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Indian Streams Research Journal



LAND USE IN SARISKA TIGER RESERVE: A HUMAN IMPACT



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ABSTRACT

Sariska, is a classic example of the ultimate havoc human interference can bring about by way of unwarranted, non scientific and haphazard manipulation of the intricate and precariously balanced environment of a scheduled Protected Area, thus endangering its very existence.

This paper is an attempt to highlight some of the factors which are supposedly responsible for degradation of this beautiful reserve as the traditional land use is succumbing to pressures of urbanization, industrialization, the after effects of which are more severe like pollution, exploitation of resources. Human impact on land use change in and around Sariska is one such factor which is worth considering. Land is the overall natural resource with which mankind was endowed in the beginning of its history. Forests as a renewable natural resource occupy a unique position due to its role in

maintaining ecological balance and environmental stability and in sustaining economic development. The land use impact study is based on impact indicators viz. diversion of wilderness land inside and adjacent to the reserve for recreation, transportation, residential, public utilities, commercial, agriculture, livestock grazing and animal husbandry, industrial, public services, water bodies, government



land use. Land use type and order of importance has changed with time.

The present study has brought forth the change of land use pattern initiating from the erstwhile princely State of Alwar, when the area was being managed as a hunting reserve and strict regulations were in place, followed by general public and culminating to the present stage where the land use is being drastically altered to cater to the rising tourism, public utilities, unsystematic commercialization, industrialization in form of mining, unplanned transport, residential facilities, increased agriculture area and livestock population, resulting in negative impact on the fragile environment of the Protected Area. Positive indicators of land use in form of water bodies, providing

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much needed succor to the wild animals and the regenerating flora of the area and Government initiative in setting up administrative infrastructure provides some relief in this otherwise disturbing scenario.

It is being genuinely felt that the key for redeeming the lost glory of Sariska lies with the people inhabiting the surroundings of the Reserve through participation in Community Based Conservation (CBC). This research will help in mitigating the negative impacts of wilderness incompatible land uses and thereby help in habitat improvement of the reserve.

KEYWORDS :Sariska Tiger Reserve , urbanization, industrialization , environmental stability .

INTRODUCTION :

Human impact on land use change in and around Sariska is one such factor which is worth considering. Land carries those ecosystems that provide the most benefits to mankind and ensures survival and co-existence of all other life forms. Forests as a renewable natural resource occupy a unique position due to its role in maintaining ecological balance. Over the years, the human impact on land use has definitely disturbed this sensitive balance resulting in a marked negative effect on the natural systems prevailing in and around Sariska Tiger Reserve. The present study has brought forth the change of land use pattern initiating from the erstwhile princely State of Alwar, when the area was being managed as a hunting reserve and strict regulations were in place accepted and followed by local people and culminating to the present stage where the land use is being drastically altered to cater to the rising human population, tourism, public utilities, unsystematic commercialization, industrialization in form of mining, unplanned transport, residential facilities, increased agriculture area and livestock population, resulting in negative impact on the fragile environment of the Protected Area. Positive indicators of land use in form of water bodies, providing much needed succor to the wild animals and the regenerating flora of the area and Government initiative in setting up administrative infrastructure provides some relief in this otherwise disturbing scenario.

STUDY AREA

The Sariska Tiger Reserve's location is 27° 5' to 27° 33' N Latitude and 79° 17' to 76° 34' E Longitude. The Sariska Tiger Reserve (STR) is located in Alwar, Thangazi, Rajgarh and Bansur tehsils of Alwar district, Rajasthan. The zonation of the STR is in four zones: core zone I, II, III and buffer zone covering a total area of 866 sq. km. The present study covers 866 sq. km. of Sariska Tiger Reserve. This area has 28 villages in total. The core zone I has 11 villages including the grazing settlements. The buffer zone appears to be degraded throughout.

Sariska Tiger Reserve (STR) was chosen as the study site for the present project due to several reasons. The dry deciduous vegetation of STR and extreme climatic conditions would enable a good seasonal comparison of resource use. Human habitation is denser in wider valleys, which has streams and comparatively higher water table. Human interference inside and around the reserve is increasing rapidly. The increasing population and the consequent biotic pressure have resulted in the degradation of the forest areas, particularly on the fringes. It is important to shift those villages from the National Park, which have been paid compensation and allotted alternate land. Cattle rearing is the main livelihood of the local people and they depend on forest area for grazing their livestock which is increasing steadily. Domestic livestock entering the reserve spreads a variety of diseases resulting in high mortality of wild animals in the area. This paper is an attempt to highlight some of the factors which are supposedly responsible for degradation of this beautiful Reserve putting a question mark on

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the very survival of its top predator--- the tiger and the remedial strategy which can restore its past glory to a comfortable level.

