STRIKING FEATURES OF ANDAMAN FORESTRY

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Introduction

Floating in splendid isolation from the mainland India in the idyllic Bay of Bengal, is the archipelago of over 570 emerald islands, islets, coral rèefs and isolated rocks, named or known as Andaman & Nicobar Islands. This Union Territory is stretched over a length of about 700 km from North to South, at a distance of about 1200 km from the Eastern coast of Mainland India with about 34 inhabited islands. The A&N Islands were insulated from the lands surrounding the Bay till the end of the 18th century. These Islands were inhabited by a few thousand tribals of Negrito and Mongoloid origin, till the British established the first settlement in 1789, which was later abandoned in 1796. The second settlement was basically a penal colony at Port Blair, taken up in 1858, after the First War of Independence. Later on, some of the prisoners, convicts, Moplas, some criminal tribes of Central and United Provinces, refugees from erstwhile East Pakistan and Sri Lanka as well as ex-servicemen were permitted to settle in small villages and practice agriculture and rear cattle.

Topography and Climate

The coastline of the Islands is every where irregular and is broken by numerous small and large indentations; some of these form spacious, deep and well sheltered natural harbours. The surface of the islands is irregular and more or less hilly. These rugged features impress even the casual visitor. The hills, following the general direction of the Islands, lie nearly North and South and from them numerous spurs and ridges branch out in all directions. Stretches of undulating ground broken by knolls and ridges and intersected by ravines occur irregularly here and there along the sea coast and in valleys strips of flat ground are found. The soil is generally poor and porous with very little water-holding capacity. Patches of clay occur in low lands restricting permeability. The hypothesis that the islands are emergent peaks of a submerged mountain chain related to the Arakan-Yoma range of mainland Burma might explain these features.

Sandstone is the commonest rock in the islands. Limestone occurs on Havelock Island near Yoto, on the east coast of the Middle Andaman and in a few other places. Quartz, inadurated clays and calcareous sandstone are also found.

Proximity to the equator and to the sea ensures a hot, humid and uniform climate with day temperature around 30°C. Since the Islands are under the influence of both South-west and North-east monsoons, it rains throughout the year except for a short break from December to April. The mean annual rainfall is around 3500 mm. The hot season or dry season comprises the months of December to April and rest of the months

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Table 1

Andaman and Nicobar Islands

Location	:	6° 45'N - 13° 41'N Lat. 92° 12'E - 93° 57' E Long.	
Distance	:	Port Blair-Chennai Port Blair-Calcutta	1,133 km 1,255 km
Geographical Area	:	8,249 km^2 Andaman Group Nicobar Group	 6,408 km^2 1,841 km^2
Forest Area	:	7170 km^2 (86% of Geographical Area)	
Coastline :		1962 km (1/4 of Indian Coastline)	
No. of Islands	:	More than 325 (21 inhabited) in Andaman Group. More than 24 (13 inhabited) in Nicobar Group.	
Xcl. Eco. Zone	:	600,000 km^2 (30% of E.E.Z. of India) (Approximate).	
No. of National Parks	:	8	
No. of Wildlife Sanctuaries	:	94	
No. of Biosphere Reserves	:	1	

form rainy season. In the months of February and March the weather is often sultry, very little wind blows and a glassy calmness prevails over the sea and it looks like a lake. The South-west monsoon commences in May and is accompanied by high winds and heavy down pours of rain, most of which falls during the month of June to September. The North-east monsoon commences in mid-October and continues, sometimes, till December. Cyclones often occur at the changes of the monsoon and are particularly likely during the months of May, June or November/December.

Forest Scenario

The tropical climate, the long rainy season and an average relative humidity of around 80% have nurtured a good forest cover over practically all the islands. These forests are important for what they are, for what they do and for what they give. Nature has blessed these islands with tropical sylvan wealth covering almost from water's edge to hill tops. Sir Harry Champion, a noted world authority on forestry had once remarked, "Forest in its pristine glory, if it is found anywhere in South-east Asia, it is in Andaman Island". At first sight, these forests look like a chaotic mass of vegetation in which leaves and stems are packed up closely, occupying almost every inch of space, huge trees jostling with each other for room to live, slender growths of cane, bamboo, climbers and other plants stretch upwards, as though in agony, towards sunlight and life.

