
SURVEY OF MEDICINAL PLANTS FOREST REGION TADOBA FOREST

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Abstract

*Phytosociology, flora and biological spectrum, and phenology are some of the aspects of vegetation ecology that are discussed in this study. Tadoba National Park is located in Chandrapur, and it is a tropical dry deciduous forest habitat. The northern coordinates of the park are 20 degrees 16 minutes 10 seconds and the eastern coordinates are 79 degrees 14 minutes 43 seconds. The whole forest that is located inside the park has been separated into five distinct communities by utilising a tabular comparison method. On the basis of the diversity indices that were generated, it was discovered that the Simpson index (λ) and the Shannon-Wiener index (H') exhibited a range of 0.085 to 0.147 and 2.35 to 2.9, respectively. The species richness of shrubs was different from that of trees, which ranged from 17 to 6, with the *Tectona Grandis Chloroxylon swietenia-Diospyros melanoxylon* community having the highest number of species that were found in shrubs. Both Communities IV and V have the least amount of richness in their communities. There was a high abundance of herbs in virtually every community, with the highest species richness score of 110 being found in community I and the lowest score being found in community IV. It was discovered that the community of *Tectona grandis, Chloroxylon swietenia, and Diospyros melanoxylon* had a maximum diversity index (H') of 3.94. A Simpson index that is exceptionally low can be found in any community. Community I was the one that carried the lowest Simpson index of all the communities. The Simpson Index was low, while the Shannon-Wiener Index score was high, both of which suggested that the vegetation variety was high. There are a total of 741 species that are classified as higher plants in the park. These species are categorised into 115 families and 427 genera. Furthermore, there are 111 trees, 66 shrubs, 89 climbers, and 475 herbs. Plants that are classified as herbs include 218 forbs, 107 legumes, 103 grasses, and 47 sedges. Due to the population structure, it became clear that there is a requirement for study on the reproductive biology of the primary tree species, specifically with regard to the generation of seeds, the germination of seeds, and the seedling establishment.*

Keywords: Medicines made from herbs, a wooded area A forest known as Tadoba.

INTRODUCTION

The field of research known as vegetation ecology examines the structure as well as the systematics of vegetation. This involves the study of the social interactions between species in various communities as well as the makeup of the species in such groups. It is a long-standing tradition in the field of vegetation ecology to bridge the gap between the fundamental and applied approaches to study. The study of plants from a quantitative perspective is referred to as phytosociology. In the field of vegetation ecology, there are a variety of factors that identify distinct communities. These parameters include floristic composition, diversity, phenology, and others. For the purpose of

portraying the social behaviour of plants, such factors are utilised. The distribution of individuals among the species in a specific environment is referred to as species diversity. The biological spectrum refers to the percentage distribution of the species among the many forms of life. Phenology is the study of the periodic biological processes that occur in vegetation throughout the seasons.

Different aspects of vegetation ecology like phytosociology, flora and biological spectrum, phenology in tropical deciduous forest ecosystem in India has been studied in detail by several workers time to time (Shah et al., 1978; Shah and Bhatt, 1980; Verma and Das, 1980; Khare, 1984; Banerjee and Lal, 1985; Sharma et al., 1986; Nautical et al., 1987; Khare et al., 1989; Jha and Singh, 1990; Sukumar et al., 1992; George and Varghese, 1993; Gogate and Anmol Kumar, 1993; Kumar et al., 1994; Dixit, 1997; Ilorkar, 1999; Kunhikannan, 1999; Verma and Totey, 1996; Valappil and Swarupanadan, 1996). The plant communities in Central India were investigated by Khare et al. (1989) using a two-level ordination in their research. They noticed that the underlying rock formation and soil conditions caused a variation in the spatial distribution of plants, and they documented this difference. In addition, biotic variables play a significant influence in the process of determining the species composition of the stand. It has been noted that the forest communities behave differently depending on the pattern of land use and the biotic disturbances that occur.

