

TIGER CONSERVATION IN INDIA : PAST, PRESENT AND FUTURE

V.K. MELKANI*

Introduction

The Tiger, *Panthera tigris tigris*, largest among cats occupies the status of the national animal of India. Indian mythological and religious descriptions, its epics and literature are never complete without the Tiger. Indian folklore in various languages and cultures depicts Tiger as a symbol of beauty, charm, strength and power. It is indeed sad that the symbol of our cultural and natural heritage is under great threat for its very survival in its home, the wilderness of Indian forests. There will be no surprise that our future generations may be forced to see Tigers only in books, films and zoos if efforts needed to provide it a safe life are not strengthened and enforced in the field. A sense of utmost commitment among all of us will be necessary to dedicate ourselves for this urgent noble cause of conservation.

Reliable data on the number of Tigers in the country in the very recent past is not available, however, one estimate put the figure of number of Tigers in India at 40,000 at the beginning of 20th Century (Weber and Alan, 1996). It is a fact that less than a hundred years ago, the Tiger population was geographically dispersed across the length and breadth of the country. The earlier years of the twentieth century witnessed a sharp decline in population of Tigers which was due to uncontrolled

hunting and poaching, indiscriminate destruction of habitat as a result of unprecedented increase in the human and cattle population and last but not the least, the rising trade of Tiger body parts. A country wide census in 1972 revealed the magnitude of damage done to the population of this majestic animal as its numbers were found to be less than 2,000 in the Indian forests. A great crisis indeed (Dey, 1996; Weber and Alan, 1996).

Global Scenario

Eight sub-species of Tiger were found in the recent past from the Caspian Sea in the West to Bali in the East. Three sub-species, the Caspian Tiger, *P. tigris virgata*, the Javan Tiger, *P. tigris sondaica* and the Bali Tiger, *P. tigris balica* have become extinct during the last century. The remaining five - the Indian Tiger, *P. tigris tigris*, Indo Chinese Tiger, *P. tigris corbetti*, Sumatran Tiger, *P. tigris sumatrae*, Siberian Tiger, *P. tigris altaica* and the South Chinese Tiger, *P. tigris amoyensis* are now surviving in the Asian continent amidst growing threats. The total wild population of these five sub-species is estimated to be between 4,600 - 7,200 individuals globally (Table 1) (Dey, 1996; Weber and Alan, 1996).

The Indian Context

The sub-species inhabiting the Indian

* Field Director and Conservator of Forests, Project Tiger, Kalakad, Mundanthurai Tiger Reserve, Tirunelveli (Tamil Nadu)

Table 1*Total wild population of five sub-species of Tiger*

Sub-Species	Range Countries	Estimated Population	
		Min.	Max.
Indian Tiger	India, Nepal, Bangladesh, Bhutan	3000	4600
Indo-Chinese Tiger	Malaysia, Vietnam, Thailand, Myanmar, Cambodia and Laos	900	1850
Sumatran Tiger	Indonesia	400	500
Siberian Tiger	Russia, China	150	200
South China Tiger	Southern China	30	80
Bali Tiger	Extinct since 1940s		
Caspian Tiger	Extinct since 1970s		
Javan Tiger	Extinct since 1980s		

sub-continent *P. tigris tigris* and distributed in range countries India, Bhutan, Bangladesh and Nepal is the largest surviving population of Tigers and constitutes about 60% of global Tiger population. Indian forests presently have about 75% of Indian Tigers (also referred as Bengal Tiger) (Weber and Alan, 1996). Table 2 summarises the estimated population of Indian Tiger in range countries.

Tigers are distributed over most parts of India. More than 90% are concentrated in eleven states Andhra Pradesh, Bihar, Orissa, Rajasthan, Maharashtra, Karnataka, Uttar Pradesh, Madhya Pradesh, Tamil Nadu, West Bengal and Assam. Table 3 summarises the Tiger population in India since 1970. The Tiger in India faces threats which are combinations of various factors which in turn are complex and pose challenges to enforcing agencies and conservationists in successfully dealing with them. Some important threats are :

Loss of Habitat

Ever increasing demands of a densely populated and expanding human and cattle population in India for increased agricultural, industrial, developmental projects, settlement etc. over the years has gradually decimated the prime forest covers resulting in the habitat loss by way of reduced areas and fragmentation. Before the enactment of the Forest Conservation Act 1980, about 1.15 million ha of forests were lost. The pressures still exist on the forests and loss of forests for various non-

Table 2*Estimated population of Indian Tiger in range countries.*

Range Countries	Estimated Population	
	Min.	Max.
India	2500	3750
Bangladesh	300	460
Bhutan	80	240
Nepal	120	150

Table 3*Tiger populations in Indian States by census years*

S.No.	State	1972	1979	1984	1989	1993	1997
1	Andhra Pradesh	35	148	164	235	197	171
2	Goa	-	-	-	2	3	6
3	Bihar	85	110	138	157	137	103
4	Mizoram	-	65	33	18	28	12
5	Orissa	142	173	202	243	226	194
6	Rajasthan	74	79	96	99	64	58
7	Gujarat	8	7	9	9	5	1
8	Maharashtra	160	174	301	417	276	257
9	Karnataka	102	156	202	257	305	350
10	Meghalaya	32	35	125	34	53	NA
11	Uttar Pradesh	262	487	698	735	465	475
12	Arunachal Pradesh	69	139	176	135	180	NA
13	Madhya Pradesh	457	529	786	985	912	927
14	Kerala	60	134	89	45	57	NA
15	Tamil Nadu	33	65	97	95	97	62
16	West Bengal	73	296	352	353	335	361
17	Assam	147	300	376	376	325	458
18	Tripura	7	6	5	5	NA	NA
19	Nagaland	80	104	102	102	83	NA
20	Sikkim	-	-	2	4	2	NA
21	Manipur	1	10	6	31	NA	NA
Total		1,827	4,005	3,015	4,334	3,750	3,435

"NA" Information not available.

