



ASIA-PACIFIC FORESTRY COMMISSION

**Forests out of bounds:
Impacts and effectiveness of
logging bans in natural forests
in Asia-Pacific**



**Food and Agriculture Organization of the United Nations
Regional Office for Asia and the Pacific
Bangkok, Thailand
2001**



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Asia-Pacific Forestry Commission

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**Impacts and effectiveness of logging bans
in natural forests in Asia-Pacific**

Edited by

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**Food and Agricultural Organization of the United Nations
Regional Office for Asia and the Pacific
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2001

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TABLE OF CONTENTS

	<i>Page</i>
List of tables	<i>vi</i>
List of figures	<i>viii</i>
Acronyms	<i>ix</i>
Foreword	<i>xi</i>
Preface	<i>xii</i>
1. Logging bans in Asia and the Pacific: an overview <i>Thomas R. Waggener</i>	 <i>1</i>
2. Impacts and effectiveness of logging bans in natural forests: New Zealand <i>Alan Reid</i>	 <i>43</i>
3. Impacts and effectiveness of logging bans in natural forests: People's Republic of China <i>Yang Yuexian</i>	 <i>81</i>
4. Impacts and effectiveness of logging bans in natural forests: Philippines <i>Ernesto S. Guiang</i>	 <i>103</i>
5. Impacts and effectiveness of logging bans in natural forests: Sri Lanka <i>H. M. Bandaratilake</i>	 <i>137</i>
6. Impacts and effectiveness of logging bans in natural forests: Thailand <i>Sureeratna Lakanavichian</i>	 <i>167</i>
7. Impacts and effectiveness of logging bans in natural forests: Viet Nam <i>Vu Huu Tuynh</i>	 <i>185</i>

LIST OF TABLES

	<i>Page</i>
1. Planted forest areas in New Zealand (April 1999)	44
2. Summary of legislation currently applicable to natural forests in New Zealand	51
3. Measures to restrict commercial logging as a conservation strategy since 1970 and area of natural forest affected in New Zealand	57
4. Volume of New Zealand's timber imports (thousand m ³)	67
5. Area affected by natural disasters and floods in China, 1952-1997 (thousand ha/year)	84
6. Area of forests covered by China's National Forest Conservation Program (thousand ha)	85
7. Volume of China's domestic timber production, 1983-1997 (million m ³)	89
8. Industrial timber consumption by sectors in China, 1993-1997 (thousand m ³ and percent)	89
9. Volume of timber available for China's domestic consumption (million m ³)	90
10. Volume of timber available for China's domestic use and actual consumption (million m ³)	90
11. Volume of China's timber plantation production by species (thousand m ³)	92
12. Volume of China's major forest product imports, 1981-1997 (thousand m ³)	93
13. Volume of China's major forest product exports, 1988-1997 (thousand m ³)	93
14. Volume of China's log and sawntimber imports, 1998 and 1999 (m ³)	93
15. Value of China's wood and wood product imports, 1998 and 1999 (thousand US\$)	94
16. Status of protected natural forests by provinces in China	97
17. China's natural forest resources by river basin	98
18. Forest area of the Philippines, 1997	105
19. Estimate of the status of forest and forest land management in the Philippines	107
20. Import of logs and processed forest products in the Philippines, 1988-1997 (thousand m ³)	108
21. Sources of Philippines' industrial roundwood supply, 1998	110
22. Area and potential timber yield from Philippines' natural secondary forests	110
23. Key forestry policies of the Philippines	112
24. Major impacts of Philippines' key forestry policies	116
25. Provinces and areas covered by logging bans in the Philippines	119
26. Natural forests in Sri Lanka, 1992	138
27. Population increase and depletion of natural forest cover in Sri Lanka	138
28. Sri Lanka's diversity and status of selected flora and fauna groups in lowland rainforests and moist monsoon forests of Galle, Matara, Kalutra and Ratnapura districts	138
29. Key policy, legislation and institutional changes concerning management of Sri Lanka's natural forests during the twentieth century	143
30. Sri Lanka's protected areas administered by the Forest Department and Department of Wildlife Conservation	147
31. Sri Lanka's natural forests by production and protection classifications (thousand ha)	147
32. Sri Lanka's wood demand, 1985 (thousand m ³)	148
33. Availability and demand for Sri Lanka's industrial logs, 1985-2000 (thousand m ³ /year)	149
34. State Timber Corporation's timber production in Sri Lanka, 1986-1995	151
35. Estimated supply sources for logs in Sri Lanka, 1993	152
36. Sri Lanka's domestic supply of logs before and after the logging ban (thousand m ³)	152

37.	STC's contribution to Sri Lanka's total timber supply, 1986–1995	153
38.	Average prices for grade "A" logs at depot sold by STC in Sri Lanka	154
39.	Sri Lanka's sawnwood imports and exports, 1985-1997	155
40.	State Timber Corporation sale of imported timber in Sri Lanka, 1986–1995	155
41.	Scenarios for consumption, production and imports of sawnwood in Sri Lanka (thousand m ³)	156
42.	Potential contribution of non-forest lands to national sawlog supply in Sri Lanka, 1995–2020	157
43.	Forest plantations established by Sri Lanka's Forest Department	157
44.	Projected timber production from forest plantations in Sri Lanka, 1999-2005 (m ³)	158
45.	Number of private forest enterprises registered with Sri Lanka's Forest Department, 1983–1997	159
46.	Sri Lanka's government revenues from the STC (thousand US\$)	159
47.	Forest offenses recorded in Sri Lanka's natural forests and plantations, 1985-1994	160
48.	Status of forest area in Thailand	167
49.	Forest conservation and reserve areas in Thailand	168
50.	Natural conservation and recreation areas in Thailand	172
51.	Thailand's domestic wood production, imports, exports and consumption of wood (thousand m ³)	174
52.	Thailand's export and import of logs and sawnwood	175
53.	Thai imports of wood by country of origin, 1994-1998	176
54.	Reforestation by the Royal Forest Department and private sector in Thailand	177
55.	Viet Nam's forest area by function, 2000 (thousand ha)	187
56.	Forest area and growing stock in Viet Nam, 1995	188
57.	Area and stock of production forests in Viet Nam, 1995	189
58.	Sawnwood production for rural housing construction in Viet Nam, 1996	191
59.	Predicted consumption of forest products in Viet Nam, 2005 and 2010 (thousand m ³)	191
60.	Loss of natural forests in Viet Nam, 1990-1998 (ha)	192
61.	Logging ban progress indicators in Viet Nam, 1996-2000	194
62.	Roundwood production in different regions of Viet Nam, 1990-1998 (thousand m ³)	196
63.	Viet Nam's fuelwood output, 1990-1998 (thousand steres)	196
64.	Viet Nam's leading wood product exports, 1990-1996 (thousand m ³)	196
65.	Value of Viet Nam's forest product export revenues, 1990-1996, (million US\$, current price)	197
66.	Average prices of pit-prop at Quang Ninh (thousand VND/m ³)	197
67.	Viet Nam's domestic prices for roundwood and fuelwood, 1991 and 1998	197
68.	Sawnwood prices in Viet Nam, 1991 and 1998 (VND/m ³)	198
69.	Number of wood product enterprises in Ho Chi Minh City, 1993-1998	198
70.	Volume of wood used by the wood-processing industry in Ho Chi Minh City, (m ³ roundwood)	199
71.	Changes in wood processing enterprises in selected provinces of Viet Nam, 1993 and 1998	201
72.	Changes in non-State wood-processing enterprises in Viet Nam, 1990-1995	202
73.	Supply and demand for paper pulp in Viet Nam, 1991–1996	202
74.	Supply and demand for pit-props in Viet Nam, 1991-1998	202
75.	Viet Nam's gross forest product revenue, 1990-1998 (billion VND)	203
76.	Structure of Viet Nam's gross forestry output by sub-sector, 1990-1998, (1994 prices) (percent)	204
77.	Viet Nam's gross revenue from logging and wood products processing, (1989 prices) (billion VND)	204
78.	Annual forest area destroyed by fire in Viet Nam, 1990-1998 (ha)	204

LIST OF FIGURES

		<i>Page</i>
1.	Natural forests in Asia-Pacific: total area and area available for harvesting	3
2.	Asia-Pacific production of roundwood by type and subregion, 1999	3
3.	Asia-Pacific net growth of commercial species on available natural forests versus industrial roundwood production	4
4.	Asia-Pacific industrial plantations: total area versus area available for harvesting by subregion	5
5.	Estimated annual growth of available industrial plantations in Asia-Pacific by subregion	5
6.	Asia-Pacific balance between estimated net growth from available natural forests and plantations compared to industrial roundwood production	18
7.	Projected Asia-Pacific net trade in roundwood and sawnwood, 1980, 1994 and 2010	20
8.	Natural forests unavailable for harvesting due to legal closure and technical/economic constraints	24
9.	Asia-Pacific natural forest unavailable for harvest due to technical/economic constraints	24
10.	Estimated forest cover in New Zealand, (from left) 1000 AD, 1840 and 1976	45
11.	Timber production from New Zealand's natural forests, 1978-1989	60
12.	Production from TWC and private forests in New Zealand, 1994-1999	60
13.	Roundwood removals from natural and planted forests in New Zealand	63
14.	Production of rough-sawn timber in New Zealand	63
15.	Comparison of New Zealand's rimu price and log supply	64
16.	Timber output from natural forests under China's National Forest Conservation Program	86
17.	Proportion of timber production by forest area in China, 1950-1997	88
18.	Proportion of timber production by region in China, 1950-1997	88
19.	Decline of the Philippine forest, 1900-2010	104
20.	Sri Lanka's forest cover	137
21.	STC's timber production in Sri Lanka, 1986 – 1995	150
22.	Sri Lanka's timber extracted by STC from natural forests, 1985 – 1995	150
23.	Viet Nam's supply and use of logs, 1998-1999 (logs with large diameter >30 cm)	190
24.	Viet Nam's supply and use of small diameter roundwood, 1998-1999 (logs with large diameter < 30cm)	190

ACRONYMS

AAC	Annual allowable cut
ACR	Accelerated Conservation Review
APFC	Asia-Pacific Forestry Commission
BFD	Bureau of Forest Development
BTT	Business turnover tax
CADC	Certificate of Ancestral Domain Claim
CADT	Certificate of Ancestral Domain Title
CBFM	Community-based forest management
CBFMA	Community-based Forest Management Agreement
CBRM	Community-based resource management
CENRO	Community Environment and Natural Resources Office
CPC	Ceylon Plywood Corporation
CPPAP	Conservation of priority protected areas
DAO	Department Administrative Order
DENR	Department of Environment and Natural Resources
DFID	Department for International Development
DILG	Department of Interior and Local Government
DOC	Department of Conservation
DWLC	Department of Wildlife Conservation
EIA	Environment impact assessment
EO	Executive Order
ESSC	Environmental Science and Social Change
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FD	Forest Department
FDC-UPLB	Forest Development Center- University of the Philippines at Los Baños
FFPO	Fauna and Flora Protection Ordinance
FIO	Forest Industry Organization
FMB	Forest Management Bureau
FMP	Forestry Master Plan
FO	Forest Ordinance
FSMP	Forestry Sector Master Plan
FYIP	Five Year Implementation Programme
GDP	Gross domestic product
IFMA	Industrial Forest Management Agreement
IRR	Internal rates of return
IUCN	International Union for Conservation of Nature and Natural Resources
LGU	Local Government Unit
MAB	Man and Biosphere
MARD	Ministry of Agriculture and Rural Development
MDF	Medium density fibreboard

MNR	Ministry of Natural Resources
MOF	Ministry of Forestry
MPFD	Master Plan for Forest Development
MSL	Mean sea level
NCIP	National Commission for Indigenous Peoples
NCR	National Conservation Review
NCS	National Conservation Strategy
NEAP	National Environmental Action Plan
NESDP	National Economic and Social Development Plan
NFCP	Natural Forest Conservation Program
NGOs	Non-government organizations
NHWA	National Heritage and Wilderness Area
NIPAS	National Integrated Protected Area Systems
NPWC	National Policy for Wildlife Conservation
NRMP	Natural Resources Management Program
NWFPS	Non-wood forest products
PA	Protected area
PAS	Protected area system
PCA	Philippine Coconut Authority
PD	Presidential Decree
PENRO	Provincial Environment and Natural Resources Office
PSSD	Philippine Strategy for Sustainable Development
RA	Republic Act
RED	Regional Executive Director
RFD	Royal Forest Department
RIL	Reduced impact logging
RMA	Resource Management Act of 1991
RTG	Royal Thai Government
SFA	State Forestry Administration
SL Rs	Sri Lanka rupees
STC	State Timber Corporation
TAO	Tambon Administrative Organization
TFSMP	Thai Forestry Sector Master Plan
TLA	Timber License Agreement
TWC	Timberlands West Coast Limited
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
US\$	United States dollar
USAID	United States Agency for International Development
VINAFOR	Viet Nam Forestry General Corporation

FOREWORD

No issue in forestry evokes such strong emotions as logging — and for good reasons. Logging provides the timber and fiber needed to satisfy the rapidly increasing demands of today's societies. It generates billions of dollars in revenues, supports national economic and industrial development, and provides income and employment for millions of individuals. It conveys immense power and prestige to officials responsible for allocating harvesting rights and monitoring logging practices.

But logging — especially as conventionally conducted in many countries — also can cause significant damage to forests, or even facilitate the conversion of forests to other land uses. Logging is viewed by many people as a key factor in the loss of biological diversity and species habitats, deterioration of watersheds and water quality, expansion of deserts and the demise of forest-dependent people. Moreover, timber harvesting is frequently seen as benefiting only a small segment of society, leaving poor people to shoulder its costs. Arguments become even more emotional when logging is blamed for causing or exacerbating floods, landslides or other natural disasters that result in loss of human life.

In response to rapid deforestation and forest degradation, a number of countries in Asia and the Pacific have imposed partial or total bans on harvesting timber from natural forests. Several other countries are contemplating similar measures. The study of the *Impacts and effectiveness of logging bans in natural forests* arose from the need to assess the successes and failures of such strategies and approaches in the Asia-Pacific region. While logging bans and other harvesting restrictions are intuitively attractive measures to support forest protection, more rigorous analysis reveals that conserving forests is not so easy as simply banning logging.

There are a number of questions regarding the effectiveness and impacts of logging bans. For example, will logging bans actually help maintain or expand the natural forest estate, or will logging continue “illegally” and perhaps even more destructively than in the past? Will countries that restrict domestic timber production simply import more wood from exporting countries, which may not have adequate capacities for ensuring sustainable forest harvesting? What will be the effects on income and employment for forest-dependent workers, communities and governments? Is it reasonable to expect timber plantations to substitute for natural forests in supplying wood needs? What are the necessary supporting conditions needed to enhance the success of logging bans and measures to conserve natural forests? The answers to these questions are crucial in guiding government policies related to logging restrictions and ensuring a policy framework that effectively supports forest conservation.

This study, requested by the Asia-Pacific Forestry Commission (APFC), highlights the increasing relevance of regional cooperation in developing forestry policy in Asia and the Pacific. The sharing of national experiences within the regional forum supports more efficient assessment and policy development, while ensuring that analyses retain a high degree of social, geographic and ecological relevance. This study continues a growing tradition of timely, high-quality APFC studies, which FAO is pleased to support as part of its efforts to promote sustainable forest management in the region.

R.B. Singh
Assistant Director-General and
Regional Representative for Asia and the Pacific
Food and Agriculture Organization of the United Nations

PREFACE

At the seventeenth session the Asia-Pacific Forestry Commission (APFC), member countries requested FAO to implement a study of the efficacy of removing natural forests from timber production as a strategy for conserving forests. The objectives were to:

- ◆ investigate past and current experiences of Asia-Pacific countries in removing natural forests from timber production as a strategy for conserving forests;
- ◆ assess the policy, economic, environmental, and social implications of implementing logging bans and other timber harvesting restrictions; and
- ◆ identify conditions necessary for the successful implementation of logging bans or likely to enhance successful implementation.

The APFC requested the study to better understand the role of logging bans and similar restrictions on timber harvesting imposed to conserve natural forests. Such actions have been taken by many countries in the region and are under consideration by several others in the face of continuing deforestation and increased emphasis on forest conservation.

In examining the history and experience of timber harvest bans in natural forests, the study sought to understand the impacts on both conservation and production from the natural forests, including the implications and strategies for timber supply. National consultants carried out studies in their respective countries, covering a variety of experiences with timber harvesting bans. A Senior Study Coordinator provided technical support and prepared the regional overview. Consultants preparing the respective country case studies were:

China: Yang Yuexian, Deputy Director and Senior Engineer, Management Center for Natural Forest Conservation Programme, National Forestry Bureau, State Forestry Administration, Beijing, People's Republic of China

New Zealand: Alan Reid, Senior Policy Analyst, Sustainable Resource Use Policy, Ministry of Agriculture and Forestry, Wellington, New Zealand

Philippines: Ernesto S. Guiang, Natural Resources Management Consultant, Manila, Philippines

Sri Lanka: H. M. Bandaratillake, Conservator of Forests and Director, State Timber Corporation (ex-officio), Battaramulla, Sri Lanka

Thailand: Sureeratna Lakanavichian, Resource Sociology and Policy Analyst, Forest Resources Department, Faculty of Agriculture, Chiang Mai, Thailand

Viet Nam: Vu Huu Tuynh, Deputy Director, and Pham Xuan Phuong, Forest Policy Expert, Department of Agricultural and Rural Development Policy, Ministry of Agriculture and Rural Development, Hanoi, Viet Nam

The FAO Regional Office for Asia and the Pacific, the USDA Forest Service, and the UK Department for International Development (DFID) provided core support for the study. Collaborative support was also provided by two FAO regional projects: "Support to the Reorientation of Forestry Policies and Institutions of Countries of Asia in Reform to Market Economy Project," and the "Forestry Research Support Programme for Asia and the Pacific" (FORSPA). Contributions and in-kind support from the Ford Foundation, the Weyerhaeuser Foundation and the Center for International Forestry Research (CIFOR) also assisted the study.

Patrick Durst, FAO Senior Forestry Officer (Asia and the Pacific) provided overall supervision and technical guidance for the project. Gary Man, Program Coordinator, Asia and the Pacific Program, International Programs, USDA Forest Service coordinated the core financial support. FAO country representatives and senior forestry officials in the countries that prepared the case studies provided coordination and assistance. In-country assistance by the forest industries sector,

environmental organizations and the NGO community helped in defining critical issues and perspectives on timber harvesting bans and forest conservation. Finally, representatives of cooperating international organizations and invited experts provided critical support at the 1999 Manila Technical Workshop and the Policy Seminar held in connection with the eighteenth session of the APFC in 2000. The Department of Environment and Natural Resources (DENR) in the Philippines and the Department of Agriculture, Fisheries and Forestry Australia (AFFA) graciously hosted the workshop in Manila and the pre-APFC Policy Seminar in Noosaville, Queensland, respectively.

Appreciation is acknowledged to those individuals who contributed technical support and guidance throughout the study. Ian Armitage, Forestry Consultant, New Zealand, provided the initial development of the study guidelines and assisted the Senior Study Coordinator in the early project implementation. Rose Braden and Michael Victor provided technical editing support for the reports and Janice Naewboonnien assisted in proofreading the final version. Their professional contributions are gratefully acknowledged.

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June 2001

LOGGING BANS IN ASIA AND THE PACIFIC: AN OVERVIEW

Thomas R. Waggener

BACKGROUND

Several countries of the Asia-Pacific region have imposed total or partial logging bans (or similar restrictions on timber harvesting) in natural forests as a response to natural disasters that are widely believed to have been caused by deforestation or degradation of forests. Banning or restricting timber harvests has thus been viewed as a corrective measure and as a strategy to promote forest conservation and protection, and to assure broader forest benefits for the future.

Other countries in the region are currently considering logging bans or restrictions, along with other options such as long-term multiple-use forestry, sustainable forest management, and modified or reduced impact logging (RIL) practices. It is thus important to assess the experiences of various countries in the Asia-Pacific region for indications of the efficacy of removing natural forests from timber production in achieving conservation goals.

The study of the efficacy of removing natural forests from timber production as a strategy for conserving forests, conducted at the request of the Asia-Pacific Forestry Commission (APFC) and coordinated by the FAO Regional Office for Asia-Pacific, sought to review the experiences with logging bans in selected countries. The objectives were to:

- ◆ investigate past and current experiences of Asia-Pacific countries in removing natural forests from timber production as a strategy for conserving forests;
- ◆ assess the policy, economic, environmental, and social implications of implementing logging bans and other timber harvesting restrictions, and
- ◆ identify conditions necessary for the successful implementation of logging bans or likely to enhance successful implementation.

REGIONAL OVERVIEW

Over the last two decades, serious and growing concerns regarding the status and use of natural forests have emerged. In spite of long-term forest management systems and extensive reservations of natural forests for conservation, deforestation and degradation have continued at alarming rates. Successful reservations, which create a variety of protected areas, commonly prohibit commercial timber harvesting, and often strictly limit or prohibit other non-commercial forest uses for both timber and non-timber purposes. Creation of protected areas is normally the result of policy processes where non-timber priorities are deemed to outweigh timber values. Reservations for national parks, wildlife habitats, biodiversity, critical watersheds and other special purposes, remove forests from timber production and thus affect sustainable timber supply. Furthermore, declaration of protected areas does not guarantee effective protection, administration or active management for the intended purposes. Adequate human and financial resources, and, most importantly, a broad social consensus and support are required, particularly where forests have traditionally been a source of livelihood for local families and communities.

