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ECONOMIC AND ENVIRONMENTAL IMPACT OF POLICY ON TRANSPORTATION SUBSIDY TO WOOD-BASED INDUSTRIES IN ANDAMAN AND NICOBAR ISLANDS

SYED AJMAL PASHA

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PLANNING COMMISSION, GOVERNMENT OF INDIA

ECOLOGICAL ECONOMICS UNIT
INSTITUTE FOR SOCIAL AND ECONOMIC CHANGE
BANGALORE-560 072
Email:pasha@isec.ac.in Web:http//www.isec.ac.in
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FOREWORD

Wood-based industries in India contribute to regional and national economies by way of value addition and export earnings. They also contribute to state and national incomes, and create significant employment opportunities. The government with several incentives and privileges is encouraging wood-based industries in India with a view that these industries can continue to contribute to the national and local economies. These industries have been highly subsidised in terms of transportation costs and cheap raw materials. At the same time, wood-based industries depend to a considerable extent on forests for regular supply of hardwood, softwood and other types of timber. Continued use and abuse of forests by these industries cause large-scale deforestation, soil erosion, degradation and decline in forest areas. This, in turn, would affect the rural livelihood systems as well as the ecological balance.

As on the mainland, wood-based industries are operating on a large scale in Andaman and Nicobar Islands too. In fact, after exploiting forests on the mainland, many of these industries have moved into the Islands on a large scale. The government of India continues to support these industries by providing transportation subsidy and other concessions. Ninety per cent of the transportation costs related to transportation of timber, other raw materials and the finished products, across the group of Islands and between the mainland and the Islands are reimbursed. It is generally claimed that the revenue to the government from wood-based industries operating in Andaman and Nicobar Islands is much more than the cost of transportation subsidy. Furthermore, it is argued that wood-based industries are also creating direct benefits to local island communities by way of providing jobs and income, and hence transportation subsidy to these industries should be continued. But it can be seen that with such government subsidy, these industries are exploiting the Islands' rich forests and imposing huge social costs in terms of large-scale deforestation, soil erosion, forest degradation and loss of biological diversity of the Islands.

Keeping in view the importance of wood-based industries on the one hand, and their negative effects on forests and ecology on the other, the Planning Commission, Government of India, commissioned this study to the Institute for Social and Economic Change (ISEC), Bangalore, to look into both the positive as well as the negative aspects of these industries operating in the Andaman and Nicobar Islands. In particular, to look into the issues related to transportation subsidy provided by the government of India to these industries.

We are thankful to the Planning Commission, Government of India for giving this important study to ISEC. Dr. Syed Ajmal Pasha from the Ecological Economics Unit of ISEC took the responsibility for conducting this research in Andaman and Nicobar Islands, and completing the study on time. We hope that the findings and policy suggestions made by him will be useful to the Planning Commission as well as to other concerned departments in Government of India.

Institute for Social and Economic Change
Bangalore

Gopal K Kadekodi
Director

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Syed Ajmal Pasha
Ecological Economics Unit
Institute for Social and Economic Change (ISEC)

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Bangalore

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ECONOMIC AND ENVIRONMENTAL IMPACT OF POLICY ON TRANSPORTATION SUBSIDY TO WOOD-BASED INDUSTRIES IN ANDAMAN AND NICOBAR SLANDS

1. Introduction

1.1 Problem Definition

India has been continuously exploiting its forest resources for its economic growth and development. In particular, wood-based industries are highly dependent on forests for the regular supply of hardwood, softwood and other types of timber as inputs. These industries, in turn, contribute to regional and national economies by way of value addition and export earnings. They also contribute to state and national incomes as well as create income and employment opportunities. At the same time, continued use and abuse of forest resources by these industries cause large-scale deforestation, soil erosion, degradation and decline in forest areas. These, in turn, affect regional and national economies, environment and local population. In sum, wood-based industries have both positive as well as negative externalities. The decision to have these industries has to be done after a proper evaluation of benefits on the one hand and costs including social and environmental costs, on the other.

1.2 Rationale and Significance of the Study

The government by offering concessions and privileges, is encouraging wood-based industries in India so that these industries can continuously enhance / maintain their operations, and contribute to the national income and local economies. These industries would operate only if their private net benefits are substantial. Keeping in view the social benefits of these industries, government would also meet some of their production costs in the form of concessions and subsidies. Among concessions, subsidies and regular supply of forest products at cheap rates are the major components. Subsidies in many cases favour haves at the cost of have-nots, and promote a culture of wasteful and destructive use of resources. The enterprises or firms operating on government subsidies may not be efficient both in the use of resources and production. Further, the question of subsidy or tax would

arise wherein the firms produce positive or negative externalities. From the economic point of view, subsidies to private firms and enterprises could be advisable, particularly where a firm creates positive externalities in terms of social benefits. Else, it has to be taxed if it is creating negative externalities (social costs) so that such negative externalities could be internalised.

Wood-based industries in India have been highly subsidised in terms of transportation costs and cheap raw materials at the cost of local resources. For example, paper industries in Karnataka were supplied with bamboo at the rate of Rs.1 per tonne, which is substantially lower than the market price. In fact, these industries with huge subsidies exploited the forests of Western Ghats during 1950s and 60s, and then moved into the eastern states of India during 1970s and 80s. Even here, they could not sustain due to their inefficient and unsustainable use and exploitation of forest resources. Since 1990s, they have moved into Andaman and Nicobar Islands (A&NI). The question is whether these industries will survive in Andaman and Nicobar Islands for a long period to come, and whether forest use by them would be sustainable. Also, whether the amount of subsidy, particularly on transportation of wood and wood products and other materials by these industries, between the mainland and the group of Andaman and Nicobar Islands, is in the interest of the nation, local economy and ecology and environment of the islands.

Keeping in view the importance of wood-based industries on the one hand, and their negative effects on forests and ecology on the other, the Planning Commission, Government of India, commissioned this study to look into both positive as well as negative aspects of these industries operating in Andaman and Nicobar Islands. In particular, the study aims at looking into the issues related to transportation subsidy provided by the government to these industries.

1.3 Hypothesis:

It is argued that the revenue to government from wood-based industries is much more than the cost of transportation subsidy, and hence it should be continued. It is also argued that these industries are creating direct benefits to the local communities by way of providing jobs and income. At the same time, probably without this subsidy, these industries may not operate in the Islands due to higher costs of production and hence low or negative net private

benefits to them. With transportation subsidy, or even without it, these industries could be viable financially, but perhaps not economically. It is not financial viability alone but also economic viability that matters much-economic viability in terms of social costs and benefits.

1.4 Review of Literature:

On subsidy in general, Mundle and Rao argue that a substantial proportion of GDP is distributed in the form of subsidies through the budget, much of it is invisible. They have also shown in their study that even by the broader National Accounts definitions, volume of visible subsidy worked out to only about 28 per cent of the volume of subsidies (Mundle and Rao, 1991).

During 1960s, Westoby (1962) assumed a strong potential for forest-based industries in contributing to the economic development of the developing nations. He argues that forest-based industries would generate income and employment to local people, and also contribute to overall economic development. But, later he concluded that forest-based industries have contributed little or nothing to the economic development of the developing nations. In turn, these industries merely provided a cheap source of raw material for the foreign market (Westoby, 1978). Sedjo (1994) argues that the local people usually lose assets, while the forest industry, often controlled by powerful interests typically captures them. Repetto and Gillis (1988) are concerned about the mechanisms designed to capture the forest resource rent (stumpage fees) in tropical countries. They argue that the incentive system that was created in tropical countries encourages excessive rates of forest harvests. Laarman and Sedjo (1991) submit that the forest industry has done little to promote the sustainable economic development of a region, but has tended instead to encourage dependency.

Nadkarni has pointed out that there was a major technical change in the use of forest resources in India by the early part of the twentieth century. Forest produce was processed for modern industries like plywood and paper and pulp mills. He argues that the prices fixed by the government for forest- based raw material were far below the market prices and the replacement cost of wood consumed by wood-based industries. The management of resource supply was such that there was a dichotomy between resource use and resource regeneration, the user having little responsibility for regeneration (Nadkarni et al, 1989).

On subsidy, Gadgil has pointed out that state subsidies have played a pernicious role in the escalation of demands for forest biomass by the advanced sector of the economy to manufacture paper, polyfibre, plywood, chipboard, veneer and rayon. And he argues that many environmental and socio-economic problems are rooted in the large magnitude of these demands, and the wasteful manner in which they are fulfilled (Gadgil, 1992).

In his study, Rathakrishnan has pointed out that forest-based small-scale industries (SSIs) in the Western Ghats of Karnataka, India, depend on government for many things, including supply of raw material, and these industries play an important role in the regional economy (Rathakrishnan, 1993).

2. Objectives of the Study and Research Methods

2.1 Objectives of the Study:

The study aims to understand, analyse and comment on the role, effects and issues related to transportation subsidy provided by the government of India to wood-based industries operating in Andaman and Nicobar Islands. It is proposed to examine both the positive and the negative aspects of these industries. Whether the cost of production without transportation subsidy is higher than the returns. What would be the economics of these industries without transportation subsidy? Who are the beneficiaries of this subsidy? How much these industries contribute to the national, and particularly to local economies. What are the negative effects of these industries on the local environment and ecology in terms of deforestation, soil erosion, and loss in biological diversity, effect on local farming and livelihood systems etc? Further, even if the subsidy on transportation is justified on the basis of net returns, it is necessary to assess the revenue to the government, income and employment opportunities, and the long-run effects of negative externalities on the local environment and ecology.

The specific objectives of the study are:

(a) To assess the contribution and role of wood-based industries in the regional and national economies, and in creating income and employment opportunities among the population of the islands,

(b) To examine the type of wood, quantity demanded and its supply to wood-based industries in the islands,

(c) To estimate the costs (with transportation costs and without transportation costs) and returns of wood-based industries operating in Andaman and Nicobar Islands,

(d) To assess the social costs and benefits of wood-based industries operating in the island,

(e) To assess the effects of wood-based industries on the livelihood and farming systems of local communities and on the ecology and environment of the islands,

(f) To suggest policy implications particularly related to transportation subsidy to wood-based industries operating in the islands.

2.2 Scope of the Study

Ecosystems—forests, marine and mangrove—of Andaman and Nicobar Islands are fragile and they are interrelated to each other. Forest ecosystem is at the centre of other ecosystems, and its excess use and abuse would result in total ecological imbalance of the Islands. Wood-based industries, though they contribute to income and employment, exert tremendous pressure on forest ecosystem. This study has made an attempt to assess the social benefits and costs of wood-based industries operating in Andaman and Nicobar Islands. The results would be useful in formulating appropriate policy measures so that economy of the Islands could grow on sustainable ways, as also the ecosystems, particularly the forest ecosystem are maintained.

2.3 Data Sources

The study is based both on secondary and primary data. Secondary data were collected from official records, published and unpublished documents and reports of the Forest Department, Industries Department, wood-based industries and other related government departments in Andaman and Nicobar Islands. Data and information were also collected through discussions with the officials of industries and forest departments, and the personnel of wood-based industries. Primary data were collected at the household level, community level and at the village level \ regional level across Andaman Islands. It was collected through discussions and with the help of brief structured questionnaires. Personal observations and assessment were also used wherever they were reliable and justifiable.

2.4 Research Methodology

As per the list provided by the Department of Industries, there are three medium- scale plywood and veneer producing industrial units in the Islands. On of them, Andaman Timber Industries (ATI) is closed; another unit, Jayashree Timber Products (JTP) is on the verge of closure and has stopped its operations; and the third one, Kitply, is waiting for the government's clearance, even though it too has stopped its operations temporarily. Out of these three units we selected two units (Kitply and JTP) for our study. Further, out of a total of 25 private sawmills on the list, 12 units were selected. Apart from this, one composite unit operating in Little Andaman has also been selected. In addition to this, out of around 174

wood and cane furniture units (including tiny units), we collected information and other details from 20 units. In general, selection of units was purposive and it was made in accordance with their location and accessibility. This was required as the duration of the study was six months, and fieldwork in A&N Islands was not easy. Nevertheless, keeping in mind the objectives of the study, and using my own judgements, different types of units across Andaman Islands have been selected and studied. Though all the sawmills and medium-scale units (plywood and veneer) have stopped their operations since November 2001 due to the Supreme Court ban on timber harvesting and saw milling, I have collected the relevant data and information for the latest period (2000-2001), and when these units were in operation. There was no difficulty in collecting the required data from furniture units, as they were in full swing of operations as usual! It was not difficult to get the data for 2000-2001, as most of the units had maintained records. But we had to depend on their records and reporting. For that matter at least 10 per cent of cost over reporting and 10 per cent under reporting of returns or benefits could be assumed. Fieldwork in Andaman group of Islands was done during February and April 2002.

Thus, a total of 35 wood-based industries covering medium-scale plywood/veneer units (2), sawmills (12), composite unit (1), furniture and tiny handicraft units (20) operating across Andaman group of Islands were selected for the study. From the selected units, data related to all the components of costs and returns, direct and indirect employment created, and revenue to the government were collected and analysed. In fact, almost all wood-based industries are located in Andaman group of Islands, except 3 or 4 small-scale units in Nicobar Islands. This also shows that all forest-based activities are largely concentrated in Andaman group of Islands, where the capital of the Union Territory, Port Blair, is also situated. Further, discussions were also held with one more medium-scale plywood unit (ATI) and a few other tiny units. Data and information were also collected both at the household and village levels from 16 villages covering north, middle and south Andaman Islands (see Table 2.1 below for details). Using Microsoft Excel, both secondary and primary data have been analysed. Wherever it was required, other statistical techniques have also been used.

As far as social costs are concerned, they have been assessed in terms of deforestation, threat to biological diversity and reduced access of local communities to forest resources. It should be mentioned that assessing social costs related to forest ecosystems is a Herculean task as no scientific data are available either on deforestation, loss of biological diversity, soil erosion,

etc or on total economic value (TEV) of forest ecosystem of Andaman and Nicobar Islands. Above all, forests are resources, which cannot be reversed to their original (virgin) form, once they are damaged or destroyed. In other words, their nature of irreversibility makes it much more difficult and complicated to estimate the social costs of their damage or destruction. What we have assessed here is a fraction of total social costs of forest ecosystem destruction or damage, which is also based on limited knowledge and data available. Assessment of social benefits was in terms of income and employment created by these industries among local communities, and revenue to the government.

