

Impact of Protected Areas vis-a-vis Human Animal Conflict

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Abstract

People and animals are increasingly coming into conflict over living space and food. Animals suffer when people enter their habitat, people suffer when animals enter their homes and fields. This is mainly due to expanding human populations and the continued loss of natural habitats. Human animal conflicts are an important aspect of management of forests as they have enormous implication to the well being and livelihood of the people in our country. The protection of wildlife has a long tradition in Indian history. The real problem does not lie in the protection and conservation but in the men and animals. Human activity is taking its toll on our closest relatives. The animals are being squeezed into smaller and smaller areas of remaining natural habitat, which are surrounded by crops that herbivores like to eat. Hence, Human-Wildlife Conflict is any interaction, between wildlife and humans which causes harm, whether it's to the human, the wild animal, or property. Human Animal Conflicts (HAC) also weakens human welfare, health and safety, and has economic and social costs. Nuisance encounters with small animals, exposure to zoonotic diseases, physical injury or even death caused by large predators attacks have high financial costs for individuals and society in the form of medical treatments to cure and prevent infections transmitted from animals. Humans can be economically affected through annihilation and damage to property and infrastructure livestock depredation, transmission of domestic animal diseases, such as foot and mouth. On the other side animals are hunted by man for flesh and eggs as food, hide, skin and shell for fancy leather articles and handicrafts, teeth and bones as charms, fat for alleged medicinal properties and venom for preparation of medicinal products as well as they also hunted for the protection of their own life. HAC not only affects rural and vulnerable communities, but commercial cattle ranches too. It is clear that with this interface of human and large mammals, conflicts are inevitable.

Keywords: Human Animal Conflicts; Natural Habitats; Livelihood; Vulnerable Communities.

Introduction

The protection of wildlife has a long tradition in Indian history. Use of natural resources was a prerequisite for many hunter-gatherer societies, which date back to at least 6000 BC. The adoption of

a National Policy for Wildlife Conservation in 1970 and the enactment of the Wildlife (Protection) Act in 1972 led to significant growth in the PA network. In spite of various rules and laws of Wildlife Protection Act, the encroachment of natural habitat of animals' i.e. forest, making the life vulnerable for the people who are residing in core and buffer zone.

Nevertheless, Animals protection is necessary to balance ecology and biodiversity. In order to achieve this object government established Protected Areas to maintain the animals' niche and their life.

Extensive clearance of forests accompanied the advance of agricultural and pastoral societies in subsequent millennia, but an awareness about the need for ecological prudence emerged, and many so-called pagan nature conservation practices were retained. As settlers began to cultivate more and more land, the hunting reserves increasingly became refuges for wildlife. Many of these reserves were subsequently declared as national parks or sanctuaries, mostly after Independence, in 1947. Such examples include Gir in Gujarat, Dachigms in Jammu & Kashmir, Bandipur in Karnataka, Eravikulam in Kerala, Madhav (now Shivpuri) in Madhya Pradesh, Simlipal in Orissa and Keoladeo, Ranthambore and Sariska in Rajasthan.

Wildlife, together (Protection) Act, 1972, has provided for the creation of posts of chief wildlife wardens and wildlife wardens in the states to exercise statutory powers under the act. Under this act, it is also mandatory for the states to set up state wildlife advisory boards. Secondly, the inclusion of protection of wild animals and birds in the concurrent list of the constitution has provided the centre with some legislative control over the states in the conservation of wild life (Pillai, 1982). The situation has improved since all states and union territories with national parks or sanctuaries have set up wildlife wings.

Along with above factors and situations human animal conflicts are an important aspect of management of forests as they have enormous implication to the well being and livelihood of the people in our country. As part of the strategy for conserving our rich bio-diversity, the Ministry of Environment and Forest (MoEF) adopted a major policy initiative by declaring a number of forest areas in the country as Protected Areas (PAs). With above background, the objective of this research paper is to observe and analyse the man-animal conflicts which

results harms for both of them in the same ecology and habitat.

Significance of Animal Species Diversity in Human's Ecology except Conflicts

Apart from the ethical and aesthetic reasons, is there any reason to fear that human survival is at risk if animal diversity is not preserved? Can human exist surrounded only by agricultural fields, planted forests and the like? This question is not easy to answer. In the short term, natural ecosystem can probably lose species without any great impairment of function. For instance, many planted forests are much simpler than the natural forests they replaced. As long as the environment does not change very much, ecosystems can apparently lose many of their rare species without any visible effects by hunting. In some cases, common animal species, such as passenger pigeons, have disappeared or been drastically reduced without endangered human survivals.