Logging bans to conserve natural forests

Despite such deliberate conservation efforts and the creation of protected areas, deeply rooted misgivings about conventional forest management and policies of timber harvesting and utilization abound. These misgivings rest on numerous perceptions about the negative consequences of previous uses of the natural forests and corollary assumptions about the desirability of shifts in policies that give greater priority to “forest conservation.” Many believe

that even more of the natural forests should be allocated to primary uses, e.g. biodiversity conservation, habitat protection, environmental protection, watershed and soil and water conservation. Such uses are often perceived to be incompatible with timber harvesting, thus resulting in growing demands for logging bans even outside existing protected areas.

Continued deforestation and forest degradation are seen by some people as evidence of management and policy failures to provide sustainable timber supply and environmental protection. For them, logging bans have become an expedient mechanism to prevent further damage and to allow for forest restoration.

Questions about whether timber production is in fact compatible with sustainable forestry in the broader economic and environmental context are being raised more frequently. Sustaining timber production may generate negative consequences or reductions in other multiple-forest values, e.g. stream siltation impacting water quality, inducing flooding or reducing hydroelectric capacity of reservoirs. Thus, even if management is “sustainable,” a bias toward timber may lead to a less efficient “mix” of overall values than might be obtained from the same natural forest base.

Given the widespread concerns about the consequences of past natural forest uses, as well as the declining area and degraded condition of much of the remaining forests, should more forests be subjected to logging bans in favor of natural forest conservation? If so, where will timber come from in the future? Is the present level of harvesting sustainable and consistent with environmental priorities? Will new supply sources be required? Can forest plantations provide a meaningful alternative to continued deforestation and degradation of natural forests?

Natural forests of the Asia-Pacific region

The Asia-Pacific region covers over 552 million ha of forests, of which 477.7 million ha are natural forests. However, only about 249 million ha are available for harvesting. The distribution by geographic subregion is shown in Figure 1.¹ Insular Southeast Asia and East Asia dominate in terms of both total natural forests and the area available for harvesting. About 236 million ha are unavailable for harvest at present, including 89.5 million ha in legally protected areas and 146.5 million ha that are unavailable due to physical and economic constraints.

The region has experienced continuing deforestation and degradation, showing a decline of almost 16.3 million ha of natural forests, or approximately 3.3 million ha annually from 1990 to 1995. The largest losses were in Indonesia (5.4 million ha), Myanmar (1.9 million ha), Malaysia (2.0 million ha) and Thailand (1.6 million ha). The Philippines had the highest rate of deforestation at 3.5 percent annually, followed by Pakistan (2.9 percent), Thailand (2.6 percent), and Malaysia (2.4 percent). In addition, continued heavy cutting and lack of reforestation and afforestation have added to the problem.²

A substantial amount of roundwood, both for firewood and as industrial roundwood, is produced in the region. In 1999, the estimated production was approximately 1 438 million m³, including 1 075 million m³ of fuelwood/charcoal and 364 million m³ of industrial roundwood (Figure 2).

¹ As used here, the Asia-Pacific Region conforms to the general region of the Asia-Pacific Forestry Commission. The Western and Central Asia subregions as used in FAO statistical sources are excluded. See Annex I for countries.

² According to the Forest Resource Assessment (FRA) 2000 annual deforestation rates between 1990 and 2000 were 1.4 percent for the Philippines, 1.5 percent for Pakistan, 0.7 percent for Thailand and 1.2 percent for Malaysia. While this may suggest a reduction in forest cover losses, FRA 2000 considered total net forest area, including forest plantations. The figures above refer to natural forests only, excluding forest plantations.

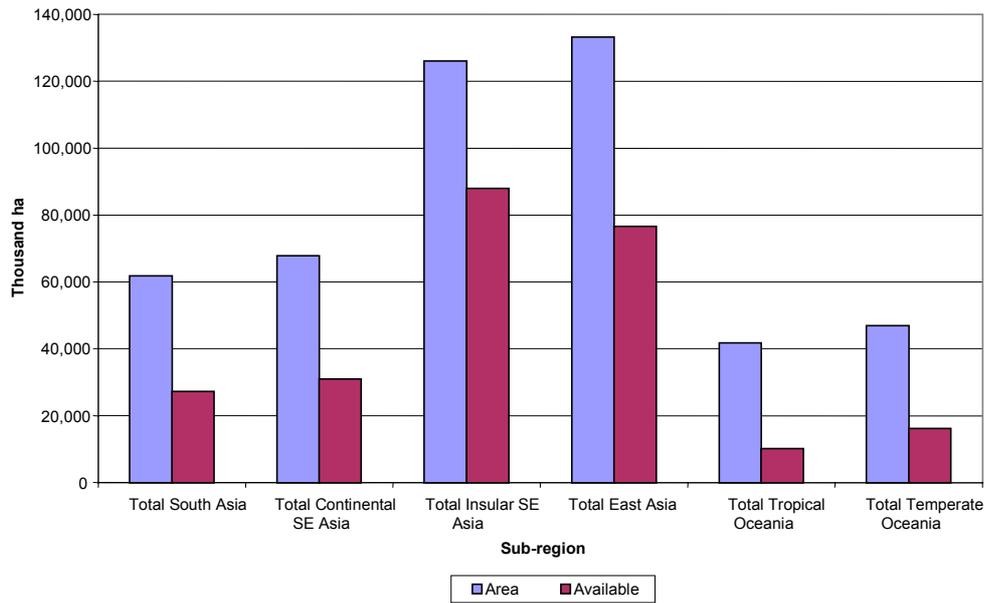


Figure 1. Natural forests in Asia-Pacific: total area and area available for harvesting

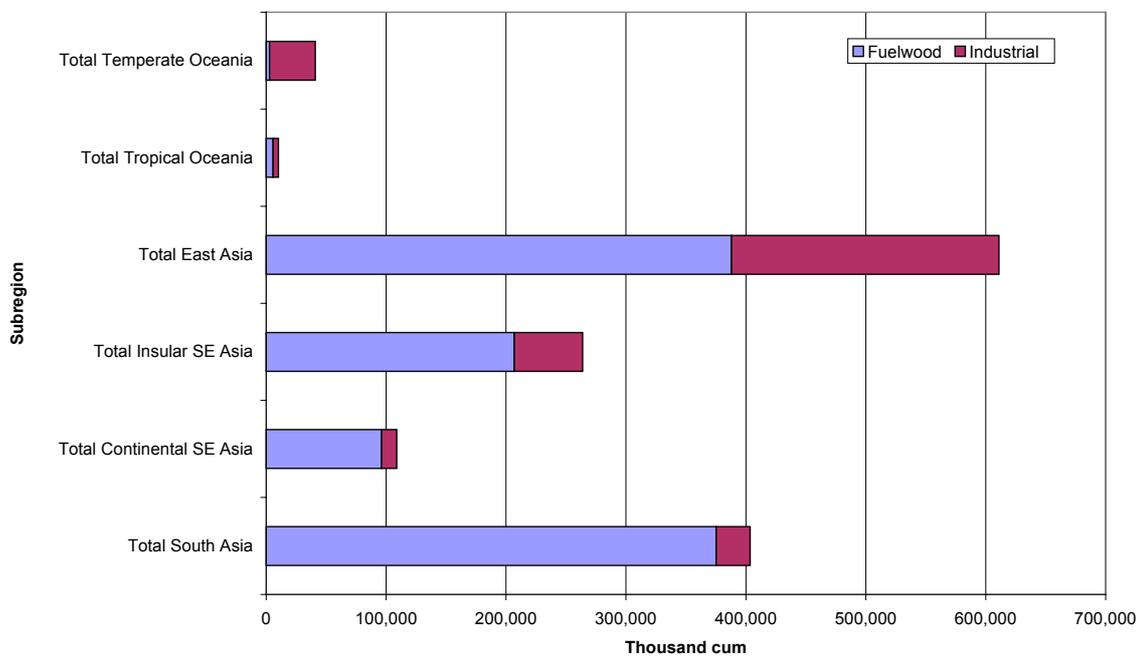


Figure 2. Asia-Pacific production of roundwood by type and subregion, 1999

Fuelwood made up a significant proportion of removals in the region, particularly in India with 297 million m³ of fuelwood and charcoal used annually. China (204 million m³) and Indonesia (153.5 million m³) account for a larger portion of the remaining firewood use.

Industrial roundwood production was primarily from East Asia (China) and Insular Southeast Asia (Indonesia and Malaysia). Oceania production was almost entirely from New Zealand and Australia, with a moderate volume (3.2 million m³) from Papua New Guinea.³

The comparison between industrial roundwood production and the estimated growth of commercial species on available natural forests is summarized in Figure 3. Total growth is estimated at 328 million m³, and industrial roundwood production is 304 million m³. While East Asia (China) shows an apparent volume of growth versus harvest, South Asia and Insular Southeast Asia both have large deficits in estimated growth against harvests. These subregions, together with Continental Southeast Asia, demonstrate high rates of deforestation and also face significant challenges in the production of fuelwood and charcoal. Temperate Oceania shows a slight imbalance.

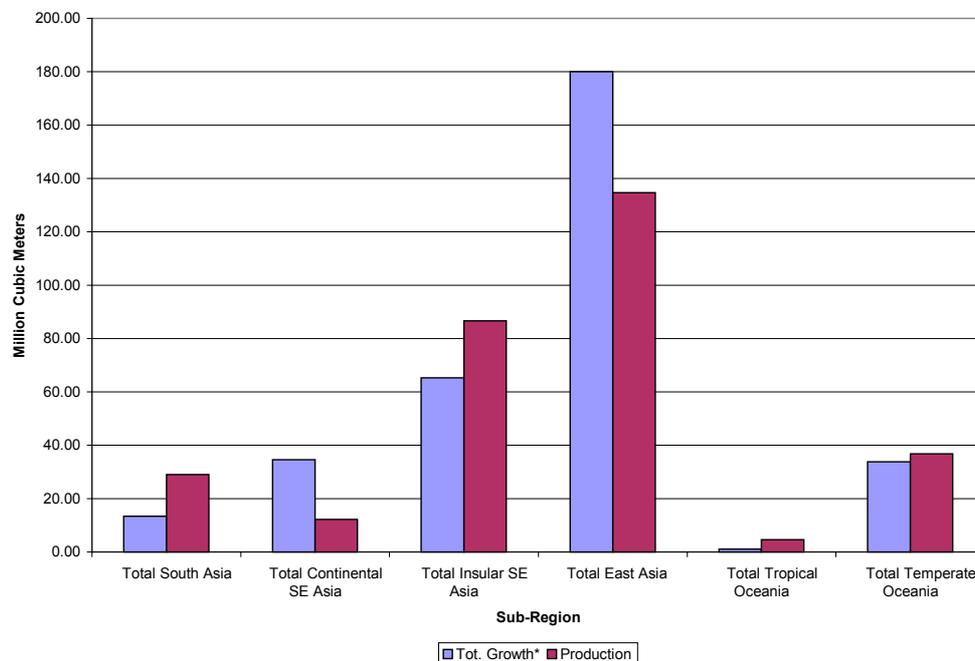


Figure 3. Asia-Pacific net growth of commercial species on available natural forests versus industrial roundwood production

Plantations in the Asia Pacific region

The Asia-Pacific region has a reported 57.4 million ha of industrial plantations, with a net area of approximately 46.8 million ha. However, only 3.5 million ha of industrial plantations are considered presently available for harvest (Figure 4).

Large areas of industrial plantations in India, Malaysia and China are still young and immature, and as yet incapable of significant contributions to timber harvests.⁴ The estimated annual growth of the Asia-Pacific industrial plantations available for harvest is 36.1 million m³ (Figure 5). By subregion,

³ These data reflect officially recorded and acknowledged harvests. An unknown, but significant, volume of illegal harvest is widely assumed within the region.

⁴ Data for plantations are derived from FAO, Global Fibre Supply Model (1998) and were estimated in 1997. National data would indicate both additions to industrial plantations and a higher proportion at or near maturity for industrial harvesting.

the highest share is in Temperate Oceania with a growth of 19.4 million m³ per year (Australia and New Zealand), followed by East Asia with growth of 10.5 million m³ per year (primarily China).

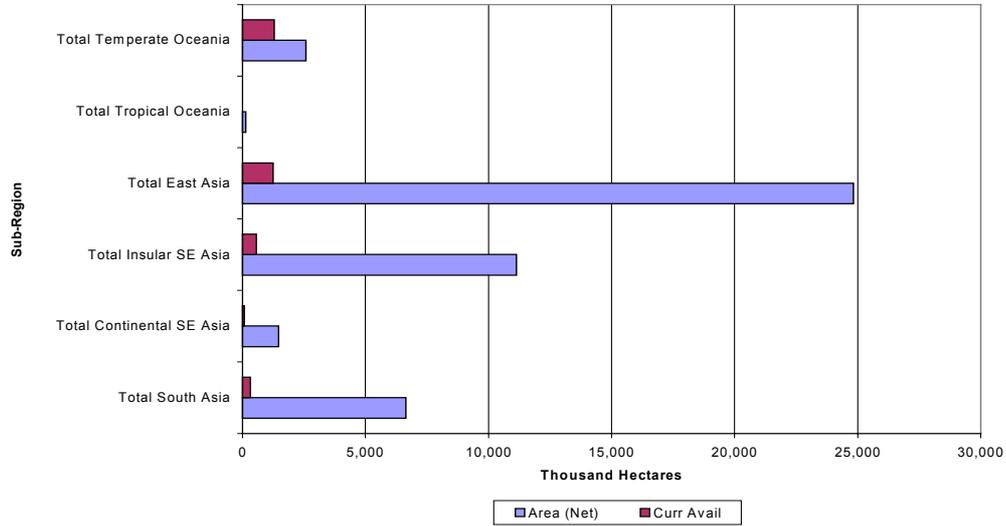


Figure 4. Asia-Pacific industrial plantations: total area versus area available for harvesting by subregion

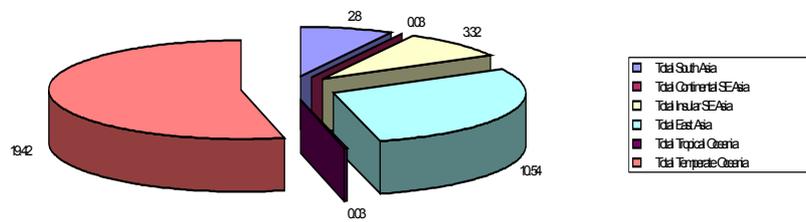


Figure 5. Estimated annual growth of available industrial plantations in Asia-Pacific by subregion

Experiences with logging bans in Asia-Pacific

The goals for timber harvesting bans in Asia-Pacific are seldom well articulated. Most bans are a response to forest policy “failures.” The undesirable outcomes from conventional forest practices and utilization are presented in arguing for swift and decisive actions to correct past problems and abuses.

Deforestation and forest degradation of natural forests are common and central themes in logging ban decisions. The problems of over-cutting beyond sustainable levels, the impact on other forest values and the assumed incompatibility of logging with the protection of environmental functions and related uses are typically intertwined. Loss of biodiversity, critical habitats and representative ecosystems, the deterioration of watersheds and water quality, soil erosion, sedimentation and flooding are frequently perceived as consequences of conventional forest practices and harvesting. Inefficient and poor logging technology and related practices have also been identified with damage to residual forest stands. Coupled with the lack of effective reforestation, these factors are often seen as serious consequences of logging. Opening of forests for uncontrolled human migration is blamed for a variety of undesirable, but non-forestry based, land-use consequences.

Logging bans can cause considerable, unanticipated impacts on timber supply. They can indirectly affect sectors and individuals dependent upon forest harvesting, transport, processing and consumption of forest products. Forest plantations are commonly seen as a logical alternative timber supply source. Seldom, however, are such linkages explicit in logging ban policies, legislation or implementation. An assumption of continued national self-sufficiency in timber supply, under conditions of growing demand, is implicit in almost all instances reviewed in this study. The growing role of economic reforms towards more market-based production and consumption decisions, together with the implications of open international trade in forest products, are only indirectly acknowledged in national logging ban policies.

SUMMARY OF COUNTRY CASE STUDIES

As part of the APFC study, case studies for six countries were conducted to assess major efforts in applying logging bans comprehensively to natural forests outside established protected areas. In addition, countries that are considering further restrictions on harvesting, or where bans have been recently announced but not fully implemented, were reviewed to gain further insights. The six countries selected were New Zealand, People’s Republic of China, Philippines, Sri Lanka, Thailand and Viet Nam. A brief summary of each case study is provided here as background to the overall findings and conclusions.

The experiences and findings from the six country case studies illustrate the linkage between natural forest conservation (objectives) and logging bans (means) for major policy decisions on natural forests.

New Zealand

New Zealand has approximately 8.1 million ha of forests, including 6.4 million ha of natural forests. Its logging ban will eventually affect 5.1 million ha of State-owned natural forests. Sustained yield restrictions were placed on another 12 000 ha of State-owned and 1.3 million ha of private natural forests as a result of major government policy changes in 1987.

Before 1987, logging was prohibited in some 300 000 ha of State-owned forests, including 80 000 ha that were previously classified as production forests. Policy changes, initiated in 1987, resulted in 4.9 million ha of State-owned natural forests being transferred to permanent conservation status under separate administration, including an estimated 1 million ha of State-owned natural forests with a potential for harvesting under sustainable forest management. An additional 670 000 ha of private natural forests are under voluntary protection agreements and restrictions, although only 124 000 ha are considered to have commercial potential.

In 1987, the Government began to phase out the public sector from the management and development of planted forests, simultaneous with imposing more restrictive measures for logging in natural forests. There are an estimated 1.7 million ha of planted forests, most of which are over 10 years of age. The area of mature plantations is expected to double during the next 10 years. A key aspect of the Government's policy has been to sell the State plantations to private enterprises. Six firms now hold approximately 50 percent of the plantations, with individual holdings of over 50 000 ha each.

The New Zealand plantation program was initiated in the 1920s and 1930s, when it was foreseen that the capacity of the natural forests was being reduced and could not be expected to play a significant role in future timber supplies. Plantations of fast-growing softwoods (conifers), rather than imports, were seen as the logical resource substitute. A second phase of plantation development occurred in the 1960s and 1970s by the State, with the private sector continuing a rapid pace of planting in the 1990s to the present.

Conditions have been positive for plantation development in New Zealand. Relatively flat land is readily available for planting, particularly in the central part of the North Island. Population density is low, and local domestic demand for timber is modest. By early 2000, an estimated 1.7 million ha of commercial plantations, comprising 1.5 million ha of radiata pine and smaller holdings of Douglas fir and other introduced hardwoods, were established.

New Zealand's timber harvest remained below 4 million m³ through the 1950s. By 1954, harvests from plantations overtook natural forest production at approximately the 1.9 million m³ mark. In 1970, about 6.8 million m³ were harvested from State-owned and private plantations, while natural forest harvest fell below 1 million m³. Plantation harvest has increased steadily to over 16 million m³ from 1996 to 1999, while natural forest production fell to below 90 000 m³ (with about 30 000 m³ coming from residual State-owned natural forests on the South Island West Coast, and the balance from private and Maori lands). Restrictions on private natural forests were progressively introduced with the Forests Act amendment of 1993, allowing for a gradual shift to alternative wood sources until the plantations are mature enough to be harvested.

The annual sustainable cut from plantations is expected to be 30 million m³ by 2010, compared to the 1999 production of 17 million m³. While volume is much greater than the declining natural forest harvests, the primary concern is the technical feasibility of radiata pine to substitute for natural forest species. There is currently no consistent supply of specialty or decorative natural forest timbers.

Much of the production from plantations is exported as logs or sawnwood and a range of finished products. In 1998, some 10.7 million m³ of logs were processed in New Zealand and 8.6 million m³ were exported. New Zealand is poised to be in a favorable position to supply plantation timbers to the Asia-Pacific region if radiata pine can meet consumer demands.

People's Republic of China

Based on the 1993 forest inventory, China reported a total of 133.7 million ha of forests, with natural forests occupying 99.5 million ha (approximately 74 percent). Natural forests under protection covered 20 million ha in area, with scattered natural forests accounting for 17.7 million ha. China estimates that some 49.6 million ha of natural forests are in need of greater protection. Responding to natural disasters, China has established a priority for natural forest conservation and protection, shifting timber production to forest plantations.

Reflecting concern for the deterioration of the forest environment, and stimulated by severe flooding in the summer of 1998, China imposed a logging ban in State-owned forests to include the upper reaches of the Yangtze River and the middle and upper reaches of the Yellow River. In addition, the Natural Forest Conservation Program (NFCP) stressed the need for afforestation and greening of wastelands, increasing forest cover, rehabilitating forest stand qualities and expanding forest eco-functions.

The estimated total supply for China's timber markets from both State and non-State sources increased from 52.3 million m³ in 1983 to 83.9 million m³ in 1987. After a brief decline, supply increased to over 90 million m³ per year from 1994 to 1996, and totaled 87.6 million m³ in 1997. Non-State forests have supplied more than 20 million m³ annually since 1992.

The NFCP aims to reduce natural forest timber production from 32 million m³ in 1997 to 12.1 million m³ by 2003. Strict logging bans will be imposed on 41.8 million ha of natural forests.

China is seeking alternative timber supplies by expanding its forest plantations and imports. It has aggressively pursued a program of establishing forest plantations, and has an estimated 34.3 million ha of plantations, of which 17.5 million ha are industrial timber plantations.⁵ Current forest plantations are relatively low in quality and their outputs are still below expectation. However, they may become the main source of industrial timber if they can meet the projected 39.3 million m³ of timber output by 2005. This will require improving forest management practices and adapting the plantation areas and species structure to market demands.

The volume of timber available for domestic consumption averaged 91.3 million m³ per year from 1993 to 1997. The volume of timber available is declining, while domestic consumption is increasing. Harvest reductions are to be phased in slowly to facilitate production and market adjustments. Initially, the shortfall is to be met by using old timber stocks and imports. Long-term supply is to be derived from both domestic and international sources.