Sources :

1. Dey, S.C. (1996). "Tiger States in India" in the Tiger Call, WWF-India, New Delhi.
2. Tiger Census reports from Project Tiger Directorate, Ministry of Environment and Forests, Government of India, New Delhi.

forestry purposes can not be ruled out. Biotic pressures on the forest resources by way of removal of firewood, small timber, non-wood forest products and grazing of cattle beyond carrying capacity of forests keep on degrading the quality of wildlife habitats. Forest fires and encroachments on forest lands are yet another aspect of habitat loss and degradation for the territorial animals like Tiger which need

an undisturbed and large tracts of forests with copious amount of water and dense cover. Protecting the Tiger unless its habitat is preserved is going to be a very tough task.

Poaching

Though the hunting of Tiger was banned in 1970 and the Wildlife Protection

Act, 1972, provides legal protection to the Tiger, the attempts on its life by hunters and poachers are not ruled out. Between 1994 and 1999, 138 Tigers were poached and 190 were reported dead due to natural death and accidents etc. The seizures of Tiger parts in the reported States during the same period has been of 210 skins in numbers, 663 kg bones and other parts including nails, teeth etc in numbers. The huge seizures of Tiger and Leopard bones, skins, claws on the eve of the new millennium and again in the first month of the new millennium in Ghaziabad and Khaga in Uttar Pradesh has revealed the severe magnitude of the threat our wildlife faces and also has given a wakeup alarm to take cognizance and stock of the situation in order to gear up and to raise up to the occasion in defending the precarious wildlife and its habitats (Anon., 1998). China has almost lost its Tiger. The Tiger in the countries bordering China has become very rare over the years due to poaching of prey and the Tiger itself, therefore, the promoters of trade in Tiger parts focus their attention on the Indian Tiger. The increased demand for Tiger parts in South-East Asia and some other countries make this trade lucrative. The control of such attempts on the life of Tiger is a tough job and will also require higher levels of international understanding and co-operation. The field situations will have to be properly monitored.

Tiger populations can recover relatively rapidly if poaching is reduced or eliminated through enhanced protection and if water and needed prey base is available (Panwar, 1992). Poaching of Tigers primarily for their bones and other body parts is a major threat to the persistence of wild Tiger populations globally. Exploring effects of realistic levels

of poaching on population viability in an individually based stochastic spatial model based on data from Royal Chitwan National Park, Nepal, it is implied that as poaching continues over time, the probability of population extinction increases sigmoidally with a critical zone in which a small incremental increase in poaching greatly increases the probability of extinction. The study also shows that even if poaching is stopped, Tiger population will still be vulnerable and could go extinct due to demographic and environmental stochasticity and the longer poaching is continuing, more vulnerable the population will be to these stochastic events.

Poaching of other animals specially the prey species of Tiger in its territory is also a very serious concern affecting the population. Many a times poaching of these important species is not given due attention and measures to check such attempts are not seriously pursued. Without adequate prey base in the Tiger territories it will not be possible to save the Tiger. Recent work of Karanth and Sanquist (1995) shows that relative densities of different size classes of prey in an area may be the key determinant of relative densities of Tigers and other large predators. It is pointed out that conservation efforts that ignore ecological data can become too narrowly focused on single high profile issue only as trade in Tiger body parts and thereby missing other important factors contributing to a species' decline such as loss or decline of the needed prey base. Poaching of the prey base species affects the Tiger more directly than what is believed. On an average the Tiger needs to kill about 50-60 Cheetal, *Cervus axis* sized animals each year to meet its food requirement. If the prey based is plentiful, Tigers are likely to thrive and increase in

numbers. Decline in prey abundance leads to the gradual extinction of Tiger.

Consumption of Tiger Body Parts

The use of Tiger body parts in Traditional Chinese Medicine (TCM) and other derivatives in South-East Asia is on increase and poses a serious threat to the survival of Tiger in wild. Tiger body parts like hair, whiskers, testicles, penis, brain, eyeball, blood, bile and bones have been identified for use in various TCMs (Mills and Jackson, 1994) The demand of Tiger body parts and based formulations and products are increasing from other parts of the globe especially from Europe, Australia and North America, China, Hong Kong, Indonesia, Singapore, Thailand and the major suppliers of Tiger parts and processed derivatives. Major importing countries identified are South Korea, Japan, Taiwan and United States of America. It is estimated that between 1970 and 1993 at least about 10,881 kg of Tiger bones and 27 million Tiger derivatives were traded in these countries (Mills and Jackson, 1994). The pressure of poaching to meet the increasing demand of Tiger body parts in international market is indeed a grave concern which if not controlled will wipe out the fragmented populations of remaining Tigers globally. The Indian Tiger faces a great threat as the mafia has eye on its habitats in Indian forests.