Table-2.1: Wood-based industries selected for the study

Type of Industry	*Total No. of Units*	*No. of Units Selected*	*Ownership*	*Activity*	*Capacity in Cbm*	*Direct employment in nos.*
Medium Scale	3	2	Pvt. Ltd.	Plywood, Black Board, Veneer	16000 to 25000	1949
Small Scale Including Private Saw Mills	23	12	Pvt.	Pencil Slat, Sawn Timber	600 to 3600	10 to 20
Composite Units	1	1	Pvt. Ltd.	Pencil Slat, Veneer, Match Splints, Sawn Timber	10000	200
Wood Furniture Unit	174	20	Pvt.	Wooden Furniture	6 to 128	4 to 5
Total Units Selected	-	35	-	-	-	-

3. Land Use & Forest Types of Andaman & Nicobar Islands

3.1 Land Use

As per official records and published reports, area under forests of Andaman and Nicobar Islands has declined from 740 thousand hectares (93.7 % of reporting area) during 1970-71 to

691 thousand hectares (87.5 % of reporting area) during 1996-97 (Table: 3.1). This could be due to an increase in net sown area during the same period. It can be seen from Table-3.1 that net sown area was 18 thousand hectares (2.3 % of reporting area) during 1970-71, which has increased to 38 thousand hectares (4.8 % of reporting area) during 1996-97. This means that forestlands have been converted into croplands, in addition to their conversion into other uses. Though there is state control over forests in A&N Islands, people consider and use all types of land other than private lands as common property resources (CPRs). In fact, it can be seen from Table-3.1 that other than private lands (net sown area) and forests as such (item no. 2 in Table-3.1), area under CPRs (permanent pastures and grazing lands, cultivable wastes, barren and uncultivable land etc) is negligible, 7.6 per cent of total reporting area during 1996-97 (see Table-3.1 for details). The biomass (fodder, fuel wood, thatch, etc) needs of local communities living in rural areas are met out of forestlands.

Table–3.1: Land Utilisation -- Andaman and Nicobar Islands (in '000 hects)

Sl. No.	*Classification / Year*	*1970-71*	*1980-81*	*1990-91*	*1996-97*
1	Geographical area	824.9	824.9	824.9	824.9
2	Reporting area	790 (100.00)	790 (100.00)	789.5 (100.00)	790 (100.00)
3	Forests	740 (93.67)	693.9 (87.84)	692.5 (87.71)	691 (87.47)
4	Not available for cultivation	2 (0.25)	13.6 (1.72)	14.7 (1.86)	23 (2.91)
5	Barren & uncultivable land	1 (0.13)	1.4 (0.18)	2.1 (0.27)	2 (0.25)
6	Permanent pasture & grazing land	3 (0.38)	5 (0.63)	4.6 (0.58)	5 (0.63)
7	Land under misc. tree crops & grooves	20 (2.53)	26.8 (3.39)	30.6 (3.88)	14 (1.77)
8	Cultivable waste	4 (0.51)	11.8 (1.49)	4.6 (0.58)	13 (1.65)
9	Fallow land other than current fallow	1 (0.13)	2.7 (0.34)	2.6 (0.33)	3 (0.38)
10	Current fallow	1 (0.13)	1 (0.13)	1.3 (0.16)	1 (0.13)
11	Total	2 (0.25)	3.7 (0.47)	3.9 (0.49)	4 (0.51)
12	Net sown area	18 (2.28)	33.8 (4.28)	36.5 (4.62)	38 (4.81)
13	Area sown more than once	0 (0.00)	1.02 (0.13)	1.2 (0.15)	8 (1.01)
14	Total cropped area	18 (2.28)	34.82 (4.41)	37.7 (4.78)	46 (5.82)

Note: Figures in the parentheses are percentages to total reporting area.

Source: Various issues of Indian Agricultural Statistics, Directorate of Economics and Statistics, Dept. of Agriculture and Co-operation, Ministry of Agriculture

Further, it can be clarified that local communities live largely in and around protected forests, and pressure on protected forests is much more as compared with reserved forests. Table-3.2 shows that across A&N Islands and in the inhabited Islands, around 41 per cent of the total forest area is reserved, and the remaining 59 per cent is under protected forests, which is used by the local communities. In some areas, particularly in Andaman group of Islands, locals also use reserve forests.

Table–3.2: Total Area under forests (sq.km.)

	TGA	*Recorded Forests*		
		Reserved	*Protected*	*Total*
Andaman Group of Islands	6408.00	2928.76 (52.0)	2699.86 (48.0)	5628.62 (100)
Nicobar Group of Islands	1841.00	-	1542.07 (100)	1542.07 (100)
Total	8249.00	2928.76 (40.8)	4241.93 (59.2)	7170.69 (100)

Source: Forest Statistics 1997-98, Department of Environment and Forests, Andaman & Nicobar Administration, Port Blair.

Though official records show recorded forests as 86.9 per cent of total geographical area, the Forest Assessment Report of 1999 has shown the total forest cover of the Islands as 92.2 per cent (Table-3.3). This could be due to the coverage and inclusion of rubber and red palm oil plantations of Andaman and Nicobar Islands Forest Plantation and Development Corporation (ANIFPDC) as well as the areca plantations on private lands by the assessment report. It could also be due to the coverage of even remote and small Islands and islets through satellite imageries (Forest Assessment Reports). But one thing is important, which can be seen from Table-3.3 that as per Forest Assessment Report, area under open forests is just 1.6 per cent of total forest area, and more than 85 per cent is under dense forests. This means that degradation of forests in the Islands is negligible, and there is no problem of forest destruction and degradation and of any ecological problems even with excessive forest exploitation for commercial purposes over a long period of time. This conclusion could be dangerous, which is based on data collected through satellite imageries. Even though area under dense forests is 85.6 per cent of total forest area, the composition of vegetation and species of trees and plants is important to judge the health of any forestland. Forest

Assessment Report did not explain this important and relevant phenomenon. Thus it may require a comprehensive ground-level study in this regard. There are many patches all over the Islands, which are barren, degraded and without adequate number and required species of plants and trees.

Table–3.3: Forest cover as per Forest Assessment Report for the year 1999

	Area (sq.km.)	*% to Geog. Area*	*% to total forest area*
Geog. Area	8249	100	-
Total forests	7606	92.21	-
Dense forests	6515	78.98	85.66
Open forests	125	1.52	1.64
Mangroves	966	11.71	12.70
Non-forest area	643	7.79	-

3.2 Forest Types of Andaman and Nicobar Islands

Relative to its limited area the biomass production from Andaman and Nicobar Islands forests is substantial. The tropical climate, the long rainy season and an average relative humidity of 79 per cent have nurtured a good forest cover over practically all the Islands (Saldanha, 1989). Andaman and Nicobar Islands are endowed with three very important natural ecosystems, viz., the forest ecosystem, the marine ecosystem and the mangrove ecosystem. These ecosystems are very closely interconnected and important not only to the region but also internationally. The rich coral reefs are unique in the Asian subcontinent and important for marine life and marine bio-diversity of the Islands. The forest ecosystem is the mainstay of these Islands, without which the importance or even the location of these Islands on the globe may disappear. In other words, damaging or destroying forest and mangrove ecosystems would lead to total destruction of the Islands. Utmost care is required with regard to the utilisation of these ecosystems. Andaman and Nicobar Islands are unique in all respect, and strategically as well as ecologically very important. Ecologically these Islands are fragile because of their steep hills, limited flat terrain, saline creeks, and with poor and porous soils with very little water-holding capacity (Sadanha, 1989).

Different forest types of A&N Islands can be seen from Table-3.4 below. The Andaman Tropical Evergreen Forests and the Andaman Moist Deciduous Forests form a mosaic on the lower hills of the Islands. Virgin Evergreen Forests are found on the central hills of Great Nicobar. White Chuglum (Terminalia alata) and padauk (pterocarpus dalbergioides) are important species of the Moist Deciduous Forests, which have been largely exploited for commercial purposes. Broadly there are six types of forests in A&N Islands (Table-3.4)

Table-3.4: Forest Types in A & N Islands

1.	Giant Andaman Evergreens	Climax formation in lowlands. Almost extinct due to large-scale clearance of flat terrain for agriculture.
2.	Andaman Tropical Evergreens	Multi-stored, closed canopy forests. Grow in hilly terrain.
3.	Andaman Moist Deciduous Forests	Open canopy forests with seasonal leaf fall. Occur on lower slopes on 45 per cent of total area. Yield timber of more economic value.
4.	Andaman Hill-top Evergreens	Stunted, wind-resistant forests.
5.	Littoral Forests	Open formations of all, sturdy trees with limited undergrowth. On sandy beaches above high water level.
6.	Mangrove Forests	Dense formations well adapted to salinity, tidal fluctuations and marshy soil. Inter-phase between land and marine ecosystems

Source: Champion and Seth, in Saldanha, 1989.

Mangroves: The mangrove ecosystem is in between the forest eco-system on land and marine ecosystem in the sea. In A&N Islands mangroves are estimated to occupy 1,15,000 hect, of which 50,000 are in the Andaman group.

The extent of forest degradation due to pressure from wood-based industries and other types of exploitation of forests in the Islands could be assessed through Table-3.4 above. It can be seen from the Table that the Giant Andaman Evergreen forests are almost extinct as a result of our promotional policy on settlements and wood-based industries in the Islands. Forests were cleared for timber and the harvested land was allotted to settlers. The Andaman Moist Deciduous forests, which are open canopy forests, are being largely exploited for commercial purposes, mainly by wood-based industries. It appears the only type of forest, which is relatively in good condition, is the Andaman Hill-Top Evergreens.

3.3 Contribution of Forests to Domestic Product (SDP)

The share of forestry and logging in state domestic product (SDP) of the Union Territory is substantial, though it has declined during the period 1980-81 to 1994-95. Across sectors, it occupies second place after agriculture. In fact, the share of agriculture has declined much more than the share of forestry and logging sector, declined from 44.2 per cent in 1980-81 to 33.9 per cent in 1994-95 (Table-3.5). It can also be seen from Table-3.5 that at constant prices (80-81), the share of forestry and logging in NSDP of the Islands has declined from 11.97 per cent in 80-81 to 10.1 per cent during 1994-95. As compared with this, the share of fisheries sector has increased considerably during the same period from just 1.44 per cent in 80-81 to as much as 7.02 per cent during 94-95.

Table 3.5: Net State Domestic Product at factor cost (1980-81 prices) and contribution of different sectors to NSDP

Year	*Forestry & Logging*	*Fisheries*	*Primary Sector*	*Secondary Sector*	*Tertiary Sector*	*NSDP Total*
80-81	590 (11.97)	71 (1.44)	2870 (58.20)	821 (16.65)	1240 (25.15)	4931 (100.00)
85-86	403 (6.39)	275 (4.36)	3802 (60.31)	745 (11.82)	1757 (27.87)	6304 (100.00)
90-91	883 (11.94)	481 (6.51)	4668 (63.14)	375 (5.07)	2350 (31.79)	7393 (100.00)
94-95	1124 (10.01)	788 (7.02)	5762 (51.32)	2733 (24.34)	2732 (24.33)	11227 (100.00)

Note : Figures in parentheses indicate percentage to total NSDP
Source: National accounts statistics of India-1950-51 to 1995-96, EPW Research foundation, Mumbai,
1997.

Further, it can be seen from Table-3.6 that at current prices the share of forestry and logging in Net Domestic Product of the Islands has declined from around 12 per cent to 6.9 per cent during the period 1980-81 to 1994-95. At the same time, the share of fisheries sector has increased substantially, from just 1.4 per cent to around 15 per cent during the same period. The decline in the share of forestry and logging could be due to reduced rate of timber harvesting and increase in the cost of timber extraction. This shows that in the Islands economy, the role of forestry and logging is declining, whereas that of fisheries is increasing. Since the primary sector accounts for 51.3 per cent of NSDP of the Islands, the fisheries sector within the primary sector occupies an important place, with its huge potential. But since fish is a perishable commodity, the role of the fisheries sector as a potential source of

income and employment to local communities appears to be limited, unless appropriate technologies are adopted to store and export fish to the mainland, where lie the potential market for these commodities. Since the Islands are far away from the mainland, easy, efficient and cheap export of fish to the mainland appears to be challenging and subject to limitations. Both transportation and handling would be very expensive, unless good and appropriate technology is used. Under the prevailing situation wherein the role of forestry and logging appears to be declining, fisheries could be a potential sector after tourism, which would play a positive role in sustaining the local economy of the Islands in terms of creating and sustaining income and employment.

With regard to the shares of the primary, secondary and tertiary sectors, primary sector continues to occupy an important place with 58.07 per cent share in NSDP, followed by tertiary sector with 28.6 per cent during 1994-95. But the share of the primary sector has remained the same during the period 1980-81 to 1994-95. The share of the tertiary sector has increased from 25 per cent to 28.6 per cent, whereas the secondary sector's share has declined from 16.6 per cent to 13.3 per cent during the same period (see Table-3.6). This shows that the primary and tertiary sectors are crucial to the Islands' economy.

Table–3.6: Net State Domestic Product at Current Prices and Contribution of Different Sectors to NSDP

Year	*Forestry & Logging*	*Fisheries*	*Primary Sector*	*Secondary Sector*	*Tertiary Sector*	*NSDP Total*
80-81	590 (11.97)	71 (1.44)	2870 (58.20)	821 (16.65)	1240 (25.15)	4931 (100.00)
85-86	1366.00 (14.44)	359.00 (3.79)	5465.00 (57.75)	1406.00 (14.86)	2592.00 (27.39)	9463.00 (100.00)
86-87	1221.00 (11.19)	504.00 (4.62)	6241.00 (57.21)	1237.00 (11.34)	3430.00 (31.44)	10908.00 (100.00)
90-91	1634.00 (10.75)	1317.00 (8.66)	8747.00 (57.55)	980.00 (6.45)	5473.00 (36.01)	15200.00 (100.00)
94-95	2330.00 (6.93)	4918.00 (14.63)	19526.00 (58.07)	4478.00 (13.32)	9620.00 (28.61)	33624.00 (100.00)

Note: Figures in brackets indicate percentage to total NSDP

Source: National accounts statistics of India-1950-51 to 1995-96, EPW Research foundation, Mumbai,1997.