RESEARCH METHODOLOGY:

The objectives of the present work were fulfilled through secondary and primary sources of information. The secondary information source includes statistical information, reports, articles, toposheets, land use records and maps of STR. The present study is based on multiple measurement technique. The study has combined personal survey for villagers, observations, tourist survey, and forest official survey with vital secondary statistical information obtained from the Sariska Tiger Reserve Headquarters, several governmental bodies and non-governmental organizations. Secondary data collected was analysed both qualitatively and quantitatively. After consulting the topographic sheets and administrative map, on the basis of intensity of occurrence, twelve kinds of land uses are identified that are functioning inside and near the boundaries of the reserve. The land use impact study is based on impact indicators viz. diversion of wilderness land inside and adjacent to the reserve for recreation, transportation, residential, public utilities, commercial, agriculture, livestock grazing and animal husbandry, industrial, public services, water bodies, government land use.

A net impact scoring matrix is developed to scale the human impact indicators as per the environmental items in Sariska quantitatively. The indicators were rated between the scales of magnitude to check the severity of the impact. A net score was computed by adding the score obtained by indicators. A scoring key is prepared, the magnitude of the indicators were classified into: negligible impact, slight, moderate, high and severe human impact on STR.

LAND USE

Land use is application of human controls in a relatively systematic manner to the key elements within any ecosystem in order to derive benefit from it (Vink, 1975). Land use or land cover always involves specific areas on the surface of earth and is therefore a

FIGURE 1: SARISKA ADMINISTRATIVE MAP



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geographical concept. This paper presents the distribution of land use in the Sariska Tiger Reserve influenced by human activities.

In Sariska Tiger Reserve, land use problems are increasing due to functioning of several land uses on limited wilderness land. Consulting the topographical sheets and the administrative maps of the study area, twelve different kinds of land uses are identified that are functioning inside and near the boundaries of the STR. The general land uses are identified on the basis of occurrence of land use inside and near the administrative boundaries of the reserve which are recreation, transportation, residential, public utilities, commercial, agriculture, livestock grazing, industrial, public services, water bodies, government projects and wilderness. Of these, recreation, transportation, livestock grazing, water bodies, public utilities, government projects, residential land uses are functioning both inside and adjacent to STR while agriculture, industrial, public services are functioning adjacent to the park.

It is clear from the figure 2 how humans are putting a great intensity of biotic pressure on the wildlife of STR. Among all the land uses, recreation, transportation residential, commercial, grazing and animal husbandry are highly incompatible land uses as these are directly exerting negative impact on the STR.

Land use Types: Pre and Post Wildlife (Protection) Act, 1972

Prior to the formation of the state of Rajasthan, the forest of Sariska was a part of erstwhile Alwar princely state and they were managed as hunting reserves. Sariska forest had been the famous shooting reserve of the ex-ruler of Alwar. Except the rulers and their V.I.P. guests, no one was allowed hunting in Sariska. Punishment for killing animals included seizure of the property of the accused and exile from the state of Alwar. But with passing years, these regulations were flouted with impunity and the massacre of wildlife continued till formation of the area as a Wildlife Sanctuary in 1955.

Before 1955, there was no hitch of shooting any wild animal. Regularly shooting permit used to be issued but hardly any returns were filed. It was a paradise for poachers.

Figure 2: Land use Functioning within and Adjacent to the Reserve

| S.No. | Land use | Sub-Use | Within | Adjacent |
|-------|--------------------------------------|--|--------|----------|
| 1. | Recreation | ➤ Tourist Accommodations ➤ Tourist Amenities ➤ Tourist Attraction | * | * |
| 2. | Transportation | ➤ Roads (Metalled, Unmetalled) | * | * |
| 3. | Residential | ➤ Housing Colony ➤ Residential Quarters ➤ Huts | * | * |
| 4. | Public Utilities | ➤ Multipurpose Dam | | * |
| 5. | Commercial | ➤ Shops | * | * |
| 6. | Agriculture | ➤ | | * |
| 7. | Livestock Grazing & Animal Husbandry | ➤ | * | * |
| 8. | Industrial | ➤ Mining ➤ Others | | * |
| 9. | Public Services | ➤ Schools/ Colleges ➤ Religious Places ➤ Dispensaries/Hospitals ➤ Anganbadi | * | * |
| 10. | Water Bodies | ➤ Water Holes ➤ Ponds ➤ Lakes ➤ Johads | * | * |
| 11. | Government (Administrative) | ➤ Wireless Stations ➤ Watch Towers ➤ Beat Offices ➤ Administrative Offices | * | * |