Management of Protected Areas - Rising conflicts

The conflicts related to use and control of resources in the protected areas (PAs) is yet another concern, which needs to be understood and ameliorated so that the threats it imposes on the survival of Tigers

are curbed. It is argued that the stoppage or restrictions on use of resources from the forests by local people around PAs has delineated the local people from conservation efforts. Conflict over the use and control of forest resources tends to create difficult situation and often result in clashes between people and PA authorities. Incidence of injury or death of humans and crop damages by wild animals further aggravate the conflict. Incidentally the levels of population densities around majority of PAs and resulting pressures on the forests as habitats of various wild animals including Tigers are significant and can not be left unattended and sidelines. One of the significant problems, which the wildlife conservation efforts have to sort out, is the clash of interests of the people and of the wildlife. Involving people in conservation, enhancing their awareness levels and education and trying to meet their genuine needs will try to create a better understanding among them for the need of conservation and also their support towards these efforts.

The efforts made so far and their impact

The Wild Birds Protection Act 1887 was the first law for protection of wildlife in India. The Act prohibited possession or sale of specified wild birds but not the killing and it is not clearly known what impact it made on protection of species. The Wild Birds and Animals Protection Act, 1912 prohibited capture, killing, trade and possession of specified birds and animals with inclusion of penalty provisions. An amendment in 1935 enabled provincial governments to declare an area to be a sanctuary for wild birds and animals. Under the 1935 Act the

protection of wildlife was entrusted to provincial governments and wildlife laws varied from state to state. However, the fact remains that even with due formulations of guiding and regulating laws the colonial and post-colonial period did witness sizeable decimation of India's wilderness and its richness (Desai, 1998).

With the crisis of dwindling population of Tigers during early 1970s the government sincerely started taking some remedial measures and most of these initiatives had a highly positive influence in averting the downfall of Tiger population in the country to a great extent. The hunting of Tiger was banned in 1970. The Indian Wildlife Protection Act, 1972 started a new era for a more active and efficient management of wildlife in the country and provided legal protection to species and their habitats. The Tiger was included in the Schedule-I of the Act providing it total protection. Wildlife subject was put on the concurrent list of the Constitution in 1976 (42nd Amendment). The 1986 amendment prohibited trade or commerce in trophies and animal articles. The 1991 amendment very significantly expanded the scope of Wildlife Protection Act and its penal provisions (Desai, 1998). Another very significant legal measure was the enactment of the Forest Conservation Act in 1980 which helped substantially in curbing the indiscriminate diversion of prime forest lands for various non forestry activities and thus became instrumental in protecting and safeguarding wildlife habitats.

The post-1970 period also saw international initiatives for Tiger conservation in particular and wildlife protection in general. Indian Tiger was though little late than its fellow brothers

included in the IUCN Red Data Book in 1971. India along with 140 member countries joined the Conservation of International Trade in Endangered Species of Wild Fauna and Flora (CITES). In its 25th year of functioning the member countries took initiative to ban commercial trade in agreed list of endangered species and regulate and monitor trade in others that may become endangered (Anon. 1998). Tiger was included in the CITES list in 1976. In 1994, CITES member nations reiterated the need to strengthen international efforts to halt trade in Tiger parts and derivatives. In 1993 the Govt. of India took initiative to sign a protocol on Tiger conservation with the People's Republic of China in which it was agreed between the two countries to exchange information on aspects of Tiger conservation and help in mutual capacity building which was formally signed during March 1995. India also took initiative for setting up of Global Tiger Forum of range countries and other international organisations working to embark on a world wide campaign to save the Tiger and the Voluntary Participative Fund for protection of the Tiger (International Symposium on Tiger, New Delhi, 1993).

Expansion of Protected Area Network

In the late sixties the concern for very rapidly depleting status of wildlife in India came to attention and serious thought was given to address the issue. One major thrust was on to expand the network of PAs for effective preservation and conservation of wildlife and its habitat. The National Wildlife Policy, 1970 articulated a clear approach with regard to creation of PAs and recommended that 4% of the geographical area of the country be set

aside as National Parks together with other categories like Sanctuaries, Nature Reserves etc. The growth of PA system in India in the post-1970s period has been significant. Beginning with less than eight PAs at the turn of the century (with the first PA as Vandanthangal Water Bird Sanctuary in 1898 in Tamil Nadu and the Hailey National Park, now Corbett National Park as the first National Park in 1935 in U.P.) there were 65 PAs (4 National Parks and 61 Wildlife Sanctuaries) upto 1970. The Wildlife Protection Act, 1972 provided legal framework for PA establishment and today there are 566 PAs (including 86 National Parks and 480 Wildlife Sanctuaries) extending over 1,53,000 km² i.e. over about 4.66% of total land area and about 20% of forest area in the country. There are recommendations to bring the total PA network to 854 (160 National Parks and 694 Wildlife Sanctuaries) which will cover 1,87,192 km² or 5.69% of country's total geographical area (Rao, 1996; Anon., 1990). Efforts to bring a significant extent of natural forests under PA system has paid its dividends in providing a safe home to many wild animals including Tiger and also improved the status of habitat through intensive wildlife management practices over these years. Though there is steady growth in the extent of PAs, inadequacies in terms of many biologically important regions, communities and species are not or only partially represented. PAs are often too small to ensure long term viability (Anon., 1990). The legal requirements to be completed prior to notification of PAs is still on in some PAs, however, the enforcement of provisions of the Wildlife Protection Act has made the interests of wildlife comparatively safe in these areas. The National Wildlife Action Plan, 1983 attempted to ensure focus on the need for

promoting adequate protection to wildlife and habitats outside PA network so as to make them to act as corridors with the PAs providing gene flow. With significantly large populations of Tiger in areas outside PA system this concept is of very high value in terms of providing a still more holistic approach to Tiger conservation efforts. The conceptualisation of managing Tiger conservation over larger ranges of areas irrespective of the status of area whether it is a PA or not may provide a healthy direction to Tiger conservation efforts.