Domestic supply will be stimulated through more intensive forest management (tending and thinning) and through technology and science to improve the utilization rate of forest resources. Substitution of wood-based panels for sawnwood, based on improved recovery and utilization of wood residues, is estimated to have saved the equivalent of 5.1 million m³ of standing timber.

China's imports of logs totaled 93 million m³ from 1981 to 1997, averaging about 5.5 million m³ annually. Maximum import of logs was 10.7 million m³ in 1988. An increasing proportion of sawnwood and plywood has also been imported. China eliminated tariffs on logs in 1999, leading to a substantial increase in imports of logs (9.1 million m³, 115 percent increase) and sawnwood (2.4 million m³, 65 percent increase). Its trading partners have been the United States, Canada, Northern and Western Europe, Russia, Africa, and South America. Within the Asia-Pacific region, China traded most extensively with Indonesia, Malaysia, Philippines, Laos and Myanmar. It has also shown strong interest in the forest resources of Oceania, including Australia and New Zealand.

China concluded that although opportunities exist to increase timber supply outside the natural forests, e.g. through plantations and intensive management, the gap between supply and demand will continue to increase, necessitating more timber imports.

Philippines

The Philippines has about 15.9 million ha of land which is officially classified as "forestland," although most of it is without tree cover. There are a little over 5 million ha of residual and old-growth natural forests, almost all of which are publicly owned. Some 20 million upland residents, including an estimated 6.3 million indigenous people, live in officially designated forestlands. There is widespread poverty in the uplands. The incidence of upland migration and illegal harvesting is high. Low royalty charges, and abuses of logging concessions led to over-cutting of forests. Ineffective operational management and population pressures have resulted in highly degraded natural forests. More than 5 million ha of public timberland have no clear form of tenure or management, essentially creating "open-access."

⁵ Recent news releases of the Fifth National Survey results indicated that China's planted forests now total 46 million ha. From 1994 to 1998, the area increased by over 10 million ha, or 2 million ha per year. Plantation development accounted for almost 75 percent of the increase in forest area. Estimated plantation expansion in 1999 is cited at 4 million ha (Source: China Forestry Information Center, 14 June 2000). Data unconfirmed by official Chinese sources.

Annual deforestation reached a high of about 300 000 ha from 1977 to 1980, decreasing to about 100 000 ha annually in the 1990s.

The Philippines has 1.38 million ha of watershed forest reserves. However, these areas generally do not have approved management plans or sufficient budgets for operational management. Most of the 1.34 million ha of protected areas also have no approved management plans.

Logging bans have been selectively imposed since the early 1970s on a case-by-case basis. General bans were initiated in 1983 covering much of the Philippines, with additional specific bans in 1986 and 1989. More than 70 percent of the provinces are now under logging bans or harvesting moratoria. The number of timber license agreements has been reduced from 114 in 1989 to 21 in 1998 down to 18 at present. The area under license has decreased to only 0.5 million ha. In 1991, the DENR issued an administrative order banning timber harvest in all old-growth forests of the Philippines. Similarly, the annual allowable cut was reduced sharply from 5 million m³ in 1990 to about 0.5 million m³ at present.

At present, two proposed bills are under consideration. The first, Senate Bill S. No. 1067, "An Act to Protect the Forest by Banning all Commercial Logging Operations, Providing Mechanisms for its Effective Enforcement and Implementation and for Other Purposes" would prohibit all commercial logging operations in all types of forest for a period of 20-30 years. The second, "An Act Providing for the Sustainable Management of Forest Resources and for Other Purposes" (Senate S.B. 1311) allows for logging in some residual forests and would constitute a partial ban (fragile areas, steep slopes, protected areas) and provide for sustainable management.

In 1998, the estimated demand for timber was about 5 million m³. This is expected to grow by about 2 to 5 percent annually. At present, the timber supply is comprised of about 588 000 m³ (or 12 percent of demand) from harvests of natural forests mostly under existing licenses and communities, 796 000 m³ (16 percent) from imports, about 721 000 m³ (14 percent) from coconut, and only 45 000 m³ (or 1 percent) from plantations. Over 57 percent are not formally accounted for and are believed to comprise "substitutes" (steel and cement) and illegal supplies of timber.

Plantations have been called the "only reliable source" of timber, together with the sustainably managed natural forest still under timber license agreements. Between 1986 and 1996, the Government and private sector developed 773 000 ha of plantations. However, only about 36 percent of the plantations are presently available for harvest. Current estimated yields are only about 300 000 m³ annually for the next decade, although projections made in 1990 forecast an output of 2.77 million m³ by 2000.

Government policies on industrial plantations have changed about 20 times between 1975 and 1995. This has caused instability and uncertainty, and subsequently very low investment. Weak incentives have led to only marginal private sector involvement, discouraging further expansion. Restrictions, lack of long-term financing, the need for local collaboration, and policy uncertainty all contribute to the low level of plantation establishment and management.

In lieu of a stronger role and capacity for plantations, the Philippines has shifted to imports as a source of timber supply. With an initial volume of about 400 000 m³ in 1989, log imports rose to more than 750 000 m³ in 1997. Total imports increased from 5.5 percent of supply in 1989 to 16-20 percent in 1996-1997.

Sri Lanka

The natural forests in Sri Lanka are owned and managed by the State. In 1992, they covered about 2 million ha, out of which 1.5 million ha were closed forests. The State also has a monopoly on harvesting and marketing of timber from these forests and State-owned plantations. The Forest Department manages approximately 60 percent of the natural forests, while the Department of Wildlife Conservation oversees about 30 percent of forests located in protected areas. The Forest Department is also responsible for about 135 000 ha of forest plantations.

In 1989, a “temporary ban” on logging in natural forests was imposed on highly degraded areas to allow them to recover and to develop sustainable management plans, primarily in the wet zone in the southwest of the island. This was extended to a total ban in 1990, at which time another 31 areas, covering 61 300 ha, were added to the protected area system. Overall, the ban affects about 1 million ha of production forests. In 1995, a large proportion of natural forests was given protected area status, and residual natural forests outside the protected areas were set aside for sustainable multiple-use management.

Prior to the ban, the demand for industrial logs in 1985 was approximately 980 000 m³, of which 425 000 m³ (44 percent) were sourced from natural forests. Non-forest wood supplies – mainly from homegardens, rubber, coconut and palmyrah plantations – amounted to 455 000 m³, and forest plantations provided 80,000 m³ of industrial wood. By 1993, homegardens, rubber and coconut plantations supplied over 70 percent of wood while plantations contributed about 4 percent. The State Timber Corporation (STC) harvests from natural forests have declined sharply, and since 1990 State plantations are the main source of timber for the STC.

Plantation forestry began after the formulation of the first Forestry Policy in 1929, with extensive planting of teak, eucalyptus, mahogany and pine. From the 1950s to 1970s, emphasis was on industrial forest plantations, but the focus shifted to developing private woodlots and forestry farms in the 1980s. Industrial plantations on State lands were extended to local people, rural communities, industry and other private organizations. By 1998, the Forest Department was managing 92 340 ha of State plantations, in comparison to the 5 000 ha of private plantations. Annual timber production from plantations is expected to be about 90 000 m³ between 1999 and 2005. This will likely cover only 36 percent of the anticipated gap between demand and supply of logs. Actual plantation harvests averaged 37 700 m³ from 1985 to 1989 and only 27 100 m³ since 1990.

Sri Lanka was essentially self-sufficient in timber prior to the logging ban, with fuelwood demand accounting for some 90 percent of utilization. Industrial log production in 1985 was about 980 000 m³. Log imports were modest. Between 1985 and 1995, annual sawnwood imports ranged from 21 000 m³ to 38 000 m³; Malaysia, Singapore, South Africa and Indonesia were the main suppliers. Sri Lanka is also a net importer of wood-based panels but in modest volumes. Imports were 30 000 m³ in 1995.

Lack of proper management and inappropriate species, encroachment, fire damage, elephant damage, and the poor quality of plantations have all limited the plantations’ harvest potential. Incentives for private development of commercial plantations remain weak. Non-forest timber from homegardens and increased sawnwood imports have largely met the shortfall in industrial wood supply created by the logging bans in Sri Lanka.

Thailand

Thailand has experienced continuing deforestation over the last three decades, often at rates exceeding 3 percent per year. Forest cover declined from 53.3 percent of the land area in 1961 to 25.3 percent in 1998, leaving approximately 12.9 million ha of natural forests. Thailand has approximately 8.1 million ha of natural forests in protected areas, with additional areas pending approval. The large rural population that inhabits many of these areas is a major concern. Reforestation and rehabilitation of degraded forests are difficult or impossible because of illegal forest encroachment.

The logging ban in Thailand was imposed on 17 January 1989 in response to devastating floods in Nakorn Srithammarat Province in southern Thailand the previous November. Logging contracts and concessions were cancelled, and applications for new concessions were dismissed. In 1991, the Government reoriented its forest policies to emphasize management of some 27.5 percent of the land area as conservation and protected areas.

In 1992, the Government, through its Forest Plantation Act, encouraged forest industries to develop large-scale commercial plantations to supplement the State’s efforts. A forest plantation

plan for 1994-1996 aimed to establish 800 000 ha of new plantations by both the private sector and Government. The Act also allowed local private sector groups to use degraded forestland with a special exemption from royalty fees. By 1997, however, it was clear that the goals of the reforestation programs would not be on schedule. Some 437 000 ha had been "reserved," but planting was completed on only about 165 000 ha.

The pursuit of large-scale, industrial plantations has faced strong opposition from local farmers and villagers who believed that commercial plantations would divert land from local use and deprive them of their livelihoods. By the end of 1992, most large-scale commercial reforestation was halted. Since then, efforts to promote small-scale plantations with local participation have been undertaken, but with only little success. Bureaucracy, over-regulation, lack of economic incentives and the long gestation periods are seen as serious constraints to plantation development. Furthermore, the market system for the production, distribution and consumption of privately produced timber is weak, with consequent inefficiencies and loss of value.

From 1906 to 1997, between 850 000 and 900 000 ha of plantations were established, in sharp contrast to the reduction of approximately 14.4 million ha of natural forests from 1961. Thailand has an implicit policy of maintaining self-sufficiency in timber, but has often been accused of turning a blind eye to illegal logging and is increasingly dependent on imports from its neighbors and the expanding Pacific Rim market to meet its needs. The country has promoted an import policy and reduced log import tariffs. Myanmar has been a leading source of timber, leading to armed conflicts among different factions in Myanmar over log trade routes. Along the Thai-Cambodian border, log trade - much of it illegal - is estimated to have reached 750 000 m³ prior to the Cambodian export ban in December 1996.

Domestic wood production was reported to be 54,800 m³ in 1998, down from a high of over 2 million m³ in 1988 prior to the log ban. No separate data are reported for production from natural forests or plantations. However, it is clear that plantations are not yet meeting expectations, nor are they currently supplying a significant volume of industrial timber.

Viet Nam

Viet Nam's forest cover is about 10.9 million ha, comprising one-third of the total land area, including 9.5 million ha of natural forests and 1.4 million ha of planted forests. In 1995, the production forests were about 5.9 million ha, which included 5.3 million ha of natural forests and 631 000 ha of plantations. The remaining forests were set aside as special-use forests (898 000 ha), and protection forests (3.5 million ha).

Between 1943 and 1995, about 110 000 ha were deforested annually. Concerns about the continued deforestation and degradation of the remaining forests led to a variety of restrictions on logging in the natural forests in the early 1990s. By 1995, State-owned production forests were yielding only about 1 million m³ of wood annually, mainly from depleted secondary forests.

In June 1997, the Government imposed the logging ban in natural forests on 4.8 million ha. It prohibited harvesting in special-use forests, and declared a 30-year moratorium on logging in critical watershed protection forests. Logging in the remaining natural forests is restricted to less critical natural forests in 19 provinces. Annual harvest volumes were expected to drop from 620 000 m³ in 1997 to 300 000 m³ by 2000. The number of enterprises permitted to log was reduced from 241 in 1996 to 105 by 2000.

Total industrial roundwood output declined from 3.4 million m³ in 1990 to 2.2 million m³ in 1998. Production from the State sector declined from 1.1 million m³ to only 300 000 m³ during the same period. Similarly, fuelwood exploitation decreased from 32 million steres to 25.9 million steres. Due to the timber shortages and the logging ban, the volume of illegal logging increased to at least 100 000 m³ annually.

Current timber supply is estimated at 1.35 million m³ of large-diameter wood (>30 cm) and 900 000 m³ of small-dimension timber. Large-dimension timber from natural forests is about

300 000 m³ under approved licenses, and as much as 100 000 without license. An additional 700 000 m³ are obtained from plantations (incl. rubber), and about 250 000 m³ are presently imported. Most of the large-dimension timber is used to produce sawnwood, with small volumes going to the handicraft and other sectors including pulp and paper. Small-dimension wood from plantations is used for basic construction, wood-based pulp and paper, pit props, matches, firewood, wood chips (for export) and boat building. Total demand is estimated to be over 4 million m³, suggesting shortages of 1.5 to 2 million m³ until 2005 when more plantation wood should be available.

Total annual wood imports (large and small dimensions) are estimated at 300 000 m³. It is expected that imports of industrial wood will increase to over 500 000 m³ per year from Malaysia, Laos, Cambodia, Myanmar, and Russia. Although the Government coordinates the flow of imports, some provinces close to Laos and Cambodia have direct contacts with the suppliers.

According to national policies, future wood supplies are to be secured only from plantations. Development of forest plantations has been slow, but has picked up recently. The volume harvested from plantations is increasing gradually. Most plantations are immature, and are located in the central and northeast regions. Under such circumstances, wood shortages are expected over the next 5 to 10 years.

By 2005, the annual production from natural forests is expected to remain at about 300 000 m³. With assumed new planting of 200 000 ha of plantations per year, production of 6 to 8 million m³ is projected by 2005. Scattered privately planted trees are also expected to yield 1 to 1.5 million m³. Added together, the projected outputs would be able to meet industrial wood demand, which is expected to double to about 9.5 million m³ by 2005.

In addition to industrial timber utilization, households and industries also consume approximately 14 million m³ of fuelwood. Approximately 8.7 million m³ is derived from natural forests, with 5.7 million m³ taken from plantations and scattered trees. Some rural communities face a shortage of firewood because alternative energy sources are scarce and largely unavailable to them.

The imposition of the logging ban in 1997 was accompanied by development of a plan to regenerate 5 million ha of forestland. If successful, the program will increase wood production to meet domestic demand by 2010.

Viet Nam is allocating land for long-term use (up to 50 years) to households, individuals and organizations. To assist farmers residing in forest areas, the Government allocated up to 3 ha of land to interested families for development of economic forests.

The ability of Viet Nam to adequately meet future demands, particularly after 2005, depends, in no small part, on the successful implementation the logging ban and the 5 million ha reforestation program. Major adjustments to State enterprises and wood industries, and attracting local and international investors, are also important elements necessary for success.

ISSUES AND CONCERNS

The country case studies reveal a highly complex and variable mixture of symptomatic reasons for imposing logging bans and restrictions on harvesting in natural forests. Concern over continuing deforestation is the dominant issue. Action is primarily driven by the aim of halting further deforestation and degradation of remaining natural forests.

Other concerns are also evident, and are often co-mingled with vague or undefined aspects of "forest conservation" or "forest protection." From the case studies and broader review of the Asia-Pacific region, the major issues regarding natural forests include:

- **Loss of biodiversity, critical habitats and representative forest ecosystems**

Timber harvesting is frequently perceived to be a major contributor to loss of biodiversity, habitats (primarily for wildlife) and representative ecosystems. Where natural forests are logged selectively, only higher-valued species are usually taken, with the consequent loss of seed source or natural regeneration for these species relative to lower-valued residual species. Non-timber components of the ecosystem can also be damaged or destroyed during logging. These concerns reflect the view that non-timber values of retaining biodiversity, habitats and ecosystems outweigh, at the margin, the value of the timber harvested and that timber output should be reduced to “protect” or provide a higher level of such values.

- ◆ **Deterioration of watersheds and water quality**

Removal of all or part of the forest cover reduces water retention capability of watersheds, resulting in increased peak water runoff and reduced water flows during periods of low precipitation. Watersheds with natural forest cover are frequently the source of both domestic and industrial (including agricultural) water. Reduction of vegetation in such watersheds also contributes to soil erosion, and thus to declining water quality.

- ◆ **Soil erosion, sedimentation and flooding**

Vegetation loss can expose soils to both wind and water erosion. In many areas of the Asia-Pacific region, soil loss and declining productivity are major concerns for both forestry and agriculture. Further, the disturbance of soils frequently leads to serious sedimentation of streams, rivers and reservoirs. Severe flooding, as experienced in Thailand and China, in recent years, has led directly to immediate and comprehensive logging bans in natural forests.

- ◆ **Forest damage from inappropriate logging and abuse of contractual obligations**

Use of ground-based logging equipment, and poor roading and skidding of harvested timber, frequently damage soils and residual forest trees. Large volumes of slash and debris also hinder reforestation efforts, and commonly increase the risk of fire. Applying reduced impact logging practices remain the exception rather than the norm across the region.

Where contract enforcement is lax or ineffective, violations of harvesting guidelines is common, resulting in site damage and deterioration of stand quality. Incentives to comply with logging standards are often weak, while the potential financial benefits of operational short cuts and inappropriate techniques may be great. Over-cutting beyond authorized levels may also yield direct financial benefits to harvesters while contributing to further forest degradation. Illegal harvesting is a common concern, both prior to and following the imposition of logging bans.

- ◆ **Inability to effectively monitor and regulate logging operations, including inability to detect and prevent illegal logging**

Where logging is carried out under permit or license systems, the capacity of governments to effectively monitor and enforce regulations may be insufficient. Even where logging is directly the responsibility of a subsidiary government unit, the lure of greater revenues and/or lower costs may lead to abuses or conscious avoidance of contract or permit conditions. The potential for corruption or complacency in enforcement can also lead to abuses. The lack of measurable criteria for contract conditions (for example, reforestation) can contribute to disputes and uncertainties about standards of performance.

- ◆ **Inadequate reforestation and forest regeneration**

Land tenure arrangements and instruments for assigning use rights vary greatly throughout the Asia-Pacific region. Frequently, rights are allocated for harvesting State-owned and administered forests, but obligations for reforestation or forest regeneration remain with the State. In cases where reforestation by users is required, standards and performance may be vague and inadequately monitored, without effective performance bonds or other provisions to assure compliance. The lack of capacity and funding for State follow-up to regenerate cut-over areas or to reforest barren or degraded lands leads to criticisms of the initial decision to

grant logging permits, even when the logging itself is in compliance with existing regulations and guidelines.

◆ **Lack of management of cut-over forestlands**

Inadequate support for management and reforestation, combined with poor enforcement of restrictions and use rights, frequently lead to poor resource conditions and degradation. Logging is again the most obvious contributor to forest disturbance, creating a need for strong management plans and operations, especially in cut-over forests.

◆ **Uncontrolled human migration and habitation of forested areas facilitated by access created by logging roads and opening of forest stands**

The natural forests of Asia-Pacific are, in most cases, subject to heavy population pressures. One consequence of logging in these forests is the creation of access through logging roads. In addition, the stand density is reduced by virtue of the logging and land clearing is consequently made easier. Shifting cultivation, small landowner settlement, illegal logging and increases in the forest populations may follow. Without logging roads, these forests would remain more remote and inaccessible. Hence, banning logging activities is seen as one means of preventing or reducing continued encroachment.

◆ **Inappropriate land clearing and conversion to agriculture**

Encroachment and opening of forests to settlement also encourage forest conversion. Where conservation or production forests are considered to be the socially optimal choice of land use, such conversions reduce the overall contribution of these lands towards social welfare. They also fragment the remaining natural forests, making the enforcement of forest policies and regulations more difficult, and increasing the potential for further land-use conflicts.

◆ **Conflicts with rights and cultural traditions of indigenous peoples and local communities**

The natural forests of much of the Asia-Pacific region are home to significant numbers of people, including many indigenous groups. The social and cultural values of these peoples often conflict with those of the increasingly urban population. Traditional rights and land tenure of local communities and cultures provide for many subsistence and non-timber values that are often unrecognized by commercial forest management operations. While timber production often disrupts traditional local use and dependency, forest protection measures may prohibit access and use. Centralized government regulation and control, together with inadequate recognition of local dependency and traditional rights, can make it difficult to forge consensus on forest management, production or conservation. Banning of commercial timber harvesting, particularly by government or “outside” contractors, is often seen as a viable option for protecting local rights and cultures.

◆ **Loss of scenic, cultural and aesthetic resources**

Asia-Pacific countries have sought to protect scenic, cultural and aesthetic resources that frequently depend on undisturbed forest structures and natural topographic features. Forest disturbances caused by logging operations threaten these values which are largely non-market in nature and thus seldom given due consideration relative to the direct financial revenues and profits from logging.

◆ **Conflicts between management for timber and for non-timber forest products, including medicinal plants and forest genetic resources**

Increasingly, non-timber and ecological values of forests are given greater weight in forest policies. Protection of biodiversity, conservation of gene pools, the still unknown potential of medicinal plants and other social values of forest fauna and flora are often incompatible with the management of natural forests for commercial timber. Timber production also potentially conflicts with efforts to sustain or increase the yields of non-timber products and services important to local people.

◆ **Climate change and carbon storage**

Natural forests are increasingly recognized for their roles in sequestering carbon and mitigating climate changes. Through photosynthesis, forest growth reduces atmospheric carbon dioxide concentrations and generates oxygen. Capture of atmospheric carbon and its storage in forest biomass have become regional and global concerns, increasingly covered under international conventions and agreements. Harvesting reduces the biomass (at least temporarily) and if deforestation results, these values are permanently lost.