Source: Toposheets & Land use sheets, Administrative Maps, Sariska Tiger Reserve.

* Land use is functional

In 1955, a part of the forest was declared as Sariska Game Reserve. In 1958, the boundaries of the Reserve were extended covering an area of 492 sq.kms. In 1959, the status of game reserve was changed to wild life sanctuary. Finally, in 1979, this area was declared as Sariska Tiger Reserve.

There have been several grazing camps in the sanctuary. These people mostly keep domestic cows, buffalos, goats in large number, which cause disturbance and upset the grazing capacity of the habitat. They also interfere with the regeneration of rich fodder growth as well as destroy the cover plants which provide shelter to wild animals and birds. The domestic stock also acts as a medium for communicable diseases. A disastrous epidemic of hemorrhagic septicemia slashed down the population of sambars in 1971. The grazing settlers have no rights to stay inside the forest. They occupy alluvial open areas in the areas as well as open plateaus. Thus, the above discussion indicates that land use type and order of importance of each land use has changed with time. Earlier hunting, livestock grazing was dominant land use in the park but today, recreation, transportation, residential, commercial and public utilities are also dominant.

Today, wildlife habitat is exposed to destructive land use both within and adjacent to the

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reserve. Wilderness still remains the dominant land use but now it is shared by eleven major land uses, functioning both within and adjacent to the park.

Land Use Distribution and Its Impact on the Wildlife

Following analysis has been carried out using the above mentioned impact indicators in the Sariska Tiger Reserve.

(A) Recreation

This is the most important land use in Sariska. Wildlife tourism started from 8th decade of 20th century. Previously forest department was realizing revenue from game hunting. At the end of 7th decade, wild life conservation got some priority. Thereafter wildlife tourism started in sanctuaries and National Parks all over India. As mentioned in the Management Plan (2004-14) of STR, the objectives of wildlife tourism were as under:

- (a) To fill up the revenue loss after banning game hunting
- (b) To justify expenditure on wild life conservation
- (c) To motivate public to love forest and wildlife
- (d) To give job opportunities to those who lost their livelihood after ban on game hunting
- (e) To provide fresh jobs to the nearby villagers of the National Parks and sanctuaries.

Today, Sariska has worldwide fame as Tiger Reserve. The number of tourists coming here is very large but the recreational facilities are not up to desired standards to cater to this flow of tourists. The routes laid out at present are not systematic. In personal questionnaire survey, majority of the tourists wished for good roads inside the reserve, adventure activities like trekking and camping, information booklets and brochures and a good coordination which unfortunately Sariska lacks presently. As per any wildlife conservationist, it is not advisable to open the whole National Park (proposed) for tourists since it may lead to many other problems. So there should be a tourism zone in the STR, which should not include the proposed national park area. Today, tourism is confined to the core area of the reserve. There are two entry points viz. Sariska (Sadar) Gate and Tehla Gate. STR remains open for the whole day, and follows the regulation of no entry before sunrise and after sunset. As per regulations only registered petrol gypsies are allowed to use the Kuccha tracks in the Reserve, whereas privately owned vehicles are only allowed on the metallic roads leading to Pandupole or Tehla. Entry is made after buying tickets from reception counter (except Tuesdays and Saturdays). Earlier the park used to remain open the whole year but after the loss of tigers due to poaching, the Park is kept closed during monsoon period for two months.

Sariska is a desired destination for visitors since it is well connected by road from Jaipur and Delhi. Good accommodation facilities like Sariska Palace Hotel, Tiger Den Hotel (RTDC), Hotel Tiger Heaven are available in and around Sariska. Tourism is developing as an 'industry' in Sariska, as it provides employment in hotels, vehicles, guides and travel agents.