Project Tiger

A challenging field conservation effort aimed to save and improve the dwindling Tiger population in prime habitats of India was launched in April 1973. The rapid decline of Tigers in wild in early seventies made the Govt. of India to take up this significant initiative based on the recommendations of expert committee on policy for wildlife conservation established by the Indian Board for Wildlife, a high level advisory body of the Govt. which in their report stated that "the situation demands simply that every single animal is saved" (Panwar, 1987).

The prime objective of the Project Tiger is to ensure maintenance of a viable population of the Tiger in India and to preserve, for all time, areas of biological importance as a national heritage for the benefit, education and enjoyment of the people. The emphasis of Project Tiger on Tiger conservation was in fact a holistic approach towards protection of biologically rich habitats and the threatened species thereon and not exclusively on the protection of Tiger alone. Project Tiger realised the fact that at the apex of a

complex ecosystem, the Tiger as a key-stone species provides an index of the health of the system which influences the catchments and climates which in turn sustains not only the wildlife but also the people. Saving the Tiger under the Project Tiger philosophy was indeed a true endeavour and attempt to protect and improve the entire ecosystem and its biodiversity.

Nine Tiger Reserves (TRs) were constituted in the first year of launching the project. A Tiger Reserve is not a legal but a management and administrative designation applied to a national park or a sanctuary or a Protected forests/Reserve forests or any combination of these and its surrounding area for meeting the objectives as set under the Project Tiger. Their numbers subsequently grew and today there are 27 Tiger Reserves in the Country. Table 4 summarises the population of Tigers in these TRs between 1972 and 1997. The Tiger receives maximum protection and has best chance of survival and growth in the TRs. The efforts made under the Project Tiger have significantly controlled the rapid decline and the population has improved since the start of the project (about three and a half fold increase in 9 TRs in ten years of launch and about four fold in 23 TRs in twenty years of launch of the project). Between 1995 and 1997 there has been reported increase of 8.5% in 22 Reserves (Anon., 1998).

By and large the Project Tiger continues to be a pioneering conservation effort and earnestly strides forward inspite of many constraints to provide the Tiger a safe home and to improve the habitats and complex eco systems in various biogeographical zones in the country. The situation is not as good as it was in the

first decade of the Project Tiger launch. The situation is at great crisis in some of the Reserves and corrective measures are needed. All involved in the conservation movement of Project Tiger have to understand the crisis and bestow new initiatives and innovation with ever more enthusiasm, endeavour and positive outlook in resolving the crisis. Some of the serious problems and constraints which commonly put hurdles in implementing and achieving the project objectives viz. Inadequate and delayed financial support to TRs, inadequate staff and infrastructure, renewed threat of poaching and illegal trade, insurgency problems in some Reserves, lack of needed training and motivation of front line staff and co-ordination among various enforcement agencies and last but not the least winning total confidence and co-operation of local people will need to be addressed, supported and strengthened to ensure still better security to the Tiger and its habitat. Continuous efforts in identifying constraints and problems and developing area based strategies to solve the issues and improving its effectiveness may be highly necessary to avert any crisis the Tiger faces today.

Involvement of Non-Government Organisations

Many international and national Non-Government Organisations (NGOs) have made dedicated efforts in various ways in ensuring a safe life to the Tiger in the wild. The efforts and involvement are continuing with more vigour and enthusiasm. The co-ordinated efforts of the government and non-government organisations will give the conservation initiatives to save the Tiger and its habitat higher chances of success. Some of the NGOs involved in Tiger

Table 4*Tiger population in Project Tiger Reserves by census years*

S.No.	Project Tiger Reserve	Year	1972	1979	1984	1989	1993	1995	1997
1	Bandipur (Karnataka)	1973	10	39	53	50	66	74	75
2	Corbett (UA)	1973	44	84	90	90	123	128	138
3	Kanha (MP)	1973	43	71	109	97	100	97	114
4	Manas (Assam)	1973	31	69	123	92	81	94	125
5	Melghat (Mah.)	1973	27	63	80	77	72	71	73
6	Palamanu (Bihar)	1973	22	37	62	55	44	47	44
7	Ranthambhore (Raj.)	1973	14	25	38	44	36	38	32
8	Similipal (Orissa)	1973	17	65	71	93	95	97	98
9	Sunderbans (WB)	1973	60	205	264	269	251	242	263
10	Periyar (Kerala)	1978-79	-	34	44	45	30	39	NA
11	Sariska (Raj.)	1978-79	-	19	26	19	24	25	24
12	Buxa (WB)	1982-83	-	-	15	38	29	31	32
13	Indravati (MP)	1982-83	-	-	38	28	18	15	15
14	Nagarjunasagar (AP)	1982-83	-	-	65	94	44	34	39
15	Namdapha (AP)	1982-83	-	-	43	47	47	52	57
16	Dudhwa (UP)	1988	-	-	-	90	94	98	104
17	Kalakad Mundanthurai (TN)	1988	-	-	-	22	17	16	28
18	Valmiki (Bihar)	1990	-	-	-	81	49	NA	53
19	Pench (MP)	1992	-	-	-	-	39	27	29
20	Tadoba-Andhari (Mah.)	1994-95	-	-	-	-	34	36	42
21	Bandhavgarh (MP)	1994-95	-	-	-	-	41	46	46
22	Panna (MP)	1994-95	-	-	-	-	-	26	22
23	Dampa (Mizoram)	1994-95	-	-	-	-	7	4	5
24	Bhadra (Karnataka)	1999							
25	Pench (Mah.)	1999							
26	Nameri (Assam)	2000							
27	Bori-Satpura Pachmari (MP)	2000							
Total			268	711	1,121	1,258	1,178	1,333	1,458

"-" Was declared a Tiger Reserve subsequently.

