INTRODUCTION

Geographic and economic background

With an area of 328.72 million ha, India is the seventh largest country in the world. It shares borders with Bangladesh, Bhutan, China, Myanmar, Nepal and Pakistan. The climatic and topographic features are diverse. The country is bounded by the Great Himalayas in the north, the Indian Ocean in the south and transversed by the Tropic of Cancer in the centre. The country can be divided into broad four regions – the great mountain zone; the plains formed by the Indus, Ganges and Brahmaputra rivers; the desert region; and the southern Peninsula. The alluvial plains of the Ganges and Indus (with their tributaries) are the most fertile and densely populated lands. The country is divided administratively into 28 states and seven centrally administered territories.

Agriculture is the dominant land use and covers about 143 million ha (43 percent of the total land area). The total forest cover is 63.7 million ha, which constitutes 19.4 percent of the total land area (FSI 2000). In addition, scrub, which has a crown density of less than ten percent, occupies about 5.2 million ha. The tropical dry and moist deciduous forests make up about 70 percent of the forest cover (FSI 1987). Other forest types occupying significant areas include tropical rain forests, montane subtropical and temperate forests. The distribution of forests across the country is highly uneven (FSI 2000). Details of land use in India are shown in Table 1.

<table>
<thead>
<tr>
<th>Land-use category</th>
<th>Area (million ha)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net shown area (agriculture)</td>
<td>142.50</td>
<td>43.35</td>
</tr>
<tr>
<td>Forest (legal)</td>
<td>76.52</td>
<td>23.27</td>
</tr>
<tr>
<td>Cultivable wasteland</td>
<td>16.00</td>
<td>4.87</td>
</tr>
<tr>
<td>Pastureland</td>
<td>12.00</td>
<td>3.65</td>
</tr>
<tr>
<td>Miscellaneous tree crops and groves</td>
<td>3.00</td>
<td>0.91</td>
</tr>
<tr>
<td>Urban and developmental use</td>
<td>21.88</td>
<td>6.66</td>
</tr>
<tr>
<td>Uncultivable wasteland and others</td>
<td>32.83</td>
<td>9.99</td>
</tr>
<tr>
<td>Fallow land</td>
<td>24.00</td>
<td>7.30</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>328.73</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

Source: NFAP (1999)

1 Former Director of Forests of India, New Delhi, India.
2 Chief Conservator of Forests, State of Goa, India.
The area of land legally designated as forest land does not tally with actual forest cover because it includes barren lands that have been legally classified as forests. Cultivable wastelands and fallow lands are areas that have the potential to grow crops but have remained fallow for many years. On uncultivable wastelands (for example, water bodies, rocks, mountains and deserts), biomass production is impossible.

India’s population is 1.03 billion, of which 741 million (72 percent) reside in rural areas (Census India 2001). With 324 persons/km², India is one of the most densely populated countries in the world. To ensure food security, productivity has been increased through improved technologies and more efficient irrigation facilities. The area under agriculture increased from 118 million ha to 143 million ha during the second half of the twentieth century. The per capita forest area is only 0.06 ha. Small-scale and marginal farmers, who constitute 78 percent of the farming community, possess only 32 percent of the operational land (Table 2). The cattle population of the country increased from 252 million head in 1951 to 445 million head in 1992, of which approximately 30 percent grazed in the forests. The forests in India are, therefore, under tremendous pressure.

<table>
<thead>
<tr>
<th>Category of holdings</th>
<th>No. of holdings (million)</th>
<th>Area (million ha)</th>
<th>Average size (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marginal (&lt; 1 ha)</td>
<td>63.4 (59.4%)</td>
<td>24.9 (15%)</td>
<td>0.39</td>
</tr>
<tr>
<td>Small (1-2 ha)</td>
<td>20.1 (18.8%)</td>
<td>28.8 (17.4%)</td>
<td>1.43</td>
</tr>
<tr>
<td>Semi-medium (2-4 ha)</td>
<td>13.9 (13.1%)</td>
<td>38.4 (23.2%)</td>
<td>2.76</td>
</tr>
<tr>
<td>Medium (4-10 ha)</td>
<td>7.6 (7.1%)</td>
<td>44.7 (27.0%)</td>
<td>5.90</td>
</tr>
<tr>
<td>Large (&gt; 10 ha)</td>
<td>1.7 (1.6%)</td>
<td>28.7 (17.4%)</td>
<td>17.33</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>106.7 (100%)</strong></td>
<td><strong>165.5 (100%)</strong></td>
<td><strong>1.57</strong></td>
</tr>
</tbody>
</table>

Source: Anon (2000)

Concerned with the depletion of the forest resource, the Government of India (GoI) enacted the Forest (Conservation) Act 1980, which prohibited the conversion of forest land without approval of the federal government. One of the essential conditions for approving any conversion stipulated the afforestation of an equivalent non-forest area to compensate for the loss of forest area. Since 1980, the rate of deforestation has slowed considerably. In addition, tree cutting has virtually ceased in seven northeastern states due to judicial interventions. No tree cutting in the forests can be carried out without a management plan approved by the GoI.

Economic and social contributions of forestry and the forest policy

Forests in India play an important role in the country’s economic development. Besides producing raw materials for industries, forestry generates employment in the primary, secondary and tertiary sectors (NFAP 1999). Forests also provide materials for villagers (for example, small timber and non-timber forest products) and grazing land for livestock. About 200 million rural people living in and around forests are wholly or partially dependent on forest resources for their livelihoods (Anon 2001). Forests used to contribute significantly to the country’s exports until 1978 when exports were scaled down. The official forestry sector’s contribution to the gross domestic product (GDP) is low due to the undervaluation of a wide range of forest products and services. Over the years, this has ranged between 1.1 and 2.9 percent of the total GDP, and a decline since 1996 is primarily due to a ban on logging in most natural forests.

The current National Forest Policy (1988) focuses on conservation. The policy emphasizes environmental stability and maintenance of the ecological balance. The derivation of direct economic benefits is subordinate to this aim. For biodiversity conservation, a protected area
network – consisting of national parks, sanctuaries, biosphere reserves and other protected areas – has been strengthened, and 15.6 million ha forest have been brought under its purview.

The policy lays heavy emphasis on meeting the requirements of fuelwood, fodder, non-timber forest products and small timber for rural and tribal people who have been given priority over the raw material requirements of forest-based industries. The latter have been advised to meet their own needs by dealing directly with farmers who can grow trees. It has been clearly enunciated that natural forest areas, even if these are degraded, will not be made available or leased to industries for creating industrial plantations (MoEF 1988).

Role of the public and private sectors in forestry

Almost all of the natural forests, including large-scale forest plantations lying within forest reserves, are owned and managed by the government through the state forest departments. They are required to prepare a working plan for managing each administrative unit (Forest Division), including protection, harvesting of timber and other products.

The private sector (that is, farmers, individuals, wood-based industries and entrepreneurs) has established only small-scale and scattered plantations. The land ceiling laws forbid the holding of large areas (maximum: 21.85 ha) by the private sector (Table 3). It is thus difficult for private industries to raise commercially viable plantations.

### Table 3: Ceiling limits on landholdings in India

<table>
<thead>
<tr>
<th>State</th>
<th>Irrigated (two crops)</th>
<th>Irrigated (one crop)</th>
<th>Dry land</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andhra Pradesh</td>
<td>4.05-7.28</td>
<td>6.07-10.92</td>
<td>14.16-21.85</td>
</tr>
<tr>
<td>Assam</td>
<td>6.74</td>
<td>6.74</td>
<td>6.74</td>
</tr>
<tr>
<td>Bihar</td>
<td>6.07-7.28</td>
<td>10.12</td>
<td>12.14-18.21</td>
</tr>
<tr>
<td>Gujarat</td>
<td>4.05-7.28</td>
<td>6.07-10.92</td>
<td>8.09-21.85</td>
</tr>
<tr>
<td>Haryana</td>
<td>7.25</td>
<td>10.90</td>
<td>21.80</td>
</tr>
<tr>
<td>Himachal Pradesh</td>
<td>4.05</td>
<td>6.07</td>
<td>12.14-28.33</td>
</tr>
<tr>
<td>Jammu and Kashmir</td>
<td>3.6-5.06</td>
<td>–</td>
<td>5.95-9.20</td>
</tr>
<tr>
<td>Kerala</td>
<td>4.86-6.07</td>
<td>4.86-6.07</td>
<td>4.86-6.07</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>7.28</td>
<td>10.93</td>
<td>21.85</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>7.28</td>
<td>10.93</td>
<td>21.85</td>
</tr>
<tr>
<td>Manipur</td>
<td>5.00</td>
<td>5.00</td>
<td>6.00</td>
</tr>
<tr>
<td>Orissa</td>
<td>4.05</td>
<td>6.07</td>
<td>12.14-18.21</td>
</tr>
<tr>
<td>Punjab</td>
<td>7.00</td>
<td>11.00</td>
<td>20.50</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>7.28</td>
<td>10.93</td>
<td>21.85-70.82</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>4.86</td>
<td>12.14</td>
<td>24.28</td>
</tr>
<tr>
<td>Sikkim</td>
<td>5.06</td>
<td>–</td>
<td>20.23</td>
</tr>
<tr>
<td>Tripura</td>
<td>4.00</td>
<td>4.00</td>
<td>12.00</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>7.30</td>
<td>10.95</td>
<td>18.25</td>
</tr>
<tr>
<td>West Bengal</td>
<td>5.00</td>
<td>5.00</td>
<td>7.00</td>
</tr>
<tr>
<td>National guidelines on ceiling (1972)</td>
<td>4.05-7.28</td>
<td>10.93</td>
<td>21.85</td>
</tr>
</tbody>
</table>

Source: Anon (2000)
In general, private individuals, industries and foreign investors do not find the existing policy environment conducive for plantation development. On the other hand, since the mid-1990s, the GoI has promoted people’s participation in protecting, managing and developing the forests to address the problem of rehabilitating degraded forests and wastelands.

**Current wood production**

Due to the increasing emphasis on forest conservation, the production of industrial wood from natural forests has gradually declined over the last two decades. Collection of fuelwood from forests by local people continues unabated. Logging in natural forests has been gradually restricted since 1982 when felling of trees above 1 000 m above sea level was banned in some states. The data on production and consumption of forest products are incomplete and unreliable. The annual production of industrial wood during the 1970s was about ten million m³ (NCA 1976), which had gradually declined to about three million m³ in 1999 (ICFRE 2000). On the other hand, production of industrial wood from trees outside the forests and private plantations has increased (Table 4).

<table>
<thead>
<tr>
<th>Forest product</th>
<th>Quantity</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timber</td>
<td>12 million m³</td>
<td>Forests</td>
</tr>
<tr>
<td></td>
<td>31 million m³</td>
<td>Farm forestry and other wooded lands</td>
</tr>
<tr>
<td>Fuelwood</td>
<td>101 million tonnes</td>
<td>Forests</td>
</tr>
<tr>
<td></td>
<td>98 million tonnes</td>
<td>Farm forestry and other wooded lands</td>
</tr>
</tbody>
</table>

Source: Rai and Chakrabarti (1996)

**AN OVERVIEW OF THE DEVELOPMENT OF PLANTATION FORESTRY**

Teak (*Tectona grandis*) was used to establish the first plantation in India in 1840 at Nilambur in Kerala State. Regular planting, mainly of teak, commenced in 1865 in many central and southern states. Eucalyptus was introduced in the Nilgiri Hills of the present Tamil Nadu State in 1858. Plantation development of other native species accelerated after the *taungya* (agroforestry) system was introduced in 1911. By 1950, the total area under forest plantations had reached 29 210 ha (NCA 1976).

Planned afforestation for soil conservation and production of industrial wood, fuelwood and fodder started slowly in the late 1950s. Industrial plantations were raised mainly within the forest reserves after clear-felling of the economically less important forests. The practice continued up to the Fifth Five Year Plan (1974-1979). Until then, most plantations were of teak, sal (*Shorea robusta*), deodar (*Cedrus deodara*), chir pine (*Pinus roxburghii*), eucalypts and acacias. The annual planting rate between 1956 and 1979 ranged from 62 000 to 244 000 ha. By 1979, the total plantation area had reached 3.33 million ha. A shortage of financial resources was one of the main factors limiting forest plantation development.

The establishment of the Forest Development Corporations in the states and launching of numerous donor-assisted social forestry projects led to a considerable expansion of plantations after 1979. While the Forest Development Corporations continued planting industrially important species, plantations under social forestry schemes were mostly established outside forest reserves, along railways, roads and canals, government-owned wastelands, and on private farmlands with short-rotation species. In the 20-Point Programme for the development of the country, the GoI declared tree planting a priority. Annual planting rates increased to about one million ha between 1980 and 1985. The Union Ministry of Environment and Forests (established in 1984) created a National Wasteland Development Board (NWDB) in 1985 to give further impetus to plantation development. The annual planting rate increased to 1.78 million ha between 1985 and 1990.
Since 1991, it has slightly declined to 1.5 million ha due to the termination of many externally funded projects and lack of funds from the central government. The area planted in the Sixth (1979-1984), Seventh (1984-1989) and Eighth (1989-1994) Plans was 4.65 million ha, 8.86 million ha and 7.95 million ha, respectively (Figure 1). The total area planted between 1951 and 1999 was 31.21 million ha (NAEB 1999).

![Annual area of plantation in thousand ha](chart)

Source: FSI (2000)

**Figure 1: Annual plantation rate between 1951 and 1999**

Between 1980 and 1990, the indicator for assessing progress in plantation development was “number of seedlings planted”, whether in block planting or linear formation. This figure was then converted into a “notional” area estimate, using a norm of 2,000 seedlings/ha, to arrive at the total plantation area at the national level. Since 1990, the planting targets have been divided into area coverage (block planting) and number of seedlings planted in linear patterns. To date, the same approach is adopted to convert seedlings distributed to private individuals and institutions. The planted area reported by the National Afforestation and Eco-development Board (NAEB), a new agency created by re-organizing the NWDB, under the Union Ministry of Environment and Forests, has two components: area of block plantations and notional area. About 35 to 40 percent of the total annual plantations are classified as notional areas. Of the total plantation area of 31.21 million ha, 10.26 million ha were planted with seedlings distributed to individuals, farmers, public and private institutions after 1980 (FSI 2000). The distribution of free seedlings boosted tree plantations by small-scale landholders, who also benefited from the extension services and technical guidance provided by the forest departments. The supplementary cash income derived from the sale of trees, in addition to recurring agricultural incomes, has been the main motivating factor for farmers.

Plantation development in India can be divided into three phases. The first phase started with the first Five-year Development Plan (1951-1956) and ended in 1978. Progress during this phase was slow. The second phase (1979-1992) saw a considerable expansion of areas planted due to the implementation of social forestry projects and the national commitment to rehabilitate wastelands. The National Forestry Policy (1952) was revised during this period. A small number

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3 Since 1951, India has completed nine five-year plans and is currently implementing the Tenth Plan (2002-2007). The guiding principles of planning are determined by the basic objectives of growth, employment, self-reliance and social justice.
of wood-based enterprises began raising quality seedlings and launched incentive schemes to attract farmers to plant trees. This approach was replicated by many other enterprises during the third phase. The beginning of the third phase (1992 to present) was marked by the end of donor-supported projects, a more active role of the private sector in supporting farmers and a shift in focus from social forestry to Joint Forest Management (JFM). Many activities of the second phase overlap the third phase.

**DEVELOPMENT OF FOREST PLANTATIONS BEFORE 1978**

After India attained independence in 1947, the government focused on developing infrastructure and industries. Forestry was not a priority sector. Although forest lands, which included treeless areas, covered about 23 percent of the total land area, the allocation of funds to the forestry sector in the national developments plans ranged only between 0.26 and 0.61 percent of the total budget allocations between 1951 and 1979. In contrast, the agriculture sector, which covered about 43 percent of the land area, received fund allocations of up to 17 percent. Government investments in forest plantations were limited to plantations of industrially important indigenous species, and of eucalyptus, within forest reserves and on degraded sites for soil and water conservation.

The National Forest Policy (1952) identified natural forests as the prime source of industrial timber. Scientific management was emphasized to produce sustainable supplies of wood for the industries. Tree planting by private entities, governmental agencies and local authorities was emphasized mainly for environmental reasons. Tree plantations established outside the forests were limited to homesteads and farms. In some states, farmers planted rubber, coconut and cashew trees. The state forest departments were expected to raise awareness, and provide (i) seeds and seedlings of suitable species and (ii) technical guidance (MFA 1952). The available budget for all these activities was limited.

Research on forest plantations was confined to government forestry research institutions. Moreover, studies focused on industrially important species (for example, teak), fast-growing exotic species (for example, eucalyptus, pines and poplars), nursery techniques, growth yield, spacing and silvicultural aspects.

The tangible incentives were seedlings distributed by the forest departments either free-of-charge or via subsidized rates (about ten percent of the production costs), particularly during the celebration of *Van Mahotsva* (the tree planting festival). Seedlings were distributed for about one week to one month per year during the rainy season. The occasion of *Van Mahotsva* was used to raise awareness about planting trees. Events were mainly organized in schools, colleges and other institutions. The ritual made little impact on developing a viable resource for wood production, but the number of trees along roads increased visibly.

**DEVELOPMENT OF FOREST PLANTATIONS BETWEEN 1979 AND 1992**

**Investment climate and initiatives for plantations**

The establishment of the National Commission on Agriculture (NCA) marked the turning point in plantation development. The NCA realized the potential of plantations in meeting India’s industrial and fuelwood needs, and pointed out the lack of investment in the sector (NCA 1976). Based on the NCA’s interim report on production forestry, Forest Development Corporations (FDCs) were set up by many state governments as fully state-owned companies to support tree growing. A major task of the FDCs was to establish plantations with industrially important timber species on forest land after clear-felling. The FDCs leased forest lands on a long-term basis with the provision to receive institutional finance from the former Agricultural Refinance and Development Corporation, now the National Bank for Agriculture and Rural Development (NABARD). Due to the inherent risks involved in forest plantation management, commercial
bankers were reluctant to finance the undertakings. The NABARD provided loans to the FDCs, which covered half of the financial costs required for different activities. Of the 26 FDCs that existed until 1990, only seven\(^4\) were involved in large-scale industrial plantations. The total area planted by the FDCs was 1.21 million ha in 1989 (Anon 1990).

Another recommendation of the NCA was to establish plantations on wastelands outside forest areas through social forestry programmes. The basic philosophy was to involve people in growing trees on marginal farmlands, barren lands and other vacant lands. In 1979, with the World Bank’s assistance, the first Social Forestry Project was launched in the state of Uttar Pradesh. Similar donor-funded projects followed in other states. The plantation programmes envisaged plantings on three types of lands: (i) vacant lands along roads, canals and railway lines, and water ponds – planted and managed by the government; (ii) common village lands (planted by the government and then handed over to village communities for their management); and (iii) farmlands – planted and managed by farm owners.

In addition, the afforestation programme by the GoI under the “20-Point Programme” further boosted tree planting outside the forests in rural areas. In fact, tree planting became an integral feature of many rural development programmes such as the National Rural Employment Programme and the Rural Landless Employment Guarantee Programme, which aimed to generate employment opportunities. Until 1992, 25 percent of the rural development funds was earmarked for tree plantations and was extended to either forest departments or other planting agencies. The NWDB identified Tree Growers Cooperative Societies as important institutions for organizing people for the rehabilitation of wastelands. Two public sector cooperative organizations, namely the National Dairy Development Board and the Indian Farmers Fertilizers Co-operative Ltd., founded such societies in different parts of India in 1986. Pilot projects were launched for the formation of a two-tier structure with tree growers’ cooperatives at the village level as the first tier and state-level federations as the second tier.

**Role of research and extension in supporting plantation development**

In the early 1980s, research and development in support of plantation forestry remained with government institutions and consisted mainly of basic research. Public sector research on the propagation of high-yielding varieties of fast-growing species began only later. This research focus was also initiated by the private sector, such as Wimco Seedlings Ltd., Tata Energy Research Institute and ITC Bhadralacham Paperboard Ltd., among others.

**Wimco Seedlings Ltd.**

Wimco Ltd., a premier match manufacturing company, has been collaborating with the Uttar Pradesh Forest Department since the late 1960s to identify suitable clones of poplar for producing matches. In 1984, the company founded Wimco Seedlings Ltd. in Uttar Pradesh to initiate research on improved planting materials for the production of industrial wood. Initially, research was confined to poplars and later extended to other fast-growing species like *Eucalyptus* spp., *Gmelina arborea*, *Acacia auriculiformis* and *Ailanthus* spp. The company has achieved remarkable success in the development and propagation of two clones of *Populus deltoids*, G-3 and G-48. These clones attained the desired form (less taper) and growth rate, and were much preferred by farmers. Since then, two new clones have been developed, which have reached growth rates of up to 49 m\(^3\)/ha/year in some of the best-managed plantations in Punjab and Haryana (Dwiwedi et al. 1990). Due to its versatility, fast growth, range of end uses (packing cases, pulpwood, poles, sports goods, plywood industry, false ceilings and fuelwood) and compatibility with agricultural production, poplar has become a valuable agroforestry species and is widely accepted by farmers.

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\(^4\) These were the Andhra Pradesh FDC, Madhya Pradesh Rajya, Van Vikash Nigam, Maharashtra FDC, Tamil Nadu Forest Plantation Corporation, Tripura Forest Development and Plantation Corporation, and West Bengal FDC.
**Tata Energy Research Institute (TERI)**

Researchers at TERI have worked on clonal multiplication techniques and developed clonal technology for several species (for example, *Anogeissus* spp., *Eucalyptus* spp., *Populus deltoides*, *Populus euphratica* and *Paulownia* spp.) since the late 1980s. By early 2001, nearly 3.5 million seedlings had been dispatched to various State Forest Departments, NGOs and private growers for field trials and routine plantings. TERI also assists in the transfer of technology to different private agencies involved in plantation forestry (TERI 2000).

**ITC Bhadrachalam Paperboard Ltd.**

ITC Bhadrachalam Paperboard Ltd., an integrated pulp and paper mill in Andhra Pradesh, has been raising and distributing seedlings to farmers since 1982. In 1989, it launched a research and development project focusing mainly on genetic improvement of planting stock and better plantation management practices. It developed genetically improved, high-yielding, fast-growing and disease-resistant clones of eucalyptus. Gene banks of tested and proven superior clones for large-scale commercial multiplication were also established (Lal et al. 1998). About 5.6 million Bhadrachalam clones were supplied to farmers between 1992 and 1999, and 1.6 million to various state forest departments. The annual production of clonal seedlings is now more than two million. The average productivity of Bhadrachalam eucalyptus clones ranges between 20 and 44 m³/ha/year (Lal 1999a). ITC Bhadrachalam also provides information on improved practices for establishing plantations to farmers.

**Incentives during the period**

The incentives offered during the period can broadly be classified as assistance provided under social forestry programmes and financial incentives for the rehabilitation of wastelands.

**Incentives under social forestry programmes**

The incentives provided by state governments to promote social and farm forestry varied among states and included:

- Subsidized seedlings;
- Survival incentives;
- Subsidies to private nurseries; and
- Extension and technical guidance to the farmers.

Providing free seedlings in the initial stage and then at nominal prices (about ten percent of production costs) to the farmers and individuals was a common incentive. Survival incentives were provided in Bihar and Orissa but not by programmes supported by the World Bank and United States Agency for International Development (USAID). Motivators were appointed in Andhra Pradesh, Tamil Nadu, West Bengal, Madhya Pradesh, Bihar and Orissa but not in the northwestern states. Incentives to nurseries included subsidies for healthy seedlings (about Rs0.40 each) or buy-back arrangements. The seedlings raised in the private nurseries were purchased by the forest departments and distributed to farmers or used by the departments when planting on the public land.

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5 US$1.00 = INR46 (16 September 2004).
**Financial incentives for the development of wastelands**

One of NABARD’s functions was to provide financing for farm forestry. In 1986, the loans arranged through NABARD were at a concessional rate of 12.5 percent, which was lower than the commercial rate banks charged individuals and industries for other activities. Furthermore, loans had to be repaid only after benefits were derived from the plantations (NWDB 1987). Although some wood-based industries assisted farmers to make use of NABARD, farmers faced numerous difficulties, as they had to produce extensive documentation from all the local banks.

After the creation of the NWDB in 1985, the scope for provision of loans at concessional rates was broadened to encourage planting on wastelands and degraded sites owned by individual farmers. Public lands under lease or “tree patta” schemes were also covered. Financial support was to cover tree-planting expenditures, including materials and labour costs. The repayment period varied according to species but could not exceed 15 years. Enterprises or voluntary agencies engaged in wasteland development could assist in motivating farmers, preparing projects and providing liaising services between farmers and banks, the costs of which were not to exceed 15 percent of the total costs, and had to borne by the beneficiaries (NABARD 1989).

The NWDB also initiated a Margin Money Assistance Scheme in 1987 (modified in 1989) to enhance the flow of institutional funds for afforestation and wasteland development activities that were not economically viable but socially beneficial. Under the scheme, the federal government provided grants of up to 25 percent of the project costs for community-based production of fuelwood, fodder and small timber. The scheme operated for five years (1987-1992) and the total funds provided were about ten million rupees. The assistance was offered only to registered voluntary agencies, cooperative societies and other similar organizations.

**Incentives for rubber plantations**

In 1954, the GoI established the Rubber Board to promote rubber plantations, to provide technical guidance to growers and to support rubber-based industries. The expansion of rubber plantations has been gradual. In 1956, the total area of rubber plantations was 86,000 ha, with 85 percent under private holdings. The development schemes introduced by the Rubber Board included subsidies for replanting and materials. Productivity improvements, marketing assistance and interest-free loans in 1957 helped in expanding the area planted with rubber trees. A total of Rs193 million was provided for replanting 53,605 ha between 1957 and 1979. Incentives targeted smallholders who managed most of the area (Table 5).

Since 1980, incentive schemes were revised. Smallholders owning up to five ha of rubber trees were entitled to a planting grant of Rs5,000/ha, paid in instalments over six to seven years after planting. Smallholders who used improved seedlings received an additional Rs6/plant (Rs8 if they belonged to schedule caste and schedule tribes) for up to 450 plants/ha. Over the years, the planting grants have been raised to adjust for increasing costs. In 1993, grants were set at Rs8,000/ha and in 1997 at Rs18,000/ha (Rubber Board 2002). Due to the attractive prices for latex, many smallholders planted rubber trees. At present, about 86 percent of the total rubber plantation area is held by smallholders (Rubber Board 2002). Apart from the latex, the current annual wood production from the rubber plantations is about one million m³. Smallholder rubber plantations have expanded rapidly since 1980, but the growth has levelled off as a result of a slump in the rubber market and less attractive prices since the mid-1990s.

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6 The Constitution of India directs the states to promote with special care the educational standards and economic interests of the weaker sections of the people to protect them from social injustice and all forms of exploitation. The government by public notification(s) specifies the castes, races or tribes, or tribal communities that shall, for the purposes of the Constitution, be deemed to be “scheduled castes” or “scheduled tribes” for positive discrimination of their statutory rights and speedy social and economic development. Since the names of such communities appear in the schedules appended to the aforementioned public notifications, these are generically called scheduled castes/tribes, as the case may be.
Table 5: Classification of rubber holdings according to size at the end of 2000

<table>
<thead>
<tr>
<th>Holding size</th>
<th>Units</th>
<th>Area (ha)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 2 ha</td>
<td>963 613</td>
<td>407 601</td>
<td>83.1</td>
</tr>
<tr>
<td>2-4 ha</td>
<td>17 627</td>
<td>45 031</td>
<td>9.2</td>
</tr>
<tr>
<td>&gt; 4 ha</td>
<td>5 249</td>
<td>37 645</td>
<td>7.7</td>
</tr>
<tr>
<td>Total</td>
<td>986 489</td>
<td>490 277</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Characteristics of plantations established and monitoring mechanism

Most small-scale and marginal farmers planted trees on farm boundaries and sometimes in multiple rows. Block plantations were established by medium- to large-scale farmers who were either absentee landowners or were very enterprising. Plantations raised on leased lands by landless people in rural areas ranged between 0.5 and one ha in size.

Species selection depended on numerous factors, the most important being the availability of seedlings from the government nurseries and attractive short-term economic returns. Farmers also tried to minimize competition between trees and agricultural crops. In northern India, *Eucalyptus* spp., *Populus* spp. and *Dalbergia sissoo* were planted widely, whereas in southern India, *Eucalyptus* spp., *Casuarina* spp. and *Acacia* spp. dominated.

Seedling quality control was often poor. Insufficient attention was also paid to species-site matching and technical aspects as too much emphasis was placed on achieving physical targets in terms of number of seedlings distributed or planted. This resulted in poor survival rates and low productivity. Only enterprising farmers with larger holdings used superior planting materials and applied improved practices.

Impact of incentives

It is difficult to assess the impact of each incentive on tree planting because monitoring in the various projects was inadequate. In many cases, implementing agencies only reported on targets attained, which were assumed to be partially the result of providing incentives. The total notional area of such plantations established from 1979 to 1992 was about six million ha through the support of the national and state governments as well as donor organizations (Table 6).

Farm forestry achieved significant success in some states (for example, Gujarat, Haryana, Punjab, Karnataka, Western Uttar Pradesh and West Bengal). The characteristics of viable farm forestry enterprises are large landholdings, assured irrigation, owner cultivation, marketable agriculture surplus, re-investment of profits in farming activities, risk-bearing capacity and generally better management. Plantation establishment rates declined around 1988, mainly due to falling wood prices. It is clear that to encourage tree planting on private lands, there is a need to reach out to the small-scale landholders with research, extension and improved technologies, demonstration areas, availability of inputs including certified quality planting materials at affordable prices, market information and credit facilities offering soft loans (NFAP 1999).
Table 6: Donor-assisted social forestry projects in India and area covered by incentives

<table>
<thead>
<tr>
<th>Name of the project and state</th>
<th>Donor agency</th>
<th>Project period</th>
<th>Plantation targets ('000 ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haryana Social Forestry Project</td>
<td>World Bank DANIDA**</td>
<td>1982/1983 to 1989/1990</td>
<td>3.00 12.00</td>
</tr>
<tr>
<td>Karnataka Social Forestry Project</td>
<td>World Bank ODA***</td>
<td>1983/1984 to 1987/1988</td>
<td>12.00 27.00</td>
</tr>
<tr>
<td>West Bengal Social Forestry Project</td>
<td>World Bank</td>
<td>1981/1982 to 1989/1990</td>
<td>52.00 6.00</td>
</tr>
<tr>
<td>Bihar Social Forestry Project</td>
<td>Sida****</td>
<td>1985/1986 to 1990/1991</td>
<td>71.70 30.75</td>
</tr>
<tr>
<td>Orissa Social Forestry Project</td>
<td>Sida (2 phases)</td>
<td>1983/1984 to 1992/1993</td>
<td>88.50 84.50</td>
</tr>
<tr>
<td>Tamil Nadu Social Forestry Project</td>
<td>Sida (2 phases)</td>
<td>1981/1982 to 1992/1993</td>
<td>85.00 131.40</td>
</tr>
<tr>
<td>Andhra Pradesh Social Forestry Project</td>
<td>CIDA*****</td>
<td>1983/1984 to 1989/1990</td>
<td>108.00 25.00</td>
</tr>
<tr>
<td>Maharasthra Social Forestry Project</td>
<td>USAID</td>
<td>1982/1983 to 1989/1990</td>
<td>44.00 34.00</td>
</tr>
</tbody>
</table>

Source: Saxena (1995)

* The data of Phase I started in 1979/1980 was unavailable.
** DANIDA = Danish International Development Agency, Denmark
*** ODA = Overseas Development Administration, United Kingdom
**** Sida = Swedish International Development Cooperation Agency, Sweden
***** CIDA = Canadian International Development Agency, Canada

A number of problems reduced the effectiveness of incentives. Important constraints included (NAEB-RC 1995):

- Legal restrictions on tree felling, transport and sale of harvested wood:
  
  Strict regulations on tree felling on private land discouraged private sector involvement in plantation development. In addition, land revenue rules and regulations of the state governments have indirectly restricted tree planting, as land-use changes are not permitted under the rule (Hegde 1991).

  Legislation covering harvesting, transporting and marketing of trees grown on private land varies among the states. Several states have enacted Tree Preservation/Protection Acts to restrict uncontrolled felling of trees even on private lands. Transport of timber in most states is governed by transit passes, which stipulate that specific permission is required from the local forest officer for transporting wood. For example, in Gujarat, felling and removal of trees from private lands have been governed by the Saurashtra Felling of Trees Act (1951). Felling of 21 listed tree species is controlled by the revenue department and transport by the forest department. In addition, there are five reserved tree species (Tectona grandis, Madhuca latifolia, Acacia catechu, Dalbergia latifolia and Santalum...
THE ROLE OF INCENTIVES IN FOREST PLANTATION DEVELOPMENT IN ASIA AND THE PACIFIC

album) that can only be felled, transported and marketed by the forest department. Charges and royalties for these species further reduce tree owners’ incomes. During the 1980s, restrictions on felling and transport of the two most commonly planted species (Eucalyptus spp. and Leucaena leucocephala) in non-forest areas were removed. Sandalwood (Santalum album) has been declared as a reserve tree in its native states (Tamil Nadu, Karnataka and Kerala).

In Punjab and Haryana, there are no restrictions on felling and transport of trees except in the narrow belt of the Shiwalik Hills where trees are required for conserving soil and water. In this case, the felling of trees is regulated under the Punjab Land Preservation Act (1900). Himachal Pradesh promulgated the Land Preservation Act (1968) to control commercial felling of trees on private lands over a ten-year felling cycle. It has also introduced trading controls of common species found in the state forests. This effectively regulates the felling of conifers (cedar, fir, spruce and pines) and important broad-leaved species (walnut and Dalbergia spp.) on private lands.

Rules and regulations were gradually simplified to encourage tree planting on private land. The Tree Preservation Act (1976) of Uttar Pradesh that imposed restrictions on felling of trees on private lands without permission was revised in 1991 and 19 tree species were exempted. Farmers are now free to fell such tree species on their lands in the districts where forest cover is less than one percent. Similar changes are being contemplated in other states.

