

The Asian countries had been the repository of invaluable biodiversity, which includes wild fauna and flora due to its geographic location, conducive climate and varied landscape. The tradition and culture of various peoples inhabiting this part of the world had been generally rooted to the norms of conservation and sustainable use of renewable natural resources. Thus till recently wildlife had remained as part and parcel of the total Life line, the end user being the homosapians. All creations of nature in India has been considered as essential ingredients of the life line and treated with compassion, however small and insignificant it may be. This traditional outlook towards what is now termed as 'Biodiversity', coupled with simple living had been the main reason behind ecological or natural balance. Human use of natural resources had always been limited within optimum limits, which could easily be restocked by natural processes.

But the ^{shape} ~~shae~~ of things changed and changed quite drastically during the last 100-150 years. Change came in basically two ways, a) population rise and b) increased consumption, as a result of change in life style.

Even before these two factors started influencing the scene of ecological balance, there had been other factors which effected consumption of natural resources. Through ages people from other countries and continents had been coming into Asian countries for trade and colonisation. Such people in the long run left impressions of their own culture and tradition on the indigenous life style, which resulted in various degree of modification in way of life. In various areas such influence has been of varying, degrees, from moderate to intensive. But the overall total effect seems to have been a spread of increased consumption of natural renewable resources without any consideration of ~~time~~ ^{true} sustainability. Thus the gradual and almost imperceptible shift in cultural and traditional way of life kept on influencing the ecological factors adversely. But this could not be noticed mainly because this region had been extraordinarily rich in natural renewable resources buttressed by matching productivity.

Further to the above this area had the dubious distinction of peerless population rise during the last ^{century} ~~country~~ and currently ^u ~~holds~~ some of the most densely populated ^{of the world} ~~areas~~. ^{interesting} The rise in population continues even today in India. It may be ^{motivating} ~~interesting~~ to note that the human population in the "Tiger ^{bel} ~~bit~~" in India has more than doubled (in some areas ^{tribled}) during the ^a ~~last~~ half century. This ^{one} ~~our~~ factor itself has caused unprecedented shrinkage of Tiger habitat which has resulted into fragmentation of the habitat and ^{severe} ~~serve~~ degradation of the remaining habitat and also serious depletion of ^{pry} ~~pry~~ base. We are still losing about 45,000 hactres of forest land annually in India due to various factors including developmental projects. Such ^e ~~deforestation~~ has caused dropping of the forest area in the country from 30% to below 20% ^{of the} within the last 50 years.

Besides, it is a well known fact that most such people living in the vicinity of the forest areas are generally poor to very poor and are uneducated. ^eBoth poverty and lack of education has long been recognised as the two chief enemies of conservation. But another factor has also influenced conservation adversely, which is lack of political will and support for conservation. Unfortunately some sort of political uncertainty has clouded Indian & even some international arena. This has undoubtedly done a great damage to wildlife interests. Political uncertainty in many cases has given birth to terrorism and insurgency, which has become an insurmountable problem for conservation. Many tiger areas have been crippled by such lawlessness.

The wildlife management in most areas requires to be properly revamped with adequate minimum equipments to ^efight the ^{ed}will armed poachers' gangs. There are only few properly orientat^{ed} and committed persons engaged in wildlife management. Govt. has very little consideration or ^{er}performance for such works. Besides, very often there is disagreement between the central and various state govts, which mostly remains unresolved and wildlife interest ^esuffers at the hand of the state govts, which regularly ^{or subjugates} ^{compromises} such ecological interests for short term human interests.

Ecodevelopment plan which had been designed to ^{contain peoples'} ~~certain~~ ^{prophs} discontant and the resultant thrust ^{of} of wildlife and habitat is possibly taking a wrong direction, where ecological interests has been granted only the second seat, first one being offered to economic considerations. Alien culture (open market economy & consumarism) is being preferred to indegenous tradition and culture, which had roots to ecological considerations. World Bank and g.E.F. are dictation^{ng}, terms, as they are financing most such ^{plans} ~~forms~~ in the name of biodiversity conservation. The ecodevelopment plan taken in a wrong direction, I am afraid may cause irretrivable damage to wildlife conservation.

The N.G.O.s are trying to help the Govt. in doing their ^{co} ~~in~~stitutional mandate of conservation, but are not generally taken friendly. Proper ^{cooperation} ~~infuration~~ from Govt. if provided to the N.G.O.s, could hav attained much more results.

The first 10-15 years of Project Tiger has proved that with proper political will, support and financial resources. The Tiger could smile again. If the Tiger and its habitat could be left alone, the tiger can easily make a come back, nothing more is required. But admittedly this is no easy job under the prevailing circumstances.

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Conservation of nature is really built into Indian traditional life style and our mature ~~old~~ time tested culture and philosophy. The purpose of conservation is aimed at sustaining the life line. But changing life style, demographic scenario and increasing gap between ~~the~~ human demand of renewable natural resources and sustainable yield of the same has gradually rendered the equation exceedingly difficult. This Ministry has the mandate to manage the renewable resources on a sustainable basis and secure the future of the mankind. But in reality what is now being sought to manage is a ^{widening} gaping resource gap, which is not only extremely difficult, but near impossible without active participation of the entire human race in full ~~the~~ whole heartedly participating in the process.

Conservation of the forestry resources, which unmistakably includes Wildlife, is linked with conservation of soil, maintenance of the natural water resources and all the life forms that ultimately decides the natural productivity. Naturally in an agrarian economy like ours, conservation has limitless value for the nation, specially for the agriculturist, the common man. Conservation, I consider, to be religion, above all short term petty interests and above politics.

② But over the past decades we have probably failed to do full justice to Conservation due to increasing human pressure and has caused serious damage to our natural capital. We have continuously exploited our resources, regardless of the future imbalances that may occur.

One example may be the desiccation of the Himalayas. The geographic location of the Himalayan range has been regulating, ~~the~~ not only the moderate climate of our subcontinent, but is also responsible in maintaining the phenomenal natural productivity of the Indo-Gangetic-Brahmaputra plains, which had been attracting various civilisations during the past thousands of years. Indian mythology depicted the Himalayas as the abode of the Gods from where the river Ganga, personified as a Goddess, descends along the matted hair of Lord Shiva. The Himalayas and the Ganga are considered sacred, Brahmaputra is regarded as the son of Lord Brahma, the creator. These myths which are thousands of years old conveys one unmistakable message, not to desiccate them and for valid ecological reasons. But we have failed to maintain our traditional respect for nature, may be under uncontrollable pressure. We

selected areas, which should be able us to chose the correct ways, if found necessary.

(7) Forestry and wildlife is a congruent subject. But quite often problem arises between centre and state in implementing conservation efforts. This happens mainly because conservation measures which guard long term human interest comes in conflict with short term human gains. Quite often such short term human interests may be capitalised by immoral politicians and big or small business houses/interests, who easily misguide poor common people, capitalising on their poverty and ignorance. This gap between the centre and state must be narrowed through proper negotiations and popular support.

(8) Natural renewable resources are common human resource linked with survival. Conservation of this resource/national heritage is naturally a collective social responsibility. Conservation efforts can be successful only if with inter-disciplinary support. Conflicts of interests in interdisciplinary linkages has to be removed in the greater interest of conservation.

(9) Eco-development to support the local and indigenous poor people in lieu of their sacrifice for conservation will be given priority. In doing so we will take care that the traditional and cultural lifestyle of these people are not unduly influenced in the name of 'development'. Indigenous knowledge will be harnessed in conservation, wherever feasible, to support "scientific management." Conservation aims at man's future interest and once this is translated into action, peoples' support should be spontaneous, without which success will be far fetched/impossible.

(10) 'Indian Board for Wild Life' (I.B.W.L.) has been inactive over a long period. This is a statutory advisory body, which will be activated shortly.

(11) Various developmental works like industrialisation, hydel power projects/thermal/nuclear power projects, mining and above all increasing biotic pressure is gradually decimating our forests and wildlife. To preserve this we must have adequate funds. But unfortunately we are grossly inadequate in our budget provisions. The forest area to date covers around 20% of the geographical land mass of the country & to manage this area we have an allotment of hardly 1% of the national development budget! This may unfortunately indicate our lack of realisation of the importance of our job at hand. If we are serious about our conservation objectives, we have to enhance this budget allocation substantially - at least to 10% of the national budget, which may allow us the required manpower and

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have dared to defy our wise ancestors' teachings on the plea of DEVELOPMENT. The matted hairs^{of Jata} which probably signified the dense forest cover on the hills and the impenetrable jungle in the Terai region of the lower Himalayan foot hills have been mostly sacrificed on the altar of development and "grow more food" campaign. The results are unfolding now in the form of ^{top}soil run off, flood annual flood damage amounting to thousands of crores and above all diminishing natural productivity. Increasing use of chemical manure and pesticide may be able to ~~man~~ ^{keep} along with other methods of agriculture and use of high yielding varieties of seeds may be able to maintain and even improve agricultural production, but at what cost and uncertain future?

A similar ravaging of the hills and mountains in Nilgiris, Western ghats and eastern ghats is causing similar effects in the South, where the effect may be slightly less pronounced because of the geologically ~~is~~ more stable formations.

(3) In a land where our ancestors had established "Abhayaranyam" more than two thousand years ago, where compassion for all life forms is the basic tenet of our philosophy, where all life forms had been regarded as equal and where human species had been advised not to encroach the domain of other life forms, wildlife is literally languishing. The lengthening list of threatened species certainly does not speak reflect our ideology. Threat The renewed threat to the Tiger is not only unfortunate but probably also indicates our lack of seriousness about conservation.

(4) We are planning for Biodiversity conservation and have already signed the Convention. But during this period of over 5 years, before and after Rio, precious little seems to have really been achieved in the field of hard conservation of the renewable resources. Precious and rare resources like *Taxus baccata*, Satourah and rare butterflies are finding their way out of the country, not to speak of other more common resources. We have probably enough had enough of meetings about a sustainable use, equitable distribution and property rights etc. Now it is time to pursue whatever we are left with.

(5) Conservation of mangrove forests and off shore marine natural resources has to be also given equal importance. Man's greedy hands are now extending into the oceanic depths in search of natural resources and has caused imbalance in many many areas. Fishing communities in the coastal belts in many areas are already facing the crunch.

(6) We have been working on a plan for conservation. But it appears, little success has come our way due to various genuine difficulties. We might have committed mistakes ~~is~~ on our way and should learn from those mistakes. This will make it essential to go for an ecological audit, at least in some

- KAZIRANGA NATIONAL PARK -

THE PROBLEMS OF FLOOD.

A MONOGRAPH.

Kaziranga National Park with an area of nearly 431 Sq. Km. is situated on the flood plains of Brahmaputra. There are a large number of water bodies in the Park, which appear to be ox-bow lakes and old abandoned channels of various streams and sub-streams of the River Brahmaputra. It is quite apparent that at a point of time during the distant past, the land mass of Kaziranga had been within the river Brahmaputra, which gradually shifted towards the North, resulting into accretions forming, what is now the Kaziranga National Park.

On the South of this riverian tract stands the Hills of Karbi Anglong, which slopes down into the Park towards the North. Naturally, the drainage of these hills, stretching from East to West, is into the Park. Along the foot-hills of these hills of Karbi Anglong are situated a large number of villages and also some large Tea Estates, which covers up most of the high grounds adjacent to the Park. On the West of the Park, some low hills exist, parts of which are included in the Park itself.

During the annual monsoon floods, water from Brahmaputra always enter the Park through various channels and also during the high floods overtops the banks and floods nearly 70 to 80 percent of the total land area of the Park. Though, floods often cause stress conditions to the wild life forms in the Park, yet it must be realised that flood is an essential part of the unique ecology of the Park and it maintains the extremely high productivity gradient here, which in turn supports a very high animal biomass potential. In absence of the floods, the ecological conditions in Kaziranga is quite certain to undergo a drastic change, which is very likely not to be conducive to the main species of this great Park - The Indian One Horned Rhinoceros.

The annual floods also bring in its wake the rather unusual "pinch period" which hardens the wild life forms and the better specimens survive while the weaker ones are weeded out to maintain the genetic viability of various species of wild animals. Without the floods, therefore, the ecological conditions in Kaziranga shall not be maintained to its required quality.

However, like every where else in the State of Assam, in Kaziranga also the level of flood waters is rising above the "highest flood level" with alarming frequency. The 1987 flood level had crossed the previous highest level by about 25 Cm. but the current year's level has surpassed even this level by more than 50 Cm. as reported.

The highest level of floods in the Park does not usually hold for long and starts receding in a day or so. During this period, when the water level is the highest 70% or more land areas of the Park gets submerged. Some low hillocks on the west and some isolated patches along the central (East and West) region only may remain either slightly above water or submerged lightly. All types of animals usually congregate in these patches and manage to hang on till the water recedes. It is a very unusual situation, when the animals may not be able to sleep or rest for 2 or 3 days, when they may have to stand on knee-deep water. Predators and prey animals are often sharing the same patch of highland, without any apparent problem. Rhino babies are often seen resting on the back or flank of the mother. The same ant-hill may serve as a refuge to 5 - 6 different species of animals. I have seen animals like deer standing on thick branches of fallen trees above submerged ground.

Fortunately, under usual flood conditions, the level of water does not stay too long at the highest level and gives respite to the harassed animals in a day or two. The southern parts of the Park is lower than the central region and animals hardly have any natural high ground to shelter. Animals from these areas cross the southern boundary of the Park and seek temporary refuge in the foot hills of Karbi Anglong Hills. In doing so, the animals have to swim across vast sheet of water often with difficult obstacles to circumvent. On reaching the high grounds, the animals totally exhausted by now, are confronted with the most dreaded of all living forms, Man, as virtually all the high grounds are inhabited. Park staff are on duty for 24 hours every day to safe-guard the harassed animals during this forced migration.

The animals that usually suffer loss of life is the deer - mainly the Hog Deer. The population of the Rhinos, Buffaloes and Elephants are usually not much affected during

usual floods. But the current year's flood was an exception. We have so far recovered 34 dead Rhinos, out of which 22 had been calves ; This is a serious and new threat to the species. To offer temporary shelter to the animals some raised (earth filled) platforms have been built up in the Park. Most of such raised grounds are situated along the southern lower areas. In few places, the level of the existing roads had also been raised above flood level to serve as temporary shelters during floods. These high grounds have offered good shelter to a large number of all types of animals.