NA - Tiger Census undertaken, but figures not yet available.

Sources :

1. Dey, S.C. (1996). "Tiger States in India" in the Tiger Call, WWF-India, New Delhi.
2. Tiger Census reports from Project Tiger Directorate, Ministry of Environment and Forests, Government of India, New Delhi.

conservation in India are :

- *World Wildlife Fund-India* : Formed

in November 1969, World Wildlife Fund-India (WWF-India) has played an important role in the launch of

Project Tiger. A financial assistance of US \$ 1 million over the years has helped in strengthening the management and infrastructure of many TRs. WWF-India also provides assistance for training of staff, procurement of equipment etc. in many TRs and other PAs. Education and awareness creation activities for the general public on issues related to Tiger conservation is an important part of the organisation's mandate. More recently the organisation has also undertaken field activities around some TRs attempting to try and reduce biotic pressures on those TRs. The Tiger Conservation programme of WWF-India aims to mobilise financial support and utilising it for Tiger conservation across the country.

- *TRAFFIC-India* : TRAFFIC-India has been an integral part of WWF-India since 1992. The organisation has made significant efforts on monitoring of illegal trade of wildlife and wildlife products across the country. A database of illegal trade on endangered species including the Tiger has been developed. The organisation also helps to increase public awareness and supports co-ordination between the govt. and non-governmental agencies engaged in enforcement and trade monitoring.
- *Ranthambhore Foundation* : The Ranthambhore Foundation is very closely associated with Tiger conservation efforts. Tiger Link - an informal network representing 49 organisations - is co-ordinated by the Foundation. Advocacy on policy issues at national and inter-national levels and generating support for these initiatives is on the main agenda of the organisation.

- *Bombay Natural History Society (BNHS)* : The BNHS, the oldest conservation organisation in the country, dedicated itself to conservation through related research, education and awareness activities.
- *Wildlife Protection Society of India (WPSI)* : The WPSI, formed in 1994 with mandate to promote support and information to combat the escalating illegal wildlife trade. The Society has network of informers and data base on wildlife crimes. It provides assistance towards prosecution of important wildlife cases through its Legal Cell.

It is not possible to mention all the various NGOs involved seriously in the Tiger conservation in the country. Many local NGOs have started patronising TRs in their areas and provide support and encouragement to TR authorities in various fields of activities. It is indeed a highly positive situation that almost all TRs and other PAs in the country enjoy concern and support from these organisations and this joint effort at local levels do indicate that Tiger has a better chance of survival in India.

Research and Training

The Wildlife Institute of India, Dehra Dun (Uttaranchal) is the premier Institute having the mandate for wildlife research, training and education. Training courses of long and short-term duration are offered to forest officers on wildlife management. The Institute also conducts a Masters programme in wildlife biology and produces trained personnel for active conservation works. Various short term and refresher courses on themes of wildlife conservation and management are regularly organised

by the Institute for government and non-government personnel. The scientists working at the Institute conduct research on various aspects of wildlife management, wildlife biology and biodiversity conservation. The Institute provides guidance and advice to the Government of India and State Governments on wildlife matters and conducts field projects in States on identified issues. Access to database for conservation works by different agencies is also provided by the Institute.

The Wildlife Conservation Society of India, Bangalore has taken up intensive research on the Tiger and its prey species and thus contributed towards understanding of Tiger conservation. Work on development of census techniques for free ranging animals carried out is of much use and importance. Environmental education and concern for conservation and related issues have now become a part of the curriculum of various universities and colleges in the country (Weber and Alan, 1996).

Involving local people in conservation

It can not be denied that the TRs and majority of PAs in the country have local communities around them who depend on the resources of the PA for sustenance and even livelihood. A survey carried out by the Indian Institute of Public Administration revealed that 69% of surveyed PAs have human population living inside and 64% have community rights, leases or other concessions. The consultative process involving local people while declaring and notifying a PA and subsequent regulation and restriction of resource use on the PA were generally missing. Lack of awareness among the

locals residing in and around the PAs about the efforts being made and the need and urgency for such efforts towards conservation and wildlife protection is one important reason that make conflict resolution between the PA authorities and the local people very difficult. The PA authorities did fail to a great extent in seriously attempting involvement of local people in the conservation planning and management taking their concerns into mind and trying to solve the issues through better management options derived through consultations and consensus building. The ongoing debate about the justification, planning and management of India's Protected Areas between wildlife conservationists and human rights advocates overlooks the fact that both wildlife and local communities are today equally threatened. A reconciliation between the two is possible if local communities and government agencies evolve a partnership in conserving the habitats with critical support from NGOs and independent researchers (Melkani and Venkatesh, 1998).

The need for integrating local peoples' interests into the policies and programmes of PA Planning and Management can not be denied or disputed. However, many advocates of co-management view it as a part of a wider social agenda and raise related issues of social justice, self-determination and democratization. In pursuing an over socialized viewpoint the essential need for integrating environmental and human concerns is frequently lost sight of. The collaborative management of PAs has to be seen as a means to an end and not an end in itself. It should not be viewed as a tool for pursuing a human rights agenda (Rao and Sharma, 1998).

