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ENVIRONMENTAL CONSERVATION AND SUSTAINABLE DEVELOPMENT IN THE EASTERN HIMALAYAS- ISSUES AND CHALLENGES

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INTRODUCTION

The concept of economic development has been changing over a period of time. In the early 1980s a new concept of economic development emerged as a reaction to negative experiences of development which is known as ‘sustainable development’. Since development is a process. Sustainable development is also a process in which the economic and social welfare of the people can be maximized with minimize damage to ecology and environment. Thus the environmental conservation and sustainable development are closely interlinked such that one cannot be achieved at the expense of the other. Arunachal Pradesh, the eastern most State of India, is a micro hotspot within the larger Eastern Himalayas. Based on satellite imagery, the forest area in this State constitute around 81.91 per cent of the total area, which is one of the highest among the States of India. Can the rich biodiversity of the State continue to be protected as development comes? Already, a price has been paid, the forest cover as well as diversity in its highly rich flora and fauna has declined. Can a development path be forged that is not destructive but is environmentally sustainable? Thus, the rich biodiversity of the State presents opportunities and challenges. The conflict between development process and protecting biodiversity of the State is becoming increasingly more apparent. Hence, the present paper deals with the concerns and challenges of environmental conservation and sustainable development in the context of Arunachal Pradesh. For convenience, the paper will be divided into four sections. The first section deals with the status of forests in Arunachal Pradesh. The second section discusses the

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diversity of fauna of the State. The third section attempts to identify major threats to the State's biodiversity. The fourth section examines how sustainable development can be achieved through conservation of bio diversity and finally the conclusion follows.

SECTION I

There are some unique features of forests situated in Arunachal Pradesh. Around 61.5% of the total geographical area is covered under forest which is highest among the seven States of North East India. As per the estimates of the forest survey of India, 2011 based on satellite imagery, forest area consists of around 80.50% of the total area of the State, out of which 77.71% consists of dense forest (crown density above 40%) and 22.29% consist of open forest (crown density 10% to 40%). An analysis reveals that in around 2.5% of India's land mass, the State of Arunachal Pradesh contains nearly 16% of total timber growing stock of the country (the highest among the individual States) and more than 30% fauna of India (Basic Statistics of North Eastern Region, 2006).

An attempt is now made to examine the position of Arunachal Pradesh in terms of total forest coverage among the North Eastern States of India on the basis of latest satellite date. The details are furnished in Table 1.

Table 1**Forest Coverage in North Eastern States in percentage in 2011 (Area in km²)**

State	Geographical Area	Dense Forest	Open Forest	Total Forest	Change in Forest Area from 2009
(1)	(2)	(3)	(4)	(5)	(6)
Arunachal Pradesh	83743	52387 (77.71)	15023 (22.29)	67410 (80.50)	-74
Assam	78438	12848 (46.43)	14825 (53.57)	27673 (35.28)	-19
Manipur	22327	6881 (40.26)	10209 (59.74)	17090 (76.54)	-190
Meghalaya	22429	10208 (59.09)	7067 (40.91)	17275 (77.02)	-46
Mizoram	21081	6220 (32.54)	12897 (67.46)	19117 (90.68)	-66
Nagaland	16579	6224 (46.73)	7094 (53.27)	13318 (80.33)	-146
Tripura	10486	4795 (60.11)	3182 (39.89)	7977 (76.07)	-8

Note: 1. Figures in the bracket in column 3 and 4 represents the per-cent of total forest coverage

2. Figures in the bracket in column 4 represent the per-cent of geographical area

Source: India State Forest Report (2011), Forest Survey of India, Ministry of Environment and Forests, Dehradun-248195 Uttarakhand

Table 1 shows that out of seven North Eastern States, Mizoram has the highest forest coverage (90.68 per cent) followed by Arunachal Pradesh (80.50 per cent). However if we look into the composition of forests, Arunachal Pradesh has the highest dense forests in the region (77.71 per cent of total forest cover) where as the Mizoram has the lowest dense forest (32.54 per cent). Table 1 also shows that all the North Eastern States lost the forest coverage in between 2009 to 2011. In fact, during this period India lost a forest area of around 367 sq. km. but North eastern Region lost the forest area of 549 sq. km.