NATURAL FORESTS AND POLICY CHOICES FOR IMPROVED PROTECTION AND USE

The policy issues and concerns behind logging bans in the Asia-Pacific region reveal two very different types of policy shortcomings: (i) inappropriate forest land-use allocation, and (ii) inefficiencies in managing and utilizing forest resources.

Forest land use

Forestland use issues involve the allocation of land to forests, and the subsequent decisions on the various uses of those forests. Forestland use often directly conflicts with alternative land uses such as settlements, agriculture or mining. Alternatively, there are many “mixed” land uses involving protected areas, watersheds, recreation and scenic areas, or agroforestry. National policies must reconcile and provide guidance and institutional arrangements for deciding priorities among forest and non-forest uses as well as for the level and “mix” of multiple uses.

“Forest use” and “timber production” have frequently been assumed to be synonymous in the past. Lands which have (or have had) forest cover are most often simply classified as “forestland” in spite of potential alternative uses. This classification has been quite rigid, making changes difficult. The conversion of lands from forests to agricultural land use, for example, is often viewed as “encroachment” on forests.

Land designated for forestry has frequently focused on wood production (both industrial timber and fuelwood). The maximum output of wood and fiber has often been the primary goal of forest policies. Other uses, including environmental protection functions, non-wood forest products, water flow, and so on, has often been relegated to secondary importance.

This conventional pattern of allocating forest use primarily for timber is now considered inappropriate by most people. But while multiple-use forestry is more widely acknowledged and appreciated than in the past, in practice timber is still given priority under most management schemes.

Most Asia-Pacific countries have long-standing policies for designating some forestlands as protected areas, where timber harvesting is prohibited. Sometimes, such designations have been based on intensive studies and analyses of the relative priorities and trade-offs with other land uses and values. In other cases, the administrative designation of protected areas has occurred without comprehensive planning and assessment of priorities. Where the objectives for such designations are not clear and specific, withdrawal of forests from production may have unnecessarily constrained productive sustainable harvests of timber. It is possible that other options could have achieved the desired results, but such options have rarely been pursued in the region. The need for total restrictions on timber harvesting, of course, depends on the actual resource conditions and the specific objectives.

How much forest should be allocated to alternative and mutually exclusive uses is a major policy choice that is usually controversial. Recent history demonstrates that “too much” forest may be allocated to timber and “too little” for other purposes. Resolutions and consensus over forest use are extremely difficult to achieve when “either-or” choices are required between two or more desirable uses that are indeed mutually exclusive. Certain forms of forest conservation and protection, for example, may be technically incompatible with even the lightest intensity of timber

harvesting. In other cases, appropriate protection and conservation may be practical and feasible under broader concepts of “sustainable forest management.”

Efficiency in forest resource use

Concerns about inefficiencies in forest management and timber harvesting also frequently arise. Much of the debate centers on inappropriate management schemes, unregulated harvesting, poor institutional arrangements and environmentally damaging logging technology, which often result in unintended loss of environmental values. These inefficiencies and abuses are a primary cause for calls to ban logging. In many cases, the negative consequences of poor logging practices detract attention from viable options for improved practices that could maintain multiple values of forests.

Environmental forest functions may be seriously impaired or destroyed during conventional timber harvesting. Wasteful harvesting and damage to residual stands also negatively impact future forest productivity, and add significantly to private and social costs.

Clearly, there are conflicting opinions regarding the ability to overcome inefficiencies in forest resource use. The technical and economic viability of sustainable multiple-use management and modified management strategies such as reduced impact logging (RIL) to reduce both economic and environmental costs have been discussed extensively. It is evident from experiences throughout the region that modifications to current management practices are required if timber harvesting is to be widely accepted.

THE EFFICACY OF REMOVING NATURAL FORESTS FROM TIMBER HARVESTING AS A CONSERVATION STRATEGY

Recent experiences in implementing logging bans and harvesting restrictions in Asia-Pacific have been mixed. Following the imposition of logging bans, significant areas of natural forests have been classified as protected areas, or the absence of harvesting is taken as equivalent to protection. While limited success of some natural forest conservation objectives is evident, lack of effective protection remains a problem.

The lack of specific conservation and protection goals contributes to an inability to measure performance and achievements, while simultaneously creating confusion and disagreement regarding the objectives. Adverse economic and social impacts have also occurred, further undermining the incentives for sustainable management, conservation and protection of non-timber values. Removal of natural forests from timber production has had significant impacts on the forest product sector, and sometimes disruptive effects on neighboring countries through legal and illegal trade, timber smuggling, and market disruptions.

Finally, a distinction between simply banning logging and the correlated need to formulate and implement strategies and programs for effective conservation and protection is essential. An uncritical assertion that halting logging is either necessary or sufficient to assure conservation has resulted in many natural forests being declared as protected while deforestation and degradation continue largely unaffected. Only where logging bans have been accompanied by transitional adjustment policies for alternative timber supplies, social and economic “safety nets” to minimize local burdens, and sustained and effective conservation management have bans proven effective.

Impacts on timber production

The remaining natural forests of the Asia-Pacific region that are still available for harvesting are experiencing heavy pressures for increased harvests. These pressures also spill over onto natural forests that are “presently unavailable” for harvesting. While the country case studies have illustrated that logging bans reduce harvests, it is also evident that continuation of pre-ban practices would have also led to falls in production as the natural resource declines in area and quality.

With few exceptions, harvest volumes from the remaining natural forests can be expected to decline in most countries in the region. Harvest bans will impact the timing and rate of harvest decline, but not the fact that prior levels of harvests were also unsustainable. Total gross annual growth of commercial species on presently available natural forests exceeds present harvests of industrial timber by about 24 million m³, compared to the production of 304 million m³.

Further deforestation and degradation at or near the present rate of about 3.3 million ha annually will reduce the capacity of Asia-Pacific to produce industrial timber from natural forests. With an average cutting cycle of about 38 years, present harvesting intensity is about 34 m³ per ha for undisturbed natural forests and 17 m³ per ha for disturbed forests. Based on the ratio for available undisturbed and disturbed forests,⁶ deforestation could reduce regional harvest by about 1.8 million m³ per year.

The present ratio of available natural forests also provides a rough estimate of the impacts of logging bans, assuming that bans impact both undisturbed and disturbed forests by the same proportion. The banning of harvesting on 1 million ha of available natural forests would reduce potential harvesting by approximately 550 000 m³ annually.⁷ For example, China's logging ban affecting 41.8 million ha with an estimated reduction in harvest of 19.9 million m³ by 2003 implies an average reduction of 476 000 m³ per 1 million ha.

For the six countries included in this study, the impacts on timber harvests from the natural forests are considerable. The expected impact for China is a reduction from 1997 levels (pre-ban) of some 32 million m³ from State-owned natural forests to only 12 million m³ when the ban is fully implemented by 2003. For the Philippines, the production was an estimated 5 million m³ prior to the 1991 general ban, before declining to about 0.5 million m³ most recently. Similarly, Thailand's natural forest harvest was about 2 million m³ prior to the 1988 logging ban, then falling to only about 55 000 m³ (recorded harvest) in 1998. Sri Lanka saw the harvest from State-administered natural forests fall from 425 000 m³ in 1990 to nearly zero, creating an almost total dependence on alternative supplies. Viet Nam likewise experienced a sharp drop in natural forest timber production from about 1 million m³ annually between 1990 and 1995 to a presently authorized level of only 300 000 m³ after the 1997 general logging ban.

For these five countries, the aggregate reduction following comprehensive logging bans is approximately 29.5 million m³ per year.⁸ New Zealand is the only country among the case studies that did not suffer such a large decrease in the volume of timber harvested. It had anticipated a declining capacity for natural forest harvests over several decades, and had pursued a strategy for both government and private plantations to supply its industrial timber. The transfer of almost all State-owned natural forests to conservation status in 1987, therefore, had only a minor impact on commercial timber supply. Harvest of natural forests was about 2 million m³ in the early 1950s, falling to below 1 million m³ by 1970. Natural forest harvest (including West Coast forests) was below 90 000 m³ in 1999, compared to 17 million m³ from plantations.

⁶ Undisturbed forest is 22.2 percent of available natural forest.

⁷ The assumed ratios used here are averages for the Asia-Pacific region as estimated in the Global Fiber Supply Model (FAO 1998) and are used for illustration only. Actual impacts would vary by country, the ratio of disturbed to undisturbed available natural forests, and the details of specific logging ban policies.

⁸ As noted, however, the time period for implementation of bans in these five countries are variable and overlap different years from 1988 (Thailand) to 1998 (China). Further, the bans have not yet been fully (or effectively) implemented and an unknown volume of timber from natural forests continues to be harvested illegally.

Alternative timber supplies

The imposition of logging bans in natural forests involves significant assumptions about timber supply from current or future plantations. For example, China's shift of focus is founded on the rapid expansion and maturing of fast-growing industrial plantations, complemented by other NFCP strategies. Viet Nam is relying on the successful implementation of its 5 million ha reforestation program. Serious consequences in both the Philippines and Thailand illustrate the problems when commercial plantations do not develop as planned. Thailand's goal of some 800 000 ha of new commercial plantations has fallen short, reaching only 164 800 ha by 1999. The 773 000 ha plantations in the Philippines are now expected to yield only approximately 300 000 m³ annually in contrast to 1990 projections of 2.8 million m³.

The Asia-Pacific region has reached a point where the production of industrial roundwood is very close to the net growth from available natural forests (FAO 1998). Current plantation yields still fall far short of the volumes required to offset logging bans, declining production and increasing demands. The regional relationship between estimated growth of commercial species in available natural forests and industrial roundwood production is shown as the first series ("Nat/Prod") in Figure 6. The corresponding comparison of combined natural forest and plantation growth with industrial roundwood production is displayed as the second series ("Total/Prod").

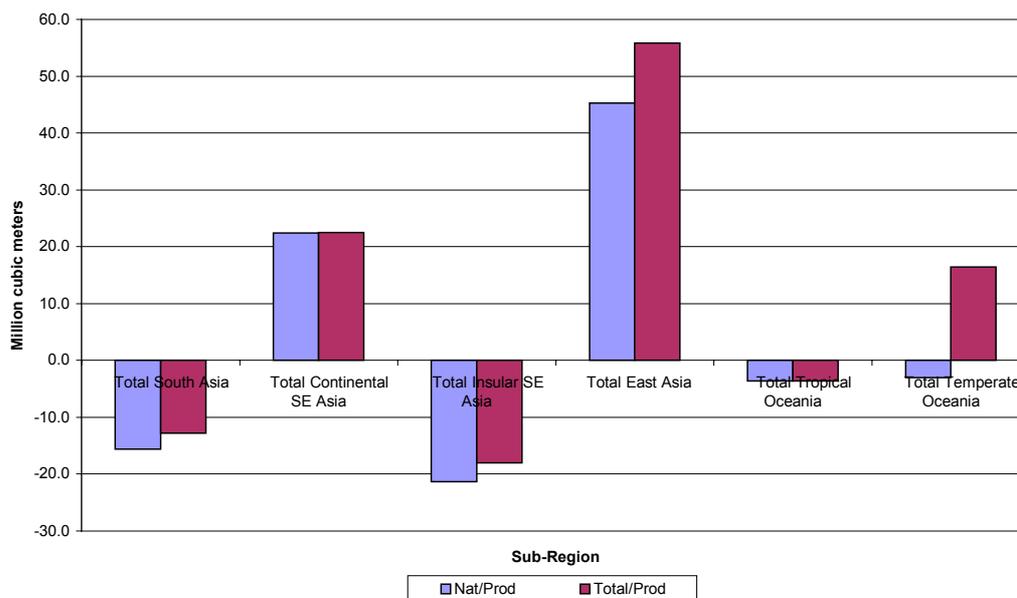


Figure 6. Asia-Pacific balance between estimated net growth from available natural forests and plantations compared to 1996 industrial roundwood production

If it is assumed that both the total growth of commercial species from available natural forests and from industrial plantations are available for harvest, the overall situation for Asia-Pacific would improve. The overall balance between total growth from both natural forests and plantations and the 1996-level of industrial timber production improves to a positive net balance of 60 million m³. However, there are significant differences between individual subregions and countries (Figure 6).

All subregions show an improved balance when plantation growth is included, although the very small growth for Continental Southeast Asia and Tropical Oceania does not significantly change

the situation for these subregions. South Asia, Insular Southeast Asia and Tropical Oceania continue to show a deficit between estimated total growth and industrial roundwood production. Only Temperate Oceania switches from a deficit to a positive balance when New Zealand's plantation timber is taken into account. Malaysia and India continue to show significant deficits even when the contribution from their plantations are included.

Reduced log production due to the logging bans in the six case countries totals nearly 30 million m³ annually. Plantations, as an alternative supply, are estimated to provide 36.1 million m³ (Figure 6), but only if all net growth from available plantations can be efficiently harvested. Additional withdrawals of natural forests together with continuing deforestation and degradation can be expected to further reduce wood supplies. More productive plantations and more effective management of such plantations will be needed *if* the balance between growth and consumption is to be maintained on a region-wide basis under growing demands. However, continuing reluctance to support intensively managed, single-species commercial plantations in many countries, and emerging challenges to genetically altered trees will make such expansions in plantation forestry less likely.

International trade implications

Countries of the Asia-Pacific have long engaged in international trade – both importing and exporting – as resource stocks and markets for wood products dictate. While trade barriers and national consumption policies have frequently distorted true open trade in the past, and trade has been sometimes reserved as a national government monopoly, considerable volumes of wood are traded in the region and worldwide.

The Asia-Pacific region has consistently been a net importer of roundwood (industrial and fuelwood). Already in 1980, the region imported over 70.6 million m³ while exporting 44.1 million m³ (a net deficit of 26.6 million m³ derived from outside the region). This deficit grew to over 32.6 million m³ by 1994. FAO provisional projections for 2010, based on the “most likely” scenario of development and economic trends, forecast a net trade deficit of 46 million m³ (Figure 7).

The region also trades sawnwood, plywood and wood-based panels, joinery products, pulp, paper, paperboard and many specialized products. Sawnwood is, by far, the most significant processed solid wood product traded. As shown in Figure 7, the region has also been a net importer of sawnwood; the net trade deficit by volume is smaller than for roundwood but is increasing. In 1980, the region had net imports of 837 000 m³ of sawnwood. The deficit grew to over 11.1 million m³ by 1994. In addition to Japan's role as a large importer, both China and Thailand became significant importers of sawnwood. FAO's provisional projections indicate a potential net trade deficit of 17.2 million m³ of sawnwood by 2010.

While many countries maintain policies of remaining self-sufficient in timber or aspiring to self-sufficiency, the Asia-Pacific case studies indicate the difficulty in doing so in the face of deforestation, forest degradation and lack of adequate plantation resources. In addition, logging bans which are abruptly imposed over a short period without adequate consideration of realistic timber supply alternatives (including trade) and likely growth of demand, create tremendous pressure for increasing imports.

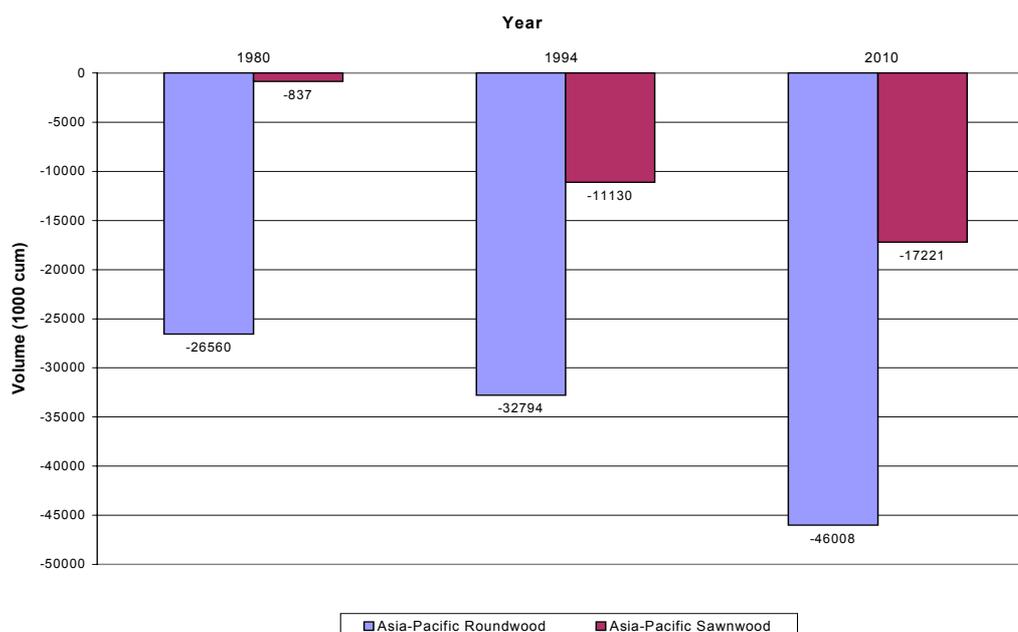


Figure 7. Projected Asia-Pacific net trade in roundwood and sawnwood, 1980, 1994 and 2010

As noted, Thailand, the Philippines, Viet Nam, and Sri Lanka have all had minimal success in developing greater production from plantations to compensate for the loss of production from natural forests resulting from logging bans. While Sri Lanka has significant capacity for timber production from homegardens and other non-forest resources, Thailand, the Philippines and Viet Nam do not have such a supply base. All four nations have become net importers of industrial wood, with imports expected to increase even further. China has identified the need for greater imports, at least for a transitional period. Only New Zealand has sufficient plantation resources to meet domestic demand and for export.

International trade also opens the possibility of “exporting” or “externalizing” the problems associated with timber harvesting to other countries. For example, there have been allegations that Thailand’s logging ban has resulted in both illegal logging and greater imports along the borders with Laos, Cambodia and Myanmar. Protection of natural forests in China has led to greater imports from Myanmar and the Russian Federation, potentially contributing to unsustainable harvesting in northern Myanmar and parts of the Russian Far East and East Siberia. Viet Nam also imports timber from Cambodia and Laos, allegedly in part from illegal harvests. While difficult to document, these negative effects raise important issues regarding the environmental and protection policies of exporting countries.

Recent analyses by Sedjo and Botkin (1997) and Sohngen *et al.* (1999) provide some insights into the relationship among natural forests, plantations and the implications of international trade. Although dealing with natural forests in the aggregate, their analyses suggest that declining natural forest harvesting (due to deforestation, degradation or logging bans) on the part of one country alarms both domestic and international markets through costs and pricing, stimulating three potential responses: 1) extended harvesting of natural forests into marginal and inaccessible areas (legally and illegally), 2) more intensive management of natural forests for improved sustained yields, and 3) expanded, intensive timber plantations. As seen in the case studies, the primary assumption is that countries will be able to expand plantations to offset declines in natural forest harvests. In practice, however, plantation development has been generally disappointing, with shortfalls largely met by increased imports.

Comparative advantage

Reduction in output from natural forests either through deforestation, degradation, logging bans, more stringent management requirements, or enlargement of protected areas also leads to price adjustments and responses by both suppliers and consumers to the extent that market-based prices prevail and influence timber production and output decisions. The impacts are not, however, limited only to the country initiating harvest bans or restrictions.

A country that has enjoyed a comparative advantage in harvesting natural forests may not automatically enjoy such an advantage in alternatives such as domestic plantations. This is particularly true where the domestic economy is undergoing both macro- and microeconomic reforms, giving more influence to market-based incentives and prices. Where prior harvesting and marketing decisions have reflected strong government control or regulation, distortions in both production and prices have frequently developed. When economic reforms unleash free market forces, such distortions become apparent and market-based incentives quickly orient decision-making toward economic efficiency rather than simply resource availability. The ability to address socio-economic impacts through plantations may also shift.

A large number of obstacles constrain economically viable creation of commercial plantations in the Asia-Pacific region, particularly in relatively small-scale operations. The comparative advantage may shift to other areas within a country, or even to other countries. For China, the shift to plantations will have substantial impacts intraregionally. Changing timber supplies pose a serious threat to established forest-based enterprises in the traditional State-owned natural forest regions of the Northeast, Inner Mongolia and Southwest China. Plantations will result in new production capacity in the southern coastal provinces that have more favorable conditions for high-yielding, fast-growing species and better access to markets.

New Zealand, as a prime source of intensively produced plantation timber, may well exploit export markets in Asia-Pacific at the expense of potential plantation development within individual developing countries. An emphasis on small-scale, community-based or individual household plantations may ultimately prove difficult, if not uneconomic, in light of international trade potential from outside a country's borders. Industrial-scale plantations may meet increasing challenges from local interests, environmental organizations and others. Lack of investment capital, available productive land for planting, equipment, marketing structures, transport and technical knowledge can all contribute to difficulties in developing domestic plantations as alternative sources of timber.

Comparative advantage is an elusive concept, largely based on market economics, prices and costs, and relative resource endowments. The specific conditions of species composition, stand volumes and quality, efficiencies in timber growing and harvesting, transport, scale of operations, and a number of other such considerations, determine costs and returns, and consequently where and how plantations will develop most efficiently throughout the region. In the past, non-economic factors, including biophysical forest and species characteristics and political considerations, have influenced many decisions regarding plantations. Free market forces, however, increasingly influence (if not determine) such decisions.

New Zealand illustrates the potential for a major reallocation of harvesting away from natural forests for timber production towards conservation objectives (in the public sector), and a transition to greater harvests from the mature plantations (increasingly private). Sri Lanka also demonstrates the possibility of restricting harvests in natural forests by shifting output to economically viable alternative timber supplies derived from homegardens, plantations and imports. The availability of suitable land and the incentives for non-State plantations have been instrumental in offsetting the reduction in natural forest timber output.