Elevation and aspect are factors which can hardly influence the distribution of vegetation in islands of such low latitude and altitude, hence climatically the islands may be considered to be more or less uniform throughout. Both compositionally and taxonomically, these forests present a

variety, hardly matched any where else, in an area of similar extent. The vegetation and its dependent fauna have Polynesian, Indo-Malaysian and Assam-Burmese affinities, besides characteristics of oceanic islands. The general forest composition is characterised by the presence or absence of certain species as one travels from North to South. For example, occurrence of *Pterocarpus dalbergioides* which is an endemic species in the islands, is limited to the main Andaman Group of islands (excluding Little Andaman Island). Similarly, *Dipterocarpus* spp. does not occur in the Nicobar Group of Islands.

The vegetation may be differentiated into six distinct types of forest growth, though these forest types visibly distinct, usually intermingle with or overlap, one another. In some cases the change in passing from one type to another is very gradual as to be hardly noticeable and in others it is more abrupt. The six distinct types of forests may be described as follows :

1. *Giant Andaman Evergreen Forests* : This is the most luxuriant type of forest met with and is the climatic climax when site conditions are optimum for the growth. The top canopy formed by the giant trees is almost entirely evergreen. This type is present in low lands, near banks of larger streams, where soil is deep alluvium. Most of these forests are almost extinct due to large scale clearance of flat terrain for agriculture and human settlement (both authorised and illegally occupied).

This type is so intimately mixed with the semi-evergreen forests that delimitation is difficult. Important species include *Dipterocarpus alatus*, the loftiest tree in the Andamans, *Artocarpus chaplasa, Artocarpus gomeziana, Dipterocarpus gracilis, Calophyllum soulattri, Sideroxylon longipetiolatum, Amoora wallichii, Pterocymbium tinctorium, Messua ferrea* etc. Climbers present are *Dinochloa andamanica, Gnetum scandens* and a variety of canes.

2. *Andamans Tropical Evergreen Forests* : Not so luxuriant as the Giant Evergreen forests particularly in height, density and size of the giant top storey, which is very irregular and incomplete but otherwise very similar in composition. These are few species in top canopy, deciduous species being more frequent and occur in upper portion of hilly terrain. Important species are *Dipterocarpus grandiflora, Artocarpus chaplasa, Hopea odurata, Planchonia andamanica, Endospermum chinenses, Myristica andamanica, M. glaucescens, Croton argyratus, Pterospermum aceroide, Euphorbia epipylloides, Actephile excelsa, Baccaurea sapida*, etc.

3. *Andaman Moist Deciduous Forests* : Met with throughout the Andaman islands covering nearly half their total area. There is typically a somewhat irregular top storey of predominantly deciduous trees about 30 m or more in height, many of trees being of very large girth and heavily buttressed. Beneath these trees is a rather definite second storey of numerous species including the evergreen, mostly deciduous and there is a fairly complete shrubby evergreen undergrowth including patches of bamboos. Climbers are heavy and often include canes. Such forests yield timber of more economic value and grow on lower slopes, undulating land of poor looking and comparatively dry soil. Important species include *Pterocarpus dalbergioides, Terminalia bialata, T. manii, T. procera, Albizia lebbek, Canarium euphyllum, Chukrassia tabularis, Legerstroemia hypoleuca, Diospyros*

marmorata, Dillenia pentagyna, Lannea coromandelica, Crotoxylon formosum, etc.

4. *Andaman Hill top Evergreen Forests* : This type of forest is found generally on the parched and shallow soiled slopes of high hills such as saddle peak in the North Andaman, Sound Peak, the Claudius range and Mt. Farrington in Middle Andaman and Mt. Ford on Rutland Island. Important species include *Pterocymbium tinctorium, Salmalia insignis, Tetremeles nudiflora, Terminalia bialata, Lagerstroemia hypoleuca, Albizia lebbek, Aphanamixis polystachya, Planchomia andamanica* etc.