In Arunachal Pradesh, the ownership of land as well as the forest land and the individual right to use it are governed by local traditions and custom of the tribes. Under the prevailing land tenure system, there are three types of land ownership namely [a] community land [b] clan land and [c] individual land. Regarding the forest land, almost all the tribes have the community forest which is controlled by the village council. In some areas, clan ownership is recognized in the forest areas falling within the village jurisdiction. That is why if we look at the data on the basis of legal status of forest in the State, it is found that around 60.11% of total forest is under community ownership which is reported as Unclassified State Forest (USF) (Table 2). However, at present there is a growing tendency of individual ownership of forest which is a recent

phenomenon in the State. For example, in the Apa Tani plateau of Lower Subansiri district and other district in the State, the forest has become increasingly privatised.

Table 2
Classification of Forest in Arunachal Pradesh in 2008 (Legal Status)

Legal Classification	Area (Km²)	Percentage of Recorded Forest	Percentage of Geographical Area
<i>(1)</i>	<i>(2)</i>	<i>(3)</i>	<i>(4)</i>
Reserved Forests	10089.39	19.54	12.04
Protected Forests	7.80	0.02	0.01
Anchal Reserve Forests	325.13	0.63	0.38
Village Reserve Forests	300.24	0.58	0.36
National Parks	2290.82	4.44	2.74
Wild Life Sanctuary	7487.75	14.50	8.94
Orchid Sanctuary	100.00	0.19	0.12
Unclassified State Forests	31038.87	60.11	37.06
TOTAL	51640.00	100.00	61.64

Source: Forest Statistics of Arunachal Pradesh (2008), Department of Environment and Forest, Government of Arunachal Pradesh, Itanagar 791 111

The reserve forest, National Parks and Wild Life Sanctuary constitutes of 10089.39 sq. km 2290.82 sq. km and 7487.75 sq. km respectively, i.e. nearly 19.54%, 4.44% and 14.50% of the total forest area respectively of the State. However, there is a steady increase in reserve forest as compared to 1950, when there was only 526 sq. km of reserve forest in the State. On the other hand Anchal Reserve Forest covered only 325.13 square kilometers (only 0.63% of the total forest area). Such forests are managed by the forest department with the provision for sharing the net revenue in the ratio of 50:50 (share of village: share of Government). However the unclassified State forests remained the highest (60.11 per cent) where there is community ownership. A much-referred to problem with common property resources is the ‘tragedy of commons’ (Bhattacharaya, 2001). Whenever any of the set of rules and regulation is violated, individual choices prevailed over the social choices. This is exactly what happened in Arunachal Pradesh. This is clear when we look into the table 3 which shows that there is steady reduction of dense forests in Arunachal Pradesh from 1987 to 2011.

Table 3

Dense and Open Forest cover in Arunachal Pradesh from 1987 to 2011 (in per cent)

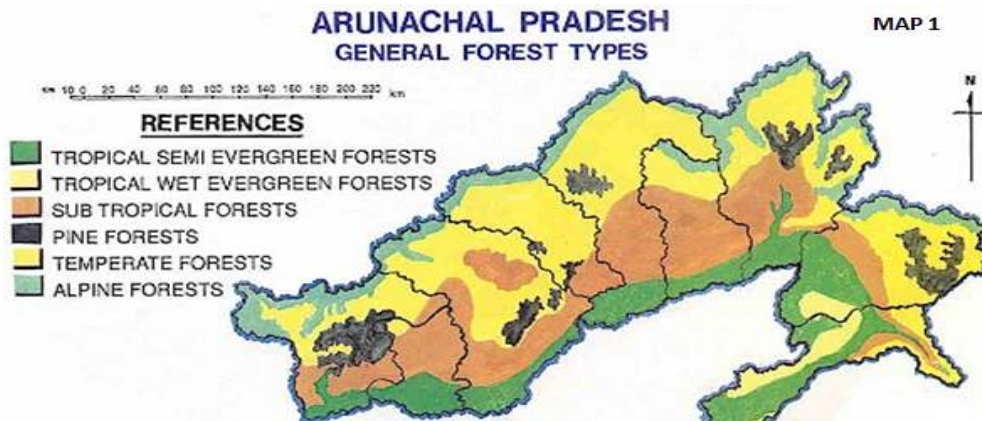
Year	Dense forest	Open Forest
(1)	(2)	(3)
1987	51096 (84.46)	9404 (15.54)
1989	54272 (78.93)	14491 (21.07)
1991	54542 (79.33)	14215 (20.67)
1993	54510 (79.39)	14151 (20.61)
1995	54176 (78.95)	14445 (21.05)
1997	54155 (78.94)	14447 (21.06)
1999	57756 (83.89)	11091 (16.11)
2001	53932 (79.26)	14113 (20.74)
2003	53511 (78.67)	14508 (21.33)
2005	52388 (77.29)	15389 (22.71)
2007	52414 (77.82)	14939 (22.18)
2011	52387 (77.71)	15023 (22.29)