However, the reason for the death of such a large number of Rhinos seems to be as follows. The Rhinos along the Central Region usually take shelter in the wooded areas of the Park (along the Central Region) where the ground level is higher in a thin linear belt. This year when water gradually submerged all these comparatively higher grounds, the animals that had taken shelter in this belt probably got dislodged during the pick flood level and were forced to seek shelter elsewhere by swimming across large sheets of swirling waters. Thus, the animals, particularly the calves perished along with the older and weaker ones. It has also been observed by the Park Director and the Divisional Forest Officer that many Rhino calves with thier mother had taken shelter on the raised grounds. But the water, without receding fast unlike other occasions, lingered on for several days together. This caused starvation, as the mothers with smaller calves did not leave the high grounds, probably with the apprehension that if they take to swim, the calves will invariably follow and was likely to be washed away or drowned. Under such pathetic conditions, the mothers did not venture out and naturally got starved along with the calves. Several starvation deaths have been recorded.

Though floods are probably an integral part of the ecology of Kaziranga, yet such devastating floods, which are showing a gradual increase in the level, is posing a new threat to the animals, particularly the Rhinos and the Swamp Deer. The Park authorities or the State Wildlife Wing may immediately conceive of some adhoc remedial measures, but the real problem and its solution lies elsewhere. However, let us discuss about the probable adhoc measures that can be taken up immediately.

1) Along the Central Region of the Park, there exist a road from east to west, almost all along the Park. Efforts should be taken up immediately to widen this road and raise the level of the same above the highest flood level, so that it can serve as a temporary shelter for the animals distressed by floods.

2) Some of the raised grounds have been submerged by the current floods. The level of such raised grounds will have to be raised further.

3) An all out effort has to be made to acquire some highland along the populated foothills of Karbi Anglong for sheltering the animals. Some attempts in the past has so far proved futile.

4) Rescue and relief operation to help the distressed animals has to be strengthened, as far as possible.

Besides, the death of animals in the Park, which are recorded and reported, many animals do get washed away with the strong current. It is impossible to record such loss.

The reasons behind the woe of Kaziranga, which is probably synonymous with that of the misery of Assam, due to the recurring floods, actually lies beyond the limits of the State. The overuse and abuse of the renewable natural resources in the North-East during the past 4 - 5 decades has destabilised the functioning of the natural high complex eco-systems of the entire zone, specially in the hills of sister states. The above, coupled with slash and burn method of cultivation and the various so-called developmental activities have resulted in ravishing the natural cover of this high rainfall zone of the country. The cumulative effects are gradually surfacing and I am sure the destructive effects are going to intensify with the passage of time, unless the natural eco-system of this region can be restored.

The situation in Kaziranga during the current floods probably is an indicator of the situation prevailing in the State and should be taken as a warning to act immediately for

stemming the rot. An integrated Forest Policy for the entire region with a very intensive management of the watershed of the Brahmaputra and all its tributaries may be able to keep the looming danger at bay.

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**THE ESTIMATE OF WORKS TO BE UNDERTAKEN FOR
PERMANENT MEASURE AT KAZIRANGA NATIONAL PARK.**

Item	Estimated cost
1) Building of Central arterial road of sufficient width by raising the road level above the highest flood level.	Rs. 13,37,27,500.00
2) Steps to construct artificial high land on some valuable areas of the Kaziranga National Park for taking shelter by animals.	Rs. 1,17,18,750.00
3) Construction of R.C.C. Bridges.	Rs. 1,02,00,000.00
4) Procurement of Motorised Boats for patrolling duty by the staff of National Park including purchase of Binoculars, Life Jackets, Arms and Ammunitions, Tranquillising Guns, Diving Equipments, etc.	Rs. 35,00,000.00
5) Acquisition of Tea Estate land for establishing buffer zone at the foothills of Karbi Anglong Hills.	Rs. 16,10,00,000.00
6) Errection of Rope way - 6 to 10 Kms.	Rs. 15,00,00,000.00
Total	Rs. 47,01,46,250.00

AN APPEAL

Continuous exploitation of the forestry resources for a very long time, traditional customs of jhumming or shifting cultivation practised in the hills of the North East and soaring demand of all natural resources resulting in overuse of the resources, beyond the limits of sustainable production in nature has caused sure depletion of the natural eco-systems of this region. The history of scientific forestry in the country and likewise in this region of the country also had been production-oriented, in other words revenue-oriented. With the dangerous consequences gradually being realised, there has been a shift in the national policy of forestry management in the country. The current concept is to manage our forest areas primarily for environmental reasons, to maintain the ecological conditions, in the interest of future life supporting process.

None less than the Prime Minister has suggested that we may ban forestry exploitation in the length and breadth of the country, till the natural health of our forests are restored, and we may even go to import our needs of this country, at whatever cost, it may amount to. This suggestion of the Prime Minister to the Central Board of Forestry may be difficult to go by, because of various reasons, but certainly this echo is the right thinking, if we have to guarantee our viable existence. This principle or philosophy will cost very heavily as far as financial resources are concerned but shall play a vital role for our future.

Mother nature has been used, over used, and abused beyond the tolerable limits and the unfailing Law of Nature is slowly unfolding in the shape of predictable natural calamities which are sure to intensify. Adhoc and temporary solutions have proved almost totally futile.

The planners of Financial resources shall have to fix this priorities, in this zone, where the rainfall is heavy, soil and rock structures are unstable and the apparent "Green" is deceptive. A single wrong step now may spell holocaust in short future and there may be no return. Ecological considerations, I feel must be granted top most priority, when development and poverty elimination is to be considered.

As a Forester, it is my duty to sound a warning about what an ecologist feel about the future via-a-vis ecological imbalance which has gradually takes the shape of a global problem by now.

(S. Deb Roy),
Chief Conservator of Forests (G),

**PROBLEMS OF CONSERVATION WITH PARTICULAR
REFERENCE TO FINANCIAL RESOURCES.**

Kaziranga National Park in Assam can now easily be regarded as a national asset. This National Park is well established as the natural home of the Great One Horned Rhinoceros, which has been brought upto a safe viable population in Assam through hard toil during the past 75 years or so.

The area had been declared as a Reserved Forests sometimes in 1907 and since then the conservation status in this area has been strengthened at various steps and now it has attained a status of most well protected wildlife area in the country. But all the same much remains to be done about tackling the multi-pronged problems that face Kaziranga.

Problems :-

(1) The foremost problem which is causing mounting concern about the future of this great National Park is the ravishing annual floods. It is paradoxical that annual floods in Kaziranga, caused by the great river Brahmaputra, is an integral part of the natural ecological conditions that are unique to the area and which is the chief reason for holding the Rhino. But due to various man-made factors the intensity of the recurring floods is on the rise. With almost predictable regularity the flood level every year is overtopping the previous flood levels and has gradually become one of the chief reasons of worry.

It may be mentioned here that the existing area of the National Park is not truly viable. An area of wildlife refuge can be termed truly viable when the denizens of that area are safe in the bounds of such area during all the seasons. But in Kaziranga, the annual floods force most of the animals to migrate to safety of the higher ground every year. But unfortunately, there exists no higher grounds free of human intrusion around Kaziranga where the flood effected animals can seek temporary shelter. All such areas to the south of the Park are occupied by people and the animals are anything but safe there.

The effects of the last two years of floods have been really telling and will cause serious concern to anyone, who thinks about welfare of wildlife. We had recorded 46 deaths of Rhinos during the last floods. But the fact that would cause concern is that out of this 46 deaths, some 30 had been sub-adults. The floods cause a weeding of the old and infirm animals, which helps in maintaining a healthy and vigorous population of genetic purity. But such large number of sub-adults being killed is not only a great loss for the slow breeding species like the Rhinos, but probably also sounds an ominous warning about the ecological imbalance in the area, caused through the effects of the unnatural floods.

For the first time in the history of Kaziranga National Park, there has been some starvation deaths recorded amongst the animals, particularly the Rhinos. It can be easily understood that in an area where the botanical productivity is amongst the highest anywhere in the World, starvation deaths are not only unnatural but probably is an warning against the seriousness of the ecological imbalance. Many animal (mostly deer) had been rescued by the Park staff, who is to keep 24 hours watch a day during this period. But considering the vastness of the problems, the attempt is probably far too insignificant, mainly because of lack of sufficient resources.

In the central region of the National Park, the ground level is slightly higher which slopes down towards the south and also towards the north in a very mild gradient. Earlier, this central region in a east - west belt used to provide necessary shelter for the animals of this zone during the high floods, as some small patches along this belt usually remain above the high flood level or gets inundated very lightly. Earlier high flood levels did not persist for more than a day or so. As a result, the animals could somehow hold on to this area and survive but during the last two seasons, even this zone got submerged ^{under} nearly 5 ft. of water and remained in that condition for more than 48 hours. This obviously forced the unfortunate animals to seek shelter elsewhere. Swimming vast stretches of water beds, many of the animals could not reach to the higher grounds and those who somehow did it had been caught in the bigger problem of saving themselves from the human beings.

2) The second biggest problem of wildlife manager in Kaziranga National Park is probably controlling of poaching. Kaziranga is an island inside the populated belt of human settlements. Naturally, the human instinct of hunting, converted in the shape of poaching that had been a continuance of old age urge for living poses as a major problem for the manager. The proverbial medicinal and charm value of the rhino horn has been luring poachers to go for the horn which gets them big money. Rhino horn in international markets now fetches more than a lakh of rupees per kilogram for its weight. With such a high monetary value involved poachers take great risks and often take new strategies to outwit the anti-poaching staff. The constant battle of nerves and wits is quite akin to the battle to deal with terrorism. By and large, poaching has been kept under reasonable control, though much more can possibly be done, if more financial resources are made available.

There are various other minor problems also facing the management in Kaziranga which I refrain from mentioning here. If the above two problems can be properly tackled, I feel Kaziranga would safe even in future.

SOLUTION

Floods :-

a) The natural solution would be to control the unnatural floods that is causing increasing problems in Kaziranga and is even threatening the future. But this should take a long term planning and proper execution of the required works, which will have to be undertaken in the catchment areas of Brahmaputra river and its tributaries. Naturally, this will be a herculean task and will involve planning possibly at the national level. Because this will involve treatment of the watersheds and various neighbouring states of Assam, besides treating the Brahmaputra basin itself. And even if such a task is undertaken, it will be extremely time consuming to achieve any results. In the meantime, most of results of a long hard toil in Kaziranga could easily be lost unless some temporary measures are taken to protect the National Park from the evils of the fury of floods.

It has been already mentioned that the available area of Kaziranga National Park is not truly viable. It could have been ideal if southern limit of the National Park can be extended upto and along the ridges of the vast hills of Karbi Anglong District in the south. But unfortunately, most of this area, that is between the existing National Park boundary and the ridges of the first hill of Karbi Anglong District in the south is now occupied by the thickly populated human population. The higher ground at the foothills which could ideally offer excellent shelter for the flood effected animals of the Kaziranga are mostly under special cultivation like tea. If these areas can be obtained as part of the National Park, the ill-effects of floods could have been reduced to a bare minimum, but which will involve huge expenditure.

b) The road network mainly from east to west extends inside the Kaziranga National Park. The main arm of this road lies along the Central High Grounds. All the neighbouring animals have shown a tendency of trying to occupy this area during the floods. It is proposed that this existing road be widened and raised above the probable maximum flood level for a total length of about 50 Kms. This will obviously offer a good shelter for the animals of the Central Region during the floods. The tentative estimates are appended. The natural areas of drainage has been proposed to be kept at natural levels so that natural drainage of the area is not effected: No bridges or culverts are also proposed to be raised across such natural depression for reasons of economy. The road is generally used during the dry spell of the year. The main purpose behind the reason of length and widening will provide shelter for the distressed animals during the floods.

c) Along the southern existing boundary of the Park, a total number of 25 raised earth filled platforms are to be established. These platforms will be of 150 X 25 X 5 M. Already some raised platforms had been established in Kaziranga to offer shelter for the animals during the floods. It seems from the past experience that such raised platforms are heavily occupied by flood effected animals during the high floods and is very effective.

d) Rescuing animals from the floods has resulted in saving lives of hundreds of animals during the past. This is done mainly by mechanised boats. But we are very short

of such mechanised boats in Kaziranga. These boats are of good utility in Anti-poaching works also and are in constant use right round the year. A fleet of at least 15 - 20 such mechanised boats are proposed to be acquired which will serve the dual purpose of strengthening anti-poaching works as also rescuing flood effected animals.

Along with boats some other equipments are also proposed to be purchased for the same reasons. This will include Binocular, Life Jackets, some arms and ammunitions, tranquillising guns, diving equipments, etc. An estimate is appended below.

This entire matter had been brought to the notice of the Hon'ble Prime Minister during his brief stop over at Kaziranga on the 14th Sept., '88. He had a detailed discussion with the undersigned for nearly an hour about all the above and was very kind to express his willingness to consider this matter and to provide necessary financial help for undertaking the suggested steps. He had been very kind to follow up the matter through the Prime Minister's Secretariat and is probably under consideration at present.

In this regard, I would also like to point out that an ambitious scheme to introduce a circular Rope Way in the Western part of Kaziranga had been floated years back. This was considered very necessary to diminish the pressure of visitors to Kaziranga, the number of which is gradually increasing. The usual mode of viewing in Kaziranga is either elephant ride or moving around in light vehicles. It has become virtually impossible to cope up with the tremendous pressure of visitors presently. Besides, a lot of undesirable disturbance is also being caused to wild animals by these large numbers of visitors. A rope way of 6 - 10 Km., if erected would cost something around Rs. 15 crores as initial capital expenditure. But this amount can be realised back within about 8 years of commissioning the system. In other words, this project if undertaken should be economically fully viable. This will also help in avoiding unnecessary disturbance to the wild animals and at the same time, no environmental pollution will also be involved. Besides, this area, where rope way will be established should remain free of poaching also.

THE WOE OF ASSAM AND THE PROBABLE REMEDY.

It is of too well known that recurring annual floods in Assam is one of the major factors behind the serious economic problems that the State is facing. Economic loss to the tune of hundreds of crores has become a regular and recurring phenomenon in Assam. Though floods are nothing new in this State, yet it can be appreciated by all that the fury of the annual floods is increasing with passage of time. It has become quite customary to anticipate multiple waves of floods during the recent times. Last year, we have faced 4 - 5 waves one after another from July till the end of September.