It can be seen from Table-3.7 that annual compound growth rate of forestry and logging sector is much more (8.06 percent) than the agricultural sector (3.56 percent) during 1980-81 to 1994-95. The annual growth rate of fisheries sector is very significant (18.04 percent), which reflects its potential role in the Islands' economy (see Table-3.7 below).

Table-3.7: Compound Growth Rate of different sectors (%)- 1980-81 to 1994-95

Sectors	*CGR %(1980-81 to 1994-95)*
Forestry and logging	8.06
Fisheries	18.04
Agriculture	3.56
Mining and quarrying	1.27
Primary Sector	5.26
Secondary Sector	4.05
Tertiary Sector	5.03
NSDP Total	5.33

Source: National Accounts Statistics of India-1950-51 to 1995-96, EPW Research Foundation, Mumbai, 1997

4. Wood-Based Industries in A&N Islands

4.1 Background

After India's independence in 1947, the policy perspective among the think tanks was by and large to industrialise the nation. It was perceived that income and employment opportunities among the vast masses of Indian communities could only be created through rapid industrialisation of India's economy. Andaman and Nicobar Islands were no exception to this perspective. But due to remoteness and distance from the mainland, and general backwardness of the Islands, rapid industrialisation was not possible there. Also, infrastructure facilities were limited in these Islands. The growth and progress was very slow. Local entrepreneurship among the settlers was also limited. Hence, special emphasis and encouragement was given to entrepreneurs from the mainland to establish industries and business in the Islands. Unfortunately, A&N Islands are endowed only with vast areas of rich forests and marine fisheries. Tapping the potential of fisheries appeared to be non-viable for the entrepreneurs; besides there was no hot and ready market demand for fisheries products as compared with wood and wood-based products in the mainland. The encouragement and special support with many concessions and privileges to entrepreneurs from the mainland to establish wood-based industries in the Islands was handy. Many entrepreneurs from the mainland utilised this opportunity to make windfall gains. Forests were leased to the wood-based industries, timber was supplied on royalty rates, which was much below the stampage value, direct subsidies in the form of capital investment subsidy, Island transport subsidy, inter- island transport subsidy, rebate, etc., were provided. As a result, a strong base of wood-based industry was established in the Islands.

Wood-based industries in these Islands were established since early 1900 with the objective of tapping rich timber from the Islands, and also to provide income and employment to the local people with overall economic development of the Islands. During the early days, a Government Saw Mill at Chatam was established, and subsequently a unit by WIMCO was

set up for match splints. And with the increase in demand, and encouragement by the government many saw mills and other wood-based industries sprang up in the Islands. In particular, three medium-scale plywood and veneer units were invited by the government during early 1960s with full assurance of timber supply at concessional rates and monetary incentives. Further, ANIFPDC, a Government of India undertaking, was set up during 1977 to give a big boost to wood-based industries in the Islands.

4.2 Relevance / Importance of Wood-Based Industries

Relevance:

Wood-based industries produce consumption goods as well as intermediate goods with both forward and backward linkages in an economy. Demand for wood-based products increase sharply with economic growth and development. In turn, these industries have the potential to play a significant role in promoting economic growth and development by way of creating income and employment opportunities. But at the same time, these industries depend completely on a fragile natural resource, i.e., forests. Excessive use and abuse of forests for timber would completely exhaust the resource itself. This in turn would result in collapse of both wood-based industries and forest ecosystem, which would have wider repercussions in terms of social costs.

Further, forests have economic value, hence it may not be wise to keep them as museums. Selective felling of trees on sustainable ways, and within the limits would be useful. With sound management and regeneration using appropriate technology,

forests could be used and managed in sustainable ways. But care has to be taken about the technology as it is subject to limitations for creating negative externalities. Forest is a resource, which has multiple functions and uses. Even with appropriate technology, which would ensure sustainable harvests of timber, the other functions and uses of forests like biodiversity, resilience, irreversibility and other ecological functions need to be addressed. And there lies the importance of an appropriate policy decision to decide whether a particular forest should be harvested, if so when, up to what limit, what type and how, etc. Also, up to what level wood-based industries could be encouraged to continue with policy interventions.

Role of Wood-Based Industries in A&N Islands:

It can be seen from Table-4.1 that there are 236 small-scale wood-based industries in the Islands. When compared with other types of industrial units, their share in the total small-scale industries (SSIs) in the Islands is more than 17 per cent. The other important SSIs are engineering based and miscellaneous based. In terms of direct employment, it can be seen from Table-4.1 that wood-based SSIs have employed 1,402 persons, which is 21 per cent of the total employment by SSIs in the Islands. After wood-based industries, it is engineering based and miscellaneous based, which are employing more persons, 21.2 per cent and 22.3 per cent of the total SSI employment respectively. This shows that wood-based industries play an important role in the Islands in terms of creating income and employment opportunities. In addition to this, the three medium-scale units which are producing plywood and veneer, which have not been included in Table-4.1, directly employ around 2000 persons.

Thus, a total of around 3,400 persons directly work in wood-based industries in the Islands. Assuming an employee with five dependent family members, around 17,000 people depend for their livelihood on wood-based industries. Further, at least an equal number of people are working indirectly for these industries in loading, unloading, trade, transport, shipping and stevedoring, etc. In addition to this, more than 4,000 people are getting employment through ANIFPDC and the Forest Department (FD). In general, it has also been roughly estimated that directly as well as indirectly around 50,000 people depend on wood-based industries for their livelihood, and these industries are the backbone of the Islands' economy. These industries also generate over Rs.40 crores through timber price, royalty and excise duty to the Government, and the total disbursements made by them in the Islands is estimated at another Rs.40 crores (Chamber of Commerce, Port Blair)

Table-4.1: Category vis-à-vis Region-wise Small-Scale Industries Units in Andaman and Nicobar Islands as on 31.3.2001.

Sl. No.	*Type of Unit*	*S/A*	*M/A*	*N/A*	*Nicobar*	*Total*	*Total Employ-ment (no.)*	*Percentage*
1.	Wood Based	179	23	30	04	236	1402	21.0
2.	Agro- Based	87	16	9	11	123	369	5.5
3.	Marine Based	51	03	03	03	60	600	4.5
4.	Food Based	68	14	11	08	101	606	9.1
5.	Mineral Based	61	06	05	-	72	504	7.5
6.	Chem. Based	39	-	-	-	39	195	2.9
7.	Eng. Based	265	09	07	02	283	1415	21.2
8.	Leather Based	06	-	-	-	06	12	0.2
9.	Tex. Based	87	04	03	01	95	380	5.7
10.	Coir Based	02	-	-	-	02	10	0.1
11.	Misc. Based	259	53	27	05	344	1491	22.3
	Total	**1104**	**128**	**95**	**34**	**1361**	**6684**	**100**

Note: S/A = South Andaman. M/A = Middle Andaman. N/A = North Andaman.

4.3 The Question of Subsidy:

In general, government subsidy may be defined as the difference between the cost of delivering various publicly provided goods or services and the recoveries arising from such deliveries. Recovery could be in the form of revenue to government, royalty, seiniorage and taxes, and indirectly in terms of employment (Mundle & Rao, 1991). In the case of wood-based industries, provision of subsidy may have to be judged on social costs and benefits. By mere recovery and employment creation, it may not be advisable.

In fact, the question of subsidy or issues related to it could be perceived differently by different groups. A macro economist would look at it from the point of view of revenue deficit. A price theorist would analyse it from the point of view of allocative effects, welfare economist would look at it for overall welfare effects, and a political scientist would study and analyse it from the perspective of distribution (Mundle & Rao, 1991). For an ecologist or

environmental economist, it is the question or issue related to social costs and benefits, which is in fact related to all the above, particularly to the question of overall welfare effects. It is the last point or issue, which requires particular attention.

It is argued that if subsidy were removed, cost of production would increase resulting in higher prices of finished or semi-finished goods, which will have to be borne by the buyers and consumers of the commodity. With subsidy, of course the entrepreneur will reap windfall profits (WP), but government also gets revenue (through excise duty, octroi, taxes etc), and the commodity is sold in the market at a lower price. It is also argued that in the tropics, forest exploitation has been characterised by a tremendous transfer of wealth from public sector (public good) to private concessionaires (Jeffrey R Vincent, 1990). In fact, entrepreneurs (industrialists) pay duty, tax, etc to government and get it back by increasing the prices of finished goods. This way the burden of duty would fall on consumers, and not on the producers. Whatever subsidy the entrepreneurs get is a kind of bonus to them. If the price of timber fixed by the Administration / Department is less than the market rate / price, it is also subsidy, i.e., supply of timber to wood-based industries at subsidised rates.

Further, it is also argued that if subsidy were removed, the margin of profit would be very less or even negative. Hence the entrepreneur will try to increase production to get the same net returns as he was getting with subsidy. This will exert excessive pressure on forests, as more trees have to be cut in order to increase production. If subsidy is there, with lower operations, net profit margin would be high, less trees will be cut, and hence lesser pressure on forests. In fact, without subsidy, if net profit margin is substantial, the entrepreneur would increase or decrease his production depending upon other situations or conditions like availability of raw materials, marketing of finished goods, cost of labour, cost of other inputs, etc. This may have a different impact on forests.

One can also argue that subsidy could be given in the initial stages, subsequently it could be withdrawn in phases, and finally removed. But the point is whether it is viable both economically (social costs and benefits included) and financially (private costs and benefits) for wood-based industries to operate once subsidy is reduced or removed.

4.4 Transportation Subsidy to Wood-Based Industries in A&N Islands:

The Ministry of Industry, Government of India, initiated 90 per cent transportation subsidy since 1971 for both medium and small-scale wood-based industries. It was amended in 1993 to benefit only for five years from the date of commencement of commercial production. It was amended again in 1995 to benefit all sizes beyond five years and it was up to March 2000. Again it was extended up to March 2003, mainly justifying the extent of employment generation among the local communities by these industries.

Two types of subsidy are in operation:

Island subsidy: 90 per cent of the transportation cost of raw materials from mainland to Island and finished goods from Island to mainland is reimbursed.

Inter-island subsidy: 90 per cent of the transportation cost of timber transported from one Island to the other within A&N Islands is reimbursed.

In addition to this, Island Capital Investment subsidy up to a maximum of Rs.25 lakhs on capital investments is also in operation.

On the recommendations of the Expert Committee (1993), constituted by the Planning Commission, Govt. of India, both Island and Inter-Island subsidies were extended up to 31st March 2003 with the following amendments:
85 per cent of the transportation cost will be reimbursed during 2000-01.
80 per cent of the total transportation cost will be reimbursed during 2001-02.
75 per cent of the total transportation cost will be reimbursed during 2002-03.

Total subsidy, both Island subsidy and Inter-Island subsidy, disbursed by the government during the period 1995-96 to 1999-2000 can be seen from Table-4.2 below. It can be seen from the table that medium-scale units have cornered a large chunk, 87.4 per cent of total subsidy, followed by saw mills, around 12 per cent of total subsidy, during 1995-96 to 1999-2000 (Table-4.2 for details). Table-4.2 also shows that 99.44 per cent of the total subsidy disbursed during 1995-96 to 1999-2000 in the Islands was for wood-based industries. A sum of Rs. 2948.34 lakhs has been distributed during this period to wood-based industries

operating in the Islands. This works out to an average of Rs.589.67 lakhs per annum during the five-year period. This is in addition to 25 per cent capital investment subsidy up to a maximum of Rs.25 lakhs per unit (see Table-4.2 for more details).

Table–4.2: Transportation Subsidy Disbursed From 1995-96 to 1999-2000 in Andaman and Nicobar Islands (Rupees in Lakhs)

	Wood Based			*Non-Wood-Based*	*TOTAL*
1	2	3	4	5	6
	SSIs	Medium	Total	SSIs	
Island	239.36 (11.84)	1781.87 (88.16)	2021.24 (99.28)	14.71 (0.72)	2035.94 (100.00)
Inter Island	132.20 (14.26)	794.91 (85.74)	927.11 (99.81)	1.77 (0.19)	928.88 (100.00)
Total	371.57 (12.60)	2576.78 (87.40)	2948.34 (99.44)	16.48 (0.56)	2964.82 (100.00)
Average of Island and Inter-Island Subsidy per annum (average of 1995-96 to 1999-2000)	74.31	515.35	589.67	3.3	592.96
% Share of Island Subsidy	64.42	69.15	68.56	89.25	68.67
% Share of Inter-Island Subsidy	35.58	30.85	31.44	10.75	31.33

Note: Figures in ( ) of columns 2 & 3 indicates % share of SSIs and Medium scale industries in total (column 6).
Figures in ( ) of columns 4 & 5 indicates % share of wood based and non-wood based industries in total (column 6).
* Since we could not get the data year-wise, average of five years (1995-96 to 1999-2000) has been shown for per annum.

5. Dependence and Pressure on Forests

5.1 Location:

Andaman and Nicobar Islands are located in the Bay of Bengal with 6o 45` N- 13o 41` N Latitude and 92o 12` E-93o 57` E Longitude. The total area of the group of Islands is 8,249 sq.km, with 6 lakh sq.km of Exclusive Economic Zone (EEZ) (approx. 30 per cent of EEZ of India). The mean annual rainfall is 3,800 mm. During monsoon, the flat terrain is waterlogged, and there is scarcely any groundwater. Except in Great Nicobar there are no rivers in these Islands. But there are freshwater streams, which remain perennials with the catchment under forest cover.