Yet, environment inevitably changes, and sometimes drastically. It is then that the role of obscure species sometimes becomes very important. When dinosaurs became extinct, an obscure group, primitive mammals, suddenly evolved into the dominant role they still play. The effect by the entrance of human into animal zone may be catastrophic for many species, which may become extinct and also problematic for the human. Therein lays the scientific importance of biodiversity in human ecology: It increases the likelihood that at least some species will survive and give rise to new lineage that will replenish the human ecology by animals.

Types of Protected Areas (PAs)

Broadly speaking, there are six types of PAs in the country (Table 1) each of these six categories has distinct features in their objective and management practices. All together, their number is 697. Of these, over 73% are Wildlife Sanctuaries (WLS), followed by National Parks (NPs), Conservations Reserves and Community Reserves.

Table 1: Number and Type of PAs in India

Type of PA	PA		Area Covered	
	Number	Percentage	sq km	Percentage
National Park (NPs)	97	13.8	39049	1.19
Wildlife Sanctuaries (WLS)	514	82.9	118202	3.60
Tiger Reserves (TRs)	29	4.1	38620	6.69
Biosphere Reserves (BRs)	15	2.1	72001.9	—
Conservation Reserves	43	6.2	1107.06	—
Community Reserves	4	1.0	2088	—
Total	702	—	—	—

Source: National Wildlife database, WII, July 2009

Number and Distribution of PAs

Wildlife Sanctuaries (WLS)

The Table 1 provides information on the number of WLS in India and the total area covered. There are 514 existing WLS in India covering an area of 118,202 sq km, which is about 3.6% of the geographical area of the country (National Wildlife Database, July, 2009). Another 219 sanctuaries are proposed in the Protected Area Network Report covering an area of 16,669 sq km. This amounts to about 4.1% of the total geographical area (3,287,263 sq km) of the country.

Nationals Parks (NPs)

In respect of NPs (Table 1) there are 99 NPs in the country covering an area of 39,049 sq km or 1.19% of the total geographical area.

Biosphere Reserves (BRs)

Table 1 shows that there 15 BRs in the country covering an area of 72, 001.9 sq km of the total geographical area. Of the total area covered by the BRs 12,446.25 sq km is core area, 27, 873.01 sq km is buffer zone and 2,520.94 sq km is transition area (this information was not available for all the BRs and therefore, is based on only those BRs where such information was available).

Tiger Reserves (TRs)

There are 28 TRs in the country covering a total area of 38,620 sq km, constituting 6.69% of the total geographical area (Table 1).

Conservation Reserves

Table 1 gives details of 43 Conservation Reserves in the country. As expected, the total area covered by these is 1, 107.06 sq km.

Community Reserves

This is a new concept recently introduced in the country. As of now, four areas are being managed under this management regime like Keshopur Chhamb, Lalwan, Kadalundi and Kokkare Bellur (Table 1).

Number of People Living in PAs

Although it is extremely important to know the number of people living in an around PAs, it is unfortunate that no systematic study is available that

gives an accurate picture about it. Therefore, one has to depend on a number of diverse sources to make a reasonable estimate.

As per detailed study (Indian Institute of Public Administration, 1989) that there were an estimated three million people (600,000 families) living within the Protected Areas. The survey also reported that 56% of the national parks and 72% of the sanctuaries had human population inside their areas. It was also found that people from 36% of the NPs and 56% of the sanctuaries removed NTFFPs. In the late another survey was conducted (IIPA, 1990) wherein an effort was made to verify the information on human habitation. The study estimated that 3.7 million people (740,000 families) lived in the 600 odd PAs of the country.