The chief reason behind such increasing floods and its destructive effects are actually man made and often talked after in various forums both in the State and at National level. The mighty Brahmaputra and its numerous tributories, most of which are going down the slopes of Himalayas are causing this havoc. Unfortunately, due to a string of reasons, the catchment areas of these rivers and streams along the geologically unstable Himalayas had not been getting due attention during the past half a century. Excessive pressure of natural forestry resources of such areas caused severe denudation of the natural forest cover or the complicated eco-systems of this zone. Besides, the prevailing traditional custom of jhum or shifting cultivation practised almost all over the hills of the North East States has added to the destruction of the natural cover. The interval between the two successive jhumming has been brought down from about 40 years to a mere 5 - 6 years. Thus the natural cover has no chance of any recovery whatsoever. This heavy depletion of the natural eco-systems of this zone coupled with the very high rainfall that this area receives has culminated in soil run off of uncalculable degree. The top soil which is an indicator of the productivity of the soil, has all being probably washed away by now. The lower ridges or the foothills which play a crucial roll in controlling the floods have all been denuded and in many cases converted into agricultural land. Earlier, all such areas used to contain very thick forest cover in the shape of extensive swamps with reed beds and other forest types. This resulted in absorbing the rush of water which came down the slopes during the monsoon. Such areas had tremendous water holding capacity and used to release water along the various streams and rivers

right round the year, which held the agricultural productivity in the Assam Plains at a very high level.

But with the loss of such crucial forest cover along the foothills, flood water started bringing down not only the top soil but also forced unproductive soil, sand, stones, etc. The river beds in almost every stream started rising. To contain the effects of the flood water, embankments were raised at great expense along most of the rivers and streams. This naturally resulted in rising of all the stream beds comparatively much higher than the ground level, through which such streams flow. It became almost regular that such embankments at the weaker points were breached during the floods and vast areas inundated for long spells, resulting siltation of the agricultural land, effecting agricultural productivity.

The futility of controlling the flood effects by raising the embankments is becoming clearer with the passage of time but the alternate and actual solution that lies in proper treatment of the catchment areas and the foot hills by restoring back the natural eco-systems has never been resorted to. It is true that there are various serious problems standing on way to do so. The chief obstacles may be as follows :-

- i) Lack of financial resources,
- ii) Stop further denudation in the catchment areas,
- iii) To effectively control the practice of jhumming.

Jhumming :-

The practice of jhumming in the hills of the North Eastern States is an age-old tradition amongst the tribals. To control such practice, some attempts has been made but the actual results are not at all tangible. Besides, the land tenure in this entire area differs from that in other parts of the country and stands as a very big obstacle on the part of the Government to handle the situation, which is often taken by the local tribals as an interference to their rights. But for the future of the zone and the country as a whole, some solutions shall have to be found because jhumming

is a practice which can sustain a small population in a very large hill tract, which used to be the prevailing conditions in the earlier days, but no longer prevails any more.

Stopping of denudation :-

The demands for forestry resources are increasing with passage of time due to increasing population level. Stopping of denudation will obviously call for stopping all extraction of forestry produces or at least slashing such utilisation. This has become practically impossible because man's immediate requirement always superceeds the long term interest.

In the last meeting of the Central Board of Forestry, the Hon'ble Prime Minister had even suggested exploitation of forestry resources in the country should be stopped, if necessary, and the local demands to be fulfilled by importing such produces from outside the country. He emphasised that for the future interest of the nation, this may become imperative, even if it will obviously cost the nation a great deal of financial resources. But this very useful suggestion of the Prime Minister triggered a lot of controversies and is still under consideration. All the same, this is a very sound advise and there seems to be almost no other alternative for saving our natural forest cover in the long term interest of the nation and the country.

It may be mentioned here that natural forest cover or eco-systems in any area is directly dependent on the climatology and soil and rock structure of the zone. Suitable eco-systems are designed and evolved through natural evolutionary process in thousands and millions of years. Such eco-systems are so designed that this helps in formation of the top soil which has a direct bearing on the productivity and also to maintain and improve the productivity of the respective area. Naturally, disruption in the eco-systems of any area is bound to bring about serious consequences, which is now empty evident in the Brahmaputra Valley.

Man made forests in the shape of plantations etc, are actually not necessary to natural eco-systems so far as the effects of such natural eco-systems in holding the productivity potential of the zone. Also it is not possible to built up the natural eco-systems artificially. we can only start putting on some forestry cover in the catchment areas which have been denude

High rainfall and conducive climate conditions (Tropical or Sub-tropical) has become a problem instead of boon in this area because of the unstable nature of rock and soil formation. The water resources of this area is really vast and much in excess probably of the actual requirement. But lack of proper harnessing of the water resources, which was the result of the intricate working of the undisturbed eco-systems, is now bringing down catastrophic result for the human race. The only long term solution to control the ever increasing ill-effects of floods may really lie in restoring the eco-systems of this zone.

It is not denied under the existing circumstances, along with restoring the natural cover we will possibly have to go for some mechanical wages and means to de-silt the Brahmaputra basin or to utilise the near desert condition of the vast expanse of "Char" areas of Brahmaputra for agricultural productivity.

In the first decade of next century, the world population will probably double itself. There will be no exception in this State also. Planners and Economists are busy the World over for ensuring "Grain safety" which will obviously call for increased agricultural productivity, but the scene in Assam appears to be really bleak. The direct effects of floods besides destroying the agricultural production and other property is also gradually reducing productivity of the agricultural land. High yield variety of agricultural seeds and improved agricultural meance of production. will certainly fail if the ground productivity goes down. It is all too well known that rising of productivity through chemical manure and also use of pesticides, etc. is causing serious ecological problems in many advanced and developing countries. The ultimate answer of a suitable sustainable and maximum productivity lies in natural fertility of the soil.

Naturally, forest cover in the North East shall have the biggest bearing on the agricultural productivity of the land mass specially in the plains of Assam. I am not advocating for the direct cause of forestry itself but even for the future agricultural productivity, which will sustain the future population of Assam. We are left with no other choices but to go for restoring all the natural cover of this zone specially along the catchment areas of the neighbouring hill States.

In this connection, I intend to emphasise one point specifically and that is the priorities to be fixed about planning and financing in the long term future interest of the State and the country. It may be true that for possible development, as is generally understood of any area, industrialisation and raising of productivity are to be given priority alongwith education, policing and defence of the country. This type of priority obviously may not help proper placing for environmental considerations of any area, the benefit of which are often difficult to realise and takes a very long time to unfold but under the present acute deteriorating status of environmental factors in the highly fragile North East area, it is possibly of top most importance to fix number one priority in this aspect for future interest of the State and the country. Apart from devastation of floods affects, we are already facing an acute situation where softwood is being imported from Malysia to sustain our timber based industries of the State, which was unthinkable even a decade ago. All these factors together unerringly point out to the fact that top most priority shall have to be granted to environmental protection in our planning and financing, if necessary diverting funds from other States. In persuit of so called development men had committed such serious mistake even in the past and it faced the consequence that had been brought down by mother nature. Such results in many areas of the World had wiped out great civilization during the past. I am afraid, we are also facing the problem of such serious nature in the coming days. Ecologist of the world are warning about such dangerous effects the human race are to be faced in various parts of the World. It is my duty to point out such probable results that may engulf us in a short while from now unless we are careful. We are running against time and should do something before it is already too late.

There could be many angles from which the total development of any area should be viewed. Opinion are likely to vary but proper planning for development, I feel should ensure sustainable developed conditions for the people in future. Proper planning for such development will therefore call for detailed evaluation of environmental or ecolgocal factors that are likely to influence the area of intended development. There are scores of instances where planning stands to over look this vitally important aspect and in course of time has to pay very darelly for such lapse.

With the increase in population and the urge to go for development, we have already put the ecological balance of the North East to disorder. Unless, we can restore the position fast, planning of development for the future is likely to bring about more catastrophies.

(S. Deb Roy),
Chief Conservator of Forests (G),
Assam : Guwahati.

Forestry in Assam

Forestry practices, in other words the activities of the Forest Dept. in Assam has now assumed unparalleled importance and ~~is~~ is causing public concern, because as the experts say, the destiny of man is becoming increasingly more dependant on maintenance of the proper forest cover because of ecological reasons. Assam being in the high rainfall zone, the possibility of a ecological disaster is said to be more real, if forest cover cannot be preserved here.

It is being readily agreed even by the Govt. that the requisit area that should bear forest cover for ecological reasons is wanting. Furthermore, Assam is surrounded virtually on all sides by neighbouring hill states or countries. Unfortunately the forest management in these neighbouring areas is even worse. The consequent results are gradually suffocating the plains of Assam through annual fury of floods, siltation, loss of invaluable top soil, lowering of sub soil water level and loss of productivity etc. To add to this the population of the state is on the rise.

The National forest policy has changed its old concept of looking at forestry resources as a source of revenue. Forest resources are now to be considered as ^{an} environmental component to sustain the human race. Revenue from forests ~~are~~ is to be only a byproduct, provided the ecological demands are properly met. But sadly, in Assam, the Forest dept. seems to be still far away from this life-saving concept. Here forest is still being ~~too~~ looked upon as an inexhaustible resource, which spins big money. And it is an accepted fact that wherever there is big money, corruption invariably finds its way and naturally the department of forest in Assam is in neck-deep ~~in~~ quick sand of corruption. Unless immediate attention from all is focussed on this and the dept. is shorn off the burden of ~~corrupt~~ corruption the last breath of the department and that of the inhabitants seems to be not far away.

Corruption in this dept. ~~is not new~~ like most other depts is not new. In the earlier periods some of the corrupt forest officers used to shelter corrupt timber merchants. Political bungling for carry money was also quite common, which used to be a spirit prior to any election. As a result it was decided

that the private person will be eliminated from the forest and all the works will be done by the departmental agency. The decision was by and large welcomed by general public.

But during the last three years or so the forest department took the credit of stealing acres of trees, totally deforesting many valuable forest tracts, settling encroachers by the thousands, ~~destroying~~ destroying wildlife and even defrauding the Govt. This period seems to be unique, when the usual "rule of the ~~forest~~ jungle" prevailed, fully patronised by the previous Govt. when ~~at~~ the few honest and dedicated officers were suffocated by ill treatment and neglect by the authorities then in command. There was no illegal action, not indulged in by the deptal officers.

Naturally when the new A.G.T. Govt. came into being with their commitment to end corruption and to rework the working of this dept. a ray of hope emanated. With the unceremonious removal of a top official of the dept., who had acquired notoriety of being very close to the previous corrupt ministry and to be instrumental in degenerating the entire Forest dept. people thought, the Govt. was determined to keep their commitment. C.M. himself kept the forest portfolio, which was taken as yet another sign of the dept. being being cleansed.

But such hopes started soon to fade and were gradually dashed. Like the slow growth of the trees, the progress, if any, started at an imperceptible pace. Not one officer, who had been publicly known to be utterly corrupt, has been taken to task, not even transferred ^{till the first week of the current month} ~~not~~ due to unknown but suspicious reasons. Some of these corrupt persons who had been open stooges of some of the previous ~~past~~ corrupt politicians are observed to have managed to cross the floor and join the present A.G.P. politicians. A few of these have even started this old game once again, though at a lesser scale.

There are naturally ^{the unmistakable} signs of weak administration at the top, which is reported to be simmering with indecision, nepotism, ~~and~~ internal departmental bickering, etc. which can be summed up as incapable handling. ~~The C.M. Earlier the C.M. and now the Forest Minister is being wrongly~~ seems to be wrongly

advised or are bounded by bureaucratic confusion. Vested interest at the back cannot also be ~~completely~~ ruled out.

Whatever the reasons may be, the situation is not only unhappy but probably alarming, especially in the context of the doom's day prediction by various ecologists that we are not unlikely to see another Ethiopia by the 2000 A.D., if we cannot manage our forest properly. It is reported that the illegal timber is again being transported from the huge quantity of illegal logs lying in the forests of Western Assam. It is also reported that old evergreen logs are ^{being} sold in auction in the Eastern Assam, surprisingly at normal market rates, though the timber is actually worth almost nothing. It is alleged that the actual old stock disappears from the forest depot and equivalent quantity of fresh logs are given away by felling new trees. These illegal deals are even floating the name of A.G.P. for this purpose, as per report. Killing of Rhinos in Kaziranga still continues. Though Social forestry has started doing some compensatory works, yet there is complaint of large scale corruption.

in lots

Under the prevailing ~~circumstances~~ circumstances the natural question arises, what is the solution? Well, the solution naturally seems to be, forestry should be kept above politics, all corruption eradicated at any cost and to allow clean, ~~and~~ dedicated and ^{knowledgeable} understanding foresters to take command. This is a subject which requires specialised training and long experience of practical work to go deep into the problems, foresee the distant future and plan up action to save the state from the impending ecological debacle. The Ministers and the secretaries cannot themselves do full justice to this need. Unless able, honest forest officers are carefully chosen and taken into confidence, repetition of the past errors, deliberate and otherwise, will nullify any well-meaning attempts.

meaning

The Forest dept. has been extended during the past which seems to be justified on the context of the heavy burden increasing work load of mainly protection of the forest wealth and to maintain and improve tree planting. During the previous

ministry three posts of C.E.Fs had been created with the blatant intention of promoting a corrupt officer out of turn and to place everything at his disposal. But this decision could be easily taken advantage of by allowing three different wings under the control of one officer, thus decentralising power and also by reducing workload, which should improve efficiency. In fact according to Govt. of India guidelines one Principal C.E.F. should have been placed to properly coordinate between various wings.

But unfortunately during the previous ministry one C.E.F. dominated the others, even suppressing them as a plan. Nepotism and patronising corruption saw the extreme end. But even during the present, it is reported that almost the same type of situations are prevailing. While some lowly placed Rangers and even Forest guards, as members of their associations are getting patronage, even some conservators are being sadly neglected and sidelined, as they are not ready to compromise their professional ethics and values for the sake of ~~or~~ gaining political patronage.

The one man enquiry committee headed by Mr. S. D. Phene still remains to submit its report though more than 6 months has already gone by. Anybody will understand that with the passage of time even gross corruption ~~is~~ is more than likely to be taken lightly. Many important documents which could prove decisively would be lost sight of. Everything would gradually fade out. Many of the corrupt officers, who had been known to be directly involved in corruption are reported to be lobbying in the corridors of Dishpur and not without any success!

The capturing of elephants, which had been allowed conditionally by the Govt. of India, after several years of ~~or~~ argumenting, is reported to have been completely messed up. Contrary to the conditions elephant mohals had been advertised and settled with public individuals and "seats" increased (as per report) arbitrarily. Even the number of

Captured elephants exceeded the limit. The excess no. of the captured animals was then sought to be taken over by the Deptt., but a court injunction stood on way. It also appears that Govt. of Assam has not replied to the repeated queries of the G.O.I. in this regard, which has ~~indeed~~ roused the centre-state relations. This may even find its reflection on the fund allocations by the G.O.I. to Assam in relation to Wildlife management, it is reported.