Malhotra and Moorthy (1972, 1973 a & b, 1974, 1977 & 1992), Choudhary (1986), Mohan Varghese and Kunhikannan (1993), and Kunhikannan et al. (1993, 1994, 2007) are among the few researchers who have conducted ecological and floristic studies on Tadoba National Park. All of these researchers have made significant contributions to the field. Research conducted by Kunhikannan (1999, 2005) and Gogate and Anmol Kumar (1993) looked at the many different facets of the Park's ecological system. Choudhary (1986) conducted research on the management aspect of the National Park following the investigation of gregarious blooming bamboo. An overview of all the vegetation studies that have been conducted on the woods in Tadoba National Park is presented in this article.

In 1955, the Chandrapur district of Maharashtra state became the location of Tadoba National Park. The park was formed with the intention of preserving the ecological abundance and variety of the dry deciduous woods that are found in the Central area. As shown in Figure 1, the park may be found between the longitudes of 79° 14' 43" and 79° 21' 25" east and the latitudes of 20° 16' 10" and 20° 24' 25" north. It encompasses a total area of 116.54 square kilometres, and it is flanked by the Andhari Wild Life Sanctuary, which together make up the Tadoba-Andhari Tiger reserve. The combination of these two reserves covers a total area of 509 square kilometres. Tropical climate characterises the region, which is characterised by three different seasons: summer, rainy season, and winter. Between the months of May and June, temperatures can reach as high as 40 to 47 degrees Celsius. With an average low temperature of 9 degrees Celsius, December is the coldest month of the year. In this region, the average annual rainfall is 1041 millimetres. According to geological analysis, the region is part of the Raniganj series in the Gondwana group, namely the Kamthi beds (Krishnan, 1982). There is a magnificent lake in the middle of the territory, which has an area of 125 hectares, is bordered by little hillocks, and has an elevation that ranges from 213 to 364 metres above mean sea level. The majority of the land has undulating terrain; the lake is stunning.

There is a widespread worry over the loss of biodiversity, which is a consequence of the growing understanding of interconnected ecosystems and the scientific study that is developing new perspectives of the applications of flora and fauna. The concepts of "sustainable development," "biodiversity conservation," and "maintenance of gene-pools," amongst others, have emerged as issues of concern on a global scale as people have learned to comprehend the extent to which their continuing existence is contingent upon the existence of healthy ecosystems. Protected regions (PAs) are regions that have been cordoned off for the purpose of preserving natural resources, such as floral and faunal species, in both developed and developing countries. This has finally led to the creation of these areas. This important policy decision, which was the outcome of collective choice at the global level, has had quite different ramifications for nations that are well developed and countries that are still in the process of developing. When compared to less developed countries, which are currently struggling with very basic issues such as poverty and starvation, developed countries are more concerned about environmental quality, which is a global public good. However, less developed countries are unable to afford to make decisions regarding land use that take into consideration such wider future concerns. When seen in this light, the dispute between "environment versus development" and "global gain at local cost" takes on a great deal of relevance.

Conservation of biodiversity, and thus putting more and more land under forest cover as well as keeping the green cover that already exists, has been added to the priority list of many countries, and this is a really good thing to do. Now comes the decision between management that is "exclusive" or management that is "inclusive." Developing nations are extending their network of protected areas, which includes national parks and wildlife sanctuaries, as a result of the growing understanding of the necessity of maintaining all forms of life, as well as the rising demands that are being exerted by the international community. As Guha correctly points out, the fundamental reason for the diminishing biodiversity is profoundly rooted in the contemporary economic development. The conservation efforts of highly industrialised countries effectively transcend the political boundaries, which ensures that they will continue to expand. Furthermore, he emphasises that "the wholesale transfer of a movement (environmentalists) culturally rooted in American conservation history can only result in the social uprooting of human populations in other parts of the globe." This is a powerful statement. As stated by Guha (1989:76). The fact that "while a 'exclusive' management approach is generally successful in preserving areas of wilderness and scenic beauty, the 'inclusive' approach is obviously the model choice for PAs that include human residents and affect local livelihood in important ways" has been ignored in many places (Gadgil, 1991; Borrini-Feyerabend, 1996; Murty, 1996; Rathor, 1996; Das, 1997; Gadgil, 98; Swain, 2001). This is a fact that has been ignored in many places. Protected areas, on the other hand, not only mean that resource usage is restricted in less developed nations like India, but they also mean that people who have lived there for generations are forced to leave.