The Andaman group of Islands is rough with undulating terrain, high mountains, and rugged surface with thick forest area. The little Andaman is different from other Islands, with more than 60 per cent of the area under flat forest cover, plain coastal areas, and only the southern part is undulating and hilly. Probably that was the reason for excessive abuse of little Andaman as compared with other Islands. The Nicobar group of Islands is flat with modified plant cover, large patches of grassland surrounded by good forests. The vegetation of the Great Nicobar is very rich with many freshwater rivers.

5.2 Socio-economic Information

There are around 349 Islands and islets constituting the Union Territory of A&N Islands. As per the Forest Statistics, 1997-98, the total number of islands and islets constituting Andaman and Nicobar is 556, out of which, 160 Islands have been named, and for which data on forest area with legal status is available. The remaining Islands are small islets and rocks, most of them unnamed, and data on forest area for these Islands is not available for us. Further, only 36 Islands are inhabited, 24 in Andaman group of Islands and 12 in Nicobar group. It can be seen from Table-5.1 that out of the total geographical area of the inhabited Islands, 75.5 per cent is of Andaman group of Isands. Concentration of population is also high among the Andaman group of Island, with 88.2 per cent of the total population of A&N Islands found there. Out of the total protected forests in the inhabited Islands, 63.9 per cent is in Andaman group of Islands. There are no reserved forests in Nicobar group of inhabited Islands (Table-

5.1). This shows that population pressure and developmental activities are more among the Andaman group of Islands as compared with Nicobar group of Islands.

Table–5.1: Area and Population of Inhabited Islands

	No. of Islands	*TGA (sq.km.)*	*Population (Nos.) 1991*	*Population (Nos.) 2001*	*Forest Area (sq.km.)*		*Area other than Forest (sq.km.)*
					Reserved	*Protected*	
Andaman Group	24	5936.45 (75.5)	241462 (86.0)	314239 (88.2)	2487.32 (100)	2666.12 (63.9)	776.91 (64.9)
Nicobar Group	12	1924.83 (24.5)	39208 (14.0)	42028 (11.8)	-	1505.40 (36.1)	420.23 (35.1)
Total	36	7861.28 (100)	280670 (100)	356265 (100)	2487.32 (100)	4171.52 (100)	1197.14 (100)

Source: 1) Forest Statistics 1997-98, Department of Environment and Forests, Andaman & Nicobar Administration, Port Blair. 2) Shekhar Singh, 2001.

Further, it can be seen from Table-5.2 that the density of population is very high in urban centres of the Islands, being 5,301 persons as compared with rural areas where it is just 25 persons per sq. km. But the literacy rate is more or less the same in both urban and rural areas, being 95 and 92 per cent respectively. This reveals that even rural areas, though remote, are provided with educational facilities. Surprisingly, though population density is very high in urban areas, the proportion of workers (main + marginal) is the same in both urban and rural areas, 34.8 and 35.4 per cent respectively (see Table-5.2).

The total geographical area of Andaman and Nicobar Islands is 8,249 sq.km, with 547 villages (43 villages uninhabited). The total population of the Islands is around 4 lakh with population density of 34 persons per sq.km. Most of the population lives in rural areas with around 27 per cent living in urban centres. The literacy rate in the 10-14 age group was 92.6 per cent as per the 1991 Census. The proportion of main and marginal workers was 35.2 per cent as per the 1991 Census (Table-5.2). Further, it can be seen from Table-5.3 that among the main workers, cultivators, agricultural labourers, workers in livestock, forestry, fishing, hunting, plantation and allied activities constitute 34 per cent of the total number of main workers. The other important sector is construction with 13.7 per cent of main workers. This shows that the primary sector occupies an important place in the economy. Even if the forestry sector's share gets reduced, it may not have an adverse impact on the employment situation of the main workers. But other sectors should be sustainable, and one has to investigate how far the other sectors depend on and interact with the forestry sector. In other words, how far does the forestry sector contribute to other sectors in terms of forward and backward linkages?

Table–5.2: Area, Population and literacy

	Urban	*Rural*	*Total*
Area (sq. km)	14 (0.2)	8235 (99.8)	8249 (100)
Population	74955 (26.7)	205706 (73.3)	280661 (100)
No. of Households	16439 (27.8)	42674 (72.2)	59113 (100)
Population density	5301	25	34
% decadal variation (1980-91)	51.02	47.88	48.70
Literacy rate	95	91.8	92.6
Proportion (%) of total Workers (main + marginal)	34.8	35.4	35.2

Note: figures in parentheses are percentages to total.
Source: Andaman and Nicobar Administration, "Forest Statistics- 1997-98", Department of Environment and Forests, Port Blair.

Table: 5.3 Distribution (%) of main workers by industrial classification

1.	Cultivators	16.0
2.	Agricultural labourers	5.5
3.	Livestock, forestry, fishing, hunting and plantation, orchards and allied	12.6
4.	Mining and quarrying	0.4
5.	Manufacturing, processing, servicing repairs in household industry	5.5
6.	Manufacturing, processing, servicing and repairs in non-household activity	6.0
7.	Construction	13.7
8.	Trade and commerce	9.2
9.	Transport, storage and communication	5.6
10.	Other service	25.6

Source: Andaman and Nicobar Administration, "Forest Statistics- 1997-98", Department of Environment and Forests, Port Blair.

5.3 Tribal Population:

Among the Aboriginals of A&N Islands, Nigrito hunter-gatherers are found in Andaman group of Islands, and the Mongoloid race of aboriginal (Nicobarese) who are horticulturists and herders are found in Nicobar group of Islands. Nicobarese are in large number, and civilized. It is the Nigrito Jarawa, Sentinelese, Onge and Shompenese who are still primitive. The other details related to these tribal populations can be seen from Table-5.4 below.

Table: 5.4 No. of Islands and total area declared as tribal reserve (area in sq.km.)

Name of the Tribe	*Tribal population, No. (1991)*	*Total No. of Islands*	*TGA (sq. km.)*	*Tribal Reserve area (sq. km)*	*No. of Islands uninhabited*
1. Nicobarese	24,639	18	902	902	12
*2. Jarwa	300	4	2896.31	912.19	1
Δ*3. Shompenese	214	1	1044.54	853.19	-
*4. Onge	104	1	731.57	403.37	-
**5. Sentinalese	100	1	59.67	59.67	-
*6. Andamanese	38	1	6.01	6.01	-

* Primitive, ** Primitive & very wild, Δ*Primitive and shy

Source: Forest Statistics 1997-98, Department of Environment and Forests, Andaman & Nicobar Administration, Port Blair.

5.4 Forest Dependence and Stakeholders

The utility of forests and timber is perceived differently by different persons. For an industrialist, it could be the recovery rate and commercial value of timber that is important; for a forester, it could be the log, its girth and production that matters, and for an ecologist, timber could be a carbon sequestering entity. Thus, there could be many stakeholders in forests and forest resources.

There are many stakeholders on A&N Islands forests and forest resources. There are settlers, in-migrants, wood-based industries, forest department, ANIPFDC, A&N Islands administration, aboriginals, environmentalists, poachers and the central government. Details about the claims and interests of stakeholders, their pressure and dependence on forests, their contribution to the local economy and their willingness to pay (WTP) for forest conservation and protection can be seen from Table-5.5 below.

Table: 5.5 Stakeholders on A&N Islands Forests and Forest Resources

Stakeholders	*Claims & interest*	*Pressure on forests*	*Contribution to local economy*	*WTP for forest conservation*
(1)	(2)	(3)	(4)	(5)
1. Settlers	From mainland settled by the govt. Farmers have become locals. It is their land.	Farmers, also encroaching on forest land. Depend on forest for biomass – timber, thatch, bamboo, firewood, NTFP.	Producing Rice, Coconut, Areca, Vegetables.	Marginal
2. In-migrants (encroachers)	Came on their own for job, and settled, claim over encroached land.	Encroachments, pressure for firewood, thatch.	Labour	Nil
3. Wood-based Industries	For medium-scale, invited by the govt. Have invested huge sums of money, and likes to continue. Other SSI like to	Tremendous – Annually 104201 cbm of timber is harvested to supply to these industries.	Employment: Direct by medium scale is around 5000 persons. By SSI and tiny units around 1000 people.	High

		continue (both locals and from mainland).		Creating backward and forward linkages in the local economy. Octroi to A&N Administration	
4.	Forest Dept.	Govt. of India has established to protect and conserve forests	Timber supply to Wood-based Industries and A&N NFPDC.	Employment – directly around 2000 persons– Hiring locals in the harvesting of timber, transport and govt. saw mills.	High
5.	A&N Forest Plantation & Development Corporation (A&N NFPDC)	Established by the Govt. of India as a company. Huge investment, and __ number of people are working.	Timber supply to wood-based industries, rubber and red palm oil plantations. Direct employment of around 2000 persons.	Employment in plantations, harvesting and transportation of timber, etc.	High
6.	A&N Administrati on	Local govt. right over Forest and forest resources	_	Employment	-
7.	Tribals	_____-	Wild life, wild fruits.	Nil	-
8.	Central Govt.	A&N Islands is Union Territory. Strategically and ecologically sensitive, so important.	Nil	Employment – mainly from mainland (Defence and other central govt. offices).	-
9.	Environment alists	Biodiversity, ecology, forests should be preserved	Nil	Creating awareness	--
10.	Others (Poachers & Smugglers)	Interested in timber, wild life and corals	Poaching and smuggling	negative	--

Note: WTP (willingness to pay) for forest conservation is based on qualitative assessment of the author, which are

again based on his discussions with different stakeholders.

Forests of A&N Islands are subjected to four types of pressure:

1. Concessions to settlers: That is, one cbm of wood, bamboo, poles, *ballies*, canes and firewood free of cost.
2. Concession to non-settlers: Small timber, bamboo, canes and poles at royalty rate.
3. Pressure from contractors, and merchants
4. Pressure from other departments like shipping, PWD, tourism, etc.

It can be seen from Table-5.6 that during 1990-91 to 1997-98, around 27,505 hectares of forest area has been harvested by the Forest Department and ANIFPDC. And during 1993-94 to 97-98, different stakeholders have harvested a total of around 5,77,104 cbm of timber. Out of this, around 53 per cent and 37.6 per cent is by the Forest Department and ANIFPDC respectively, which was to meet the demand/requirement by wood-based industries, mainly from medium-scale plywood and veneer units. Around 9 per cent of the total harvest of timber was by private parties on payment of royalty. Free and at concessional royalty rate to locals (mainly settlers) constitutes another 0.7 per cent of the total timber harvests during the same period (see Table-5.7 for details). Privileges and concessions to settlers and locals exert pressure on forests of the Islands (please see Appendix-1 for these details).

Table 5.6: Total Area Harvested for Timber (in hectares)

	1990-91 to 1997-98
By Forest Department	19,673
By ANIFPDC	7,832
Total	27,505

Source: Forest Statistics 1997-98, Department of Environment and Forests, Andaman & Nicobar Administration, Port Blair.

Table 5.7: Timber Harvested (cbm) in A&NI during the last five years (1993-94 to 1997-98)

	Timber (cbm)
1. Forest Department	3,04,040 (52.7)
2. Private parties on payment of Royalty	52,147 (9.0)
3. Free and at concessional Royalty	3,952 (0.7)
4. FPDC	2,16,965 (37.6)
5. Total	5,77,104 (100)

Source: Forest Statistics 1997-98, Department of Environment and Forests, Andaman And Nicobar Administration, Port Blair.
Note: Forest Department has harvested on an average around 26 cbm of timber per hectare during 1993-94 to 1997-98.

Timber demand/requirement by medium scale (plywood and veneer) units:

As it has been mentioned elsewhere, out of three medium-scale and one composite unit, one unit (ATI) has already been closed, another unit (JTP) is on the verge of closing down, and it is only the other two (medium-scale Kitply and Composite ATP) that are in existence. As per the official data, these four units would require around 76,148 cbm of log wood per annum as per their actual capacity. And since ATI has been closed down, the other three require around 60,148 cbm of log timber per annum. Total direct employment provided by these units is around 2,000 persons.

It can be seen from Table-5.8 below that more than 82 per cent of the total demand/requirement of wood-based industries is by the medium-scale units. Saw mills' share in this demand is 15 per cent, furniture units' demand is just 2.1 per cent. This shows that if the medium-scale units are closed down, the requirement/demand of timber by the existing sawmills (SSIs) and furniture units could be easily met out of the existing worked forest areas. In fact, the total harvests by FD and ANIFPDC, which is unsustainable, could drastically come down, if medium-scale units are closed down. Table-5.8 shows that FD and ANIFPDC extract, on an average, around 1,04,201 cbm of timber annually from 3408 hectares of forest area. Once the medium-scale units are closed down, the extraction would fall to around just 13,000 cbm per annum to meet the SSIs. Thus, in total, on an average, timber extraction would be around 20,000 cbm. 13,000 cbm to meet the SSIs (sawmills and

furniture units) requirement and around 7,000 cbm to meet the requirement of government depots, private parties and for departmental work through government sawmills. Once it is done, the existing rate of extraction, which is around 31 cbm per hectare, would come down to just around 6 cbm per hectare. This certainly would not be a burden on the Islands' forests.

Table-5.8: Timber (cbm) per annum harvested by FD and ANFPDC and the demand/requirement of timber (cbm) by different wood-based industries

1.	Timber harvested by FD&FPDC	1,04,201
2.	Timber demand/requirement by A. Medium Scale Units B. Sawmills (SSIs) C. Furniture Units (including tiny units) D. Total demand/requirement by wood-based industries	 60,148 (82.6) 11,118 (15.3) 1532 (2.1) 72,798 (100)
3.	Timber demand/requirement by government departments, private parties and departmental work (cbm)	6551

Note: Timber harvests and demand/requirements per annum are the averages of five years, 1993-94 to 1997-98

Source: Forest Statistics 1997-98, Department of Environment and Forests, Andaman & Nicobar Administration, Port Blair.

Timber Demand by Existing Sawmills:

There are around 23 sawmills (SSIs) operating in the Islands producing sawn timber to meet the local demand. In total, their actual capacity is around 11,118 cbm of logwood. Their operations would exceed this figure, as many are operating beyond their capacity without the knowledge of Forest Department or the Industries Department. But as per the official figure, their total requirement of logwood per annum is estimated at around 11,118 cbm, which would not be difficult for the Forest Department to meet. Further, sawmills, in total, provide employment to around 300 persons.