- Lack of market information and low prices for wood products:
  Marketing mechanisms for wood produced by farmers remained underdeveloped. In northwest India, the farmers who planted eucalyptus on a massive scale in the 1980s were disappointed when they did not obtain reasonable prices for their wood from paper mills. Poles had to be sold as fuelwood when there was a surplus in the market (Saxena 1991). Combined with the legal constraints and bureaucratic procedures for felling and transport, low prices were a great disincentive to producers, especially small-scale farmers.

- Shortage of good quality planting materials:
  Traditionally, the state forest departments produced planting materials. However, as the demand for seedlings multiplied, some villagers collected whatever seeds were available, ignoring technical guidelines for collection and usage. In trying to meet planting targets and generate employment, the government had to rely on unskilled labour for seedling production, which adversely affected the quality of the planting stock.

Lessons learnt

The incentives offered to the private sector between 1979 and 1992, particularly to farmers, helped in augmenting tree resources outside the forest. The trees planted during this period contributed substantially to the overall wood supply, but actual production was still short of targets, principally because of the following factors:

- The goal was to meet targets (such as the numbers of seedlings produced, area planted) rather than to produce adequate supplies of wood but not wood yielded;
- Plantations were frequently established with insufficient consideration given to matching sites with species, quality of the planting materials, adequacy of plantation practices and testing of different approaches;
- Monitoring was inadequate;
- Data on the actual extent and productivity of plantations were unavailable;
- Technical guidelines and funds for long-term plantation management (five to seven years) were lacking;
Fluctuating prices caused unease amongst the growers; and
Legal restrictions on tree felling, transport and sale of harvested wood inhibited investors’ commitment and interest in tree growing.

Notwithstanding these shortcomings, the period from 1979 and 1992 in general, and the implementation of social forestry projects in particular, provided field staff with considerable experience in recognizing farmers’ perspectives related to planting trees on private land.

DEVELOPMENT OF FOREST PLANTATIONS SINCE 1992

Investment climate in forestry plantations
An important goal of the National Forest Policy (1988) is to raise the forest cover to 33 percent of the total land area. The National Forestry Action Programme (NFAP 1999) proposes to achieve the goal in 20 years by enhancing natural regeneration of degraded forests and tree planting in degraded forests and non-forest lands of over two million ha annually. The notional area to be established annually by farmers has been projected to be 0.2 million ha (NFAP 1999).

The GoI announced a new investment policy in 1991 for facilitating the inflow of foreign capital and for encouraging investments in different sectors. However, the forestry sector has remained stagnant, and domestic financial resources are insufficient to reach the target of 33 percent forest cover. In accordance with the National Forest Policy, wood supplied to industries from government forests has been greatly reduced. Industries are expected to meet their raw material requirements mainly from private sector plantations, farm forests and imports. No policy has been formulated to attract investors to develop forest plantations. In 1992, donor-funded social forestry projects also declined. In accordance with the National Forest Policy, the federal government requested the state governments to involve local communities in the management of the degraded forests in June 1990. By 2001, most state governments had issued resolutions in support of JFM. While this has shifted the focus of tree planting to local communities, state governments continue to promote plantations albeit with reduced funds. The current generation of donor-funded projects has multiple objectives and focuses on institutional development, capacity building, technology improvements in forestry and people’s participation in forest management.

Export-import policy
India’s market for wood and wood products is predominantly domestic in nature. The export-import policy of 1992 further restricted the export of wood products. Exports of logs, timber, stumps, roots, bark, chips, powder, flakes, dust, pulp and charcoal have been totally banned. The total exports of wood products in 1994 and 2000 were only US$25 million and US$29 million, respectively. On the other hand, wood and wood products were put on the Open General License list in 1992, which means that their imports are not restricted. The tariff charges on the import of logs or rough wood (round logs and sawntimber) have been drastically reduced over the last decade (Table 7).

<table>
<thead>
<tr>
<th>Raw materials</th>
<th>Import tariff (%)</th>
<th>Finished good</th>
<th>Import tariff (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Round logs</td>
<td>5</td>
<td>Veneer sheets</td>
<td>30</td>
</tr>
<tr>
<td>Sawnwood</td>
<td>15</td>
<td>Particleboard</td>
<td>30</td>
</tr>
<tr>
<td>Wood chips</td>
<td>10</td>
<td>Plywood &amp; veneered panel</td>
<td>40</td>
</tr>
<tr>
<td>Pulp</td>
<td>10</td>
<td>Newsprint</td>
<td>0-45</td>
</tr>
<tr>
<td>Waste paper</td>
<td>20</td>
<td>Other paper products</td>
<td>65</td>
</tr>
</tbody>
</table>

Source: NFAP (1999)
The reduced tariff resulted in a gradual increase in imports. The value of imported wood and wood products increased from US$481 million in 1992 to US$1.3 billion in 2000. It is expected to reach US$2 billion in the April 2002 to March 2003 financial year. The quantity of rough wood has increased from about 0.5 million m³ in 1992 to 1.9 million m³ in 2000 (MoC 2001). Due to raw material shortages and low production volumes, domestically produced pulp is more expensive than imported pulp. The corporate sector has responded by developing partnerships with farmers for production of raw materials at competitive costs by funding intensive high-technology plantations on private lands.

**Research and development**

Public sector forest research was restructured in 1990 after the creation of the Indian Council of Forestry Research and Education (ICFRE). A number of new Regional Forest Research Institutes were created to develop high-yielding clones of different tree species suitable for their regions. Seed production areas in many natural forest stands and plantations were identified, large-scale seed orchards were established and improved plantation management packages were developed.

Several wood-based companies also recently set up in-house research centres for the production of clonal seedlings to be supplied to farmers. For example, the Grasim Forest Research Institute set up by Harihar Polyfibres, a unit of Grasim Industries Ltd. in Karnataka, is now distributing about nine million seedlings annually to farmers. The company has also established 57 demonstration plots on farmers’ lands in strategic locations in Karnataka to demonstrate the effect of scientific plantation management (Maru et al. 2001). Another example is JK Corporation based in Orissa. It has undertaken research to develop high-yielding and disease-resistant clones of eucalyptus and established a four-ha clonal seed orchard.\(^7\)

**Incentives by the government**

The federal government’s incentive schemes for plantations have focused on the development of wastelands, degraded forests and private non-forest lands. Financial assistance provided to government institutions, registered bodies and non-governmental organizations during the Eighth Plan is presented in Table 8.

<table>
<thead>
<tr>
<th>Schemes</th>
<th>Expenditure (Rs million)</th>
<th>Area planted/developed (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated afforestation and ecodevelopment projects</td>
<td>2 031.2</td>
<td>289 917</td>
</tr>
<tr>
<td>Fuelwood and fodder projects for forest areas</td>
<td>1 541.9</td>
<td>387 216</td>
</tr>
<tr>
<td>Grant-in-aid 100 percent to NGOs to promote afforestation</td>
<td>75.1</td>
<td>338 projects</td>
</tr>
<tr>
<td>Integrated Wastelands Development Projects in non-forest areas</td>
<td>2 161.6</td>
<td>284 000</td>
</tr>
<tr>
<td>Grant-in-aid 100 percent to registered voluntary agencies</td>
<td>137.5</td>
<td>18 684</td>
</tr>
</tbody>
</table>


The Department of Wasteland Development has recently initiated the Investment Promotion Scheme. It offers a grant covering 25 percent of the cost of plantation establishment to enterprises for rehabilitating wastelands. One of the conditions for the subsidy requires that the activity

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\(^7\) Sharda, A.K., Chief General Manager (Commercial), JK Corporation, Rayagada, Orissa, 2000, personal communication.
should not adversely affect the livelihoods of poor people. The government employs local agencies to evaluate the plantations in the first and the second year. The grant is released only after a satisfactory report on survival rates has been obtained.

In addition, state governments have devised numerous incentive schemes mainly to support small-scale farmers’ efforts to plant trees on their land. For example, in Andhra Pradesh farmers have been exempted from sales tax on the three most popular species (*Leucaena leucocephala*, *Eucalyptus* spp. and *Casuarina* spp.) planted in Prakasham District since May 1999. The state government has also passed a resolution to sell the wood produced by farmers through the Agriculture Market Committee based on a fixed price and payment within five days. Farmers in this district are already supplying about 0.65 million tonnes of wood to various paper and rayon mills of Andhra Pradesh and neighbouring states (APFD 2001).

Under the Rural Development and Rural Employment Guarantee Programmes, many states have also developed schemes to provide incentives to small-scale farmers. In Gujarat, the state forest department plants suitable trees, including those bearing edible fruits, on marginal land owned by farmers belonging to the poorer castes or tribes as identified in the Indian Constitution. The entire cost of plantation establishment is borne by the forest department. From the second year onwards, the beneficiaries are responsible for protection and maintenance, for which they are paid at the rate of Rs1/plant in the second year and Rs0.50 in the third year, provided that the survival rate is above 50 percent. In Maharastra, small-scale farmers are provided with Rs12 000/ha to cover costs for block plantations until the third year. The payment is released in stages after performance evaluations. The survival rate has to be at least 60 percent to obtain funds in the second and third years. For teak plantations on farm bunds, grants are in the order of Rs12/tree provided in three annual instalments. The area covered under these schemes is small in comparison to the intended scale of afforestation in India. In Gujarat, it ranged between 10 000 and 12 000 ha annually between 1997 and 2001. The achievement under the programme, since its inception in 1981, is 119 817 ha.

NABARD has continued to refinance the financial institutions at 100 percent of the loans disbursed to borrowers for developing wastelands in forest or non-forest areas. Interest rates have changed over time – from 8.5 percent applicable with effect from 1 July 2001 to 7.5 percent in February 2002.

While grants have increased over the last ten years, the use of subsidized seedlings is declining. In Haryana, the distribution of seedlings (subsidized at 90 percent) was discontinued in 1993, although some subsidized seedlings are still handed out to the poor and needy. In West Bengal, five seedlings per industrial unit and 100 seedlings per institution are provided free-of-charge. Subsidized seedlings are also provided to small-scale landholders with up to 0.4 ha upon the recommendation of the village panchayat. In Karnataka, seedlings of valuable species such as teak are priced according to market rates.

**Incentives provided by the private sector**

In 1984, Wimco Seedlings Ltd. started an innovative scheme to promote tree planting on farms, with (refinance) assistance from NABARD, in selected districts of Uttar Pradesh, Haryana and Punjab. Under the scheme, Wimco offered high-quality one-year old poplar seedlings to farmers at a reasonable price, provided technical assistance and extension support, arranged fertilizer inputs and provided, most importantly, a buy-back guarantee at an agreed price. The banks participating in the project disbursed long-term loans to farmers for purchasing the seedlings,

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11 An administrative body of elected members for a group of villages.
planning and management. Repayment of loans was usually linked to the length of rotation (between six and eight years). Although NABARD refinanced the banks at the interest rate of 6.5 percent, the banks charged farmers ten percent. The agreed price was according to market demand and the buy-back rates offered by the company in 1993 and 1994 were as follows (Joshi and Chandra 2001):

<table>
<thead>
<tr>
<th>Girth Class</th>
<th>Price (Rs/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>90 cm and above girth at breast height</td>
<td>870.00</td>
</tr>
<tr>
<td>75-90 cm girth at breast height</td>
<td>450.00</td>
</tr>
<tr>
<td>60-75 cm girth at breast height</td>
<td>245.00</td>
</tr>
</tbody>
</table>

Since then, the rate has been revised to a flat rate of Rs1 600/m³ for all girth classes.\(^\text{12}\)

The annual rate of planting by the farmers gradually increased from around 500 ha in 1984 to about 4 000 ha during 1988/1989 (Jones and Lal 1989; Lal 1991). The total area covered by the NABARD-assisted project was 30 700 ha, involving a total of 15 831 farmers, with an average of about two ha per farmer. Even after the end of the project, enterprising farmers have continued expanding plantations as a result of the impressive performance of the poplar and attractive returns. The market demand for high-quality veneer logs for manufacturing match splints, plywood and flush doors has grown over the years. The total area of poplar plantation in West Uttar Pradesh, Haryana and Punjab reached 56 100 ha in 2000 (Joshi and Chandra 2001). The farmers participating in the project ranged from small-scale farmers with less than two ha of land to large-scale farmers with more than six ha of land. Small-scale farmers who selected block plantings reported a decline in agricultural income after the third year. Therefore, planting poplars on farm boundaries was preferred to block plantings.

In 1994, Wimco launched a scheme of “smart units” to raise funds for planting poplars. Buyers of each unit would pay Rs4 000 for planting ten poplar trees on the company’s land. In return, they would receive Rs16 000 from the company after eight years. Nearly 30 000 units were sold between 1994 and 1997, and trees were planted on about 750 ha. The success of the scheme stimulated replication by several other plantation companies that made attractive financial returns on their propositions, such as doubling their investments within three years. The Security Exchange Board of India (SEBI), a wing under the Ministry of Finance responsible for overseeing investments under mutual funds, intervened to protect gullible investors and drafted stringent conditions, which the companies were unable to fulfil. The sale of new units ceased in 1999, as growth rates – and hence returns to investments – claimed by the promoters were unrealistically high.

ITC Bhadrachalam launched an incentive scheme in 1987, with refinance assistance from NABARD, for producing pulpwood by farmers. The company provided high-quality eucalyptus seedlings, technical extension services and a buy-back promise at a minimum guaranteed price or the prevailing market price, whichever was higher, at the time of harvest. The cost of seedlings and extension services offered by the company amounted to about Rs35/seedling and trees were harvested after seven to eight years. In total, 6 185 farmers participated in the scheme and planted 17.4 million seedlings covering an area of 7 441 ha. The average area planted per farmer was less than 1.5 ha, and only two to three farmers per village opted to join the scheme. In addition, 5.65 million eucalyptus clonal seedlings developed by the company benefited 1 914 farmers who planted on 3 217 ha between 1992 and 1999 (Lal et al. 1998; Lal 1999b).

**Misuse of incentives and plantation schemes**

About 3.5 percent (550) of all the participants in the Wimco-NABARD project breached the contract or misused the incentives. Some farmers sold their plantations before maturation to a third party and reneged on their loans from the banks. In turn, district authorities attached the

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properties of such farmers. Others did not pay for the seedlings and services rendered by the company even though they had obtained loans from the banks. As a result, legal action has been taken in the courts. Although the funds were partially recovered, a considerable sum of Rs52.5 million remained outstanding (Joshi and Chandra 2001). On the other hand, some farmers have also approached Consumer Forums to take action against the promoters of the schemes for misleading them about the productivity and for providing poor technical assistance, which allegedly resulted in their financial losses.

The experience of ITC Bhadrachalam in the NABARD project was more alarming compared to Wimco Seedlings Ltd. as the majority of the farmers felled their plantations prematurely at four or five years. Many farmers sold their plantations to third parties and refused to repay the loans, despite having signed tripartite agreements for the sale of pulpwood to ITC Bhadrachalam.

Many other private plantation companies were also set up in the early 1990s to raise funds, promising very high returns for investments in teak plantations. They attracted a large number of individual investors, most of whom started planting teak on leased lands that were either degraded or of low productivity. The total area brought under teak plantation was about 5 000 ha. After receiving complaints about the companies’ financial mismanagement, the Ministry of Environment and Forests appointed a technical committee to look into the matter. The committee concluded that predicted yields and financial returns were grossly inflated. The teak stumps planted were also not of genetically superior quality. The SEBI found that most of these private companies were using new investments in teak units, and not the interim returns from the established plantations, for their operations. The area of established plantations was disproportionately low compared to the funds raised and investments shown. Since the companies could not justify their claims of high returns, they were asked to terminate their operations by the SEBI in 1998. Some companies collapsed because they could not pay out promised interim returns (Chundamannil 2000).

**Impact of the incentives offered by the private sector**

Despite problems in the arrangements among companies, banks and farmers, wood supplies from farmers have increased. Many wood-based industries followed the examples of Wimco Seedlings Ltd. and ITC Bhadrachalam, by offering financing arrangements through NABARD or independent buy-back guarantees. In addition, some companies have developed captive plantations (Table 9).

While data provided by the companies cannot be independently verified, the estimated notional area covered annually is about 38 250 ha (2 000 seedlings/ha). Since most initiatives are comparatively recent and plantations are still young, the full impact in terms of wood production will only be realized in the future. However, it is certain that the companies, after initial trials and difficulties, have now attained the confidence and the expertise to produce their own raw material supplies, primarily in collaboration with farmers.

**Lessons learnt**

Due to the recent forest policy shift from production to conservation, the main objective of government wasteland development programmes is ecological restoration based on peoples’ participation. Priority has been given to supporting local livelihoods over the production of industrial wood. At the same time, afforestation activities financed externally and internally have declined

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13 An attached property cannot be sold or mortgaged by the owner. If the owner fails to pay up after being given sufficient opportunities to do so within a reasonable length of time, the dues can be recovered as arrears of land revenue by auctioning the property.

14 Plantations established and managed by a company for its own use.
since the early 1990s. Even the state-owned FDCs are discouraging intensive, monoculture industrial plantations.

On the other hand, the quality of the planting materials used by farmers has improved markedly, mainly due to the efforts of private companies. The productivity of the plantations raised through cloned seedlings has increased two- to threefold. Considering the huge demand for industrial wood, the plantation areas are still too small. The main impediments to plantation development are: (i) small landholdings; (ii) weak market development; and (iii) land ceiling regulations. Whereas small-scale farmers are often not willing to plant trees due to the long gestation period and market uncertainties, private companies fail to achieve the economies of scale to raise captive plantations cost-effectively due to the stringent land ceiling regulations. To move forward and realize the advantages that India can offer (for example, potential for high productivity, large labour force, huge demand for wood and wood products). Enabling policies, legislation and policy instruments need to be devised, and structural impediments and direct disincentives need to be removed.

Table 9: Number of seedlings distributed

<table>
<thead>
<tr>
<th>Name of the company</th>
<th>Number of seedlings distributed annually to farmers</th>
<th>Total area planted (ha)</th>
<th>Captive plantations (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wimco Seedlings Ltd., Rudrapur, Uttarakhand</td>
<td>2.7 million poplars</td>
<td>56 000</td>
<td>750 (Populus deltoides)</td>
</tr>
<tr>
<td>ITC Bhadrachalam, Paper Boards Ltd., Andhra Pradesh</td>
<td>2 million</td>
<td>10 700</td>
<td></td>
</tr>
<tr>
<td>Andhra Pradesh Paper Mills Ltd., Rajahmundry, Andhra Pradesh</td>
<td>20 million (Casuarina and Leucaena leucocephala)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ballarpur Industries Ltd., New Delhi</td>
<td>2.5 million</td>
<td>1 200</td>
<td>(eucalyptus)</td>
</tr>
<tr>
<td>Century Pulp and Paper, Lalkua, Uttar Pradesh</td>
<td>5 million</td>
<td>4 100</td>
<td>(eucalyptus)</td>
</tr>
<tr>
<td>Hindustan Newsprint Ltd., Kerala</td>
<td>1 million</td>
<td>2 030</td>
<td>2 800 (eucalyptus and Acacia auriculiformis)</td>
</tr>
<tr>
<td>JK Corporation, Rayagada, Orissa</td>
<td>10 million</td>
<td>15 000</td>
<td></td>
</tr>
<tr>
<td>Mysore Paper Mills Ltd., Bhadravati, Karnataka</td>
<td>2 million</td>
<td>30 000</td>
<td>(eucalyptus)</td>
</tr>
<tr>
<td>Sirpur Paper Mills Ltd., Sirpur-Khagaznagar, Andhra Pradesh</td>
<td></td>
<td></td>
<td>4 820</td>
</tr>
<tr>
<td>Siv Industries Ltd., Sirumugai, Tamil Nadu</td>
<td>12 million</td>
<td>10 303</td>
<td></td>
</tr>
<tr>
<td>West Coast Paper Mills Ltd., Dandeli, Karnataka</td>
<td>4 million</td>
<td>2 400</td>
<td></td>
</tr>
<tr>
<td>Kitply Agroforestry Project, a unit of Kitply Industries Ltd., Raipur, Chattisgarh</td>
<td>2 million</td>
<td>700 (Gmelina arborea)</td>
<td></td>
</tr>
<tr>
<td>Harirhar Polyfibres, a unit of Grasim Industries Ltd., Karnataka</td>
<td>12 million</td>
<td>60 000</td>
<td></td>
</tr>
</tbody>
</table>

Source: Data provided by companies
CONCLUSIONS

According to the National Forest Policy, government incentive schemes for tree planting are to target small-scale farmers and especially the weaker sections of society. Their main goals are to improve rural economies, support local livelihoods, enhance access to forest products for local use (for example, fuelwood, small-diameter wood and fodder), and achieve environmental stability. The production of industrial wood is only a secondary objective. Incentives, in the form of tax benefits, subsidized loans and extension services, to medium and large-scale farmers and others have been negligible. Income derived from selling trees grown on farmlands is exempted from the taxes. Incentives offered by the government have helped to improve the overall situation, but the cost-effectiveness and real impact have never been quantified due to the absence of adequate monitoring and appraisal tools.

To meet the demand for industrial wood, private companies have offered their own incentives to farmers. Besides buy-back guarantees, some companies assist farmers in obtaining bank loans through tripartite agreements. There are many successful experiences in establishing high-yielding plantations. However, regulatory frameworks for the operation of such schemes have not been developed, which has led to some problems. Moreover, the land ceiling laws limit the size of companies’ landholdings. This restriction seriously affects the efficiency and economic viability of plantation management.

FUTURE DIRECTIONS

The Planning Commission of India, in finalizing the “Approach Paper to the Tenth Five-Year Plan (2002-2007)”, has taken note of land and forest degradation in the rural areas. The deterioration of these resources, in combination with the overexploitation of the groundwater, poses a potential threat to food security. The Commission has also linked deforestation to the increasing drudgery of rural women in collecting fuelwood, which is further aggravated by the worsening condition of traditional water sources.

The National Development Council\textsuperscript{15} has directed that the forest cover\textsuperscript{16} be increased to 25 percent by 2007 and 33 percent by 2012.\textsuperscript{17} Achieving this target requires adequate funds, an appropriate policy framework, innovative and people-centred policies and schemes, efficient delivery mechanisms and effective monitoring at the field and national levels.

Despite the high population density, sufficient land is available to expand tree plantations not only for ecological restoration but also for the production of industrial wood. Opportunities have not been fully realized because of limited funds. Increasing investments in plantations through the involvement of the private sector requires innovative policies and support through appropriate financial policy instruments, including the following:

- The land ceiling laws need to be relaxed (to match those for tea, coffee and rubber), particularly in dry areas that cannot support agriculture, so that wood-based industries can establish large-scale and economically viable plantations. Companies should be allowed to enter into long-term lease agreements, free of land ceiling restrictions, with farmers to raise commercial tree plantations. To ensure that prime agricultural land, which forms India’s grain bank, is not diverted to tree growing, exemptions should be provided only for rainfed areas.

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\textsuperscript{15} The National Development Council, headed by the Prime Minister, is the highest planning body in India.

\textsuperscript{16} Although forest cover in the country extends over 19 percent of the geographical area, the extent of good forest cover (over 40 percent crown cover) is only 12 percent.

\textsuperscript{17} The NFAP envisages a time horizon of 20 years, which was recently reduced to ten years.
Proper regulations should be developed to control the quality of planting materials supplied to farmers through public or private agencies to ensure high productivity and disease-free planting materials. Only certified producers should be allowed to market seedlings.

Private companies starting in-house research should be encouraged and supported in developing high-yielding, disease-resistant planting stock and improved management practices. One possible approach would be tax exemptions on investments made in research.

Laws and procedures related to cutting, transporting and selling of privately owned trees should be simplified. Where government forests are absent or minimal and the risks of timber theft from public forests are negligible, restrictions on cutting, transporting and selling of privately owned trees should be abolished.

Import duties on wood and wood products should be raised to increase the competitiveness of domestic production.18

Market mechanisms should be developed to ensure reasonable prices to private wood producers.

Effective extension mechanisms should be developed through the establishment of model plantations, frequent technology promotion camps, distribution of attractive extension literature and extensive media publicity to support farmers and other landholders interested in growing trees.

The GoI is contemplating a massive people’s movement (known as “Greening India”) to raise the country’s forest cover to 33 percent by 2012. The recommended approaches include mass production of high-quality planting materials, and establishment of centralized hi-tech nurseries and a network of satellite nurseries throughout the country. Local forest officers at the district or division levels can be appointed as the Certification Authority to register, and exercise strict quality control of, government and private seed orchards, clonal orchards, plus-trees and hi-tech nurseries, tissue culture facilities and satellite nurseries.

Close collaboration with the Agriculture, Rural Development, Public Works, Irrigation and Panchayat Departments is needed to achieve the targeted coverage. At the same time, the “Greening India” initiative shall endeavour to develop and facilitate linkages between production systems and user groups. Creating awareness amongst people for tree planting in general, and quality materials in particular, will be an integral component of this programme. Non-governmental organizations and reputable village-level voluntary agencies will be involved in assessing and addressing the requirements for planting materials (quantities and species-mix), technology transfer, ecological rehabilitation of degraded sites and capacity building at all levels.

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18 Editors’ note: In general, increasing import tariffs does not enhance competitiveness but promotes inefficiencies.
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THE ROLE OF INCENTIVES IN FOREST PLANTATION DEVELOPMENT IN ASIA AND THE PACIFIC


IMPACT OF INCENTIVES ON THE DEVELOPMENT OF FOREST PLANTATION RESOURCES IN INDONESIA, WITH EMPHASIS ON INDUSTRIAL TIMBER PLANTATIONS IN THE OUTER ISLANDS

P.H. Guizol\(^1\) and A.L.P. Aruan\(^2\)

INDONESIAN FORESTRY SECTOR POLICIES AND FOREST RESOURCES

Forestry is the largest non-oil export-oriented sector in Indonesia. For over 30 years, the wood-processing industry has been supplied with low-cost raw materials from the natural forests. However, deforestation and forest degradation have led the Indonesian Government to turn to forest plantations as an alternative source of wood.

Indonesia: A large country with declining rich natural resources

Indonesia’s population of 210 million is unevenly distributed across 17,000 islands. About half of the people live on Java, which constitutes only 6.9 percent of the country’s total land area.

The natural forests of Indonesia are amongst the world’s most biologically diverse, and are characterized by three biogeographical zones:

- The western islands of Sumatra, Java and Kalimantan with their extensive dipterocarp forests;
- The intermediate zone comprising Sulawesi, Maluku and Nusa Tenggara with a variety of ebony, eucalypts and sandalwood (*Santalum album* or cendana) forests; and
- Papua in the east with less diverse dipterocarp forests containing valuable *Pometia* and *Agathis* spp.

The three largest islands – Sumatra, Kalimantan and Papua – were until recently covered by extensive forests that comprised approximately 80 percent of the total natural forests. The forest in Kalimantan and Sumatra is rich in hardwood species (mainly dipterocarps) and accounts for 75 percent of the commercial log production. Fertile volcanic soils and teak (*Tectona grandis*) plantations characterize the Javanese landscape.

At the end of the nineteenth century, the Outer Islands had a continuous forest cover while Java still possessed important forest areas. By 1950, Indonesia’s forest cover was estimated to be 162 million ha, or 84 percent of the total land area (Hannibal 1950, cited in FWI/GFM 2002).

Today, Indonesia has 120 million ha of forest land under permanent forest status (Ministry of Forestry Strategic Plan 2001-2005, cited in FWI/GFM 2002), although only 82 percent may actually be covered by forests (Fox *et al.* 2000, cited in FWI/GFM 2002). The deforestation rate continues to be as high as two million ha *per annum* (FWI/GFM 2002).

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The role of the forestry sector in the economy

Indonesia shifted from being a producer and exporter of tropical hardwood logs during the 1970s, to a major producer and exporter of processed forest products by the late 1980s. During the 1990s, it also became a major pulp producer.

**Indonesian strategy for the forestry sector: export orientation**

The forestry sector has a key role in Indonesia’s strategy for export-led development, which includes attempts to diversify exports beyond oil and gas (Madhur et al. 2000). The government has kept domestic wood prices much lower than international market prices. The vast forest resources were used for decades to attract foreign investment in wood processing and to boost economic development to generate revenues and employment, increase exports and improve the balance of payments. The comparative advantages of Indonesian wood-processing industries are competitive production costs due to low labour costs and cheap raw materials from the natural forests.

In the short term, the strategy has been successful in terms of forest product exports. However, it has also resulted in overcapacities in the processing sector and an inefficient industry that is unable to compete in the world market without subsidized wood prices. This has created an “irreversible” situation, in which the government has no choice but to continue supporting the industries by exploiting more natural forests (Karsenty and Piketty 1996).

**Employment in wood processing**

Data on employment are unreliable. Most employment is generated by the wood-processing sector. In the 1990s, formal employment in the primary wood-processing industries was about one million, and about 1.6 million including secondary processing. This corresponds to about two percent of the total national labour force (Fenton and Neilson 1998). Forests also provide jobs in the informal sector (such as fuelwood collection, handicraft and cottage industries, illegal logging). For example, each hectare of teak plantation in Java generates one to two jobs in the rural furniture industries, far more than plantation management itself. Plantations raised for the capital-intensive pulp industries generate far fewer jobs (0.1 to 0.2/ha in plantation management including harvesting).

**Forest product exports**

During the mid 1990s, the forestry sector provided about 17 percent of the total value of all export commodities (Chaumont 1999). Total exports reached a value of US$8.5 billion, with US$3 billion being attributed to pulp and paper, and US$2.5 billion to plywood. Today, pulp and paper products represent about half of Indonesia’s forest product exports in value. The Indonesian pulp industry has five main operating mills. Between 1988 and 2002, the country’s pulp production capacity expanded from 0.6 to six million tonnes/year. The importance of plywood, on the other hand, has been declining. The Indonesian plywood industry comprises 115 companies. Eighty percent of the plywood production is exported. While total installed capacity is about 12.0 million m³/year, annual production currently reaches only about 50 percent of capacity.

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3 In 1988, Indonesia became the leading exporter of tropical plywood (Madhuret al. 2000).

4 According to an estimated 5 m³/ha/year and results from Fauvreau and Laburthe (2002).
Overharvesting of natural forest

Annual raw material requirements by the wood-processing industries are about 48 million m³, with the pulp and plywood sectors taking the largest share (Figure 1). The officially recorded average annual log production has been around 22.5 million m³ over the last five years. In addition, an unrecorded amount of wood is unofficially processed by sawmills and a huge volume of logs is illegally smuggled across the country’s border.5

![Figure 1: Total wood-processing capacity](image)


Current forest policies

Role of forest categories

According to the Basic Forestry Law (UUPK No. 5 1967, Article 4), about 50 percent of the total forest land has been declared as production forest, with the remainder set aside as protection and conservation forests. The New Basic Forestry Law6 re-affirmed this classification and divides the forest land into five subcategories:

- Production forest (29 percent of the forest land): Designated for timber production in which selective felling and clear-cutting followed by reforestation are permitted;
- Limited production forest (18 percent of the forest land): Designated for erosion prevention and timber production in which selective cutting is permitted;
- Conversion forest (seven percent of the forest land): Designated for conversion to agriculture such as oil-palm plantations or other uses;
- Protection forest (27 percent of the forest land): Designated for soil and water conservation; no exploitation is permitted;
- Conservation forest (parks and reservation forests, 19 percent of the forest land): Designated for nature and biodiversity conservation; no exploitation is permitted.

Logging is permitted within the production, limited production and conversion forests only. These three categories currently cover about 65 million ha, or 54 percent, of forest land (Ministry of Forestry Strategic Plan 2001-2005, cited in FWI/GFM 2002).

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5 Official trade data show around 250,000 m³ of logs are exported annually; the volume of logs smuggled is unknown but could be as high as ten million m³/year.

6 Article 6 Undang-Undang tentang Kehutanan No/4:1999.
**Current main policy objectives and natural forest harvesting issues**

The government has five immediate programmes for forestry development for the period between 2001 and 2004, namely:

- combating illegal logging;
- controlling forest fires;
- restructuring the forestry sector;
- developing forest plantations and reforestation; and
- decentralizing the forestry sector.

Numerous regulations imposed on the industry are intended to discourage excessive logging. However, most efforts seem to have little impact. Illegal logging and timber smuggling remain substantial problems. Since the start of the monetary and political crisis in 1997, illegal logging in protected forest areas has been widespread (FWI/GFM 2002). Environmental groups and some researchers are seeking to impose a moratorium on logging in all natural forests.

**Forest management and decentralization**

Indonesia is experiencing tremendous political changes. In 1999, a central government decision passed authority to district governments to allocate “forest harvest concessions” in areas classified as forest estates. District governments could issue small concessions of up to 100 ha for timber extraction in conversion forests or under certain conditions in production forests. Initial assessments showed that since authority has been decentralized, forest resources have declined at an unprecedented pace (McCarthy 2001a and 2001b; Kartawinata *et al.* 2001).

Governmental Regulation No. 33/1970 on Forest Planning set the criteria for determining state forest lands and their use. Logging activities (mainly by private forest concession holders or *hak pengusahaan hutan* (HPH)) were based on a Long-term Forest Management Plan (*Rencana Karya Jangka Panjang*), followed by Five-year Management Plans (*Rencana Karya Lima Tahun*) and Annual Activity Plans (*Rencana Kerja Tahunan*). The Ministry of Forestry (MoF) was responsible for assessing and approving the annual plans based on selective cutting and replanting procedures. Following the decentralization of authority, provincial and district forest agencies are responsible for preparing the various plans.

**The rationale of forest plantation policies**

According to the Basic Forestry Law, State Forest Areas that are not covered by forests are to be reforested and kept as permanent forests. To supplement the diminishing wood supply from natural forests, plantations were viewed as viable alternatives especially since timber production from one ha of a productive forest plantation was estimated to be equivalent to that from 20 ha of natural forest (Davis 1989). Hence, increasing the supply of plantation-grown timber for domestic wood processors would release more timber from the natural forests for export (Davis 1989) and reduce pressure on the remaining natural forests.

**FOREST PLANTATION DEVELOPMENT IN INDONESIA**

To facilitate analysing and discussing the impacts of incentives, plantation development in Indonesia can be divided into four periods:

- Prior to 1980: Little interest in plantation development;
1980 to 1989: First efforts to develop industrial timber plantations, or *hutan tanaman industri* (HTI). Investments in plantations remained insignificant as natural forest exploitation held priority;

1990 to 1997: Supported by a variety of incentives, development of fast-growing plantations by the pulp industries flourished; and

Since 1997: Investments in Indonesia have been affected by financial and political uncertainties.