Thailand and the Philippines continue to struggle to effectively implement their long existing bans on harvesting in natural forests. In spite of the bans, the achievement of effective protection and conservation remains elusive. The lack of effective institutions and policies to deal with reduced natural forest timber supplies (and enforcement of harvesting restrictions), together with

substantial unanticipated adverse social and economic impacts, have made the realization of natural forest conservation difficult. At the same time, the institutional, policy and investment infrastructures in both countries have adversely impacted the potential for commercial plantation development as an alternative timber supply.

As a consequence, both Thailand and the Philippines have become major net importers of timber since imposing harvesting restrictions. The shift towards imports indicates, at least indirectly, that the comparative advantage for increasing timber supplies may reside with countries that have viable, maturing intensively managed plantations or those still allowing the export of timber from their natural forests (for example, the Russian Far East). Such developments are leading to greater concerns over the harvesting practices and the ultimate sustainability of harvesting in supplier countries. Pressures on neighboring countries create incentives for increased harvesting and exports (including illegal harvesting and smuggling) in spite of policies in those countries to also restrict harvesting to sustainable levels or to set aside their forests for protection and conservation.

China is now in the early phases of introducing new logging bans intended to conserve and protect much of the remaining natural forests. In the past, China has relied heavily on natural forests for timber production, resulting in widespread over-harvesting and environmental degradation. A long-term strategy has been adopted for increasing plantations for future harvesting (timber base) while allocating much of the remaining natural forests for environmental protection and the restoration of degraded forests. Closing much of the natural forests in the headwaters of major river systems as an emergency measure was introduced in 1998 under the country's NFCP. China has also developed substantial plantation resources for both protection and production. It remains unclear, however, how much additional plantation development will prove to be technically and economically viable under the ongoing economic reforms.

Viet Nam is also at an early stage of further restricting timber harvests in its natural forests. The success of this effort will be largely determined by the simultaneous implementation of the country's 5 million ha reforestation program. Funding and transitional adjustments will remain critical issues over the next decade or longer until the presently inadequate plantation resources are sufficient to meet both industrial and fuelwood needs. To date, many technical, social and economic issues remain unresolved, and thus the comparative advantage of plantation establishment within Viet Nam relative to other opportunities in the Asia-Pacific region is still uncertain.

New Zealand represents the clearest example of comparative advantage for commercial plantations as a substitute timber resource. As natural forest supplies declined, plantations were in place to supply both domestic and export markets. Favorable conditions of land availability, technical development of fast-growing radiata pine, market development, and a strong private industry willing to invest in plantations have given New Zealand an edge over other countries. This, of course, represents conditions and economics of the past decade, and may well change in the future if and when other countries formulate viable plantation policies and the supporting technical and economic frameworks.

Achieving conservation

Asia-Pacific has been a leader in the designation of legally protected areas, having so classified a total of some 89.5 million ha, effectively removing these natural forests from harvesting. The largest aggregate protected natural forest is in Insular Southeast Asia, with some 43.3 million ha, including almost 40 million ha in Indonesia and 2.8 million ha in Malaysia. East Asia accounts for 15.4 million ha of protected area, with over 13 million ha in China. Temperate Oceania and South Asia each has over 10 million ha in protected areas. Continental Southeast Asia accounts for about 6.8 million ha (mainly in Cambodia and Thailand). These areas include, of course, some natural forests that would otherwise be available for harvest, as well as areas that would be unavailable due to physical and economic limitations.

Despite the legal designation of protected natural forests, there is substantial concern about the adequacy of the on-the-ground protection of these areas. As well, controversy about the need to

set aside additional areas for protection of representative biodiversity, critical watersheds and habitats for rare and endangered fauna and flora continues. Unfortunately, qualitative assessments of protection and conservation are largely lacking. This is in part due to the non-specific policy objectives not translatable to measurable actions beyond area statistics, and the lack of adequate indicators of conservation, protection, biodiversity, ecosystem health, and so on. Monitoring and evaluation are thus weakened, and relatively little factual information is available to assess whether the various forms of legal designations are effective.

Over 236 million ha of the natural forests of Asia-Pacific are presently unavailable for harvesting due to physical and economic factors. Figure 8 shows the breakdown, led by Insular Southeast Asia (55.1 million ha), East Asia (45.7 million ha), Continental Southeast Asia (38.6 million ha) and South Asia (35.0 million ha). Some 89.5 million ha of this area are legally protected.

Over 146.5 million ha are unavailable without being legally “protected.” In many instances, these “unavailable” natural forests are at the most risk for continuing deforestation and degradation. Even available natural forests (not yet closed to logging) face pressures from over-cutting and encroachment, leading to further degradation. Figure 9 classifies three categories of such constraints as follows:

- ◆ Category I: physical and terrain conditions
- ◆ Category II: remoteness and lack of access
- ◆ Category III: low productivity, degraded forests and other site conditions

Category I presently restricts harvesting on some 58 million ha in the region, primarily in the Tropical Oceania subregion (Papua New Guinea - 17.6 million ha) and Continental Southeast Asia (Laos 4.5 - million ha; Myanmar - 5.7 million ha; Thailand - 2 million ha). Other countries with substantial physical constraints on their natural forests include India (4.8 million ha), China 5 million ha) and Australia (9.7 million ha).

Remoteness and lack of access are less of a constraint in Asia-Pacific due to generally heavy population pressures in the rural areas and developed infrastructure. Category II accounts for 9.5 million ha of natural forests being unavailable for harvesting at present, with Indonesia (3.4 million ha), Papua New Guinea (4 million ha), Laos (1 million ha) and Nepal (0.9 million ha) accounting for almost all of this area.

Category III limits harvesting on a total of 79.1 million ha. East Asia, led by China (16.3 million ha) and Japan (4.5 million ha) accounts for about 23 million ha in this category, with South Asia (India – 15 million ha) accounting for an additional 17.9 million ha. In Continental Southeast Asia, Thailand has an estimated 6.8 million ha of such natural forests followed by Laos (4.4 million ha) and Viet Nam (3.9 million ha). In Temperate Oceania, Australia has about 8.5 million ha of such areas.

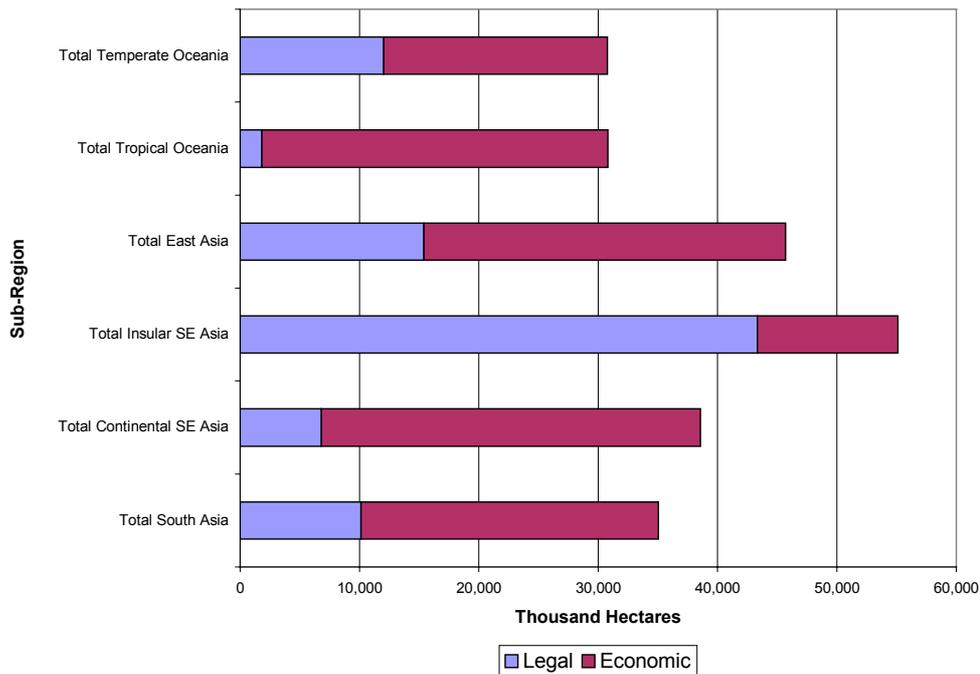


Figure 8. Natural forests unavailable for harvesting due to legal closure and technical/economic constraints

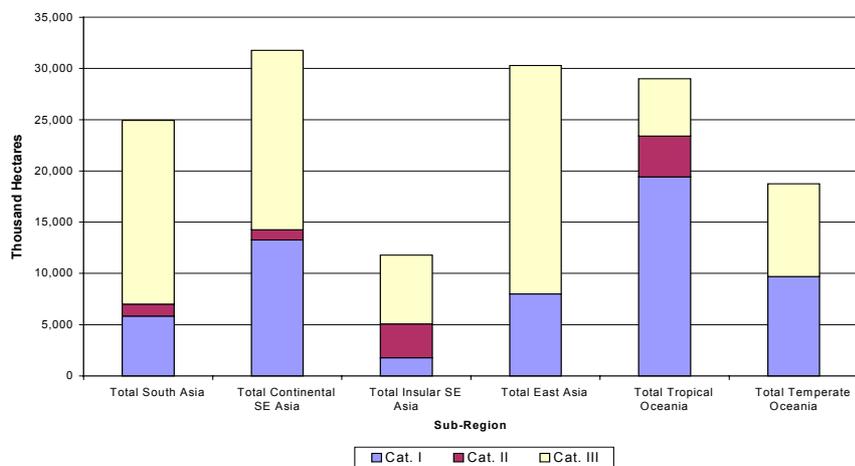


Figure 9. Asia-Pacific natural forest unavailable for harvest due to technical/economic constraints

Despite being “unavailable,” much of the natural forests are continually exposed to pressures leading to deforestation or further degradation. A simple change in legal status from “available for harvesting” to “unavailable” or “legally protected” status does not in itself assure either protection or conservation. Much of the 89.5 million ha of legally protected natural forest are at risk of further deforestation or degradation due to ineffective policies for protection, inadequate resources for management planning and implementation, presence of rural people dependent on forests, and other constraints.

The country case studies indicate that substantial areas of natural forests have been brought under legal protection status or *de-facto* protection. Some of these are included in the totals reported above for legally unavailable forestland. The recent implementation of the NFCP in China will initially encompass some 41.8 million ha of natural forests most critically in need of protection and rehabilitation. About 5 million ha of natural forests in both New Zealand and the Philippines were reclassified as protected – under separate legal administration as conservation forests in New Zealand but as *de-facto* conservation in the Philippines. About 8.1 million ha in Thailand were closed to logging and are either declared protected areas or are awaiting formal designation. Sri Lanka increased legally protected natural forests by about 1 million ha under the logging ban. Finally, Viet Nam has added some 4.3 million ha to protected areas as a result of the total logging ban. Over 64 million ha in the six countries have, as a result of logging bans, become, theoretically at least, subject to protection.

The extent to which these lands will be actually protected in the long run is yet unclear. New Zealand and Sri Lanka have transferred administration of the protected natural forests to separate State institutions, thus clearly separating protection and production functions. In the other countries, such separation of functions is not fully defined in their organizational structures or practical operational management, potentially creating confusion or conflicts within traditional forestry-natural resources units. The “timber culture” of traditional foresters frequently casts doubts about their commitment to protection and conservation.

As noted, measures of conservation achievement attributable to logging bans or other restrictions are largely lacking. “Success” is usually expressed in terms of area administratively or legally closed to logging. Reduction or elimination of harvesting, if actually achieved, may avoid (at least temporarily) some of the negative consequences of inappropriate harvesting methods. However, as demonstrated by the experiences in many parts of Thailand and the Philippines, ineffective enforcement of bans and the failure to provide adequate resources and innovative participatory management for conservation and protection of the closed areas hinder the realization of the intended goals. Lack of participation in designing and implementing conservation and protection, or in recognizing local dependency on forests, often discourages consensus and support. It also frequently results in local resistance to protection measures and to continued “illegal activities” for household survival in the absence of “safety-net” policies that address adverse social and economic impacts.

Conservation and protection require much more than the simple elimination or reduction of timber harvesting. Protection is most successful where strong supportive policies and institutional capacity exist (or are created) to effectively carry out the desired conservation mandate. For example, New Zealand’s natural forests have been placed under the separate administration of a Department of Conservation with supporting policies, operational support and professional staffing. Even there, however, the elaboration of specific conservation and protection goals is still somewhat indirect, leading to difficulties in monitoring and quantitatively measuring conservation success.

STRATEGIES AND SOLUTIONS

A common assumption is that halting logging is an effective (if not the only) direct means of avoiding or minimizing the negative consequences of inappropriate forest use and practices. The case studies clearly illustrate that this is only partially true, and that a logging ban is only one of a number of possible policy instruments in support of forest conservation. Numerous questions remain as to whether logging bans can be efficiently implemented, whether they achieve desired results, and whether they are as effective as other possible strategies. Unfortunately, the feasibility and efficacy of alternative strategies are seldom evaluated relative to logging bans.

Major adjustments in natural forest conservation policies imply drastic changes. Under logging bans, significant changes are made in how forests are managed and utilized, impacting government, communities, individuals, households, and consumers of wood and non-wood products. Furthermore, changes are implicit for the physical and biological conditions of forests,

closely linked to forest ecosystem health, biodiversity, stand characteristics, yields and growth. When social, economic and environmental impacts are not assessed, nor ameliorating strategies developed, the policy changes may lead to unexpected or unintended impacts.

Logging bans imposed in the Asia-Pacific region in crisis situations or as emergency responses to natural disasters have seldom included supplemental strategies to effectively manage the withdrawn forests. In most cases, the intended conservation and protection goals themselves are only very generally specified, making monitoring and evaluation of “success” very difficult. Without planning and longer-term programs beyond the harvest bans, and actively managing the forests for protection and environmental values, logging bans may be in vain (Poore 1998). Further, without the political commitments, staffing and funding resources, effective conservation is improbable (Anon 1999).

The use of logging bans as a “one-approach-fits-all” strategy for conservation can confuse the complex and multiple factors at work in deforestation and degradation, and can obscure the cumulative nature of consequences of past policy decisions and management practices. The typical response has been to focus on the immediate tasks related to enforcing the logging bans or harvest restrictions, rather than working towards the implementation of a comprehensive conservation strategy or realistically addressing issues of adverse social, economic or environmental impacts. Such comprehensive strategies require a “systems approach” and should include careful evaluation of alternatives.

For long-neglected issues underlying deforestation or degradation, and in the face of consequent crises, corrective action in the form of a total logging ban may be desirable as a first step towards developing long-term strategies and solutions. Such bans, if effectively implemented, may buy time to assess long-term forest management goals and objectives, develop appropriate criteria, selectively adjust forest uses, and implement sustainable forest management (for both protection and utilization).

Temporary or short-term logging bans (“time-out strategies”) also allow degraded forests a respite from further damage and an opportunity to recover. Ensuing harvest reductions or elimination may be for relatively short duration (10 to 15 years), or longer term (50 or more years), until such time as forest health is restored and growth is adequate to sustain modified harvest levels while maintaining forest ecosystem integrity. The initial logging ban in the natural forests of Sri Lanka in 1989, for example, was intended to be a “temporary” measure to allow the degraded forests to recover and to develop sustainable forest management plans.

Some forests may need to be permanently closed to timber harvesting (or other specific uses) if such activity is deemed incompatible with preferred uses. In this case, a major land-use change is implicit (e.g., Sri Lanka, in 1980, extended the “temporary ban” to a comprehensive logging ban and formally placed the withdrawn forests into protected area status). Other sites, however, may need only temporary or partial closure to accommodate forest restoration, or may be subject to continuing harvest under modified adaptive management techniques such as RIL to ameliorate the negative environmental impacts of conventional logging technologies. In some instances, more effective guidelines for forest practices (e.g., codes of practice) and more rigorous monitoring of logging can provide acceptable standards of improvement so as to allow continued harvesting.

A “time-out” strategy, as adopted by China, might first involve temporarily closing broad areas of natural forests to harvesting. This will be followed by systematic analyses and “forest zoning” whereby natural forests are stratified according to priorities for permanent protected area (land-use change), forest restoration, reforestation, intensive but sustainable timber production, or multiple use (potentially including limited timber production). During this closure, forests could be categorized based on forest health, and the conditions and requirements for future utilization specified. Some forests will likely be closed permanently where environmental values clearly outweigh timber values. Some may be closed only temporarily pending recovery of forest health and renewed capacity for sustainable multiple-use management. Still others may be found sufficiently healthy to allow continuing harvests under appropriate management adjustments. Such an approach could provide the basis for sustainable use of natural forests, pragmatically linked to site-specific circumstances and resources.

MAKING POLICY CHANGES AND RECOGNIZING IMPACTS

The need for clear policy objectives has been emphasized. The terms “conservation,” “protection,” “biodiversity,” “environmental values” and so forth, invoke broad support but do not directly convey or identify the expected results or practical outcomes from policy changes including logging bans. There is substantial disagreement as to what specific form “conservation” should take in the case of natural forests. Perceptions vary widely from practicing sustainable management and utilization to absolute preservation of natural forest ecosystems. “Sustainable management” and “multiple use” also mean different things to different individuals.

Logging bans are not normally the end objective of policies, but rather represent one of many choices to achieve something else – in this case, conservation of natural forests. But what is “natural forest conservation?” Policy makers, governments, private organizations and the general public must first agree on goals appropriate to the actual resource conditions before consensus on the most effective policy instruments to achieve those goals can be determined.

Virtually all forest utilization creates social and economic linkages and dependencies. Any change in forest utilization patterns, even when deemed socially desirable, inevitably results in impacts – both favorable and unfavorable. Some consequences, of course, may be the very reasons behind the policy and management changes, such as reduction of sedimentation, reduced flooding, and enhancement of endangered species habitats.

Other consequences of changing forest utilization patterns may be indirect and unintentional (e.g., loss of employment, declining community incomes, disruption and relocation of households, increased illegal harvesting, and other social and cultural consequences. Depending on present economic and market factors and the size of the forest area closed under logging bans, domestic consumption of wood products and prices may also be affected. With increasingly open trade, international consequences may be seen through adjustments in imports and exports. Protection of natural forests in one country can result in increased harvests (perhaps in an environmentally damaging manner) in other countries. The comparative advantage of investing in domestic plantations as an alternative timber supply source may prove elusive due to a variety of constraints and may be adversely affected by increased competition from imports.

Many such consequences (intended and unintended) have been identified in the individual country case studies⁹. For example, government revenues may decrease due to lower harvests, declining royalties and reduction of tax revenues. At the same time, government expenditures may increase, due to necessary investments in reforestation, personnel, new management schemes for conservation management, monitoring and evaluation. Laid-off workers may need retraining and, perhaps, income supplements in the short run. Profitability of operations may decline, discouraging private sector investments. Unfortunately, detailed analyses of potential impacts rarely augment political decisions on timber harvest bans or restrictions, and the magnitude of adverse impacts (particularly the unintended impacts) becomes obvious only when the impacts have taken their toll.

Mitigating adverse impacts of forest conservation policy changes is a necessary part of successful policy implementation, along with generating public consensus and active participation. The disappointing experiences of Thailand and the Philippines illustrate the consequences of strategies that fail to address the full range of planning needs, required financial resources, institutional capacities and public participation in decision-making related to implementation of logging bans.

In contrast, New Zealand benefited from a gradual transition over a considerable period of time that enabled plantations to be established in anticipation of the decline in natural forest production. While the actual removal of natural forests from harvesting was somewhat abrupt under national policy shifts, the transition had essentially occurred much earlier. The establishment of a separate national Department of Conservation with distinct goals, funding and

⁹ See the individual country case study reports for detailed discussion of social, economic and environmental impacts of the specific logging bans.

staff assured follow-up management and planning according to conservation objectives. It was perhaps incidental that the Government also chose to privatize State-owned plantations and withdraw from commercial timber production.

LESSONS FROM COUNTRY CASE STUDIES

Society's expectations and demands for forest management have changed

The findings from the case studies reflect the complex and highly variable nature of the issues and concerns involved in adjusting and balancing forest uses. The dynamics of policy adjustments in response to changing socio-economic conditions and environmental awareness suggest that public values have shifted at the same time natural forests have declined in both area and quality. Although forest products continue to be economically important and timber production plays a large role in some national economies, non-timber and environmental values have gained increasing recognition and public endorsement in recent years. There is growing popular demand for natural forests to be set aside for conservation and environmental purposes that are often incompatible with conventional timber harvesting practices. Although timber values are high, the potential loss of environmental and other benefits is considered even more significant by many people.

The case studies also reflect the outcry against lax natural forest administration, poor enforcement of existing regulations and guidelines, and the external consequences of careless logging, over-cutting, and the often disregard for environmental values. Together with ineffective and inappropriate management practices and wasteful utilization, problems of land-use and timber harvest abuses have grown to levels now deemed politically and socially unacceptable in many countries.

Logging bans are viewed as simple and logical policy instruments for conserving forests

It remains unclear whether these abuses and institutional failures can be sufficiently corrected to permit continued timber production while simultaneously guaranteeing acceptable levels of forest conservation and protection. Logging bans have become the policy instrument of choice in light of continuing mistrust and skepticism regarding the actual ability or willingness of timber producers to implement more benign management regimes.

Dispassionate considerations of moderate, deliberate and incremental management adjustments in response to adverse forest conditions have often given way to highly visible top-down political actions, often in response to crises or natural disasters. Under such conditions, planning and lead time for implementation of harvesting restrictions are frequently inadequate, contributing to confusion, conflicts and adverse impacts on forest-dependent stakeholders.