Timber Demand by Wood Furniture Units:

As per official record, there are around 174 Wood Furniture Units in the Islands. Even in their case, it is difficult to accurately estimate their timber demand, as many buy timber illegally and operate beyond their actual capacity. But as per official data, their total timber demand/requirement is estimated at just 1,532 cbm of sawn timber. Even if we add another

20 per cent to their estimated requirements as illegal wood consumption, pressure on forests by these units would be negligible.

These units are important, as they provide employment to around 800 persons. Most of the entrepreneurs of these units are poor and self-employed. They get no support or help from the government, except, in a few cases, loans from KVI at interest. It would be better if some kind of subsidy were provided to these units. It was found that their products (furniture and handicrafts) are being marketed locally as well as through emporiums, also reaching the mainland. A few have reported exporting directly to the mainland through agents. This sector has to be properly analysed and supported. The demand for their products, as it shows, would not be sustainable unless it is properly linked to the demand on the mainland. In other words, marketing of their products on the mainland has to be tapped, as local demand is minimal.

Type of Wood Required by Wood-Based Industries:

The plywood and veneer producing units use White Chuglum, Gurjan, Nabbe, Lalchini, Pymna and Bakota species of timber. The sawmills process all types of hardwood and softwood, and also superior wood. Furniture units use ornamental and other superior wood. Details of the commercial and non-commercial timber species can be seen from Appendix-2.

6. Economics of Wood-Based Industries

6.1 Commercial / Financial Viability of Wood-Based Industries:

6.1.1 Costs and Returns:

Costs are estimated averages, and may differ considerably from enterprise to enterprise. Estimates are based on recorded and reported data in rupees. It can be seen from Table-6.1 that net returns of medium-scale units are negative over total costs, and the rate of return is -0.2 per cent, which is not encouraging. Big industrial units like Birla who are operating as medium-scale units (JTP) in Andaman Islands may find it uneconomical to operate at this rate of return. It is transportation subsidy that adds to the unit's substantial gains. When transportation subsidy is subtracted from total costs, net returns would be positive and increase substantially, and the rate of return will be around 5 per cent. One can argue that even at 5 per cent rate of return it is not worthwhile to operate a medium-scale unit in Andaman Islands far from the main market areas. The low rate of return is due to cost of timber and excise duty, which is around 49 and 16 per cent of total cost respectively. Moreover, these units are operating below their full licensed capacity, around 15,628 Cbm against their full licensed capacity of around 22,000 Cbm. Since the Andaman and Nicobar Administration increases the price of timber every year at least by 10 per cent, the cost of timber is becoming more and more for these units to operate in the Islands. Also, it is difficult for them to compete with the mainlanders in this venture to sell their products at the increasing cost of production. It is said that the cost of production of this type of units is much less in the mainland due to availability of plantation timber at lower rates. Labour is also cheap on the mainland as compared with the Islands. Thus with transportation subsidy or even without it, it appears to be non-viable for these industries to operate in the Islands.

Table-6.1: Commercial / Financial Viability of Medium-Scale (Plywood and Veneer)Wood-based industries
(Average costs and returns per unit per annum in Rs. in thousands)

A	Fixed Cost	
	(i) Depreciation (10%) on Fixed Capital	7686(3.6)
	(ii) Interest on loan taken to set up the unit	1932(0.9)
	(iii) Total fixed Costs	9618(4.5)
B	Variable Costs:	
	i) Timber (logs)	105100(48.6)
	ii) Labour (wages and salaries)	18159(8.4)
	iii) Chemicals	10200(4.7)
	iv) Electricity, Diesel, Water, License	16742(7.7)
	v) Total Transportation Costs (including loading, Unloading, port clearance and wharefare charges)	23303(10.8)
	vi) Interest (10%) on Working Capital	1133(0.5)
	vii) Excise duty paid (16% of sale value of finished products)	33946(15.7)
	viii) Total variable costs (i to vii)	208583
C	Total Costs (A+B)	218201
D	Transportation subsidy	10733
E	Total costs minus Transportation subsidy (C-D)	207468
F	Gross Returns (Veneer, plywood and byproduct)	217833
G	Net Returns over Total Costs (F- C)	-368
H	Net Returns over Total Costs minus Transportation Subsidy (F- E)	10365
	Rate of Return (%) over Annualised Total Costs (C)	-0.2
	Rate of Return (%) over Annualised Total Costs (E)	5.0

Note: Figures in parentheses are percentages to total costs (item C)

As compared with medium-scale units (plywood and veneer), the economics of sawmills (SSIs) is quite different. Some of these sawmills used to produce match splints, pencil slats, etc., which they have stopped due to increase in the cost of production, and difficulty in selling their products on the mainland. Now all of them have become sawmillers. It can be seen from Table-6.2 that commercially these units are viable as their net returns over all costs, including depreciation, and excluding transportation subsidy, is substantial, being Rs.796 thousands per unit (Table-6.2). If transportation subsidy were included, net returns per unit over all costs would increase substantially. In other words, even if transportation subsidy is removed, the net returns are positive and substantial, with rate of return as high as 17.3 per cent. If transportation subsidy were included, the rate of return would jump to 27.1

per cent, which is very impressive. In total costs, though cost of timber constitutes 71.2 per cent, these units operate on profits due to ready market for sawn timber locally, as a result of all-round economic development of the Islands. Further, it can also be seen from Table-6.2 that total transportation costs, including loading and unloading, are just 10.5 per cent of total costs. A transportation subsidy makes hardly any difference to the total costs. More than this, operators are getting positive net returns, even without subsidy.

Table-6.2: Commercial / Financial Viability of Small-Scale (Saw Mills) Wood-based industries
(Average costs and returns per unit per annum in Rs. in thousands)

A	Fixed Costs: (Annualised)	
	i) Depreciation (10%) on Fixed Capital	84(1.8)
	ii) Interest on loan taken to set up the unit	50(1.1)
	iii) Total fixed Costs	134(2.9)
B	Variable Costs:	
	i) Timber (logs)	3277(71.2)
	i) Labour (wages and salaries)	311(6.8)
	ii) Electricity, Diesel, Water charges, License fee, Octroi	334(7.2)
	iii) Total Transportation Costs (including loading and unloading expenses)	484(10.5)
	iv) Interest (10%) on Working Capital	62(1.3)
	v) Total variable costs (i to vi)	4468(97.1)
C	Total Costs (A+B)	4602
D	Transportation subsidy	356
E	Total costs minus Transportation subsidy (C-D)	4246
F	Gross Returns (value of sawn timber and by-product)	5398
G	Net Returns over Total Costs (F- C)	796
H	Net Returns over Total Costs minus Transportation subsidy (F- E)	1152
	Rate of Return (%) over Annualised Total Costs (C)	17.3
	Rate of Return (%) over Annualised Total Costs (E)	27.1

Note: Figures in parentheses are percentages to total costs (item C)

The focus of this study is, of course, on the question of transportation subsidy to wood-based industries. The major beneficiaries of this subsidy are the three medium-scale units producing plywood and veneer, followed by sawmills. But there are around 200 tiny furniture units, both wood-based and cane based, which are playing an important role in the

economy of these Islands. Hence, we have studied them too, and Table-6.3 shows their costs and returns. It can be seen from Table-6.3 that even without any kind of subsidy these units are viable commercially with positive and substantial net returns, and with the rate of return as high as 19.3 per cent over all costs. Most of these units are largely family based. In other words, the entrepreneur and his family also work in the unit. As we have mentioned elsewhere, the total demand for timber by these units is negligible, and they are locals contributing to their own economy unlike the medium-scale units whose entrepreneurs are from the mainland, and their contribution is largely to the mainland economy. The total employment in the tiny sector is around 800 persons. It would therefore be appropriate to encourage the tiny furniture units by even removing the octroi on the value of timber purchased by them, and offering them incentives in the form of subsidy. Since their total demand for timber is also much less, pressure on local forests and ecology could be marginal.

Table-6.3: Commercial / Financial Viability of Tiny Units (SSI)- Wood Furniture Production

(Average costs and returns per unit per annum in Rs. in thousands)

A	Fixed Costs: (Annualised)	
	i) Depreciation (10%) on Fixed Capital	8.6(1.1)
	ii) Interest on loan taken to set up the unit	7.7(1.0)
	iii) Total fixed Costs	16.3(2.1)
B	Variable Costs:	
	i) Timber (logs)	624(78.7)
	ii) Hired Labour	81(10.2)
	iii) Materials	31(3.9)
	iv) Electricity	3.2(0.4)
	v) Transportation	8.6(1.1)
	vi) Octroi / tax (5%) on the value of timber purchased	10.8(1.4)
	vii) Interest (10%) on working Capital	18.3(2.3)
	viii) Total variable costs (i to vi)	776.9(97.9)
C	Total Costs (A+B)	793.2
D	Gross Returns	946.6
E	Net Returns over Total Costs (D- C)	153.4
	Rate of Return (%) over Annualised Total Costs (C)	19.3

Note: Figures in parentheses are percentages to total costs (item C)

The other type of tiny units is the cane-based furniture producing units, which are also largely family based, depending on local forests for canes. It can be seen from Table-6.4 that in total variable costs, the cost of canes is around 12 per cent. Though these units are family based, cost of hired labour constitutes around 43 per cent of total variable costs. These too are commercially viable, with rate of return as high as 126.4 per cent over total variable costs (see Table-6.4 for details).

Table-6.4: Commercial / Financial Viability of Tiny Units (SSI)-Cane Furniture Production (Average costs and returns per unit per annum in Rs. in thousands)

A	Variable Costs:	
	i) Canes	4.6(12.0)
	ii) Hired Labour	16.5(43.1)
	iii) Transportation	6.6(17.2)
	iv) Electricity	0.9(2.3)
	v) Rent for building	7.2(18.8)
	vi) Interest (10%) on working capital	2.5(6.5)
	vii) Total variable costs (I to vi)	38.3
B	Total Costs (only variable costs)	38.3
C	Gross Returns	125
D	Net Returns over Total Costs (C-B)	86.7
	Rate of Return (%) over Annualised Total Costs (B)	126.4

Note: Figures in parentheses are percentages to total costs (Item B)

Further, it is not only the tiny units, which are found in the furniture sector. Even big SSIs are involved in this business. To have an idea about their costs and returns, we have studied one unit as a case study. From Table-6.5 it can be seen that per annum the timber cost of this unit is around 4180 thousand rupees, which is 74.1 per cent of total costs. But the net returns are substantial and positive even over all costs, with a rate of returns as high as 22.4 per cent over total costs. This type of units may not require any kind of subsidy or support from the government as their returns cover all costs.

Table-6.5: Commercial / Financial Viability of a (large) Small-Scale Wood Furniture Unit
(Average costs and returns per unit per annum in Rupees in thousands)

A	Fixed Costs: (Annualised)	
	i) Depreciation (10%) on Fixed Capital	192(3.4)
	ii) Interest on loan taken to set up the unit	115(2.0)
	iii) Total fixed Costs	307(5.4)
B	Variable Costs:	
	i) Timber (logs)	4180(74.1)
	ix) Hired Labour	552(9.8)
	x) Materials	240(4.3)
	xi) Electricity	4.4(0.1)
	xii) Transportation	18(0.3)
	xiii) Octroi / tax (5%) on the value of timber purchased	188(3.3)
	xiv) Interest (10%) on working Capital	150(2.6)
	xv) Total variable costs (i to vi)	5332.4(94.6)
C	Total Costs (A+B)	5639.4
D	Gross Returns	6903
E	Net Returns over Total Costs (D- C)	1263.6
	Rate of Return (%) over Annualised Total Costs (C)	22.4

Note: Figures in parentheses are percentages to total costs (item C)

6.2 Economic Viability of Wood-Based Industries:

6.2.1 Social Costs and Benefits

It is not just the paid out costs and returns that are important in the analysis of wood-based industries. These industries depend on a resource, forest, which has multiple uses and functions. More than the private benefit from forests it is the societal and global benefits that are important. Neglecting social and global benefits and hence not accounting social costs would disturb the ecological balance, and lead to the collapse of all systems. Thus valuing forests and forest resources and also accounting social costs of their use and abuse is essential.

In this direction, Kumari has tried to estimate total economic value (TEV) per hectare of forests, taking a sample site of forest area in Malaysia (Kumari, 1995). Under the existing unsustainable logging operations with 20 per cent damage level and at 8 per cent discount rate, she has estimated TEV per hectare of the study site at M$12464. TEV includes value of timber, hydrological, endangered species, carbon stock, NTFP, recreation, domestic water and fish. She has further classified the TEV into total social benefits (TSB), total global benefits (TGB) and total private benefits (TPB). TPB is the value of timber, TGB is the value of endangered species and carbon stock, and TSB includes hydrological (agricultural), NTFP, recreation, domestic water and fish. She has analysed a situation where current logging operations are unsustainable with very high harvest rate, and the logging method environmentally destructive. Her hypothetical management options represent environmentally less disruptive and sustainable. The options represent increasingly benign methods of logging. She has shown that increased level of logging on unsustainable ways would result in lower TEV at higher damage level. But improved logging methods, where timber extraction would be much less would result in higher TEV. Both social and global benefits streams increase over time, while the private benefits diminish with the shift from unsustainable to sustainable logging methods. The reduction in private benefits corresponds to the reduced volume of timber extracted. It has been estimated by Kumari that total social benefits would increase from M$ 627 to M$ 1,407 per hectare at 20 per cent damage level when shifted from unsustainable to sustainable logging methods. Similarly, total global benefits would also increase from M$ 8,389 to M$ 9,171 through this shift. But total private benefits would decline from M$ 3,448 to M$ 1,276 when logging operations are shifted from unsustainable to sustainable logging methods.