Moreover, the practice of equating nature conservation with the establishment of PAs under the Forest Department's control leading to the exclusion of subsistence uses of living resources, is based on false premises like only the state machinery can protect biodiversity; conservation of biodiversity is no concern of development agencies but is a monopoly of Forest Department; creation of new protected areas will enhance the prospects of protecting biodiversity; exclusion of subsistence demands .

WORRIES ABOUT EXTERNALITIES

Recognising that diverse social groups are affected by protected areas in a variety of different ways is an essential but often overlooked fact. It is essential to have a clear understanding that the impoverished populations of developing nations that reside in or near Protected regions, and particularly those who depend on these regions for their means of subsistence, are the ones who face the brunt of the expenses that are involved with the very existence of these places. According to this point of view, the locals are subjected to unidirectional negative externalities as a consequence of the demand of the international community on the establishment of protected areas. The effects of protected areas (PAs) on the local population have been the subject of a great number of studies. These studies have shed light on the fact that a region that was once frequently utilised by the locals for activities such as small-scale fishing, sericulture, honey collection, and firewood collection is now legally off-limits to these uses, but it is still open to other uses (Guha, 1989, Townsend, 1992, Gadgil, 1998). People who live in or adjacent to biologically diverse ecosystems typically do not get the financial benefits that will result from the protection or usage of resources in a sustainable manner. In contrast, local communities are often the ones that are forced to bear the brunt of the expenditures associated with conservation efforts, particularly in the near term. According to Dixon and Sherman (1990), Wells (1992, 1995), and other researchers, local communities seldom profit significantly from conservation efforts; in fact, there are occasions when they benefit little than nothing at all.

In the name of conservation, the people who are already experiencing marginalisation and poverty become even more excluded and destitute. These groups are vulnerable to exploitation from outside sources due to the fact that they have been uprooted from their ancestral country and native socio-cultural context, as well as the fact that their economy, which was formerly mostly self-sufficient, has been decimated. This essay explores the inescapable cost that localities must endure in order to address global conservation-related challenges. This is due to the fact that local "collective choice" in a particular region is less powerful than universal "collective choice."

Despite the fact that it is possible for global issues to have an impact on local concerns through a range of coercive and persuasive strategies, constitutional decisions seldom give voice to local concerns. The wellbeing of the local community and conservation are two things that, in the long run, tend to lose out. Both the incapacity of the people to carry out their long-standing usage of forest products and the inefficient execution of conservation measures are contributing factors to the deterioration of the inhabitants' standard of living. The Taboba-Andhari Tiger Reserve (TATR), which is located in the central region of India, is the topic of a case study that illustrates how the marginalisation of the poor has occurred as a consequence of national decisions to construct protected areas at the same time as international concerns for the preservation of biodiversity have been taken into consideration. In an effort to get a better understanding of this complex matter, our investigation is founded on the Institutional Analysis and Design (IAD) framework. This framework incorporates many levels of analysis and decision-making domains from different perspectives.