Banning timber harvests alone is insufficient to conserve forests

Logging restrictions and bans alone have not corrected the underlying problems of misuse, unsustainable natural forest management and destructive conventional harvesting. While the symptoms of poor forest use are evident, the actual causes and issues are much more difficult to evaluate and mitigate with workable policy alternatives. Without an adequate framework for subsequent support of ongoing conservation and protection policies, and appropriate management capacity, the closing of natural forests imposes inequities and hardships on communities and commercial enterprises that have relied on forests, and gives rise to continuing abuses and illegal forest activities.

Clear tenure and use rights are critical for forest conservation

Most governments recognize the importance of close cooperation with local people and communities to conserve natural forests and to expand the area of planted forests. Where customary and traditional use rights are threatened, or rural households are excluded from commercial opportunities, livelihoods are at risk and government plans may face stiff opposition. On the other hand, where participation is effective, local dependencies on forests can be better understood and recognized in strategic planning. Active involvement of local people in development and conservation efforts also helps to alleviate concerns about employment and income generation. Too often, governments monopolize decision-making, while expecting local communities and industries to bear much of the burden of forest use changes and socio-economic impacts.

With few exceptions, governments in Asian countries claim ownership of natural forests, and may also control significant areas of deforested or degraded land potentially available for new plantations. Governments may exercise direct rights of use and management, or alternatively may privatize some or all aspects of use. Forests may be retained under public ownership, but made available to others for use under various contracts, leases, grants, or infrequently through sale.¹⁰ “Collaborative” forest management, involving both government and non-government entities, can also take on many different forms. When available to non-government entities, forest use is often characterized by poorly defined ownership or tenure, with both direct and indirect governmental regulations influencing forest management and production, decision-making, investment, harvesting and marketing of outputs. Insecure tenure or use rights, together with the absence of functioning economic systems (credit, finance, transportation, etc.) can also dissipate potential economic returns and reduce or eliminate incentives for private sector participation.

Sometimes, allocated forestland may be too small in size to make operations economically viable (as perhaps in the case of Viet Nam’s forest allocation program), reducing the practical feasibility of private plantations. In Thailand, local communities and individuals strongly resisted development of large-scale industrial plantations because it was seen as transferring resource control to the “rich” and “outsiders” at the expense of local welfare. In many cases, only the poorest or degraded forestland is allocated to local people, while healthier forest stands are reserved for State administration and control. Although it may be desirable to regenerate degraded sites, they may not be the most optimal sites for establishing profitable forest-based activities for either local or commercial uses.

In countries with a large population and high level of poverty, competition and conflicts over forestland are common. In the Philippines, Thailand and Viet Nam, for example, social conflicts frequently erupt between indigenous people and others who have occupied forestlands for many years and new migrants who are perceived as trying to wrest control of the land. Conflicts also develop between those who wish to maintain traditional forest use patterns and those who desire commercial development of forestlands.

New Zealand’s extensive private plantations, subsequent government withdrawal from production forestry, and the transfer of State plantations to the private sector, have demonstrated the feasibility of placing plantations on “a totally independent commercial footing” and encouraging private foreign investment. However, this requires mature market-based economic structures and transactions, vibrant financial and capital markets, and strong managerial capacities.

Sri Lanka has also shown the feasibility of fostering tenure arrangements that permit homegardens to become a significant source of commercial timber. Open markets for land, including forests and potential plantation lands, are clearly the exception in much of Asia-Pacific.

¹⁰ New Zealand is the notable example where use rights to planted forests, but not natural forests, were sold to private enterprises. Lands outside of forests, such as homegardens in Sri Lanka, may also function as “privatized” timber production areas.

Likewise, market reforms are leading to new and innovative schemes for allocating forest-use rights in China. While short of formal ownership, these schemes facilitate long-term private use of forestlands still technically owned or retained by the State. They also allow for leasing of lands to business enterprises, including joint venture investors. Conditions of use, decision-making authority, investment choices, and the ability to capture economic returns need to be clearly identified and guaranteed if confidence and commitment are to be achieved and maintained under these new schemes.

The long-term transferability of tenure and use rights is an important pre-condition for non-State forest development. Without such rights, the willingness to provide capital and labor for growing trees is constrained. Legal protection of such rights, and access to courts or other legal instruments to ensure these rights over time, need to be considerably strengthened and codified.

Monitoring and assessing of outcomes need improvement

Conservation and protection policy goals must be more explicit and translated into measurable, realistic and operational terms. Without effective monitoring and assessment, it is difficult or impossible to know whether the conservation and protection goals of logging bans are being accomplished or not. Simple tallying of forest areas removed from harvest or legally protected is almost exclusively used as indicators of forest conservation, but they are poor measures of actual protection success. Similarly, the area of land reforested is implicitly cited as progress in addressing deforestation and degradation of natural forests, while standards for assessing forest health and stand restoration are largely absent. Overall, qualitative indicators of various conservation and protection goals, as well as programs to monitor and assess policy and management, are badly needed to augment basic statistics.

Mitigating social and economic impacts is important for success

Compensation and other forms of transitional social security (“safety nets”) for those most seriously impacted (both economically and socially) are fundamental requirements for successful natural forest conservation and protection. Lost jobs, reduced household and community incomes, and restrictions on traditional local consumption and subsistence use rights - if ignored - can lead to conflicts, resentment of government policy, and increase illegal activities. Programs to alleviate poverty in areas near forests can go a long way towards complementing forest protection efforts. Scarcity of viable job alternatives characterizes much of the rural forest regions. Retraining and teaching new technologies, encouraging new livelihood opportunities and possibly migration, are all features of social adjustment policies.

Adverse impacts may also spread to distant production centers and consumer markets. Government tax revenues, incomes, employment, distribution and marketing, and ultimately consumers may be affected. Policies to assure that the costs of changes in forest use are equitably borne by all segments of a society are necessary.

Comprehensive policy implementation, rather than incremental measures, is required

Important differences exist between incremental or partial policy changes (such as logging bans) and more systematic and comprehensive approaches. Bans born from crises, such as floods and landslides in Thailand and the Philippines, tend to be incremental, action-oriented steps that deal only partially with the system’s underlying problems. Although the new logging ban in China was also precipitated by serious flooding, it reflects a more deliberate planning process under the NFCP to comprehensively address the multiple dimensions of change, including recognition of likely adverse impacts.

It should be noted that the logging bans reviewed in the case studies are not isolated actions, suddenly developed and imposed. The underlying issues and concerns first discussed in this report

are long term and cumulative in nature. Crisis can serve as the impetus for action, after long periods of passive tolerance or neglect of the fundamental underlying causes. Properly formulated and implemented, logging bans can contribute to desirable long-term natural forest conservation and protection while stimulating new and positive responses for assuring a continuing flow of benefits from both wood and non-wood forest products.

Logging bans are simply one policy instrument, albeit an important tool, in the spectrum of options for assuring that future forests will continue to contribute to environmental values and human welfare for the people of the Asia-Pacific region.

ACHIEVING NATURAL FOREST CONSERVATION: NECESSARY CONDITIONS

Achieving natural forest protection and conservation is extremely complex and unique to each country's social and economic conditions. This makes it difficult, if not impossible, to define a single strategy or policy that will be successful in all circumstances. From the case studies, however, it is possible to identify a set of conditions that are likely to contribute to the success of logging bans in support of natural forest conservation. Some general principles based on findings of this study provide helpful insights and general guidance for modifying current logging ban in Asia and the Pacific:

1. *Policy objectives and goals must be clearly identified, specific, measurable, and consistent with local forest conditions*

Government policies should reflect high-level national goals and objectives, as well as the basic strategies or means for achieving these goals. Where natural forest conservation and protection goals are absent or unclear, meaningful implementation will be seriously hampered, debate and disagreement regarding the intent will prevail, and the inability to determine the appropriateness of logging bans as a central policy instrument will prevent a consensus on operational programs of action.

2. *Conservation policy goals should be incorporated into, and be consistent with other forest policies, legislation and operational guidelines*

Merely announcing a forest conservation policy is insufficient to achieve desired results. The policy needs to be embedded in legislation or statute, and the subject of clear, written guidelines and regulations so that transparency will be possible for the government, professionals, interested businesses, NGOs, international organizations, and most importantly, the general public to understand both objectives and implementation. Further, existing laws, statutes, policy directives, and operational regulations and guidelines must be regularly reviewed and updated to assure consistency and congruence in purpose and prioritization of the programs.

3. *Policies should promote stability and be consistent with national policies and guidelines regulating other sectors*

Uncertainty regarding public policy, and the associated risks of unanticipated changes, undercut long-term efforts for sustainable management, conservation and environmental protection. Forests are an important part of the broader policy framework of most Asia-Pacific countries, supporting macroeconomic goals of growth and development, environmental protection, social stability, education and public welfare. Forest sector policies must be consistent and supportive of these higher-level national aspirations and goals. While dynamic in nature, such national policies and goals should avoid abrupt, unpredictable, and continuous changes or re-interpretations. Forest production and conservation are long-term goals, requiring stability and consistency.

4. *Institutional reform of forestry organizations should be consistent with new roles and expectations*

Professional forestry has a long history in the Asia-Pacific region, rightfully proud of its contribution to the welfare of the public at large. That professionalism is, however, also the source of bias and frequent “elitism” in terms of “knowing what is best.” The growing public distrust of professionals involved with forestry highlights the need to differentiate the broader task of determining social goals (a public matter) and the scientific and technically superior ways of achieving those goals (professional management). A historical bias emphasizing timber as the primary forest output has also led to questions of the professional capacity to adjust to changing circumstances and forest valuation.

Within the Asia-Pacific region, most forests are owned or controlled by governments, and public institutions have direct (often monopoly) control over forest decision-making and management. This authority frequently extends to harvesting, processing and marketing of forest products and services.

Changing expectations now call for greater public participation in both policy and operational matters involving natural forests. New roles are being defined for professional and technical foresters, who will increasingly assist in policy formulation but will likely be less involved in direct operational matters. While State and cooperative forestry will continue to be widely practiced, joint management, contract agreements, and even privatization of some forestry functions will likely expand. Government foresters will guide, but not conduct, many of the management tasks. Staff skills and levels of personnel, financial support, and roles must be adapted to the changing institutional structures for participatory forestry in the future.

5. *The real costs of forest conservation must be recognized and consensus built for sharing of costs*

Conserving and protecting natural forests is potentially a costly proposition. Where logging bans are imposed, there are often large transitional costs of implementing and enforcing new policies, rules and institutional changes. Further, new management strategies, plans, and operational activities must be undertaken on a long-term basis to achieve and maintain the desired resource conditions and assure continuing public benefits. The costs of monitoring and evaluation may also be significant.

Forest conservation is not a free “good” simply obtained by not logging. Provisions for meeting the costs of conservation and protection are normally regarded as a public cost, although in practice much of the cost is borne by local households, communities and other stakeholders that are “encouraged” to participate in joint management and protection activities – often without adequate compensation. Public budgets have been, in the case of the countries studied, very limited or lacking for sustained long-term conservation management.

Policies to assure adequate resources for operational conservation and protection management, and equitable sharing of costs are required if greater public participation and joint management schemes are to be realized successfully. Opportunities to obtain benefits from management and revenues from entrepreneurial activities must be consistent with responsibilities. Logging bans frequently take away the single most important potential source of revenue for forest management, and must be consciously replaced with other dependable, secure sources. Without such sustained support, *in situ* conservation may well fail due to inadequate institutional and human resource capacities.

Shifts in natural forest use and management necessarily involve changes from the existing *status quo*. Although there may be strong consensus regarding the purposes and objectives behind the changes, there will inevitably be negative impacts on some individuals, organizations, communities and local governments. Without provision of “safety nets” to assist in the transitional burdens, equity and fairness issues may well stall or stop the necessary changes. Individuals who lose their jobs may not easily find alternative employment, and may not have the required skills to adapt to new and different work.

Retraining, income supplements, government assistance to communities and secondary dependent businesses, tax concessions, and numerous other forms of assistance are frequently required.

6. *Greater recognition and incentives should be provided to the private sector*

Throughout the Asia-Pacific region, governments have dominated forestry as a centralized policy maker and as the operational manager of forestlands and resources. The engagement of the private sector and its recognition of the potential role of markets to guide forestry activities are largely ignored, except in a few countries such as New Zealand. To date, most community-based participatory schemes rely heavily on a continuing strong role for governments. While limited efforts to decentralize management responsibility are widely discussed, effective transfer of resources and control are less evident.

Where market systems permit, the role of private initiatives and incentives can be a powerful motivation for responsible, productive involvement in forestry (Landell-Mills 1999). The discipline of markets in rewarding efficiency and penalizing inefficiency can also provide clearer indicators of the various types of goods and services that can be economically produced and distributed, as well as recognition of the actual cost structures and output values involved. For such market-based reforms to succeed, direct forest ownership is not required, as demonstrated by New Zealand's privatization of forest plantations. However, granting secure rights through enhanced land-use provisions, stable resource tenure, increased independent private decision-making, equitable economic participation in forest management and open access to markets for forest products, can all help to mobilize human resources and capital. New Zealand's plantations, Sri Lanka's homegardens and increasingly China's contract management systems offer important lessons on public-private linkages designed to enhance the contributions of private initiative and resources.

7. *Land use and forest monitoring, and resource assessments must be given higher priorities*

The country case studies indicate a significant weakness in the monitoring and evaluation of conservation and protection strategies, including specific logging bans. Little is known about the actual impacts on timber harvest or overall timber supply. Conservation success is largely gauged in terms of area designated rather than qualitative changes in valid criteria and indicators for specific conservation objectives. The overall inability to measure performance objectively limits the analysis of policy implementation and weakens the ability to adapt and change policies and strategies as required. Consensus based on reasonable and objective assessments should assist in guiding operational management under approved plans as well.

8. *Strong political commitment must lead to practical, long-term policy and institutional reforms and implementation of effective forest management*

Logging bans have frequently been imposed in response to political pressures for action, following long-term degradation of forests and/or natural disasters. Leadership in government must show concern and take actions in response to such pressures. However, more is needed. A meaningful commitment to support and sustain new initiatives, including natural forest conservation and protection, is necessary. Without political support, public consensus and adequate resources, the hoped-for accomplishments can easily erode even if the responsible forestry institutions are capable of responding to the new challenges. However, political support will require a better understanding and demonstration of technical concepts and underlying issues, more evidence of success, and continued public consensus on the goals and objectives related to proposed policy changes, institutional reforms, and management reorientation.

9. *Forest planning and land-use planning should be integrated and conducted as a dynamic process*

Natural forests are an important component of land resources in the Asia-Pacific region. Overall, forests account for about 19 percent of total land area, with natural forests comprising almost 88 percent of all forestlands. Land use is a dynamic process, constantly adjusting in response to population growth and changing social values. The growth of environmental awareness and concern about sustainability are fundamental issues of land use, increasingly suggesting the

potential desirability of shifts away from timber production in favor of greater environmental protection. The rigidity of land-use planning and the traditional separation between forest planning and land-use planning have delayed critical decisions regarding the appropriate scale and mix of forest allocations for timber and non-timber priorities. Resistance to changes in forest uses is perhaps stronger than in agriculture where use is frequently more adaptive. Imbalances in forest use can grow over time, and corrective actions (such as expansion of protected areas) become more complex, difficult and controversial.

10. Dependencies of local people on forests need to be recognized and people need to be involved in forest management decision-making

Centralization of natural forest policy and management has often resulted in “top-down” decision-making that can easily ignore or misrepresent the legitimate interests and concerns of individuals and local communities dependent on forests. The intimate nature of traditional and customary forest uses (and traditional use rights) for indigenous populations can conflict sharply with prevailing national sentiments and demands. Forest dependency on non-wood goods and services may also be poorly understood. Reductions of harvesting, while perhaps justified to maintain overall forest values, nevertheless can threaten the existing dependencies and leave large numbers of individuals at risk. Participation in forest planning, policy development and implementation can provide new perspectives and understandings to both decision-makers and forest users. Recognition of legitimate local interests and dependencies can provide an initial point for building consensus.

The lessons learned and the identification of the necessary conditions for successful natural forest conservation are not unique to logging ban policies alone. They underscore the universal need for careful strategic analysis, strong preparation for new policy implementation, recognition of legitimate interests, provisions for addressing adverse impacts, and adequate support and resources to follow through on goals and objectives.

Logging bans are neither good nor bad as natural forest conservation and protection policy instruments. If adapted selectively, and in combination with other options, they can help assure that natural forests will be sustained and continue contributing multiple forest values for the well-being of the people of the Asia-Pacific well into the future. If implemented in isolation of other supporting policies and programs for conserving forests, they are likely to be ineffective, and may even be counter-productive.

RECOMMENDATIONS

It is recommended that the APFC work with FAO, the international forestry community and member countries to encourage further development of appropriate integrated policy frameworks for natural forests, recognizing the legitimate needs for both production and conservation. These frameworks should reflect the unique conditions of each member country, and should encompass the following key lessons from the experiences with logging bans in the region:

- ◆ Practical conservation and protection goals should be clearly defined and expressed in both qualitative and quantitative terms.
- ◆ Forest land use must be acknowledged as a dynamic process, and policies must recognize dominant (often incompatible) uses requiring zoning or exclusive classifications for management, as well as multiple (integrated) uses where outputs and forest values may change over time.
- ◆ Adaptive management regimes will be required for each management alternative consistent with intended goals and priorities.
- ◆ Rehabilitation for highly degraded natural forests may require temporary or short-term closures independent of long-term future use based on restored sustainability.

- ◆ Overall environmental quality and public values require recognized “safe minimum standards” of forest practices, regardless of specific uses; such standards are frequently embodied in codes of practice or forest practice regulations, representing a consensus of public and technical viewpoints on a broad spectrum of forest practices and uses.
- ◆ Public participation in policy formulation and land-use activities is essential to generate consensus and/or broad support on issues of land-use tenure, use rights, and other options to complement government control and management.
- ◆ Roles of government forestry agencies may need to be redefined to provide guidance and technical support, but not monopoly management, of both production and conservation forestry.
- ◆ Effective monitoring and evaluation of various forestry programs, using well-defined criteria and indicators, are required to measure progress and to guide modifications needed to achieve well-defined goals and objectives.

The APFC, working together with FAO and other regional and international organizations, should support and coordinate future efforts to build upon the lessons learned from the case studies. It should also direct efforts towards gaining a better understanding of the following issues impacting natural forest protection and conservation:

- ◆ Mechanisms and options for allocating forest use rights under government ownership and control.
- ◆ Impacts of expanded international trade in timber and other forest products on natural forest conservation and protection.
- ◆ Roles of forest plantations and alternative resources as substitutes for natural forest timber in meeting national and regional market demands.
- ◆ Mechanisms for improving the technical and economic performance and efficiency of forest management, logging, timber distribution and transport, wood processing, and marketing of forest products to enhance productivity and to reduce environmental impacts.
- ◆ Ongoing and effective monitoring and evaluation of natural forest conservation and protection based on operational-level criteria and indicators complementary to internationally developed criteria and indicators for sustainable forest management.

CONCLUSIONS

The issues and concerns related to natural forests – their use, management and conservation – suggest that the forestry sector has often failed to meet the changing demands and expectations of society. Consequences of ineffective past forest policies have sometimes been direct and immediate, such as flooding and sedimentation, or indirect and cumulative such as the loss of endangered species, habitats, or whole forest ecosystems. As a result, public pressures and governmental concerns in several countries of the Asia-Pacific region have reached a point where swift and major policy changes are demanded without a detailed analysis of alternative ways to conserve forests and use them sustainably.

Over the last decade, several countries have resorted to banning any form of harvesting in natural forests – an extreme measure with sometimes unpredictable or unintended impacts. Other countries are contemplating similar actions, along with alternatives such as long-term multiple-use forestry, sustainable forest management, and improved timber practices. It is thus useful to assess the experiences of various countries in the Asia-Pacific region for indications of the effectiveness of removing natural forests from timber production in achieving conservation goals. As long as the impacts of logging bans are not better understood, it remains difficult to either promote or reject bans as a policy option.

The experiences of Asia-Pacific countries, including some that have imposed logging bans over a decade or more, provide valuable insight into the questions of “why, how, and when” logging

bans can be effective policy instruments. Examination of individual cases reveals that even though logging bans have mainly been political reactions to crises, desired conservation and protection goals have seldom been clearly defined. In actual practice, the operational objective following imposition of logging bans has been to halt logging rather than create and implement new and innovative forms of sustainable management.

Destructive logging practices may be slowed or stopped by effective bans. But ineffective implementation has often contributed to further deforestation and degradation through the lack of enforcement and control, and through the inadvertent creation of perverse incentives and impacts. Frequently, unanticipated impacts and perverse incentives have risen both within the country imposing harvesting restrictions, as well as in neighboring countries or new emerging timber exporters as far away as Africa or South America.

The complexity and number of issues and concerns surrounding natural forests in the Asia-Pacific region suggest that solutions must be specific and based on a comprehensive understanding of the causes of the symptoms of failure observed. Furthermore, the diversity of issues and concerns imply that the desired outcomes from policy changes are also diverse and can be conflicting.

A key conclusion to be drawn from the Asia-Pacific experience is that logging bans are neither inherently good nor bad as natural forest conservation and protection policy instruments. Logging restrictions are simply one set of policy tools available to decision-makers within a spectrum of options and alternatives. If bans are adapted selectively and used in combination with other complementary policy instruments, they can help assure that natural forests will be sustained and will continue to contribute to enhancing the well-being of the peoples of the Asia-Pacific.

The experiences of Asia-Pacific countries point towards several conditions that are necessary for successful natural forest conservation. These requirements are not unique to logging ban policies alone, but rather reflect the broad principles needed for success in all aspects of forest policy development and implementation. These include the need for careful strategic analysis and solid preparation prior to policy implementation. Also necessary is recognition and balanced consideration of all stakeholder interests, and provisions for addressing adverse impacts. Underlying all efforts, there must be adequate support and resources – including political will – to follow through on clearly established goals and objectives.