Study carried out by Mehta et al. (1991). The main findings of the study are summarized below:

1. Information was obtained separately for human population residing inside each park or sanctuary and those living in areas adjacent to it (i.e. within a 10 km radius). An area of 10 km specified because studies have shown that, by and large, direct sustained impact on the PA comes from people living inside the PAs or within 10 km of the boundary.
2. Population within park and sanctuaries: Of the 32 NPs and 138 sanctuaries responding, 18 (56%) and 100 (72%) respectively reported human populations within their boundaries.
3. Population densities: Since the absolute quantum of population inside is not a good indicator of the potential biotic pressure it can put on to the ecosystem, the database was used to work out population densities. This was worked out by simply dividing the total population with the total area of each and sanctuary. This was compared with the average population density of India, which is about 2.5 per ha. The percentage of population of the PAs in different ranges of density is summarized in table 2 which reveals that:

The range of density of persons/ha varies between 0.01 and 0.99 among the 16 NPs, whereas in 101 WLSs it varies from 0.01 to >10. The large number of PAs fall within the density class of 0.01 to 0.09 (n=11). A majority of the WLSs fall within the density range of 0.01 to 4.99 (95/101).

Population Adjacent to Parks and Sanctuaries

Of the 23 NPs and 132 sanctuaries responding 19

Table 2: Ranges of Population Density around Protected Areas

Density (Person/ Ha)	No. of PAs		Total	Average
	NPs	WLS		
>10.00	0	3	3	2.6
5.0 to 10.00	0	3	3	2.6
1.0 to 4.99	0	24	24	20.5
0.5 to 0.99	1	14	15	12.8
0.1 to 0.49	4	35	39	33.3
0.01 to 0.09	11	22	33	28.2
Total	16	101	117	

Source: Mehta et al., 1991

Table 3: Population pressure on national parks and sanctuaries

Pressure	No. of PAs		Total
	No of Persons per ha.	National Parks/ Sanctuaries	
>1000.00	0	2	2
100 to 1000.00	0	3	3
10.0 to 99.00	2	9	11
5.0 to 9.90	2	11	13
1.0 to 4.99	6	38	44
0.5 to 0.99	1	19	20
0.1 to 0.49	3	26	29
0.01 to 0.09	2	6	8
Total	16	114	130

Source: Mehta et al., 1991

(83%) and 115 (87%) respectively, reported populations in their adjacent areas.

An index of population pressure was worked out for each PA by dividing the total population reported from adjacent areas with the total area of the park or sanctuaries are presented in Table 3. The key observations that emerge from the Table 3 are:

The range of population pressure of persons/ ha varies between 0.01 and 99 amongst the 16 NPs, where as in 114 WLSs, it varies from 0.01 to >1000. The largest number of PAs fall within the pressure class of 1.0 to 4.99 (n=6). A majority of the WLSs fall within the density range of 0.1 to 4.99 (93/130).

Number of Villages and People in the Core Area and in the Tiger Reserves

Naraian et al. 2005 computed as estimate of the number of villages and people in the core areas and

in the Tiger Reserves of the country. There are 273 villages with 19,215 families and 101,077 population in core areas and in the Tiger Reserves. As expected, the number of villages, families and population outside the core area in the Tiger Reserves is far greater than in the cores area. There are 1,487 villages with 66,516 families and with a population of 380,535 outside the core area of Tiger Reserves.

Livestock Situation within and Around PAs

Around most of the PAs in the country, there is substantial population of cattle that are traditionally grazed in the PAs. However, the actual number and types of animals in and around the PAs is not known. The animals raised by the people around PA include primary cattle, goat, sheep and buffalo. The only readily available data on livestock around PA is by Mehta et al. (1991). The salient features of the study are:

Table 4: Ranges of Population Density around Protected Areas

Density (No. of Cattle per ha)	No. of PAs		Total	Percentage
	NPs	WLS		
>10.00	0	1	1	0.7
5.0 to 10.00	0	1	1	0.7
1.0 to 4.99	1	10	11	8
0.5 to 0.99	0	22	22	16.1
0.1 to 0.49	5	57	62	45.3
0.01 to 0.09	8	32	40	29.2
Total	14	123	137	100

Source: Mehta et al., 1991

Data on cattle population around the PAs is available for 137. Out of these, 14 are NPs and 123 are WLSs. The range of cattle density/ha is given table 4. The range of cattle density in these 14 PAs varies between 0.01 and 4.99, whereas in the 123 WLSs it varies from 0.01 to >1000. The largest number of PAs fall within the density class of 10 to 0.09 (n=8). A majority of the WLS fall within the density range of 0.01 to 4.99 (121/137).