Even though Kumari has focussed on logging methods and suggested efficient methods of logging, her analysis and results are useful in our study. The site that she has studied (Malaysia) is more or less similar to our study area (A&N Islands). Both Andaman and Nicobar Islands and Malaysia have good tropical forests with valuable trees like padauk and other ornamental timber trees. Both the regions have undergone the problem of commercial logging of valuable species of trees. The problem of social costs (deforestation, degradation, carbon stock biodiversity etc) is borne by both the regions. Though there are many benefits, excessive logging to meet the demand from wood-based industries is creating ecological and environmental problems to both the regions.

Thus, to estimate social costs of timber extraction (timber to meet the demand by wood-based industries), we have used the figures estimated by Kumari (Kumari, 1995) and converted them into Indian rupees. The estimated benefits by Kumari have been taken as social costs in our analysis, i.e., benefits foregone. The benefits of wood-based industries are in terms of employment, excise duty, revenue to government and total disbursements in the Islands by these industries.

The estimate of social costs in our study is as follows:

In order to meet the total demand / requirement, on an average (average of five years, 1993-94 to 1997-98, based on the data provided by the A&N Forest Department) 33.86 cbm of timber per hectare per annum is being harvested in the Islands. Further, on an average, timber supplied to wood-based industries per annum is around 1,04,201 cbm. That means, 3,077.4 hectares of forest area (1,04,201 divided by 33.86 cbm) is being logged / harvested per annum to meet the demand / requirement of wood-based industries. Out of the total 1,04,201 cbm of timber, medium-scale plywood and veneer units require 60,148 cbm. In case of medium-scale units being closed, timber requirement by SSIs (sawmills and furniture units) would be just around 12,650 cbm (see Table 5.8 above).

In the case of wood-based industries, at the unit level, we have taken the unit's average timber requirement per annum, to arrive at their social costs. As mentioned elsewhere, the estimate of social cost is based on Kumari's work. Nevertheless, it is a good and useful pointer and indicates the gravity of neglecting total benefits and total value from forests. What we have estimated is a fraction of social cost of forest destruction and damage. If a full estimate based on sound methodology is worked out, the magnitude of social costs will be tremendous. Social costs of habitat destruction, loss in biodiversity, loss of all forms of water bodies, value of all types of fauna and flora etc. will be huge and may be difficult to account for.

Further, even at the present level of timber extraction, forests have economic value, including social benefits. But the danger is that if unsustainable or excessive extraction were continued, the total economic value, particularly social benefits, would decline drastically, resulting in total ecological imbalance and heavy social costs. If timber is extracted on sustainable ways, TEV would be substantial and ecological balance will also be maintained.

Thus, it can be seen from Tables-6.6 to 6.10 that with social costs, net returns of wood-based industries would decline substantially, and in the case of medium-scale and sawmill unit, it is negative. This shows that these units are financially viable with transportation subsidy, but commercially non-viable even with subsidy. To be sustainable, their gross returns should also cover the social costs. That means even with subsidy these units, particularly medium-scale plywood and veneer industries are not suitable to A&N Islands, unless the social costs are met out of their returns.

Table-6.6: Economic Viability of Medium-Scale (Plywood and Veneer) Wood-based industries (Average costs and returns per unit per annum in Rs. in thousands)

A	Fixed Costs: (Annualised)	
	i) Depreciation (10%) on Fixed Capital	7686(3.6)
	ii) Interest on loan taken to set up the unit	1932(0.7)
	iii) Total fixed Costs	9618(3.5)
B	Variable Costs:	
	i) Timber (logs)	105100(48.6)
	ii) Labour (wages and salaries)	18159(8.4)
	iii) Chemicals	10200(4.7)
	iv) Electricity, Diesel, Water, License	16742(7.7)
	v) Total Transportation Costs (including loading, unloading, port clearance and wharefare charges)	23303(10.8)
	vi) Interest (10%) on Working Capital	1133(0.5)
	vii) Excise duty paid (16% of sale value of finished products)	33946(15.7)
	viii) Total variable costs (i to vii)	208583(75.3)
C	Social Cost	58583(21.2)
D	Total Costs (A+B+C)	276784
E	Transportation subsidy	10733
F	Total costs minus Transportation subsidy (D-E)	266051
G	Gross Returns (Veneer, plywood and byproduct)	217833
H	Net Returns over Total Costs (G- D)	-58951
I	Net Returns over Total Costs minus Transportation Subsidy (G- F)	-48218
	Rate of Return (%) over Annualised Total Costs (D)	-21.3
	Rate of Return (%) over Annualised Total Costs (F)	-18.1

Note: Figures in parentheses are percentages to total costs (item D)

Table-6.7: Economic Viability of Small-Scale (sawmills) Wood-based industries (Average costs and returns per unit per annum in Rs. in thousands)

A	Fixed Costs: (Annualised)	
	i) Depreciation (10%) on Fixed Capital	84(1.3)
	ii) Interest on loan taken to set up the unit	50(0.7)
	iii) Total fixed Costs	134(2.0)
B	Variable Costs:	
	i) Timber (logs)	3277(49.9)
	ii) Labour (wages and salaries)	311(4.7)
	iii) Electricity, Diesel, Water charges, License fee, Octroi	334(5.1)
	iv) Total Transportation Costs (including loading and unloading expenses)	484(7.4)
	v) Interest (10%) on Working Capital	62(0.9)
	vi) Total variable costs (i to v)	4468(68.0)
C	Social Costs	1967(30.0)
D	Total Costs (A+B+C)	6569
E	Transportation subsidy	356
F	Total costs minus Transportation subsidy (D-E)	6213
G	Gross Returns (value of sawn timber and by-product)	5398
H	Net Returns over Total Costs (G-D)	-1171
I	Net Returns over Total Costs minus Transportation subsidy (G- F)	-815
	Rate of Return (%) over Annualised Total Costs (D)	-17.8
	Rate of Return (%) over Annualised Total Costs (E)	-13.1

Note: Figures in parentheses are percentages to total costs (item D)

Table-6.8: Economic Viability of Tiny Units (SSI)-Wood Furniture Production (Average costs and returns per unit per annum in Rs. in thousands)

A	Fixed Costs: (Annualised)	
	ii) Depreciation (10%) on Fixed Capital	8.6(0.9)
	ii) Interest on loan taken to set up the unit	7.7(0.9)
	iii) Total fixed Costs	16.3(1.8)
B	Variable Costs:	
	i) Timber (logs)	624(69.2)
	iii) Hired Labour	81(8.9)
	iv) Materials	31(3.4)
	v) Electricity	3.2(0.4)
	vi) Transportation	8.6(0.9)
	vii) Octroi / tax (5%) on the value of timber purchased	10.8(1.2)
	viii) Interest (10%) on working Capital	18.3(2.0)
	ix) Total variable costs (I to vi)	776.9(86.2)
C	Social Costs	108(12.0)

D	Total Costs (A+B+C)	901.2
E	Gross Returns	946.6
F	Net Returns over Total Costs (E-D)	45.4
	Rate of Return (%) over Annualised Total Costs (D)	5.0

Note: Figures in parentheses are percentages to total costs (item D)

Table-6.9: Economic Viability of a (large) Small-Scale Wood Furniture Unit (Average costs and returns per unit per annum in Rs. in thousands)

A	Fixed Costs: (Annualised)	
	i) Depreciation (10%) on Fixed Capital	192(2.9)
	ii) Interest on loan taken to set up the unit	115(1.8)
	iii) Total fixed Costs	307(4.7)
B	Variable Costs:	
	i) Timber (logs)	4180(63.6)
	ii) Hired Labour	552(8.4)
	iii) Materials	240(3.6)
	iv) Electricity	4.4(0.1)
	v) Transportation	18(0.3)
	vi) Octroi / tax (5%) on the value of timber purchased	188(2.9)
	vii) Interest (10%) on working Capital	150(2.3)
	viii) Total variable costs (i to vii)	5332.4(81.1)
C	Social Costs	937.0(14.2)
D	Total Costs (A+B+C)	6576.4
E	Gross Returns	6903
F	Net Returns over Total Costs (E- D)	326.6
	Rate of Return (%) over Annualised Total Costs (D)	5.0

Note: Figures in parentheses are percentages to total costs (item D)

It can be seen from Table-6.10 that in general, taking all wood-based industries into account, their social costs and benefits have been worked out. Table-6.10 shows that at the aggregate level net benefits (per annum) of these industries are negative. And out of the total revenue of Rs.40 crores, a substantial part (more than Rs.10 crores) goes to the central government. And it is not clear how much of the total disbursements go to the local people and to the local economy. The total disbursement figures are as provided by A&N Islands Chamber of Commerce and Industry. Ground-level findings suggest that locals are not getting this much benefit from wood-based industries. A clear analysis and understanding is required before arriving at any conclusion. Once it is done, net benefits would decline further! Also whatever

social costs have been estimated here, are a fraction of the total social costs of forest degradation and decline.

Table-6.10 also shows the social costs and benefits at the existing level of logging operations. If timber extraction were reduced, i.e., excluding the demand from medium-scale units, the social costs would decline substantially. In fact, that much social benefit is foregone as a result of unsustainable timber extraction in the Islands.

Table–6.10: Economic Viability of Wood-based Industries operating in Andaman & Nicobar Islands at the Aggregate Level (costs and benefits per annum in crores of rupees)

1.	Average area of forests (in hectares) harvested per annum to meet the average annual demand of 1,04,201 cbm of timber by wood-based industries	3,077.4
2.	Costs: i) Total Social Costs (estimated social and global benefits foregone)** ii) Total disbursements made by wood-based sector in the Islands iii) Transportation Subsidy iv) Total (i+ii+iii)	 39.06 40.00 5.89 84.95
3.	Benefits: a) Revenue through timber price, royalty and excise duty b) Employment	 40.00 21.91

** Kumari has estimated total economic value (TEV) of Malaysian forests by studying a sample forest area of the country. In her estimate, TEV includes total social benefits (TSB), i.e. hydrological (agricultural), non-timber forest products (NTFP), recreation, water and fish; total global benefits (TGB), i.e., endangered species and carbon stock; and total private benefits (TPB), i.e., value of timber. To estimate the social costs we have taken TSB and TGB. The total TSB and TGB estimated by Kumari is M$ 10578 per hectare. We have converted M$ into Indian Rupees, to arrive at the social cost in our study, which is around Rs. 1,26,936 per hectare. Further, to arrive at social costs we have taken the average per hectare timber harvested by the forest department and A&NIFPDC (average of five years -1993-94 to 1997-98), which was around 33.86 cbm per hectare per annum. We have also taken the average timber per annum supplied to wood-based industries in the Islands (average of five years – 1993-94 to 1997-98), which is around 1,04,201 cbm. We have divided the average quantity (1,04,201 cbm) of timber supplied by 33.96 cbm (average timber harvested per hectare per annum) to arrive at the forest area required to meet the timber demand from wood-based industries. And finally this has been multiplied by social cost figures (Rs. 1,26,936 per hectare) derived from Kumari to estimate the social cost.

	c) Total (a+b)	61.91
4.	Net Benefits (3c-2 iv)	-23.04

Note: Social cost (social benefits foregone) estimated by Kumari = M$10578 per hectare. We have converted it into Indian rupees which is around 1,26,936 rupees. The total area harvested to meet 1,04,201 cbm of timber by wood-based industries = 3077.4 hectares. Estimated social cost per hectare (Rs.1,26,936) has been multiplied by 3077.4 hectares to get the total social costs.

Source: Item No.2. i) = Kumari (1995)

Item No.2. ii) and 3 a) = Chamber of Commerce & Industry, A&N Islands, Port Blair,2001.

Item No.2.iii) = Department of Industries, Port Blair.

Item No. 3 b) = Estimated.

7. Wood-Based Industries and Their Impact on Ecology and Environment

One could argue that it might not be right to blame only the wood-based industries for forest degradation and decline. Any entrepreneur would try to maximise his private net benefits, and to achieve this he would try to increase production by utilizing the resources like timber, and minimising the paid out costs. He would also try to maximise his private benefits within the policy framework. It is the policy perspective in operation, which matters. In other words, on the one hand policy perspective could be to enhance social benefits through increased industrial production, and on the other, concern over social costs of such production. One has to have a clear policy perspective and the guidelines in this regard. For instance, ANIFPDC was established during 1977 on the recommendations of National Commission on Agriculture (1972) with a view to developing inaccessible forest areas and conversion of low value mixed forests into plantations of quick growing species (ANIFPDC, Port Blair). And later the Corporation is being blamed for forest degradation and decline. Of course, the Corporation has plundered the virgin forests, and converted the harvested area into rubber and palm oil plantations, which are a social liability without much of social benefits. Around 30,788 hectares of forest land in little and North Andaman Islands have been leased out to the Corporation for timber harvesting, and regenerating the harvested area through commercial plantations. The Corporation has to pay royalty to A&NI Administration for harvesting timber in addition to the lease amount. It deals with scientific harvesting and regeneration of forest on the basis of sustained yield forestry as per the working plans. And the Corporation dispose of the harvested timber to wood-based industries at prices fixed by A&N Administration from time to time.

Forests are sources of raw materials to industry, but are also vital for ecological importance, catchment protection, wildlife conservation (biodiversity), erosion control and material for non-industrial activities (fuel, agriculture, fodder, poles, thatch, canes, NTFP, etc.). But logging is undertaken without adequate care of protecting timber, which remains. Also roads built to open up new areas for logging facilitate (migrant) encroachers, and leads to soil erosion. Further, it has been pointed out that in tropical countries, the estimates of "Annual Allowable Cut" are based on assumptions concerning re-growth which, may not be supportable (Ewing and Chalk, 1988).

Lack of clear understanding of forest uses and functions, and proper valuation of forest resources has resulted in its abuse and bad management. Forest resource use does not come under the full purview of market mechanism, wherein price could reflect the value of forests. Forest products, which are extracted, are being marketed after value addition. While extraction, the total value or the true value of forest resources is not taken into account, and hence the price for its product reflects its partial value. Property rights in forest resources are not clear and in many cases hardly exist, resulting in its under valuation or no valuation at all. For forest to be managed on sustainable ways, their total valuation is one among the basic requirements.