The whole tourism is active in core I zone. There is no tourism in core II and III relating to wildlife. Core II and III also have many religious places and forts which need to be developed to divert the tourist pressure from core I. Reason being, the wilderness of the core I is under a great impact from tourists. To conclude, the recreational land uses for tourism is having a severe impact on wildlife habitat fragmentation, sound and air pollution of the atmosphere, increase in litter have negative impact on the movement patterns of wild animals.

(B) Transportation

The transportational land use in Sariska is done both by metalled and unmetalled (Kuccha) tracks inside around Core I, II, III and the Buffer Zone of STR. Transportational land use is extensive in STR, as every forest range is now accessible via metalled and unmetalled road network.

Major highway that crosses Sariska is State Highway No.13. The traffic is very heavy. As per the management plan of Sariska, (2004-14), on S.H. No. 13 approximately 2000 vehicles (Buses, Trucks, Mini Buses, Car, Jeeps, Tractors and Two-wheelers etc) ply to and for in 24 hrs. duration causing tremendous disturbance to the core I which is heart of Sariska. Effort has been made to divert the traffic by an alternative route bypassing Thanagazi and Sariska. The road constructed for this diversion is complete, but still heavy traffic is passing through Sariska due to agitation by residents of Thanagazi who are opposing the diverted route and have support of local politicians.

Visitors to religious places like Pandupole and villages located in the core Zone I travel through Sariska. As a result of which there is a continuous traffic in Core Zone I, which is a proposed National Park. Also, there is a free entry to the Rajasthan Roadways Buses inside the Park. There are twelve such buses which are entering the Park from Sariska and Tehla. The buses start from Alwar and go to Dausa via Tehla and Sariska and vice versa. These buses are causing disturbance in the serene atmosphere of Sariska and various accidental killings of wild animals have also been reported both on S.H. 13 and this road route. Wildlife mortality and habitat fragmentation are the major impacts of transportational land use on wildlife.

(C) Residential

Residential quarters, huts, housing colonies are the major residential land use functioning in and around the STR. Residential quarters of government workers and forest staff, forest rest house (for stay of officers on duty), forest chowkies, watch towers etc. are all the official residential land use in STR.

There are 11 villages/guwadas inside the proposed National Park Core I area, which pose severe biotic interference so far as their needs for fuel wood, fodder for the cattle, raw materials for huts are concerned. The conflict is intensifying every year because of high population growth rate. In total there are 28 villages/ guwadas in the STR. More-than 300 villages are located within 5 km radius from the park boundary around STR.

(D) Public Utilities

Mangalsar Dam is located adjacent to STR. This serves the needs of the villagers near Sariska. Siliserh Lake is another big water body in the vicinity. The water body covers an area of about 10.5 sq.kms. and has some magnificent cenotaphs on its embankment. Maharaja Vinay Singh built a royal hunting lodge for his queen, Shila in 1845 A.D. It has been converted into a hotel and is an attractive spot for a peaceful holiday. Jaisamand Lake is an artificial lake and was constructed by Maharaja Jai Singh in 1910 A.D. It is an excellent picnic spot during the rainy season when the entire countryside turns lush green. This Jaisamand Bandh also serves the need of water for irrigation to the villagers around. They bring water from the lake to their fields with the help of motors.

(e) Commercial

Commercial use includes shops and canteens located inside STR. These are mainly found near religious places as lots of devotees come and stay for the whole day. Also, these small cafeterias are found near the entrance of the reserve area. Considering the present positive growth rates in tourist

arrival, the land under commercial use is likely to increase in future. These may ultimately result in habitat fragmentation and hindrance for the free movement of wildlife. Also, these canteens and shops are advised to follow certain strict rules but mostly these rules are violated. After a strict round of check by the forest officials, these people are not bothered to control their wrongdoings.

(f) Agriculture

At present, agriculture is a major earning profession of all the people living the revenue villages in the reserve area. The negative impact can be seen as the ground water depletes every year and chemical pesticides use is deteriorating the quality of the soil.

(g) Livestock Grazing and Animal Husbandry

Livestock grazing is another major land use activity functioning in all the zones of the STR including Core Zone I. The main animals include cows, buffaloes, goats and sheep. Livestock grazing has reduced the availability of forage for wild herbivores of STR. The grazing settlements of Core Zone I have no agricultural land and raise no crops. They totally depend on domestic cattle and goat rearing. Being in the heart of the forest area, the grazing pressure is high and more destructive. Most of the areas notified as Protected Areas have sizeable chunk of reserve forest (nothing is allowed until permitted). This situation implies that the PAs are heavily burdened by the rights of people living in an around PAs. In today's scenario of depleting forest cover, the PAs stand out as reserves of good forests and hence work as lungs of nation.