In another study, Kothari et al. (1989) observed that only 39% of NPs and 73% of sanctuaries allowed grazing of livestock within their boundaries. It is highly noteworthy that there are several PAs, which do not allow grazing; however the same study observed that the cattle were actually being grazed in 67% of the NPs and 83% of sanctuaries (Kothari et al., 1989).

Impact of PAs on Local Communities

The creation of PAs has substantial impacts on lifestyle and livelihood of the people living in these areas. The impacts can be divided into three types: 1. Right related to access to resources 2. Restriction on grazing and 3. Man animal conflicts in PAs.

The above impacts have been examined separately in the context of NPs and WLSs. It is appropriate here to give legal definition of NPs, WLSs and Community Reserves.

Right Related to Access to Resources

The information of the protected areas has resulted in conflicts in many PAs. This is mainly due to the reason that after the formation of the PAs, the forest rights and the access to the forest resources is curtailed, which resulted in the resentment of the entire population of villages in the buffer zone (sometimes, even outside buffer zone villages) who depended on these areas for their livelihood. The experience of top-down conservation programme in recent decades has led to breakdown of the local communities relationship with the natural environment and is the cause of the increasing hostility of local people towards conservation.

It is evident from legal definitions of PAs that the access to resources in NPs is quite different compared to WLS and Community Reserves. Although detailed studies that have examined the nature and extent of the impacts of PAs across the country, it is observed that the loss of access to biomass and other resources that provided subsistence need such as food, fuel wood and fodder, have improvised the people in and around PAs, resulting in constant conflicts between

local communities and the park management. As expected, the negative impacts have been rather severe in NPs.

In general, no alternative strategies of livelihood were planned for the people while creating PAs. In retrospect, this lack of sensitivity towards the inhabitants of PAs has often resulted in conflicts with the park management.

It is appropriate here to cite the key observation made by Kothari et. al. (1989) They examined the issues of rights and leases in the studied PAs. They found that in 19 (43%) of the 44NPs and 128 (68%) of the 187 sanctuaries, there existed some rights or leases. This meant that these 19 national parks were still not being protected according to the legal requirements. Also, the data collected with regard to the completion of legal procedures (and quoted earlier) revealed that only 16 sanctuaries had completed the prescribed procedures. As at the time it was mandatory to extinguish all rights even in sanctuaries (prior to the 1991 amendment), this means that these 128 sanctuaries depicted existence of rights, had not completed their legal procedures and were, as such, not being managed as stipulated.

Restriction on Grazing

Livestock is an integral part of the livelihood strategy of the tribals across the country. Severe restrictions have been imposed on the grazing of animals in the PAs. This has resulted not only in loss of livelihood options but also impacted the cultural values of the people.

Livestock Killed

From 1979 to 1980 and from 1983 to 1984, 1648 livestock from within the PAs and 3322 from adjacent areas were killed (All India Survey, 1984). According to a recent study, the species compositions of prey killed by lions within the PAs from 1987 to 1990 showed that 64.8% of kills were wild prey and 35.2% were livestock (Chellam, 1993). The easy availability of livestock prey in and around the PAs has significantly changed the diet of the lion and consequently affected its "wildness". In fact, the lions that have dispersed out of the PAs are totally dependent on livestock for their survival, although this dependence is at least partly due to the scarcity of wild prey.

Man Animal Conflicts in PAs

The creation of PAs had many impacts as

mentioned above on the people whose rights were taken away. Consequently, 363 plus 63 sanctuaries and national parks which account barely 4% of the country's geographical area. These forests areas have been encroached by villagers as well it is also the habitat of animals. So, the protected parks and sanctuaries are not free from human intrusion and cattle grazing beside it animal attack on human and their properties. About 50% of the national parks and 70% of sanctuaries where the people living inside the core zone. Most of the buffer zones have disappeared and the fringes of these sanctuaries have turned into major battle ground between man and animals. In one of the study conducted by Rao et al (2002) in the surrounds of Nanda Devi BR (Uttarakhand), it was found that crop yield losses

and livestock depredation were serious problems in the most buffer zone village.

In the late 1980s, the Indian Institute of Public Administration (IIPA) conducted a questionnaire based survey in the PA network in India. It discovered that 60-70% of the managers who responded to its survey had filed cases against people for illegal grazing or hunting, setting reserves on fire and other similar offences. The managers also reported physical confrontation with local communities. By then it was clear that conflicts between protectors of the parks and people who lived in and around them were growing fast and becoming the key threat to conservation. Box 1 gives illustrative examples of conflicts reported from several PAs in the country.