Data on plantation areas for the years prior to 1980 were derived from the literature. From 1980 onwards, MoF data on annual plantings were used (Tables 1 and 2). However, it is widely accepted that the data are unreliable as they are based on information provided by private companies or state enterprises, and are usually unverified. Some plantations might not have been established at all or have virtually disappeared due to extremely high tree mortality rates. Thus, the figures used in the analysis must be considered as a theoretical maximum. Despite their weakness the available data indicate a trend, and help to illustrate how policies, laws and incentives have affected investor decisions.

### Table 1: Industrial timber plantations by ownership type (ha)

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Private</td>
<td>102 080</td>
<td>741 339</td>
<td>263 279</td>
<td>1 106 697</td>
</tr>
<tr>
<td>Joint venture</td>
<td>5 211</td>
<td>882 975</td>
<td>191 901</td>
<td>1 080 087</td>
</tr>
<tr>
<td>Total</td>
<td>107 291</td>
<td>1 624 314</td>
<td>455 180</td>
<td>2 186 784</td>
</tr>
</tbody>
</table>

### Table 2: Industrial timber plantations by purpose and transmigration (ha)

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulpwood</td>
<td>19 010</td>
<td>934 029</td>
<td>301 776</td>
<td>1 254 815</td>
</tr>
<tr>
<td>Non-pulpwood</td>
<td>88 281</td>
<td>415 009</td>
<td>72 107</td>
<td>575 396</td>
</tr>
<tr>
<td>Transmigration</td>
<td>0</td>
<td>275 276</td>
<td>81 297</td>
<td>356 573</td>
</tr>
<tr>
<td>Total</td>
<td>107 291</td>
<td>1 624 314</td>
<td>455 180</td>
<td>2 186 784</td>
</tr>
</tbody>
</table>

### Plantation categories

The term “plantation” is used in Indonesia for a variety of perennial crops (for example, rubber, cocoa and oil-palm). Including such estate crops, plantations cover a total area of about ten million ha. In the following discussion, reference is made only to forest plantations (excluding estate crops), which are divided into plantations in production forests and on critical lands.

### Plantations in production forests

The two main plantation types in production forests are the HTIs on the Outer Islands and the plantations in Java. They are predominantly managed by the HPHs and forest plantation companies to supply wood to the pulp and paper industries, under the supervision of the Directorate of Management of Development of Plantation Forest. The HTI transmigration scheme also falls

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8 Defined by Decree 320/Kpts-II 1986, the purpose of the HTI was to enhance the output of unproductive forest land and to produce raw material for the industries. HTI operators include HPHs, provincial forestry offices, state enterprises and private companies that are regarded and classified as able and appointed by the MoF.
under this category. HTIs on the Outer Islands consist of fast-growing species (rotation lengths range from seven to 12 years). They have been established since 1985 and are mainly managed by private companies or through joint-venture arrangements with state forest enterprises, such as Inhutani. According to private company data, the HTIs on the Outer Islands cover 2.1 million ha, although the actual area reaches only between 0.9 and 1.2 million ha. The total productive area in Java is about one million ha. Java’s teak, pine or mahogany (Swietenia macrophylla) plantations differ from those on the Outer Islands in the following characteristics:

- Rotations range from 20 to 80 years;
- Most were established in the early 1900s and management systems have changed little since then; and
- A single state enterprise (Perum Perhutani) manages these plantations.

**Afforestation or rehabilitation of critical lands: state initiatives**

Regreening or afforestation on non-forest lands in Java and the Outer Islands is supervised by the Directorate of Reforestation and Rehabilitation of the MoF jointly with other Directorates (for example Directorate of Soil Conservation) or ministries (for example Ministry of Public Works). The Directorate of Reforestation and Rehabilitation is also responsible for reforestation of forest land on the Outer Islands. Characterized by poor survival rates, most of these plantations were established for protective purposes. The same directorate also promotes agroforestry and social forestry. In addition, the MoF has promoted community-based forest management and plantations through out-grower schemes on the Outer Islands.

**Farm forestry and agroforestry: smallholders’ initiatives**

Farm forestry and agroforestry are well developed in Indonesia, especially on Java where millions of farmers manage trees in their gardens and community forests. Farm forestry and agroforestry provide, though often unrecorded, wood supplies for domestic consumption and raw materials to small- and medium-scale enterprises. In Java, the main species planted are *Paraseriethes falcataria* (sengon), mahogany and teak.

**Prior to 1980: Little interest in plantation development**

**Productive plantations**

Prior to 1980, forest plantations (of mainly teak) were almost exclusively located in Java; rehabilitation planting took place either on Java or on the Outer Islands. Indonesia experienced several successive waves of reforestation programmes, but they have left few traces. Forest plantation development on the Outer Islands was not a priority.

Since 1895, large-scale industrial plantations have been established on Java (Fenton and Neilson 1998). Teak, the principal species, was planted mainly in Central and East Java. By 1940, 266 000 ha had been planted with teak (Davis 1989). By 1980, the plantation area, including regreening and rehabilitation projects, had officially reached about 1.5 million ha, of which 800 000 ha were industrial teak plantations and 280 000 ha were planted with pine.

Due to the land scarcity on Java, agricultural crops (for example, maize, pineapple or *Calliandra calothyrsus* during the first few years after planting) were integral features in forest plantation establishment. Until recently, Perum Perhutani also provided employment to landless farmers. It

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9 Teak was planted in West and East Nusa Tenggara as well.

10 According to Perum Perhutani, the total area of teak plantations is 1.09 million ha; 0.8 million ha refers to the area of productive teak plantation.
has its own budget, which is supplemented by funds made available through presidential instructions for social forestry and reforestation activities. Perum Perhutani had full control over the plantations until the 1997 monetary and political crisis.11

**Large government rehabilitation programmes of the 1950s and 1960s**

Prior to 1980, reforestation activities implemented by the government had little success. Most of the regreening and rehabilitation programmes were financed through special presidential instructions or projects funded by the Asian Development Bank.

Plantings (of mainly pines) in the 1950s and 1960s covered 400,000 ha in Sulawesi, 200,000 ha in Kalimantan, and up to 1.6 million ha in Sumatra. These figures do not account for losses incurred after the survival assessment (three years after planting) and are unreliable. By 1980, the survival rate at Year 9 was as low as six percent for regreening and 34 percent for reforestation (FAO 1980; cited in Davis 1989). These plantations might have been repeatedly burned or harvested and not replanted. Apparently, only about 67,000 ha established under the programmes have remained (Fenton and Neilson 1998).

**Private plantations in logging concessions on the Outer Islands**

Before 1969, commercial timber exploitation on the Outer Islands was insignificant. It was promoted by the initial Five-year Development Plans or Repelitas (1969/1970-1973/1974 and 1974/1975-1979/1980) and started to take off slowly in the early 1970s. The goal was to attract foreign and domestic investors. Logging concessions were leased initially for 20 years and could be extended to 35 years. Although regulations stipulated that the HPHs had to invest in forest plantations, most did not. In fact, only four percent of the companies followed the regulations (P.T. ITCI established 5,000 ha of plantations between 1974 and 1980 in Kalimantan); the government never prosecuted companies for non-compliance.

**Lessons learned prior to 1980**

As Indonesia’s natural forest resources were perceived to be indefinite, serious efforts in forest plantation establishment were lacking. Regulations did not control timber exploitation in natural forests effectively or trigger significant tree planting and forest rehabilitation. In fact, both were viewed as a formality or a target to be reached on paper only but not on the ground. They were phantom activities that generated income for the forest administration with few tangible accomplishments.

**1980-1989: Plywood and natural forest concession development**

**Forest policy: Support of domestic wood processing**

During the 1980s (the golden age of logging in Indonesia), HPHs enjoyed virtually unlimited freedom and extensive natural forest areas were degraded. At the same time, demand for industrial wood increased dramatically, induced by incentives from the government to develop domestic downstream wood processing. Roundwood exports were restricted to help the domestic industry compete with foreign wood processors (Decree MoF No. 317/Kpts/1980). Log exports were banned in 1985 and domestic wood prices were kept below world market prices to further assist the domestic industries, especially plywood producers.

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11 Today, rotations are shorter and teak plantations suffer from illegal logging.
Between 1980 and 1989, the number of plywood mills increased from 29 to 116 (Fenton and Neilson 1998). Within only one decade, Indonesia became the largest exporter of tropical timber products. Annual plywood production surged from one to nine million m$^3$, which created a huge domestic demand for timber.

**Main government decisions related to plantation development**

To mitigate the negative impacts of timber exploitation and generate alternative timber supplies, the government set up a reforestation fund and promoted large-scale industrial timber and pulp plantations of fast-growing species.

**The Reforestation Fund**

Prior to 1980, HPHs did not rehabilitate the logged-over forests within their concessions as expected. The first attempt to address this situation was the introduction of the Danan Jaminan Reboisasi (DJR), or Reforestation Fund, by Presidential Decree No. 35 in 1980. HPHs were required to pay US$4/m$^3$ for logs or US$0.5/m$^3$ of chipwood extracted from forests in Kalimantan and Sumatra. The payments, which were in the form of a bond, went into the DJR to guarantee sustainable forest management by the HPHs. The DJR was to finance seeds and seedlings, land clearing, planting, weeding and inventory of logged-over forest stands. According to DJR regulations, HPHs could reclaim the bonds once they had fulfilled their obligations. Most concessionaires chose not to plant, but rather to write off their contributions to the DJR, which consequently grew considerably.

In 1984, the DJR was changed to Dana Reboisasi (DR), which could provide direct incentives for plantation development inside as well as outside concession areas. The government could use the bonds from non-performing HPHs for other purposes (Decree MoF No. 327/Kpts-II/1988). The DR became a royalty and was increased from US$4/m$^3$ to US$7/m$^3$ in 1989 to further support the development of HTIs.

**The development of HTIs**

In 1989, it was anticipated that wood demand would outstrip supply derived from natural forests. To counter the growing gap between supply and demand, the government planned the conversion of 4.4 million ha of unproductive land$^{12}$ to short-rotation plantations, to increase the plantation area from 1.6 million ha to six million ha by 2000.

**Research**

The government initiated research on fast-growing species to support the programme of rehabilitation of degraded lands and to create fuelwood plantations. Trials for pulpwood species were established on Java, Sumatra, Sulawesi and Nusa Tenggara. Research of private companies focused on *Acacia mangium* and eucalyptus species.

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$^{12}$ Unproductive lands were defined as *Imperata cylindrica* grasslands and shrub forests within production forests.
Limited impacts of the DJR and DR on the establishment of HTIs

Forest plantation development

Industrial plantation development was marginal between 1980 and 1989 (Figure 2). The first HTIs on the Outer Islands were established for non-pulp uses\(^\text{13}\) in 1985.\(^\text{14}\) About 55 000 ha had been planted by 1988. During 1989, around 19 000 ha of pulp plantations were established. In total, between 1984 and 1989, 107 000 ha of productive plantations were reportedly established, compared to an annual target of 300 000 ha (Figure 3).\(^\text{15}\) Following the changes since 1984, plantation development accelerated although it remained far behind the government’s expectations.

\[\text{Figure 2: Area of plantations (1980-1989)}\]

Natural forest logging: A disincentive for plantation development

The imposition of the log export ban discouraged plywood industries from investing in forest plantations. As large volumes of wood were available from the natural forests, investing in plantations was viewed as financially unattractive. By doing so, the government sent contradictory signals to industry with respect to forest plantation development and intentions to use the DJR for plantation development.

It was very naïve to rely on concessionaires’ goodwill for the rehabilitation of logged-over forests. In fact, concessionaires enjoyed enormous profits from exploiting natural forests while investing the proceeds outside the forestry sector. The interest rate for borrowing capital was about 20 percent in 1989, which was enough to discourage most investments in plantations.

\(^{13}\) This excludes enrichment planting on the Outer Islands. Enrichment plantations refer to plantations of wild seedlings in areas where natural generation has failed. During this period, an average of 5 000 ha/year of enrichment plantations were established. However, survival rates were poorly recorded and it appears that many plantations exist on paper only.

\(^{14}\) From 1985 to 1990, some plantations were established in Java to supply small-scale enterprises. For example, 35 000 ha were set up to provide material for a pulp mill at Cilacap. Other industrial plantation projects planted *Paraserianthes falcataria* and eucalyptus.

\(^{15}\) The target of Repelita IV (1984-1989) was set at 1.5 million ha over five years.
THE ROLE OF INCENTIVES IN FOREST PLANTATION DEVELOPMENT IN ASIA AND THE PACIFIC

In the HPHs on the Outer Islands, 29 concessionaires and four state enterprises (Inhutani I, II and III and Perum Perhutani) were involved in HTIs between 1984 and 1989 (Davis 1989). The main species planted during that time were eucalyptus, *Acacia mangium* and *meranti* (*Shorea* spp.). Due to a general lack of interest by the concessionaires, plantations were poorly maintained after the first three years, and were burned in many cases.

1990-1997: the expansion of pulp plantations

Context and main policies: oil-palm, pulp and paper development

During this period the government embarked on a development policy for oil-palm. Its intention was to ensure adequate supplies of cooking oil for domestic consumers, promote industrial development and boost exports. Plywood production remained stable\(^{16}\); the production and export of wooden components, furniture, and pulp and paper rose sharply.

The government continued to promote the establishment of large-scale industrial timber and pulp plantations. This was motivated by the anticipation of a raw material deficit by 2000, due to expanding domestic and export markets, and continuing deforestation and forest degradation. The target for production plantations by 2000 was five million ha.\(^{17}\) The plantation development target for Repelita V (1989-1994) was 1.5 million ha and it was slightly reduced for Repelita VI (1994-1999) to 1.25 million ha.

\(^{16}\) Annual plywood production was 8-9 million m\(^3\); it peaked in 1992 and 1993 at about ten million m\(^3\).

\(^{17}\) Investment needed for achieving the target of some five million ha of productive forest plantations outside Java was estimated to be up to US$5 billion (Davis 1989). The target of 25 million ha of plantations, including rehabilitation and protection plantations, was set for 2000.
Main incentives for industrial forest plantations

In 1990, the MoF decided to encourage private-sector investments in forest plantation development. Incentives targeted the Indonesian wood conglomerates, foreign investors, state enterprises and HPH holders. The main government schemes included:

- promotion of HTI development;
- joint ventures between private companies and state enterprises;
- modification of the reforestation funds; and
- HTI transmigration programme.

These schemes were inter-related. They provided HTI developers access to forest land, ready sources of capital and also cheap labour through the HTI transmigration scheme.

The HTI development policy

The official aim of promoting HTIs was to create wood resources on unproductive forest lands located in “productive forests”. However, in practice because of a lack of control and collusion, it triggered, in many places, clear-cutting of rich natural forests.

The HTI development policy was backed by a number of regulations throughout the 1990s. It was part of a development policy that recommended wood production within a 100-km radius around the pulp mills. In the early 1990s, prior to submitting proposals for investments in the pulp industry to the government, companies were required to demonstrate their capability to develop forest plantations by planting an area of 30 000 ha.¹⁸ A number of plantations were established for this purpose between 1990 and 1992.

The main incentive was access to unproductive forests (Government Regulation No. 7/1990). After 20 years of logging (with frequent re-entries), many old forest areas were severely degraded. Some of these areas were thus legally converted into HTIs.

Joint ventures with state-owned companies

A state-owned forestry company, Badan Usaha Milik Negara (BUMN), and Inhutani on the Outer Islands, together with a private company, were made responsible for the management of logged-over forests from revoked HPH concessions. Through such ventures, land, access to reforestation funds and, in some cases, advantages associated with transmigration projects, were integral features of the partnership.

HTI transmigration scheme

The Ministries of Forestry and Transmigration jointly introduced the HTI transmigration scheme in 1990. One objective of this scheme was to control population growth in densely populated regions (Java and Bali). Another purpose was to provide cheap labour to a variety of companies active on the Outer Islands. The scheme started with the Ministerial Decree No. 341/Kpts-II/1992. The decree effectively reduced labour costs and indirectly subsidized plantation development as well as the expansion of oil-palm plantations.

Modifications to the reforestation fund

In 1990, the DR became a royalty and was increased from US$7 to US$10/m³ for logs and set at US$1.50/m³ for chipwood and logging waste (Presidential Decree No. 29/1990). In 1996, the

¹⁸ Christian Cossalter, CIFOR, personal communication.
“DR procedure for Government Capital Share and DR Loan for HTI Development” defined the DR-related financing schemes for joint ventures. Plantation development could be financed as follows: 14 percent Government Capital Share, 21 percent private capital share, 32.5 percent loan from reforestation funds and the remainder of 32.5 percent by commercial loans. As official figures for plantation establishment costs were usually inflated, capital provided through the financing schemes frequently exceeded actual costs.

The loans from the DR were interest-free for private enterprises willing to invest in plantations. They had to be repaid within seven years (the anticipated rotation length of *Acacia mangium* plantations). Disbursements were made annually or half yearly, based on assessments by state enterprises or consultants using a standard scoring system. The disbursements took into account the previous year’s performance, the annual working plan, and corrections related to the previous disbursements.

For “pure” private companies, 100 percent of the funds could come from commercial loans. The government also supported companies borrowing establishment capital from banks or other financial institutions (Barr 2000).

### Other incentives

Research has focused mainly on fast-growing species for short-rotation fibre production (for example, *Acacia mangium*, *Pinus merkusii*, *Paraserianthes falcataria* and *Gmelina arborea*). In the drier areas, teak and mahogany were also tested. Besides the traditional research by government bodies, private companies (pulp and paper) tested fast-growing species. The main improvements were derived from *Acacia mangium* selection.19

The Wood Utilization Permit (IPK) was introduced, granting the right to use logging residues from conversion or degraded forests in HTI concessions, which were joint ventures with Inhutani.20 Logs were supposed to be under 29 cm in diameter. The IPK allowed access to low-cost wood for pulp mills. Controls in the field were difficult and, in some cases, the IPK resulted in clear-cutting of rich natural forests. It encouraged plantation development to some extent, as it reduced the cost of clearing land.

### Impacts of cross-sectoral policies

#### The 1991 tight money policy

In early 1991, a rumour about the imminent devaluation of the rupiah increased the risk of a double-digit inflation and an eventual devaluation. Faced by pressure to sell the rupiah, the government initiated a tight money policy (TMP), or the Sumarlin Shock II. The TMP restricted offshore loans and limited mega-projects. As a result, several plantation projects were cancelled after October 1991.21

#### The oil-palm development policy

From 1994 to 1997, the oil-palm boom had a direct negative impact on forest plantation development (Figure 4). During Repelita V (1990-1994), the government gave high priority to the agricultural development of provinces outside of Java. This was successful for oil-palm plantation establishment, which attracted many investors.

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19 Before selection, the mean annual increment (MAI) was on average around 15 m³/ha. Improved varieties reached more than 30 m³/ha. Rotation declined from 12 to seven years.

20 Wood Utilization Permit (IPK), MoF Decree No. 178/Kpts-II/1996.

21 For example, P.T. Rimbabelantara Pertiwi (C. Cossalter personal communication). See also Iljas (1998) and Watanabe (1998).
The oil-palm sector enjoyed a variety of government incentives: government-funded infrastructure, easy land access and acquisition, credit for investors, subsidized interest rates, cheap labour as a result of transmigration projects, and policies conducive for attracting foreign capital (Potter and Lee 1998). These incentives accelerated the conversion of natural forests. Some companies also applied for oil-palm concessions in Kalimantan or Papua to harvest timber during land clearing. Such activities sometimes extended into production forests and even protected forest areas (Casson 2000).

The area of oil palm plantations reached 1.1 million ha in 1999 (Departemen Kehutanan dan Perkebunan, cited in Casson 2000). This expansion occurred mainly in Sumatra, and to a lesser extent in Kalimantan.

In some cases, oil-palm development competed directly with forest plantation development for land, as witnessed in the P.T. Finnantara (Stora-Enso) concession in West Kalimantan, and for financial resources, as in the case of the Sinar Mas (Indah Kiat-WKS) and APRIL (RAPP) groups.

**Impacts of incentives on plantation development**

During Repelita V (1990-1994), 900 000 ha of large-scale plantations were planted, amounting to 60 percent of the 1.5 million ha target. Overall, it was a period of rapid HTI expansion, although the annual target of 300 000 ha planted was only met in one year, that is 1993 (Figure 5).

From 1990 to 1993, “pure” private companies invested considerably in forest plantations to persuade the government to approve their pulp mill development plans. These plantations achieved a record growth of 170 000 ha in 1993. In 1994, most of the requests for pulp mills were granted. The joint-venture investments in forest plantations were high from 1992 to 1997. They peaked in 1992 when the HTI transmigration programme was initiated and in 1996 when access to the reforestation funds was facilitated by regulation MoF 375/Kpts/1996. The cartels, which held the HPHs-HTIs, however, soon turned to new investments, such as oil-palm plantations. As a result, investments in private forest plantations decreased drastically and annual plantation establishment has since then been below 100 000 ha.

**Impact of HTI transmigration scheme**

The HTI transmigration programme accounted for 20 percent of the reforestation fund disbursement. However, the HPH companies participating in the programme were rather
inexperienced in forest plantation development. In many cases, the plantations were unsuccessful. Some were located in remote areas too far from industries. The most successful ones were associated with large HTI projects, such as the joint venture with Barito Pacific in South Sumatra.

**Impact on small-scale HTIs, smallholders and communities**

Small-scale concession holders had no access to the reforestation funds. Small-scale plantations have generally remained undeveloped despite MoF Decree No. 69/Kpts-II/1995 that obliges HTIs to involve communities in forest plantations. The decree does not specify how management of the plantations and their benefits are to be shared. Few HTI-concession holders paid attention to the welfare of local communities. P.T. Finnantara was amongst the few that tried establishing partnerships between communities/smallholders and large companies during Repelita VI (1994-1999). This attitude changed only with the increase in social disputes over land rights and forest fires.

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**Figure 5: Annual plantation establishment**

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Sources: MoF (1989); MoF (1989-2000); Directorate of the Management of Forest Plantation (2000/2001)

a: Presidential Decree 35/1980 (bond for HPH rehabilitation)
b: Repelita IV (1984-1989), political decision to develop industrial plantations
c: Some impact due to Decree MoF 320/1986 (HTI and reforestation funds)
d: Land access facilitated by Decree MoF 327/1988 about non-performing HPHs and Decree MoF 495/1989 (IPK) on easier access to reforestation funds; impact on joint ventures
e: Beginning of the TMP; negative impact on pure private plantations
f: HTI transmigration scheme launched in 1992; impact on joint ventures
g: Reforestation fund regulation (MoF 375/Kpts/1996): impact on joint ventures
h: 1997 economic crisis; less HTI transmigration, extensive forest fires, decrease in joint ventures
i: End of reforestation funds; drastic decline in joint ventures
**Misuse of the reforestation fund**

From 1990 to 1994, access to land and capital were the major incentives for forest plantation development. However, procedures to access the reforestation fund were not transparent. Funds were mainly available to a select group of people with close ties to the political elite. Many investors sought to maximize their short-term profits and neglected the long-term future of their plantations. Most HPH holders were involved in HTIs only to extend their logging permits. In many cases, the MoF did not enforce its regulations and allowed companies to establish HTIs in rich natural forests. The state forest enterprises themselves were not always eager to develop HTIs, as logging in natural forests was considerably more profitable.

Few companies used the reforestation fund as stipulated despite guidelines to prevent misuse. Companies had to formulate proposals requesting the reforestation funds for HTIs. Once the proposals were approved and funds disbursed, companies established plantations on smaller areas than actually declared.22 There was a lack of independent monitoring and assessments, the main weakness of the system. Although the MoF was to conduct field assessments, it had limited resources for field inspections. In addition, information was not shared by the various divisions in charge, which exacerbated comparisons between field and disbursement data (Ernst and Young 1999).

Some companies have also been suspected of deliberately setting fire to plantations, especially if plantations were unsuccessful. This was one way to avoid repaying loans at the end of the seven-year term. Other companies minimized costs by using poor planting techniques, such as direct seeding, to divert funds to other activities.

The government itself used a large proportion of the reforestation fund for non-forest related projects. Between 1993 and 1998, US$5.25 billion was lost from the reforestation fund, due to poor enforcement (Down to Earth 2000). The reforestation fund disbursed US$950 million between 1990 and 1997 for forest plantation development (Kamil 2001). This should have been sufficient for establishing approximately five million ha, compared to the 0.9 million ha that were actually established using the fund.23

**Lessons learnt and discussions**

The area under forest plantations increased more slowly than planned by the government. However, plantation development accelerated between 1990 and 1997. About 1.6 million ha of plantations were established, although doubts about the accuracy of this figure remain.

*Acacia mangium* was the predominant species. Direct incentives assisted joint-venture efforts to establish 0.9 million ha. Private companies established another 0.7 million ha without any direct incentives. This suggests that direct incentives are not necessarily needed to stimulate investments in short-rotation plantations.

The misuse of the reforestation fund was not surprising, considering the political and economic context during the Suharto era. With poor governance and control, channelling direct payments through the reforestation fund proved to be virtually impossible. The lack of independence and integrity of consultants evaluating the results, and the lack of reliable data and maps were key factors that led to the improper use of the funds.

Incentives for forest plantation development cannot be seen in isolation from other government decisions. The TMP and the oil-palm development policy had a significant influence on the willingness to invest in plantation development after 1992. Investors preferred commodities,

22 For example, P.T. Musi Hutan Persada claimed 200 000 ha were planted, while independent estimates are in the order of only 100 000 ha.

23 Another evaluation (up to May 2002) found that 1.2 million ha were established under joint-venture arrangements (MoF Directorate General of BPK – Ministry of Forestry 2002).
such as oil-palm, with more rapid returns. In addition, the re-organization of the MoF and the appointment of a new Minister of Forestry in 1994 also delayed new forest plantation developments.

1998-2002: The forest sector during the Indonesian crisis

The new political context and its impact on forest plantation development

General investment climate: lack of confidence

The 1998 economic crisis and subsequent political changes in Indonesia kept investors away from Indonesia. Political instability on the Outer Islands and conflicts with local communities led to the failure of the transmigration programmes. The rapid development of the wood-processing sector of the previous decades resulted in an industrial overcapacity that could not be met by the annual wood production, and illegal logging filled the gap. Poor law enforcement reinforced the impact of the crisis on the forest plantation sector. The government did not even issue specific targets for HTI development in Repelita VII (1999/2000-2004/2005). Plywood exports fell from eight million m³ in 1998 to 6.3 million m³ in 2001.

The decentralization process encourages logging

The regional autonomy policy came into effect in 2001, allowing regional authorities to take charge of forest concession licensing. The provincial governors were authorized to issue forest concession permits for up to 100,000 ha. Small-scale logging concessions under 100 ha could be issued at the district level. Such arrangements caused considerable confusion since regional policies often differed from that of the central government. For example, the central government revoked a number of HPHs but local governments assigned new, smaller concessions. The outcome encouraged logging, legalized part of the ongoing illegal logging and gave industry access to wood resources at cheap prices.

Incentives and disincentives: unclear messages to investors

The domestic wood price

Two sets of measures were taken to bring domestic wood prices in line with world market prices, namely:

- A Letter of Intent (LOI) between the Indonesian Government and the International Monetary Fund, which paved the way for trade liberalization in the wood industry (the LOI revoked the ban on log exports); and
- Increased levies for wood from natural forests.

Logging companies operating legally must comply with replanting regulations and pay up to 13 forestry-related fees. Fees total about US$35/m³ of logs harvested from designated forest areas. Recent policy subjects logs to a ten-percent value added tax (VAT). However, illegal logging has upset these measures and no clear signals have been sent to investors. In fact, the government recently re-imposed the log export ban.

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24 MoF Decree No. 05.1/Kpts-II/2000 about Forest Utilization Permit and Forest Product Harvesting Permit in the Production Forest.
26 MoF Decree No. 510/1998 – Allow small log export.
27 MoF Decree No. 1132/Kpts-II/2001 – Ban of export logs/raw material for chips.
The suspension of reforestation fund disbursements

This period was characterized by a drastic reduction in the contributions from the reforestation fund. Bowing to international pressures, the management of the reforestation fund was transferred from the MoF to the Ministry of Finance in 1998, and an audit of the reforestation fund was conducted in 1999 (Ernst and Young 1999). The audit results have not been widely publicized. The reforestation fund was frozen from 1998 to 2002.

In 2002, a decision was made to resume using the reforestation fund, which stood at that time at around Rp7.8 trillion. The head of the district (Bupati) is to conduct field monitoring to control the use of the fund. The allocation system has remained unchanged, and the fund is to be managed by the MoF headquarters and the Bupati.28

A new trend: incentives to attract smallholders and communities

Policy for community involvement in plantations

MoF Decree No. 69/Kpts-II/1995 requires HPHs and HTIs to involve communities in forest development. Community involvement in forest management is also stressed in the Basic Forestry Law (No. 4/1999). Other decrees emphasize the rights of local communities and their access to credit. In addition, forest exploitation was opened to cooperatives soon after the departure of Suharto as president.

Private initiatives of community involvement

Indonesia’s pulp producers increasingly require wood from plantations. However, access to land and wood supplies were constrained due to land disputes between companies and local communities. As a result, some companies are testing new forms of partnerships with individuals or communities through cooperatives. P.T. Musi Hutan Persada, an HTI in South Sumatra linked to the Barito Pacific group, provides three types of incentives to encourage villagers to plant trees on community lands:

- wages for labour during the planting phase;
- management fees paid to local community organizations; and
- production fees after harvesting.

On private land, other incentives include:

- material inputs and technical advice from the company;
- financial support for owners; and
- sharing of revenues with landowners receiving 40 percent and the company 60 percent.

All other major HTI companies, such as Finnantara Intiga in West Kalimantan, RGM and P.T. Araba Abadi in Riau, and P.T. Wirakarya Sakti in Jambi, are offering similar incentives to communities and small-scale landowners.29 However, these attempts are still in their infancy: In 2001, the total cumulative area of such partnerships initiated by large pulp companies covered only about 30 000 ha.

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28 PP 35/2002 on reforestation fund.
29 For more information about Finnantara and the WKS outgrower scheme, see Nawir et al. (2002).
**Impacts of the crisis: fewer incentives, less plantations**

Annual forest plantation development decreased from 230,000 ha in 1997 to 78,000 ha in 2000, most being private plantations (Figure 6). This largely reflected the termination of the transmigration projects, loss of contributions from the reforestation fund, uncertain land tenure and the increasing attractiveness of oil-palm. Private investments were less affected than joint ventures from these developments.

Although wood production derived from plantations is not sufficient to meet the needs of the pulp industry, it is slowly increasing.\(^{30}\) Most large pulp producers are developing plantations to supply their mills despite considerable problems with land access and tenure, and escalating land disputes. The quality of plantations is improving, as the industry increasingly relies on plantation wood.

![Figure 6: Annual plantation development (1998-2002)](image)

**Lessons learnt and discussions**

Concession holders have learned that their authoritarian relationship with local people poses a risk for forest plantation development. The rapid expansion of plantations in the early to mid-1990s, during which large conglomerates benefited from the incentives, was unsustainable. The most equitable incentives since the late 1990s have been the efforts to support community forestry. Within the current policy context of Indonesia, plantation developers have realized that they must also invest heavily in infrastructure and social relationships.

Today, the key problems of the concessionaires and investors are poor law enforcement and security of their plantations. Developing partnerships and positive relations with communities is a long-term investment – much longer than a rotation of *Acacia mangium*. The duration of concession rights for HTIs follows that of HPHs. It is most suited for operators whose only interest is in logging but not for companies that invest heavily in forest management prior to harvesting.

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\(^{30}\) For example, Riau Andalan Pulp and Paper claims that supply from *Acacia mangium* plantations contributed up to 30 percent of their raw material needs in 2002 and is expected to reach 100 percent by 2008.
OBSERVATIONS AND FINDINGS

Links between policies and their impacts on plantation development are not straightforward. In fact, declarations, laws and guidelines are only indicators of the decision-making processes, which are affected by a variety of factors that cannot be completely identified. Policies also remain ineffectual if they are not implemented.

A major factor that cannot be directly observed is the political-economic context in which policy-making processes are taking place. Since the 1970s under the New Order Regime, the forests and non-renewable resources have been overexploited with a small elite profiting most (Dauvergne 1994; Durand 1994; Barr 2000).

While the effects of policies take time to become apparent, other decisions made by the government and other stakeholders also affect the magnitude of the potential impacts. It is thus difficult to identify the exact cause-and-effect relationships or to interpret the impacts.

Continuing deforestation in Indonesia

Even though most of the forest plantations were established during the 1990s, deforestation continued largely because of poor governance, given the political and economic situation in Indonesia (Barr 2000). The government approved the development of too many pulp mills. The excessive installed capacity necessitated the use of mixed dipterocarps as raw material. In many places, the pulp producers were enabled to establish plantations in rich natural forests without any sanctions. The HTI policy to rehabilitate overharvested production forests was actually being used to degrade natural forests.

Provision of cheap raw material for the wood industry

The policy of providing cheap raw material for the wood processing industry has proven to be a major disincentive for forest plantation investors. Wood stumpage prices dropped and developing plantations became financially unattractive. Measures to increase wood stumpage prices and reduce access to natural forest resources would likely be a more efficient way to promote forest plantation development.

Incentives, market prospects and land security

In the early 1990s, forest plantations mushroomed in response to the perception of an ever-increasing demand in Asia for pulp and paper products, and government incentives. The requirement for an industrial plantation to be established before being granted a permit to set up a processing plant also triggered private and joint-venture initiatives in tree planting.

In fact, the boom-and-bust cycle was similar to developments in the plywood sector during the 1980s when the installed processing capacity outpaced the wood output from Indonesia’s forests. The plywood industry continued to expand without proper investment in sustainable forest management and plantation development, eventually leading to the problems the plywood industry and the entire forestry sector face today.

Reforestation fund irregularities

According to the most recent assessment by the MoF (based on company declarations), the reforestation fund has helped to establish 1.2 million ha of joint-venture plantations, an area that is only one-fifth of what it should be if the fund had been used properly. Even then, in some cases, the area established was exaggerated or inferior planting stock and techniques were used
to minimize the costs. Many incentives had been abused and this was largely due to a lack of control by independent bodies.\textsuperscript{31}

Private plantations established without assistance from the reforestation fund were doing as well as joint-venture establishments supported by the fund. This suggests that the reforestation fund or direct subsidies may not be needed for the development of plantations that rely on fast-growing species.