Note: Figures in the bracket indicates per cent of total forest area

Source: India State Forest Report (1987, 1989, 1991, 1993, 1995, 1997, 1999, 2001, 2003, 2005, 2007, 2011), Forest Survey of India, Ministry of Environment and Forests, Dehradun- 248195 Uttarakhand

In spite of less of dense forest cover, Arunachal Pradesh still has all the vegetative type i.e., tropical, sub-tropical, temperate and alpine. The details are given in Map 1.

Map 1



A great diversity is associated with tropical and sub-tropical vegetation types. All the useful plant species ranging from medicinal to timber plants are closely linked with the economic

life of the people. The State is endorsed with about a third (5000 seed plants) of the 15000 seeds plants found in the India along with thousands of non-flowering plants and around 500 exotic Orchids (Human Development Report of Arunachal Pradesh, 2005).

SECTION II

The faunal diversity can be found by the fact that the State harbours out of 16 species of primitive found in India. Bison or Gaur and Mithun are two important mammals found in the State. Additionally at least six species of Squirrel, Mongoose, etc and some smaller mammals found in wild (Government of Arunachal Pradesh, 2002). The State provides suitable habitat for four species of deer i.e., (i) Samber, (ii) Hog deer, (iii) Barking deer and (iv) Mask deer. It is the only place where three antelopes namely Serow, Goral and Takin are found. Hispid hare, a highly endangered species is also reported to be present in some tracts of the State. Out of the six largest cats of the world recorded from India. Arunachal Pradesh alone sustains four of them i.e., (i) Tiger, (ii) Leopard, (iii) Snow Leopard and (iv) Clouded Leopard. Red Panda, protected under schedule I of the Indian Wildlife Act, 1972 is also predominantly available in the State. According to one estimate Arunachal Pradesh alone holds more than 90 per cent of the Pandas found in India (Zoological Survey of India, 2012).

As one of the biodiversity hotspots of the world, the State has many important species of birds which reside in as many as 28 designated important bird areas. The status of many such species has not been documented properly mostly due to difficulties in accessing many of the remote areas. However, as per the assailable document, the State has over 650 species of birds including three species of Hornbills, endangered white winged duck, critically endangered white backed vulture, etc. (Zoological Survey of India, 2012). The details are given in Table 4.

Table 4

Animal Diversity in Arunachal Pradesh

Animal Species	Numbers of Species
Mammals	190
Deer	4
Major Cats	4
Primates	7
Antelopes	3
Hispid Hare	A highly endangered specie
Birds	650
Amphibians	42
Fishes	105
Reptiles	50

Source: States of Biodiversity in Arunachal Pradesh, State of Forest Research Institute, Itanagar, Arunachal Pradesh

Section III

The floral and faunal diversities of the State and the dependence of the people on natural bio resources from substance resulted in a rich indigenous knowledge system (IKS). A contributing factor to this richness in the IKS is the ethnic and cultural diversity associated with the demography of the State. These systems played a pivotal role in the conservation of the unique biodiversity over the centuries. In recent years, the State's rich biodiversity has increasingly come under threat. The fast development activity in the last four decades and the improvement of communication network has meant increased access. Road building improved communication system but the blistering process involved has meant the loss of valuable habitat. The monetization of barter economics has meant increased trade in timber (Human Development Report of Arunachal Pradesh, 2005). Some of the important threats of biodiversity are identified as follows:

A. Illegal Felling of Trees: It is found that accessible natural forests particularly in the foothills of Arunachal Pradesh are under great pressure to a large scale due to extraction of timber and illegal felling of trees. Although the demand for wood for local consumption is relatively low due to low population of the State but in view of the increasing demand for industrial timber within the State and other parts of the country, the forest in the State are under great pressure. As per the official estimate, the State used to contribute to nearly 50% of the timber supply made from the North Eastern region of India. The tree permit system in unclassified State forest (U.S.F.) which was introduced to enable the local people to earn their livelihood in logging and extraction of timber with a view to generate income led to the emergence of a 'neo-rich' class in the traditional tribal society in collaboration with private forest contractors. There is a growing social and political pressure to overexploit the forest and the protection of forest are becoming increasingly difficult.

Moreover, the forest located particularly along the inter-state border with Assam and Nagaland are mainly prone to illegal fellings of trees and smuggling of timber. Some illicit fellings are also reported in the forests adjacent to the tributaries of the Brahmaputra River and the logs are thrown into the river which is collected in the downstream of Assam plains for sale to saw and veneer mills in different parts of the country. The State forest department finds itself ill equipped to fight such timber poachers and smugglers and contain this menace due to the limited resources available with it for protection of forest.

B. Large Scale Practice of Shifting Cultivation: Shifting cultivation ('jhum') is one of the factors adversely affecting the forest conservation efforts in North-Eastern states in general, and Arunachal Pradesh in particular. Jhumming is mainly practiced in the USF areas in the district of Tirap, East and West Siang, Lower and Upper Subhansiri, Papumpare and East Kameng. Population wise around 54,000 families are practising shifting cultivation in the State (North Eastern Council, 2006). Thus, the dominance of shifting cultivation in the whole economy is quite evident. At the same time, it is a well-known fact that much of the forest land in the State is lost due to shifting cultivation. For example, according to Forest Survey of India, 2011, there was a net decrease of forest area in Arunachal Pradesh by around 74 square kilometers and out of these a major portion is lost due to the shifting cultivation. Forest gets denuded when old jhum land is left uncared for and new land is taken for jhum. The danger of ecological imbalance due

to deforestation looks large when the claim for such new land soars up with the growth of population.

C. Hydro Power Projects: The State is very rich in water resources and has enormous potential of hydropower resources. A number of hydropower projects have been commissioned and these projects are at various stages of progress. The commissioning of hydropower projects have not been taken into account the proper environmental impact assessment. As a result, these projects put pressure on State's bio resources.

In addition, there is illegal trade of non-timber forest products such as medicinal plants, orchids, animal hides, musk, gland and birds which are smuggled out of the State by poachers.

SECTION IV

The rich biodiversity of the State presents huge opportunities and challenges. The conflict between development and protecting the biodiversity of the State is becoming increasingly more apparent. Arunachal Pradesh has a unique opportunity to map out a development path that is sustainable and ecologically sound. However to do this, the State Government will have to take the initiative and will also have to take the people into confidence. In order to achieve sustainable development along with environmental conservation the following areas need attention:

- ↳ Resources mapping must constitute an integral part of the biodiversity conservation strategy, with a view to identify endangered species and threat to geological diversity. This can help to evolve protected area management. The involvement of local people in documenting indigenous knowledge for posturing can go a long way in creating awareness and protecting biodiversity.
- ↳ Joint Forest Management especially in the regeneration of forests on degraded land should be encouraged with sharing of benefits. This model is very suitable in a hilly State like Arunachal Pradesh where around 60 per cent of total forests are mainly under the traditionally ownership of local village communities. In this direction Arunachal Forest Department has been able to achieve significant progress by establishing around 21 forest

development agencies (FDA) and 364 village forest management communities (VFMC). Under this scheme, an area of 21,416 hectare were covered under plantations generating 1,33,559 labour days. Efforts should be made to cover all the villages of Arunachal Pradesh under JFM system for sustainable development of forest resources for socio-economic upliftment of villages and maintenance of ecological balance (Mitra, 2002).