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Center of International Forestry Research (CIFOR): <http://www.cifor.cgiar.org>

Environment News Service: <http://www.ens.lycos.com/>

FAO Policy & Planning: <http://www.fao.org/forestry/fon/fons>

FAO Regional Office for Asia and the Pacific: <http://www.fao.or.th/default.htm>

FAO Asia-Pacific Forestry Sector Outlook Study:

<http://www.fao.org/forestry/fon/fons/outlook/Asia/APFSOS/APFSOS-e.stm>

Forest Networking: (Forest Conservation Archives): <http://Forests.org/web/>

International Tropical Timber Organization (ITTO): <http://www.itto.or.jp/index.html>

New Zealand: <http://www.nfa.org.nz/slides.htm>

New Zealand: <http://www.timberlands.co.nz/>

POLEX (Forest Policy Experts List): palex@cgiar.org

RILNET (Reduced Impact Logging): tlc@loxinfo.co.th

Suite101.com: <http://www.suite101.com>

World Bank: <http://wbln0018.worldbank.org/Research/workpapers.nsf>

Annex I. Forest statistics for the Asia-Pacific region

Asia Pacific Forests	Land Area (Th. Ha)	Total Forest		Natural Forest				Unavailable					
		Area (Th Ha)	% Land	Natural Forest (Th Ha)	% of Forest	Available		Total	Legal	Economic	Cat. I	Cat. II	Cat. III
						(Th Ha)	% Nat For						
South Asia													
Bangladesh	13,017	1,010	7.8	700	69.3	0	0.0	700	87	613	0	0	613
Bhutan	4,700	2,756	58.6	2,748	99.7	1,242	45.2	1,506	356	1,150	500	0	650
India	297,319	65,005	21.9	50,385	77.5	21,935	43.5	28,450	8,700	19,750	4750	0	15000
Maldives	30	n.a.	n.a.	n.a.									
Nepal	14,300	4,822	33.7	4,766	98.8	2,806	58.9	1,960	350	1,610	380	900	330
Pakistan	77,088	2,033	2.3	2,033	100.0	1,273	62.6	760	45	715	220	260	235
Sri Lanka	6,463	1,796	27.8	1,657	92.3	0	0.0	1,657	565	1,092	0	0	1092
Total South Asia	412,917	77,422	18.7	62,289	80.5	27,256	43.8	35,033	10,103	24,930	5,850	1,160	17,920
Continental Southeast Asia													
Cambodia	17,652	10,532	55.7	10,532	100.0	4,984	47.3	5,548	3,548	2,000	0	0	2000
Laos	23,080	12,435	53.9	12,431	100.0	2,495	20.1	9,936	0	9,936	4500	1000	4436
Myanmar	65,755	27,151	41.3	26,875	99.0	20,442	76.1	6,433	293	6,140	5740	0	400
Thailand	51,089	11,630	22.8	11,101	95.5	0	0.0	11,101	2,300	8,801	2000	0	6801
Vietnam	32,549	9,117	28.0	8,613	94.5	3,052	35.4	5,561	663	4,898	1020	0	3878
Total Continental SE Asia	190,125	70,865	36.9	69,552	98.1	30,973	44.5	38,579	6,804	31,775	13,260	1,000	17,515
Insular Southeast Asia													
Brunei Darussalam	527	434	82.4	434	100.0	427	98.4	7	4	3	3	0	0
Indonesia	181,157	120,600	60.6	120,600	100.0	74,166	61.5	46,434	39,858	6,576	990	3288	2298
Malaysia	32,855	16,325	47.1	16,325	100.0	11,255	68.9	5,070	2,784	2,286	790	0	1496
Philippines	29,817	6,766	22.7	5,798	85.7	2,202	38.0	3,596	690	2,906	0	10	2896
Singapore	61	4	6.6	4	100.0	n.a.							
Total Insular SE Asia	244,417	144,129	54.2	143,161	99.3	88,050	61.5	55,107	43,336	11,771	1,783	3,298	6,690
Total Tropical Asia	847,459	292,416	33.0	275,002	94.0	146,279	53.2	128,719	60,243	68,476	20,893	5,458	42,125

Asia Pacific Forests	Land Area (Th. Ha)	Total Forest		Natural Forest										
		Area (Th Ha)	% Land	Natural Forest (Th Ha)	% of Forest	Available		Unavailable						
						(Th Ha)	% Nat For	Total	Legal	Economic	Cat. I	Cat. II	Cat. III	
East Asia														
China	932,641	133,323	14.3	99,452	74.6	65,160	65.5	34,292	13,004	21,288	4,991	0	16,297	
HK SAR (UK)	99	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.							
DPR of Korea	12,041	6,170	51.2	5,300	85.9	2,800	52.8	2,500	900	1,600	800	0	800	
Japan	37,652	25,146	66.8	13,380	53.2	6,468	48.3	6,912	912	6,000	1,500	0	4,500	
Macau (Portugal)	2	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.							
Mongolia	156,650	9,406	6.0	9,406	100.0	n.a.	n.a.							
Rep of Korea	9,873	7,626	77.2	4,200	55.1	2,200	52.4	2,000	600	1,400	700	0	700	
Total East Asia	1,148,958	181,671	15.9	131,738	72.5	76,628	58.2	45,704	15,416	30,288	7,991	0	22,297	
Total Eastern & Trop. Asia	1,996,417	474,087	23.1	406,740	85.8	222,907	54.8	174,423	75,659	98,764	28,884	5,458	64,422	
Oceania														
Tropical Oceania														
American Samoa	20	0	0.0	0										
Cook Islands	23	n.a.	n.a.	n.a.		n.a.								
Fiji	1,827	835	45.7	757	90.7	307	40.6	450	30	420	90	0	330	
French Polonesia	366	0	0.0	0										
Guam	55	0	0.0	0										
Kiribati	73	0	0.0	0										
New Caledonia	1,828	698	38.2	689	98.7	n.a.								
Niue	26	6	23.1	6	100.0	n.a.								
Pacific Isl. Trust Terr	178	0	0.0	0										
Papua New Guinea	45,286	36,939	81.6	36,909	99.9	9,000	24.4	27,909	1,784	26,125	17,625	4,000	4,500	
Samoa	283	136	48.1	127	93.4	n.a.								
Solomon Islands	2,799	2,389	85.4	2,371	99.2	601	25.3	1,760	0	1,760				
Tonga	72	0	0.0	0							1,500	0	260	
Vanatu	1,219	900	73.8	893	99.2	193	21.6	700	7	693	200	0	493	
Total Tropical Oceania	54,055	41,903	77.5	41,752	99.6	10,101	24.2	30,819	1,821	28,998	19,415	4,000	5,583	
Temperate Oceania														
Australia	768,230	40,908	5.3	40,719	99.5	15,905	39.1	24,814	6,614	18,200	9,700	0	8,500	
New Zealand	26,799	7,884	29.4	6,228	79.0	268	4.3	5,960	5,415	545	0	0	545	
Total Temperate Oceania	795,029	48,792	6.1	46,947	96.2	16,173	34.4	30,774	12,029	18,745	9,700	0	9,045	
Total Oceania	849,084	90,695	10.7	88,699	97.8	26,274	29.6	61,593	13,850	47,743	29,115	4,000	14,628	
Total Asia-Pacific	2,845,501	564,782	19.4	495,439	87.7	249,181	50.3	236,016	89,509	146,507	57,999	9,458	79,050	

Source: State of the World's Forests - 1999

IMPACTS AND EFFECTIVENESS OF LOGGING BANS IN NATURAL FORESTS: NEW ZEALAND

Alan Reid

INTRODUCTION

New Zealand's natural forests have been the subject of protracted public and political debate regarding the role of Government in forestry and the future use of natural forests during the last three decades. This review covers the evolution of the country's logging ban since the early 1970s, when public interest and disquiet over natural forest management became prominent, through late 1999 when the Government decided to phase out the last logging operations on State-owned natural forests in the West Coast region.

Some events played major roles in the way logging restrictions have been implemented. One was the development of planted forests of introduced species, which eventually became the main source of timber in New Zealand. Another was the reorganization of the Government natural resources administration in the mid-1980s, which resulted in the separation of commercial planted forests and natural forests.

Prior to these events, large areas of natural forests covering New Zealand's rugged and erosion-prone terrain were also set aside for water and soil protection. Such reservation became a feature of forest management when the first Government policy on natural forest management and timber sales was formulated.

The exclusion of timber harvests from other natural forests, as a matter of national policy for conservation reasons, is a relatively recent development in New Zealand. Logging restrictions followed growing public interest in natural forest management in the 1970s, and subsequent political changes affecting forestry administration. The Government reorganized the natural forest administration in 1987. Maturing planted forests provide alternative raw material in many parts of the country, cushioning the effect of these changes in the forest industry.

After 1987, new policies and legislation focused on private forests. Timber harvests have not been banned in these forests. Commercial timber harvests are, however, restricted by export, sawmilling, and sustainable forest management constraints.

Natural forest areas affected by logging bans

Logging restrictions eventually will apply to about 5.1 million ha of New Zealand's State-owned natural forests. An additional 142 000 ha of State-owned natural forests and about 1.3 million ha of private forests are subject to restrictions that limit commercial timber harvest according to sustainable forest management guidelines. However, much of the natural forests in all ownerships cover steep land and other protection areas. After forests within catchment protection areas, national parks, and other key reserve areas are removed from the available harvest area, an estimated 930 000 ha of logged and unlogged forests on State lands remain directly affected by the logging ban. Similarly, about 670 000 ha of private forests are potentially available for commercial management, although only about 124 000 ha of this area are currently of commercial interest.

GENERAL BACKGROUND

New Zealand lies between latitudes 34° and 48° South, and comprises two main islands, extending 1,600 km from north to south, and 250 km east to west. The total land area is just over 27 million ha. About 50 percent of the land is steep, including the main mountain systems and adjacent lands.

The climate ranges from sub-tropical in the north to sub-Antarctic in the south. The prevailing westerly winds give rise to a rainfall gradient from west to east. Rainfall is generally between 600 and 2 500 mm per year.

New Zealand's population is 3.6 million (1996 census). The doubling time for the population is estimated to be about 75 years and the population is projected to be 5.4 million by 2010. The majority of New Zealanders live in urban centers and enjoy a high standard of living.

Forests and the forestry sector

Forests cover about 8.1 million ha, or 30 percent of New Zealand. The forests are made up of 6.4 million ha of natural forests and 1.7 million ha of planted forests. The planted forests comprise mainly radiata pine with lesser areas of Douglas fir and other species (Table 1). The natural forests reflect a long period of separation from major landmasses, evolving a unique flora and fauna with a high percentage of endemism among the higher plant species and bird-dominated fauna. The forests also reveal patterns of destruction and renewal following major volcanic eruptions and glacial advances in recent geological time, and more contemporary influences of erosion, destructive storms, and earthquakes.

Table 1. Planted forest areas in New Zealand (April 1999)

Species	Area (thousand ha)	Percent of total
Radiata pine	1 520	90.5
Douglas fir	81	4.8
Other introduced softwood species	32	1.9
Introduced hardwood species	46	2.8
Total	1 679	100.0

The natural forests are ecologically complex but are generally classified into sub-groupings of two broad types: podocarp (conifer) forests and hardwood and beech ("false beech," *Nothofagus*) forests. Timber species include the traditionally favored conifers, and to a lesser extent beeches and other hardwoods. Conifers are relatively slow growing and long-lived, whereas beeches grow faster and regenerate readily.

Prior to human settlement by Polynesian explorers in about 1250 AD, approximately 75 percent of New Zealand was forested. Major clearance commenced with the arrival of Europeans in the mid-nineteenth century. The current distribution of natural forests reflects the development of the last 150 years. The most extensive natural forest tracts are in the State-managed conservation estates, which are located primarily in the hills and on higher altitude slopes. Smaller natural forests remain on private lands in the lowlands. The total natural forest area includes unlogged and logged forests in various stages of regeneration, as well as reforested farmlands.

A reassessment of the extent of total forest cover, including regenerated areas, is almost complete following work on the revised New Zealand Land Cover Database. Project findings indicate that the current estimate of forested land area (6.4 million ha) is conservative in light of the cumulative contribution of regenerated forest remnants.



Figure 10. Estimated forest cover in New Zealand, (from left) 1000 AD, 1840 and 1976

Planted forests have steadily replaced the natural forests as the mainstay of the wood processing industry since the 1950s. The industry has emphasized the utilization of increasing volumes of relatively fast-growing radiata pine. In 1998, 16.3 million m³ of roundwood (over 99 percent of the total) were harvested from planted forests and less than 0.1 million m³ came from natural forests. Much of the radiata pine is in the “post-tending” age class range (10 to 25 years). Maturing stands mean that the total production is likely to double within the next 10 years.

Six companies, with individual holdings totalling over 50 000 ha each, own over 50 percent of the planted forests. The balance is held by smaller companies, forest investment companies, private groups and partnerships, and farm-scale growers. About 50 percent of current plantings are by small-scale growers and over 98 percent of the area planted in the last three years has been with radiata pine. The management objective is to produce high-quality clear wood. Intensive pruning and thinning are complemented by increased use of improved planting material.

Much of the harvested planted forest timber is exported as finished components, sawn timber, and unprocessed logs. In 1998, 10.7 m³ of timber were processed domestically, while the roundwood equivalent of 8.6 million m³ were exported as raw logs and processed products valued at NZ\$2.4 billion.¹ Forestry directly provides jobs for over 25,000 people and contributes 3.9 percent to New Zealand’s GDP.

Processing industries include integrated sawmills with drying and finishing facilities, panel producers including medium density fiberboard (MDF), plywood and particleboard, and pulp and paper producers. A number of smaller sawmills produce rough sawn, and planed and dried timber.

The natural forest timber industry has undergone significant transition as a result of continuing uncertainty over future resource availability and major changes to the legislative and regulatory framework governing both State and private indigenous forests. Over the last 50 years, the industry moved from a dominant position to a small, specialist industry, the result of diminishing

¹ US\$ 1 = 2.25 NZD (January 2001)

supplies of natural forest timber. The total annual timber harvest from natural forests declined from about 500,000 m³ in the mid-1970s to approximately 82 000 m³ currently. About 30 000 m³ come from State-owned forests on the South Island West Coast and the balance from private and Māori-owned forests.

A large number of generally small individual mills, over half of which are portable mills, process the natural forest timber harvest. Approximately 180 mills qualified for the 1992-1996 allowable cut. This allocation enables the mills to either progressively wind-down or to use alternative timber sources. However, about 260 mills are currently registered, many of which process very small volumes of timber. Despite the consistently high number of registered mills, many have ceased processing indigenous timber. Six larger companies now process logs from natural forests into veneer and other products.

There is a small but high-value export market for natural forest timber. The Forests Act restricts commercial exports of indigenous timber to rimu and beech sawnwood. Finished products made from any species can also be exported. Sawnwood exports totaled about 1 900 m³ in 1996 and 1 700 m³ in 1997.

POLICY ENVIRONMENT CONCERNING THE FORESTRY SECTOR

Historic context of policy development

Forest clearance

After the mid-1800s, European settlers substantially cleared natural forests in the lowlands for farming. Forests were considered an obstacle to agricultural development and land clearance priorities dominated Government policy until nearly 1920. Much of the land initially cleared was converted to pastures. Substantial areas of forest were simply destroyed by fire. Later, commercial logging also occurred. Early exploitative timber trade was for the sought-after kauri used in shipbuilding. There were early efforts to assess the remaining resource and impose timber-harvesting standards. These efforts were coupled with experimental planting of non-indigenous species to offset predicted supply shortfalls from depleted natural forests. The Europeans also released non-indigenous domestic and feral mammals into forest areas. Wild populations of deer, goats, pigs, mustelids and Australian brush-tailed possum caused widespread damage to forests, and reduction and loss of native bird species.

As forests were progressively converted, calls increased to restrict the uncontrolled felling, burning, and clearing of forests. The first legislation regulating access to forests and restricting the use of fire was passed in the 1870s. In the latter part of the nineteenth and early twentieth century, there was further regulation to set aside steep forests on the watersheds above agricultural land. However, clearing forests for agriculture remained the main policy priority.

Early forest policy development

Resource surveys in 1909 and a Royal Commission on Forestry in 1913 led to the recommendations for “climatic reserves” in river headwaters, standards for timber measurement and sale, and forest classification. The Commission noted the slow growth of the timber species and also noted the damage by introduced animals.

In 1920, the Government established the State Forest Service and formulated the first New Zealand forest policy dealing with timber sales control, the setting of stumpage rates, forward planning, survey of resources, and management of protection forests. These measures were implemented under the fourth Forests Act passed in 1921. The fifth Forests Act passed in 1949 detailed Forest Service responsibilities, including the identification and designation of protection forests, and measures for managing large areas of soil and watershed protection forests.

Planted forest development

The establishment of planted forests with fast-growing non-indigenous softwood species in the 1920s and 1930s by the State, and parallel programs by private companies, sought to offset future timber supply shortfalls that were predicted in 1913.

By the 1950s, harvests from maturing planted forests increased and their annual timber production overtook the natural forest cut. Further State-funded planting occurred during the “second planting boom” of the 1960s and early 1970s. Concurrently, the Forest Service began to review the options for future larger scale and regional processing of the planted forest wood resource.

Issues that lead to logging bans as a conservation measure

The issues that led to the sequence of logging restrictions gained prominence in the early 1970s, although their onset can be traced to earlier forest policies. Once the first logging restrictions were invoked during the 1970s, the growing public disquiet over natural forest management drove the restrictions that followed.

The issues that lead to the logging restrictions can be grouped into four distinct time periods:

- ◆ policies pre-dating the 1970s;
- ◆ policy changes in the 1970s;
- ◆ political changes in the 1980s, including the split of forestry functions in 1987; and
- ◆ post-1987 policy changes.

Natural forest policy change and conservation concerns prior to 1970

The National Forest Survey, a nation-wide survey of natural forests conducted by the Forest Service, commenced in 1946. It was completed in 1955 and provided information on the characteristics, extent, and timber volumes of remaining natural forests throughout New Zealand. The survey results confirmed predictions that the natural forest resources were rapidly declining under the prevailing harvesting rate, particularly on the North Island. Although there was increasing use of timber from maturing planted forests, the Forest Service policy during the 1950s and 1960s focused on conserving natural forest timber resources through monitoring and control of timber sales. A major change to forest management at that time was hampered by timber sale commitments and continuing Government price controls on natural forest timber. The controls were maintained to ensure that timber would continue to be freely available for house construction.

Events in the 1970s

By the 1970s, the public interest in management of natural forests was increasing and it influenced subsequent forest policies. Public involvement at a national level was a relatively new development, although public protest in earlier years led to the 1952 preservation of remnant kauri forests at Waipoua Forest on the North Island. By the time a number of multiple-use, sustainability, and other policies for State-owned natural forests gained official acceptance in the 1970s, public concerns about forest conservation had also gained momentum. Public protest was directed particularly at the practice of replanting logged forestland with introduced pine species. Well-organized and informed groups opposed the Government policies. These groups argued the case for forest conservation on ecological, aesthetic, and recreational-use grounds.

The forest policy changes of the late 1970s and 1980s reflected the changing and turbulent political climate and popular support for forest conservation. The Government was faced with conflicting goals. On one hand, there were logging contract commitments and timber price controls, reflecting a legacy of priority on timber production. On the other hand, the contemporary thinking favored forest sustainability that would in turn require a reduction in wood-processing

levels. Pressure emerged, both within the Government and publicly, for increased forest preservation and the designation of prominent forest areas as national parks.

The policy goals of the period were generally oriented toward finding solutions to land-use conflicts. Thus, the Government moved to close out existing logging contracts, reduce timber cuts, and impose logging moratoria. In addition, it published forest management plans and sought public input in developing the plans. Logging restrictions during the period were primarily the result of public campaigns mounted to prevent further logging in specific State-owned natural forests on the West Coast and the central North Island.

Public opinion hardened after the announcement of the 1973 “beech project” that proposed major industrial processing of timber from the extensive beech forests of the West Coast and Southland. It included proposals to convert substantial areas of logged beech forests to pine on the basis that the level of processing could not be supported in the future by natural forest growth alone. The overall beech forest scheme, and especially the conversion proposals, attracted strong and well-organized public opposition and generally set the course for the following years of debate. The proposals themselves disclosed some of the priorities of the time and set out the Government’s intent to invite commercial proposals to utilize the beech forests in Southland and the West Coast regions. The Government’s approval of the scheme reflected pressure for regional development through “wise land-use” but with “the fullest consideration given to all objections raised.”

For example, the proposal stated:

“While the Government recognizes the genuine concern expressed by conservation organizations and many individuals it has concluded that with the environmental constraints originally incorporated by the Forest Service, and others put forward by the Minister of the Environment, the proposals present an opportunity for wise use of forest land and resources.”

And further:

“Both schemes have the potential to contribute greatly to the development of the regions. Social considerations have a big bearing in the Government’s decision.”

By the time the “Management Policy for New Zealand’s Indigenous State Forests” was published in 1977, the increased emphasis given to conserving and managing natural forests was evident. The period of change and uncertainty was also evident. The 1977 Policy stated, for example:

“It [the Policy] recognizes that indigenous forests can fulfill a range of desirable purposes and that these need to be defined for specific areas.”

“Unless the need is adequately demonstrated, clearing of indigenous forest will not be practiced.”

“It gives much more emphasis to maintaining indigenous forest as such, although modified in some cases, leaving options open for management decisions in accord with circumstances prevailing in the future.”