**Cross-sectoral impacts**

Developments in other sectors have also had a major impact on forestry development in Indonesia. For instance, the 1991-1994 TMP or the 1994-1998 boom of oil-palm plantations significantly slowed down the HTI development. Land-use conflicts between different sectors also posed problems for plantations. In some cases, concessions for agricultural development in areas around paper mills were issued, such as in Riau, or they overlapped with forest plantation concessions, such as in West Kalimantan. In Riau, two huge complexes of pulp and paper industries were established in the same area, increasing wood-supply problems and land-use pressures.

**Non-involvement of the local population**

Rapid plantation development during the early 1990s rarely considered the interests of the local population. It was thus unsustainable and often created more long-term problems. It is now generally accepted that the involvement of local communities is necessary to ensure the success of plantations.

**RECOMMENDATIONS**

**Direct subsidies should be reserved for long-term investments**

Subsidizing short-rotation plantations is usually neither necessary nor useful. Instead incentives should be provided for long-term rotation plantations that have the potential of producing more raw materials to supply future timber and pulp industries. These plantations also provide more environmental services.

Land-use planning, land-tenure resolution, social forestry and social welfare are issues that must be addressed by the government. The private sector is not in a position to deal with such issues effectively. Government support is also needed to encourage private investments in long-term forestry projects.

**Control of pulp and paper mill supplies should be tightened**

Deforestation in Indonesia is currently out of control due to:

- illegal logging and poor governance;
- low salaries of MoF employees;
- conflicts of interests amongst various ministries; and
- other problems (for example, debts, poverty, transition to decentralized authorities, extortion, corruption).

\textsuperscript{31} In late 2002, the Ministry of Forestry revoked the timber concessions of 15 companies due to their failure to develop required industrial timber plantations. Companies had been awarded a total area of 989 079 ha, but developed only 188 950 ha, despite the government providing them with loans for the purpose (Jakarta Post, 12 November 2002).
The government should strongly discourage pulp industries from using mixed-tropical hardwoods, but persuade them instead to utilize plantation-grown or imported wood. Eventually, the Indonesian wood industry will have to rely on sources other than the natural forests to meet raw material requirements. Wood prices at the mill gate need to be on par with world market prices. Currently, the main disincentive for plantation establishment is the low stumpage price. Past experience has shown that direct incentives for forest plantation development (such as soft-loans, grants) are likely to be abused. An efficient stimulus would be to increase the mill gate price for wood as early as possible.

Capacity of state forestry officers should be strengthened

Indonesia needs to create a new generation of state forestry officers who are dedicated to sustainable forest management. Foresters need to be well paid and equipped in order to be independent of the industry and concessionaires whom they are to monitor and control. To be totally transparent, MoF employees and NGOs should jointly monitor and control natural forest management, plantation developments and the wood-processing sector.

Taken, together, these measures could be more effective for forest plantation establishment in Indonesia than the provision of direct incentives.

LITERATURE CITED


IMPACT OF INCENTIVES ON THE
DEVELOPMENT OF FOREST
PLANTATION RESOURCES IN
SABAH, MALAYSIA

Chan Hing Hon¹ and Chiang Wei Chia²

INTRODUCTION

This paper presents a case study of a private enterprise involved in forest plantation development in Sabah, Malaysia. It is intended to provide a private sector perspective of the investment climate and environment in Sabah. The experience of this relatively large private company, with its ultimate objective of maximizing returns to its shareholders, is likely to be different from that of the public sector and smallholder investors in the forestry sector.

Malaysia

Malaysia is a federation of 13 states and two federal territories. With a total area of 330,113 km², it is made up of two distinct geographical regions: Peninsular Malaysia (131,566 km²) sharing borders with Thailand in the north and Singapore in the south, and the eastern states of Sabah and Sarawak and the Federal Territory of Labuan (198,547 km²) on Borneo Island. The two regions are about 540 km apart, separated by the South China Sea.

The economy of Malaysia has seen some rapid changes in the past two decades. The manufacturing sector, especially for electrical and electronic products, has overtaken agriculture as the engine of growth. However, the nation is still a major exporter of such natural products as oil-palm, rubber, timber, tin, petroleum and natural gas. Currently, Malaysia is moving rapidly from the industrial into the information age and it has targeted the year 2020 for achieving the status of a developed nation.

Sabah

Sabah, the most eastern state of Malaysia, is located on the northern tip of Borneo. Its immediate neighbours are Brunei, the Malaysian state of Sarawak, and Kalimantan (Indonesia) and the Philippines. Sabah has a total land area of 7.36 million ha. The population of Sabah stood at 2.72 million in 2001, with a density of 37 people/km². This represents almost a threefold increase from 1980 (Table 1).

<table>
<thead>
<tr>
<th>Year</th>
<th>Total population (million)</th>
<th>Average annual population change (%)</th>
<th>Population density (km⁻²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>0.93</td>
<td>–</td>
<td>12.6</td>
</tr>
<tr>
<td>1985</td>
<td>1.25</td>
<td>6.4</td>
<td>17.0</td>
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<tr>
<td>1990</td>
<td>1.47</td>
<td>4.4</td>
<td>20.0</td>
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<tr>
<td>1995</td>
<td>2.32</td>
<td>17.0</td>
<td>31.5</td>
</tr>
<tr>
<td>2001</td>
<td>2.72</td>
<td>6.6</td>
<td>37.0</td>
</tr>
</tbody>
</table>

Source: Department of Statistics (2002)
* provisional

¹ Senior Manager, Innoprise Corporation Sdn Bhd, Kota Kinabalu, Sabah, Malaysia.
² Director, Sabah Softwood Sdn Bhd, Kota Kinabalu, Sabah, Malaysia.
The state is endowed with extensive forest land. Forests cover 4.45 million ha (about 61.81 percent) of its total land area. Six major vegetation types can be distinguished (Table 2).

Table 2: Vegetation types in Sabah in 2000

<table>
<thead>
<tr>
<th>Vegetation type</th>
<th>Area (ha)</th>
<th>% of total land area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mangrove forests</td>
<td>341 377</td>
<td>4.63</td>
</tr>
<tr>
<td>Transitional and freshwater swamps</td>
<td>118 513</td>
<td>1.61</td>
</tr>
<tr>
<td>Undisturbed mixed dipterocarp</td>
<td>286 838</td>
<td>3.89</td>
</tr>
<tr>
<td>Montane forests</td>
<td>700 000</td>
<td>9.50</td>
</tr>
<tr>
<td>Others (immature, disturbed, and regenerating forests)</td>
<td>2 961 400</td>
<td>40.17</td>
</tr>
<tr>
<td>Plantations</td>
<td>154 600</td>
<td>2.01</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>4 562 728</td>
<td>61.81</td>
</tr>
</tbody>
</table>

Source: Forestry Department (2002a)

Sabah’s economy is basically agrarian and natural resource-based. It depends on the production and export of several commodities, the main ones being timber, petroleum, oil-palm, cocoa and marine products. The agricultural sector consists of mainly oil-palm (one million ha), cocoa (52 000 ha), rubber (90 000 ha) and to a much smaller extent, coconut and paddy. Ownership of the oil-palm plantation is roughly divided equally between government-sponsored land development schemes and private owners of smallholdings and large estates. Cocoa plantations are principally privately owned, by smallholders mostly. Rubber plantations are almost entirely owned by smallholders.

Timber processing and exports have been important contributors to Sabah’s economic development. In fact, it was the leading foreign exchange earner until 1998. The timber industry was traditionally oriented towards the export of round logs, with minimal downstream processing. In the 1970s, the government started to promote downstream processing, and by the mid-1990s it decided to ban the export of round logs, which triggered unprecedented investments in the wood-based processing sector. This is clearly reflected in the significant increase in the export values of wood products, especially those of plywood and blockboard, when the log export ban took effect between 1994 and 1996 (Table 3).

Table 3: Export values of wood products of Sabah, 1990-2000 (RM million)*

<table>
<thead>
<tr>
<th>Year</th>
<th>Logs</th>
<th>Sawntimber</th>
<th>Veneer</th>
<th>Plywood</th>
<th>Blockboard</th>
<th>Moulding</th>
<th>Paper</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>1 074</td>
<td>1 167</td>
<td>151</td>
<td>117</td>
<td>1</td>
<td>45</td>
<td>253</td>
</tr>
<tr>
<td>1991</td>
<td>935</td>
<td>1 208</td>
<td>276</td>
<td>146</td>
<td>9</td>
<td>156</td>
<td>179</td>
</tr>
<tr>
<td>1992</td>
<td>882</td>
<td>1 345</td>
<td>354</td>
<td>283</td>
<td>10</td>
<td>118</td>
<td>179</td>
</tr>
<tr>
<td>1993</td>
<td>52</td>
<td>2 100</td>
<td>373</td>
<td>836</td>
<td>14</td>
<td>119</td>
<td>84</td>
</tr>
<tr>
<td>1994</td>
<td>*</td>
<td>1 852</td>
<td>248</td>
<td>1 277</td>
<td>17</td>
<td>116</td>
<td>210</td>
</tr>
<tr>
<td>1995</td>
<td>*</td>
<td>1 571</td>
<td>203</td>
<td>1 405</td>
<td>81</td>
<td>116</td>
<td>314</td>
</tr>
<tr>
<td>1996</td>
<td>*</td>
<td>1 142</td>
<td>218</td>
<td>1 883</td>
<td>127</td>
<td>95</td>
<td>191</td>
</tr>
<tr>
<td>1997</td>
<td>62</td>
<td>1 025</td>
<td>209</td>
<td>1 697</td>
<td>181</td>
<td>95</td>
<td>205</td>
</tr>
<tr>
<td>1998</td>
<td>134</td>
<td>826</td>
<td>172</td>
<td>1 256</td>
<td>93</td>
<td>66</td>
<td>244</td>
</tr>
<tr>
<td>1999</td>
<td>317</td>
<td>955</td>
<td>407</td>
<td>1 174</td>
<td>98</td>
<td>39</td>
<td>222</td>
</tr>
<tr>
<td>2000</td>
<td>156</td>
<td>966</td>
<td>341</td>
<td>1 163</td>
<td>105</td>
<td>56</td>
<td>233</td>
</tr>
</tbody>
</table>

Source: Forestry Department (2001)

+ exchange rates of US$1.00 = RM2.50 prior to the third quarter of 1998; subsequently, US$1.00 = RM3.80

* log export ban
The relative importance of the major export commodities in 2000 and 2001 is indicated in Table 4. The agriculture sector led in importance in 2001, followed closely by petroleum, while the wood-based sector ranked third.

<table>
<thead>
<tr>
<th>Commodity</th>
<th>2000 (RM million)</th>
<th>%</th>
<th>2001 *(RM million)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural products</td>
<td>3 605.3</td>
<td>33.0</td>
<td>3 859.5</td>
<td>38.5</td>
</tr>
<tr>
<td>Palm oil</td>
<td>3 019.8</td>
<td></td>
<td>3 325.9</td>
<td></td>
</tr>
<tr>
<td>Cocoa bean</td>
<td>87.6</td>
<td></td>
<td>110.1</td>
<td></td>
</tr>
<tr>
<td>Rubber</td>
<td>62.3</td>
<td></td>
<td>46.0</td>
<td></td>
</tr>
<tr>
<td>Palm kernel oil</td>
<td>435.6</td>
<td></td>
<td>377.5</td>
<td></td>
</tr>
<tr>
<td>Crude petroleum</td>
<td>3 673.7</td>
<td>33.7</td>
<td>3 319.2</td>
<td>33.1</td>
</tr>
<tr>
<td>Wood-based products</td>
<td>2 864.4</td>
<td>26.3</td>
<td>2 018.5</td>
<td>20.1</td>
</tr>
<tr>
<td>Round logs</td>
<td>156.0</td>
<td></td>
<td>28.7</td>
<td></td>
</tr>
<tr>
<td>Sawtimber</td>
<td>988.0</td>
<td></td>
<td>627.0</td>
<td></td>
</tr>
<tr>
<td>Veneer</td>
<td>374.7</td>
<td></td>
<td>143.1</td>
<td></td>
</tr>
<tr>
<td>Plywood</td>
<td>1 219.5</td>
<td></td>
<td>1 136.2</td>
<td></td>
</tr>
<tr>
<td>Moulding</td>
<td>97.2</td>
<td></td>
<td>60.0</td>
<td></td>
</tr>
<tr>
<td>Plantation logs</td>
<td>29.0</td>
<td></td>
<td>23.5</td>
<td></td>
</tr>
<tr>
<td>Methanol</td>
<td>244.3</td>
<td>2.2</td>
<td>295.1</td>
<td>2.9</td>
</tr>
<tr>
<td>Hot briquette iron</td>
<td>281.5</td>
<td>2.6</td>
<td>285.6</td>
<td>2.9</td>
</tr>
<tr>
<td>Printing &amp; writing paper</td>
<td>243.9</td>
<td>2.2</td>
<td>251.3</td>
<td>2.5</td>
</tr>
<tr>
<td>Total</td>
<td>10 913.1</td>
<td>100.0</td>
<td>10 029.2</td>
<td>100.0</td>
</tr>
</tbody>
</table>

* provisional

Sources: Department of Statistics (2002); Forestry Department (2001)

The State Development Planning Committee formulated the Land Capability Classification in Sabah in 1973. It was based on earlier work undertaken in Peninsular Malaysia, which classified the land according to economic uses. The various natural resource groups were split into the following five capability classes:

Class I: High potential for mineral development and therefore best suited for mining.

Class II: High potential for agriculture and therefore best suited for diversified forms of agriculture.

Class III: Moderate potential for agriculture with a limited range of crops and therefore best suited for restricted form of agriculture.

Class IV: Commercial forest potential varying from high to marginal but with a very restricted or zero agricultural potential and therefore best suited for forestry.

Class V: No potential for mining, agriculture or forest exploitation and generally best suited for conservation or other recreational purposes.

The land use in Sabah is thus committed to various end uses. The amount of land still uncommitted, which remains as state land, is about 6.5 percent or around 0.475 million ha. Slightly less than half of the total land area (48.8 percent) is classified as forest reserve (Table 5).
Under the Constitution of Malaysia, power to govern certain matters, for example land and forestry, is vested with the states. Thus all the states have control over their land and its development. The principal law governing land administration in Sabah is the Sabah Land Ordinance\(^3\) (Cap. 68) together with its subsidiary rules and regulations.

The aim of the Land Ordinance is to regulate the alienation and occupation of state lands. State land in Sabah may be alienated or leased by the state government to (i) an individual person or persons and (ii) a company, corporate body or registered society having power under its constitution to hold land. The right of any landowner is not absolute, as there are conditions attached to the land titles. A condition of issuance of a land title is normally for a specific duration (normally 99 years) and for a specific crop (such as rubber or oil-palm). A typical condition would read: “The said land is demised herein expressly and only for the purpose of the cultivation of coconut and trees bearing edible fruits.” This is further strengthened by a related condition that reads: “Only materials approved by the Director of Agriculture shall be planted or cultivated on the said land.”

Timber trees, with the exception of rubber, are not considered agricultural crops and specific approval has to be obtained from the Land and Survey Department to change this condition. Modification to this ruling is a matter of policy decision. Both the Land and Survey Department and the Agriculture Department are reportedly strict in upholding the policy to reserve alienated land for agricultural use. One argument against any change is that the ratio of agricultural land to non-agricultural land would be upset, as tree plantations are extensive. Moreover, some individuals argue that there are already sufficient forest reserves set aside for forestry use. Tree plantations are considered to be better confined to forest reserves.

### FORESTRY

#### Forest reserves

Similar to land matters, forestry is fully controlled by the states as enshrined in the Federal Constitution. The principal law governing forestry in Sabah is the Forest Enactment (1968) and its subsidiary Forest Rules (1969). The Forestry Department of Sabah is the principal government agency in charge of the administration of all forest reserves in the state. It does not have any jurisdiction over private lands apart from the collection of royalty on timber from such land.

In 1984, the state government successfully regazetted 3.35 million ha of forests as Permanent Forest Estates or Forest Reserves. By 1997, the total area had been expanded and redesignated to 3.59 million ha. The forest reserves are classified into different categories, each serving a specific function (Table 6). Commercial forest harvesting is only allowed in Class II areas.

---

\(^{3}\) State laws are known as Enactment or Ordinance while federal laws are known as Acts.
Table 6: Classes of forest reserves

<table>
<thead>
<tr>
<th>Class</th>
<th>Categories</th>
<th>Area (ha) 1984</th>
<th>Area (ha) 1997</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Protection forest reserve</td>
<td>99,977</td>
<td>342,216</td>
<td>Conservation for ecological and environmental protection</td>
</tr>
<tr>
<td>II</td>
<td>Commercial forest reserve</td>
<td>2,674,576</td>
<td>2,685,119</td>
<td>Commercial production of timber and other forest products</td>
</tr>
<tr>
<td>III</td>
<td>Domestic forest reserve</td>
<td>7,355</td>
<td>7,355</td>
<td>As above for local consumption</td>
</tr>
<tr>
<td>IV</td>
<td>Amenity forest reserve</td>
<td>20,767</td>
<td>20,767</td>
<td>Provision of recreational and other attractions</td>
</tr>
<tr>
<td>V</td>
<td>Mangrove forest reserve</td>
<td>316,457</td>
<td>316,024</td>
<td>Supply of mangrove timber and other related products</td>
</tr>
<tr>
<td>VI</td>
<td>Virgin jungle reserve</td>
<td>88,306</td>
<td>90,382</td>
<td>Conservation for biodiversity and research</td>
</tr>
<tr>
<td>VII</td>
<td>Wildlife reserve</td>
<td>141,203</td>
<td>132,653</td>
<td>Conservation for wildlife</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>3,348,641</td>
<td>3,594,516</td>
<td></td>
</tr>
</tbody>
</table>

Source: Forestry Department (1998)

Forest management units

In 1997, the Commercial Forest Reserves were divided into 27 Forest Management Units (FMUs), each approximately 100,000 ha in size. The FMUs are essentially forest administrative units for which long-term licenses are issued to corporate bodies. These agreements take two forms: Tree Plantation and Forest Management Agreement, and Sustainable Forest Management License Agreement. Both agreements are valid up to 100 years. Of the two types of licenses, the second is predominant.

Both license agreements provide long-term tenure security that is so vital in sustainable forest management. The significance of FMUs to Sabah cannot be overemphasized. In the past three decades or so, the forests of Sabah have been indiscriminately logged through a system of short-term annual licenses. Primary forests have dwindled from 2.7 million ha in 1970 to approximately 0.3 million ha in 2000, or a mere 11 percent of the Class II Forest Reserve (Mannan and Yahya Awang 1997). This represents an annual loss of 80,000 ha.

As a result of the initial overexploitation of natural forests in most of the FMUs, extensive rehabilitation activities are necessary. This requirement is also reflected in the strategic plan of the Sabah Forestry Department for forest resource development as follows (Forestry Department 1998):

- Encourage licensees to conduct forest rehabilitation in logged areas as required under the Sustainable Forest Management License Agreement;
- Intensify rehabilitation measures in forest reserves of low productivity through enrichment planting and appropriate silvicultural treatments. On poor and degraded forest areas, plantation forestry should be introduced;
- Promote forest plantation development through the active participation of the private sector; and
- Provide appropriate incentives to create a conducive investment environment to encourage developers to venture into forest plantation.
FOREST AND AGRICULTURE PLANTATIONS

Forest plantation

Forest plantation development in Sabah started in 1922 with a trial planting of teak (Tectona grandis) by a Dutch company for pole production. However, most research focused later on natural forests. Systemic research on forest plantation began only in 1965 when the Forestry Department created its Plantation Research Section. Its main objective was to identify suitable species for commercial plantation establishment in Sabah. To date, a total of 170 species, of which more than half are indigenous species, have been tested (Rahim Sulaiman 2001). From these trials, four hardwoods (Paraserianthes falcata, Acacia mangium, Gmelina arborea and Eucalyptus deglupta) and four softwoods (Pinus merkusii, P. caribaea, Araucaria cunninghamii and A. hunsteinii) were identified as potential species for commercial forest plantation in Sabah. These species were adopted by the private sector in small-scale planting throughout Sabah. All the softwood species were later abandoned for various reasons (for example, seed availability problems and high establishment and maintenance costs). Over time, the species list was complemented by high-value timber species, such as mahogany and teak, and some indigenous species for forest rehabilitation.

Approach to tree planting

Traditionally, tree planting is similar to planting any agricultural crop. Land that is under private holding is usually first logged for commercial timber, then cleared of any remaining vegetation before planting takes place. In the case of forest reserves, policy dictates that the natural forest must be replenished and maintained as far as possible to conserve biological diversity. In this case, a good mix of indigenous species is planted to enrich the logged-over forests. Complete site clearing and planting can be used in a forest reserve only when either the forest is licensed specifically for large-scale tree planting or where the land is seriously denuded or devoid of trees. This type of planting is confined to the “forest reserve” category. Selected species are usually indigenous, principally dipterocarps.

A third method of planting is confined to private land when the owners opt to enhance the value of the land by introducing timber species on their agricultural holdings. Trees are either interplanted with agricultural crops or planted along perimeters. However, this method of planting, although common, covers only a small area.

Plantation species

Both indigenous and exotic species are being used in plantation development in Sabah. For forest rehabilitation, common species used are the four main genera of the Dipterocarpaceae family (that is, Shorea, Parasorehore, Dipterocarpus, and Dryobalanops). For industrial tree plantations, popular species include exotics such as acacias (principally A. mangium, hybrids of A. mangium and A. auriculiformis, and A. crassicarpa), and teak, while local species consist principally of Octomeles sumatrana and Anthocephalus chinensis. Table 7 provides a breakdown of the species composition of the forest plantation in Sabah as of 2001. Over the years, some 146 311 ha of plantation have been established in Sabah (Tables 8 and 9).
Table 7: Forest plantation species’ composition in Sabah, December 2001

<table>
<thead>
<tr>
<th>Species</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tree species</strong></td>
<td></td>
</tr>
<tr>
<td>Acacia mangium</td>
<td>76 620</td>
</tr>
<tr>
<td>Paraserianthes falcataria</td>
<td>10 122</td>
</tr>
<tr>
<td>Eucalyptus grandis</td>
<td>9 058</td>
</tr>
<tr>
<td>Tectona grandis</td>
<td>5 969</td>
</tr>
<tr>
<td>Gmelina arborea</td>
<td>4 766</td>
</tr>
<tr>
<td>Acacia crassicarpa</td>
<td>2 169</td>
</tr>
<tr>
<td>Hevea brasiliensis</td>
<td>2 030</td>
</tr>
<tr>
<td>Mixed acacia &amp; eucalyptus</td>
<td>1 528</td>
</tr>
<tr>
<td>Eucalyptus deglupta</td>
<td>1 477</td>
</tr>
<tr>
<td><strong>Others</strong></td>
<td>1 818</td>
</tr>
<tr>
<td>Eucalyptus urophylla</td>
<td>460</td>
</tr>
<tr>
<td>Pinus caribaea</td>
<td>348</td>
</tr>
<tr>
<td>Acacia aurococarpa</td>
<td>274</td>
</tr>
<tr>
<td>Azadiracta excelsa</td>
<td>191</td>
</tr>
<tr>
<td>Peronema canescens</td>
<td>67</td>
</tr>
<tr>
<td>Eucalyptus camaldulensis</td>
<td>56</td>
</tr>
<tr>
<td>Swietenia macrophylla</td>
<td>46</td>
</tr>
<tr>
<td>Pterocarpus spp.</td>
<td>30</td>
</tr>
<tr>
<td>Acacia auriculiformis</td>
<td>25</td>
</tr>
<tr>
<td>Acacia arborea</td>
<td>25</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>117 079</strong></td>
</tr>
<tr>
<td>Rattan spp.*</td>
<td>14 044</td>
</tr>
<tr>
<td>Enrichment planting**</td>
<td>15 189</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>146 312</strong></td>
</tr>
</tbody>
</table>

Source: Adapted from Anuar Mohamad (2002)
* mainly Calamus caesius, C. manan and C. subinermis
** mainly species of the dipterocarp family

Table 8: Forest plantation development in Sabah, 1980-2001

<table>
<thead>
<tr>
<th>Year</th>
<th>Accumulated total area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>9 800</td>
</tr>
<tr>
<td>1985</td>
<td>34 960</td>
</tr>
<tr>
<td>1990</td>
<td>62 400</td>
</tr>
<tr>
<td>1995</td>
<td>112 700</td>
</tr>
<tr>
<td>2000</td>
<td>154 600</td>
</tr>
<tr>
<td>2001</td>
<td>146 311</td>
</tr>
</tbody>
</table>

Sources: Anuar Mohamad, 2002, personal communication; Forestry Department (2002a)
Forest plantations were not considered important in the 1980s when natural forests were still abundant. It was only in the 1990s that the forest industry realized that the timber resource base was dwindling due to excessive logging. In response, interest in establishing plantations increased.

### Table 9: Forest plantation in Sabah, December 2001

<table>
<thead>
<tr>
<th>Organizations</th>
<th>Fast growing plantation (ha)</th>
<th>Rattan plantation (ha)</th>
<th>High value timber plantation (ha)</th>
<th>Enrichment planting</th>
<th>Total area (ha)</th>
<th>Land ownership/ type</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAFODA*</td>
<td>25 891</td>
<td>2 119</td>
<td>383</td>
<td>0</td>
<td>28 393</td>
<td>Government land</td>
</tr>
<tr>
<td>SAFODA’s Smallholder Scheme (smallholders)</td>
<td>3 050</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3 050</td>
<td>Private land</td>
</tr>
<tr>
<td>Sabah Forest Industries Sdn. Bhd. ^ (SFI)</td>
<td>36 676</td>
<td>0</td>
<td>0</td>
<td>197</td>
<td>36 873</td>
<td>Forest reserve**</td>
</tr>
<tr>
<td>SFI’s Tree Farming Scheme (smallholders)</td>
<td>1 913</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1 913</td>
<td>Private land</td>
</tr>
<tr>
<td>Innoprise Corp. Sdn. Bhd (ICSB)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICSB – Luasong</td>
<td>0</td>
<td>11 653</td>
<td>812</td>
<td>0</td>
<td>12 465</td>
<td>Forest reserve</td>
</tr>
<tr>
<td>ICSB – Infapro Project</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>9 808</td>
<td>9 808</td>
<td>Forest reserve</td>
</tr>
<tr>
<td>ICSB – INIKEA Project #</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2 678</td>
<td>2 678</td>
<td>Forest reserve</td>
</tr>
<tr>
<td>ICSB – Sabah</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Softwood Bhd.</td>
<td>32 272</td>
<td>0</td>
<td>244</td>
<td>0</td>
<td>32 515</td>
<td>Private land</td>
</tr>
<tr>
<td>CSB – Benta Wawasan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sdn. Bhd.#</td>
<td>5 500</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5 500</td>
<td>Forest reserve</td>
</tr>
<tr>
<td>Boonrich Sdn. Bhd.</td>
<td>759</td>
<td>0</td>
<td>384</td>
<td>0</td>
<td>1 143</td>
<td>Private land</td>
</tr>
<tr>
<td>Lak Sdn. Bhd.</td>
<td>489</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>489</td>
<td>Private land</td>
</tr>
<tr>
<td>Freehold Greenland</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sdn. Bhd.</td>
<td>0</td>
<td>0</td>
<td>190</td>
<td>0</td>
<td>190</td>
<td>Private land</td>
</tr>
<tr>
<td>Kebun Singa Sdn. Bhd.</td>
<td>121</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>121</td>
<td></td>
</tr>
<tr>
<td>Forestry Department</td>
<td>895</td>
<td>70</td>
<td>220</td>
<td>1 298</td>
<td>2 483</td>
<td>Government land</td>
</tr>
<tr>
<td>KTS Plantation Sdn. Bhd.</td>
<td>5</td>
<td>0</td>
<td>2 044</td>
<td>1 036</td>
<td>3 085</td>
<td>Forest reserve</td>
</tr>
<tr>
<td>Ladan Tabung Haji (Keningau)</td>
<td>0</td>
<td>0</td>
<td>1 483</td>
<td>0</td>
<td>1 483</td>
<td>Private land</td>
</tr>
<tr>
<td>Tabung Haji – (Bongaya)</td>
<td>0</td>
<td>0</td>
<td>1 500</td>
<td>0</td>
<td>1 500</td>
<td>Forest reserve</td>
</tr>
<tr>
<td>Empat Bersaudari Sdn. Bhd.</td>
<td>0</td>
<td>114</td>
<td>0</td>
<td>0</td>
<td>114</td>
<td>Private land</td>
</tr>
<tr>
<td>Bugaya Forests Sdn. Bhd.</td>
<td>0</td>
<td>0</td>
<td>347</td>
<td>163</td>
<td>510</td>
<td>Forest reserve</td>
</tr>
<tr>
<td>Total Degree</td>
<td>0</td>
<td>0</td>
<td>1 473</td>
<td>0</td>
<td>1 473</td>
<td>Forest reserve</td>
</tr>
<tr>
<td>Sabah Cattle Farming</td>
<td>0</td>
<td>0</td>
<td>121</td>
<td>0</td>
<td>121</td>
<td>Private land</td>
</tr>
<tr>
<td>Timberwell Bhd.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>150</td>
<td>150</td>
<td>Forest reserve</td>
</tr>
<tr>
<td>TSH Forestry</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>0</td>
<td>8</td>
<td>Forest reserve</td>
</tr>
<tr>
<td>Dukawan Sdn. Bhd.</td>
<td>200</td>
<td>46</td>
<td>0</td>
<td>0</td>
<td>246</td>
<td>Private land</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>107 771</strong></td>
<td><strong>14 002</strong></td>
<td><strong>9 209</strong></td>
<td><strong>15 330</strong></td>
<td><strong>146 312</strong></td>
<td></td>
</tr>
</tbody>
</table>

Sources: Anuar Mohamad (2002) and adjustments from plantation companies
* SAFODA = Sabah Forest Development Authority
** Forest reserves where Sustainable Forest Management Licences Agreement are issued.
*** Sdn. Bhd. = Sendirian Berhad (Private Limited)
# adjusted from company records
Main players in plantation forestry

Yayasan Sabah and Innoprise Corporation Sdn. Bhd.

Yayasan Sabah, or the Sabah Foundation, is a statutory body established in 1966 to improve the quality of life of Sabahans, particularly in education, welfare and social services.

In 1988, Innoprise Corporation Sdn. Bhd. (ICSB) was established as the investment arm of the Sabah Foundation and the holding management company in diverse business interests. In 1984, the already large concession of the Foundation was expanded to a single block of 972 804 ha – about one-seventh of the landmass of Sabah. This area was later divided into two main portions, the concession proper and Benta Wawasan Sdn. Bhd., a wholly-owned company of ICSB, which is to embark on a large-scale industrial tree plantation. These, together with Sabah Softwood Bhd., another ICSB majority-owned subsidiary, make ICSB Sabah’s biggest forest management company, with a total forest area of over one million ha.

ICSB is involved in the following planting activities:

- **The Forests Absorbing Carbon Dioxide Emission (FACE) Foundation Project**, which aims to plant sufficient trees to offset the equivalent of the carbon dioxide emissions from one large power station over 25 years (FACE 1991).
- **The Inikea Project**, which aims to restore around 14 000 ha of degraded forest in the Kalabakan Forest Reserve within the Sabah Foundation concession area.
- **Luasong Forest Centre**, which is located in the Sabah Foundation concession area, serving as a centre and an operating base for numerous forestry activities including a major rattan-planting programme.
- **Benta Wawasan Sdn. Bhd.**, a wholly-owned subsidiary of ICSB, which is developing a forest plantation of up to 306 000 ha.
- **Sabah Softwood Bhd. (SSB)**, a joint venture between the Sabah Foundation and the North Borneo Timbers Bhd.

Sabah Forest Development Authority (SAFODA)

SAFODA was established in 1976 as a semi-government body to:

- Convert wasteland and marginal agricultural land into productive forests;
- Supplement the production of natural forest products with products derived from man-made forests;
- Encourage and promote the active participation of the rural population in afforestation and reforestation; and
- Raise the living standard of the rural people through forest settlement and agroforestry development schemes.

A total of 108 243 ha of land parcels have been allotted to SAFODA through a gazette notification. Most of it is considered wasteland or lalang (**Imperata cylindrica**) grassland and non-commercial forest land, which have been classed as unsuitable or marginally suitable for agriculture (Stanley 1992). As of December 2001, 25 891 ha have been planted with tree species and 2 119 ha with rattan.


The Sabah Forest Industries Sdn. Bhd. was established in June 1982, as a wholly-owned company of the state of Sabah, to expedite the industrialization programme (Sabah Forest Industry 1993). The coastal town of Sipitang in the southern part of Sabah was chosen as the mill site for a 150 000 tonne capacity pulp and paper mill. The Sabah Forest Industries was allocated 288 623 ha of natural forest to support the mill. The company is now privatized with the Lion
The role of incentives in forest plantation development in Asia and the Pacific

Group of Malaysia holding the majority of the share while the state government holds a minor interest.

While the mill currently takes in residual timber from forest clearing, plantations of fast-growing tree species have been established to supply the mill in the future with raw materials. As of December 2001, more than 36,676 ha have been planted with acacias.


KTS Plantation is a member of the KTS Holdings Sdn. Bhd. It has entered into an agreement with the Sabah Government to manage a forest concession of 57,247 ha at Segaliud Lokan Forest Reserve in the Sandakan area. A major part of the area is being rehabilitated with dipterocarps, rubber (Hevea brasilienis), and some other indigenous species.

Agricultural plantations

In the 1970s, Sabah experienced a steady expansion of cocoa and oil-palm plantations. The cocoa boom in the late 1970s saw the rapid development of cocoa plantations, both by smallholders and large estates. However, the collapse of the cocoa price in the mid-1980s, coupled with cocoa pod borer infestations, has dampened the interest in cocoa cultivation.