For ecological balance and eco-systems of the islands to be maintained, it is essential to protect and maintain their forests. By the metabolic processes of forests, the atmospheric balance is maintained, run-off controlled, surface water conserved and percolation sustained. The poor soils of the Islands are enriched, and their erosion prevented. Control of siltation protects the coral beds. It also maintains the soil conditions necessary for the survival of the mangroves. The organic nutrients leached into the surrounding sea sustain both mangrove and marine eco-systems (Saldanha, 1989). The other strategic and ecological relevance is that although the land area of A&N Islands is only 8,249 sq. km., the Exclusive Economic Zone of the Islands extending to 200 nautical miles from the shoreline, is 75 times larger, approximately 6 lakh sq. km. This is an enormous real estate comprising 30 per cent of the Exclusive Economic Zone of India (Saldanha, 1989).

Further, due to unsustainable timber harvesting, the rich marine resources and the coastal areas of the Islands will also get affected. The western side of the Andaman Islands has a coral reef running intermittently for about 350 km. There is an abundance of fish in the shallow waters as well as in the deep sea. A conservative estimate puts the possible annual catch at 50,000 tonnes. Shrimps, lobsters, crabs and mollusks add to the variety and abundance (Saldanha, 1989).

8. Conclusions and Suggestions

Conclusions:

The study has aimed at understanding, analysing and commenting on the role, effects and issues related to transportation subsidy provided by the Government of India to wood-based industries operating in Andaman and Nicobar Islands. It has tried to examine both the positive as well as the negative aspects of these industries. An attempt has been made to analyse the economics of wood-based industries with transportation subsidy as well as without it. An attempt has also been made to assess how much these industries contribute to national, and particularly to local economies, and who are the beneficiaries of transportation subsidy. Further, an assessment has also been made about the negative effects of these industries on local environment and ecology in terms of deforestation, soil erosion, and loss in biological diversity, as well as effect on local farming and livelihood systems.

The study is based on both secondary and primary data. Secondary data were collected from official records, published and unpublished documents and reports of the Forest Department, Industries Department, wood-based industries and other related government departments in Andaman and Nicobar Islands. Data and information were also collected through discussions with the officials of industries and forest departments, and personnel of wood-based industries. Primary data were collected at household level, community level and village level \ regional level across Andaman Islands. It was collected through discussions and with the help of brief structured questionnaires. Personal observations and assessment were also used wherever they were reliable and justifiable.

In total 35 wood-based industries covering medium-scale plywood/veneer units (2), composite unit (1), sawmills (12), furniture and tiny handicraft units (20) operating across Andaman group of Islands were selected for the study. From the selected units, data related to all the components of costs and returns, direct and indirect employment created, and revenue to the government were collected and analysed.

As far as social costs are concerned, they have been assessed in terms of deforestation, threat to biological diversity and reduced access of local communities to forest resources. It should be mentioned that assessing social costs related to forest ecosystems is a Herculean job.

Above all, forests are resources, which cannot be restored to their original (virgin) form, once they are damaged or destroyed. In other words, their nature of irreversibility makes it much more difficult and complicated to estimate the social costs of their damage or destruction. What we have assessed here is a fraction of total social costs of forest ecosystem destruction or damage, which is also based on limited knowledge and data available. Assessment of social benefits was in terms of income and employment created by these industries among local communities, and revenue to the government.

As per official records and published reports, area under forests of Andaman and Nicobar Islands has declined from 740 thousand hectares (93.7 per cent of reporting area) during 1970-71 to 691 thousand hectares (87.5 per cent of reporting area) during 1996-97. This could be due to an increase in net sown area during the same period. Net sown area was 18 thousand hectares (2.3 % of reporting area) during 1970-71, which has increased to 38 thousand hectares (4.8 per cent of reporting area) during 1996-97 ***(Section 3.1).***

The Andaman Tropical Evergreen Forests and the Andaman Moist Deciduous Forests form a mosaic on the lower hills of the Islands. Virgin Evergreen Forests are found on the central hills of Great Nicobar. White Chuglum (Terminalia alata) and padauk (pterocarpus dalbergioides) are important species of the Moist Deciduous Forests, which have been largely exploited for commercial purposes. The Giant Andaman Evergreen forests are almost extinct as a result of our promotional policy on settlements and wood-based industries in the Islands. The Andaman Moist Deciduous forests, which are open canopy forests, are being largely exploited for commercial purposes, mainly by wood-based industries ***(Section 3.2)***.

The share of forestry and logging in state domestic product (SDP) of the Union Territory is substantial, though it has declined during the period 1980-81 to 1994-95. Across sectors, it occupies second place after agriculture. In fact, the share of agriculture has declined much more than the share of forestry and logging sector, declined from 44.2 per cent in 1980-81 to 33.9 per cent in 1994-95 ***(Section 3.3).***

There are 236 small-scale wood-based industries in the Islands. When compared with other types of industrial units, their share in the total small-scale industries (SSIs) in the Islands is more than 17 per cent. In terms of direct employment, wood-based SSIs have employed 1,402 persons, which is 21 per cent of the total employment by SSIs in the Islands. In

addition to this, the three medium-scale units which are producing plywood and veneer directly employ around 2000 persons ***(Section 4.2)***.

As far as subsidy is concerned, medium-scale units have cornered a large chunk, 87.4 per cent of total subsidy, followed by saw mills, around 12 per cent of total subsidy, disbursed during 1995-96 to 1999-2000. Further, 99.44 per cent of the total subsidy disbursed during this period was for wood-based industries. A sum of Rs.2,948.34 lakhs has been distributed during this period to wood-based industries operating in the Islands. This works out to an average of Rs.589.67 lakhs per annum during the five-year period, 1995-96 to 1999-2000 ***(Section 4.4)***.

There are many stakeholders in A&N Islands forests and forest resources. There are settlers, in-migrants, wood-based industries, forest department, ANIPFDC, A&N Islands administration, aboriginals, environmentalists, poachers and the central government ***(Section 5.4).***

During 1990-91 to 1997-98, the Forest Department and ANIFPDC harvested around 27,505 hectares of forest area. And during 1993-94 to 97-98, different stakeholders harvested around 5,77,104 cbm of timber from the Islands' forests. Out of this, around 53 per cent and 37.6 per cent is by the Forest Department and ANIFPDC respectively, which was mainly to meet the demand/requirement by wood-based industries, particularly from medium-scale plywood and veneer units. Around 9 per cent of the total harvested timber were by the private parties on payment of royalty. Free and concessional royalty rate to locals (mainly settlers) constitute another 0.7 per cent of the total timber harvests during the same period. Privileges and concessions to settlers and locals also exert pressure on forests of the Islands ***(Section 5.4).***

More than 82 per cent of the total demand/requirement of wood-based industries is by the medium-scale units. Sawmills' share in this demand is 15 per cent. And furniture units' demand is just 2.1 per cent. This shows that if the medium-scale units are closed down, the requirement/demand for timber from the existing sawmills (SSIs) and furniture units could be easily met out of the existing worked forest areas ***(Section 5.4).***

Net returns of medium-scale units are negative over total costs, and the rate of return is –0.2 per cent, which is not encouraging. It is transportation subsidy, which adds to the unit's substantial gains. When transportation subsidy is subtracted from total costs, net returns would be positive and increase substantially, and the rate of return will be around 5 per cent. The low rate of return is due to cost of timber and excise duty, which is around 49 and 16 per cent of total costs respectively. Moreover, these units are operating below their full licensed capacity, around 15,628 Cbm, against their full licensed capacity of around 22,000 Cbm ***(Section 6.1.)***.

As compared with medium-scale units (plywood and veneer), the economics of sawmills (SSIs) is quite different. Some of these sawmills used to produce match splints, pencil slats etc., which they have stopped due to increase in the cost of production, and difficulty selling their products in the mainland. Now all of them have become saw millers. Commercially these units are viable, as their net returns over all costs, including depreciation, and excluding transportation subsidy, are substantial, being Rs.796 thousand per unit per annum. Even if transportation subsidy is removed, the net returns are positive and substantial, with rate of return as high as 17.3 per cent. If transportation subsidy were included, the rate of return would jump to 27.1 per cent, which is very impressive. Total transportation costs of these units, including loading and unloading, are just 10.5 per cent of the total costs. A transportation subsidy makes hardly any difference to the total costs. More than this, operators are getting positive net returns, even without subsidy ***(Section 6.1.).***

There are around 200 tiny furniture units, both wood-based and cane based, which are playing an important role in the economy of these Islands. Even without any kind of subsidy, the net returns of these units are positive, with rate of return as high as 19.3 per cent over all costs ***(Section 6.1.).***

The other type of tiny units is the cane-based furniture producing units, which are also largely family based, depending on local forests for canes. In their total variable costs, the cost of canes is around 12 per cent. Though these units are family based, the cost of hired labour constitutes around 43 per cent of total variable costs. These units too are commercially viable, with rate of return as high as 126.4 per cent over total variable costs ***(Section 6.1.).***

It is not only the tiny units that are found in the furniture sector. Even big SSIs are involved in this business. In such cases net returns are substantial and positive even over all costs, with a rate of return as high as 22.4 per cent over total costs. This type of units may not require any kind of subsidy or support from the government as their returns cover all costs ***(Section 6.1).***

With social costs, net returns of wood-based industry declines substantially, and in the case of medium scale and sawmill unit, it is negative. This shows that these units are financially viable with transportation subsidy, but commercially non-viable even with subsidy. To be sustainable, their gross returns should also cover the social costs. In particular, medium-scale plywood and veneer industries are not suitable to A&N Islands, unless the social costs are met out of their returns **(Section 6.2).**

Further, in general, at the aggregate level taking all wood-based industries into account, net benefits (per annum) of these industries is negative ***(Section 6.2)***.

Policy Suggestions:

Government may offer incentives such as subsidies and direct grants to encourage investments in industries. This may be appropriate as a policy tool to stimulate development, provided a proper economic evaluation of the project is undertaken, which includes all the relevant costs, as well as the benefits (such as regional development), which may accrue outside the project itself.

Andaman and Nicobar Islands ecology, local economy (socio-economic) and location (strategically sensitive) make every one to think about second best or even third best alternative or policy intervention. Sweeping statements or policy prescriptions may be harmful in the long run rather than becoming solutions. One has to take a holistic approach to address all interrelated issues of the Islands. If anything needs to be changed or done, it should be cautiously handled, and policy changes can be brought in phase-wise.

Though our policy suggestions are based on our study in the Islands, we have also taken note of the Supreme Court judgement / order of 7th May 2002 with regard to Andaman and

Nicobar Islands forests, ecology and wood-based industries. The Supreme Court order says that no licenses are issued to new private sawmills, and licenses of the existing sawmills should not be renewed after 31st March 2003. The local demand / requirement of timber should be met through government sawmills (Chatam and Betapur sawmills). No doubt it is a good decision. But at the same time, government sawmills are huge and may have to be downsized. Also, government sawmills are subjected to malpractices while supplying timber to locals. In the absence of private sawmills, if government sawmills are inefficient in meeting the raw materials requirement of tiny furniture and handicrafts units, which are local in nature, the local economy will be affected.

Further, the Supreme Court has suggested that medium-scale wood-based industry (plywood, veneer, match splint) should be relocated in the mainland away from forest areas. In fact, these industries are not required for the Islands. But the order is silent on the ANIFPDC. It is also not required for the Islands, and should be taken away. Since tree felling is banned in little Andaman, where the corporation has its base, it is no longer required. The order is also silent on the red oil palm plantations in little Andaman, which are also not required. In general, the Supreme Court order is a good intervention to safeguard the fragile Islands.

On transportation subsidy to wood-based industries, the policy options could be:

Since net returns of medium-scale plywood and veneer units are negative on all costs (fixed and variable costs excluding transportation subsidy), these units are no longer commercially viable. If transportation subsidy were taken into account these units would become commercially viable. But even still the rate of return is not encouraging. Their social costs are also much more than the social benefits and these units are economically non-viable. Also since the market for plywood and veneer is in the mainland, there could be no justification for these units to continue on A&N Islands timber. Further, since the Supreme Court has ordered (order dated 7th May 2002) relocation of these units elsewhere in the mainland away from forest areas, there is hardly any justification for transportation subsidy to these units.

But the options could be:

Medium-scale plywood and veneer producing units could be encouraged to import timber from foreign markets, and they can sell the finished products wherever they like. There could be no subsidy of any kind, and these industries could also be exempted from paying excise duty. As it has been mentioned, without subsidy, if excise duty is exempted, the units' net returns will increase, and they can operate on viable ways.

The other option could be, subsidy either equivalent to or 50 per cent of the existing 90 per cent could be continued on timber imported from foreign countries. And there will also be excise duty on the output sold. Plantation timber could also be used by these industries, and such timber could also be imported from the mainland.

Further, within the developing countries, Latin American countries have comparative advantage in industrial plantations. They are producing plantation timber for world industries very efficiently, and for India to compete with them will be difficult. Though India has vast areas of plantations, but producing low growth and poor quality timber. It would be advantageous to wood-based industries in India to import good quality timber from these countries. This would also help us to maintain our forests and ecology in good condition.

Sawmills may be required to meet the local demand for timber. If government sawmills can meet this demand efficiently, there is no need for even these units. In fact, the Supreme Court order of 7th May 2002 says that there shall not be any extension or renewal of licenses even to the existing sawmills beyond 31st March 2003. In this situation the government sawmills would have to be more efficient. But government sawmills are subject to limitations. In that case, the existing sawmills may be allowed to continue, but no license may be issued for new sawmills. Further, sawn timber should not be allowed to export to the mainland. And since net returns over all costs of these units are positive, there could be no need of any subsidy to them.

