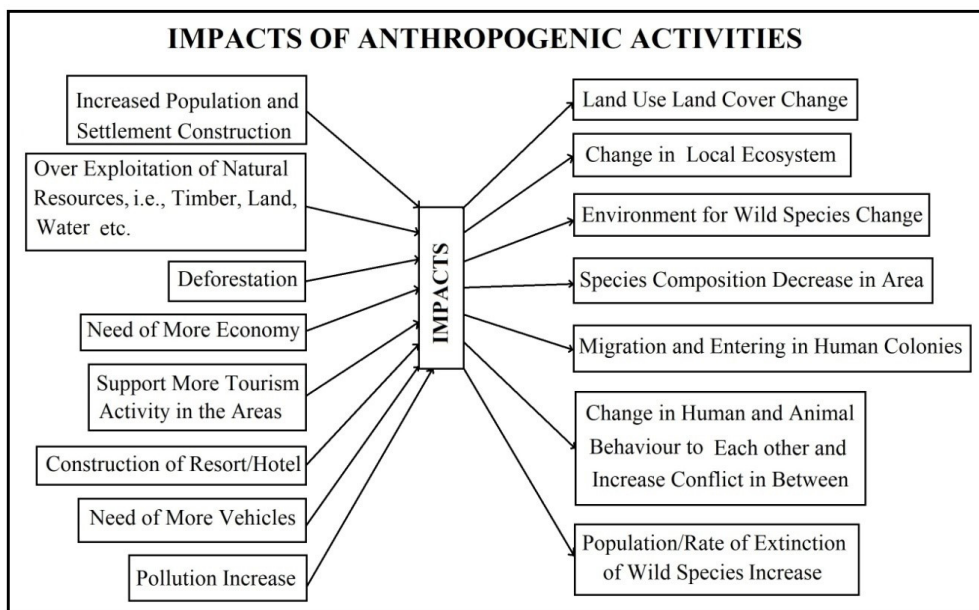


rain forest, tundra, deserts, taiga, grassland and temperate deciduous forest. They provide fresh aqua to nearly half of the earth's population and on each continent (except Antarctica) they prepare mineral wealth, power, jungle and farming products. Flora on peak of hill gives a diversity of environmental gain.

The structural additives of the living group's withinside the land ecosystems are particularly composed of flora, animals and tiny organism. However, the land communities are practically much diversified and compound than the aquatic ecosystems. Terrestrial ecosystems are the network of residing organisms and the non-residing environmental capabilities that assist them. They are vital for the availability of services (e.g. food, fuel, oxygen) and ecological approaches for all lifestyles on earth.

**Causes of LULC Changes**

CNP is nowadays in front of pressure of invasion from human colonies around the buffer zone causing to proliferating human and animal clash. Peaceful and safe environment of area attract peoples for various activity, which includes- tourism, encroachment for settlement, agriculture, resort and hotel construction for economy, formation of building for various purpose and cutting down green fruit trees for establishment of human colony etc. (Fig. 5). CNP has seven exploration zones for tourism purpose in Corbett tiger reserve. Tourist places of CNP zones include- Bijrani, Dhikala, Dhela, Jhirna, Sonanadi, Durgadevi and Sitabani. Many tourists visit these sites for various purposes which make disturbance in the park.



**Fig. 5: Most anthropogenic activities which impacts surrounding terrestrial biodiversity of CNP (after author).**

**Impact and Effects of LULC Change on TB**

As the rate of land use change accelerate, space for wildlife will decrease. The chance of entering in human colonies of wild animals will increase which may disturb both local people as well as wildlife. Geospatial analysis in Ramnagar urban zone of CNP advocates socity, economy and ecological alteration in this intermediate related zone facilitate the HWC average 20 events (6%) yearly, later on the place

under little to average conflicting place (yearly one to eight HWC/km<sup>2</sup>) with 0.89 km<sup>2</sup> (1.37%) yearly.<sup>44</sup> As the number of MWC will increase, it may cause change in the behaviour of both human and animals to each other.