Unlike cocoa prices, crude palm oil (CPO) experienced continuous price increases. The CPO prices peaked at an average of RM2 377/tonne (US$625.50) in 1998 (PORLA 2002). The corresponding fresh fruit bunch (FFB) prices of oil-palm fruits reached a high of RM500/tonne (US$131.60) in Sabah. At this price level, oil-palm production is extremely lucrative. As a result, large areas of oil-palm have been developed, reaching more than one million ha in 2000 (Table 10). Some landowners have converted from cocoa to oil-palm. The current CPO prices have dropped to around RM1 400/tonne (US$368.42/tonne) with a corresponding FFB price of RM280/tonne (US$73.68/tonne).

<table>
<thead>
<tr>
<th>Year</th>
<th>Oil-palm</th>
<th>Cocoa</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>93,967</td>
<td>57,984</td>
<td>151,951</td>
</tr>
<tr>
<td>1985</td>
<td>161,500</td>
<td>172,713</td>
<td>334,213</td>
</tr>
<tr>
<td>1990</td>
<td>276,171</td>
<td>179,648</td>
<td>455,819</td>
</tr>
<tr>
<td>1995</td>
<td>518,133</td>
<td>113,691</td>
<td>631,824</td>
</tr>
<tr>
<td>2000</td>
<td>1,000,777</td>
<td>52,177</td>
<td>1,052,954</td>
</tr>
</tbody>
</table>

Sources: Malaysian Cocoa Board (2002); PORLA (2002)

Economics of plantation development

Comparative costs of establishment of forest and agricultural plantations

The main cost components of agricultural and forest plantations are similar, and include mainly:

- Administration: salary, wages, Employee Provident Fund, office expenses, vehicle maintenance;
- Direct planting cost: road and culvert construction, site preparation, seedlings, lining, holing for and planting seedlings, boundary survey, climber cutting, weeding;
- Maintenance: boundary, roads, weeding, shade adjustment;
- Capital expenditure: buildings, vehicles, nursery establishment; and
- Training, research and development.

4 At US$1.00 = RM3.80
The main differences relate to plantation management. For example, oil-palm plantations require higher labour inputs than forest plantations due to their intensive management. One labourer in an oil-palm plantation is able to take care of only four ha of land, while for a forest plantation this amounts to 30 to 50 ha. As a result, the cost (up to maturity) of establishing an oil-palm plantation is around RM7 200/ha for the first four years, whereas it is only RM3 500-4 000 for the first seven years for an *Acacia mangium* plantation.

The costs of marketing also differ. For example, there is no royalty and cess tax on timber produced from forest plantations. On the other hand, since 1999, the state government has put a levy of RM56/tonne on the production of CPO if the CPO price is above RM1 000/tonne. Similarly, the federal government also imposes a “windfall” levy when the CPO price exceeds RM2 000/tonne.

**Economics of forest plantations**

Various analyses have been carried out on the financial viability of large-scale industrial forest plantation in Sabah over the years. The studies are based on various assumptions related to, *inter alia*, the mean annual increment, length of rotation and prices of the end products. Invariably, results of financial analyses differ, although they all show a positive internal rate of return (IRR). Examples include:

- A weighted average IRR of 6.7 percent, based on planting of 50 percent *Acacia mangium* (eight-year rotation), 30 percent *Paraserianthes (Albizia) falcataria* (12-year rotation) and 20 percent *Gmelina arborea* (15-year rotation), excluding interest on capital (Golokin and Cassel 1987).
- IRRs of 5.9 and 5.1 percent for two scenarios. Scenario 1: 50 percent *Acacia mangium* and 50 percent *Gmelina arborea*, both for chip production with a rotation of eight years. Scenario 2: 40 percent *Acacia mangium* and 20 percent *Gmelina arborea*, both for chip production with a rotation of eight years, and 20 percent *Paraserianthes falcataria* with a rotation of ten years for sawlog production. Prices of RM80/m³ for logs of 20 cm diameter and above and RM50/m³ for logs of 14-19 cm diameter (Ti and Tangau 1991).
- IRR of 19.2 percent for the Compensatory Plantation Project in Peninsular Malaysia. Major assumptions are: average mean annual increment of 20 m³, non-commercial thinning at years 4 to 5, second commercial thinning at years 8 to 9 with a yield of 67 m³/ha (stumpage value of RM23/m³), production at final harvest at year 16 of 180 m³/ha (stumpage value of RM126/m³) (Johari Baharudin 1987).
- IRR of 13 percent with *Paraserianthes falcataria* (12-year rotation), *Acacia mangium* and *Gmelina arborea* (both 15-year rotation), all for sawlog production at prices of RM80/m³, RM90/m³ and RM100/m³, respectively (Rahim Sulaiman 1990).
- IRRs of 7.3 to 17.3 percent for four species: *Tectona grandis*, *Azadirachta excelsa*, *Hevea brasiliensis* and *Acacia mangium* under various assumptions such as rotation of 15 years for the monocrop and 20 years for *Hevea* with a latex production. Price assumptions are RM95/m³ at 15 years and RM115/m³ at 20 years for *Hevea* wood, RM600/m³ for teak, RM150/m³ for acacia and RM450/m³ for sentang (*Azadirachta excelsa*) at 15 years (Krishnapillay and Abdul Razak Mohd. Ali 1998).
- IRRs of 12.8 percent for rubberwood alone, and 13.7 percent for rubberwood with latex production commencing at year 8, on a rotation of 15 years (Mohamad Johari Mohd. Hassan 2002).

**Economics of oil-palm plantations**

Oil-palm is by far the most important economic agricultural (estate) crop in Sabah. In general, the returns on oil-palm are very sensitive to CPO prices (Table 11). Since 1994, CPO prices fell below RM1 000/tonne only in 2000 and 2001 (Table 12). At normal price levels, the IRR is
expected to exceed 20 percent. High prices that exceeded RM1 500/tonne have brought considerable profits to the oil-palm industries.

<table>
<thead>
<tr>
<th>CPO price (RM/tonne)</th>
<th>900</th>
<th>1 000</th>
<th>1 200</th>
<th>1 500</th>
<th>2 000</th>
</tr>
</thead>
<tbody>
<tr>
<td>IRR (before taxation)</td>
<td>10</td>
<td>15</td>
<td>23</td>
<td>32</td>
<td>44</td>
</tr>
</tbody>
</table>

Table 12: Crude oil-palm prices, 1991-2000

<table>
<thead>
<tr>
<th>Year</th>
<th>CPO prices (RM/tonne) (local delivered)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>836.50</td>
</tr>
<tr>
<td>1992</td>
<td>916.50</td>
</tr>
<tr>
<td>1993</td>
<td>890.00</td>
</tr>
<tr>
<td>1994</td>
<td>1 283.50</td>
</tr>
<tr>
<td>1995</td>
<td>1 472.50</td>
</tr>
<tr>
<td>1996</td>
<td>1 191.50</td>
</tr>
<tr>
<td>1997</td>
<td>1 358.00</td>
</tr>
<tr>
<td>1998</td>
<td>2 377.50</td>
</tr>
<tr>
<td>1999</td>
<td>1 449.50</td>
</tr>
<tr>
<td>2000</td>
<td>996.50</td>
</tr>
<tr>
<td>2001</td>
<td>894.50</td>
</tr>
<tr>
<td>2002</td>
<td>1 363.50</td>
</tr>
<tr>
<td>2003</td>
<td>1 544.00</td>
</tr>
</tbody>
</table>


* Prior to the third quarter of 1998, US$1.00 = RM2.50; subsequently, US$1.00 = RM3.80

Note: In March 2004, the CPO price rose above RM2 000 again.

SABAH SOFTWOODS BERHAD (SSB)

SSB, incorporated in late 1973 under the Companies Act (1965) as a private limited company, was converted into a public limited company on 23 May 2000. It is a subsidiary of ICSB. It was originally established to plant logged-over areas with fast-growing commercial timber species and to develop commercial forest plantations. In 1977, SSB entered into a 60-year lease agreement with Sapangar Sdn. Bhd. for an area of 60 618 ha, which was partitioned into two main blocks of approximately 20 000 and 41 000 ha at Kalabakan and Brumas, respectively (Figure 1).

By December 2000, SSB had planted fast-growing forest trees on 34,024 ha of the leased land. Another 11,843 ha were planted with oil-palm and cocoa (95 percent and five percent of the land, respectively). Some of the forest plantations are in their third rotation. The oil-palm has not yet matured.

Since its incorporation, the shareholders of SSB have invested about RM200 million (US$52.6 million) in the company. To date, SSB has yet to declare a dividend or repay shareholder advances. By 2000, the retained profits of the company amounted to about RM85 million (US$22.4 million), which had been used to finance new plantations.

Plantation development expenditures have been the major cost of SSB, amounting to RM254 million in 2000 (that is, RM160 million for forest plantation and RM94 million for agricultural crops). The net profits after taxes were RM14.3 million (US$3.8 million) and RM18.7 million (US$4.9 million) in 1999 and 2000, respectively. Most profits can be attributed to the sales of plantation timber and woodchips.

Compared to the returns on alternative investments, SSB’s forest plantations have achieved limited success over the last 26 years. Since harvesting commenced in 1982, the accumulated retained profit of RM85 million (US$22.4 million) over a period of 18 years averaged RM4.7 million (US$1.2 million) per annum, or an internal rate of return of about 2.4 percent. The return on assets (profit/forest plantation assets) in 1999 and 2000 was only around 7.5 and 9.8 percent, respectively. This is considered low compared to other investments, especially taking into account the long investment period.

SSB is a pioneer in forest plantation development but it made some unfortunate mistakes in the early years of development (such as unsuitable species), which certainly depressed the company’s profits. To capitalize and increase SSB’s returns from the forest plantations, a woodchip mill using plantation-grown wood was established in 1998.

**SSB’s forest plantations**

SSB has identified *Acacia mangium* and acacia hybrids, *Paraserianthes falcataria* and, to a lesser extent, *Gmelina arborea* as species with the highest potential for Sabah’s climatic and topographic conditions. The three species are planted regularly, as their establishment costs are low, they grow faster and can be used for a wide range of end products. Species such as *Eucalyptus deglupta* and *Pinus caribaea*, which have poor growth characteristics and are commercially less economical, have not been used since 1986 and are currently being replaced by the other three species. In total, the five species have been planted (and replanted) on 73,300 ha between 1974 and 2001 (Table 13). SSB’s current objective is to fully plant the 40,000 ha designated for tree plantations with the three main species.
THE ROLE OF INCENTIVES IN FOREST PLANTATION DEVELOPMENT IN ASIA AND THE PACIFIC

Table 13: Annual planting of Sabah Softwood Bhd., 1974-2001

<table>
<thead>
<tr>
<th>Year</th>
<th>Acacia mangium</th>
<th>Albizia falcataria</th>
<th>Gmelina arborea</th>
<th>Eucalyptus deglupta</th>
<th>Pinus caribaea</th>
<th>Others</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1974</td>
<td>0</td>
<td>12.53</td>
<td>4.65</td>
<td>15.75</td>
<td>21.03</td>
<td>19.36</td>
<td>73.32</td>
</tr>
<tr>
<td>1975</td>
<td>0</td>
<td>543.05</td>
<td>37.56</td>
<td>450.39</td>
<td>143.46</td>
<td>459.3</td>
<td>1 633.76</td>
</tr>
<tr>
<td>1976</td>
<td>0</td>
<td>1 456.58</td>
<td>273.31</td>
<td>787.23</td>
<td>743.89</td>
<td>613.69</td>
<td>3 874.70</td>
</tr>
<tr>
<td>1977</td>
<td>9.27</td>
<td>2 242.06</td>
<td>476.29</td>
<td>2 361.87</td>
<td>218.28</td>
<td>34.89</td>
<td>5 354.06</td>
</tr>
<tr>
<td>1978</td>
<td>22.33</td>
<td>2 499.69</td>
<td>663.04</td>
<td>2 220.76</td>
<td>8.09</td>
<td>50.16</td>
<td>5 464.07</td>
</tr>
<tr>
<td>1979</td>
<td>79.30</td>
<td>1 430.02</td>
<td>90.24</td>
<td>926.76</td>
<td>0</td>
<td>202.47</td>
<td>2 728.79</td>
</tr>
<tr>
<td>1980</td>
<td>171.34</td>
<td>175.75</td>
<td>357.24</td>
<td>2 381.82</td>
<td>2.13</td>
<td>35.95</td>
<td>3 123.23</td>
</tr>
<tr>
<td>1981</td>
<td>41.97</td>
<td>207.61</td>
<td>1 106.99</td>
<td>1 684.11</td>
<td>4.92</td>
<td>39.45</td>
<td>3 084.05</td>
</tr>
<tr>
<td>1982</td>
<td>638.61</td>
<td>847.30</td>
<td>844.74</td>
<td>4.20</td>
<td>0</td>
<td>186.6</td>
<td>2 520.45</td>
</tr>
<tr>
<td>1983</td>
<td>1 315.13</td>
<td>98.02</td>
<td>563.85</td>
<td>0</td>
<td>41.31</td>
<td>2 017.31</td>
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<tr>
<td>1984</td>
<td>178.20</td>
<td>466.98</td>
<td>957.69</td>
<td>0</td>
<td>1.19</td>
<td>2.15</td>
<td>1 606.21</td>
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<tr>
<td>1985</td>
<td>0</td>
<td>226.20</td>
<td>1 241.71</td>
<td>97.00</td>
<td>0</td>
<td>0</td>
<td>1 564.91</td>
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<td>1986</td>
<td>37.22</td>
<td>722.86</td>
<td>7.37</td>
<td>0</td>
<td>1.32</td>
<td>768.77</td>
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</tr>
<tr>
<td>1987</td>
<td>0</td>
<td>1 012.78</td>
<td>18.79</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1 031.57</td>
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<tr>
<td>1988</td>
<td>879.75</td>
<td>814.84</td>
<td>502.09</td>
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<td>0</td>
<td>0</td>
<td>2 196.68</td>
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<td>1989</td>
<td>1 307.31</td>
<td>1 022.47</td>
<td>760.66</td>
<td>0</td>
<td>0</td>
<td>3 090.44</td>
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<td>1990</td>
<td>467.78</td>
<td>1 321.31</td>
<td>314.91</td>
<td>0</td>
<td>0</td>
<td>2 104.00</td>
<td></td>
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<td>1991</td>
<td>731.49</td>
<td>956.79</td>
<td>40.01</td>
<td>0</td>
<td>0</td>
<td>1 728.29</td>
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<tr>
<td>1992</td>
<td>590.66</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>1 618.78</td>
<td></td>
</tr>
<tr>
<td>1993</td>
<td>779.22</td>
<td>1 412.78</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2 192.00</td>
<td></td>
</tr>
<tr>
<td>1994</td>
<td>2 158.97</td>
<td>1 258.65</td>
<td>126.68</td>
<td>0</td>
<td>0</td>
<td>3 544.30</td>
<td></td>
</tr>
<tr>
<td>1995</td>
<td>2 784.80</td>
<td>1 031.90</td>
<td>698.4</td>
<td>0</td>
<td>0</td>
<td>4 515.10</td>
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</tr>
<tr>
<td>1996</td>
<td>954.99</td>
<td>871.50</td>
<td>803.17</td>
<td>0</td>
<td>0</td>
<td>2 629.66</td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td>1 536.01</td>
<td>513.05</td>
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</tr>
<tr>
<td>1998</td>
<td>4 263.62</td>
<td>0</td>
<td>281.53</td>
<td>0</td>
<td>0</td>
<td>4 545.15</td>
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</tr>
<tr>
<td>1999</td>
<td>1 844.66</td>
<td>89.97</td>
<td>747.87</td>
<td>0</td>
<td>0</td>
<td>2 682.50</td>
<td></td>
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<tr>
<td>2000</td>
<td>1 911.50</td>
<td>179.23</td>
<td>383.8</td>
<td>0</td>
<td>0</td>
<td>2 474.53</td>
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</tr>
<tr>
<td>2001</td>
<td>2 546.51</td>
<td>195.22</td>
<td>78.55</td>
<td>0</td>
<td>0</td>
<td>2 820.28</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>25 250.64</td>
<td>22 637.26</td>
<td>11 632.06</td>
<td>10 929.89</td>
<td>1 142.99</td>
<td>1 706.65</td>
<td>73 299.49</td>
</tr>
</tbody>
</table>

Between 1982 (when harvesting commenced) and 2000, SSB harvested more than four million m$^3$ of plantation-grown timber (Table 14). The current annual production is estimated at 400 000 m$^3$. 
### Table 14: Production of plantation timbers from Sabah Softwoods Bhd., 1982-2001 (m³)

<table>
<thead>
<tr>
<th>Year</th>
<th>Albizia</th>
<th>Eucalyptus</th>
<th>Gmelina</th>
<th>Acacia</th>
<th>Pinus</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1982</td>
<td>10 217</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>10 217</td>
</tr>
<tr>
<td>1983</td>
<td>42 829</td>
<td>0</td>
<td>86</td>
<td>0</td>
<td>0</td>
<td>42 915</td>
</tr>
<tr>
<td>1984</td>
<td>70 546</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>70 546</td>
</tr>
<tr>
<td>1985</td>
<td>77 403</td>
<td>0</td>
<td>501</td>
<td>0</td>
<td>0</td>
<td>77 904</td>
</tr>
<tr>
<td>1986</td>
<td>142 469</td>
<td>1 757</td>
<td>758</td>
<td>774</td>
<td>0</td>
<td>145 758</td>
</tr>
<tr>
<td>1987</td>
<td>162 574</td>
<td>10 624</td>
<td>778</td>
<td>0</td>
<td>0</td>
<td>173 976</td>
</tr>
<tr>
<td>1988</td>
<td>147 331</td>
<td>19 423</td>
<td>10 253</td>
<td>541</td>
<td>0</td>
<td>177 548</td>
</tr>
<tr>
<td>1989</td>
<td>185 740</td>
<td>51 762</td>
<td>8 502</td>
<td>9 893</td>
<td>0</td>
<td>255 897</td>
</tr>
<tr>
<td>1990</td>
<td>129 707</td>
<td>57 719</td>
<td>30</td>
<td>7 712</td>
<td>0</td>
<td>195 168</td>
</tr>
<tr>
<td>1991</td>
<td>199 755</td>
<td>33 591</td>
<td>533</td>
<td>7 268</td>
<td>0</td>
<td>241 147</td>
</tr>
<tr>
<td>1992</td>
<td>159 020</td>
<td>34 665</td>
<td>1 483</td>
<td>2 999</td>
<td>12 128</td>
<td>210 295</td>
</tr>
<tr>
<td>1993</td>
<td>118 294</td>
<td>38 702</td>
<td>12 574</td>
<td>1 747</td>
<td>62 002</td>
<td>232 746</td>
</tr>
<tr>
<td>1994</td>
<td>136 887</td>
<td>125 503</td>
<td>21 844</td>
<td>120</td>
<td>2 196</td>
<td>286 550</td>
</tr>
<tr>
<td>1995</td>
<td>104 280</td>
<td>91 516</td>
<td>31 137</td>
<td>7 287</td>
<td>408</td>
<td>234 628</td>
</tr>
<tr>
<td>1996</td>
<td>142 481</td>
<td>22 792</td>
<td>64 448</td>
<td>11 044</td>
<td>0</td>
<td>240 765</td>
</tr>
<tr>
<td>1997</td>
<td>138 838</td>
<td>11 029</td>
<td>182 907</td>
<td>3 974</td>
<td>46 397</td>
<td>383 145</td>
</tr>
<tr>
<td>1998</td>
<td>68 271</td>
<td>1 365</td>
<td>35 230</td>
<td>166 864</td>
<td>1 211</td>
<td>272 941</td>
</tr>
<tr>
<td>1999</td>
<td>68 474</td>
<td>3 803</td>
<td>116 488</td>
<td>*143 615</td>
<td>0</td>
<td>332 380</td>
</tr>
<tr>
<td>2000</td>
<td>81 904</td>
<td>2 067</td>
<td>145 235</td>
<td>**209 576</td>
<td>0</td>
<td>438 782</td>
</tr>
<tr>
<td>2001</td>
<td>86 085</td>
<td>760</td>
<td>75 096</td>
<td>288 656</td>
<td>0</td>
<td>450 597</td>
</tr>
<tr>
<td>Total</td>
<td>2 273 105</td>
<td>507 078</td>
<td>707 883</td>
<td>861 497</td>
<td>124 342</td>
<td>4 091 188</td>
</tr>
</tbody>
</table>

* Source: Sabah Softwood Bhd. internal reports
* including 44 953 bone-dry tonnes (or 103 841 m³) for chipping
** including 85 271 bone-dry tonnes (or 196 976 m³) for chipping

### SSB’s agricultural plantations

In response to high CPO prices in 1997 and 1998, SSB increased its oil-palm plantation from 2 300 ha in 1997 to 14 000 ha by 2001. Most of the new plantations are not yet productive and it is premature to comment on the actual return on investment. However, SSB envisages that oil-palm and oil-palm-related activities would contribute positively to its future income. The remaining agricultural cropping area of 560 ha is planted with cocoa. By December 2000, a total of 46 767 ha had been cultivated with different crops (Table 15).

In conjunction with the oil-palm plantation programme, SSB proposed to set up a CPO mill. The construction was expected to commence in 2002 and be completed by 2003.
Table 15: Tree and agricultural crops of SSB, December 2000

<table>
<thead>
<tr>
<th>Species</th>
<th>Area (ha)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tree</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. mangium</td>
<td>18 118</td>
<td></td>
</tr>
<tr>
<td>P. falcataria</td>
<td>9 538</td>
<td></td>
</tr>
<tr>
<td>G. arborea</td>
<td>5 147</td>
<td></td>
</tr>
<tr>
<td>E. deglupta</td>
<td>1 607</td>
<td></td>
</tr>
<tr>
<td>Mixed</td>
<td>514</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>34 924</td>
<td>74.7</td>
</tr>
<tr>
<td><strong>Agriculture</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil-palm</td>
<td>11 283</td>
<td></td>
</tr>
<tr>
<td>Cocoa</td>
<td>560</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>11 843</td>
<td>25.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>46 767</td>
<td></td>
</tr>
</tbody>
</table>

Source: Sabah Softwood Bhd. internal records

TAX INCENTIVES IN MALAYSIA

Historical development

During the 1970s, the potential long-term role of forest plantations in the forestry sector and the national economy was not recognized. As a result, no direct incentives were offered to encourage plantation development until the 1980s. As time progressed and the natural forest dwindled, the government introduced various incentives to promote forestry and forestry-related activities. A chronological order of the changes to tax legislation and incentives, directly or indirectly affecting forest industry in Malaysia, is given hereunder:

Until 1979: Tax legislation and incentives did not specifically favour forest plantation activities.


1987: Further changes in definitions so that replanting costs could qualify for revenue deduction. Timber retained its qualification as an approved crop.

Investment Incentives Act replaced by Promotion of Investments Act (covering Pioneer Status and Investment Tax Allowance as promoted activities under the Act).

1991: Income exemption based on statutory income instead of adjusted income.

1992: Introduction of tax incentives for research and development activities.

1994: Forest plantations treated as industry of national and strategic importance with enhanced tax incentives.

Additional incentives for investments in Eastern Corridor States of Peninsular Malaysia, Sabah and Sarawak.


Today, there is a wide range of tax incentives available to the plantation sector in Sabah. The forest plantations have been accorded more incentives than the traditional agro-crops such as oil-palm and rubber, as reforestation has been regarded as an industry of national and strategic importance since the Sixth Malaysia Plan (1991-1995). As a result, special tax incentives under Section 4A of the Promotion of Investments Act (PIA) are available to the forest plantation
sector. The two principal incentives available to the forest plantation sector but not to the agricultural sector are Pioneer Status and Investment Tax Allowance.

In 2002, the government included forest plantations as an “Approved Agriculture Project” under Schedule 4A (see Annex 1 for details) of the Income Tax Act, in response to the disappointing impact of the previous tax incentives and requests by the private sector for additional support. Schedule 4A was originally formulated for food and fruit cultivation only. Under Schedule 4A, certain capital expenditures, ordinarily claimable over a period of time, can be treated as current year deductions. Some people are hopeful that this change may provide a boost to forest plantation development.

As a result of the 1997/1998 regional financial crises in Asia and the surging value for imported food products – RM11 billion (US$2.9 billion) in 1998 – the government first introduced “group relief” as a further incentive to encourage investment in approved food production projects in 1999. As the cost of importing food products continues to increase, emphasis is placed on urging agro-based companies to diversify into food production. The government has since removed some of the rather restrictive definitions and conditions of “group relief”.

The current incentives available under Section 4A of PIA, the Income Tax Act and other support fall into two categories, that is, direct and indirect incentives:

**Direct incentives**

Direct incentives can be made available according to “Pioneer Status” or “Investment Tax Allowance” under Section 4A of the PIA. The latest inclusion of forest plantations under the “Approved Agriculture Project” also supports investments. The common feature of the first two incentives is that the untaxed profit can be transferred to an account from which tax-exempted dividends can be declared. In contrast, Schedule 4A of the Income Tax Act allows all the qualifying expenditures to be offset against the current year’s income from other sources, thus reducing the current year’s taxable income.

**Pioneer Status**

Forest plantation developers are granted a 100 percent tax exemption on statutory income for ten years (as compared to five years in the past), commencing from the “production day”, which has been set as the date of first harvest. Normally, a company that is granted Pioneer Status enjoys tax exemption of 70 percent on its statutory income for a period of five years. Effectively, a company granted Pioneer Status would have an effective tax rate of 8.4 percent (30 percent [taxable income] x 28 percent [current tax rate]).

**Investment Tax Allowance (ITA)**

The ITA allows an eligible investor an additional deduction, over and above normal entitlement, for capital costs incurred on qualifying planting expenditures including roads and bridges, farm buildings, plant and equipment that are directly used in plantation development. The costs must be incurred within a period of five years commencing from the date of approval.

The ITA for forest plantation developers has been increased to 100 percent of the qualifying expenditures (instead of the normal rate of 60 percent) for other promoted sectors and enhanced to 100 percent deduction (instead of the normal 70 percent) from statutory income for each year of assessment. Effectively, the eligible company can claim up to 200 percent of its qualifying expenditures incurred during the initial five years.
**Schedule 4A of Income Tax Act**

Since a forest plantation is now recognized as an “Approved Agriculture Project” under Schedule 4A of the Income Tax Act, an investor who is currently deriving profits from other sources benefits from having all the qualifying forest plantation expenditures offset against current income. Previously, the planting costs could only be claimed under Schedule 3 of the Income Tax Act\(^5\) as annual capital cost allowance and not against other income.

As the Pioneer Status, ITA and Schedule 4A of the Income Tax Act are mutually exclusive, an investor has to decide on the most appropriate incentive. An investor who expects to profit soon after the commencement of harvesting will logically opt for Pioneer Status. However, becoming profitable soon after harvesting is unlikely to happen. The ITA, on the other hand, allows unutilized allowances to be carried forward indefinitely. This seems to favour forest plantation development, which incurs high initial capital costs and no returns in the first few years of operation. On the other hand, Schedule 4A of the Income Tax Act is suitable for a company that enjoys profits from various other sources as it reduces taxable income for the current year.

**Indirect incentives**

According to the ITA for approved in-house and other research activities, an additional 50 percent of capital expenditures incurred within ten years from the date of approval can be deducted. For approved research and development (R&D) activities, double deduction for expenses incurred and double deduction for cash contribution to approved research institutions or R&D companies are granted.

Other double deduction incentives are also accorded to expenditures such as approved training, freight charges for exporting rattan and wood-based products (excluding sawntimber and veneer), insurance (with a Malaysian incorporated company) on imported and exported cargo, export credit insurance premiums and cost of export promotion.

**Experience of SSB**

**Tax incentives**

SSB, as a pioneer in forest plantation since the early 1970s, does not qualify for Pioneer Status or ITA. Nevertheless, SSB has suffered from initial tax losses in its early years of operation. These losses and some unabsorbed plantation development allowances are being used to offset current taxable profit. It is estimated that SSB is unlikely to be taxable for another ten years.

**Other incentives**

Grants and subsidies in any form, soft loans, technical assistance, training and marketing assistance are not available to SSB. In addition, SSB develops its infrastructure without much governmental assistance. Water and electricity supply to the plantation area and the woodchip mill are also provided by the company without any external assistance.

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\(^5\) Initial development expenditures, which are considered capital in nature, are not tax deductible. However annual capital allowances for capital expenditures incurred are granted under Schedule 3 of the Income Tax Act. The annual capital allowances for agriculture and reforestation are between ten and 50 percent on the various types of expenditures, and they are deducted from the company’s adjusted business income to determine the statutory business income (See Annex 2 for definitions of the types of incomes).
Non-tax incentives for SSB

To facilitate the reforestation project, the Sabah Government alienated an area of about 60,618 ha to Sapangar Sdn. Bhd. This was alienated with minimum charge on land premium and low annual rental rates during the initial stage of plantation development. The land was subsequently subleased to SSB for 60 years. The allocation of land of such a size and the waiving of the normal terms and conditions of land alienation are the most significant government incentives provided to the joint-venture company.

Compared to other companies, SSB enjoyed a very low land premium and annual rent (Table 16). This has significantly reduced the initial costs of its plantation development. The Net Present Value (at five percent interest) of the land premium and annual rents over 30 years for SSB is only RM216 compared to RM1,403 for other companies. At ten percent interest, the respective figures are RM63 for SSB and RM1,230.

<table>
<thead>
<tr>
<th>Table 16: Land costs of SSB compared to other companies (cost/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Particulars</strong></td>
</tr>
<tr>
<td>---------------------------------</td>
</tr>
<tr>
<td>Land premium (one-time payment)</td>
</tr>
<tr>
<td>US$ equivalent</td>
</tr>
<tr>
<td>Annual rent first 3 years</td>
</tr>
<tr>
<td>US$ equivalent</td>
</tr>
<tr>
<td>Annual rent second 3 years</td>
</tr>
<tr>
<td>US$ equivalent</td>
</tr>
<tr>
<td>Annual rent balance 93 years</td>
</tr>
<tr>
<td>US$ equivalent</td>
</tr>
<tr>
<td>Annual rent first 15 years</td>
</tr>
<tr>
<td>US$ equivalent</td>
</tr>
<tr>
<td>Annual rent next 45 years</td>
</tr>
<tr>
<td>US$ equivalent</td>
</tr>
</tbody>
</table>

The subsequent annual rent (US$7.16) may appear high. However, the amount is still considered reasonable because the state government imposes no other royalty or cess tax on the plantation-grown timber. This exemption improves the competitiveness of plantation-grown timber against the small-diameter logs from the natural forests in the market.

DISCUSSION

Despite the government’s efforts to encourage forest plantation development through several tax incentives, investments in forest plantation development are being manifested only slowly. This is clearly reflected in the fact that the current ratio of oil-palm plantations to forest plantation is about 6:1. Between 1995 and 2000, oil-palm plantations have increased annually by 18.6 percent; forest plantations are a distant second at 7.5 percent. There are several reasons for this discrepancy.

Land availability

Land availability, though an age-old issue, is a fundamental constraint to forest plantation development (Rahim Sulaiman 2001). There is relatively little uncommitted state land and most is located in remote areas or is unsuitable for plantation development due to unfavourable terrain or soil conditions. Alienated land, on the other hand, is abundant. However, land can only be alienated for agricultural purpose. Also, land rents and premiums are too high, rendering forest plantations less competitive than alternative land uses.
Since 1997, forest land suitable either for rehabilitation or reforestation has been made available through Sustainable Forest Management Licence Agreements for 27 FMUs. More tree planting has taken place in some of the licensed areas, notably those of ICSB. Whether this will become a long-term development, remains to be seen.

**Land-use competition**

Aside from the question of land tenure, landowners generally prefer agricultural crops, especially oil-palm, for the following reasons:

- Shorter gestation period (oil-palm starts to produce four to five years after planting);
- Ease of marketing despite volatile CPO prices, because of an established market system;
- Higher returns due to high CPO prices in the past and currently (early 2003);
- Less risk (for example, less incidence of fire, pests and diseases);
- Single species, which improves the availability of high-quality planting stock and R&D information; and
- Potential additional income from residues, such as empty fruit bunches that can be used to generate energy or as raw material for industrial products (for example, paper and fibreboard).

In comparison with oil-palm, forest plantations are viewed as more complicated, especially if more than one species are selected. Marketing, technical and scientific support, and planting stock availability are also more problematic. The biggest disadvantage, or most significant impediment, is perhaps the long gestation period. Tree planting, especially over large areas, incurs substantial initial capital costs. This makes investments in forest plantations particularly unattractive. It is therefore not surprising that agricultural development in Sabah has outstripped forest plantations by a large margin over the past two decades.

**Deficiencies of tax incentives**

Even though direct and indirect incentives have been enhanced and much flexibility is provided, certain deficiencies remain, especially when the long-term nature of investing in forest plantations is considered. The Pioneer Status and ITA incentives are primarily designed for industrial and commercial projects with short gestation periods (Thornton 1987). Although these incentives have given extended periods, they do not adequately address the cash-flow problems of investors. Furthermore, Pioneer Status incentives are considered unattractive for the following reasons:

- Mandatory offset of pioneer losses against pioneer income;
- Inability to offset pioneer losses against non-exempted income of the pioneer company during the holiday and postholiday periods;
- Inability to carry forward unutilized pioneer losses to the postpioneer period;
- The ten-year holiday period is suitable only for fast-growing species, but does not suit high-value timber species that require longer rotations; and
- Unutilized plantation development allowances that are common in reforestation projects cannot be offset against income from another business source even if carried out by the same company.

In the case of the ITA, although the standard allowance rate of 60 percent has been enhanced to 100 percent, resulting effectively in a 200-percent claim for qualifying expenditures incurred, the qualifying period remains at the first five years. This suits industries where most capital expenditures are incurred early after commencement; forest plantations are subjected to costs for silvicultural treatment throughout the rotation until the final harvest.
However, the recent amendment of Schedule 4A of the Income Tax Act is an attempt to address the interim cash-flow problem of an investor in forest plantation. Of significance in this amendment is the inclusion of a list of tree species that qualify for an “Approved Agriculture Project”. This list comprises both exotic and indigenous species that are commonly used for planting including important dipterocarps for rehabilitating logged-over forest.

**Possible improvements to the incentive schemes**

Some incentives that may alleviate the cash-flow problem in the early years of planting are:

- **Grants and subsidies**
  Support should be provided in the form of replanting grants, cost refund grants (subsidy), grants for prescribed R&D and grants for a variety of capital costs incurred. Any form of grants and subsidies would enhance considerably an investor’s cash flow in the early years after plantation establishment.