5. *Littoral Forests* : They are found generally all round the coast and sandy beaches above high water level. The most characteristic species is the tall evergreen *Manilkara littoralis* which often forms an almost pure fringe on sandy beaches and dunes along the sea face. Scattered smaller evergreen trees occur with fewer deciduous trees and these form the dominant canopy. There are numerous shrubs and where the undergrowth is light, maritime grasses and surface creepers are conspicuous binding the sand.

6. *Mangrove forests (Tidal Swamp Forest)* : Typically a closed evergreen forest of moderate height, composed of trees specially adapted to survive on tidal mud which is permanently wet with salt water and submerged during every tide. Stilt roots are very typical (notably in *Rhizophora*), so also are leathery entire leaves and vivipary. They occur in the river deltas along the edge of the water ways and sheltered muddy coasts. Important species are *Rhizophora mucronata, R. candelaria, Bruguiera conjugata, B. parviflora, Avicennia officinalis, Ceriops tagal, Xylocarpus molluccensis, Sonneratia caseolanis*, etc. Mangroves in the Andaman & Nicobar Islands are estimated to occupy about 1,15,000 ha of area. These are considered to be one of the most important surviving formations in the world.

The tropical rain forests of A & N islands cover about 86% of its geographical area. The remaining 14% of non-forest area is also frequently frilled with tree growth unlike in similar areas of many other parts of the country. Out of 86% forest area, 56% still maintained in pristine glory in the form of coastal forest belts (13%); small islets, protected areas (7%), tribal reserves (36%) with National Park, Sanctuaries (overlapping) etc. without any interference. Thus, only 30% of balance forests are is open to timber harvesting and for scientific management.

The Forest Department in A & N Islands came into existence in 1883 initially to meet the requirements of penal settlements, under the charge of a Forest Officer. During the World Wars I and II, the timber needs increased and this led to more timber harvesting operations. After Independence, the position got further worsened, due to clearance of land for settlement and agricultural needs which consumed a major portion of giant evergreen forests. So much so, the requirement of timber in the Islands further increased manifold due to the establishment of three plywood and other wood based industries. Table 2 gives a glimpse of pre-1950 and post 1950 timber extraction in Andaman forests.

During 1995-96, round logs export to Mainland India, which was a very lucrative business for local contractors, was banned and consequently, timber extraction rate per annum is gradually coming down. But still forest revenue constitutes more than

Table 2

Forest Extraction in Andaman & Nicobar Islands

Period	Average Annual Extraction (m^3)
Pre-1950	
1869-1929	15,300
1930-1950	49,700
Post-1950	
1951-1962	88,800
1968-1983	1,18,800
1986-1987	1,45,000
1988-1989	1,23,012
1991-1992	1,05,343
1993-1994	1,30,000
1994-1995	1,35,000
1995-1996	1,24,000
1996-1997	1,00,000
1997-1998	80,000 (Target)

40% of the State revenue as revealed in Table 3.

It is clear from above table that forests are still considered as major source of revenue in A & N Islands whereas proportion of State plan expenditure for forestry sector is just around 2.5% of the whole plan expenditure as indicated in Table 4.