An ambitious plan for protection of Rhinos in Assam is reported to have been cleared by the G.O.I. costing Rs 5 crores till 1990. But though poaching of the Rhino continues almost unabated, not much head-way has been made to fulfill the preconditions.

All these certainly does not speak well about the goings on in the Forest Deptt. It appears that the comradeship and friendly relationship amongst the officers, which was once enviable in this deptt. has been replaced by groupism, internal bickering and mistrust, which is affecting efficiency as the honest and good officers have isolated themselves and have lost their initiative. To cap it all, some of the subordinate officers, who have come close to the politicians through patronage of high officials have become successful in vitiating the atmosphere to the advantage of their own. This is naturally causing gross indiscipline also.

Instead of reorganisation of the Deptt., there emerges a sad picture of complete disharmony and confusion that has taken over. Naturally no good can be expected as an outcome. It seems Govt. is now thinking of abolishing the posts of the C.C.F. in wildlife and Social Forestry on the plea of a top heavy administration and also because the post of S.F. C.C.F. had be created by a "Black order" by the previous Govt. to bring in a particular person, out of ~~their~~ turn. While the plea of the "Black order" is justified yet ~~the~~ it may be asked, if any other similar "Black mark" of the previous Govt. has been erased. Since creation of these posts, a large number of lower posts has to since been created and there remains many more plans, at least in the Wildlife wing to materialise. ~~This~~

As a result the argument of Top heavy administration in the deptt. will not stand, specially if compared with the Police Deptt. The magnitude of works and budget provisions is gradually mounting with the work load. It seems, it will be ~~not~~ suicidal to abolish the two posts of c.e.f.s if the deptt. has really to work for the good of the state. Instead there should be another principal c.e.f. to see to the policy matters and to co-ordinate. There seems to be a directive of the G.O.I. in this regard for all such states where there is more than one c.e.f.

It also troubles that ~~there~~ despite a post of c.e.f. wildlife being in existence, the wing is ~~being~~ receiving the least attention, if any. The main reasons seem to be, complete lack of understanding of the inherent problems of the wing, inadequate fund provisions & control of establishment by the c.e.f. general. On the other hand the state forest deptt. cannot deny that the wildlife refuges of the state are their show-pieces, where all the dignitaries are ~~not~~ taken for a proud show.

Similarly though the social forestry wing is being headed by a c.e.f. similar conditions are said to be prevailing there too. Undoubtedly the works of the social forestry wing has assumed prime importance and seems to have been accepted quite well by the general public. But here too the indirect control is being held by the c.e.f. general by virtue of his controlling the budget and the establishment.

Things could have moved smoothly if all these three c.e.f.s had formed a team and worked in unison after consultations relating to important matters. But in reality it is said to be otherwise, all these are pulling their forces apart and causing harm to their professional cause.

Unless there is cohesion of thoughts and works, no meaningful progress will be possible, even if only one c.e.f. is allowed to head the entire deptt. To arrive at a correct decision may look difficult, but a suggestion can be made. There are a number of retired c.e.f.s and c.f.s who are now residing at Guwahati. Since they had served in this

department and knows most of the problems now facing the dept., ~~So~~ they may be able to provide necessary guidance in this line. They also know many of the senior serving officers of the dept. and their views should be quite unbiased, as they are now retired and should be in a better position to look into the ~~the~~ true welfare and interests of the state of Assam.

However, time seems to be really running out and a quick decision warranted to avert any further decay for the sake of the future of Assam and its inhabitants.

Nature trail - Wilderness trail

The appeal of a Nature trails or wilderness trails in the ^{advanced & industrialised} countries abroad is phenomenal and it is in the rise. People from various walks of life, particularly the younger and middle age groups ~~are~~, who work hard through 5 days in a week make a bee line ^{during the weekends} for various recreation areas, amongst which the Nature or ~~Wildlife~~ Wilderness trails are one of the major attractions. People through such trails in groups, small and large and such trails are very well organised and run efficiently by Govt. organisations, who sometimes employ private agencies on contract service.

The trails are essentially of two types. In one the users traverse certain distance from one point to another, where camping facilities are available. In other cases the trackers take their back-packs and camp inside the jungle areas in their own tents etc. ~~entry~~

The utility of such tracking is multipurpose. This provides a scope for the users of such trails to escape the monotony of ^{modern day} hard work for sustenance and the consequent stress and strain, & both psychological and physical and refreshes the ~~the~~ person to enable ^{them} to take a fresh look at his own way of living with renewed zest. Besides, during such tracking people get a chance to know Nature and understand many aspects of ecology through their own experience. The value of such ~~Natural~~ Nature education cannot really be evaluated. This goes a long way to promote consciousness about preservation of the natural resources like forests and wildlife and the relation between the animal community (including the ~~insects~~) and the plant life.

Further more, this also helps building up a sense of a ^{self-propelled} struggle for survival against odds and makes people more courageous to take up challenges in life.

Indian people had been an "ecosystem people" and even during the early part of our ancient civilisation our people knew very well the value of conservation. Our ~~so~~ ancient social and religious norms had been centred around this concept of conservation which made it possible to preserve our renewable natural resources to the modern age. But with the colonisation of some alien cultures, with the advancement of the modern civilisation and with the ~~popul~~ phenomenal population increase, we tended to become oblivious of our ~~rich~~ invaluable social and religious culture. The modern generation in India now has to be taught about nature.

Though there has been a lot of effort to promote this Nature education amongst our people, not much headway has yet been made. The laying of nature trails or wilderness trails, ~~should~~ if made to attract people, should go a long way to promote such education.

The norms of laying out Nature or Wilderness trails.

1) In laying out such trails, the distance or length of such trails should be such that an average able person should be able to cover this distance without much trouble or fatigue within 4 to 6 hours. In Assam such distance may be taken as 15 to 20 K.M. in the flat plains and about 12-16 K.M. in hilly areas.

2) Both the points, beginning and end, should be easily accessible by vehicles. If only one point is accessible, then the trail will have to end at the starting point.

3) At every 2 to 3 K.M. on the trail, there should be some sheds with moderate facilities for ~~rest~~ sanitation, drinking water and some sitting arrangements.

4) On the trail all the important species of trees, shrubs, herbs and grasses should be identified and so labelled, so that the tracker can get themselves acquainted with the botanical aspects of the area visited.

5) The animals, including birds, commonly found on the area should be listed in some ~~list~~ illustrated literature and handed over to the willing persons to enable them to identify those found on the trail. A small account of their behavioural aspects including food habits should also be incorporated in the literature, which will automatically ~~will~~ imbibe a sense of the need for preservation of the flora of the region as also the interdependence of animal and plant communities of the region.

6. Geological formation of the area and the history of such formation should also be made available to the trackers in some literature. This will enable the people on such trails to know the basic history of geological evolution, which is again interlinked with ecology and therefore preservation.

7. A batch of properly trained interpreters will be essential to deliver lectures to the intending users of such trails on the basic history of the area and ecology. This may be done twice, at the beginning of the trail and later once the tracking is finished to enable trackers to evaluate what all to observe during the tracking and to sum up their experience. It will be ideal to provide such interpreters/guides to accompany the parties on the trails all along to answer their questions on the spot.

8. Top-most priority shall have to be given to the aspect of safety of the trail-users, while on the trail. In the jungles of Assam, anywhere there could be hidden dangers from animal bite like snakes, various poisonous insects and other larger animals like elephant, and hence proper and adequate measures of safety is an imperative aspect, which shall have to be carefully planned.

If the trail can be covered by H.T. net, it would be of great help. Besides arrangements for rescue operation for any unforeseen exigencies or accidents shall have to be planned in details. In the U.S.A. & Canada such rescue operations are carried out even by helicopters.

9. In the wilderness trails, people may like to camp for a night or two. Camping sites shall have to be identified and properly demarcated. Small huts or tents may be constructed or tents pitched at these camp sites with proper facilities for drinking water and sanitation. Some more adventurous type of people

may like to be of their own. They may be provided with a map of the area and briefed properly about the terrain, nature of jungle-cover and the probable dangers that may be confronted.

10. Garbage disposal has to be looked into properly. The ~~trains~~ trucks will have to be properly briefed about dropping garbage and litter only at the disposal points and the accumulated garbage disposed of from time to time. Though the garbage disposal in our country has not been considered seriously anywhere, the undispensed garbage in the forest areas can cause serious problems, specially with regard to leftover eatables. There are numerous instances of elephants raiding forest camps, mainly in search for food materials and salt. Once such eatables are detected by the elephants, they are likely to cause raid camp sites, making the same unsafe. In the U.S.A. and Canada, there are many instances where Black bear or Grizzly raiding the camps, despite meticulous garbage disposal arrangements. Many accidents have also taken place.

Planning and estimate:-

Planning of the camp sites and laying out trails will have to be done keeping in view the above points. Besides in laying out such trails attention has to be given to the fact that not much artificial construction is resorted to and whatever has to be done, blends with the surrounding and nature. It may be convenient to develop some wild animal ~~trail~~ tracks, wherever found and possible, making a detour near areas of vital animal use like water holes, salt-licks etc.

Wildlife Prospects

Conservation of wildlife has evoked a lot of genuine ~~interest~~ global interest during the last decade or two and India ~~is~~ can be safely considered as one of the leaders in this aspect, at least amongst the developing countries. That Indian efforts are recognized and appreciated by the entire world is manifest in our late Prime Minister - Indira Gandhi being awarded as the prestigious award, which is one of the most coveted ~~awards~~ International awards in the sphere of wildlife conservation. In another ~~very~~ remarkable development, Dr. Swaminathan, ~~an~~ a noted Indian scientist has been appointed as the ~~Chairman~~ of the I.U.C.N., which is considered as the highest and most important world body on conservation of Nature.

All these recognitions has come through untiring efforts taken to preserve wildlife in the country India, which is one of the developing countries and where the conflicting interests of the wildlife and that of humanity is constantly ~~clashing~~ ^{making} the going tough at each step. ^{for wildlife preservation} But even under the extremely trying conditions, when fixing of priorities and mustering resources, vitally essential for conservation of wildlife, in the face of growing demand for developmental activities could be really ^{be} very hard, our developing country could achieve some of the most remarkable objectives in the ~~the~~ sphere of conservation and under the stewardship of a conservation-oriented leader.

ship and the dedicated hard ~~and~~ field work put on by a properly oriented and motivated hard core band of wildlife field staff.

The spectacular success, ^{of Project Tiger} acclaimed all over the world as the most successful and the largest ever ~~for~~ wildlife conservation project anywhere in the world, ~~as~~ a whole hearted attempt to save the elephants, ~~and~~ the starting of the Wildlife Institute and many other ^{similar but} smaller projects testify ^{for} the efforts and the strong will to back such efforts in India.

But in the broad view of the conservation these efforts ~~are~~ do not seem to be enough, if one considers the state of conservation that prevails in the country, outside the wildlife preserves. There will probably be hardly any dispute if one comments that the state of wildlife conservation in areas other than the wildlife preserves is practically lamentable. There may be a few happy exceptions here and there but these probably prove the general rule of the day. The wildlife status in most areas stands sadly depleted, habitat destroyed, in many cases transformed ^{for indigenous wildlife} uninhabitable ^{by way of inducing monoculture} for economic reasons ^{for economic reasons} and also unabetted poaching either for protein or for economic gains. The alarming ~~and~~ report that ~~at~~ satellite ^{photos} reveal an annual loss of 1.3 million ^{hectares} forest cover, which naturally is a direct loss of animal habitat will ~~cause~~ naturally cause no end of worry to the conservation oriented people of the country, and for genuine reasons.

Naturally with this rather alarming state of situations at the backstop, it is about time to put all ^{the} shoulders together to take up the challenge that is posed. There is no necessity to discuss why we have to save the wild dinosaurs. This has been realised, though quite late, that we have really no ~~option~~ other option for the sake of the future existence of our own race. This fact has been realised and continues to be realised that human life form and its existence is intricately interwoven with that of wildlife forms, both animal and plants, specially at this crucial juncture, when human population in our country is literally bursting at the seams and this demands for development is pressing the ~~on~~ wildlife resources with their backs to the walls.

Though the above knowledge or facts are now known, to at least the elites, and may be even to ^{a large section} ~~the~~ majority of the common people, thanks to the publicity machinery hard at work, yet one may wish a feeling that the depth and magnitude of ~~the~~ ^{the} problem of conservation and the ~~relating~~ ^{consequence} disastrous effects that may follow, if the attempts prove futile in future, has not been visualised fully. In other words, there seems to be a sense of complacency amongst most, who are otherwise abreast of the situation. Often interesting and sometimes quite valuable discussions are held, wildlife week is celebrated during the first week of every October, but soon afterwards things are pushed back in the lower order of preference till some

other "occasion" comes by. Well, this attitude of, shall I call it apathy, will lead us nowhere, specially when ^{the demand for} all the exhaustible and renewable natural resources are continuously mounting. Loss of habitat seems to be the most corrosive of all the adversities to wildlife and there is no reason to imagine that the situation, particularly in a developing country like ours is going to improve. In fact, on the contrary, to cope with the soaring demand, more and still more areas are only too likely to be snatched away from the wildlife for agriculture ^{or other developmental works.} The long list of the threatened species of ~~the~~ both plants and animals are ^{alarmingly} increasing with passage of time and the genetic stock is getting poorer. ~~The~~

The potential of the apparently innocuous plant and animal life-form is being constantly realised in the present time of genetic engineering, which may ultimately prove vital in keeping the humanity viable, specially in the context of diminishing and already depleted natural resources, particularly the renewable resources. The realisation of this fact seems to provide the silver lining for ~~in~~ the otherwise dismal field of conservation, because man is utterly selfish, ^{and} ~~but~~ can go to any lengths for his own self-centred interests!

However, preservation or conservation of wildlife is ^{to be} an all-embracing effort to achieve success. Unless the entire populace is properly oriented and adopts conservation in their life-style itself, any amount of legal protection and even proper execution of the laws or concerning laws and rules are bound to give only marginal result - may be in the

areas, specifically constituted for the purpose. I don't intend to belittle the hard earned achievements ^{in such areas} by any way, but want to impress upon the point that unless we can extend this achievements into the other habitats which are providing us with the crucial and much needed natural resources, the sad state of depleted status position of wildlife shall never improve. This means we shall be kept deprived of some of the resources, because of their threatened status and critical status position, when we may need them most.