- **Special/soft loans**
  It is not a common practice for most of the Malaysian financial institutions to extend any loan beyond ten years’ maturity. Access to long-term and inexpensive financing is important for forest plantation development. Special loan schemes for long-term investments should be arranged at preferential rates.

- **Group relief**
  Companies incorporated in Malaysia are limited by shares. The liability of the shareholders is limited to the amount of the paid-up capital of the companies. Corporate taxes are based on the annual return of each individual company. The company may not claim any relief that is accorded to its parent company or subsidiary company. Group relief is not permitted except for the food and fruit cultivation sector with certain conditions.

  As the initial planting costs are now treated as an operating cost and are fully deductible from current year revenue, they can be offset against any other company income immediately without having to wait until the final harvest. This may reduce profits or incur losses.

  Having allowed the offset of initial planting costs by transforming them into losses, the unabsorbed amounts of losses could be used immediately to offset them against the income of another company within the group if group relief is available. The group relief incentive, if permitted, would allow major investments in forest plantations.

- **Non-taxation of income derived during land clearing**
  Despite the ruling of the Privy Council on a controversial tax case (*Makmor Sdn. Bhd. vs Director General of Inland Revenue, 1983*), it is still uncertain whether indigenous timber cut during land clearing is taxable. The income from the sale of such timber, if non-taxable, would alleviate the negative cash flow during the first years after plantation establishment.

- **Effect of unutilized Schedule 3 allowances**
  According to the current system of granting tax exemption for ten years, statutory income is determined only after the accumulated Schedule 3 plantation development allowance has been offset. Considering that timber plantations would have accumulated substantial plantation development allowances, in view of its long gestation period, the tax holiday may be of academic interest if there is little or no statutory income after the mandatory offset of agricultural and other Schedule 3 allowances. It would be extremely advantageous if the tax exemption could revert to the old basis at adjusted income stage (before Schedule 3 allowances being offset), leaving the unutilized allowance untouched for future offsets and at the same time enhancing the tax exempt credits being created for franking dividends.
Effect of unutilized pioneer losses

Similarly, the current basis of treating companies with Pioneer Status is to offset pioneer income against pioneer losses. This diminishes and caps the extent of benefits otherwise available with a higher level of exempted income. Furthermore, should unrelieved pioneer losses remain unutilized, they are not carried forward to the postpioneer period, effectively making a pioneer company worse off than a company operating without such incentive. The inability to offset pioneer losses during the pioneer period against non-pioneer income also unduly punishes a pioneer company that incurs losses.

The effect of the unutilized Schedule 3 allowances and pioneer losses, which were generated by the tax reform in 1991, severely punishes long-term and risky investments such as forest plantation development. If losses are incurred, a pioneer company is rendered weaker than a non-pioneer company.

CONCLUSIONS

Tax incentives alone had only a minor impact on forest plantation development in Sabah in the past. To effectively promote tree planting, incentives need to be more suitable and better targeted. They should take into account the cash-flow requirement of investments with long gestation periods. In addition, the forest plantation sector needs to be supported by non-tax incentives such as land at reasonable premiums and annual rents.

The amendment of Schedule 4A of the Income Tax Act in early 2002 is seen as a major step forward since 1994 when forest plantations were treated as an industry of national and strategic importance. It is designed to address the cash-flow problem that has been lamented by the industry for too long. Enrichment planting in logged-over forests is given appropriate attention, as most of the species commonly used in rehabilitation are included in the amendment.

Although the effect of the amendment is not known yet, it is hoped that it will encourage some of the major oil-palm companies to consider planting trees as an alternative to oil-palm and investors to rehabilitate the vast area of forest land made available under the Sustainable Forest Management Licence in Sabah.

LITERATURE CITED


### ANNEX 1: COMPARISON OF INCENTIVES

<table>
<thead>
<tr>
<th>Incentives</th>
<th>Forestry</th>
<th>Traditional agriculture: rubber, oil-palm, cocoa</th>
<th>Other promoted agricultural activity/produce, fruit &amp; food cultivation, floriculture/ aquaculture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replanting costs claimed as revenue items</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Schedule 3 agricultural allowance for capital expenditures</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Promoted activity (for tax incentives such as Pioneer Status and ITA)</td>
<td>Yes (including bamboo and cane)</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Approved agriculture product qualifying for Schedule 4A option as revenue write-offs</td>
<td>Yes</td>
<td>No</td>
<td>Yes (aquaculture, food crops, floriculture)</td>
</tr>
<tr>
<td>Group relief for losses incurred</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Strategic industry of national importance qualifying for 10 year pioneer &amp; 100 percent ITA</td>
<td>Yes</td>
<td>No</td>
<td>Uncertain</td>
</tr>
<tr>
<td>Re-investment allowance (additional 60 percent claim on capital expenditures for qualifying agricultural projects)</td>
<td>On application</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Additional incentive for promoted area (Eastern Corridor)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Infrastructure allowance (100 percent allowances for capital expenditures on roads and bridges: jetties and other permanent structures in promoted areas)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

#### R&D incentives:

- Double deductions for expenditures on approved R&D projects: Yes, Yes, Yes
- Cash contribution to approved R&D institutes: Yes, Yes, Yes
- Payments for use of R&D centres: Yes, Yes, Yes

#### Pioneer Status/ITA incentives for companies carrying out:

- Contract research companies (5 years Pioneer Status/100 percent ITA): Yes, Yes, Yes
- R&D for group and other companies (ITA 100 percent): Yes, Yes, Yes
- In-house research for related companies (ITA 50 percent): Yes, Yes, Yes
- Duty exemption for imported machinery/materials for agricultural and R&D activities: Yes, Yes, Yes
- Capital allowance and ITA assets used for R&D: Yes, Yes, Yes
ANNEX 2: DERIVATION OF ADJUSTED AND STATUTORY INCOME

GROSS INCOME

Less: Allowable expenses
Less: Double deduction of expenses
Less: Special deductions (S36(6) of the ITA 1967)

ADJUSTED INCOME

Add: Group relief – current year adjusted loss surrendered by a “surrendering company” (Y/A 2000 onwards – Sch 4C of the ITA 1967)
Less: Re-investment allowance (Y/A 1996 and prior)
Less: Industrial adjustment income
Add: Balancing charges
Less: Capital allowances and balancing allowances (part of Schedule 3 allowances)

STATUTORY INCOME

Less: Exemption of income for pioneer companies/investment tax allowance (for application received on or after 1.11.91)
Less: Re-investment allowance
Less: Previous year’s business losses
Add: Statutory income from other sources
Add: Recoveries of abortive prospecting expenditure
Add: Recoveries of expenditure on approved agricultural projects (Schedule 4A of the ITA 1967)

AGGREGATE INCOME

Less: Current year’s business losses
Less: Prospecting expenditure
Less: Expenditure on approved agricultural projects (Schedule 4A of the ITA 1967)
Less: Pre-operational business expenditure (Schedule 4B of the ITA 1967)
Less: Proportion of permitted expenses for investment holding companies (Y/A 1993 onwards – S60F of the ITA 1967)
Less: Trust annuity (S64(5) of the ITA 1967)
Less: Approved donations (S44(6), 44(6A), 44(8), 44(9), 44(10) & 44(11) of the ITA 1967)
Less: Group relief – current year adjusted loss transferred from a “surrendering company” (Y/A 2000 onwards – Schedule 4C of the ITA 1967)

TOTAL INCOME

Less: Personal relief for resident individuals

CHARGEABLE INCOME
INTRODUCTION

Geographic and economic backgrounds

New Zealand comprises two main islands (North Island and South Island) and several small islands, totalling 27.1 million ha in area. About 25 percent of the land area is less than 200 metres above sea level; steep hills and mountain ranges that approach 3 754 metres often form a backdrop to this low-lying land. New Zealand experiences a maritime, temperate and windy climate. It has a population of 3.8 million people. The economy is based largely on export-oriented primary production, with agricultural products accounting for about 35 percent of total overseas trade (by value). Some economic indicators of New Zealand are presented in Table 1.

Before initial Māori (Polynesian) settlement in New Zealand about 800 years ago, most areas below the natural treeline were forested. Over 100 natural forest types covered around 85 percent of the country. Between the fourteenth and sixteenth centuries in particular, large areas of forest were burnt as the population expanded. In 1840, when the Māori population was about 115 000 and European settlers numbered approximately 2 000, the Treaty of Waitangi was signed between the British Crown and Māori chiefs to record the consent of the Māori to New Zealand becoming a British colony.

European settlement commenced in earnest from this time, when indigenous forests covered about 53 percent of the land area. The European settlers and their descendants saw forests as both an obstacle to agriculture and an inexhaustible source of timber. Pasture increased from less than 70 000 ha in 1861 to 4.5 million ha in 1901. By 1920, most of the current 11.9 million ha of agricultural land had been cleared. This was the primary cause of the decrease in natural forest cover to the current 6.3 million ha or 23 percent of New Zealand’s land area (Ministry for the Environment 1997).

Table 2 details current land uses, while Figure 1 shows the distribution of plantation and indigenous forests. Approximately 16.8 million ha of the total land area is under private ownership and 10.3 million ha belong to the government.
Table 1: New Zealand economic indicators (year ended 31 March 2001)

| Indicator                                           | Value  
|-----------------------------------------------------|--------
| Population density (people/km²)                    | 14.16  
| GDP (NZ$ million)*                                 | 112 316
| GDP per capita (NZ$)                               | 29 271 
| Forest industry contribution to GDP (%)            | 4.0    
| Total NZ merchandise trade – re-exports (NZ$ million)** | 30 793
| Forest industry contribution to total NZ merchandise trade by value (%) | 11.5   
| Net international debt (NZ$ billion)               | 84.3   
| Annual percentage change in GDP                    | +2.5   
| Inflation (%)                                      | +3.0   
| Labour force (million)                             | 1.915  
| Forest industry employment as percentage of labour force | 1.3    
| Unemployment rate (percentage of labour force)     | 5.2    

Sources: Statistics New Zealand; Ministry of Agriculture and Forestry
* GDP = Gross domestic product; on 1 August 2002, NZ$1.00 = US$0.47.
** Year ended June 2001 (provisional).

Table 2: Current land uses in New Zealand

<table>
<thead>
<tr>
<th>Land use</th>
<th>Area (million ha)</th>
<th>Percentage of total area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indigenous forest</td>
<td>6.3</td>
<td>23.2</td>
</tr>
<tr>
<td>Shrubland</td>
<td>2.7</td>
<td>10.0</td>
</tr>
<tr>
<td>Plantation forest</td>
<td>1.8</td>
<td>6.6</td>
</tr>
<tr>
<td>Pastoral, horticulture &amp; arable</td>
<td>11.9</td>
<td>43.9</td>
</tr>
<tr>
<td>Tussock grassland</td>
<td>2.0</td>
<td>7.4</td>
</tr>
<tr>
<td>Other land*</td>
<td>2.4</td>
<td>8.9</td>
</tr>
</tbody>
</table>

New Zealand total land area

Source: Ministry of Agriculture and Forestry (2001)
* Mostly land with no potential for sustainable production, towns, lakes, rivers and unclassified areas.

Role of the forest industry in the economy

New Zealand is geographically isolated from major world markets, so innovations to increase productivity and competitiveness are cornerstones to survival and growth, including plantation forest development. Fertile soils, abundant rainfall in most areas and few temperature extremes, provide ideal conditions for growing trees. In addition, no part of the country is very far from a seaport.

Timber has always played a significant role in the New Zealand economy, and in the early development of the country it was the principal export. Many of New Zealand’s small towns started as lumber camps. As European settlement increased, a strong local timber market developed with wood required for housing, fuelwood, fencing, gold mining, construction and, in due course, railway sleepers. The indigenous timber industry reached a production peak in 1907 and then declined as the prized kauri (*Agathis australis*) forests were logged to near extinction. The development of a plantation-based forest industry began with the establishment of a State Forest Service in 1919. There are now 1.8 million ha of plantation forests. Plantations cover seven percent of New Zealand’s land area and comprise 29 percent of the total forest area.
In the year ended March 2002 (provisional figures):

- An estimated 20.9 million m³ of wood were harvested from New Zealand's forests (99.7 percent of which came from the plantation forests);
- The average recovered volume from plantations was 482 m³ per ha harvested, and the average age of the harvested radiata pine was 27 years;
- 13.5 million m³ were processed domestically by New Zealand’s industry mix of four pulp and paper companies, eight panelboard companies, more than 350 sawmillers and approximately 80 manufacturers;
- The estimated roundwood equivalent of 14.3 million m³ were exported, in raw and processed forms, earning NZ$3.6 billion and ranking forestry third in terms of commodity exports;
- The estimated roundwood equivalent of 1.7 million m³ of forest products (December 2001) were imported (largely paper and paperboard); and
- Forestry directly provided jobs for 24,300 people or 1.3 percent of the total number of people employed (as at February 2001).
New Zealand accounts for 1.1 percent of the world’s total supply of industrial wood. This generates 1.3 and 8.8 percent of the world and Asia-Pacific trade in forest products, respectively. However, the New Zealand forest industry has huge potential. Looking forward to 2010, the industry based on plantation forests could:

- Cover 2.2 million ha or eight percent of New Zealand’s total land area (at a planting rate of 40,000 ha per year);
- Supply 31 million m$^3$ of wood per year;
- Account for 1.9 percent of the world’s industrial roundwood (based on current total world production);
- Invest up to NZ$3 billion in new wood processing facilities if most of the predicted annual production of 31 million m$^3$ was processed domestically;
- Add NZ$5 billion to current export earnings; and
- Provide employment for an additional 20,000 people.

**Role of public and private sectors in forestry**

From 1919 to March 1987, the government’s commercial forestry operations were administered by one agency, the New Zealand Forest Service. In the mid-1980s, New Zealand underwent radical reforms moving from a regulated to a market-based economy, and there was significant re-organization of government agencies. In 1987, the government announced its intention to sell its entire plantation forest estate. This involved 550,000 ha, or about half of New Zealand’s plantation forest resource at the time. The Department of Conservation manages the government’s indigenous forest estate. The Ministry of Agriculture and Forestry has policy, sustainable development, forest health and protection (quarantine) functions. Forest research is carried out under contract to government and private enterprise.

Generally, New Zealand has enjoyed stable and transparent governments with sound legal, policy, planning and institutional frameworks in all sectors. This played a significant role in encouraging overseas investment in forest assets. Central government now controls a mere three percent of the country’s plantation forests. State-owned enterprises and local government control another three percent each. Through the sales process, the face of New Zealand forestry has become more diverse and international. There are 20 companies that each manage more than 10,000 ha of forest. Small-scale growers are increasing their presence. Increased competition and greater exposure to international market fundamentals have enhanced the industry’s competitiveness and its contribution to the New Zealand economy.

**Current forest production and conservation policies**

The government’s focus has shifted from direct involvement in the industry to promoting economic and regulatory environments in which the forest industry acts for itself wherever possible – to seize economic opportunities, protect and enhance the environment and, in the process, to advance New Zealand’s social goals. New Zealand has no national forest policy at the moment. The Resource Management Act 1991 sets the legislative framework for the sustainable use, development and protection of land, air and water resources. It is implemented primarily at the regional and district government levels. A 1993 amendment to the Forests Act 1949 requires indigenous forests on private land to be managed under approved sustainable forest management plans or permits where timber is to be harvested, and sawmills processing indigenous timber to be registered. The amendment also introduced further controls on the export of indigenous timber products.
GENERAL OVERVIEW OF PLANTATION FOREST DEVELOPMENT

As early as the 1870s, concern was developing over the rapid rate of indigenous forest depletion. Some leading politicians recognized that the indigenous forests were not inexhaustible and future demands would have to be satisfied by imports or plantation forests. The first forestry legislation was passed in 1874 in an attempt to limit deforestation. It did not endure against the dominating view that forests impede the development of agriculture. Further legislation in 1885 set aside state forests, established a school of forestry, and appointed forestry staff. The interest shown in forestry at that time was again short-lived.

Apart from early European settlers’ efforts to provide shelter or beautify some treeless areas, tree planting took place only from 1871, encouraged mainly by local governments. Central government afforestation took place from the late 1890s under the Lands Department, and about 16 000 ha were planted by 1919.

In 1913, a Royal Commission on Forestry identified some of the main forestry and timber problems, and predicted that the growing demand for timber would exhaust the supply from the indigenous forests in approximately 50 years. The First World War delayed implementation of the Commission’s recommendations, but also highlighted the importance of adequate timber supply. In 1919, the newly established State Forest Service incorporated exotic forestry, indigenous forestry and indigenous forest regeneration under its responsibilities. Further and enduring legislation was passed in 1921 and 1922. These initiatives provided a boost to forest management and afforestation.

The assessments of indigenous timber resources and future domestic timber demand, and the concern that the indigenous forests would be depleted, led to the adoption of large-scale afforestation by the government. This was accompanied and supported by technological developments that significantly improved the economics of forestry and lowered the risks. Growth and yield performance led to radiata pine becoming the species of choice. Between 1925 and 1936, about 288 000 ha were planted. Initially this was a government undertaking, but once the financial rewards and technologies were firmly established, the private sector quickly responded and contributed significantly to the planting boom. The largest afforestation company (New Zealand Perpetual Forests Ltd.) planted 68 000 ha during this 12-year period.

From 1936 to about 1960, little planting was undertaken. Initially this reflected a review of Forest Service Policy that noted the prominence given to exotic plantations in the preceding years. A more balanced approach was subsequently pursued to complete the establishment of existing forests, rather than focus on the silvicultural treatment of indigenous forests.

Another important factor was the 1937 discovery of a remedy (cobalt) for so-called “bush sickness” on the pumice lands of the central North Island that had severely restricted the development of agriculture. This land was ideal for forestry and was where most of the large-scale afforestation had taken place. With the discovery of a cure, the prospects for further large-scale afforestation diminished. Mistakes were also made in these early plantings with poor siting in particular leading to extensive failures of radiata pine and other species. A major fire and an insect epidemic over a large area were other factors that caused foresters to reflect upon appropriate management practices.

The 1940s and 1950s were also times of great change for processors and end-users who had been accustomed to high quality, indigenous timbers, but were now increasingly faced with non-durable pine from untended early plantings, which contained many defects. The State Forest Service devoted considerable attention to utilization issues.

With the significant production and demonstrated returns from plantations, the building of a processing sector utilizing plantation-grown timber, plus a re-assessment of future demand and the desire to create an export industry, the government initiated a second wave of planting in the early 1960s. This time the circumstances were somewhat different – the government also
needed to provide political support and financial incentives apart from demonstrated returns and adequate information.

Since 1960, the government progressively introduced a range of support measures to accelerate tree planting on private land. As with the first planting boom, this expansion was driven by the Forest Service. Again, the planting was largely with radiata pine. The ever-increasing amount and complexity of the government incentives to forestry characterized this period from the early 1960s to the mid-1980s. The plantation estate grew from 352 000 ha in 1960 to over one million ha by 1984, of which nearly half was on private land.

Deregulation in 1984 changed the New Zealand economy from one of the most controlled to perhaps the most open economy in the world. Direct incentive schemes were terminated, extension services became cost-recoverable and significant changes were made to the taxation regime that applied to forestry. The government’s commercial forestry activities were initially corporatized, then privatized in the early 1990s. This combination of events resulted in a dramatic drop in new planting. By 1992, the bulk of the government’s plantation forest assets had been sold. Further changes to the taxation regime were introduced and the government actively promoted forestry investment, mainly through the provision of information. Development of the supporting infrastructure, such as ports, railways and bridges, in most regions was another key facilitating factor. Declining agricultural product prices and land values also had an important influence on the competitiveness and profitability of forestry. Agricultural landowners recognized the value of forestry in diversification and sustainable management. Most importantly, a global price spike for logs in 1993 and 1994 drew unprecedented interest in forestry. These factors buoyed private investment and were important in attracting foreign investors and forest managers, who brought capital, plantation development expertise, technology and crucial access to foreign markets. As a result of these influences, new plantings surged to record levels during the mid-1990s. The last few years have seen planting decline to a perhaps more sustainable long-term rate as log prices returned to more traditional levels.

Having progressed successfully from public plantation development and ownership to private corporate ownership and expansion, the industry has now moved into another phase where the majority of the new planting is on small woodlots and plantations by private landowners and partnerships. A further sign of the maturation of the industry is the presence of professional organizations and sector associations in the processing and marketing arenas, as well as the constructive working relationships that have been built up over time with key stakeholders – the government, research organizations, civil society and environmental groups.

The enduring nature of the newly created forest plantation prompted the following observation 30 years ago that still holds true today:

In numerous localities where the indigenous timbers, first the kauri, and later those outside the kauri country became exhausted all that remained as a reminder of once flourishing sawmilling centers were ghost settlements and often not even that. With our predominantly radiata exotic plantations, however, we now seem to have somewhat of a paradox – new and apparently permanent prosperous towns the economy of which is based entirely on these plantations (Simpson 1973).

The history of plantation forestry development in New Zealand has run in parallel with a gradual change in the mindset regarding tree planting. From being appropriate just for “waste” land (i.e. land unsuitable for agriculture) and marginal land, plantation forestry is now being actively pursued as a profitable enterprise able to compete for land with any other activity and contribute to sustainable land management. New Zealand’s plantation forests of 1.8 million ha continue to grow at around 30 000 to 40 000 ha per annum, and are 91 percent privately owned. Radiata pine (Pinus radiata) accounts for 89 percent of the plantation area, Douglas fir (Pseudotsuga menziesii) another six percent, other softwoods (mainly Pinus spp.) two percent and hardwoods (mainly Eucalyptus spp.) three percent. The plantations are managed
primarily for industrial roundwood production, although some smaller areas are maintained for soil conservation purposes. An accord signed between the industry and environmental groups in 1991 recognized commercial plantation forests as an essential source of perpetually renewable fibre and energy, offering an alternative to stop the depletion of the natural forests. At the same time, it also acknowledged the importance of protecting the existing native biodiversity.

**Figure 2. Annual government and private new planting**

**PLANTATION FOREST DEVELOPMENT PRIOR TO 1870**

Until 1840, the New Zealand timber industry depended on the harvesting of Māori-owned indigenous forests. The provincial government in the Canterbury region of the central South Island was the first to encourage tree planting by passing the Planting of Trees Ordinance in 1858. This was mainly to develop on-farm wood resources on leased land in significant treeless areas. The ordinance permitted tenants to plant trees on their land and reimbursed them for the trees if the leases were terminated (see Annex 1 for summary of developments during this period).

**INITIAL RECOGNITION OF PLANTATION FORESTRY AND THE BEGINNING OF THE LEARNING CURVE (1870-1918)**

By 1870, increasing concerns about the depletion of the indigenous forests led some politicians to acknowledge that future demands for industrial wood from these sources would have to be supplemented by imports or plantation forests. However, the government’s primary objective of promoting European settlement and rapid economic development took precedence over any concerns about the rate of deforestation. Most of the land clearance by Europeans took place between 1870 and 1920.

**Legislation**

Two reports submitted to the government in 1870 recommended incentives for the planting of trees and provided the initiative for the Forest Trees Planting Encouragement Act 1871. This was particularly targeted at the treeless Canterbury Plains and Central Otago in South Island, where trees were needed for building materials, railway sleepers, fuel and shelter for stock and
crops. Under the provisions of the Act, farmers were entitled to a free land grant of two acres\(^3\) of wasteland for every acre of freehold land planted with suitable trees. The government also encouraged tree planting on state land by reducing the rents of tenants who planted trees on their leaseholds. The Act was never fully implemented, nor was it particularly popular with the farmers. By 1877, only 622 acres were planted in Canterbury compared to 1,300 acres that had been planted independent of the Act on private land by 1871.

The first Forests Act (1874) was an attempt to halt the indiscriminate destruction of indigenous forests and establish a forest department specifically focused on ensuring a long-term supply of (indigenous) timber. It provided £10,000\(^4\) for ten years to be spent on forest management, which included planting. However, the first forest conservator, appointed in 1893, saw only a small role for the government in plantation forestry. Government forestry was also seen to be in conflict with settlement aspirations, and the legislation failed after three years.

Under the State Forests Act of 1885, the revenue from harvesting indigenous forests was placed in a dedicated “State Forests Account” from which the costs of plantation forestry could be drawn. The legislation also offered subsidies to local government for establishing plantations. Once again, however, the brief interest in forestry did not endure and the State Forest Department was dismantled in 1887.

**Local-level afforestation assistance**

Since 1871, large grants of government land were made available to district councils for afforestation purposes. In return, the councils were expected to provide seedlings and funds, and undertake forest establishment, which was difficult to achieve. It was eventually agreed that planting should be gradual and that the areas where planting was deferred could be leased to provide revenue to defray some of the costs. Provincial governments also sought to increase private planting by issuing a land order of £4 to anyone who successfully planted one acre with any type of tree. This scheme lasted for 20 years. It was particularly popular in Canterbury and Otago where the establishment of shelterbelts to provide protection from the prevailing northwest winds was valuable to farmers. Some of these plantations were up to 200 or 300 acres of largely radiata pine or *Cupressus macrocarpa*. Continuous, small-scale planting, partly funded in this way, provided the foundation for the Canterbury Plantation Board to become New Zealand’s first plantation forest management agency.

Tree planting subsidy schemes had stopped in the early 1890s. By this time, planters had identified species with superior yield potential including several pine species, Douglas fir, eucalypts, cypresses and, in particular, larch (*Larix* spp.).

**Government leadership and national coordination**

A turning point for plantation development came in 1896 when the government convened a national timber conference, bringing together timber industry representatives, conservationists and farmers. The conference concluded that, because of the demand for timber, attempts to conserve indigenous forest would be futile without the establishment of plantations. The recommendations, listed hereunder, were well received and adopted:

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\(^3\) One acre is approximately 0.4 ha.

\(^4\) The New Zealand currency was pounds, shillings and pence until 1967 when dollars and cents were introduced at the rate of £1 to US$2.
It is desirable to commence the planting of lands unfit for agricultural or pastoral purposes immediately;

Experimental grounds should be established for the raising of various trees and the supply of trees at nominal cost to those willing to make plantations for timber purposes only; and

Advice and direction should be afforded by the government to assist private planting for forestry purposes.

**Government afforestation**

The government responded in 1896 by establishing an afforestation branch within the Lands Department, and the first government-organized afforestation commenced. The government implemented an annual planting programme that focused on land in the central North Island volcanic plateau, considered deficient for farming. The first tree nurseries were also established.

Fifty-four acres were planted in 1898 and numerous trials were established to compare indigenous with exotic species and determine the most suitable trees for plantations. Initially, labour constraints hindered the expansion of plantation forestry, but tree-planting prisons were established and convict labour was used until 1920. By 1904, afforestation was up to approximately 1,000 acres of new planting per year. Planting was targeted at government land near railway lines where there was little existing adjacent forest.

By 1908, 9,465 acres of plantations were established. These plantings illustrated that exotic plantations were technically feasible, although the cost of establishment was high. The average figure was £20/acre (approximately NZ$5,970/ha in December 2001 values).

**Government supply and demand analysis**

In the early 1900s, the quality and quantity of indigenous timber were diminishing rapidly. It was estimated that the supply was likely to be exhausted in less than 70 years (Kensington 1907). Demand for wood was also growing quickly. Between the turn of the century and 1908, imports had increased fivefold despite indigenous timber production doubling over the previous ten years. A Royal Commission on Forestry set up in 1913 recognized the limitations of the indigenous forest to meet future timber supply, the unsatisfactory fragmentation of forestry administration and a lack of interest in afforestation by the administrators. The Commission suggested that indigenous species, and even the most commonly planted exotic at that time – larch, were unsuitable for plantation purposes, but did note that *Pinus radiata* was being raised in quite insufficient numbers. The strong performance of pine species in New Zealand was becoming evident. Its roles in controlling erosion and stabilizing sand dunes were also recognized.

**Government support and indigenous timber controls**

In 1908, the government responded to industry lobbying by introducing reduced rail freight rates for timber, which cost the government between £25,000 and £35,000 (approximately NZ$3.0 to 4.2 million in December 2001 values). Forestry was given a considerable stimulus when the government began supplying seedlings to settlers at cost price for farm planting as early as 1916, and assisted further through the provision of extension.

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5 All inflation-adjusted figures in this paper are based upon a Consumer Price Index (CPI) (All Groups) regular survey that commenced in 1914. Where the original figure predates 1914, the inflation adjustment for the intervening period is based upon an estimate of CPI trends from a 1912 Royal Commission report that detailed food and rent prices in New Zealand’s four main centres from 1891.
The repatriation of 1914-1918 soldiers, an increase in the number of marriages, higher wage rates and a general feeling of prosperity, all led to a high demand for construction timber. This situation was fuelled by substantial government housing subsidies for returned soldiers. During, and for some years after the war, discharged soldiers were also eligible for grants of forest trees for farm purposes.

The growing concern over the fate of New Zealand’s indigenous forests resulted in the introduction of wide-ranging regulations in 1918 to control timber milling and exports. The Minister of Forestry was empowered to set the maximum production at each sawmill, require millers to report their activities and impose a system of export and domestic price controls. Later, export quotas were introduced and permits required for timber exports to control domestic prices with the aim of “conserving New Zealand timbers for New Zealand use”.

Period summary and conclusions

The period was notable for the gradual change from viewing indigenous timber supply as inexhaustible to a realization that existing forest resources were inadequate to meet the country’s future needs. Accordingly, increasing government involvement in the forestry sector took place. Development and implementation of forest policy and legislation were severely constrained by the European pioneering attitude that saw forests as obstacles to settlement and agricultural development. While land settlement reached its peak around the turn of the century, forestry continued to be perceived only as an alternative where agriculture was uneconomical. The government attempted to address these issues many times, but overall political support was weak until the end of the period. Land grants were the principal direct means of encouragement for plantation forestry. Initial steps by the government to develop a viable industry and knowledge on afforestation, and the gradual refinement of cost-effective planting techniques, provided some indirect incentives. By 1918, a toehold of some 13 000 ha of plantations had been established, most of it encouraged, but not owned, by the government.

The government also impacted on the timber industry through duties and tariffs, adjusting rail freight rates and establishing new wage bargaining procedures. These were generally ad hoc responses either to crises in the timber industry, rising production costs, or increasing competition from imported timbers. The First World War led to the introduction of export price controls and quotas in an attempt to provide low-cost raw materials for postwar construction. Whilst this policy achieved its objectives, it also meant that even greater incentives were required to persuade private individuals to grow trees. Annex 1 summarizes incentives for plantation forestry development provided during this period. Conclusions about these incentives are:

- A fundamental and long-term need for wood was accepted;
- Plantations could readily substitute natural forests to nearly satisfy this need;
- To implement plantation strategies, incentives are required because of the time lag between establishment and maturity;
- In an environment dominated by short-term objectives, the New Zealand Government had an important role in demonstrating and developing the management for a new land use – plantation forestry (based on exotic species);
- Incentives are ineffective where they are at odds with the prevailing attitudes, and their success is significantly impeded if other policies are inconsistent with the objectives of the incentives; and
- Fragmentation in government administration hinders the development and implementation of effective policy for land use and industry.
LARGE-SCALE GOVERNMENT PLANTING (1919-1938)

In 1919, the State Forest Service was formed, and experienced, trained, professional foresters were appointed to senior positions. The Forest Service initially adopted a new policy direction away from afforestation, export restrictions and price controls, and towards a more comprehensive government forestry programme focused on sustainable management of indigenous forests. It was believed that this would be enough to assure future supplies of timber for the country.

The first national forest inventory, carried out between 1921 and 1923, revealed that five million ha, or around 20 percent of the country, could be classified as forest land, of which only 45 percent (2.24 million ha) was merchantable. Furthermore, the 1925 annual report of the Forest Service estimated the total economically available indigenous softwoods at around 60 million m³, and the per capita consumption of the 1.35 million inhabitants of New Zealand at a little over 0.5 m³ per annum. Based on population trends and the expansion of industry, particularly agriculture, it was further calculated that by 1965, the national demand for sawntimber would be 1.6 million m³, and that New Zealand’s virgin softwood supplies would be exhausted by 1970.

These results forced a policy rethink. Timber product substitution was not considered feasible, and increasing reliance on imports was perceived as costly and creating an unwelcome dependence on overseas supplies. Despite the uncertainties of large-scale afforestation, it was viewed as the only solution, and from 1925 onwards afforestation became a central plank of forest policy. Thus, the conclusions of 20 years earlier were reconfirmed and the afforestation solution was pursued with renewed vigour. This became the rationale for the extensive government forest planting and the incentives to encourage private companies, local authorities and private individuals that followed.

An official report calculated that about 238 000 ha of radiata pine planted over a 34-year period would be needed to supply expected demand, assuming no remaining indigenous forest resources. A new afforestation strategy was announced, which recommended that the 5 200 ha of government plantations that existed in 1925 be increased to 120 000 ha by 1935 to meet New Zealand’s timber needs from 1965 onwards. The early learning phase had provided much of the groundwork that allowed planting on this scale to be contemplated.

Research

An improved seed collection service was introduced in 1923 to counter the impacts of poor, and inconsistent, tree-form characteristics. Silvicultural research efforts had focused on ascertaining the most appropriate time to plant, spacing, maintenance of soil fertility, shade requirements and fertilizer response. A separate stream of research was concerned with insect pests and fungal diseases of trees. Forest product research, including kiln-drying, physical and mechanical properties of various timbers, timber treatment and preservation, and pulp and paper potential, began in 1921. By 1925, when the first planting boom occurred, there were already some five or six years of useful results from government-conducted research to draw from. Dedicated forestry schools were also established in Canterbury in 1925 and Auckland in 1926, although both closed in the early 1930s.

Government support

From 1921 to the end of 1930, the sale of seedlings at cost price from government nurseries for private planting was also given considerable emphasis, and resulted in a significant number of trees being planted. In 1927 alone, some 4.8 million trees were supplied from government nurseries to individual landowners. Much of this planting was for shelter and on-farm uses, rather than for commercial returns. The government ceased to supply seedlings in 1930 after submissions from the Nurserymen’s Association that considered it to be unfair competition.
From 1921 to 1930, the State Forest Service employed a North Island and a South Island officer whose role was to travel the country giving addresses and dispensing advice on tree planting. This was supported by extensive Forest Service research into the growth, yield and potential of various exotic species, although a forest research institute was not established until 1947.