Timber Extraction

There are certain unique features associated with timber harvesting activities in Andaman group of Islands, which are rarely observed anywhere in India. Timber extraction operation is performed departmentally by Forest Department and a huge infrastructure of Elephants and heavy machinery like bulldozers, skidders, cranes and trucks are maintained by different territorial Forest Divisions for timber extraction activities. In addition to above, marine diesel-engine boats/water-craft (HP ranging from 10-200) for towing of logs, for transportation of store items like diesel, petrol, engine-oil, elephant ration, building construction material like cement, rods, etc. and machinery parts from Port Blair to different Forest Divisions are also maintained by different Divisions. All above mentioned activities necessitate maintenance of huge army of permanent employees/workers which have to be maintained by each Forest Division, e.g., Veterinary Compounders and Mahaouts for Elephants, Seacunny, Engine Driver, Motor Boat Driver, Oiler, Lascars, etc. for each water-craft/boat, heavy and light motor vehicle Drivers, Mechanics, Fitters, Welders, Electrician, Wire-men, Lathe-men, Turners, Moulders, Head Boat Builders, Tractor Drivers and Cleaners for running and maintenance of various equipment and machinery. In addition to the above, Head Carpenters, Carpenters, Masons, etc. for building construction and maintenance works, Head Workers (B and C grade), Raft-men, Feller-cum-Loggers and Regular Mazdoors, etc. for timber extraction and ghat depot works, are also maintained by each Division. All of these workers/ employees are in addition to regular forest executives and ministerial staff found in each Division. Most of these employees are non-Islanders and avail free sea passage for their full family every year in addition to normal LTC rule as prevailing elsewhere in Mainland India. Due to all these factors, per capita non-plan expenditure in respect of A & N Administration is among highest in India.

Local labour was not available earlier around 1950s because of the rural population which is mainly agriculturists,

Table 3

Revenue in lakhs Rupees

Year	State Revenue	Forest Revenue	% of Forest Revenue against State Revenue
1990-91	2,551.00	1,536.13	60.20
1991-92	3,344.00	2,000.28	59.80
1992-93	4,271.72	2,200.69	51.50
1993-94	6,067.19	2,633.78	43.40
1994-95	7,198.08	2,984.72	41.50
1995-96	—NA—	2,815.68	—

Table 4

Plan Expenditure in Lakhs Rupees

Year	State Sector	Forest Sector	% of Forest Expenditure against State Sector
1990-91	9,438.426	258.84	02.70
1991-92	14,829.393	328.14	02.20
1992-93	12,583.452	405.36	03.20
1993-94	15,413.062	431.61	02.80
1994-95	19,605.580	636.15	03.20
1995-96	18,846.650	489.84	02.60

were available for the employment by Forest Department only after the cultivation season for seasonal works. This casual labour was insufficient to meet the needs of Forest Department and therefore, in the past, labourers used to be recruited from the Mainland. Most of these recruited labourers are "Adivasis" (popularly known as "Ranchies" in Andaman) - from Bihar, Madhya Pradesh and Orissa. Most of them were brought to regular pay scale and have been absorbed in the permanent strength of the various Divisions with designations like, Regular Mazdoors, Head-Workers, Feller-cum-Loggers, etc. They are still considered as good forest workers. The remaining permanent labour consists of people from Andhra Pradesh and Tamil Nadu. They are also being employed as daily rated Mazdoors under daily wages of unskilled and skilled worker category. At present, there is no shortage of casual or daily rated Mazdoors in Andaman group of Islands as local youths are sitting idle for want of Government jobs.

Each territorial Forest Division is told about its annual timber extraction target based upon its working plan during the months of May or June every year. Marking

of trees which are to be felled and those which are to be retained as mother trees, is completed as per prescribed marking rule in different ranges of each territorial Division and such marking lists are submitted to concerned Conservator of Forests by Divisional Forest Officers. As mentioned earlier, the rainy season in Andaman continues generally upto November each year. Hence, as per prevalent practice, the "rainy season timber felling areas" are separately marked, from where logs can be dragged upto road side depot by elephants even during rainy season. "Dry season marked areas" are separate, which account for more than 80% of yearly extraction target. In such areas, during the period from December to March/April next year, timber is virtually mined because of the constraint of short time to achieve timber extraction target. The bulldozers are pressed into service who make kaccha roads in these areas and also drag logs up to these roads. Trucks ply on these kaccha roads and logs are loaded on these trucks with the help of elephants and cranes. Skidders, in some Forest Divisions are also utilized to drag round logs upto motorable points. During this period of four to five months, i.e., from December to March/April; concerned Divisional Forest Officer has to remain on his toes continuously to supervise timber extraction work while utilizing all his available machinery, men, material, financial and time resources which are at his disposal, most optimally so that no round logs remain inside the jungle at the time of onset of South-West monsoons, which start sometimes mid of April, May being the general month. During this period following constraints/risks are generally encountered by the field staff for which correct planning, organizing, direction and control/feed back on the part of forest authorities are must for the achievement of desired goal :