Since the PAs constituted under provisions of the Wildlife Protection Act restrict activities which are detrimental to the health of the PA and its ecosystems. Human habitations, grazing and other resources exploitation activities are prohibited in a National Park, where as grazing and continuance of some rights by some local people may be permitted if these are not detrimental to conservation in a Wildlife Sanctuary. It is also a fact that only about 4.5% area of the total land area of our country is under PA system and in many of the cases the areas do not have the capacity to allow resources extraction and restrictions thereon imposed are the control mechanisms making way for conservation of genes, species and ecosystems and their variability in these PAs to the best extent possible. Keeping these views in mind the efforts to involve local people in conservation efforts are visualised and planned to reduce resource dependency by them on the PA resources. Providing assistance to people depending on the PA resource for livelihood is a major concern in this approach. Generating higher levels of awareness in understanding the need for conservation and its role in ensuring and sustaining a better quality of life. Since the exploitation of resources is not the recommended action the concept of resource sharing as followed in many JFM approaches in various on going forestry programmes in the country is not highlighted and followed in approaches designed to seek people's participation and involvement in conservation programmes. A new concept of eco-development approach has now been followed since 1980s in many PAs and the experience gained and the results obtained are significant, positive and encouraging.

Panwar (1992) defined eco-

development as a site specific package of measures derived through people's participation, which addresses all aspects of land use and other resources in order to promote sustainable land use practices as well as off-farm income generating activities, which are not deleterious to PA values. The Ministry of Environment and Forests (MoEF), Government of India describes eco-development as a package of programmes that will demonstrate the concern of the PA manager for the socio-economic development of the fringe or buffer zone villages and will result in greater co-operation of the residents of the villages in the conservation and management of wildlife.

Eco-development as a strategy for conservation goals may not be a panacea for all the problems conservation efforts are facing in all the areas yet, as a management tool, it will be helpful for areas where PAs have pressures on its resources predominantly from local rural communities. The strategy highlights people's participation in planning and implementation of various agreed options and activities.

Keeping these objectives in mind the Govt. of India has been assisting implementation of eco-development activities in and around PAs across the country for last many years. The initiative has made the PA authorities to assist the local people and seek their co-operation and support in conservation activities. However, in majority of cases no formal tie-ups were made with the PA authorities and the people in these efforts.

One pioneering attempt aimed at conservation of biodiversity through improved park management and eco-

development was initiated in the Kalakad Mundanthurai Tiger Reserve (KMTR), in Tamil Nadu in the South and the Great Himalayan National Park (GHNP) in Himachal Pradesh in the North as a pilot project involving people in conservation. This five-year project (1995-1999) now on extension in KMTR upto 31.1.2000 envisages to generate vital experience and information on causes, concerns and outcome of people's involvement in conservation of biodiversity. The project, which is a component of the larger Forestry Research Education and Extension Project (FREEP) is assisted by the World Bank. The implementation of the project initiatives has been appreciated and many key learnings have emerged (Melkani and Venkatesh, 1998; Anon., 1991). Similar efforts are also being tried in six important Tiger Reserves in the country under the World Bank and Global Environmental Facility funded India Eco-Development Project (1997-2002).

Future concerns and strategy

So far so good. The concern and the initiatives taken by India in ensuring a safe life to the Tiger in the wild against growing threats need to be appreciated. The Project Tiger has sailed through over a period of last 27 years and has its ups and downs. The crisis which the Indian Tiger today faces with growing threats on its life and home has to be averted and resolved. New initiatives, and mechanisms with dedicated commitment for the cause and concern of Tiger conservation are now required. Very close monitoring of the Tiger habitats and population trend in not only the PAs and TRs but wherever Tiger now survives will be highly essential.

There have been strategies suggested by various organisations, both government and non-government ones, and Wildlife and Tiger conservationists nationally and internationally for dealing with the threats the Tiger face today in all its range countries including India. Though there may be difference in emphasis these suggestions seem to share common grounds as far as formulating future Tiger conservation strategy is concerned (John Singh, 1998; Norchi and Bolze, 1995; Weber and Alan, 1996). The strategies highlight on the need for :

Higher support at political policy level :

The wildlife conservation in the country was strongly influenced in the 1970s and 1980s by the strong political and policy initiatives. Laws and Acts dealing with wildlife protection were drawn. There is need to have extra zeal and initiative for conservation of wildlife in general and Tiger in particular, now at political levels. The Indian Board of Wildlife, the steering committee of Project Tiger chaired by the Prime Minister will have a strong role to play in developing new policy measures for saving the Tigers. The new initiatives may include empowering wildlife enforcement agencies with stronger powers to deal with poachers; allowing PA authorities to exercise special police powers for investigation, seizure of property, arrest, and use of arms; enhanced penalties to poachers and other offenders, including poachers of prey species; extending extent and scope of PAs; allowing management of Tiger habitat in a more contiguous manner over larger extents even outside the PAs; devising efficient domestic trade control laws; initiatives to bring about better co-ordination among interstate and border issues and in ensuring that no diversion of forests land

for non-forestry purposes which affect the wildlife habitats from any prime Tiger habitats in the country.