- ↪ In order to reduce the pressure on forest cover, more and more areas of the State should be covered under plantation crop like Tea, Coffee and Rubber. The cash crop like ginger and spices should be encouraged on degraded forest land.
- ↪ The establishment of small scale industries based on non-timber forest product (NTFP) like floriculture etc so as to ensure a regular flow of such produce is another area which can be encouraged. The setting up of these small scale industries can provide livelihood opportunities. One such area that has enormous potential is bamboo and cane.
- ↪ The State can also be developed through promotion of nature based tourism in which the State has enough potentiality, provided certain infrastructural facilities are built up. Forests used to contribute a major source of total revenue from the local source to the State exchequer, in which around 85% of its total budgetary expenditure comes from the centre in the form of grants-in-aid. The situation has worsened with the royalty of forest products declining due to the Supreme Court's order regarding restricting of felling of trees since mid nineties. Hence, alternative internal resources and employment opportunities have to be created within the State itself and the promotion of nature based tourism appears to be the best way in this respect which is considered the least ecologically disturbing industry in hill regions (Mitra, 2003). Hence, under the present circumstances a vigorous study is required to make the people aware of how additional income and employment can be generated locally due to the existence of forest resources by promoting ecotourism which may also help to conserve the forest resources. In fact, the flow on academic thinking on forestry has always been directed towards issues like timber demand, survival of forest based industries or sustainability and biodiversity. However, very few studies have been stressed on the valuation of recreational aspects of forests in the context of India and it is urgently required, particularly in the context of Arunachal Pradesh in order to conserve the rich forest resources of the State.

CONCLUSION

There is ample scope for scientific management to improve the productivity and sustainable utilization of vast forest resources of the State. Various projects and programs are being implemented in the State. In the past, the State's economy was dependent on forest resources. However, economic transformation and development has led to the loss of biodiversity and deforestation. Now serious attempts are being made to encounter this by involving the local communities in Joint Forestry Management. Alternatives are explored and the forest management is reoriented towards NTFP and sustainable utilization without compromising on conservational issues. A long term perspective plan is being evolved in forestry and wildlife sectors. With these expected shifts in policies and plans, the State is poised for better environment and sustainable development.

References:

- Bhattacharaya, R. N. (ed) (2001): *Environmental Economics- An Indian Perspectives*, Oxford University Press, New Delhi.
- Dutta Ray, B. (ed) (1987): *North East India: 2000 AD.*, New Delhi
- Elwin, V (1957): *A Philosophy for NEFA*, published on behalf of advisor to the Governor of Assam, Shillong
- Ganguly J .B. (1986): 'Planning for Forestry Development in the North Eastern Region. An Approach' in Das Gupta et al. *Forestry Development in North East India*, Omsons Publications, Guwahati
- Government of Arunachal Pradesh (1992): *Eleventh Five Year Plan*: Department of Planning, Itanagar
- (1993): *Arunachal Pradesh Forests*, Environment and Forest Department, Itanagar
- (1995): *State Forestry Action Programme Report*, Environment and Forest Department, Itanagar
- (2002) *Arunachal Pradesh State Biodiversity Strategy and Action Plan*, Forest Department, Itanagar
- (2005), *Human Development Report of Arunachal Pradesh*, Department of Planning
- (2008) *Arunachal Pradesh Forest Statistics*, Forest Department, Itanagar
- (2009) *Arunachal Pradesh State Development Report*, Department of Planning
- Government of India (different issues): *The State of Forest Report*, Forest Survey of India, Dehradun
- Majumder, D.N. (ed) (1990): *Shifting Cultivation in North East India*, Omsons Publications, New Delhi
- Mitra, A. (1998): 'Environment and Sustainable Development in the Hilly Regions of North-East India. A Study in Arunachal Pradesh' *International Journal of Social Economics* Vol-25, No. 2-4
- Mitra, A. (2002): 'An Evolution of Forestry Planning in Arunachal Pradesh' in Ganguly J.B. (ed) *Forest Resource in North Eastern India* pp. 259-267, Omsons Publications, New Delhi
- Mitra, A. et. al. (2003): *Environment and Nature Based Tourism- An Endeavor at Sustainability*. Kanishka, Delhi
- North Eastern Council (2006): *Basic Statistics of North Eastern Region*, North Eastern Council, Shillong
- Zoological Survey of India (2012): *Fauna of Protected Area of Arunachal Pradesh*