1. Timber extraction areas in most of the Divisions have gone deep into slopy terrain, leading to larger road length (lead) which in turn consumes more time and other resources for timber extraction. Even light showers, which sometimes visit these Islands during this period as unwanted guests from timber extraction point of view, make kuccha road muddy and plying of trucks/bulldozers has to be stopped for 15-20 days depending upon intensity of showers. This adds to the risk of living some of the round logs inside the jungle at the time of onset of South-West monsoons.

2. Due to slopy terrain and longer lead, stress on departmental elephants for dragging the logs inside jungle has also increased, leading to frequent obstacles in long drag paths, which cause frequent ailment/wounding of elephants near their neck portion and slight negligence of elephant mahaut in this regard can render elephant out of operation for 10-15 days, till the wound is healed up. It is observed that, at least, 50% of elephant strength of a Division remain on sick-leave or maternity leave during this period.

3. Availability of a few critical spare parts at right time for heavy machinery utilized in timber extraction, is also a major problem as most of such parts come through DGS&D Rate Contract and rarely arrive at proper time in interior Divisions.

4. Lack of skilled man-power for operation and maintenance of such machinery is also a major constraint. At times, casual/service continued service mazdoors fill-up this gap.

5. Sometimes diesel, petrol, mobil-oil etc. become scarce at critical juncture of time due of problem of budget availability or due to some problem with transportation boats.

Then the Divisional Forest Officer has to run to different agencies (government and non-government) for acquiring these items on loan.

6. Recently most to the timber extraction areas of South Andaman, Middle Andaman and Baratang Forest Divisions have reached near Jarwa (a hostile Negrito tribe) reserve and forest workers/staff including FPFs (Forest Protection Force personnel with guns and muskets) have to work under constant fear of Jarwa attack, whose *modus operandi* is to make a gherao of forest workers working in jungle in the form of a big circle and then attack with sharp-edged arrows (sometimes poisonous). A few casualties of forest workers, elephant mahauts and FPFs have also occurred during last 4-5 years because of such attacks.

7. Departmental elephants are let off free in the jungle for feeding themselves after a day's hard-work. Sometimes elephant searching operation during next working day consumes considerable time. Near Jarwa reserve, this task is more dangerous as elephants enter the Jarwa area in search of food and water and FPFs along with concerned elephant-mahaut have to move into jungle with guns/muskets with regular air/blank fires to avoid encounter with Jarwa. In this way, elephants are located after great difficulty. It also happens, sometimes, that an elephant is not found and people come out of Jarwa reserve empty handed due to fear of Jarwa attacks. During the year 1995-96, one elephant of South Andaman Division was searched out after 7-8 months in Jarwa reserve and in such circumstances the departmental elephant acquires wild elephant characters after roaming freely in the jungle for such a long period and does not perform well or obey its mahaut when put to log extraction/loading work.

8. Sometimes it has happened that due to early setting of South-West monsoons or early heavy showers in March/April months, complete logs could not be taken out of jungle and when they were taken out during next one or two years, the quality of soft-wood was very poor, ply species faring medium and hardwood was found intact to some extent. Such poor quality logs were not accepted by local ply-wood or private wood based industries and ultimately such logs land into government saw mills at Chatham (Port Blair) and Betapur (Middle Andaman) leading to poor out turn of sawn timber and thus, inviting unnecessary criticism from different quarters.

Recently A & N Islands Forest Department has taken very wise step in reducing timber extraction target to just 80,000 m^3 for the year 1997-98, which is further likely to go down in coming years and the A & N Administration is beginning to recognize the role of Forest Department as a guardian of natural riches of the Islands and not as a source of revenue.