PA-Management Issues : Many of the PAs are understaffed and financial resources are not adequate to meet the growing attempts of poaching and other large scale disturbances to the habitat. Providing the man power and money resource so as to intensify and improve patrolling, jungle camping and other anti-poaching measures will have desired effect on Tiger conservation efforts in the field. Majority of PA staff specially the front line staff lacks training and motivation, therefore, efforts to train the staff in basic skills and knowledge on issues related to management, peoples participation, biodiversity conservation etc will go a long way in achieving the management objectives of PAs and in securing support from local communities effectively. Motivating the PA staff by way of rewards, PA allowance, housing, needed jungle kits and uniforms, and other incentives, etc. will make staff to contribute their best to the efforts being made for Tiger conservation. Infrastructure support to PAs in term of vehicles, arms and ammunition, communication and other camp equipment lack to a great extent in many PAs and need to be addressed early. Serious thinking needs to be given in addressing the rising issues of insurgency and its adverse effects on the overall management of Manas, Palamau, Valmiki, Indravati and Nagarjuna Sagar Tiger Reserves and in many other important PAs in the country.

Improved co-ordination between different enforcement agencies : There is also an important need to develop and support mechanisms for efficient intelligence gathering and its dissemination and timely

use. Effective workable co-ordination with various government enforcing agencies like the Police, Customs, Coast Guard, BSF and NGOs working on these lines will be of very high practical use in monitoring and controlling poaching and illegal trade of wildlife including Tiger.

Securing local support for conservation : Conservation efforts will be futile if local communities in and around the PAs are not motivated and involved in the efforts. Strategies like Eco-development needs to be further strengthened and augmented where in the resources dependencies of local communities on PA resources is gradually reduced. The PA-people positive and negative interactions need to be sorted out and the people are duly compensated for losses which occur to them due to the PA activities and regulations. Right motivation and providing necessary alternative means and methods to local communities will make the regulations restricting the biotic interference in core zones of PAs more meaningful and better implementable. Failing which only conflicts will rise and precipitate and such a situation will never be healthy and supportive to conservation efforts. The rural communities should be helped so that they meet their basic needs away from the PA and their life and property is secure which will make them to identify themselves in having some stake followed by support for Wildlife and Tiger conservation. Alienating the local populations from the conservation efforts and undermining their needs and aspirations and finding out suitable solutions where in the subsistence of the weak and needy is either linked with conservation or alternatives for sustenance are made will never lead to success stories in conservation efforts and approaches.

Tiger conservation integrating habitats in larger landscape units : Many PAs in the country generally cover relatively small and isolated areas of Tiger conservation units. The future strategy for Tiger Conservation may have to consider in addition to controlling poaching about the increase not only in PA areas but also linking them with surrounding natural habitats and managing it as a larger landscape unit. Linking of PAs by natural habitat corridors and its effective management will permit dispersal of Tigers and their prey. Further buffering these areas will minimise impacts from adjoining land uses and pressures.

The concepts of Tiger Conservation Units (TCUs) identified with aspects of available large blocks of habitat suitable for Tigers and prey with adequate core areas, low poaching pressures, habitat integrity and population status and trends will be helpful in deciding future Tiger conservation protocols and practices.

Generating higher levels of awareness and public support : The average educated Indian tends to think of "Wildlife Conservation" as being synonymous with defence of animal rights or even with environmental or social activism. Such perceptions are seriously flawed. Awareness on issues of conservation and wildlife management is generally poor among the people. Serious efforts are needed to educate people and creating higher levels of awareness among them about wildlife conservation - its need and values, the tangible and non-tangible flow of benefits accruing to the society by way of conservation status of Tigers, the threats it faces and the need for its conservation as a key species and indicator of the health of our forests. Various authorities in the legal

profession and other spheres of work need to be made aware of the seriousness of wildlife crimes and for increased support for conservation of wildlife. The required inputs in this directions are lacking presently. Indian people have responded to the awareness created through media and NGOs towards AIDS control and Pulse-Polio programme for children and very clearly understood their personal stake in the affairs. Why can not such intensive awareness drive be taken through effective use of media and involvement of all in making the people of this country aware about the needs and values of conservation and the irreparable losses which all of us will face if we do not protect and care for our natural resource. People of our country will have to realize that the natural resources of our PAs today support the various perennial rivers in our country and help us in providing the very basic need for our lives, the water. If we do not understand our stake in conservation of our rich natural resources including the wildlife for our own sake then whom can we blame ? Conservation efforts will have higher success if everyone in the country, irrespective of one's occupation and work nature, understands the need to conserve the nature and natural resources. If instead of damaging and degrading it, the people help to preserve and improve it in whatever little way they can, then only the needed support and appreciation to the overall conservation efforts being made in all country by the responsible parties will be realistically achieved. The media will have to shoulder a very active and important role in this endeavour.

Enhancing International Co-operation : The Tiger range countries and various international organisations concerned with Wildlife and Tiger conservation will have

to develop greater co-operation in efforts aiming at supporting conservation. Greater financial support for field conservation activities, initiating better understanding of trans-boundary issues and developing and seriously enforcing mutually agreed regulatory or prohibitive actions to control illegal trade in Wildlife and Tiger products in their countries. Encouraging association of professionals and experts in developing alternate treatments which don't depend on Tiger and other wildlife body parts will have to be given a serious thought. Various NGOs will have to take lead in these international policy advocacy and generating financial support for Tiger conservation efforts in range countries. Effective information sharing mechanisms among different nations on smuggling and use of Tiger parts may have to be developed so that timely co-ordinated actions are taken to curb such attempts.