On the other hand it is much simpler said than done - orientation and motivation of the common man, because of very practical reasons. A poor man, who may stay by the side of a wildlife area may already know why he has to preserve wildlife, but may turn ~~the~~ to be the chief source of scourge, when in a few hours his ~~ripe~~ ripening crop is devastated by wild animals or his only pair of plough animal is preyed upon by a large cat and he staves suddenly into a shattered economy. Since he may have only marginal land holding, if at all, and a number of mouths to feed, his immediate pressing problems may turn him a bitter enemy of wildlife. I have come across many incidents where the only earning family member ~~is~~ has been killed by a Tiger or Elephant, thus shattering the viability ~~of~~ a full family. It becomes futile, ~~to~~ or even inhuman at times, to say that

the dead person was actually at fault, and not the deprading animal or the family had encroached upon the animals' habitat, which is very often the reality. In fact, it is the most tiring and tricky moment for a wildlife worker to talk to the lamenting, ~~for~~ bereaved family members.

But fortunately our common people are extremely tolerant and they strongly believe in "Fate". With sympathy and a magic helping hand ~~they~~ most of them can be pacified, at least partially. But fact remains that bearing payment of some ex-gratia grant for "accidental death" caused by wild animals, ~~but~~ we have no other means to draw them into our folds.

When we have to have special wildlife areas for preserving wild animals, we owe certain responsibilities to nullify the probable damage caused to the property and sometimes even to human life by the wild animals in the neighbouring areas, populated mostly by poor to very poor people. Otherwise such people, who actually matters most, are only too likely to lose any sympathy for preservation, because their very existence is threatened. It is quite easy and sounds only sensible to take to preservation by the urban people but it is a completely different story to take ^{up} wildlife preservation for the rural people, who may ~~reside~~ ^{reside} by ~~reside~~ by a wildlife area and make a co-existence with the wild animals.

Terrai - Bhabar areas of the sub Himalayan tract

The Himalayan range in the North of India, which is the highest mountain range in the world is curiously one of the most recent geological formation, created by the movement of South Indian plate, which continues its north ward movement till today. However, the Himalayas has been responsible in modulating the climatic conditions in the Indian subcontinent and has rendered this area into one of the most fertile tracts in the world, which has supported human civilisation for thousands of years and this land has produced the ultimate in philosophy in the history of mankind.

It is said by scientists that if the Himalayas had not been formed, the monsoon climate would not be effective in Indian soil and naturally the whole situation would have been quite different. The high rainfall and moderate climatic conditions that sustains the natural level of natural productivity, are all gifts of the Himalayas. Naturally, therefore, the traditional Indian belief about the Himalayas being the abode of Gods and that Himalaya being itself portrayed as a divine character in Indian mythology, assumes much more significance in common people's perception, which goes a long way against desecration of nature in these hills, being deeply embeded in In Indian mind.

However, the total rainfall received in the Himalayas and in the huge Indo-gangetic - Brahmaputra plains is actually much in excess of the total requirement of these areas, which is needed to sustain the natural productivity. The result is, the major portion of this water flows into the Bays. Also because the precipitation is irregular, most of it being distributed, somewhat erratically during 4/5 months of summer, occassional floods are a natural consequence here. The high rainfall, which is a boon and supports very high productivity, thus also causes some problems. Besides the formation of the Himalayas being very recent in geological history, it is also extremely fragile and highly prone to erosion.

But nature has its own way to perform the balancing trick! The natural ecosystems that have been evolved through aeons of time in this region, do not only maintain and upgrade the natural productivity, but also hold and conserve the top soil, which is the key to natural productivity. Unless the hill slopes had been covered by natural forest cover, the top soil would have been eroded away, severely depleting the natural productivity, not only in these slopes, but also in the down stream areas, as the intensity of the floods would have been much more severe.

If we focus our eyes on the ecology of the Terrai and Bhabar belt of the foot hills of Himalayas, the picture may be somewhat clearer. When high rainfall occurs in the Himalayan hills, first the ground gets saturated with whatever water it may hold and then the excess water rushes down along the countless rivers, rivulets, streams and nullas. This monsoon rain water carries a

lot of soil, stones, both big and small as also various other organic and inorganic materials that may lay loose on the forest floor.

When the water reaches the foot hills, first the heavier materials are deposited. This usually consists of big and small stones or boulders and in the lower gradient coarse sand may also be present. The lighter materials like smaller stones, pebbles and some silt along with various other plant materials are deposited later on, when the water reaches flat ground. Some finer materials like fine sand and silt flows downstreams and may eventually be carried into the sea or the Bay of Bengal.

The lower foot hills and the flat plains where the Himalayan streams disgorge their burdens on entry into the plains develops some special characteristics, which is extremely important in understanding the ecology of the region. This belt on the Himalayan foot hills is known as "Terai" region.

But actually the base of hills, where mostly the heavier and larger stone materials are deposited first, has different characteristics than that of the lower reaches. In the upper areas, along the foot of the hills deposition of rocks and coarse sand makes the ground very porous, where water can easily percolate down. In other words the ground has hardly any water holding capacity and the smaller streams completely dry up on receding of the monsoon. Water table in this belt is quite low and except for some sporadic water holes, formed by some impervious deposition locally, water may become a limiting factor for the animals. This belt is actually known as "Bhabar" area and supports excellent forest like pure Sal patches with its, associates, moist deciduous, semi evergreen and evergreen forests. As one goes from West to East along the foot hills of the Himalayas, the rainfall increases, which along with the humidity changes the forest type. But generally this belt contains some of the best high forests with an extremely broad spectrum of biodiversity, even with the limiting factor of seasonal availability of water.

The conditions of the Terai area, which is situated just below the Bhabar tract is in stark contrast, with plentiful ground water available right round the year. The deposition of lighter particles like fine sand, silt, soil, humous and various woody forest materials brought down by the flood water makes the area spongy with high water holding capacity. The deposition of soil and silt forms a impervious layer, which does not allow the water to percolate too much below the surface. The net result is, the entire area holds perineal water and because the ground is spongy, the area becomes soggy. The area is one of the most fertile and supports extensive tall grass and various taller reeds, with occasional stands of trees, wherever the ground may be slightly less spongy and a little compact due to micro climatic conditions. All the sub Himalayan streams, barring the major perineal water courses from the Terai region, where enormous ground water resource, which come down from the Himalayas, have their seasonal source is held in store during the dry season. The

Terrai area thus is an unique natural mechanism to recharge ground water resources in the agricultural ground in the Indo-genetic-Brahmaputra plains, during the lean period. Naturally its usefulness in maintaining and also regenerating productivity is hard to assess.

The Terrai swamps with its tall grass land with reed beds harbours some endemic species of flora and fauna. Some of these are highly specialised, exacting in nature and are not found elsewhere. The ecosystems here are highly dynamic as also productive, the biomass productivity may be one of the highest in the entire country. But then this area is also highly inhospitable to man, if not very nearly hostile to human existence. Various tropical diseases and extremely difficult communication renders life extremely hazardous. Besides, wild animals are a continuous scourge and hazard to the human beings in Terrai. It is this hazardous inhospitable climate and conditions that were responsible to hold back the human populations settling in this otherwise highly productive area. Nature was thus successful in shielding this unique area from human abuse till quite recently. Large tracts of the Terrai region with impassable swamps, quick-sand bogs, thick jungle and inhospitable climatic conditions remained out of bounds for human settlers till lately. But after independence a tremendous demographic change took place and demand for agricultural land rose abruptly "Grow more food" and Green revolution" simultaneously gripped the nation. As a result human settlement was encouraged in the wild Terrai and the area was brought under cultivation systematically by mechanised "Reclamation" and raising sugarcane in extensive U.P. Terrai. Most of the Terrai belt even elsewhere has also been put to agricultural use and for settlement.

In doing so the jungle, grass and reed were removed and the boggy land was consolidated and put to agricultural use. Soon the immense capacity of such areas to hold ground water disappeared, with the so called "reclamation". The Terrai area with the natural ecosystems which earlier controlled and modulated the floods in a big way by first holding a large quantity of water and then breaking the force of the flow of the flood waters, now could not perform these essential flood control functions. With heavy monsoon rains in the upper catchment areas water rushed down the hill slopes and then through the Terrai belt without any obstacle and caused havoc not only locally but all along the agricultural plains.

It goes without saying that intensive economic extraction of forest produce, extension of settlements and agriculture, construction of roads and large and small dams and heavy pressure of grazing bared the hills in most areas. All these activities caused immense soil run off, land slides etc. and caused serious degradation of the invaluable ecosystems. The top soil, which is formed through various complicated organic and inorganic processes over long period of time (may be hundreds of years) is the main ingredient of natural productivity, not only locally but also in the downstreams areas, as this top soil is washed down by

the main water into the plains below. Thus the loss of top soil is uncalculable national loss, specially in any area where the overall economy is based on agriculture.

But this is not all. The depletion and degradation of natural forest cover in this crucial area (hill and the Terrai combined) first causes top soil run off. After the thin top soil is removed, the coarse materials like boulders small stones, pebbles and sand is carried down by the onrushing flood waters and deposited in the downstream areas. Naturally the stream beds rise and the agricultural fields get covered with coarse unproductive materials, impairing agricultural production. Raising of the stream beds invariably reduces the flow and causes gradually increasing inundation. Flush floods become a regular occurrence after consolidation of the Terrai belt and repeated flood waves in a single monsoon has become the order. The actual damage caused to crop, property and life itself is enormous and regular, but I think more ominous is the resultant loss of natural productivity and shrinkage of agricultural land, being covered by sand and other useless materials, deposited by the floods. At a time when more agricultural production is necessary to feed the increasing months, loss of natural productivity can prove to be disastrous in the long run, despite innovation of high yielding crop and better scientific way of agriculture.

There is still another dangerous effect of destruction of the Terrai ecosystem, which has to be carefully studied. As mentioned earlier, the Terrai area with its natural forest cover acts like a huge reservoir, which stores the abundant rain water of the monsoon and later releases water through innumerable water courses, small a large, that run down into the plains below, right round the year. This natural 'irrigation' sources dry up after the monsoon once the Terrai areas are "reclaimed". Irrigation by lifting ground water or by damming perinial water courses, become essential to sustain agricultural production, which results in cost escalation, obviously, besides lowering of the water table. It is now a well known fact that availability of water during the lean periods is going to be a very serious problem everywhere in the world, including India, mainly due to heavy drawal of ground water for irregating agricultural fields during the next decades. The indications are already clear. This changing facade probably proves in a more emphatic manner about the danger of tempering with the natural system of water holding systems, in built in Himalayan ecology.

In an attempt to enhance agricultural production, intensive use of pesticides/insecticides and various chemical fertilisers has become widely prevalent. The result naturally is spelling danger. Many plants and animals have become locally extinct and many more are following the design, lengthening the list of "endangered" species. It appears, the natural food chain has already been severely disrupted in the process of 'reclamation' and the ultimate result is going to unfold gradually. There are many more aspects which are inter-related and requires in depth study for seeking some remedy, before it is too late.

Terrai area had been looked upon as a wild area, fit to be reclaimed and put to agricultural use to boost up production. This is a short sighted and suicidal outlook, which is already proving disastrous. The whole land use pattern/system has probably gone drastically wrong, as far Terrai is concerned. It must be realised that the apparently 'wild' looking area had been designed by nature to ensure real 'sustainable productivity'. This area with the natural ecosystems contained there is precious beyond any description to the humanity. The flood damage, which is a direct result of depleting Terrai, is acting as a drag not only against economic development, but also against productivity.

Our wise ancestors had probably realised the moot point of ecology relating to the Himalayas. It appears very reasonable that the Himalayas had been visualised as the abode of Gods and even personified as a God. No wonder also that the Ganges is regarded as sacred and flowing down from the matted hair of the great God "Shiva" or "Mahadeva", who has been portrayed in Hindu mythology as the kindest of all Gods but who can destroy the creation, when angered. By desecrating the Himalayas and the Ganges system, we are sure to invite ecological catastrophe as nature's back lash, if not the wrath of "Mahadeva"! It is wise to watch out!.

The ecological devastation of the Himalayas is not unlikely to set in motion a series of chain reactions which may effect the rainfall (specially the distribution pattern), carbon sequestration and changing of weather conditions, ultimately helping the dreaded global warming. The future actual implications may be much more serious than what can be visualised now. We have no alternative but to put a leash to our evergrowing demands on mother nature, if we have to return the earth to our children, from whom we had borrowed it.

WET LAND IN ASSAM

Wet lands, which are inundated for most part of the year or throughout the year had long been looked upon as some unutilisable land area, without much use for the human community. Anything that finds no direct use for human beings, naturally fails to draw much attention and therefore more or less neglected, same was the fate for the wet land also till quite lately.

But in reality wet land is one of the most productive area, when under natural evolutionary process and besides supporting a host of biodiversity or life forms, it also provides immeasurable support to natural productivity of the entire neighbouring area, which in turn helps the agricultural process, so vital for human existence. Wet land and maintaining the natural ecosystems therein under the natural evolutionary processes is therefore extremely important for the long term benefit of man.

Wet land by itself support a large spectrum of floral and faunal diversity, many of which is utilised by man. Fish may be the most commonly and extensively utilised resource in the North eastern India from such wet lands, which forms an integral part of the land in the Brahmaputra and Barak flood plains of Assam. Besides fish and some other source of animal protein, a number of plants, and fruits and tubers from many aquatic plants also form food items of the local people. In fact fish is one of the most important and widely consumed protein in this part of the country.

But man's use of any natural renewable resource is the end product of a chain of natural process that brings about energy transfer, the key to sustain the life line on this planet. This chain of natural recycling is extremely intricate and infinitely complex and remains mostly obscure to human understanding. Further, many of the guiding factors are uncertain, as these factors are variable, which render understanding more complicated. Under this circumstances, it is quite apparent that human manipulation of the wet lands for his short time gains will only end up in disrupting the infinitely complicated process of natural energy transfer, which forms the cobweb of food chain. Naturally if and when man must take up modification (the other name is development or in case of wet land, "Reclamation") of such delicately balanced ecosystems, he must confine himself to the least tempering of the natural process..

The plains of Assam which comprises mainly two flood plains of the rivers Brahmaputra and Barak holds a large number of wetlands. totalling to.....¹³⁹²..... The total area of such wetlands in Assam is roughly about ^{5,00,000}..... hactors. Some of these wetlands are large, while some are much smaller with differing periods of inundation, which invariably depends on annual flood cycles. Some of these wetlands are permanently under varying depth of water, while others may seasonally dry up for two months or a little more.