Forestry and other Sectors

After Independence, the population of our country has increased in geometric progression, with the Andaman group of Islands registering the largest growth. This has, naturally, caused tremendous change in the ecosystems of these Islands. As per one Planning Commission estimate, at the most five persons per hectare can be supported by agriculture in A & N Islands. Land under agriculture and plantation crop is of around 50,000 ha at present, which means that the present population is already

above the maximum carrying-capacity. At present there is heavy pressure on the forest and natural environment. Under such circumstances, managing a limited forest area for sustained development is a great challenge. In Andaman group of Islands, employment of more than 10,000 persons is directly generated by the wood-based industries and thousands other get indirect employment because of forest resources and trades related with forest products. In order to reduce pressure on forests for supply of raw material for wood based industries as well as in the interest of over all fragile eco-system of these Islands, wood based industries and local administration must encourage local people to raise ply and soft wood plantations of shorter rotation in their hilly and paddy lands. A large chunk of hilly lands (a kind of revenue land allotted to locals/settlers) is lying idle in Andaman group of Islands. Example of WIMCO, who has entered into agreement with farmers of Punjab and Haryana for supplying soft wood of Poplar/*Eucalyptus* to them at a pre-fixed rate, can also be followed by local plywood industries of Andaman. There is also scope for optimising yields from existing horticulture plantation and also for inter-cropping. Crops like, coffee, cocoa, clove, nutmeg, cinnamon and pepper can be grown in combination with forest trees in mono-culture or bi-culture, without significant ecological damage. A serious R & D effort on the part of local wood based industry on this aspect of agroforestry of convincing (settlers) is the need of the hour. Farmer-education and motivation needs to improved. Such farmers/settlers are accustomed to large allotments of land and other subsidies. Because their land is under-used, hence, Government must caution them to use it properly otherwise, excess land may have to be resumed by government for redistribution.

There is vast potential for the development of inshore and deep sea fishing as well as mari-culture. The deep sea fishing is initially capital intensive but coupled with proper processing and marketing facilities could be of immense benefit to the Islanders. Low yielding cattle is another menace in these Islands and their unaccounted multiplication is posing danger to agricultural fields as well as to forests, especially young seedlings and saplings. Proper livestock improvement programme and control is also needed.

The present population of Andaman group of Islands exceeds the carrying capacity of the local resources. Food, clothing, paper, petroleum products, building material and even vegetables (most of the time) come from the Mainland and, at times, are in short supply. Potable fresh water is in short supply during dry months of the year. Therefore, in the over all interest of the fragile ecology of these Islands, the further influx of the Mainland people has to be stopped. Instances of encroachment over forest and non-forest land are increasing. Local administration has to devise some effective policy to check illegal entrants into these Islands. Only then, with the expansive sandy beaches, rare avi-fauna, unexplored under-water marine life and corals, beautiful creeks virgin fores cover and aborigine tribes; these Islands can be a treat to a fun-loving connoisseur.

SUMMARY

The paper deals with certain unique features of timber harvesting operations in Andaman group of Islands and its related consequences on fragile ecosystem of these Islands. An integrated approach involving improvement in land use pattern, cattle-management, local people - Industry - Administration interface has been stressed upon.

अंडमान वानिकी की मुख्य विशेषताएँ

प्रदीप चौधरी

सारांश

प्रस्तुत अभिपत्र में अंडमान द्वीप समूह में प्रकाष्ठ निष्कासन की कतिपय विलक्षणताओं और इन द्वीपों की कमज़ोर अर्थ-व्यवस्था पर उनके संबंधित प्रभावों का वर्णन किया गया है। इसके लिए एक एकीकृत दृष्टि अपनाने पर ज़ोर दिया गया है जिसमें भूमि उपयोग रूपसज्जा में परिष्कार, पशु प्रबंध, स्थानीय जन, उद्योग और प्रशासन एक साथ परस्पर अभिमुख हों।

Reference

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