"PROTECTED AREAS" DEFINED

In order to accommodate a wide variety of biological and socioeconomic circumstances as well as ownership regimes, the International Union for Conservation of Nature (IUCN) has developed a classification system for protected areas that consists of six distinct types. These categories range from managed resource protected area to strict wilderness reserve. A protected area is defined as an area of land or water that is specifically dedicated to the

preservation and management of biological variety, as well as to natural and related cultural resources, and that is controlled by law or other practical measures. This definition was provided by the International Union for Conservation of Nature (IUCN) World Commission on Protected Areas (IUCN, 1994). According to the Convention on Biodiversity, a protected area is classified as a geographically defined area that is designated, regulated, and maintained in order to achieve certain conservation goals. According to Guha (1989) and Bishop et al. (1995), the national park movement was initiated in the United States as a response to the immense destruction of the natural environment that European immigrants perpetrated upon the American continent over the course of three centuries. This is a well-known fact. Over a significant portion of the United States' territory, there were regions with a low population density. It was decided to set them apart or protect them as national parks in order to satisfy the broad desire for outdoor leisure. Additionally, they were managed by a bureaucracy that was accountable to those who enjoyed spending time outside.

Regardless of disparities in biotic requirements, socioeconomic structures, or practicalities, this concept was disseminated, embraced, and occasionally enforced across borders. As a result, certain civilizations, which were frequently destitute, were subjected to living conditions that were exceedingly unfavourable. Since then, a significant number of national parks have been established all over the world in order to protect the natural environment. This has resulted in a severe influence on the towns that are located in close proximity to these parks. For this reason, relationships between the park and the neighbourhood are an essential subject that should be taken into consideration (Fortin & Gagnon, 1999). We might be able to gain insight from the history of civilizations that fell because the trees that provided them with sustenance were cut down. The accumulation of all of these factors makes it quite clear that additional area need to be covered with trees, and the forest that is already there ought to be conserved. On the other hand, different people have varied understandings of what the word "protected area" means in the context of the current circumstances. As Madhav Gadgil (1998) so eloquently explains, "National Parks, wildlife sanctuaries, gene-pool reserves, and other similar places are all examples of Protected Areas (PA) where the primary objective is the conservation of flora and fauna." Protecting the "people" (the global community) from the "people" (the locals) is the responsibility of the "people" (the government department that is armed with constitutional laws).

In 1994, the International Union for Conservation of Nature (IUCN) presented a definition of national parks that was more contemporary and widely accepted. According to the International Union for protection of Nature (IUCN), national parks are protected places that are administered primarily for the purpose of leisure and ecological protection. This is the precise definition that is being used: 3 A natural area of land and/or sea that has been designated for the following purposes: (a) to protect the ecological integrity of one or more ecosystems for the benefit of current and future generations; (b) to prohibit exploitation or occupation that would undermine the overall purpose of the area's designation; and (c) to serve as a foundation for opportunities related to spirituality, science, education, recreation, and tourism that must all be compatible with the environment and cultural norms.

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INDIA'S PROTECTED AREAS

The scientific reality that forests sustain more plant and animal species than any other ecosystem, that they manage both local and global temperature, and that they have an influence on the energy balance of the world is acknowledged in the Indian forest policy statements that were made in 1952 and 1988. In forest policy documents, which are visible in regulations dealing to forests, the preservation of the resource is clearly addressed. This is especially true in locations that are biologically significant, such as mountains and river sources. Because of this concern for conservation, large swaths of natural forests have been designated as National Parks, Wildlife Sanctuaries, Reserved and Protected woodlands, and Closed areas in a number of different regions across the United States.

Clearly stated in Article 48A of the Indian Constitution, "The State shall endeavour to protect and improve the environment and safeguard the forests and wildlife of the country," the state is obligated to make every effort to protect and improve the environment. Additionally, Article 51G states that "every Indian citizen shall have compassion for all living creatures and shall protect and improve the natural environment, including forests, lakes, rivers, and wildlife." The Indian Board of Wildlife (IBW) defines a national park as "An area dedicated by the statute for all time to conserve scenery, natural and historical objects of national significance, and wildlife, and where provision is made for the enjoyment of all alike by the public." In other words, a national park is a place where the public is able to enjoy all of these things. The establishment of wildlife parks was one of the many ways in which the government attempted to protect wild species and the environments in which they lived. This is a traditional method of conservation that is utilised by the majority of developing countries. It places an emphasis on custodial management, which includes the establishment of parks and reserves, where the bulk of human activities are restricted inside the limits. A little more than four percent of India's land is protected, which helps to assure the survival of endangered species and has a direct influence on the three million people who live in protected areas, in addition to having an indirect influence on a number of other people who live in villages that are located nearby. There were around 83 national parks and 447 sanctuaries across the country in the year 1997.