The flooding pattern and the intensity has undergone serious change during the last 7 to 8 decades in this region, mainly because of overuse and even abuse of the catchment areas of these two rivers and their tributaries. This has been the result of an unprecedented demographic change in the area, during which period the population (human) has more than doubled. The consequent increase in demand for food has resulted in "Reclamation" of the shallow wetlands for agriculture. Simultaneously, the hills have been put under very intense pressure of exploiting the natural ecosystems. Unfortunately this also includes the agricultural process of slash and burn of "Jhooming" which is very widely prevalent in the hills of this area. All this overuse of the natural cover in the hills has denuded the catchment areas very severely, causing tremendous erosion and consequent soil run off. As a result the river beds or stream beds have risen constricting the flow which in turn resulted in widening of the rivers and streams. Naturally during the monsoon increasingly more areas are regularly getting inundated, causing enormous economic and material loss in the shape of food grains. In Assam in the North East India is a high rainfall zone and annual floods is a regular feature, which has a great bearing on the reformation and retention of the wet lands. Due to extraordinary siltation, old wetlands are quite often filled up, to be immediately undertaken by agriculture, but due to erosion and change in river course, new wetlands are created. This phenomenon is clearly noticeable along the great Brahmaputra, the width of which is around 15 k.m. at many points. The river course may have one or more channels, but will also have large and small islands and plenty of wetlands. Thus the composite river course of Brahmaputra, which runs for nearly 800 k.m. within Assam is virtually a vast stretch of wetland, which maintains the high water table and also rejuvenate the natural productivity of virtually the entire valley. It may be interesting to note that large parts of the Kaziranga National Park is nothing but wetland. However it may be clearly understood that the wetlands in Assam provide a vital clue to the natural productivity of the area, which is of vital interest to the human community.

But the full potential and the implications of maintaining the wetlands has probably not been carefully analysed and understood.

Due to intensive pressure for agricultural land, accentuated by river erosion and covering of productive agricultural area by sandy particles during the floods, more and more wetlands are being reclaimed. Besides, embankments are being constructed and reconstructed in a vain bid to contain the floods, which is actually choking the wetlands in some areas by blocking the natural drainage.

There are many other factors also besides human use, which requires proper assessment even for the sake of potential human utilisation. As mentioned earlier, the wetlands support various aquatic ecosystems, which ultimately contributes to the terrestrial ecosystems. In a similar way the terrestrial ecosystems do also contribute and influence the aquatic ecosystems. Modifica-

tion of one is therefore sure to effect the other. And in Assam both the terrestrial and the aquatic natural ecosystems have been modified quite drastically. Agriculture and special agriculture has altered natural ecosystems in large tracts, the drainage of which is effecting the natural aquatic ecosystems, besides many such areas being under the process of reclamation.

Five to six decades back, high floods, in a cycle of 5 to 6 years had been taken as a boon for agriculture, as despite the instant bane of the damage caused by such floods it would rejuvenate the land by depositing nutrient-rich silt, coming down from the catchments, where top soil had been formed. But this is not the case any longer. The flood level is rising higher and higher with the passage of time and what is being deposited with the flood water is often sand or other debris which impairs agricultural production, instead of revitalising the land for agriculture. As a result more and more chemical manure is being widely used to keep up production. In a similar way use of pesticide is being increasingly used to keep up production. In fact the natural land productivity (biomas productivity) seems to be on the decline, although improved methods of agriculture, use of high yielding varieties of crop seeds, putting chemical manure, pesticide into wide use and irrigation has been able to maintain and even upgrade the production, which may set in dangerous complacence.

The use of pesticides and manure is finding way to the rivers and the wetlands, which is raising the toxicity level, causing unknown damage to the natural ecosystems - both for the flora and fauna. The Tea estates are utilising pesticides and chemical manure very intensively and is the single largest contributor to this type of pollution. Fortunately the area is situated in one of the highest rainfall zones which helps in diluting the effect to a big extent, otherwise the result could have easily been much more serious.

Extensive irrigation and the overall rise in river beds by deposition of mostly sand has resulted in lowering of water table almost everywhere, which has naturally effected the wetlands, where their existence is required more than ever. The rivers and the wetlands of Assam hold immense capacity of supporting a very large variety of fish and other aquatic fauna, most of which form the source of protein for the local people. Fish breed or spawn in the grass and reed beds contained by the wetlands, which are connected with the rivers. The riverine islands of Brahmaputra is always colonised by such grass and reeds. But such areas are under tremendous biotic influence. In the initial stages, when such islands surface, these are occupied by graziers and later when such islands rise higher than the flood level through silt deposition, these are put to agricultural use and for settlement. Naturally the wetlands, which are situated nearby, are also put to human pressure. This biotic influence has reduced a lot of wetlands area through conversion to agricultural land.

Many such wetlands have disappeared in the North Lakhimpur area. One major such area is Pova, which had been once well known for wild buffaloes. This area had extensive swamps and shallow lakes full of reed beds and was once thick with fish and various aquatic fauna. This area had been one of the major spawning area for various fish. But the entire area is now under plough and the area is inhabited by more than 10,000 people at present. In fact, as far as I know, except the protected areas (National Park & sanctuary) hardly any other suitable spawning ground is left for the fish. Simultaneously fishing in the wetlands of Assam has increased to unreasonable limits. No closed season is observed and no mesh for fishing net is enforced. Fish production is sharply on the wane and some species of fish are disappearing in some localities.

The wetlands support a large variety of avifauna, both resident and migratory, which depend on the aquatic biomass that is available as food. Many species breed in the wetland habitat and the migratory species come to winter here from the colder regions of the distant North. The available plant biodiversity in these ecosystems is extremely varied to suit the selective food habits of a large number of life forms at different trophic levels. Not much is known about this intricate copweb of food chain.

Besides, such wetlands also form part of the natural composite habitat for various other animals, which include the Buffalo, Rhino and the Elephant, who utilise these areas and is therefore of utmost importance to wildlife interest.

It may however be clearly noticed that the avifauna and other animals, who are dependent either solely or partially on the wetlands, utilise more than one wetland, large and small. Often the water birds rest at one wetland and go to some others for feeding during the day. Thus often a single wetland, large or small is not sufficient to support such birds and even animals. Besides, the continuous availability of food such use of numerous and scatchred wetlands forms a part of their defensive mechanism. Thus the migratory ducks and the Geese will not rest at their feeding place. They will rest mostly on the isolated river islands or scheid parts of the larger water bodies, while may prefer to feed in smaller and shallower wetlands. The Pilicans will move from one waterbody to another, depending on the depth of the water bodies, which ensures adequate food supply. Thus only a luster of wetlands may become a viable natural habitat of the avifauna in particular and all wild animals in general.

Though conservation of the wetlands, specially in the monsoon-fed high rainfall zone of Assam is of extremely high importance and significance in relation to biodiversity conservation, yet the ecological evaluation of such wetlands remains yet to be properly tackled. Even now there remains a marked tendency to look upon such areas as something inaccessible, unhygienic and may be wild area, which is better 'Reclaimed' and put to direct human use, specially under the spiralling human demand on nature, arising out of demographic change as also gradual change in traditional

Indian life style through influence of consumerism. The considerations of immediate human gain by conversion or modification of the wetlands has overshadowed the very important ecological role of such areas on long term human interest which, in any case, is not properly understood and assessed.

Before talking about "sustainable use" of such areas by modifying the natural ecosystems, we have to understand fully and assess the total direct and indirect benefits offered to humanity by such ecosystems. Otherwise we are not unlikely to impair our natural sustainability itself. Natural ecosystems have been evolved through aeons of time contributed by various factors like geographical location, climatic factors, geological formations and various other natural factors. Most of the highly complex interactions are yet unknown. Under these circumstances, I don't support the apparently impetuous plan to modify natural ecosystems and repent later. I would suggest that nature should be offered protection to enable continue with the evolutionary process, rather than making any attempt to modify the same for short term human interest, even for the sake of sustainable use, the real implications of which are not clearly appreciated, and the word "sustainability" being rather too causally coined about. A lot more research to split the extremely complicated food chain is warranted before embarking on an attempt to 'develop' the same. It must not be forgotten that all these links ultimately ends up in human use as the end use in the process of recycling, which keeps the life line going. There may be just about enough in nature for human need, but not for his greed. More attention is needed to be focussed on the human population rise in the tropical areas, which appears to be the root cause of most problems to day, which actually stems from quite clear imbalance in demand and supply (within real sustainable limits!) of natural renewable resources, on which the entire life line is helplessly dependent. Let us have some lesson from the extinction of the Pink headed duck, which disappeared from this very tract early in the present century. and scattered wetlands forms a part of their detritive mechanism. Thus the migratory ducks and the Geese will not rest at their feeding place. They will rest mostly on the isolated river islands or scattered parts of the larger water bodies, while may prefer to feed in smaller and shallower wetlands. The Pink headed duck will move from one wetland to another, depending on the depth of the water, which ensures adequate food supply. Thus only a wetland of wetlands can become a stable and reliable habitat of the avifauna in particular and all wild animals in general.

S. DEB ROY

Though conservation of the wetlands, specially in the lowland high rainfall zone of Assam is of extremely high importance and significance in relation to biodiversity conservation, yet the ecological evaluation of the wetlands is yet to be properly tackled. Even now there remains a marked tendency to look at such areas as something inessential, unproductive and may be a hindrance, which is better 'eliminated' and put to direct human use, especially under the spillover from Germany's nature conservation out of geographical change as also gradual...

The controversy relating to human demand to use the renewable resources from the Protected areas (wildlife) is nothing new. In various countries this ^{demand} has even been accepted either partially ~~for~~ or in varying degrees. Obviously this demand was nothing unexpected. But what is surprising is the source from where the demand is voiced. The people who have voiced the demand are actually highly urbanised and have taken the ~~task~~ self imposed task of wildlife preservation. They have made Ranthambore their playing arena and basing on ~~a~~ whatever contacts they have developed in this area, they seem to have developed the theory that the N.P. can be better protected by allowing human use within the N.P.

Well, this brings about some pertinent question about wildlife preservation. The main (or the first) question is when we talk about wildlife preservation are we not thinking of protecting or preserving the wildlife or ecological interests from biotic influences? Is there any scope to doubt that the human influence ~~is~~ exerted on the natural resources is the only adverse effect, which has decimated wildlife anywhere in the globe?

In this country man has already ^{been} using about 98% of the total geographic area of this country for his clan. He ~~has~~ has, by now, decimated wildlife of every species. The list of threatened or endangered species is lengthening with regular monotony. Biodiversity in the wild is now restricted only in the Protected area not ~~work~~ ^{work}, mostly. I don't think there is any shade of doubts, if we take stock of the situation during the last hundred years or so, that man ~~man~~ has ^{been} singularly responsible for the ruthless decimation of wildlife and affecting ecological interests, which is now threatening the future of man himself.

These facts and observations have led the Govt. to formulate the national policy on Forest and Wildlife management, which are the results of long deliberations, discussions and a lot of scientific input based on long observations. The wildlife Act, as amended in 1991 attempts to prohibit human use of the National Parks, except for scientific, management and tourism purposes. Besides, the existing human settlements within the N.P.s are also to be relocated outside the Park boundary, only with the intention of eliminating the adverse biotic influences in the true interest of wild life forms.

There is no use to go into arguments about whether human use is compatible to wildlife interests in any wildlife area specially in this country, where wildlife management ^{has} a 2000 year old history. 'Rabharanyam' is a reality and not any ^{hypothetical} concept during the time of Ashoka. Indian Vedas have 6000 years old lessons of ecology, which ^{still} remains ~~still~~ to be improved upon! From the Vedic era upto Gandhian days Indian thought or philosophy ^{contains} preaches and warns against greed, which is a destroyer.

The hominids have colonised almost the entire world except only those areas where they cannot survive ^{due} to incompatible climatic conditions. But their proliferation has already become the most difficult problem in the world against the very future viability of their ~~own~~ own race. With the advent of nuclear power, nearly quarter of a century back, man had the impetu-
^{end} siveness of planning to reshape nature, to suit his own ~~best~~ best, but soon realised his utterly foolish and impossible aim, with some humility. The idea of opposing the long standing understanding of conservation by ~~is~~ allowing human intrusion in the wildlife protected areas is not only unacceptable even going by scientific

reason, but also ~~also~~ in direct contrast to Indian philosophy and ethics.

But the most ~~import~~ interesting part is that this absurd argument is coming from ~~an~~ a N.G.O. who has been working ~~for~~ in ~~an~~ ~~area~~ a P.A. where a glaring and clear evidence had been ~~obtained~~ ^{established} of how the wildlife (including habitat) can bounce back to life from utter degradation only through eliminating biotic interference. This also decisively proves that only human overuse and abuse of the natural resources is the cause of depletion of the wildlife status, which in the long run becomes detrimental to human interest also.

Maybe the N.G.O. has some points, but I have no interest in such points and arguments, which may draw applause from some vested interest groups. There is some covert and even overt support to terrorism, which may often preach some ideal! But this does not mean sensible people have to debate about the justification or admissibility of terrorism. I simply don't want to involve myself into this subject, the arguments in favour of which is simply absurd.

Man has to contain ~~his~~ the proliferation of his own clan if he has to save his future, which is said to have been borrowed from his children. He has to contain his greed, which is engulfing the entire globe in the shape of consumerism and market economy. ~~Otherwise~~ everything (natural resources) will end up ~~is~~ and even then man will remain hungry, may be more than ever.

Human use of the P.A. has been disguised behind "joint management of the P.A. Joint management is certainly worth considering, particularly in view of the immense traditional knowledge about ecology and wildlife, which should be harnessed and made proper use of. But to achieve this end human use of the P.A. (N.P.) is just not acceptable.

Another point is also pertinent in this connection. Though the blame of degrading any forest or wildlife area is generally attributed to the local communities, yet in reality about 70% of the resources from such areas are siphoned out, which reaches ~~the~~ urban areas! If this indirect line of drainage of resources is cut off, the problem of management may become solvable. But this line is very intricately woven and backed by powerful economic and political ~~to~~ lobbies and hardly any mention is hardly ever made by those who want to seek a solution.

anywhere
1 The reasons for the degradation of wildlife management in India, specially in Ranthambhore National Park of Rajasthan has to be understood clearly to seek the remedy. The main such reasons are as below, -

① All said and done management of wildlife has very little or no priority and importance in its parent department, i.e., Forestry, even though it is now admitted that wildlife management is an integral part of ~~Forest~~ scientific forestry and requires special scientific training of the field people at all levels.

② Though forestry and wildlife management is in the "concurrent list" as per constitutional arrangements, yet for all practical purposes the State govt, who are the "land owners" and who control the forest and wildlife administration, do not heed any advice or guidance or suggestions offered by the Central govt, which may become 'inconvenient' for the state politics. Flagrant violation, that too repeatedly, is the norm of the guidelines of the Project Tiger, may be sighted as one of the examples.