**Improving the economics**

Improvements in afforestation and planting techniques, particularly between 1921 and 1924, reduced the cost of establishing plantations from £26.18/acre in 1918 to less than £2/acre in 1925. This eliminated one of the principal objections to afforestation – that it was uneconomical. The goal of 120 000 ha by 1935 became a national policy. Direct sowing of tree seeds and wider spacing between planted seedlings were also introduced. By the mid-1930s, the cost of planting in the central plateau, where half of the planting was taking place, remained at around £2/acre (approximately NZ$408/ha at December 2001 prices).

**Provision of labour**

Convict labour comprised the bulk of the labour force used in government afforestation up until 1921. This was supplied free-of-charge to the Forest Service at first, but for about six years until 1921 the Forest Service (and its predecessor) was charged the actual cost of maintaining the convicts, which illustrates the true cost to government. From 1921 onwards, the Forest Service no longer used convict labour, and workers were drawn instead from the ranks of the unemployed. During the Great Depression, subsidized work relief programmes gave considerable stimulus to the government’s afforestation programme. Tree planting under public works’ relief schemes was widespread during the 1930s and the target of 120 000 ha by 1935 was exceeded by 25 percent in 1934. Another government response during the Depression was to provide a subsidy for construction of houses equivalent to 33.3 percent of wages up to a maximum of total construction cost. This had obvious linkages to the timber industry. Freight rate concessions were also available.

**Government plantation forestry**

Government plantation establishment was financed by loans with compounding interest, rather than annual appropriations. Combined with forest revenues that could be applied to non-planting purposes, annual receipts were consequently insufficient to meet accumulated debts. In one of the worst cases, the expected yield from Dumgree Forest established in 1903 was less than five percent of the accumulated debt, largely due to compounding interest.

Between 1927 and 1932, exotic pine production increased from 17 500 to 32 000 m³, although still only representing six percent of total production. Twenty percent of this exotic production came from government forests and was typically used domestically for poles, sleepers, mine props, posts, battens and fuel.

A new forest policy in 1934 de-emphasized the importance of expanding the plantation estate, and large-scale forest planting ceased. Exotic plantations were seen as “supplementary forest resource capital”. In view of subsequent events, the reasons are worth noting. Firstly, halting large-scale plantings was perceived to be appropriate because it was considered that plantation resources were sufficient to supplement indigenous forests for the next century. In addition, surplus exotics were envisaged to be export oriented and therefore would not be competitive in the international market.

Diversification was also emphasized so that no species would form more than 30 percent of the total resource. This strategy had been given impetus by outbreaks of the wood wasp (*Sirex noctilio*) and fungal infections. A more limited afforestation programme continued, partly
to reduce the proportion of radiata pine from its 40 percent level in 1934 to the 30 percent target, and partly to improve the age class distribution.

**Private afforestation**

Concurrent with the government forestry expansion was a private forest-planting boom, although for very different reasons. Initial work by the Forestry Branch of the Lands Department and subsequent research undertaken by the Forest Service provided knowledge on species suitability, growth rates and planting techniques. Consistent with research results on the performance of the government’s exotic species plantations, the harvest of some older private exotic forests and shelterbelts resulted in attractive returns. The investment potential of plantation forestry had been demonstrated. In response, several private companies were formed after 1923. These new afforestation companies benefited from the government’s experiences, and were speculating on reaping the financial rewards of the new industry.

Besides special-purpose afforestation companies, other enterprises with an interest in securing a long-term supply of timber were attracted to the government’s tree-planting efforts. These included some sawmilling companies and other wood users. Capital was raised by means of bond sales through public offerings. Combined with the government’s efforts to encourage plantation forestry, significant new private plantings took place.

When the Great Depression commenced in 1929, the New Zealand timber industry was already in recession. From 1928 to 1934, timber prices fell due to oversupply from the indigenous forests and competition from imports, even though the government withheld timber from sale to support the private industry. New Zealand timber was increasingly displaced by imported timber such as Douglas fir, cedar and redwood, despite increasing import duties on timber. This trend eventually spelt the end for many companies, and new plantings by surviving companies fell steadily during the early 1930s (Figure 3), mirroring the fall in the government plantings, but for different reasons.

Abuse of the bond-selling system by private companies eventually led to its abolishment and to changes in the legislation governing companies in 1934. This accentuated the decline in private planting.

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* A bond entitled the purchaser to an acre of land on which the issuing company would plant and manage trees for a specified period.

* Concern developed over the methods of promotion, inflated claims about financial returns, inappropriate expenditure and dubious transactions.
Period summary and conclusions

The formation of the State Forest Service, an inventory of the natural forest resource and assessment of the country’s future timber demand laid the foundations for plantation forestry in New Zealand. The Forest Service’s main objective was to ensure an adequate, long-term timber supply. Substantial areas of government and private plantations were established.

Throughout the 1920s and 1930s, the government implemented forest policies that provided both direct and indirect incentives for the development of the forest industry. In addition to a government afforestation programme, these measures included a government extension service, the development of forest management techniques, research, unemployment relief, housing subsidies and price controls.

This was very much an experimental phase. A number of extensive planting failures occurred where radiata pine was planted on inappropriate sites. Afforestation was concentrated on land not suitable for agriculture and, in a number of cases it was also poor for commercial forestry. Some plantations were destroyed by fire.

The inadequate age class distribution was another concern. Eighty percent of the Forest Service’s radiata pine forests and 50 percent of the private forests were established between 1927 and 1931. This posed significant management problems. Importantly, though, for the development of the plantation forest industry, the government bore the bulk of the costs associated with this experience. By 1938, both government and private planting had effectively ceased, and most of the plantation estates were between nine and 13 years old.

A summary of incentives and disincentives during this phase is available in Annex 1. The conclusions from this period with respect to incentives for plantation forestry are:

- Integrated forestry administration was important for the development and implementation of a cohesive forestry policy;
- A well-funded research programme on all aspects of plantation forest management was essential;
- A good understanding of forest resources and likely future demand for wood were fundamental components of an enduring afforestation policy;
- A good understanding of the product, its management and end uses were essential for commercial viability;
- A wide range of direct and indirect incentives for plantation forestry existed, and different interest groups responded according to their various motivations for planting;
- Government demonstration of the commercial viability of plantation forestry attracted private investment, particularly from companies; and
- With experience and research, new opportunities became available, such as the emergence of viable export products.

CONSOLIDATION AND FOCUS ON UTILIZATION (1939-1958)

Afforestation, particularly private planting, was limited during the 1940s and 1950s. Meat and wool farming were especially buoyant during this period and tree plantings on farms were unable to compete when, at the same time, the government was maintaining timber price controls. In addition, the government’s focus moved away from plantation development to processing. From 1939 to 1958, the total area planted reached only 55 000 ha. Private planting picked up only during the latter part of this period and accounted for 16 000 ha (29 percent) of the total.

The planting of radiata pine during the 1920s and 1930s in concentrated areas provided large quantities of relatively uniform raw materials in the late 1940s. The advantages gained – low logging and transport costs, and bulk marketing – were important to the development of the
processing industry, and outweighed the disadvantages of poorer wood quality from untended radiata pine stands.

Table 3: Estimated roundwood removals from New Zealand’s forests between 1939 and 1958 (000 m³)

<table>
<thead>
<tr>
<th>Year ended 31 March</th>
<th>Indigenous forest</th>
<th>Plantation forest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average of 1936 to 1939</td>
<td>1 387</td>
<td>226</td>
</tr>
<tr>
<td>1948</td>
<td>1 455</td>
<td>829</td>
</tr>
<tr>
<td>1950</td>
<td>1 624</td>
<td>934</td>
</tr>
<tr>
<td>1955</td>
<td>1 610</td>
<td>1 845</td>
</tr>
<tr>
<td>1959</td>
<td>1 573</td>
<td>2 394</td>
</tr>
</tbody>
</table>

Sources: New Zealand Forest Service (1986); Ministry of Agriculture and Forestry (2001)

Subsidized processing and associated infrastructure

The Forest Service’s involvement in commercial logging and processing was very important in consolidating the economics of plantation forestry and expanding the demand for products from the developing plantation resource. In 1939, the government commissioned a large sawmill near Rotorua, adjacent to the major central North Island plantings. Another major government sawmill, Conical Hill, began operating in South Island in 1948. These sawmills served as demonstration and development units for production and marketing techniques for the sale of exotic plantation-grown timber, and in having radiata accepted as construction timber. The industry was quick to follow with a major private company (NZ Forest Products Ltd.) commissioning an integrated sawmill-structural board plant in 1941 that utilized radiata pine.

Research was required to develop grades and to determine seasoning, preservation practices, strengths and physical properties of plantation-grown timber. In 1948, the Forest Experiment Station (now Forest Research) at Rotorua was established by the government as the base station for a national indigenous forest inventory, but its work soon extended into exotic species. The value of a centralized research institution was quickly illustrated during a sudden epidemic of the Sirex wood wasp in the late 1940s.

The first commercial pulping of radiata pine commenced in 1939 by Whakatane Board Mills. In 1943, as part of a “National Pulp and Paper Scheme”, the government approved the establishment of a newsprint and pulp and paper mill. A change of government in 1949 resulted in a policy shift favouring private over public ownership. In 1952, the government signed an agreement with the Tasman Pulp and Paper Company, and a pulp and paper mill was established at Kawerau in central North Island. An important aspect of this arrangement was the degree to which the government, as the owner of the wood resource, made the venture as attractive as possible by selling a very large volume of wood at low stumpage prices, effectively subsidizing the mill’s profits. Weighing the benefits of establishing a plantation industry – with associated downstream processing facilities – against the cost of selling the logs at below-market value would have been a difficult exercise and was very much a political decision. In essence, “The direct and secondary benefits to the community are, politically, close to being irresistible, while below-market pricing of logs is practically invisible under most systems of Government accounting” (Kirkland and Berg 1997).

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* Annual statistics for roundwood removals prior to 1948 are not readily available.
The government also agreed to: (i) construct many miles of new roads and a modern port facility at nearby Tauranga; (ii) supply energy from hydroelectric power stations and (iii) establish railway lines to link the plant with the existing rail network and new port. It constructed over 700 rental houses and 550 one-man huts for the workforce, plus all necessary town services. The £14 million cost (approximately NZ$511.8 million at December 2001 prices) to the government for providing this support represented almost 50 years’ gross revenue under the terms of the sale agreement. This was before the additional cost of the low stumpage price was factored in. Furthermore, the contract was effective for 75 years and thus locked the government into providing wood from yet unplanted forests.

By comparison, NZ Forest Products Ltd. initiated parallel development of an integrated sawmill and pulp and paper mill in 1949 without direct government participation. This was based on its almost equally extensive exotic forests in central North Island and commenced operation in 1953.

In 1957, the first log shipment in 50 years went offshore, this time of radiata pine. Exotic sawntimber production exceeded indigenous production for the first time in March 1960.

**Tax relief**

Tax relief was provided from 1949 to farmers who had forest plantations. This allowed expenditure incurred in planting, protecting and maintaining shelterbelts and woodlots, to be charged against income for tax purposes. In addition, farmers were able to spread income from the sale of farm trees over five years to mitigate the impact of higher marginal tax rates. The standing value of trees did not increase the assessment for land valuation and local tax rates. Little planting by farmers was undertaken, however.

**Price controls**

In 1936, the government had established a Timber Price Committee due to demand exceeding supply following the end of the Depression. The Committee set standard timber prices through negotiations with sawmill representatives.

Demand was further increased by the start of the Second World War and the government assumed even greater powers by appointing a Timber Controller with authority to undertake the sale, purchase and cutting of any trees. After the war, demand for new housing outstripped supply until the mid-1950s. Building permits for dwellings rose from 1 634 in 1943 to 10 356 in 1945 and 1946. Government price controls were continued to address a significant backlog of construction needs, and to ensure affordable housing. They applied to both indigenous and exotic timbers, and kept stumpage payments low. These controls slowed down the anticipated shift from indigenous to exotic timber, as did the continued access by sawmillers to private indigenous forests. A government scheme introduced in 1946 that allowed sawmillers to provide subsidized housing to attract workers into the countryside was also likely to have benefited the indigenous forest industry more than plantation forestry.

Under the price controls, valuable indigenous timbers were available at the same prices as radiata pine, with minimal price differences across timber grades. Throughout the 1950s, the Forest Service and private forest companies argued that such price controls needed to be removed if exotic plantation timber was to have any chance of substituting indigenous timber. Price controls were considered a significant disincentive to tree planting. The government, however, was more concerned with ensuring low-cost timber for housing and employment opportunities, and timber price controls were not removed until 1965. The government also regulated the supply of timber.
National forest survey

A major new national forest survey of the indigenous resource (1946 to 1955) provided high quality information on the resources and composition, condition and ecology of the forests. Only 0.8 million ha of the estimated 5.8 million ha of indigenous forest were considered suitable for timber utilization. The results confirmed that timber supplies from indigenous forests could be sustained at the current rate of harvest for only a few more decades. The government consequently accepted that sales of timber from indigenous forests should be reduced.

Period summary and conclusions

The focus of this period was on the utilization of the maturing plantation trees, with only limited further plantation development. Notably, a new Director of the Forest Service appointed in 1939 was a forest product engineer. The impacts of the earlier planting were significant as a very large volume of poorly and rapidly grown wood, mostly radiata pine, began to replace the high-quality native timbers that had been used so successfully for the previous hundred years. Access to large, concentrated volumes of uniform plantation wood that could be harvested easily overcame the disadvantage of poorer quality relative to wood from indigenous forests.

In some respects, New Zealand’s extensive plantation forests had been grown speculatively, and this was the period of developing a better understanding of their management, the wood properties and their utilization potential. The government responded by providing significant subsidized development of the infrastructure necessary for processing the wood.

Annex 1 highlights the incentives and disincentives available during this period. The conclusions drawn with respect to incentives for plantation forestry are:

- Development of infrastructure by government paved the way for large-scale processing initiatives based on plantation-grown timber;
- Government ownership of extensive plantation forests enabled the provision of low-cost wood to facilitate the development and success of new, large-scale processing;
- Logging, sawing and marketing techniques developed by the Forest Service played a significant role in ensuring the development of exotic plantation forestry;
- The real cost to the government for the incentives was not documented, but it was considerable and unlikely to have been justified purely on its financial merits. Some developments might have taken place anyway (and indeed did);
- The contributions to broader economic development and social goals could be sufficient to make the financial costs politically acceptable;
- Price controls inevitably depressed further expansion of plantation forestry, and revealed how the implementation of other policies could significantly reduce the impact of incentives; and
- Taxation incentives on their own were insufficient to persuade farmers to adopt plantation forestry.

PLANTING IN PARTNERSHIP AND DEVELOPING AN EXPORT INDUSTRY

(1959-1984)

The large increase in plantation wood in the mid-1950s from the first planting boom gave rise to strong growth in the industries and trade. The anticipated demand from these new industries triggered perceptions of further future wood shortages. Another assessment of New Zealand’s future wood supply needs was undertaken for the government. Its report in 1959 predicted a deficit of 5.4 million m³ in 2000. This assessment stimulated a second major afforestation

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9 This was based on the population being over five million by that time, whereas the current population is only 3.8 million.
effort. Much of the planning was also based on developing an export capacity. From 1959 onwards, the Japanese log trade increased significantly. It was delivering prices well in excess of what was available in the domestic market, and made forestry a more competitive and profitable form of land use.

A threefold increase in planting was proposed and in 1960 the government approved a new planting programme of 400 000 ha by 2000, principally aimed at creating a major export industry. Annual planting targets were steadily increased from 9 000 ha/year in 1959 to 28 000 ha/year in 1972.

Unoccupied land available for either agriculture or forestry was limited and it was recognized that the government (through the Forest Service) could only contribute to part of the target. It was envisaged that the government and the farming community would need to contribute equally to achieve the required level of new planting. This meant winning the support of a farming community that was, in general, wary of any further plantation expansion. Initially, the targets of the planting programme could not be met because the government had difficulties in purchasing sufficient land for planting, and because of the farmers’ limited interest. Price controls, still in effect until 1965, were another obstacle to afforestation.

A small farm forestry movement had been initiated in the late 1950s and achieved some success in promoting small-scale forestry and the use of a more diverse range of exotic species. Despite the government’s promotional efforts, however, these efforts were not enough to encourage sufficient numbers of farmers to plant trees. Similarly, the exemption of the timber value of trees from estate duty in 1960 had little effect. Moreover, financial institutions were reluctant to provide loans to forestry enterprises because of their inexperience with such investments. More direct incentives were considered necessary, and were quickly and increasingly brought into play. In 1972, planting by the private sector exceeded that of the government for the first time since 1939.

**Government promotion**

For the first time, forestry was actively promoted by the Forest Service as a legitimate land use in its own right, and began to compete with agriculture for more productive land. The Forest Service devoted considerable time and resources to promote the benefits of forestry as a land development option that complemented agriculture. It also supported research on the relative profitability of farming compared with forestry, and provided technical advice through a nationwide extension service. However, impediments to expansion remained, the most important being prevailing attitudes and the legislative environment.

The increased rates of tree planting in the 1970s resulted in a vigorous “farming versus forestry versus the environment” debate. Although afforestation was concentrated on cutover indigenous forest and poorer quality farmland, many in the agriculture (livestock) industry still strongly viewed plantation forestry as a waste of good land. This was particularly focused on large-scale plantation forestry undertaken by private corporations and the government.

Other arguments against plantation forestry focused on the disruption of existing rural communities by a new land use that changed the social structure and supporting services. Typically, forest workers were younger, often single, and were concentrated in fewer and larger towns. Large-scale plantation forestry did not involve family ownership and land management. It was blamed for increasing urban migration and thus the consequential loss of education, health, transport and other social services in rural areas. Farmers expressed fears of becoming surrounded and isolated by plantations because they could not compete with the corporate sector in purchasing land. However for those who sold their land, forestry provided an additional and welcome exit opportunity in many cases.
The situation was compounded by a general disinterest in forestry among the agricultural community. There was little interaction between the forestry school (established in 1970) and the agricultural universities. Courses in agroforestry were only introduced into the agricultural universities in the 1980s. Consequently, farm advisers, trained in livestock production techniques, had little experience or interest in promoting trees.

The farming versus forestry debates also continued in the statutory planning arena, particularly under the Town and Country Planning Act (1977), and polarized the parties involved. The Act listed the protection of land having actual or potential value for food production as a matter of national importance. This was supposed to control urban development on high-quality agricultural land, but the provision became a convenient mechanism for local authorities to justify the control of plantation expansion. Throughout the 1980s, this restriction had a significant, although unquantifiable, impact on the development of plantation forestry while agriculture remained largely free of any controls.

**Loans and grants schemes**

**Forestry Encouragement Loans 1962**

Prior to 1962, farmers found it difficult to obtain finance for forestry purposes. The government introduced Forestry Encouragement Loans under the Farm Forestry Act (1962). Landowners could borrow money for up to 20 years at an annual interest rate of five percent (inflation at the time was three percent *per annum*), including a provision for insurance up to the amount borrowed. Loans could be sought for the establishment (£25/acre or approximately NZ$1 871/ha in December 2001 values) and tending (£15/acre or approximately NZ$1 123/ha in December 2001 values) of areas from five to 100 acres (2-40 ha), over a five-year period. The amount was intended to cover the full cost of establishing a small forest or farm woodlot. Half of the loan and half of the interest were refundable after 20 years if the plan was implemented satisfactorily. Priority was given to areas with high timber demand, close to population centres, and where forest industries were present or expected to develop.

Despite these measures, the area planted remained significantly below target. In 1965, the Farm Forestry Act was modified and renamed the Forestry Encouragement Act. With this amendment, local governments could take advantage of the terms and request loans for up to 40 years. The rate of interest payable on new loans was reduced to three percent, with interest only charged on the non-refundable half of the loan. Another option was provided to compound interest up to the point where the forest began earning income. The limit of 100 acres (40 ha) as the maximum area able to be planted over a five-year period was removed to enable greater areas to be planted with the approval of the Ministers of Forests and Finance.

In 1962 and 1963, 57 planting loans and 11 tending loans were provided. This rose to 100 and three respectively by 1966/1967, but still the area planted remained considerably below target (Table 4). Amendments to the Forestry Encouragement Loans were made virtually every three years, when the maximum loan finance and interest rates were varied to account for inflation.

It is unclear why the areas planted were such small proportions of the area for which loans had been granted. The economics showed the planting under the loan scheme to be considerably cheaper than that carried out by the Forest Service.
Table 4: Area planted during the first five years under the loan scheme (ha)

<table>
<thead>
<tr>
<th>Year ended 31 March</th>
<th>Area granted (ha)</th>
<th>Area actually planted (ha)</th>
<th>Value of loans (NZ$)</th>
<th>Approximate value of loans in December 2001 values (NZ$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1963</td>
<td>1 236</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>1964</td>
<td>680</td>
<td>364</td>
<td>27 308</td>
<td>406 000</td>
</tr>
<tr>
<td>1965</td>
<td>1 086</td>
<td>518</td>
<td>61 198</td>
<td>878 000</td>
</tr>
<tr>
<td>1966</td>
<td>3 113</td>
<td>462</td>
<td>62 324</td>
<td>865 000</td>
</tr>
<tr>
<td>1967</td>
<td>2 716</td>
<td>1 097</td>
<td>112 228</td>
<td>1 516 000</td>
</tr>
</tbody>
</table>

Sources: Reports of the Director-General of Forests (1964 to 1968); Poole (1968)

Forestry Encouragement Grants 1969

In 1969, the government concluded that the rate of planting under the loan scheme was unlikely to ever reach the target. Regulations providing for Forestry Encouragement Grants were introduced in 1970 to gradually replace the loan scheme. Under the new plan, individuals, trusts, partnerships and smaller companies whose qualifying expenditures did not exceed NZ$200 000\(^{10}\) per year (approximately NZ$2 185 000 in December 2001 values) were entitled to receive annual cash grants equal to 50 percent of the qualifying costs of establishing new forests. A maximum of NZ$750/ha (approximately NZ$8 194 in December 2001 values) was payable and the minimum area eligible was two ha. Such incentives seemed to balance the tax exemptions enjoyed by the larger forest companies.

The two encouragement schemes

The Forest Encouragement Loan scheme was retained for local authorities only. A maximum loan of NZ$1 200/ha was available for establishment and tending of plantations of at least two ha. Interest was charged at seven percent per year (the inflation rate in 1970 was 6.6 percent), of which 0.5 percent was to provide fire insurance.

The loan and grant schemes were amended twice. In 1977, a single interest rate of 4.5 percent was introduced for new loans and the 50 percent loan refund provision was revoked. Farmers with existing loans, and whose planted forests were up to an acceptable standard, had the option to retain their loans, or cancel their existing debts fully and claim a proportion of their future qualifying costs under the grant scheme. The maximum grant amount was increased from NZ$300 to 450 (approximately NZ$1 506 to 2 260 in December 2001 values) per hectare. The Forest Service reported that the area of new plantings was falling because the grants covered only one-third of the establishment costs instead of the intended 50 percent.

In 1980, the financial limits on annual expenditure under the grant scheme were removed. Protection/production grants were introduced and targeted at farmers who wished to work on their properties that needed stabilization themselves. The scheme provided grants of up to two-thirds of the establishment costs, together with half of all subsequent costs.\(^{11}\)

\(^{10}\) New Zealand “decimalized” in 1967. The currency changed from pounds, shillings and pence to dollars and cents, and units of area changed from acres to hectares.

\(^{11}\) Less than three percent of the area approved by the Forest Service for assisted planting in 1982/1983 qualified under the protection/production scheme.


**Forestry Encouragement Grants 1982**

In 1982, the government introduced the Forestry Encouragement Grants to provide equitable assistance to all landowners (Box 1). From 1 April 1983, all previous forestry incentives were withdrawn. They were replaced by a flat rate grant of 45 percent of qualifying costs. The new grants were extended for the first time to the larger companies. At the same time, the right to deduct current forestry expenditure from taxable income, which had been available to the forestry companies since 1965, was removed. The effect was to increase the government’s tax revenues and create a large new expenditure item concurrently. In view of the large planting areas involved, the grants were to be controlled clerically, by random financial audits of annual claims, rather than by field inspections of forestry operations.

With the introduction of the Forestry Encouragement Grants, the Forestry Encouragement Loans ended in 1983. Loan holders could choose to maintain their loans, or terminate them and receive grants for further expenditures. Many opted for the grant payments, but most local authorities continued with their loans for cash flow reasons.

The Forestry Encouragement Grants scheme was ended in the 1984 budget, and replaced by full deduction of plantation establishment costs against current income for tax purposes. Transitional loans, to complete the development of existing plantations, were available to previous grant holders through the Rural Bank. Protection/production grant holders remained eligible for grants of up to 39.4 percent of qualifying costs until 1990/1991.

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**Box 1: Activities qualifying for Forestry Encouragement Grants**

- Clearing and preparing of land
- Cost of trees, planting, blanking and release cutting
- Pruning and thinning
- Chemicals and fertilizers, and their application
- Establishing access and temporary roads, and associated culverts and bridges
- Repairs and maintenance
- Disease and pest control
- New fencing for crop protection
- Fire protection and suppression (not including capital items)
- Temporary (only) forest huts
- Hiring or leasing plants or equipment for forestry development
- Professional forest services or advice
- Work carried out under contract
- Subscriptions to forestry associations
- Administration expenses and directors’ fees
- Rent, rates, land tax, insurance or “other like expenses”
- Interest on money borrowed and employed as capital or for forestry development
- Depreciation on plants and machinery
- Value of the owner’s labour

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Repayments on individual farmer loans (last loans approved in 1970) could last until 2010. Local authority repayments (last loans approved in 1970) could last until 2023. The current total value of outstanding loans is NZ$34 million, including NZ$19.5 million of capitalized interest.

**Achievements of the loans and grants schemes**

Nearly 200 Forestry Encouragement Loans were approved over the 20 years of the scheme’s operation. The total area planted under the scheme was 20 000 ha. More than 3 000 Forestry Encouragement Grants were made over the scheme’s 13 years of operation. The total area planted under this scheme was 100 000 ha (Table 5).
### Table 5: Private sector forest plantings 1963/1964 to 1983/1984 under loan and grant schemes (ha)

<table>
<thead>
<tr>
<th>Year ended March</th>
<th>Total new private planting (a)</th>
<th>Loans scheme planting (b)</th>
<th>Grants scheme planting (b)</th>
<th>Combined scheme planting (b)</th>
<th>Total cost of scheme (NZ$000) (c)</th>
<th>Approx. cost in December 2001 values (NZ$000)</th>
<th>Combined scheme (%) (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1964</td>
<td>4 000</td>
<td>364</td>
<td>0</td>
<td>364</td>
<td>27</td>
<td>406</td>
<td>9</td>
</tr>
<tr>
<td>1965</td>
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<td>518</td>
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<td>518</td>
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<td>1970</td>
<td>8 000</td>
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<td>1 162</td>
<td>121</td>
<td>1 408</td>
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<tr>
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<td>227</td>
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<td>23 000</td>
<td>–</td>
<td>–</td>
<td>6 764</td>
<td>1 216</td>
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<tr>
<td>1978</td>
<td>19 000</td>
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<td>(e) 7 596</td>
<td>1 767</td>
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<tr>
<td>1979</td>
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<td>7 211</td>
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<td>33</td>
</tr>
<tr>
<td>1980</td>
<td>26 000</td>
<td>–</td>
<td>–</td>
<td>6 544</td>
<td>2 182</td>
<td>8 608</td>
<td>25</td>
</tr>
<tr>
<td>1981</td>
<td>21 000</td>
<td>–</td>
<td>–</td>
<td>5 717</td>
<td>(f) 2 245</td>
<td>7 960</td>
<td>27</td>
</tr>
<tr>
<td>1982</td>
<td>23 000</td>
<td>–</td>
<td>–</td>
<td>7 225</td>
<td>(f) 2 894</td>
<td>8 119</td>
<td>31</td>
</tr>
<tr>
<td>1983</td>
<td>30 000</td>
<td>–</td>
<td>–</td>
<td>7 203</td>
<td>(f) 4 731</td>
<td>11 887</td>
<td>24</td>
</tr>
<tr>
<td>1984</td>
<td>31 000</td>
<td>–</td>
<td>–</td>
<td>(g) 31 000</td>
<td>(f) 71 953</td>
<td>72 403</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>354 000</td>
<td>(h) 20 000</td>
<td>(h) 100 000</td>
<td>119 509</td>
<td>94 031</td>
<td>273 420</td>
<td>34</td>
</tr>
</tbody>
</table>

b Data for loans and grants from annual reports of the Director-General of Forests unless otherwise stated.
c Sources: Poole (1968); O’Brien (1982). Costs include planting and tending.
d Area planted under grant and loan schemes expressed as percentage of total new private planting.
e Source: O’Brien (1982).
g This is an anomaly as grants temporarily replaced the previous taxation provisions for forestry companies.
h Totals for loans and grants from McKenzie (1997).

### Taxation

In the early 1960s, the government did not see forestry companies as significant actors in the afforestation programme. The tax regime at that time deterred shareholders from re-investing their dividends and profits into second rotations. Being ineligible for the 1960 loans, the companies were provided with a more favourable tax regime in 1965 that made afforestation more attractive to them. This change might have been influenced by the inability to achieve planting targets through more direct incentives to farmers.

Under the Income Tax Act, new forest establishment was encouraged by allowing companies to make current year deductions from assessable income of expenditures incurred directly and indirectly in tree planting. While individuals did not enjoy the same benefit, they could accumulate the costs and deduct them from tax payments at the time of felling. This was known as the “cost of bush”.
Companies that were unable to obtain an immediate tax-saving benefit could receive a tax credit refund of 45 cents to the dollar, in line with an export taxation incentive available at the time. This benefit was not available to companies that already had a Forest Encouragement Grant on the same lands.

To encourage regional investment, forestry and sawmilling were eligible for up to 20 percent depreciation on any plant and machinery used primarily and directly in these activities. The exact level of depreciation was dependent on the priority status of the region as determined by the government in relation to the region’s development needs.

A number of incentives under the Income Tax Act were available for establishing plantations to offset the long gestation period associated with forestry, such as:

- Spreading income from the sale of timber over a period of up to five years, including the year of sale. This concession was available only to farmers who planted the trees for agricultural or pastoral purposes, or a woodlot owner whose trees were planted, or maintained, under a forestry encouragement loan.
- Individuals depositing forestry income into an “equalization reserve account”. This money then earned interest at three percent and was only taxed when it was withdrawn from the account.
- Companies depositing money from thinning operations into an account to be carried forward free of tax.

A number of the tax incentives offered to companies were the same as those that had been offered to individuals in 1949. For several reasons, this time the uptake was considerably better. Firstly, the tax benefits were more important to, and better able to be utilized by, investors than landowners. Secondly, in the 1940s and 1950s, meat and wool farming were very buoyant and timber price controls provided a considerable disincentive. Finally, in the mid-1960s, a range of other incentives also supported the tax benefits.

Māori leased land

Another option the government selected to facilitate afforestation was land lease arrangements with the Māori. The Forest Service established and managed forests on Māori land, and profits were to be shared between the government and the landowners. From 1967 to 1985, a number of leases involved a total of 71 000 ha of Māori land, with around 51 000 ha planted with trees. From the government’s perspective, the forests were a means of utilizing Māori land that was otherwise unlikely to be used as productively. The initial leases were for 99-year terms, with the landowners receiving a share of stumpage in lieu of rent. The leases provided for consultation with the landowners and safeguards relating to wahi tapu (sacred) areas. Subsequent leases were for shorter terms with annual rental payments in response to Māori wishes for greater control. Following this initiative, the private forest industry also entered into lease arrangements with Māori landowners.

National forestry development conferences

In 1969, the government convened a Forestry Development Conference to assess forest resources and associated industries, and make recommendations for their expansion. The conference served to establish a common commitment to and belief in forestry as a long-term contributor to the economy, and created a sense of partnership between the government and the private sector, both large and small. At this point, the private companies took a much more significant role in afforestation. The conference considered immediate, medium- and long-term perspectives, and reported on efficiencies that could be achieved. Industry, government, the Forest Service and universities were all brought together to contribute to the planning. Export targets were doubled to over 3.7 million m³ by 1973.
Further forestry conferences followed in 1974/75 and 1981. The 1974/75 conference addressed land-use policy, regional development, indigenous forest policy, forest legislation, forest industry, afforestation, short-term wood supply and recreational use of forests. The 1981 conference also addressed a wide range of issues including management practices, utilization, transport, landscape, social and environmental matters.

During the 1970s, public concern over the utilization of indigenous forests grew steadily. The primary concern was clear-felling and burning of indigenous forest to enable conversion to faster growing plantations. A number of new environmental groups emerged. The Maruia Declaration was the largest petition in New Zealand with 341 159 signatures. It opposed an indigenous forest utilization and conversion proposal and was presented to parliament in 1977. The petition received little support from the government, but indigenous forestry became a major political issue. The environmental movement was generally not favourably disposed towards plantation forestry. The conferences were part of the government’s efforts to try to include all relevant stakeholders, including environmental and community groups, in the planning process and to achieve a shared vision for plantation forestry development. The 1981 conference re-affirmed the expansion in the plantation estate achieved and recommended a continuation to 1990 at 43 800 ha per year to complete the goal of an estate with balanced age class distribution.

**General export incentives**

Two export-focused incentives (not targeted specifically at forestry) – the Market Development Expenditure Scheme and Increased Exports Taxation Incentive (IETI) – were introduced under the Income Tax Act in the early 1960s. Under the IETI, assessable income from the increase in free-on-board (f.o.b.) value of exports over total sales can be reduced. The increase was based on the average of the first three of the last four years’ trading figures. Companies unable to take advantage of the benefit could elect to convert it to a tax credit at the rate of 45 cents to the dollar.

Changes were made to the IETI in 1966 to deduct 15 percent of the increase in export sales over total sales based on the first three of the last five years, and again in 1972 to increase the deduction to 20 percent from the first three of the last six years. Further changes were made in 1975 to raise the deduction to 25 percent and the base to the first three of the last seven years.

Export Development Grants were introduced in 1975 allowing 40 percent tax-free payments towards export development expenditure. A New Market Increased Export Taxation Incentive was also introduced. This allowed a further deduction of 15 percent of the increase in f.o.b. value of export sales if these sales were to new markets. This could be a new product to an existing market, or an existing product to a new market.