These policy suggestions could be useful in view of the relevance and importance of wood-based industries in terms of income and employment to local communities, and revenue to the government. Appropriate policy measures need to be taken phasewise. With the above policy changes or interventions, felling of trees in the Islands would come down, and this will be helpful in protecting the industry as well as local people. But it is also important that:

1. Clear and appropriate working plans need to be prepared and implemented.
2. Protection of forest against poaching and illegal felling should get top priority, and strict laws and rules should be enforced.
3. Patrolling forests is a tough and challenging job in the Islands, hence special efforts should be made with appropriate infrastructure and machinery to safeguard the forest resources.
4. Encroachments should be checked, and handled firmly. For this it is very important to check the influx of streams of population flows from the mainland.
5. Andaman and Nicobar Islands could be treated as a special area, and government of India may have a policy to maintain its stability in terms of income and employment only to local residents. For this some amount of subsidy could also be provided in the budget. This is required in view of the importance of these Islands, both strategically and ecologically (rich in biodiversity).
6. Tiny units, particularly furniture and handicrafts units, should be encouraged even with some kind of subsidy and support in the marketing of their products.
7. No new forests should be worked for timber harvesting, and the demand/requirement by existing sawmills and furniture units could be met out of the existing worked forest areas.
8. Government sawmill at Chatam and Betapur could also supply the required timber by furniture and handicrafts units at concessional rates. In that case it may not be necessary to have private sawmills in the Islands.
9. No felling of trees in non-worked areas.
10. Privileges and concessions to settlers and others could be selective and slowly be discontinued.
11. Locals residing in rural areas could be encouraged and supported to regenerate degraded lands, and the biomass (timber, firewood, bamboo, canes, thatch, etc) from the regenerated lands could be shared on the principles of Joint Forest Management, being practiced in the mainland.

Appendix-1

CONCESSIONS AND PRIVILEGES TO SETTLERS AND LOCALS

1.	Free for Settlers (only for self use and not for sale)	- Once in life time - Once in five years - Every year	- 15 cbm timber - 3 cbm timber - 1 cbm timber 20 posts 100 *ballies* 200 bamboos 100 mtr. Cane 200 thatch leaves 2 cart firewood
2.	For others (non-settlers) and for bonafide use Every year and at royalty rate		1 cbm timber @ Rs.6000/cbm 20 posts @ Rs.7/post 100 *ballies* @ Rs.1.50/*bally* 200 bamboos @ Rs.12/100 100 mtr. Cane @ Rs.0.14 per mtr. 200 thatch @ Rs.2/100 pieces 2 cart firewood @ Rs.6/cart

- Settlers can also buy at royalty rate beyond their free quota
- To get the forest products free of cost, the settlers have to first apply to the local forest officer, then it will be verified. Rs.5 as timber fees and Rs.5 for other products have to be paid to the Forest Department to get the permit. Then a site will be shown from which the beneficiaries have to bring their allotted forest products on their own, i.e., at their own cost.

Appendix: 2

LIST OF COMMERCIAL AND NON-COMMERCIAL TIMBER SPECIES OF A&N ISLANDS

I COMMERCIAL

I(A) ORNAMENTAL WOODS

	Vernacular Name	Scientific Name
1.	Chooi	**Sagerea elliptica**
2.	Marble wood	*Drospyros marmorata*
3.	Padauk	*Prerocarpus dalbergioides*
4.	Satin wood	*Murraya exotica*
5.	Silvergrey	*Terminalia bialara*

I (B) HARDWOODS

1.	Badam	
2.	Black chuglam	*Terminalia manii*
3.	Chakrisia	*Chakrasia tabularis*
4.	Gangaw	*Masua ferrea*
5.	Gurjan	*Depterocapus species*
6.	Hill mohwa	*Madhuca butyracea*
7.	Jhingam	*Pajenalia rhedii*
8.	Jungli aam	*Mangifera andamanica*
9.	Koko	*Albizia lebek*
10.	Lakuch	*Artocarpus gomeziana*
11.	Lalchini	*Amoora wallichi*
12.	Lal bombwe	*Planchonia andamanica*
13.	Mau	*Duabanga soneratioides*
14.	Nabbe	*Lennea grandis*
15.	Poon	*Calophyllum ionophyllum*
16.	Pymna	*Lagerstroemia hypoluca*
17.	Red thingan	*Prunus mariabanica*
18.	Red dhup	*Parishia insights*
19.	Sea mohwa	*Manilkara littoralis*
20.	Toungpinne	*Artocarpus chaplasha*
21.	Thienkla	*Nauclea gageana*
22.	White thingan	*Hopea odorato*
23.	White chuglum	*Terminalia bialata*
24.	Ywegi	*Adenanthera pavonina*

I (C) SOFTWOODS

	Vermacular Name	Scientific Name
1.	Ailanthus	*Ailanthis kurzii*
2.	Bakota	*Endospermum chinense*
3.	Bombeza	*Albizia stipulata*
4.	Didu	*Bombax insignis*
5.	Evodia	*Evodia glabra*
6.	Letkok	*Sterculia alata*
7.	Lambapatti	*Sideraxylon longepetiolata*
8.	Myanin	*Zanthaxylum badrunga*
9.	Papita	*Pterocymbium tinctorium*
10.	Thitpok	*Tetrameles nudiflora*
11.	White dhup	*Canarium euphyllum*

II NON-COMMERCIAL WOODS

1.	Ambara	**Spondias mangifero**
2.	Chinyok	*Bracantomalum mangifera*
3.	Gular	*Ficus Species*
4.	Jaiphal	*Myristica species*
5.	Jamun	*Schizigium species*
6.	J/lakuch	*Antiaris taxicana*
7.	Jungli neem	*Ganophyllum falcatum*
8.	Kattaphal	*Baccaria sapida*
9.	Karanj	*Pongamapunnata*
10.	Lai chilka	*Sterculia villosa*
11.	Letauk	*Aglaia andamanica*
12.	Lephew	*Xanthophyllum andamanica*
13.	Sambium	*Dillenia species*
14.	Siris	*Enterolobium saman*
15.	Thitkandu	*Pometia pinnata*

Appendix: 3

SALE PRICE OF ALL OTHER MILL & FOREST PRODUCTS OF ANDAMAN FOREST DEPARTMENT WITH EFFECT FROM 1.4.1997 TILL FURTHER ORDERS

a.	Cane per Quintal	Rs.	278/-
b.	Charcoal per Quintal	Rs.	406/-
c.	Sawn Fuel (for cord of 3.5 Cum) (for public & others)	Rs.	870/-
d.	Sawn Fuel (for bundle of 46 cm dia) (for public & others)	Rs.	30/-
e.	Sawn Fuel for Forest Workers (per cord of 3.5 Cum)	Rs.	638/-
f.	Sawn Fuel for Forest Workers (for bundle of 46 cm dia)	Rs.	21/-
g.	Saw Dust per Cum	Rs.	2/-
h.	Seasoning Charges for Cum	Rs.	1438/-
i.	Planing of Timber for Square metre	Rs.	12/-
j.	Revetting of Timber per metre (16cm x 2.5 cm)	Rs.	12/-
k.	Preservation treatment charges		
	1. Special grade Kiln Seasoning with grade I preservative	Rs.	4408/-
	treatment/Cum	Rs.	2761/-
	2. Grade I preservative treatment/Cum	Rs.	2320/-
	3. Grade II preservative treatment/Cum	Rs.	1682/-
	4. Grade III preservative treatment/Cum		

Appendix: 4

Concessions and Privileges:

The cutting, sawing conversion or removal of trees or collection, manufacture or removal of forest produce in or from a forest may be permitted under and in accordance with the terms and conditions of a license or a permit issued in this behalf under these rules.

Licenses under these rules may be granted in the following cases: (i) to bonafide inhabitants of the villages in the vicinity of forest and to the persons resident in Port Blair Municipal area who are in occupation of agricultural land allotted to them by the appropriate authorities of the Andaman and Nicobar Administration, and who are not entitled for the timber free of royalty under sub-rule (ii) of rule 4 of these Rules, licenses shall be issued by the Divisional Forest Officer or his nominees subject to the payment of royalty of such timber as fixed by the Government from time to time and subject to the terms and conditions of said license, to cut, saw, convert or remove trees and other forest produce except those declared to be Reserved under Sub-section (a) of section 3 of act, for their "bonafide" domestic use only.

Application for issue of license for removal of timber on payment for construction of new houses shall be made to the Divisional Forest Officer, through the Tehsildar or other Revenue Official authorised for the purpose by the Government, who shall certify that the applicant is a bonafide agriculturist entitled to get timber on payment under this sub-rule and that he does not already possess a house and that he has got a land allotted in his name for the construction of a new house. Application for repairs to a house may be made to the Divisional Forest Officer concerned through the Tehsildar or other revenue official authorised by the Government who shall certify that the applicant is a bonafide agriculturist eligible for timber on payment under this sub-rule and that the requirement of timber of repairing his house is genuine. The following are the limits up to which the timber must be removed by a licensee:

(a) 15 (fifteen) cubic metres of timber in round for construction of a new house once,
(b) 6 (six) cubic metres of timber in round for repair to a house once in five years, and
(c) 1 (one) cubic metres of timber in round for construction of a dinghy and/or manufacturing of agricultural implements to be used solely for domestic purpose and not for trade once in five years.

A fee of Rs.5 (rupees five only) shall be charged for each permit to be issued, in addition to the royalty that may be chargeable. The permit fee shall be deposited in advance with the Range Officer having jurisdiction. The choice of the locality from where the licensee shall extract the timber shall rest with the Divisional Forest Officer who shall mark the timber or get the same marked through his nominee. The area where the tree would be marked shall however as far as possible be close and nearest to the residence of the permittee/licensee. The licensee shall accept the tree marked by the Divisional Forest Officer or his nominee and extract the entire quantity of timber that will be available from the marked tree to be felled after the same is marked by the Divisional Forest Officer or his nominee.

(i) The licensee shall have to deposit the full royalty for the timber in advance, any quantity required in excess of the above limits will be sanctioned by the Chief Conservator of Forests in consultation with the Deputy Commissioner on the merits of the case.

(ii) To occupiers of agricultural land including settlers settled under colonization scheme who reside in village outside the Port Blair Municipal area, to religious, cultural, recreational and educational institutions and to village panchayats, license shall be granted by the Divisional Forest Officer or his nominee, free of royalty to cut, saw, convert, remove trees, other than this declared to be Reserved under sub-section (a) of section 3 of the Act, for their bonafide domestic use only.

Applications for issue of permit to cut timber free of royalty shall be submitted through the Tehsildar or other Revenue Official authorised by the Government, who shall certify that the persona concerned is a bonafide agriculturist entitled for timber free of royalty under this sub-rule and that he does not already possess a house/his house is in bad state requiring repairs and that he has got land allotted in his name for the construction of a house/on which the house needing repairs is standing. The following are the limits of the quantity of timber which may be issued to a village or a village panchayat or any of the institutions mentioned above, free of royalty, for their bonafide use and not for sale:

(a) 15 (fifteen) cubic metres of timber in round for construction of a new house once,

(b) 6 (six) cubic metres of timber in round for repair to a house once in five years, and

(c) 1 (one) cubic metres of timber in round for construction of a dinghy and/or manufacturing of agricultural implements to be used solely for domestic purpose and not for trade once in five years.

A fee of Rs.5 (rupees five only) shall be charged for each permit to be issued, but no royalty is to be charged. The permit fee shall be deposited in advance with the Range Officer having jurisdiction. The choice of the locality from where the licensee shall extract the timber shall rest with the Divisional Forest Officer who shall mark the timber or get the same marked through his nominee. The area where the tree would be marked shall however as far as possible be close and nearest to the residence of the permittee/licensee. The licensee shall accept the tree marked by the Divisional Forest Officer or his nominee and extract the entire quantity of timber that will be available from the marked tree to be felled after the same is marked by the Divisional Forest Officer or his nominee.

(iii) License to the bonafide agriculturists in possession of agricultural land residing outside municipal area to extract minor forest produce free of royalty on a permit issued by the Range Officer concerned as per the following limits per family:

(a)	Firewood	:	Two carts per year
(b)	Bamboo	:	Five hundred numbers per year
(c)	*Ballies*	:	One hundred numbers per year
(d)	Posts	:	Twenty numbers per year
(e)	Thatching	:	Two thousand numbers per year (leaves including Dhanipalm and Pandanus)
(f)	Canes	:	Two hundred numbers per year

A fee of Rs.5 (rupees five only) shall be charged for each permit to be issued, but no royalty is to be charged. The permit fee shall be deposited in advance with the Range Officer having jurisdiction.

(iv) Licenses for trade purposes and for purposes other than those covered by the above sub-rule shall be issued by the Divisional Forest Officer at rates of royalty as are fixed by the Government from time to time.

5(i) Collection of minor forest produce for public functions such as Republic Day, Independence Day, Gandhi Jayanti or for other public functions shall be allowed free of royalty subject to the permission of the Chief Conservator of Forests in each case

on the application of the department concerned collection of minor forest produce required for other departmental work shall be allowed only after payment of royalty of the rates prescribed by the Government from time to time.

(ii) For the purpose of sub-rule (I) Chief Conservator of Forests may allow free grant up to the value of Rs.500/- in each case, as authorised under Government of India, Ministry of Food and Agriculture No.6-18/59 F,11, dated 7.9.1959. Cases beyond the competency of the Chief Conservator of Forests shall be referred to the Lt. Governor for sanction.

If the Conservator of Forests, having jurisdiction, is at any time, of opinion that the supply of any kind of forest produce in an area is sufficient only to meet local requirement he may, by an order in writing, prohibit the removal of such forest produce beyond the limits of any locality specified therein and such forest produce shall not be removed beyond such limits.

The Divisional Forest Officer may grant temporary license in the forest area up to 2 ha. with the approval of the Conservator of Forests having jurisdictions to the contractor who has been allotted any work in the forest concerned for keeping the labourers and equipments on payment of license fee of Rs.5 (rupees five only) and payment of land rest of Rs.5 (rupees five only) per ha. per annum or part thereof such license will be for one year only at a time and the grant of such licensee shall not confer on licensee/permitee any right on or over the land. The licensee shall be responsible to ensure that no encroachment by any of his workers and others takes place in or outside the area allotted and for the purpose of the section 33 of the act, any encroachment by him or by his staff, employees or workers shall be deemed to be an infringement of the Rules.

The scheduled tribes of Andaman and Nicobar Islands shall collect their actual requirement of forest produce from the forests for their bonafide domestic use without any restriction.

Source: Andaman and Nicobar Administration, Working Plan for Mayabandar Forest Division (1997 to 2007), Written by Prakash M Bhat, Port Blair.

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