Transfer/Posting of the Field Director or any gazetted officer to or from any Project Tiger area has to be done by the State govt, but only after obtaining prior approval of the Central govt. This guideline is hardly ever followed by the states. Besides, there are innumerable examples of financial irregularities, deliberately carried on by the States with regard to govt. of India funds, provided by the Central govt.

There are innumerable other areas of conflicts between the Central and the State govt in relation to wildlife management and unless these areas of conflicts are resolved in mutual interest, suffering of wildlife interest may never be contained in this country.

③ Due to lack of priority, wildlife management is suffering from acute financial inadequacy. The Protected areas should get ~~pro~~ financial support, which should be proportionate to the percentage of land it occupies in the state in relation to average expenditure per unit area for different purpose of land use. [In fact the state govt. must come out with a ^{clear cut} Land use policy.]

④ ^{successful} Wildlife management involves unorthodox hard work at field level continuously, relentlessly all the time. Naturally efficient man management is an unavoidable compon-

(2)
ent of successful wildlife management. This will include not only ideal service conditions for the staff, but must also provide for appreciation of good and daring works and prompt payment of suitable compensation in case of any unfortunate incident involving any field staff. All these are very nearly totally missing in the present system.

⑤ Wildlife management now demands a great deal of scientific input about ecology, animal behaviour, socioecological impact on human population etc. Naturally wildlife field staff, particularly at the level of the Directors to Rangers is imperative. Besides, only willing persons, who are dedicated should be engaged in such works. But in reality this happens only rarely. Even the Chief Wildlife Warden, who is the statutory head of the Wildlife wing in a state quite often is posted from officers, who had no training or experience in wildlife management, in effect without any wildlife background. It is quite evident ^{that} such officers has no other alternative, but to mark time for the next transfer/promotion. Wildlife interest thus becomes of secondary importance to him and subservient to conflicting human interest, because of his lack of orientation and experience. Officers at the level of Directors ~~and~~ and below are often posted in a similar manner with disastrous results. It is not uncommon to come across cases when officers trained in wildlife management are posted in other aspects of forestry. Worse still, there are examples of willing and tough wildlife officers with proven track records being withdrawn from the field posting of wildlife almost as a punitive measure, because they had taken tough uncompromising stand in favour of wildlife interest. This whole double standard attitude towards wildlife management arising out of lack of priority, political will and total lack of understanding about how ~~fore~~ natural food chains ultimately benefit the human community, has to change if wildlife in general and the apex species of Tiger ^{with} their natural habitat has to be saved, in the future interest of mankind.

⑥ Some areas like Ranthambore National Park have been kept aside by the Govt. to save the wildlife interest, out of human use. But such areas had earlier been used by the human communities for their own sustenance. Removal of forest produce, ~~grazing~~ for human use from such areas, grazing of domestic animals in such areas, thoroughfare for pilgrimage etc. had been carried out in such areas. But since sitting up of the National Park, the area has been legally been sealed off from human use, which has caused genuine problem to various groups of people, who live in and around ~~the~~ such areas. Worse still, the human population level ^{as also domestic stock, used} continuously rising in these areas and the demand for natural resources like fuel wood, small timber for construction work and grazing domestic animals is consequently soaring. Besides, the people are by and large very poor, not able to go for any alternate source of living or purchasing alternatives.

When human long term interest demands that such sacrifice has to be done by the local communities, it becomes imperative for a beneficiary state to adjust and take full responsibility of the demand of the local communities in their traditional way of sustenance. ~~Ranthambore~~ Otherwise such people would have no alternative but to infringe on the legal provisions of Wildlife protection. Ranthambore is thus not free from collection of enormous quantity of timber (both as fuel wood and small timber). Large numbers of uncounted cattle not only graze within the Park at certain period of the year, but even stay inside the Park for several months, looked after by organised cow herd people, who set up their camps. Caravans of cycles carry milk from within the Park, which is supplied to the adjoining localities. These are facts, however much may be denied in official papers by the Wildlife managers of the Park.

Such carnage may stop only when the ~~the~~ local demand linked with human sustenance is taken care of by the state authorities. A new scheme named 'Eco-development' has been launched by the govt. since last 3/4 years. But though considerable amounts have already been spent in the name of this scheme, no worthwhile result has come about, even where the scheme had been operative. Inefficient planning by the local authorities and probable corruption cannot be ruled out as the major reason for this failure.

⑦ People's participation is being given a lot of importance at present, whatever it may mean. But the first step towards achieving ~~this~~ the objective of people's support for management of wildlife is being grossly overlooked. In this regard various N.G.O.s with proven track records should be encouraged to strengthen the management, specially because they may be able to play a catalytic role between the govt. and the local people. Some of these N.G.O.s have done some good work towards achieving this objective, specially in motivating the local people. But the Park authorities not only refuse to accept the N.G.O.s as ^{their} supporters, but seek all opportunities to ~~to~~ blame them for ^{even} insignificant lapses. The govt. authorities, who are responsible for wildlife management are intolerant of any criticism, & much less carrying on a proper introspection of their own works and the results. This sad state of affairs, which basically was the reason for this particular case, has been the result of ~~unmitable~~ ^{unmitable} and ~~unwilling~~ ^{unwilling} officers at the helms of affairs, who are ^{even} unable to judge what is good and what is bad for the Park management, besides being obstinate in their stand.

⑧ Wildlife management in any protected area calls for concerted efforts from the entire Govt. machinery. The Forest/Wildlife authorities are helpless to tackle offences outside the protected areas, once the offenders have managed to escape from the protected/forest area. The civil administration and the Police only can tackle such situations. Naturally all the govt. agencies must move like a ~~at~~ ^{well} oiled machine. But unfortunately, this is not the case in reality. Each deptt. has its own angle and consequent

problems to look at wildlife management related matters, besides very silly ego problems! The ultimate result is, - wildlife interest is the casualty.

⑨ In management and planning of wildlife matters, the status of wild animal species and the range condition assume top priority. But quite often actual status position is clouded with doubtful accuracy. Hot controversy raged about the status of the tiger in Ranthambhore. Ultimately it was revealed that the status position that had been shown by the authorities had been grossly exaggerated! This again is a fall out of placing wrong persons in charge of such areas, who did not perform their primary job well, but fiercely argued in favour of the wrong number they had produced. Well, one has to be honest, at least about matters of such vital importance. animals belonging to

⑩ Offences relating to poaching of threatened species hardly ever gets due attention and care from the prosecuting authorities. The Wildlife Act appears to be quite strong and adequate to take care of the related offences crimes of poaching and smuggling. But unfortunately the implementation part of the enforcement is not only weak, but almost nonexistent in most part of the country. As a result even in straight forward cases of wildlife crime, offenders easily manage to escape, due mainly to inadequate and inefficient legal proceedings undertaken by the authorities. In any case detection of wildlife offences is also few and far between. In case of any such detection proper investigation is very seldom carried out, which is required to prove the offence during prosecution. Quite often such cases are delayed far beyond reasonable limits of time and by the time such cases are heard and argued, key witnesses from the govt. side are away on transfer, in some cases even dead! Lack of witness evidence (forensic or otherwise) to prove that seized articles like skin, meat or bone etc. had been of threatened species also often causes failure of proceedings in Wildlife Act cases. The overall legal system is thus not only inadequate, but may really be termed 'atrocious'!

⑪ Preservation of wildlife and the related interests is a collective social responsibility. Naturally the leaders (political and social) must accept this bit of responsibility in ensuring that at least whatever measures of wildlife management is acknowledged to be a must, is religiously pursued and results achieved. If some one is not doing so, he or she should and must take the responsibility. Without a political commitment and will no govt. achievement is possible at least in a democracy. The initial spectacular success of the Project Tiger in our country, which had been internationally acclaimed as the single largest success story anywhere, became so successful because of strong political commitment and will that blew across the country at that time, thanks to the political leadership of that time.

Recommendations:-

- ① The wildlife wing of the State Forest Deptt. must be properly reorganised by placing suitable willing and trained persons officers in different wildlife jobs. These officers must be allowed to perform their jobs without interruption or hindrance from the bureaucracy or from political circle. All officers upto the level of Rangers and above must be trained in special wildlife management and related courses.
- ② The real objective of putting Forest & Wildlife management in the 'conquerer' list of the constitution must be fully achieved. Any difference of opinion between the Central and the State govt regarding wildlife related matters should first be attempted to resolve through discussions (based on scientific arguments only). But in case such disputes still remain, then Govt. of India's (Central govt) views must prevail. Central govt should call a meeting of all the State govt, once in 6 months to resolve mutual points of difference.
- ③ A detailed review of the funding for wildlife management must be carried out by the Central govt. (Planning Commission) as also the State govt. Funding for wildlife should be commensurate to the proposed works as also to the proportionate land area that is put under the Protected area net works. Simultaneously a clear cut land use policy must be worked out within a reasonable period of time.
- ④ The Central and State Planning must have some advisors to look up the wildlife matters. Such advisors should be selected from N.G.O. or N.G.I.s with adequate track records.
- ⑤ The service conditions of the field staff on whom largely depend the fate of wildlife management, must be carefully reviewed as the present position leaves much to be desired. Such field staff have to lead a tough life in inhospitable areas, away from their family and have to face dangers frequently. Proper pay structure and amenities like proper supply of durs, field ration, medical facility, insurance against accidents, family accommodation etc. should be provided, as is done for the army or para military service-holders. Simultaneously strict discipline and code of conduct must also be set up for such field staff.
- ⑥ Exemplary good works of bravery must be given proper recognition through state level or Central level awards/medals and cash rewards, followed by accelerated, out of turn promotion. At the same time ~~proper~~ provisions for strict punishment or even removal from service for serious lapses in duty should also be provided.
- ⑦ The administrative system of wildlife management must be overhauled. Only officers with proper training and experience should be taken as the statutory head of the State wildlife wing. Only this may be able to establish proper orientation of the outlook necessary for wildlife welfare. Similarly all field officers also must be taken only from willing persons and trained up in due course.
- ⑧ The field staff, Rangers downwards, must serve ~~at least~~ a minimum period of time in wildlife postings. Those who may like to continue in wildlife postings later on may be allowed to continue. This will allow the elderly wildlife staff

to join forestry postings with less burden of works. This will also enable such staff to safeguard wildlife interest in forest areas, outside the Protected area network.

The present system of posting any one either at random or by deliberate design to hold wildlife posts, must be stopped.

⑨ The ecodvelopment plan, which is a Govt. of India scheme must be properly implemented. Whatever work has so far been undertaken should be carefully evaluated by some independent experts and the defects, if any rectified.

In implementing this plan utmost care must be taken to safeguard the traditional customs of the local people. Cultural invasion through flooding by big money must be meticulously avoided.

⑩ Good understanding and a rapport with the local rural communities has to be achieved for successful ecodvelopment implementation. In this regard N.G.O.s may play a vital catalytic role, which requires immediate and strong support from the govt. A local body should be set up in which local community leaders/representatives & N.G.O.s & N.G.I.s should be involved along with govt. officials for implementation and for monitoring of the schemes.

⑪ Though the management of Park is the direct responsibility of the Park officials, yet quite often surrounding human population and their interest in the Park get other govt. agencies to be involved. A District coordination committee (or state inter-district coordination committee) should be formed to oversee the smooth linkage between various govt. departments to enable uphold the community interest, which will help in wildlife management.

⑫ The status of the wild animals (at least the major species) should be periodically ~~etc~~ monitored by the Park authorities in association with some of the experienced and knowledgeable N.G.O.s or N.G.I.s to understand the trend clearly and to take up suitable management measures.

⑬ The State Govt. should immediately set up a special enforcement cell/agency who should see to anti-poaching and anti-smuggling activities like the criminal investigation (C.I.D.) deptt. in the Police. All the officers and men should be adequately trained in this regard.

⑭ There should be a trained prosecuting officer supervising & processing all court cases relating to Wildlife Act. The Director/Field Director of the Protected area should be empowered to engage any pleader/advocate of his/his choice depending on the budget available. ~~with~~ He/she should also be empowered to file appeal against any Court order, which may be felt to have been improper.

⑮ Wildlife preservation should be a part of human living, as this is linked with sustainable living. Naturally this is a collective social, cultural and religious responsibility of all citizens, which is reflected in Indian Constitution. Mere Court orders cannot ensure this. The social, religious and above all political leaders must take up their bit of responsibility in a positive way, without which no result may ever be obtained.

A NEW FRAMEWORK
FOR
MAN MANAGEMENT
IN
TIGER RESERVES/PROTECTED AREAS

Any wildlife manager, worth his salt and who has some experience in wildlife management in the field shall admit that the key to the success of wildlife management in any Protected areas lies, to a great extent on 'Man management' besides other factors. But I would consider myself, that this aspect is the most crucial factor which leads to conservation success, as all other factors can not deliver that goods, if man management fails in any protected area.

Protection of wildlife and the related ecological interests is probably the primary and the chief objective of wildlife managements today, particularly in view of the spiraling biotic pressure on the protected areas specially in countries like ours. I feel strongly that if the decimation of wildlife and degradation of the habitat caused by poaching and other human interferences can be contained, the chief objectives of wildlife management are actually achieved.

But this is easier said than done because to accomplish this relentless vigil, one needs 24 hours a day and 365 days in a year. This is necessary from the field staff. Obviously this will involve extreme dedication and hard labour, besides involving a high degree of personal risk. Further this work is rather unorthodox and there cannot be any fixed time of working hours. More vigil is actually necessary during the nights and since all our protected areas are running with grossly inadequate field staff, quite often the same staff dashing off to a second mission immediately on return from their routine patrolling duty.

I have myself spent 38 hours non stop on some elephant poachers trail before we were finally successful in arresting the gang. All this time we had to go without food, but nobody complained! In the Army, Para military and Police there is a system of fixed duty hours, after which (generally 8 hours) the persons on duty is replaced by a fresh batch of people. In the wildlife areas huge areas are left in charge of 2 to 4 people, mostly unarmed and naturally the expected vigil is next to impossible unless the staff themselves develop a feeling that they are protecting their own wealth. And this feeling can come only form extreme dedication and a passion for living in nature, perhaps a little dangerously!

And if we consider what the field staff (in the Protected areas) get as remuneration in line of what they are expected to do it may look simply astonishing as to how the Protected areas are being saved from total destruction! The very basic amenities like health care family accommodation, children's education etc are pure luxury and out of reach for such people. But these are the

guardians of our national heritage and no comparison of service conditions is possible between them and the guardians of our borders and those who maintain law and order. Yet I feel, the duty of the wildlife field staff is as sacred as any and may be more arduous and demanding in view of the lack of logistical support and gross numerical inferiority, that is invariably associated with this job, because of lack of priority that wildlife receives, compared to the other services.