An Export Performance Incentive (EPI) was introduced in 1979 under the Income Tax Act. For four years this ran concurrently with the other two export incentive schemes described above, although it was a mutually exclusive situation with potential recipients having to choose either the EPI or the other schemes. The EPI provided an incentive that was related to the total f.o.b. value of goods exported, based on their level of domestic content. The scheme comprised seven bands that ranged from the highest level of incentive (11.9 percent) for a value-added component of 80 to 100 percent, down to a rate of 1.4 percent for those goods with 0 to 20 percent added value. On average, these rates were equivalent to 14 percent of the domestic value added in each foreign exchange earned. The incentive was distributed as a tax credit. Most forest products fell into band B (70 to 80 percent), which attracted an incentive of 10.5 percent. In 1983, the EPI replaced the other two export incentive schemes.
Other export incentive schemes from the early 1980s were:

- An Export Market Development Incentive introduced in 1980 under the Income Tax Act. This allowed certain expenditure related to the cost of promoting New Zealand goods and services abroad, and incurred outside New Zealand, to be eligible for a tax refund of 67.5 cents to the dollar.

- A programme of Export Grants introduced in 1980 to replace the New Market Development Grants and Services Export Development Grants. This was aimed at encouraging the development of new markets and provided a non-taxable rebate, available in advance, of 64 percent of eligible promotion expenditure in designated target markets.

- An Export Manufacturing Investment Allowance under the Income Tax Act allowed, in addition to the normal 25 percent depreciation in the first year, up to a further 20 percent of the cost of investment in plant and machinery to be deducted from assessable income. The exact amount that could be deducted depended on the proportion of the output that was destined for export. In addition, under certain circumstance, machinery used primarily for the production of export goods was eligible for Sales Tax exemption.

- Export Suspensory Loans allowed an exporter to borrow at commercial interest rates up to NZ$100 000 (approximately NZ$337 000 in December 2001 values) in loan finance for intensive export investment projects. Thereafter, those exporters who managed to meet a set export target for three consecutive years during a five-year period were eligible to have their loans converted to grants. Once converted, the amount was then treated as taxable income over the following three years.

**Research and education**

Prior to the early 1960s, long-term silvicultural research by the Forest Research Institute was limited to growth studies based on sample plots with a range of multiple thinnings. Other research was limited to short-term projects. In 1961, an Economics of Silviculture group was established with three objectives:

- Produce predictive yield tables for thinned and unthinned stands;
- Determine the effects of initial spacing, pruning, thinning and size of final crop trees on yields and grades of sawntimber and pulpwood produced; and
- Provide financial forecasts for different silvicultural regimes.

In 1978, the problems of analysis of the large and growing database, and effective communication of the results to forest managers were considered. As a result, the accrued knowledge was incorporated into a stand model that would simulate the entire growing, harvesting and conversion processes.

At the same time, the Forest Service was becoming concerned with the proliferation of silvicultural regimes throughout New Zealand. The Radiata Pine Task Force, established at the Forest Research Institute, developed a model that simulated the growth of one hectare of tended radiata pine and then simulated the harvesting, transporting and sawing of the wood from that stand (Sutton 1984).

The Forest Research Institute’s services were generally provided free-of-charge to forest growers and processors until the mid-1980s. In 1980, the institute’s budget was NZ$12 million (approximately NZ$40.4 million in December 2001 values), entirely funded by the government. In 1998/1999, the government invested NZ$25.4 million (approximately NZ$26.7 million in December 2001 values) in forest research (distributed among all research organizations covering indigenous and plantation forestry) and the industry invested NZ$32.6 million.
After the closure of the two university forestry schools in the 1930s, New Zealand foresters were trained overseas. It was not until 1970 that a new School of Forestry opened at the University of Canterbury, offering Bachelor of Forestry Science and postgraduate study for New Zealand and overseas students.

The Forest Service had a programme of sponsoring trainees for university education. It was generally accepted that some foresters trained by the Forest Service would be enticed to work for private forestry companies. Similarly, the Forest Service established forest “ranger” and “woodsman” training schools, and some trainees also went on to work in the private industry. This supply of trained personnel was another important indirect incentive that assisted the development of the plantation industry.

The National Exotic Forest Description

The purpose of the National Exotic Forest Description (NEFD) is to maintain an authoritative, publicly available, high quality, quantitative database of New Zealand’s plantation forests. The principal components of the NEFD are the forest area, age class information, yield tables and national and regional wood supply forecasts. Area and age class information is updated annually, while yield tables are revised, and wood supply forecasts are produced periodically (about every five years). Information is readily available through printed publications and the Internet.

Since its inception in 1982, the NEFD has operated as a partnership between the government’s forestry department and private industry. A wide range of forestry stakeholders, including central government, relies on the NEFD for monitoring, policy-making, wood supply forecasting and planning. It also plays an important role in investment analysis by the forest industry, domestically and internationally, as well the financial sector.12

The Forestry Rights Registration Act 1983

In 1983, the Forestry Rights Registration Act was passed to facilitate the use of joint ventures for the development of plantations. The Act provided for a forestry right to be granted by the owner or lessee of land to another person to establish, maintain and harvest, or just to maintain and harvest, a crop of trees on that land. It also incorporated rights of access and provisions for payments, royalties, or a division of the crop or the proceeds from the crop. The Act also permitted the registration of a forestry right against the title of the land in question, but without the high standard of survey normally required for registering instruments against land titles. Nonetheless, companies and private investors did not invoke the Act frequently.

Period summary and conclusions

In contrast to the earlier planting boom based on expectations of a domestic wood shortage, the second major wave of planting was initiated to meet an estimate of increased domestic needs and the development of exports. The annual planting targets were revised several times as export goals steadily grew. From the mid-1970s, the bulk of the planting was destined for export products. This time the government envisaged that these targets would be met in partnership with private forest growers. Of the initial 21 000 ha per year target, for example, the Forest Service was authorized to plant 14 500 ha per year.

From 1962 to 1984, the government provided forestry loans, forestry grants and a more favourable tax regime to encourage private sector planting. Key legislation included the Farm Forests Act 1962, the Forestry Encouragement Act 1965 and the Land and Income Tax Act 1965. The target groups for these measures were farmers, local authorities, and private forestry companies. From

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mid-way through this period, the rate of private planting overtook government planting (Table 6). Figure 4 shows the increasing trend of private plantings.

Table 6: Trends in new planting from 1960/1961 to 1983/1984 (ha)

<table>
<thead>
<tr>
<th>Year ended 31 March</th>
<th>Government</th>
<th>Private</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1961</td>
<td>4 000</td>
<td>2 000</td>
<td>6 000</td>
</tr>
<tr>
<td>1966</td>
<td>8 000</td>
<td>5 000</td>
<td>13 000</td>
</tr>
<tr>
<td>1971</td>
<td>15 000</td>
<td>11 000</td>
<td>26 000</td>
</tr>
<tr>
<td>1976</td>
<td>22 000</td>
<td>23 000</td>
<td>45 000</td>
</tr>
<tr>
<td>1981</td>
<td>17 000</td>
<td>21 000</td>
<td>38 000</td>
</tr>
<tr>
<td>1984</td>
<td>20 000</td>
<td>31 000</td>
<td>51 000</td>
</tr>
<tr>
<td><strong>Total new plantings 1960/1961 to 1983/1984</strong></td>
<td><strong>354 000</strong></td>
<td><strong>361 000</strong></td>
<td><strong>715 000</strong></td>
</tr>
</tbody>
</table>

Source: Ministry of Agriculture and Forestry (2001)

Over a 21-year period, the various grants and loans contributed greatly to new private forest plantings. Setting aside the 1983/1984 year when grants temporarily replaced the previous taxation provisions for forestry companies, the combined area planted under the grant and loan schemes was 88 509 ha. This made up a significant 28 percent of all new private plantings throughout the duration of the schemes, given that this was initially targeted at owners of small landholdings. Furthermore, the area planted was in addition to that encouraged by a range of other incentives. The impact of the grants was more considerable than the loans. For the four years where the grants and loan statistics were separated, the ratio of subsidized planting attributable to grants versus loans is in the order of 4:1.

![Figure 4: Private planting as a percentage of total planting between 1961 and 1984](image)

Source: Ministry of Agriculture and Forestry (2001)

Higher subsidies were necessary to increase the annual planting rates. From about 1973 through to 1983, and despite ongoing changes being made, the contribution of the grant and loan schemes to new private sector planting remained relatively constant. Taxation measures and a range of export incentive schemes played a major role in the continued development of plantation forestry and processing industries. The dramatic increase in the level of afforestation led to greater competition for land and further debate regarding the merits and roles of forestry and agriculture.
A summary of incentives for plantation forestry in this period is found in Annex 1; conclusions drawn are listed hereunder:

- A comprehensive understanding of the wood resource, future domestic demand and the potential for an export-oriented industry were fundamental to the development of an afforestation strategy;
- Where plantation forestry was a new land use, the expectation should be for a gradual uptake, not an overnight adoption;
- Financial incentives to small-scale forest growers had a significant impact on their contribution to achieving the strategy when combined with concurrent information support on silviculture and economics;
- Individual landowners might be more influenced by ready access to good information, advice and tree planting stock than financial assistance;
- A range of taxation measures and export incentive schemes undoubtedly lifted the contribution from the larger-scale, corporate forest growers;
- Major advances in research made a considerable contribution;
- The Forest Service provided important training for potential employees of private companies; and
- Competition for land, acrimonious debate between the farming and forest industries, and land-use controls probably limited forestry development in some districts of New Zealand.


**General economic reforms**

In 1984, a new government was elected and confronted with low economic growth, high inflation and an uncompetitive export sector. The policies and actions that resulted had a dramatic impact on private and public enterprises and the population at large, as a highly regulated economy moved quickly to a market-led economy.

An initial 20 percent devaluation was followed in 1985 by a float of the New Zealand dollar. Export assistance, domestic subsidies, and price controls that existed on some products were removed, tariffs were lowered, and the extensive import licensing system was dismantled. Investment and land development concessions were withdrawn, the taxation law was amended and cost recovery for previously free government services was introduced. A number of government-owned businesses, including commercial forestry, were corporatized and later privatized.

The rates of afforestation fell to very low levels in the late 1980s and early 1990s, then quickly rose to record levels subsequent to privatization, with further amendments to the taxation regime, and influence from an international price spike for wood.

These fundamental changes to the economy created an environment that increased the relative attractiveness of forestry. Once embedded, they were a powerful stimulant to further plantation development.

**Government plantation forestry**

Concurrently, a number of converging factors suggested that it was time for the government to rethink how it managed its indigenous and plantation forest assets:

- The environmental movement was seeking to ensure that the government considered a wider range of sustainable indigenous forest management issues, and not to focus on wood supply only;
There was a forecasted surge in the supply of wood from plantation forests and a more commercial operating environment was regarded as necessary to maximize returns to the country;

The government’s economic policy was to deregulate industries and expose businesses to nationally and internationally competitive environments to promote efficiency; and

Government policy was also to clarify the organizational objectives of its departments and improve transparency and accountability.

In 1987, the government dissolved the Forest Service and corporatized its commercial functions under a state-owned enterprise, the New Zealand Forestry Corporation. This was a limited liability company, established to manage the government’s 550,000 ha of plantation forests, 142,000 ha of indigenous forest, two sawmills, nurseries and other assets. The non-commercial functions of the Forest Service were transferred to a new Department of Conservation that managed the bulk of the government’s indigenous forests, and a new Ministry of Forestry that assumed forest policy, forest health and protection, and forest research functions. The Department of Conservation has no commercial wood production function. Subsequent changes saw the Forest Research Institute become an autonomous Crown research institute, and the Ministry of Forestry merge with the Ministry of Agriculture.

In the same year, the government announced a privatization strategy aimed at reducing public debt substantially. The government was not seen to be the most appropriate entity to run commercial forestry businesses where management decisions were too easily influenced by political objectives. The strategy was to sell state-owned corporations, unless there were strong economic or social reasons to retain ownership. The government’s 1988 budget included its commercial forest assets (with the exception of the small area of indigenous forest) among the businesses to be sold. The forest assets were intended to be sold (by open tender) in 90 units ranging from 51 to 132,112 ha in area, but some units were withheld from sale as a result of contractual, environmental and other concerns. Each unit was assigned tradable property rights (Crown Forestry Licences) containing individual terms and conditions of sale. Only the forests were sold, not the land upon which they stood. The sales left the government with less than seven percent of the national plantation forest estate. Subsequent settlements of claims under the Treaty of Waitangi have seen forest land, and some of the remaining forests and land, pass to Māori ownership so that today the government owns about three percent of the plantation resource.

**Amendments to the taxation regime**

In the government’s 1987 budget, a significant change to the taxation legislation applicable to forestry was announced. This resulted in the removal of the provision that allowed immediate deduction of forest establishment costs against current taxable income. Most of the costs that previously qualified for deduction were to be capitalized and deducted against future income from the forest in a “cost of bush” account. The capitalized costs were not indexed to inflation.

The change was part of a business taxation reform aimed at standardizing the tax treatment of business expenditure. The key issue was whether the long-term nature of forestry investment, and in particular the impact of inflation over time, should be taken into account in the tax regime. While the forest industry accepted the need for a “neutral” taxation system, it was highly critical of the “cost of bush” account and attributed much of the downturn in afforestation to this legislation.  

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13 In 1991, another amendment re-introduced immediate deductibility
The Resource Management Act (1991)

The Resource Management Act replaced the Town and Country Planning Act (1977) and a range of resource management legislation. It is now the principal statute for the management of land, subdivisions, water, soil resources, the coast, and air and pollution control. The legislation is primarily implemented by New Zealand’s local government authorities through local plans that contain policies, rules and performance standards associated with resource use.

The widely varying approaches to the implementation of the Resource Management Act have resulted in considerable criticisms from the forest industry and other resource managers. Plantation forestry remains subject to inconsistent forms of control, including consent requirements, over much of New Zealand’s rural land under these plans. The main impact on the forest industry has been the high cost and lengthy time incurred in seeking consents, particularly for wood-processing initiatives.

The internationalization of New Zealand plantation forestry

Prior to the sale of the government’s plantation forest assets, the government owned 52 percent of the resource. The remainder was largely held by a small number of domestic corporations. An Australian company (Elders Resources) that had entered the scene in the mid-1980s was the only significant foreign investor in the industry.

One major outcome of the sale was the internationalization of New Zealand’s plantation forests. Many companies from Asia and the United States of America have purchased plantation forest assets in the country. Subsequently, other overseas investors have also committed funds to the plantation forestry. The seven largest forest owners are currently held or controlled by foreign companies, and many other major forest owners are overseas-based enterprises. This has facilitated access to export markets and resulted in significant investment in Douglas fir plantations.

Environmental accords

Discussions from 1990 between the New Zealand Forest Owners’ Association (which represents owners of the large majority of plantations by area) and the principal environmental groups in New Zealand (with the exception of Greenpeace) culminated in the New Zealand Forest Accord in 1991. Essentially, forest owners agreed that they would not clear any land or disturb any area with naturally occurring indigenous vegetation (subject to definition) in return for recognition by the environmental groups that commercial plantations were an essential source of perpetually renewable fibre and energy, offering an alternative to halt the depletion of indigenous forests.

This Accord marked the beginning of a greatly improved working relationship between the plantation forest owners and the environmental movement. It has subsequently been complemented by a set of Principles for Commercial Plantation Forest Management in New Zealand, agreed in 1995.\(^\text{14}\) At the ten-year anniversary of the signing of the Accord, the parties gathered and re-affirmed the document.

Government extension services

The Forest Service had provided free forestry extension services. The Ministry of Forestry initially assumed this role, but the government required it to charge for its services and introduce a 100 percent cost recovery system over several years. In 1989, the government decided to exit from a service that was seen to be competing with private forestry consultants. This marked the end of one-on-one forestry advice from the government’s forestry agency to private landowners.

\(^{14}\) See [http://www.nzfoa.nzforestry.co.nz/pfm_principles.asp](http://www.nzfoa.nzforestry.co.nz/pfm_principles.asp)
In the early to mid-1990s, the Minister of Forestry focused efforts to raise the profile of forestry and facilitate investment. The Ministry of Forestry subsequently adopted an information brokerage role and produced a range of publications on plantation forestry and investment opportunities. These publications provided information sought by forestry managers and investors, including foreign direct investors.15

Price as an incentive
A global price spike for wood in 1993/1994 saw some log grade prices more than double (in New Zealand dollars). This undoubtedly drove the unprecedented interest in plantation forestry in the mid-1990s despite the fact that the fast returns for the new plantings would be dependent on a price some 30 years into the future. Non-corporate private investment surged through direct investment, partnerships and the purchasing of shares. Much of the investment was superannuation motivated.

The price spike also drove a dramatic increase in log exports and led to calls for government to intervene to secure supply to domestic processors, increase domestic employment opportunities and prevent a perceived overcutting of the wood resource. The government did not intervene, however.

Support to wood-processing industries
The government approach to commercial forestry throughout the 1990s was to create appropriate investment and regulatory environments, but not be directly involved in the industry. A new government elected in 1999 softened the hands-off, free market approach. The forest industry was again identified as a key contributor to economic development, particularly in some underdeveloped regions. It also became apparent that the necessary planning and infrastructure development had not been undertaken in crucial forestry growth regions to the required extent. A joint whole-of-government (coordination of all relevant government agencies) and industry Wood Processing Strategy was initiated in 2000 to address the main issues associated with biosecurity, climate change, investment promotion, labour/skills/safety, national certification, research/science/technology, the Resource Management Act, trade access, trade enhancement and transport.16

The broad goal is to formulate and implement integrated response strategies targeting identified development barriers to boost investment in New Zealand’s value-added wood processing. The corporate forestry sector responded positively to this government initiative. In particular, the direct participation of both the Deputy Prime Minister and the Minister of Forestry in the discussions was viewed as a sign of the government’s commitment to the partnership approach. Funding has targeted such items as research and road construction. This financial assistance has been an important incentive, but it is clear that re-assurance by the government that it places a high value on the forest industry has been no less of an incentive, particularly to those companies with foreign ownership.

Indigenous forest management
Indigenous forest management, a highly political issue in the late 1970s, received special attention from the government in the late 1980s. The transfer of the bulk of the government’s indigenous forest resource to the new Department of Conservation in 1987 led conservation groups to shift their focus to private indigenous forest management. The announcement of new policy initiatives

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15 See references listed under Ministry of Forestry, and Ministry of Forestry in association with other agencies, for key examples.
in 1990 resulted in further export controls, and an amendment in 1993 to the Forests Act (1949). The amended legislation required the registration of sawmills cutting indigenous logs and the commercial harvesting of indigenous forest on private land to be under government-approved sustainable forest management plans or permits.

The 142 000 ha of government-owned indigenous forest managed for timber production were mostly under a Deed of Appointment with the Crown. In 2000, the government announced that harvesting of indigenous forests from all but 12 000 ha of government-owned land would cease by March 2002.

The ever-increasing restrictions on harvesting of the indigenous forest, and the development of what are effectively two distinct forest management categories, have encouraged the continuing development of the plantation industry.

**Climate change**

In April 2002, New Zealand announced a preferred policy package for the domestic implementation of the Kyoto Protocol, which it ratified in December 2002, focusing on:

- A price on carbon dioxide emissions, applied at first through an emission charge on carbon fuels. It will approximate the international price but will be capped at NZ$25 a tonne of carbon dioxide equivalent, to be effective from 2008;
- Provision of government incentives such as funds or the allocation of emission units for projects that deliver defined reductions in greenhouse gas emissions in any sector of the economy, and are additional to business-as-usual;
- Negotiated greenhouse agreements for sectors and industries that would have difficulty in adjusting to a full price on emissions in the first commitment period (2008-2012). This would involve a contractual commitment by the sector or industry to achieve international best practice in managing emissions in return for exemption from an emissions charge;
- Government retention of the sink credits and associated liabilities allocated to New Zealand under the Protocol in recognition of the carbon sink value of post-1990 forest plantings; and
- Exemption for the agricultural industry from any price measures in the first commitment period, provided the industry is willing to invest, in partnership with the government, in research to identify options for reducing agricultural emissions.

This package is subject to further public consultation. As proposed, it has the potential to affect the forest industry principally through the charge on carbon fuels from 2008. The forest industry has expressed a number of concerns about the policy.

**International issues**

Major environmental issues in a number of Pacific Rim countries have resulted in significant areas of their forest resources being withdrawn from commercial forest management. In particular, harvesting restrictions to protect the habitats of the northern spotted owl in the United States Pacific Northwest region and logging bans in a number of Asian countries (Durst et al. 2001) have led to enhanced market opportunities for the New Zealand forest industry.

International trade negotiations have seen the reduction of tariff barriers in some markets, although escalating tariffs remain a key issue in New Zealand’s principal Asian markets. As tariff barriers have been reduced, non-tariff barriers have taken their place. Examples include the requirement for environmental certification, phytosanitary prerequisites, and technical barriers such as building standards.
Period summary and conclusions

The period from 1984 to 2000 witnessed huge variations in the rate of new plantation forest establishment (Table 7), influenced by a range of factors. Previous governments that had provided a wide array of incentives were replaced in 1984 by a government that emphasized the role of the free market. The Treasury also viewed central planning and target setting as inappropriate. Notwithstanding this, the Forest Service managed to hold to its target plantings until the organization was corporatized in 1987. Thereafter new planting by the government decreased significantly and ceased in 1991. Over the same period, the private sector was also within five percent of its suggested contribution, despite the removal of incentives.

Table 7: Government and private new plantings from 1984/1985 to 2001/2002 (ha)

<table>
<thead>
<tr>
<th>Year ended 31 March</th>
<th>Government</th>
<th>Private</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td>20 000</td>
<td>36 000</td>
<td>56 000</td>
</tr>
<tr>
<td>1986</td>
<td>18 000</td>
<td>30 000</td>
<td>48 000</td>
</tr>
<tr>
<td>1987</td>
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</tr>
<tr>
<td>2001</td>
<td>0</td>
<td>34 000</td>
<td>34 000</td>
</tr>
<tr>
<td>2002 (p)</td>
<td>0</td>
<td>31 000</td>
<td>31 000</td>
</tr>
<tr>
<td><strong>Total new planting</strong></td>
<td><strong>68 000</strong></td>
<td><strong>766 000</strong></td>
<td><strong>834 000</strong></td>
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</tbody>
</table>

Source: Ministry of Agriculture and Forestry (2001)
* Total figure is available, statistics for state and private planting have been estimated.
p = provisional

The termination of all subsidies and export incentives was just a part of a dramatic overhaul of the New Zealand economy to which all businesses had to adjust. There was substantial re-organization and rationalization undertaken by private enterprises (as well as government businesses) that resulted in sales and exchanges of plantation forests among companies. The sales changed the face of plantation forest ownership in New Zealand and over a period of six years essentially saw the government exit from the industry.

The “cost of bush” taxation account had been highly contentious and was widely viewed as having severely depressed new plantings. By 1991, new plantings had dropped to 15 000 ha, the lowest level since 1966. Replanting following harvesting was the standard practice and this accounted for the majority of the planting taking place each year. A new government elected in late 1990 implemented a pre-election policy to remove the “cost of bush” account and re-introduce immediate deduction of qualifying costs against income from any source in 1991. The new government saw forestry as a major contributor to sustainable economic development, and the Ministry of Forestry adopted a strong focus on information brokerage and overcoming impediments to forestry development.
An unprecedented log price spike, in association with the conclusion of the bulk of the asset sales and changes to the taxation regime, drove record new plantings in 1994. A generally weak New Zealand (and international) share market through the early 1990s prompted private investors to seek alternative investments. The log price spike allowed forestry investment schemes to predict very high comparative returns. It is not possible to quantify the impact of each event. Due to the removal of subsidies and export incentives, about 1.5 million ha became regarded as marginal or uneconomic for agricultural production. New land uses were required and forestry was often one of the favoured options. Woodlots and plantations also became more generally accepted as having a role in sustainable “farm” management. The removal of subsidies also depressed rural land prices and in turn raised the profitability of afforestation based on purchased land.

Consequently, the majority of new plantings through the 1990s was undertaken by a variety of small-scale investors, rather than the government or major forestry companies. Today, 91 percent of the plantation forest resource is in private ownership and the plantation forest estate contributes 99.7 percent of New Zealand’s total wood harvest.

A summary of incentives during this period is available in Annex 1, and conclusions for its plantation forestry incentives are presented hereunder:

- Government involvement in plantation forest ownership had played a major role in the development of an internationally competitive industry, but once established, continued involvement was not necessary;
- Regardless of the government’s involvement in plantation forest ownership, it retained a role in ensuring appropriate planning and infrastructure development;
- Corporate forest investment was motivated by financial returns and subsidies were not required, provided a neutral investment environment was in place;
- Smaller-scale forest investors were often influenced by the media and might have been motivated by a range of financial, environmental and social factors, so incentives should be carefully targeted;
- Taxation regimes had a significant impact on investment in plantation forestry, and a stable and equitable regime was important;
- Direct financial incentives masked the real viability of plantation forestry and other businesses;
- Access to independent and objective information about plantation forestry was a valuable incentive for encouraging new investors; and
- Profitability ultimately determined the level of investment, i.e. it was pointless trying to encourage plantation forestry where it was not inherently viable.

**CONCLUSIONS**

The history of forest plantation development in New Zealand is one of long-term vision, targeted government policies, use of direct and indirect incentives during its development phases, and the ability to quit government involvement once its role had been fulfilled (Figure 5). In the early stages of development, policies, legislation and incentives were focused on establishing a largely government-owned plantation resource to reduce the pressure on indigenous forest. In 1987, after over 60 years of such involvement, the government decided to relinquish its hold on plantation forestry. Direct incentives to forest planting were removed and a government-owned corporation was established to manage government plantations. By 1993, the government sold the bulk of its 0.5 million ha of plantation forests to domestic and overseas bidders.
Once direct government incentives had been removed during the reforms of the 1980s in an
even-handed way across the economy, within a relatively short time the industry neither expected
nor wanted the assistance. Indeed, the replacement of, at times, unpredictable government policy
with free-market signals was seen by a mature industry as more sustainable. It was apparent
that any move to restore subsidies or other market distorting mechanisms would be firmly opposed.
Just as direct incentives played a central role in the establishment of New Zealand’s plantation
forest industry, the absence of direct incentives was equally important in ensuring that a mature,
export-oriented industry remained efficient and internationally competitive, and flourished.

The government and the forest industry recognize the continuing importance of certain indirect
incentives. These focus on the provision and funding (in part) of infrastructure, biosecurity,
research, market access initiatives and information, particularly independent and authoritative
plantation resource data. Also critical have been the establishment and maintenance of neutral
investment and environmental regulatory regimes within which all industries operate on an equal
footing.

A wide range of direct and indirect incentives have featured in the development of New Zealand’s
plantation forestry. The effectiveness of incentives is dependent on a clear understanding of
their objectives (short, medium and long terms), the phase of development of the industry
(new, developing, and mature), the key participants and their motivations. It is not possible to
quantitatively assess the impact and effectiveness of individual incentives because:

- They have been used in conjunction with each other and cannot be isolated;
- The plantation forest industry comprised a number of interest groups that are motivated
  by diverse objectives and therefore by different incentives;
- The impact of the incentives changes with the stage of development of the industry;
- Cost details for most individual incentive mechanisms are not readily available; and
- Indirect incentives are generic and not specific to plantation forestry.

The history of plantation forest ownership in New Zealand has seen dominance by the government
replaced by dominance of the corporate sector. If the recent new planting trend continues, there
could be dominance by small-scale plantation forest owners over the next couple of decades.
The various types of owners have been motivated by different objectives. The government initially wanted to ensure a sustainable wood supply to meet the nation’s future needs, and then desired economic development based on an export-oriented industry. The corporate enterprises had to deliver financial returns to their shareholders, while small-scale investors were motivated by a combination of factors (Table 8).

**Table 8: Motivations of small-scale investors to establish plantations**

<table>
<thead>
<tr>
<th>Farmers’ motivations:</th>
<th>Individual investors’ motivations:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• sustainable land use</td>
<td>• diversification of their investment portfolios</td>
</tr>
<tr>
<td>• economic diversification</td>
<td>• financial return</td>
</tr>
<tr>
<td>• financial return</td>
<td>• taxation advantages</td>
</tr>
<tr>
<td>• on-farm wood supply</td>
<td>• superannuation requirements</td>
</tr>
<tr>
<td>• shelter for livestock, crops and buildings</td>
<td>• a personal interest in trees and specialty timbers</td>
</tr>
<tr>
<td>• a personal interest in trees and specialty timbers</td>
<td>• a strong belief in the future market outlook for wood</td>
</tr>
<tr>
<td>• aesthetics</td>
<td></td>
</tr>
</tbody>
</table>

**Plantation forestry as a new industry in New Zealand**

The key incentives influencing the successful establishment of a new plantation forest industry in New Zealand were:

- The understanding by the government of the importance of a secure wood supply, knowledge of the limitations of the indigenous forests to satisfy future supply and clear and generally consistent policies (focused on afforestation) to address these issues, which provided the foundation upon which the industry has been built; and
- Government-led afforestation to demonstrate the biological and commercial successes of this new land use with exotic species on a long production cycle (thus developing the knowledge base and reducing the risks for private enterprises).

**Plantation forestry as a developing industry in New Zealand**

The key incentives influencing the successful development of a young plantation forest industry in New Zealand were:

- An established government-owned resource base that private industry could build upon to develop regionally significant, and eventually export-oriented, plantation forest industries;
- Government-led development of new, large-scale sawmilling and marketing to utilize the plantation wood resource. This was a critical step because plantation-grown wood has very different physical properties to the indigenous wood resource traditionally used in New Zealand;
- Government-led planning and development of infrastructure in the key central North Island region that formed the heart of the plantation forest industry;
- Government-funded research that increased the understanding of silvicultural management of plantation forests and the utilization of plantation-grown wood;
- A period of government subsidies and extension services to encourage the uptake of small-scale plantation forestry by farmers, other landowners and local authorities; and
- A commitment to train professional foresters and forest management personnel.
Debates and acrimony between the agriculture and forest industries, and the environmental movement and the forest industry, in the 1970s and 1980s, were the major disincentives. These resulted in statutory land-use controls, a poor public perception of the forest industry, and constrained development to some degree.

**Plantation forestry as a mature industry in New Zealand**

The key incentives influencing the transition to a mature plantation forest industry were:

- Deregulation of the economy and the withdrawal of direct subsidies to ensure that plantation development became more efficient, market-led and internationally competitive;
- The introduction of neutral and stable economic and regulatory environments to ensure that land uses and industries competed on their merits and did not face risks from changing and conflicting political directions;
- The opportunity for private investors to purchase government-owned plantation forest assets and secure access to significant wood resources;
- Majority funding of research by private industry to ensure it focused on end-user requirements;
- Development of effective working relationships between the forest and agriculture industries, and the forest industry and environmental groups that led to better understanding and varying degrees of support for the objectives of each group; and
- Publication of high-quality forest industry statistics, wood-supply forecasts and other information, often through joint initiatives by the government and private sector, that is essential for good policy development, short-, medium- and long-term planning, and monitoring.

A major, but short-term (1987-1991) disincentive was a taxation regime that might have been theoretically neutral, but failed to recognize the long gestation periods, and depressed new planting during its existence.

**FUTURE DIRECTIONS**

The focus of New Zealand’s plantation development strategy over the last 15 years has been on managing economic fundamentals (inflation, interest rates and the costs of business undertakings), encouraging enterprises and innovations, and avoiding, remediying or mitigating adverse environmental effects. There is no expectation of, or desire for, change to this approach. Built around an open and market-led economy, the New Zealand plantation forest industry has matured sufficiently to ensure continuing growth and vigour.

Nevertheless, there are issues that impinge on the development of the industry. Through the joint Wood Processing Strategy initiative, the government and forest industry have identified these issues as:

- Biosecurity and the protection of the forest resource;
- Climate change and the impacts on industry by the ratification of the Kyoto Protocol;
- Investment in wood processing with a rapidly increasing wood supply;
- Availability of skilled labour;
- Market development and certification of sustainably grown plantation wood;
- Research, science and technology and increasing the focus on markets, end uses and new products;
- Inconsistency in the implementation of the Resource Management Act (1991), and the cost and time required for obtaining agreements;
The role of incentives in forest plantation development in Asia and the Pacific

- Trade access and the elimination or reduction of tariffs and non-tariff barriers;
- Development of infrastructure in some forestry growth regions;
- Future energy needs of, and availability to, the wood-processing industry; and
- Improvements in occupational health and safety.

The delivery of strategies to address these issues and other supporting functions will continue to require government border control, forest policy and research agencies with appropriately trained staff. A growing and diverse industry will continue to coordinate its input to issue resolution through sector associations and an integrated Forest Industries Council.

At the farm forestry level, development will continue to depend on the relative profitability of farming and forestry, the perception of forestry (often gained through the media), the development of certification, and the perception of long-term commercial and non-commercial values associated with trees and wood.

The ongoing success of the current strategy and new initiatives will be monitored primarily through:

- Annual estimates of new planting and the expansion of the plantation forest estate;
- Statistics reporting roundwood removals from plantation forests;
- Estimates of investment in new wood-processing facilities;
- Trade statistics reporting the volume and value of exported forest products;
- Statistics reporting the volume of logs exported versus the volume processed domestically;
- Comparisons of wood supply forecasts with estimates of actual harvest volumes;
- Monitoring of trends in domestic and international log prices and price indices for forest products;
- Reporting on incursions of new pests and diseases entering the country and their controls; and
- Economic statistics reporting the contribution of forestry to the GDP.

Concluding Comment

Lessons can be learned from the successes and failures of incentives in other countries, but ultimately the appropriate combination of policies, strategies and supporting incentives should reflect individual country circumstances, and the national needs and objectives. Consideration must be given to the factors that motivate people to invest in planting trees. Forestry is a long-term investment, and long-term visions and strategies – based on reliable information of resource, product, market supply and demand – are required. There is no universal model for success. New Zealand’s approach has been highly successful. Much of the impetus provided by the New Zealand Government has been through indirect incentives, particularly research. Such an approach may or may not be successful elsewhere.
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The Role of Incentives in Forest Plantation Development in Asia and the Pacific


New Zealand Forest Owners’ Association website: http://www.nzfoa.nzforestry.co.nz/