Box 1: Human Animal Conflict in the PA

Some cases of human-animal conflicts make news

1. In Pakka sanctuary, Assam, 18 wild elephants were reportedly poisoned to death in 2001;
2. In 2002, four more were killed. The administration had to ban the sale of pesticides in the district in a bid to stop the killings.
3. In Palamau Tiger Reserve, Jharkhand, on one hand, there is tension with villagers who are known to kill elephants and on the other, with naxalites who rule the area.
4. In Bandipur, again, severe drought in 2003 forced farmers to drive their cattle into the forests of the reserve.
5. In 2004, there were reports of electric fences and poison being used by farmers living near the forests to kill elephants.
6. In the well protected Kanha Tiger Reserve in Madhya Pradesh, in January 2005, there were reports of 10 wild dogs and one tiger being found poisoned by neighboring villagers.
7. In Pench, Maharastra, three tigers were killed in 2004 by villagers in retaliation for cattle deaths.
8. The project Tiger succeeded in increasing the population reported that more than 450 people have been killed by tigers since 1978 in Dudhwa (Uttar Pradesh).
9. In the Dudhwa Tiger Reserve in Uttar Pradesh, tiger poisoning cases been reported frequently till recently.
10. In Assam, hundred peoples had been killed by elephants and they raid the crops which come in the way.
11. In 1975, Tamilnadu, project crocodiles was launched to save this reptile from extinction. The project was successful and they grew three times. One third of them were released into rivers but there were still above 7000 in 32 farms on the country. The fisherman of those areas where these crocodiles attacked them and absorbed the fish population.
12. Cattle lifting are a common phenomenon. The people of Sunderban, Ranthambor and other reserves are always afraid of these animal terrorists.
13. In Madhya Pradesh, 166 human deaths and 3,131 human injuries from wildlife were reported from the state between April 1998 and March 2003. In addition, 14,090 heads of cattle were lost to large predators.

Different Interactions between Men and Animals

There is a complex relationship between human and animal. Some of these relationships play a vital role in the regulation of both populations. Successful

parasitism represents something of compromise between two populations. Predator-prey system is the product of long evolutionary process. A close relationship existing, but it is not always beneficial.

Interactions among both Human and Animal			
Type of Interaction	Human	Animal	Nature of Interaction
Neutralism	N	N	Neither both of population effects the other.
Competition	-ve	-ve	Direct inhibition of one species by the other or indirect inhibition when a common resource is in short supply.
Parasitism	+ve	-ve	Population of Human, the parasite, generally smaller than animals, the host.
Predation	+ve	-ve	Population of men, the predator, generally larger than animals, the prey.
Amensalism	-ve	N	Population of human inhibited, animal not affected.
Commensalism	+ve	N	Population of Human, the commensal, benefits while animals the host not affected.
Protocooperation	+ve	-ve	Interaction favourable or both but not obligatory.
Mutualism	+ve	+ve	Interaction favourable to both but obligatory.

N: No Significant Interaction

-ve: Indicate Beneficial Effect on Growth, Survival or other Population Attributes.

+ve: Harmful Effects

Main Obstacles to Protect Human and Animals from Harms in PAs

1. National development programmes undervalue biological resources monetarily.
2. Over exploitation of biological resources (eg. Natural habitat of animals) yields great profit for traders and manufacturers (who can externalize environmental costs) while impoverishing the local people (especially forest dwellers) who must have few other sources of livelihood and who must pay the environmental costs of over exploitation.
3. The species and ecosystems upon which human survival depends are still poorly known.
4. Scientific research often does not meet the need of resource and protected area managers.
5. Conservation activities tend to be focused too narrowly.
6. Institutions assigned responsibilities for conserving animal diversity have lacked sufficient financial and organizational resources to do the job.

Recommendation

1. Improvement of habitat to augment food and water availability and to reduce movement of animals from the forests to the habitations.
2. Encouraging State Governments for creation of a network of Protected Areas and wildlife corridors for conservation of wildlife.
3. Awareness programmes to sensitize the people

about the minimize conflicts.