Under these adverse and difficult conditions, it is no wonder that the burden falls heavily on the shoulders of the leader, who only may be able to get the maximum out of his inadequate manpower including other necessary resources and an unfriendly, if not hostile world to attain his objectives of long term ecological interests, which invariably clash with the short term human interests, which renders everything even much more difficult. This will probably indicate the immense, value of leadership necessary for successful wildlife management anywhere. This may be the reason why almost all the success stories in wildlife management are centered around particular persons, who had managed these Protected areas. Very rarely, if at all, such success is sustained, long after the departure of the particular persons/leaders from these protected areas on transfer/promotion or retirement.

It is therefore crucial that selection of the Park/Protected area managers and his staff is done extremely carefully. Only willing and dedicated persons must be selected for such jobs and preferably trained up in wildlife management. But it must be remembered that nothing, even training, possibly can replace experience, which alone helps in understanding nature, the base of wildlife management.

But in reality hardly ever does this sequence take place. Usually people are just transferred into wildlife without any of the above considerations. It is still more unfortunate that often people, who are found incompetent in forestry sector or become unwanted there, are transferred into wildlife, more or less as a punishment posting. Many of such incumbents naturally just while away time and seek the first opportunity to go out of wildlife, where he takes a fresh breath! There are more instances of the posting of the Chief Wildlife Wardens as the first ever posting in Wildlife for the incumbents, than having someone with experience in wildlife. And the C.W.L.W is the statutory head of wildlife organisation in any state! This may show how seriously wildlife management has been viewed in our country's governing system.

Naturally, without full support of the political wisdom no major conservation effort in wildlife can ever advance as wildlife works are not institutionalised. Further, in most of the Protected areas even no proper management plan is available. In view of all this, the service conditions, recruitment of the wildlife staff at all levels, their orientation and training etc has to be very minutely examined for attaining proper 'Man management' in wildlife, which is now functioning as a wing of the Forest De-

partment but has an extremely subdued role in the Forestry set up. This has resulted in few takers of the wildlife jobs seriously. Only those who take up wildlife management as a way of life, stick around in wildlife jobs for any substantial period, because wildlife management hardly offers any prospect which is equivalent to the prospects in other wings of the same service. In fact the general Forestry wing hardly ever considers wildlife as an integral part of the composite forestry practice and there probably lies the crux of the problem. Wildlife management has all along been granted a very innocuous position and the trend continues till today. This is the reason why many people who are really concerned about wildlife, consider that a special wildlife service, which should be independent of forestry service, should be set up to look at wildlife interests in the protected areas only.

Government is probably considering the matter of setting up a Wildlife Authority of India to find out a solution. But I feel wildlife is an integral part of Forestry and should continue as a complimenting component of what is now being termed as Biodiversity conservation. It is truly a matter of understanding the real problems and deal with those honestly.

But this will require a new look at the training programme of the Foresters, wherein wildlife management shall have to be regarded as important as silviculture or systematic Botany. In other words a Forester should be a wildlifer, which will enable him to do full justice to his profession of Forestry which has no longer remained production oriented and is now aiming at restoration of the adverse effects of past excesses done to meet human demands.

The same system should be adopted in all levels of Forestry training and at the time of sending them back to the field, an option should be taken from them and the willing people earmarked to join wildlife service, where they should be able to continue till the end of their career. Of course, there could be some special provision of interdisciplinary transfer in case of unavoidable circumstances arising out of personal reasons.

If this is done, there will obviously be one administrative problem and that is the comparatively meagre promotional scope in wildlife service/wing. But this problem may probably be solved by granting such officers time scales and also granting them promotion, due to them, had they joined the Forestry wing. It should not matter, if one incumbent is granted the pay scale of the C.C.F, even though he is in charge of a Protected area at the time, because of the absence of promotional scope in wildlife wing. I feel strongly from my own experience that a person may spend his entire life time (service life, if you wish) in one Protected area and even then may not be able to do much, even if he is dedicated hard working and a man of professional integrity. It is not easy, by any standard, to fight all the adverse forces, playing against conservation, and achieve success.

To even understand ecology in any area, a lifetime seems to me to

be grossly inadequate in most parts of this country, where the biodiversity is nearly endless and the intricate linkages are equally or more unfathomable.

The above suggestion is for the higher staff, may be from Rangers upwards. For the lower field staff, I consider the most important factor is the initial selection. I feel that all the new recruits in the Forest Department, irrespective of wherever vacancies may come up, should initially be posted in some Protected area and from there some one may be transferred to the actual place, where the vacancy came about. If this process is followed, all field staff in the Forest Department will gradually have developed wildlife orientation, which will be of immense use to wildlife management in Forest areas outside Protected areas also. In the field works of the Protected areas involves much more physical strain and arduousness than in normal Forestry. Naturally people part 40/45 years of age gradually become less effective. Besides, in most wildlife field posts, the staff cannot keep their families with themselves and naturally cannot do justice to the family members, though their encumbrances keep piling up. Naturally if they desire to leave wildlife and go for other branches of forestry, they should be allowed to do so, which will also allow steady induction of new blood in wildlife service, which is a must.

Training in wildlife management is a must and similarly arms training and jungle craft training should be made compulsory everywhere. Further, short time training courses should be regularly conducted amongst the field staff to sharpen their ability to sustain the level of efficiency. So far, refresher courses and various other courses like capsule courses etc are run for the senior Forest officers only. But it must be realised that the success of wildlife management/conservation depends almost entirely on the efficiency and integrity of the field staff, whose moral and efficiency has to be sustained all through, which is the most difficult job of a manager. Such courses, I feel, will provide a great help in achieving the desired degree of success.

But all said and done, the main burden of the management still remains on the shoulder of the Manager/Director/Field Director which can be achieved only through proper man management. This involves building up proper relation with all the field staff and trying to lead them to the front. He also must understand their difficulties and problems and try his best to help them out as much as possible, even in their private lives. But this by no means should indicate that he should tolerate any slackness in duty. He shall have to be a tough task master, who responds to their problems in turn. With a little warm response and helpful attitude, the field staff often do wonders. Usually such people develop a liking for such works, which offers a lot of independence and a taste of living an adventurous life. Some of these staff may never like to be out of such jobs.

S DEB ROY

Points - The ~~South~~ Asian (~~South east included~~) countries had been the repository of invaluable biodiversity, which includes wild fauna and flora due to its geographical location, conducive climate and varied landscape. The tradition and culture of various people inhabiting this part of the world had been generally rooted to the norms of conservation and sustainable use of renewable natural resources. Thus, till recently wildlife had remained as part and parcel of the total life line, the end user being the hominids. All creations of nature in India has been considered as essential ingredients of the life line and ~~is~~ treated with compassion however small and insignificant it may be. This ~~is~~ traditional outlook towards what is now termed as biodiversity, coupled with simple living had been the main reason behind ecological or natural balance. Human use of natural resources had always been limited within optimum limits, which could easily be restocked by natural processes.

But the shape of things changed and changed quite drastically ~~to~~ drastically during the last 100-150 years. Change came in basically two ways, a) population rise and b) increased consumption, as a result of change in life style.

Even before these two factors started influencing the scene of ecological balance, there had been other factors which effected consumption of natural resources. Through ages people from other countries and continents had been coming into Asian countries for trade and colonisation. Such people in the long run left impressions of their own culture and tradition on the indigenous life style, which resulted in various degree of modification in way of life. In various areas such influence has been of varying degree from moderate to intensive. But the overall total effect ~~has~~ have been spread of increased consumption of natural renewable resources without any consideration of true sustainability. Thus the gradual and almost imperceptible shift in cultural and traditional way of life ~~is~~ kept on influencing the ecological factors adversely. But this could not be noticed mainly because this region had been extraordinarily rich in natural renewable resources buttressed by matching productivity.

Further to the above this area had the dubious distinction of ~~people~~ population rise during the last century and is currently holds some of the most densely populated areas. The rise in population continues even to-day in India. It may be interesting to note that the human population in the "Tiger belt" in India has more than doubled (in some areas ~~to~~ tripled) during the last half century. This one factor itself has caused unprecedented shrinkage of Tiger habitat which has resulted into fragmentation of the habitat and severe degradation of the remaining habitat and also serious depletion of prey base. We are still losing about 45,000 hectares of forest land annually in India due to various factors including developmental projects. Such deforestation has caused dropping of the forest area in the country from 30% to below 20% within the last 50 years.

Points

~~D Present situation - Inception of Project Tiger in 1st April, 1973 initiated at Corbett N.P. This had been preceded by a recommendation of the general assembly of the I.C.N. at New Delhi in 1969 November. The number of tigers were estimated to be below the 2000 mark in 1972 in the whole country.~~

Besides, it is a wellknown fact that most such people living in the vicininity of the forest areas are generally poor to very poor and are uneducated. Both poverty and lack of education has long been recognised as the two chief enemies of conservation. But another factor has also influenced conservation adversely, which is lack of political will and support for conservation. Unfortunately some sort of political uncertainty has clouded Indian & even some international arena. This has undoubtedly done a great damage to wildlife interests. Political uncertainty in many cases has given birth to terrorism and insurgency, which has become an insurmountable problem for conservation. Many tiger areas have been crippled by such lawlessness.

The wildlife management in most areas requires to be properly revamped with adequate ^{only} minimum equipments to fight the well armed poachers' gangs. There are few properly oriented and committed persons engaged in wildlife management. Govt. has very little consideration or preference for such works. Besides very often there is disagreement between the central and various state govt., which mostly remains unresolved and wildlife interest suffers at the hand of the state govt., which regularly subjugates such ecological interests for short term human interests.

Ecodvelopment plan which had been designed to contain proper dicentment and the resultant threat of wildlife and habitat is possibly taking a wrong direction, where ecological interests has been granted only the second seat, first one being offered to economic consideration. When culture (open market economy & communism) is being preferred to indigenous tradition and culture, which had roots to ecological considerations. World Bank and A.E.F. are dictating terms, as they are financing, most such plans in the name of Biodiversity conservation. The ecodvelopment plan taken in a wrong direction, I am afraid may cause irretrevivable damage to wildlife conservation.

^{constitutional} The N.G.O.s are trying to help the Govt. in doing their mandate of conservation, but are not generally taken friendly. Proper cooperation from Govt if provided to the N.G.Os, could have attained much more results.

The first 10-15 years of Project Tiger has proved that with proper political will, support and financial resources the Tiger could ~~be~~ revive again. If the Tiger and its habitat could be left alone, the tiger can easily make a come back, nothing more is required. But admittedly this is no easy job under the prevailing circumstances.

Assam - North-East.

- ① Permits to individuals are being allowed to remove illegally felled timber - encourages illegal felling. Quantity of timber allowed on such Permits may give a clue to the magnitude.
- ② Inter-state smuggling of timber between Assam and Mizhalaya, Nagaland and Arunachal is rampant. Illegally operated timber in one state is dragged across the border and branded with legal or illegal steel hammer of the neighbouring state, which is then covered by genuine or counterfeit Transit Pass for all India trade. Plywood Mills in Eastern (or Upper) Assam is infamous for such illegal operation of timber.
- ③ Over 12% of the Total Reserve Forest in Assam is under encroachment, patronised by various Political groups. Gohpur R.F. ~~and~~ in Arunachal Pradesh border and Daiang R.F. in Nagaland border (Golaghat Dist.) was thrown open for settlement without Central Govt. approval. Govt. of Nagaland established some settlements, including a Sub-divisional H.Q. in a disputed R.F. area through utilising Govt. of India funds, without caring for Conservation Act clearance.

(4) No action has been taken against many high forest officers, caught in corruption. Instead some has been promoted later on! M.M. Pathak, who is now a Conservator had been suspended more than once for corruption and some charges had been established also. But no action has been taken, instead he has been promoted, though he is not even an I.F.S. Numerous instances of protecting corruption from top level downwards is quite common.

(5) Most of the Working Plans are not updated, many areas are without any working plan at all.

(6) Wildlife posts are filled up by unwilling & untrained people (Rangers in particular). No priority in wildlife management seems to be existing. Wildlife budget has come down below 10%, whereas this stood above 21% few years back.

(7) Elephant damage is a constant headache in the State, but virtually nothing has been done in Project Elephant during the last two years. Some elephants have even been poisoned recently, most likely as a retaliation, by villagers.

(8) About 4 lakhs of rupees had been provided by the Govt. of India to Kaziranga for compensating and rehabilitating some villagers (I think 64 houses) from the foot hills of the Karbi anglong hills adjacent to K.N.P. Though this amount has been paid to the Dist. Council (probably in 74) the villagers did not move and on the contrary many more people has settled in the area (over 2500, as estimated).

(9) Commercial fishing is reported to have been allowed in Dibru-saikhowa recently despite a High Court order against the same.

As a result, poaching, which had been strictly controlled since the area was declared as a wildlife sanctuary, has again become a problem. White winged wood ducks which became resident in the area are reported to be killed and trapped. There is some report that trapped live 20.20.20 ducks had been openly sold in some markets. Dibru-Saikhowa may be an alternate viable habitat for Rhinos in future and this Park has immense potential.

Some captive breeding of white winged wood duck has been undertaken in some neighbouring T. Estates in Assam and Arunachal. I have a report that nearly 30 birds have died due to avian T.B. Any one of these T.E. captive breeding centres may be visited.

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I strongly feel that an integrated management policy for entire North east should be taken up, irrespective of the political boundaries, with catchment area/watershed management as the basic objective to sustain future economy of this region, rich in natural ecosystems.

but of comparatively less endowed with industrial scope. Shifting cultivation, though arguably the most useful agricultural practice in the hills, has caused extensive hills in the neighbouring states of Assam and also in the central Assam hill districts, mainly due to shortening of flood cycle and the effects are gradually becoming catastrophic for Assam. Multiple waves of ever increasing fury of floods have become regular feature in the plains of Assam, causing enormous damage to life and property, to the tune of thousands of Crores annually. Besides, the natural productivity level is falling, inviting more and extensive use of chemical fertilizers and pesticides, adding to the battering of ecological norms. The river Brahmaputra has become a degraded source of awe to Assam, instead of a life-rejuvenating system, what it had been for thousands of years. The mega development budget is not even enough, probably to compensate the material loss, not to speak of the loss of productivity.

Forestry as a whole must see to these vital points and the Planning must be made to understand the implications. My suggestion that N.E.C. should consider these points and act as a nodal agency to priorities forestry in Planning has been totally glossed over. This cannot be neglected any more to allow many areas of mega diversity and strong endemism to turn into, what I visualise as a "Green desert" in future. Let us not be outlookers to complete the process of rape of mother Nature. N.E.C. in the name of development is actually actuating the process of ecological devastation.