EXPENSE TO THE LOCALS

The strategy of evicting populations from national park regions has allowed the "park vs. people" debate to gain broad resonance in recent years. In spite of the fact that regulations governing wildlife parks differ from country to country, they frequently have a detrimental effect on the lives and means of sustenance of the adjacent communities since they render the "traditional" activities of such villages illegal. The establishment of protected zones does not, in and of itself, provide support to the marginalisation of persons who are prevented from entering the territory. People, on the other hand, frequently fail to realise the fact that it is an integral component of the general process. Although it is not possible to determine with a high degree of precision the average rate of extinction of species, it has been observed that this rate has dramatically increased over the course of the past

several decades. In addition to the numerous other reasons, one of the most important ones is that protected zones are imposed on a community without the residents being consulted or taken into consideration, which results in conflict. As a result, the local population is forced to incur the costs and has limited access to the land, while the benefits accrue to society as a whole. The Forest Act and the Wildlife Protection Act are exclusively concerned with the preservation of the environment, despite the fact that the relocation of projects is supported by the general welfare of society. The process reduces displacement to an implicit occurrence that is disregarded as inescapable and irrelevant when it has been reduced to this level.

People who live in close proximity to forests are the ones who are most likely to be affected by the impacts of deforestation. On the other hand, despite the fact that decisions about land usage in their homelands frequently put their cultural and economic existence in peril, these individuals are rarely represented when such decisions are being made. An illustration of the lack of engagement of local organisations in the decision-making process regarding development is provided by the fact that they were not included in the planning process. They frequently take on the role of subservient followers and are under the need to make judgements. The decision to move them is taken, but the implementation of the decision is delayed, which causes their suffering to become even more intense. They are forced to live a life that is filled with uncertainty, hunger, and waiting against their will. While this is taking place, their counterparts in the villages that are next to them are gradually making progress and reaping the benefits of the aid provided by the government. A population that is sacrificed for the sake of national or international concerns tends to remain stagnant for a considerable amount of time. Despite the fact that there are often issues over the timing of land declaration for public use and related procedures such as submitting an objection, intention, and notice, there is no timeframe for the completion of final rehabilitation. In many of India's sanctuaries, the process of relocating and rehabilitating those who are located within the sanctuary territory has been neglected for a considerable amount of time. One such instance is the Tadoba Tiger Reserve, which serves as an excellent example. Residents of the six villages that are located within the reserve have been warned for the last seventeen years that they would surely be transferred and that they will be given the opportunity to recover; nevertheless, as of right now, not even a new spot has been chosen.

RESEARCH AREA

There has been a significant amount of time that has passed since the Tadoba-Andhari Tiger Reserve (TATR) was established. According to maps 1 and 2, it may be found in the Chandrapur district of the state of Maharashtra. An original declaration of the Tadoba Sanctuary was made in 1931, and it has a total area of 116.55 square kilometres. The year 1955 marked the beginning of Tadoba National Park's transformation.