Animal Husbandry is a major source of income for all the villagers inside and outside STR. Villagers sell milk and also make milk products eg. 'mava' which is sold at a much higher price in the market. As a result, livestock grazing and animal husbandry are giving a great competition to wildlife survival.

Adverse impact of intensive grazing in the core area:

- (i) Core areas are getting degraded
- (ii) There is every possibility of transmission of communicable diseases to the wild animals.
- (iii) Illegal wood cutting/lopping goes on with illegal grazing.
- (iv) Man –Animal conflict as there is every possibility of villagers poisoning the big cats, as these sometimes lift their cattle.

The livestock grazing in core areas and buffer areas is not just a violation of Forest Act or Wildlife (Protection) Act. It is a socio-economic problem and needs to be resolved by short term and long term strategies.

(h) Mining

A large number of mines are operating close to the park. The forest department has no control over these mines. Explosives are very frequently used on these mines legally or illegally. It only adds to the confusion since the explosives can be used to camouflage gun fire used for poaching. The mining activity is a major type of land use happening in the vicinity of Reserve. Mines are located touching the border/boundary wall of the STR. There are no trees left in the vicinity. Waste is thrown near the boundary of STR and a big heap of waste has already accumulated here. The sites in the Kalwar Block near the STR are having a severe visible impact on the forest cover of the mountains. It is essential that no mining should be done within 5 kms of STR as this is also causing severe environmental pollution.

(I) Public Services

Public services include educational institutes, religious places and health care centers. Such public services viz. primary schools, primary health care centers, dispensaries, worship places are all located in the revenue villages all around the STR. Public services have a negligible impact on the STR as these are quite less in number even in the revenue villages around.

(J) Water Bodies

Water holes, johads, anicuts, ponds, constitute the water bodies within and adjacent to the STR. Water conservation is one of the most important wildlife management intervention in the Tiger Reserve. Due to recurrent droughts in the area, this has become a priority activity. Due to continuous efforts in this direction, drinking water is available for the wild animals even during peak summer months. This also faces a threat from cattle stock of villagers as they share these johads with wild animals.

(K) Government

The government use of land refers to the land used by the STR administration inside the reserve. It includes land used for wireless stations, watch towers, administrative offices, beat offices, gates and barriers. These are compatible uses of land as they provide protection to wildlife and regulate the movement of people (towards, villagers and poachers) inside the park. This is improving the quality of wildlife habitat in the Reserve.

(L) Wilderness

This is the most compatible land use as the wild animals use this land for their survival and depend on its resources for all their needs. This reserve's land is for use by the wildlife. The Sariska Tiger Reserve encompasses an area of 866 sq km. The present legal status of Forest Area included in STR is:

| | | |
|------------------|---|---------------|
| RESERVED FOREST | - | 604.97 Sq.km |
| PROTECTED FOREST | - | 261.03 Sq.km. |
| TOTAL | - | 866.00 Sq.km. |

CONCLUSION

From the analysis it is clear that in spite of the enforcement of the Wildlife (Protection) Act, 1972, fragmentation and destruction of wilderness land has continued inside and adjacent to the STR. Amongst all the land uses, the recreational land use is highly incompatible in the core areas of Reserve. It is also functioning near the STR due to presence of large number of lakes and forts around.

Increase in tourist rush is also resulting in mushrooming of small resorts, hotels at the periphery of the Reserve. It has also been observed that some farmers are selling their agricultural land to the buyers who in turn are getting these lands converted for commercial use which is not legal as per the Wildlife (Protection) Act, 1972.

The second ranked land use is transportation. Road building activities and increase in traffic have fragmented the wildlife habitat. It has also led to increase the killing of wild animals due to vehicle accidents inside the park.

The third ranked land use in terms of intensity of impact is residential. Villages in and around the reserve are developing in terms of population and settlement and thereby interfering in the wildlife habitat.

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The fourth ranked land use is commercial use in the tourism zone in STR. It has exerted a slight impact in the form of habitat fragmentation.