**Threats to TB**

- Biodiversity is each part of nature and laid low with it. Some biodiversity losses are due to

activities along with seasonal adjustments or ecological trouble (wildfires, floods, landslides etc.) however those consequences are commonly temporary and ecosystems have command to conform to those threats.

- Human-driven biodiversity decrease in contrast, has a proneness to be prominent intense and enduring. The man-driven climate calamity is leading to environmental demolition, habitat reduction and species disappearance.
- Increased attempts are required to preventing further loss of TB and the ecosystem services they deliver. TB is reducing quickly through habitat destruction: an action where a natural territory becomes inadequate of carrying its native species, which are consequently displaced or destroyed.
- The sorrowful fact is that lots of the land that was once a vegetation habitat of those native species is repurposed for farming and forestry. Is it too past due to anticipate the lower or will we still have chances?

#### **Suggestions for Save TB**

- To keep in mind to biodiversity loss, we should make a better conservation plan that maintain the biodiversity and bring back the degraded areas.
- For a successful procedure to the sufficient biodiversity, protection practices should be put together with supply-aspect or demand-aspect practices. We need a very strong management for biodiversity, regaining efforts and universal land use planning and landscape application.
- Need center of attention on growth in area of land, protected area control, restore areas and productivity of land in agriculture utilization and farming goods trade.

#### **Conclusion**

Uttarakhand is a state having CNP as a treasure with natural and cultural aesthetic heritage. It takes part in state development. It is a significant source of income in the form of tourism and brings architectural and profit making works to the local area and continuous non native exchange to the country. It also provides employment to the local people, jungle dependence and also helps in making better employment activities. The establishment and

growth of CNP provides local people livelihood and also improve employment because most of the rural people are dependent on agriculture and obtainable resources. Reach to assets, particularly land, is the only employment for them but CNP provide heterogeneity in this field. Negative impact on local people is in the form of narrow reach to the resources and CNP rule for conservation plan.

Impact of human activities on environment is very well known. Gradual increase in terrestrial biodiversity and continues to do so, it plays a crucial role. Ironically, the whole world is in front of problems such as: availability of food for rapidly growing population to obtain it and need more land and more cultivation per year. However, the continuous effort and broader sustainability goal can achieve it, but it is possible only with coordination and unprecedented objective. In this way we can supply food and complete the biodiversity goal.

Many animals are changing their natural habitat and migrating toward the non conventional area where they were not present before. Besides this many non-native insects and wildlife are acclimatizing in altering environment and adopting toward it which may cause future risks (raids on crops, attacks livestock, harm to people, or damage property, often causing to the loss of livelihoods and exacerbation of poverty).<sup>47,48</sup> The risk of extinction of native species of flora and fauna and co-extinction may increase as the land use change will increase. MWC increase which may change those animals that inhabit in peaceful environment may feel difficulties for their survival in the form of scarcity of food, foliage walking and breeding ground. Increase in tourism may increase the risk of contamination of disease for wildlife. Increase in dust and pollution due to increase entering of vehicles may cause respiratory problems in wild fauna. Congestion of surrounding forest area may cause ill mental and physical health of animal. Behaviour of animals toward human or vice-versa may change as increase the MWC.

#### **Acknowledgement**

The author(s) wish to acknowledge the help of numerous researchers, institutes, organizations and information officers who provided valuable publications and statistical compilations.

**Funding Sources**

The author(s) received no financial support for the research, authorship, and/or publication of this article.

**Conflict of Interest**

The author(s) declares no conflict of interest.

**Data Availability Statement**

The manuscript incorporates all datasets produced or examined throughout this research study.

**Ethics Statement**

There is no any experimental work done on human and animals.

**Authors' Contribution**

- Meera Rawat: conceptualization, data creation, writing original draft.
- Devendra Singh Parihar: conceptualization, data and figures creation, method, draft reviewing and editing.

**Reference**

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