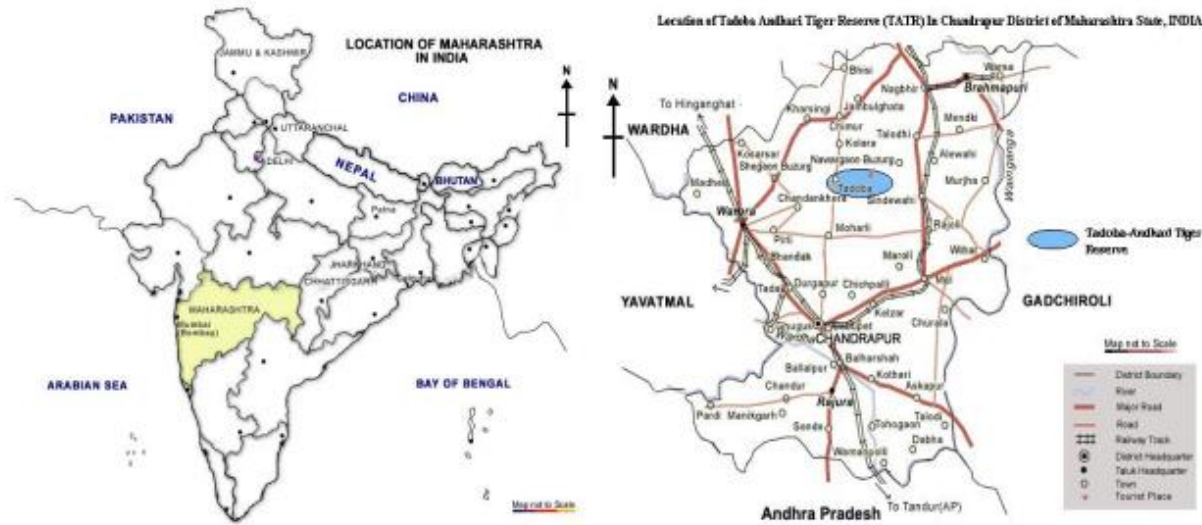


Figure 1.1 Where the Tadoba-Andhari Tiger Reserve, Chandrapur district, and Maharashtra State are located

According to the policy that was in place at the time, which was to build species-specific reserves, the park was established without the participation of any human beings. In order to preserve the forest as a natural habitat for animals, notably tigers, it was considered that at least a portion of the forest should be preserved in its original state. Due to the fact that the existence of humans was considered to be "unnatural," it was decided to restore the villages that were situated within the national park or within the five sanctuary regions. The relocation of two of these communities was completed in a short amount of time; they were situated within Tadoba National Park. The two communities that were located within the park, Khatoda and Pandharpauni, were relocated to a location that was beyond the limits of the national park. An additional relocation is now taking place at Pandharpauni, which was previously known as Navegaon (Ramdegi). This is due to the fact that it is now a component of the Tiger reserve that was only recently formed. A greater financial strain has been placed on the community as a result of the problem of frequent relocations. Since the park was proclaimed, the territory has not been included in the prescriptions for the operating plan. This prohibition on the collection of non-timber forest products, which includes gum, mahua flowers, thatch grass, and other similar items, dates back to 1968.

To serve as a buffer zone for Tadoba National Park, the Tiger Reserve area was enlarged in February 1986 to become the Andhari Tiger Sanctuary. This sanctuary included a total area of 509.27 square kilometres when it was established. Since then, preparations have been underway to relocate six communities that are located within the sanctuary territory that has been defined. In the meanwhile, upon receiving authorization from the federal government in 1993, the state administration named the whole territory that encompasses Tadoba National Park and Andhari Wildlife Sanctuary as the Tadoba-Andhari Tiger Reserve in the year 1995. This reserve had a total area of 625.40 square kilometres. Since 1990, however, every single one of the rights and concessions that were granted to the local community have been suspended. The rights to harvest minor forest products, such as tendu leaves, were suspended in 1992, a significant amount of time before the Tiger Reserve was officially formed. There is a restriction on grazing at the moment, and the only type of wood that may be removed outside of the sanctuary

region, which is to say outside of the area that was formerly a national park, is wood that has died or fallen. "The local people are deprived of the rights to use the protected area to meet their requirements of firewood, grazing, and non-timber forest product (NTFP) collection, etc., which has created genuine problems for them," unambiguously stated the tiger reserve management plan. "This has created genuine problems for them."