The fifth ranked land use in terms of intensity of impact is livestock grazing and animal husbandry as these severely interfere in the availability of forage to the wildlife and subsequent decline in prey base in the Reserve adversely impacting the very survival of the top predator- the Tiger.

The sixth ranked land use is agriculture as it is leading to continuous use of groundwater of the area and also encroachment of wilderness land by the farmers at many places.

The seventh ranked land use is industries. They are having a direct impact as mining activities have degraded the forest of Buffer area.

The eighth ranked land use is public utilities. There are dams outside the area for the people and serve to the needs of water. This is semi-incompatible as there is no direct impact on the wilderness of the park.

The ninth ranked land use is public services and these are semi-compatible as these occupy less area around the Reserve.

The tenth ranked land use is water bodies. It is a compatible land use as it increases the quality of wildlife habitat.

The eleventh ranked land use is government. It is also a compatible land use as it provides protection to wildlife and helps monitor the STR.

The twelfth ranked land use and which is supreme to all other land uses is wilderness. A net impact scoring matrix (Figure 3) is developed to scale the human impact indicators as per the environmental elements in Sariska quantitatively. The indicators were rated between the scales of magnitude to note the severity of the impact. Scale used for scoring is:

| | | |
|-----------------|---|---|
| No impact | : | 0 |
| Slight impact | : | 1 |
| Moderate impact | : | 2 |
| Severe impact | : | 3 |

The matrix is based on several environmental elements viz. habitat quality, migratory movement, local movement, animal behavior, feeding & breeding, predator-prey relation, nutrition, water availability, tree cover, endangered sp. (flora & fauna), eco-sensitive & corridor areas of STR. The human impact threat indicators are agriculture, dairying, deforestation, development activity, encroachment, human habitation, livestock grazing, mining (waste discharge), NTFP collection, poaching / forest mafia, recreational structures, religious fairs, roads, timber collection, tourism, transportation/ traffic. A net score was computed by adding the score obtained by indicators. A scoring key is prepared and the magnitude of the indicators were classified into:

| | | |
|-----------------------------|---|--|
| Negligible impact (below 4) | : | dairying, NTFP collection |
| Slight impact (4-8) | : | religious fairs |
| Moderate impact (8-12) | : | poaching, agriculture, timber collection |
| High impact (12-16) | : | roads, recreational structures, mining, development activity, encroachment, tourism, livestock grazing |
| Severe impact (above 16) | : | deforestation, human habitation |

This helps substantiate the fact that land use change leads to biodiversity loss.

Figure 3. Net Impact Scoring Matrix for Human Impact on Biodiversity in Sariska Tiger Reserve

| Human Impact Actions | Elements of environment | | | | | | | | | | | Total score |
|--------------------------|-------------------------|--------------------|----------------|-----------------|--------------------|------------------------|-----------|--------------------|------------|--------------------------------|-------------------------------|-------------|
| | Habitat quality | Migratory movement | Local movement | Animal behavior | Feeding & breeding | Predator-prey relation | Nutrition | Water availability | Tree cover | Endangered sp.(flora & fauna) | Ecosensitive & Corridor areas | |
| Tourism | 2 | 0 | 1 | 2 | 3 | 3 | 0 | 0 | 0 | 2 | 2 | 15 |
| Poaching/ forest mafia | 0 | 0 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 3 | 2 | 10 |
| Deforestation | 3 | 1 | 0 | 1 | 2 | 1 | 2 | 3 | 3 | 3 | 2 | 21 |
| Agriculture | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 3 | 1 | 2 | 10 |
| Livestock grazing | 3 | 0 | 0 | 2 | 1 | 1 | 1 | 2 | 1 | 0 | 2 | 13 |
| Transportation/traffic | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 9 |
| Development activity | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 2 | 2 | 1 | 3 | 13 |
| Encroachment | 3 | 0 | 1 | 1 | 0 | 0 | 0 | 2 | 2 | 1 | 3 | 13 |
| Timber collection | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 2 | 11 |
| NTFP collection | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Mining (waste discharge) | 3 | 0 | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 1 | 2 | 12 |
| Recreational structures | 2 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 2 | 2 | 3 | 14 |
| Roads | 3 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 12 |
| Dairying | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 |
| Religious fairs | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 7 |
| Human habitation | 3 | 1 | 2 | 2 | 2 | 1 | 1 | 3 | 3 | 2 | 2 | 22 |

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