Conclusion

Indian forests still provide a home to

about 60% of the world's Tiger population and India being the custodian for this population base of Tigers has a special responsibility. The country has to take up a leading role in influencing Tiger conservation efforts in its own Tiger habitats as well as in other range countries. The threats facing the Tiger are great and on increase and, therefore, the ongoing efforts to protect the Tiger and its habitat will have to be strengthened and suitably improved based on experiences gained so far in order to ensure that the problems and issues are controlled effectively with better co-ordination and efficiency. All like minded nations, national and international organisations who have Tiger conservation in their agenda will have to provide greater support and co-operation to the efforts being made by India now and in coming years. These dedicated and co-ordinated efforts will only make the Tiger, the symbol of Indian heritage and culture and an indicator of health of its forests to happily live and multiply in its wild territories and remain with us ever always.

Acknowledgement

The author is grateful to Dr. A.J.T. John Singh, Joint Director, Wildlife Institute of India for going through the manuscript and suggesting changes and providing encouragement.

SUMMARY

Tiger *Panthera tigris tigris*, our National Animal, is a symbol of our cultural and natural heritage. During the first seven decades of the last century, the population of Tigers in Indian jungles drastically dwindled. Sincere efforts have been made to ensure a safe habitat to the Tiger in the wilderness of Indian jungles. Unfortunately, the threats to the individual and its habitat persist even today. The ongoing efforts need further strengthening with effect control and improved co-ordination among all who are concerned for the survival of Tiger.

भारत में बाघ संरक्षण : विगत, वर्तमान और भविष्य

वी०के० मलकानी

सारांश

हमारा राष्ट्रीय पशु बाघ, पैन्थेरा टाइग्रिस टाइग्रिस हमारे सांस्कृतिक और प्राकृतिक पितृदाय का प्रतीक है। गत शताब्दी

के प्रथम सात दशकों में भारतीय जंगलों की बाघ संख्या में भारी कमी हुई। भारतीय जंगलों के बयाबान क्षेत्रों में बाघ के लिए सुरक्षित प्राकृतावास सुनिश्चित करने के सद्भावी प्रयत्न किए गए हैं। दुर्भाग्यवश, इस पशु और इसके प्राकृतावास को आज भी खतरा बना हुआ है। इन प्रयत्नों को प्रभावकारी नियन्त्रण और उन सभी में जिनको बाघ के बचाए रखने की चिन्ता है, अधिक सुधरा समन्वय करते हुए, मजबूत बनाने की आवश्यकता है।

References

- Anon. (1990). Project Tiger Directorate, Ministry of Environment and Forests, New Delhi.
- Anon. (1991). *Detailed Guidelines of the Centrally Sponsored Scheme - Eco-Development in and around National Parks and Wildlife Sanctuaries*. The MoEF, Govt. of India.
- Anon. (1996). *Tiger Conservation Strategy and Action Plan* WWF-India, New Delhi.
- Anon. (1996). *Species Status Report Tigers in the Wild*, WWF-India, New Delhi.
- Anon. (1996). *Tiger Update*, WWF-India, New Delhi 1 (3).
- Anon. (1998). *Rural Development, South Asia Brief, Conserving Bio-diversity through Eco-Development*. The World Bank Group.
- Anon. (1998). *Developments - the International Development Magazine*, Issue 2, 2nd quarter, p. 39.
- Desai, B. (1998). Protected by Law, *The Hindu*, pp. 14-15.
- Dey, S.C. (1996). *The Tiger Call*, WWF-India, *Tiger Status in India*, p. 20-24.
- John Singh, A.J.T. (1998). Policy Makers and Wildlife, *The Hindu* p. 10-13.
- Karanth, Ullas K. and Melvin E. Sunquist (1995). Prey Selection by Tiger, Leopard and Dole in tropical forests, *J. Animal Eco.*, 64 : 439-450.
- Melkani, V.K. and A. Venkatesh (1998). Attempts Aiming at Reduction of Anthropogenic Pressures on Resources of KMTR through Eco-Development Strategy. *Paper presented at Regional Workshop on Collaborative Management of Protected Areas*, Royal Chitwan National Park, Nepal.
- Mills, Judy and P. Jackson (1994). *Killed for a Cure : A Review of the Worldwide trade in Tiger bone*, TRAFFIC-International, Cambridge.
- Norchi, D. and D. Bolze (1995). *Saving the Tiger : A Conservation Strategy*, Wildlife Conservation Society, *Policy Report* No. 3.
- Panwar, H.S. (1992). Guidelines for planning and implementing Eco-Development Programmes as a Means of Integrating Management of Protected Areas with the Concerns of People for Sustenance and Culture, (*Unpublished*).
- Panwar, H.S. (1987). Project Tiger, the Reserves, the Tiger and their Future, *Tigers of the World, the Biology, Biopolitics, Management and Conservation of an Endangered Species* (R.L. Tilson and U.S. Seal, eds.). Noyes Publication, New Jersey. pp. 110-117
- Rao, Kishore and S.C. Sharma (1998). *Collaborative Management of PAs in India- A Country perspective*. Regional workshop on collaborative management of Protected Areas. Royal Chitwan National Park, Nepal.
- Rao, Kishore (1996). *Tiger Call*, WWF-India, *Habitat Conservation through Protected Areas*. pp. 29-33.
- Weber, W. and Rabinowitz Alan (1996). A Global perspective on large carnivore conservation. *Conservation Biology*, 10 (1) : 1046-1054.