Engulfing Villages

Every one of the six villages that are located within the reserve has been waiting for their transfer for more than fourteen years, ever since they were notified that their home will be transformed into a refuge for animals. They never had the opportunity to be advised or convinced; rather, they were only passive bystanders as the vegetation in their immediate vicinity got more prosperous while they themselves became less prosperous. Jamani, Nawegaon, Palasgaon, Rantalodhi, Botezari, and Kolsa are the names of the cities and towns that make up the neighbourhood. When it rains, nearly all six of the settlements are inaccessible to pedestrians and drivers. In none of the villages are there any low-cost stores or roads that are suitable for all kinds of weather. In the whole community, Kolsa is the only one that possesses both a main health facility and a post office. There are six different villages, but only two of them have access to state transit, and five of them have power supplies that are inconsistent. After getting their graduation from the fourth grade, children are either compelled to quit attending school permanently or are required to go to far-off places in order to continue their education. This is the case despite the fact that every village has a primary school. Each of these communities is located between 12 and 34 miles away from the marketplace for their respective settlements. In order to make their purchases, which include everything from salt to a pair of bullocks, they are need to go a considerable distance.

Features of the Demographics

A total of five hundred twenty-seven families are distributed over the six communities. The gender ratio favours women by a margin of 49 to 50, mostly as a result of male members departing the group in pursuit of career opportunities. People who are between the ages of 14 and 55 are considered to be members of the "working class," which accounts for 56.27 percent of the population. Despite the fact that more than forty percent of the villagers are illiterate, just one percent of them have a level of literacy that is higher than the fourth grade. The majority of the houses in the region are made of mud and have thatched roofs on top of them. Agriculture is the most common kind of employment in the region, and every single head of household is employed in the field. On the other hand, just fifty percent of the households own property, and the land that they do own is all smaller than two hectares in size. All of the surviving individuals are currently performing manual employment in the agricultural sector. The presence of cattle in the majority of residences is considered to be an indication of wealth. Twenty-four buffaloes, 118 sheep, 280 goats, 611 cows, and 634 bullocks were among the animals that were owned by the six respective villages. The importance of these numbers is further increased due to the fact that all of these cattle graze in the wooded region where there is an abundance of grass.

Earnings and Jobs

Illegal bamboo poaching is the other primary source of cash for the company. A scenario in which villagers are compelled to participate in the illicit bamboo trade has been brought about by a number of factors, including the

ownership of small plots of land, a large percentage of people who are without land, a dearth of alternative employment opportunities, and restricted access to the labour market. For the purpose of this study, data on earnings were collected from two different sources: legitimate (generated from labour, small-scale companies, and agriculture) and illegal (mostly from hunting bamboo). There are very few options to earn a livelihood that is considered to be of a good standard, and it is a fact that every single house is below the poverty line. Additionally, there is a readily available supply of forest products that have access to an assured market. In addition, it is true that the villagers had previously utilised this resource in a sustainable manner; nevertheless, when the tiger reserve was established without the knowledge or consent of the locals, they were immediately changed into encroachers. Additionally, this shift did not result in the production of any new revenue streams or alternatives for fuel or feed.

CONCLUSION

There is a possibility that the formalisation of the international concern over the decline of biodiversity at the national level might result in unintended repercussions. In developing countries like India, decisions about land use are influenced by the competing demands of different development goals and environmental preservation objectives. It is possible that people who have lived in such locations for generations would be compelled to leave in order to protect the environment through a management strategy known as "exclusive" management. This strategy entails the establishment of large zones that are devoid of human habitation. An unbalanced cost sharing between the local population and humanity as a whole is the result of the formation of protected areas for the goal of conserving biodiversity. This results in a negative externality for the people who live in the region. To add insult to injury, if the people are compelled to make the decision to restrict access to a specific region, that region might be considered "protected" for the purposes of accounting, but in reality, it might be the victim of unreported poaching, which would result in a loss for the community on a local, national, and international scale. As a consequence of this, it is necessary for local levels to give solutions to global problems that are associated with the conservation of biological diversity.

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