4. Training programmes for forest staff and police to address the problems of human-wildlife conflicts.
5. Issuance of guidelines to the State Governments for management of human-animal conflict.
6. Providing technical and financial support for development of necessary infrastructure and support facilities for immobilization of problematic animals.
7. Providing assistance to State Governments for construction of boundary walls and solar fences around the sensitive areas to prevent the wild animal attacks.
8. Empowering the Chief Wildlife Warden of the State/Union Territories to permit hunting of such problematic animals under the provisions of the Wild Life (Protection) Act, 1972.
9. Providing assistance to the State Governments for eco-development activities in villages around Protected Areas to elicit cooperation of local community in management of the Protected Areas.
10. In the buffer zones areas for human use, should be clearly demarcated. Here with the help of villagers in surroundings areas fuel and fodder should be grown to meet their needs and the remaining parts should be developed for animals to roam around free.
11. Encouraging and supporting involvement of the research and academic institutions and leading voluntary organizations having expertise in

managing human -wildlife conflict situations.

12. Conduct social science research to determine how local people manage their resources and how and which kind of changes in resource availability and land use affect human behaviour and how the animals are socio culturally important in human ecology.
13. Any strategy to foster the sustainable use of biological resources must be based on public involvement. Indeed initiative that do not involve local communities generally are doomed to fail. Indigenous people in many parts of the world are especially reliant on natural resources for their cultural continuity and economic well being. Their role in conservation should be given particular attention, and they should be given opportunities to participate as major players in the design of conservation programmes affecting their resources. Local people should be closely associated with the authorities responsible for both the management of biological resources and the establishment and management of protected areas.

Conclusion

According to the environmentalists there is around 33% area of forest in a country. For ecological balance there are 60% forests on the hilly mountainous terrain and 20% forest covers on plains. In India the data shows, it has 22.8% area under forest, but the recent satellite pictures show that it has hardly 10% to 11% forest area. These forests are natural habitat for the wild animals which are usually occupied by human beings as well government organizations for various purposes. Man is consequently depends on animal while animals like to live within their ecological environment. So the number and variety of wild life is affected by the expansion and shrinking of natural habitat. Beside that human and their properties have been decimated by animals. Dwivedi (2003) reported that cattle killing cases are prevalent when the domestic animals are sent for grazing in forest or Pas rich in predators. The case of livestock damage are mostly concentrated in districts rich in wild animals' population. Animals suffer when people enter their habitat. Pabla (2005) stated that a large number of

people are adversely affected by conservation. For such people, they fail to comprehended the justification for protecting the dangerous competitions and predators at considerable costs to the society in general and forest dwellers in particulars. People suffer when animals enter their homes and fields. This is the fundamental reason which ever creates confliction between human and animals.

References

1. Chellam, R. Ecology of the Asiatic Lion Mimeograph, April. 1993
2. Dwivedi, A.P. Loss Suffered by Locals due to Pas. Paper Presented in Seminar held at SFRI, Jabalpur. 2003
3. Forest Survey of India https://www.iirs.gov.in/iirs/sites/default/files/.../thesisshiva_chavan 1984.
4. Indian Institute of Public Administration www.moef.gov.in/.../Environment%20Annual%20Report%20%20Eng..pdf 1989
5. Kothari, A. et al. Management of Wildlife Sanctuaries and National Parks in India: A Status Report. New Delhi: Indian Institute of Public Administration 1989.
6. Mehta, R., Singh, S., Kothari, S. India's National Parks: A Management Profile. Environment Studies Division, Indian Institute of Public Administration, New Delhi. 1991
7. Narain, S., Singh, S., Panwar, H.S., Gadgil, M. The Report of Tiger Task Force. Joining the Dots. Published by Project Tiger, Union Ministry of Environment and Forests, Government of India 2005.
8. National Wildlife Database www.wiienviis.nic.in/Database/Protected_Area_854.aspx 2009.
9. Pabla, H.S. Use it or Loose it: The mantra for man-animal co-existence. International Seminar on man-animal co-existence, Kaziranga Assam 2005.
10. Pillai, V.N.K., Status of wildlife conservation in states and union territories. In: Saharia, V.B. (Ed.), Wildlife in India. Natraj Publishers, Dehra Dun. 1982; Pp. 74-91.
11. Rao, K.S.R.K, et al Crop damages and livestock depredation by wildlife: a case study from Nanda Devi Biosphere reserve. Jour. Of Environmental Management. 2002; 66: 317-327.