“The object of management of State indigenous forests shall, in general be to perpetuate indigenous forests both as natural forests and as managed stands.”

The 1977 New Zealand Indigenous Forest Policy sought to realign forest management with a stated objective of “perpetuating indigenous forests both as natural forests and as managed stands.” The policy also provided for greater public participation in forest planning, sustainable management, identification of scientific reserves, and multiple use. However, it explicitly retained the option of clearfelling where land shortages necessitate the development for planted forests.

In 1978, separate policies for forests on the central North Island and the West Coast were formulated. These were based on the principles set out in the 1977 policy, but dealt with specific regional issues.

In 1977, environmental groups presented the “Maruia Declaration,” a public petition carrying 341 159 signatures, to the Parliament. The petition set out the groups’ forest conservation objectives. It became the basis for a continuing public campaign against natural forest logging until the major forest administration changes following the 1984 general election. While not an expression of Government policy of the time, the petition nevertheless illustrated the gulf between the official policy and the goals of the environmental movement at that time.

The six principles set out in the Declaration were:

1. Native forests, wherever they remain, need recognition and protection in law.
2. The wholesale burning of indigenous forests and wildlife has no place in a civilized society.
3. The logging of virgin forests should be phased out by 1978.
4. Our remaining publicly owned native forests should be placed in the hands of an organization that has a clear and undivided responsibility to protect them.
5. To reduce commercial pressures on native forests, the growing of fine quality exotic and native timbers on land not presently forested should be given encouragement.
6. It is prudent to be conservative in our consumption of these forest products, especially newsprint and packaging paper, which make heavy demands on our precious resources of land, energy and water.

The Government’s initial reaction to the Maruia Declaration was relatively low key but the proposals endured to become incorporated in some policy changes of the 1980s. Specific policy goals were developed during the 1981 political campaign. These were further reinforced in policies of the Government elected in 1984 and the subsequent administration’s policy changes made in 1987.

Political changes in the 1980s

The 1980s are regarded as a political and policy watershed for New Zealand. Past events had strongly shaped the decisions made and the future course of forestry thereafter. The role of the State in forestry was dominant before 1987. The New Zealand Forest Service had jurisdiction over the Government-planted forests and carried out an array of multiple-use management roles for natural forests and forest research. Other agencies involved in the management of State natural forests included the Department of Lands and Survey, which controlled farm development and farm leasehold on State lands, national parks, scenic reserves and other unallocated Crown lands; the latter often including forested lands. The New Zealand Wildlife Service within the Department of Internal Affairs also managed habitat reserves, protected species, and freshwater fisheries.

Concerns that drove the 1980s policy changes included:

- ◆ a perceived lack of concerted environmental advocacy;
- ◆ mounting public opposition to Government departments managing the environment with multiple and apparently conflicting roles;²
- ◆ a political mood that the development-oriented philosophy guiding land-use in previous years should make way for a stronger conservation ethics; and
- ◆ mounting criticism of the accounting practices of Government departments and of State subsidies for land development.³

² For example, The Lands and Survey Department managed farm development programs and forest reserves. Both this agency and the Forest Service performed similar environmental management roles over separate state land categories.

³ This criticism was fuelled by growing support, after the 1984 election, for a market-driven economic approach in New Zealand. There was also a call for clear and separate accountabilities for Government departments and the removal of state subsidies.

The 1984 newly elected Government affirmed its policy to halt logging in North Island forests and extend protection to all other natural forests. The Government also committed to restructuring the entire Government administration of natural forests.

In 1985 the Commission for the Environment reviewed the legislation, policies and natural forests management issues and concluded:

- ◆ existing legislation and policies had varied and often conflicting provisions for natural forest management, providing for protection and conservation in general, but encouraging forest clearing in some cases;
- ◆ there were conflicts between regional employment goals and national objectives for conservation; and
- ◆ fiscal provisions and policies encouraged clearance and none provided for protection of under-represented lowland forests, largely located on private lands.

The 1987 Government restructuring of forest agencies dissolved the Forest Service, and Lands and Survey Departments. It also set up new agencies: the Department of Conservation (DOC) established under the Conservation Act of 1987, the Ministry of Forestry, which assumed the role of a policy advisory department, and the Ministry for the Environment, instituted under the Environment Act of 1986, dealing with broad national environmental policy.

The change resulted in the conversion of most State-owned natural forests to protected area status. Production shifted to planted forests then held by the New Zealand Forestry Corporation. Since 1990, only very limited volumes of timber were removed from State-owned natural forests by Timberlands West Coast Limited (TWC) – a State-owned enterprise.

Post-1987 events

The post-1987 administrative structure is characterized by a strong separation between fully protected forests and timber production. A fundamental shift in the role of Government in 1987 included the phasing-out of the State from management and development of the planted forests and a series of restrictive measures specifically aimed at logging in natural forests.

After the 1987 changes, the Government began developing a broader policy for natural forests with the objective of maintaining or enhancing, in perpetuity, the area of indigenous forest through protection, sustainable management or reforestation with indigenous species. The policy sought to cover ownership through controls and positive incentives for private owners to conserve and protect their forests or sustainably manage them. Provisions were also made for accords, exchanges and export controls.

Following the separation of forestry functions and the establishment of full conservation management under the DOC in 1987, a further review focused on private natural forests. These forests had been unaffected by the legislative changes although they included a high proportion of lowland forest types which were under-represented in protected areas. The Government thus considered a forest policy covering both State and private natural forests, in conjunction with the proposed Resource Management Act. The 1989 policy framework was based on the following key principles:

- ◆ recognizing the rights and responsibilities of private owners;
- ◆ recognizing the rights and obligations of the Crown to maintain wildlife habitat and reflect international agreements involving the Crown;
- ◆ recognizing the rights and obligations of Māori landowners and the Crown under the Treaty of Waitangi; and
- ◆ being efficient, cost effective and equitable.

Considerations included Māori land values, dealing with uncontrolled woodchip felling (as was occurring on some private forestland), future specialist timber supply, lack of forest information, and the prospect of increased timber imports potentially required to meet the continuing demand for high-quality wood products. The proposed policy contemplated provisions for sustainable management that allowed timber production but controlled unsustainable felling and export, and incentives for conservation of private forests. A forest policy was announced in June 1990 and a further discussion paper was prepared that covered a broad set of desired outcomes related to planted and natural forests.

In response to the public submissions sought on this policy, and the increasing public opposition to the chipping and export of beech forests from private land, the Government imposed an interim ban on the export of unsustainably harvested timber and woodchips in 1990, with the intention of introducing legislation to replace the export ban. Due to a change in the Government in 1990, the policy did not progress further until the Forests Act was subsequently passed in 1993.

The Forest Heritage Fund (later renamed the Nature Heritage Fund) and Nga Whenua Rahui arose from the 1990 policy development. These funds were established to enable covenanted or purchased protection of private natural forests.

CURRENT FOREST POLICY AND LEGISLATION IN RELATION TO NATURAL FOREST MANAGEMENT

Statutes that directly or indirectly affect natural forest management (Table 2) can be broadly divided into legislation related to:

- ◆ fully protected State natural forests; and
- ◆ commercial sustainable management of other natural forests.

Table 2. Summary of legislation currently applicable to natural forests in New Zealand

Land tenure category	Applicable legislation
Conservation estates	Conservation Act, Resource Management Act (RMA), Reserves Act, National Parks Act, Wildlife Act, Wild Animal Control Act
State-owned production natural forests managed by TWC	RMA, State-owned Enterprises Act
Private natural forests	Forests Act, RMA, Biosecurity Act

Management of fully protected natural forest

Legislation covering these forests includes the Conservation Act of 1987 that governs the operation of the DOC. The DOC manages the bulk of State-owned natural forests, approximately 4.9 million ha, under the Conservation Act of 1987. These forests are located in national and forest parks, reserves and conservation areas and other protected natural forests. The key role for DOC is management of the protected natural forests that includes both the long-established reserve and national park systems and the additional lands conserved by the 1987 reforms.

In a broader context, the Government of the 1990s developed policies and strategies to protect and enhance New Zealand's environment. These are based on:

- ◆ principles covering sustainable management of natural and physical resources;
- ◆ integration of environmental, social and economic values;
- ◆ consideration of regional and global environmental impacts; and
- ◆ imposing the lowest cost on the economy and the environment.

The Environment 2010 Strategy brings together these principles in the broad context of the “biophysical environment.” This includes urban and rural environments, commercial primary production based on introduced species and natural species biodiversity, protection from and control of pests and diseases, and social and heritage issues of the Māori. The strategy emphasizes sustainable land management that recognizes issues such as hill erosion and protection of biological diversity.

A number of international initiatives relating to forests and the environment also drive New Zealand’s environmental policy. This includes initiatives relating to climate change, international conservation of biodiversity, and sustainable management of forests. The current Government has broadly followed similar policies although it has moved to strengthen environmental and biodiversity conservation aspects of its environmental policy.

In addition to management of the protected conservation estates, the Government also introduced the Nature Heritage Fund and Nga Whenua Rahui schemes to assist private owners of natural forests to enter into voluntary protection agreements with the Government. Other voluntary covenanting schemes have been made between private landowners and the Government-funded Queen Elizabeth II National Trust. Lease or management contracts are also arranged through the DOC. Private land protection arrangements currently cover over 300,000 ha.

Management of natural forests subject to commercial timber

Two key pieces of legislation govern the modification or clearance of natural forests. These include the Indigenous [natural] Forest Provisions of the Forests Act of 1949 and the Resource Management Act (RMA) of 1991.

Indigenous Forest Provisions of the Forests Act of 1949

The Indigenous Forest Provisions of the Forests Act of 1949, inserted by amendment in 1993, apply to about 1.3 million ha of private natural forests and about 12 000 ha of State-owned forests that remain available for timber production. The Act also restricts exports of wood products from natural forest timbers. This provision largely replaces a previous export ban imposed in 1990.

The Act restricts milling to only the harvest of timber under sustainable forest management and requires mills wishing to cut natural forest timber to be registered. The Act provided a transitional four-year period of harvesting from 1992 to 1996 based on the mills’ pre-legislation cutting levels so that the industry could adjust to the change in supply. The Act offers some opportunity for landowners to benefit from timber production and provides for a continuing role for specialist timber species. However, it also imposed specific restrictions, including explicit prescriptions for the sustainable management of natural forest timber species. For landowners wishing to harvest timber, the Act requires the preparation and approval of sustainable forest management plans. Less elaborate approvals can be obtained but only for lower timber harvest levels.

The Ministry of Agriculture and Forestry administers the Act’s provisions. The approval process requires a forest owner to provide documentation and information to demonstrate how timber production (volumes, harvesting methods, rate of cut and other silvicultural information) and, non-timber natural values, will be managed. The Ministry of Agriculture and Forestry also consults in each case with the DOC, which in turn may request amendments to the plan or provision for reserves. An approved plan under the Forests Act is registered against the land ownership title.

The Act also provides for “sustainable forest management permits,” which require less detailed approval documentation but restrict the cut. Timber can also be taken for personal use and to salvage dead and dying trees, and under other specific circumstances, when the forests need to be cleared. Some forests exempted from the Forests Act include:

- ◆ forests under the Conservation Act of 1987;
- ◆ approximately 36 000 ha of forests on some Māori lands in recognition of continuing settlement or historic issues;
- ◆ planted forests; and
- ◆ remaining State-owned production natural forests in the West Coast region of the South Island and managed on behalf of the State by TWC.

Further amendments to the Forests Act are currently before a Parliamentary Select Committee. These proposed additional reforms seek significant changes to the Forests Act. They include the liberalization of the current export restrictions to allow export of any forest product provided it originates from sustainably managed forests. The reforms also propose the removal of exemptions for State-owned natural forests on the West Coast. The changes to the Act mark a settling-in period, increasing public confidence that forest management under the Act can meet the sustainable forest management requirements without the additional fetter of export restrictions. The amendments reflect a move to simplicity and equity under the Act.

Resource Management Act (RMA)

The Resource Management Act of 1991 promotes sustainable management of natural and physical resources. The RMA is administered by local Governments through district and regional plans. The Act follows a process of plan preparation, public participation and submissions, and implementation through regional and district councils. Restrictions on natural forest management for timber harvest can be imposed by restrictive rules arising from this process.

Accords

Accords, in the form of negotiated and signed agreements between several parties of opposing interests, gained some prominence in New Zealand in the late 1990s. These can be locally focused and typically embody agreement on specific conservation issues, yet they also add greater certainty to forest use and management. They may involve Government or only non-government parties. Two of the most prominent accords relating forest conservation are the 1986 West Coast Accord and the 1991 New Zealand Forest Accord.

The 1986 West Coast Accord and the New Zealand Forest Accord

The 1986 West Coast Accord sought to end previous years of debate between disparate parties over the use of West Coast forests. The Government-brokered Accord is an agreement between a number of regional, community, industrial, and environmental interest groups. The Accord defined an agreed-upon allocation of State-owned natural forests to be managed by DOC. It also defined forests allocated for timber production under sustainable management and forests allocated for a limited period of unsustainable logging to maintain local sawmills. The production forest was exempted from the Forests Act and includes about 130,000 ha of State-owned forest managed for production on behalf of the crown by TWC.

The New Zealand Forest Accord is an agreement between non-government forest industry and environmental organization representatives. Members of New Zealand's Forest Owners' Association and several conservation groups signed the agreement in 1991. It recognizes the important heritage values of natural forests and the need for their conservation, maintenance, and enhancement. The Accord acknowledges the role of commercial planted forests and the need for protection and conservation of natural forests. It sets protocols and defined limits for establishing planted forests on natural forest areas. The Accord also supports the scope for sustainable management of natural forests to harvest timber and produce added-value solid wood products in New Zealand.

Recent policy developments

Following the November 1999 national election, the incoming Government affirmed a policy that logging in State-managed natural forests on the West Coast would be banned. This position had been published in the Labor Party pre-election manifesto and reflects the Government's view that remaining State-owned natural forests should be fully protected. The previous Government was already implementing a gradual harvest reduction to sustainable levels. This would have reduced timber production to about 122 000 ha and replaced rimu harvests with beech.

The Government has already halted proposals to harvest timber from beech forests managed by TWC. The beech proposal included about 80 000 ha of forests with a proposed annual roundwood yield of about 60 000 m³. The Government has proposed measures to phase out harvests of rimu under existing contracts and has introduced legislation to cancel the West Coast Accord. However, the Government has also agreed to support the continuing scope of the Forests Act by allowing private forest owners to harvest timber under Forests Act approvals.

Impacts of current forest policy and legislation on development of wood industries and the production of wood products

Following the passage of the Forests Act amendments in 1993, the natural forest timber industry underwent major adjustments. During the 1992-1996 transitional phase, the industry positioned itself to compete for scarce forest resources, adapt to other species, cut for grade, and turn to smaller capacity and portable mills, with increasing interest in veneering and other value-added processing.

Markets for natural forest timbers include traditional domestic users such as the furniture makers. Specialist users such as woodturners, continue to seek podocarp timber. A great reduction in supply is likely as stocks from previous forest cuttings get depleted. There is also a market for products of recycled timber. Stumps are exported and manufactured locally into items such as tables. Veneer from the increasingly expensive premium grades is also being sought to take advantage of the decorative and popular indigenous timbers.

Until the late 1990s there was a small hardwood chip export market based on Southland beech species. This market is likely to be replaced by supplies of planted hardwood (*Eucalyptus* spp.) coming on-stream in Southland. Beech timber has been sought for traditional uses such as brush handles. Red beech from sustainable forest management areas has gained some localized market acceptance for both decorative and structural uses.

The uncertainty over future supply has elicited a mixed response from manufacturers. Some specialist processors are adapting to capitalize on the small volume, high-value, end-use markets. Others are waiting to see the effect of the logging ban on prices and supplies. The State supply of rimu, substantially reduced in the last decade by policy measures, has provided a steady supply together with uncertain cutting rates from private forests and unsustainable cut from Māori-owned forests. It is apparent that the rimu market niche will change as the processing sector either reduces in scale or finds rimu substitutes or alternative timber sources. In May 2000, the Government announced that it proposes to end rimu harvests on State-owned natural forests on 31 March 2002, allowing a lead time of less than two years for the rimu-using processors to find alternative supplies.

Effects of current policy on conservation values

The passing of the 1987 Conservation Act resulted in the protection of approximately 4.9 million ha of State-owned natural forests in much of the hill and high country. The quality of conservation measures relating to the DOC-managed conservation estate relies very much on the status of the resources and the actual implementation of programs by the Department.

The 1987 legislation did not cover the 1.3 million-ha of privately owned natural forests, which include much of the lowland forest remnants throughout New Zealand. The conservation of these forests is therefore achieved through the covenanting arrangements, sustainable management, and representative area provisions under the Forests Act of 1949 and provisions for protection through local Government council plans under the RMA.

Forest clearing for chipwood production occurred in some privately-owned beech forests in the late 1980s. The 1990 export ban sought to curtail this trade. The transitional provisions under the 1993 Forests Act amendments also resulted in unsustainable cutting in private forests as mills and forest owners ensured that they reached their allowable timber volumes during the limited period provided.

Provisions in the 1986 West Coast Accord also allowed for over-cutting⁴ in specified areas of the State-owned natural forests of the region. Current policy provides for all unsustainable cutting in State-owned natural forests to cease by the end of 2000.

The approximately 36 000 ha of Māori-owned natural forests are exempted under the Forests Act and current policy provides for negotiated settlements with the owners to either grant the forests full protection or to sustainably manage them. The Government has already arranged for full protection of some of these areas through specific compensation deals.

The Government's policy emphasis has been to limit the loss of natural forest areas. However, there is currently a shift towards measures to enhance biodiversity conservation. The Government is reviewing a range of measures through the Biodiversity Strategy to improve and expand the quality, area, appreciation, and understanding of key natural habitats (including natural forests). The scope of the strategy relates to both State-owned and private forests.

⁴ The 1986 West Coast Accord provided for specified period of cutting in some West Coast podocarp forests at rates in excess of the sustainable level of cut. The "overcut" applied to forests the North Westland, Karamea and Buller regions of the West Coast and recognised a need to maintain some interim level of supply to mills in these areas. The term "overcut", therefore, refers to a timber supply strategy rather than primarily to a forest management-linked cutting strategy. Currently, only the Buller overcut remains active. In contrast to the overcut, timber harvests from other West Coast podocarp forests have been sustainable.

GOALS AND OBJECTIVES FOR FOREST CONSERVATION SOUGHT THROUGH LOGGING RESTRICTIONS

The goals and objectives for forest conservation were initially a response to the strong and nationally focused public concern since the early 1970s. The public campaigns, the Government's political and policy responses, changes to forest administration and post-1987 policy development all served to shape the major goals for conservation. Some fundamental goals have endured as the leading issues throughout the period. These include:

- ◆ decline of lowland natural forest remnants;
- ◆ damage and modification by introduced invasive plant and animal species; and
- ◆ loss and threat to endangered endemic fauna and flora species.

Government policy after 1984 strongly reflected the broad public concerns of earlier years, resulting in administrative restructuring and the emergence of fully protected natural forests. Subsequent goals reflected similar conservation issues but were directed at the balance of private and State-owned natural forests considered still at risk. The thrust of post-1987 Government policy has been to maintain and enhance the remaining natural forests by halting major forest clearance and phasing out unsustainable milling.

The Government's stated goals in relation to the operation and outputs of the DOC, relating to State-owned conservation lands, including natural forests, are:

- ◆ safeguarding New Zealand's ecosystems and biological diversity for the enjoyment of future generations;
- ◆ recognizing the importance of the Treaty of Waitangi,⁵ building relations between the Crown and Māori and negotiating and implementing fair durable and affordable settlements; and
- ◆ celebrating, fostering and protection of the cultural, historical and environmental heritage.

POLICY, ECONOMIC, ENVIRONMENTAL AND SOCIAL IMPLICATIONS

Overview of the logging restriction measures

Two groups of measures specifically restricted commercial logging: a) the pre-1970 West Coast Accord, and b) four policy and legislative measures from 1987 up to the present (Table 3).

While each measure is identified separately, these restrictions are part of a complex span of forest policy history in New Zealand. This period includes several Government changes that resulted in significant shifts in policy. The 1984 election resulted in the 1987 administrative changes. The 1990 election probably curtailed some policy developments of the latter 1980s, and the 1999 election resulted in the most recent decision of the Government to phase out remaining logging on State-owned natural forests.

⁵ In 1840, New Zealand was established as a colony under the British Crown. More than 500 chiefs of the Māori tribes of New Zealand signed the Treaty of Waitangi, an agreement between the Māori people and the British Crown. The Treaty of Waitangi is recognised as the founding document of the nation. Today, the Treaty continues as a "living document" and is the subject of much debate on race relations in New Zealand. It has an important position in many Government activities.

Table 3. Measures to restrict commercial logging as a conservation strategy since 1970 and area of natural forest affected in New Zealand

Forest affected	Measure applied	Year	Forest area affected (ha)
State forest administered by the former Forest Service	Logging moratoria, selection harvest, and forest zoning restrictions.	1978-86	80 000
State forest administered by the former Forest Service	Forest permanently reserved under gazetted forest sanctuaries, ecological areas and other dedicated reserves.	1978-86	300 000
State forest administered by the former Forest Service	Transferred to reserve, or potential reserve, under the West Coast Accord.	1986	180 000
State-owned natural forest not already within national park or reserve or in watershed protection	Transferred to full protection within the conservation estate under the Conservation Act 1987.	1987	750 000
Private and State forests	Export ban on unsustainably milled timber and woodchips – as interim measure until legislation was in place.	1990	1 465 000
Private and State forests	Timber milling constrained by sustainable management provisions of Forests Act 1993.	1993	1 312 000
West Coast State-owned production forests	To be removed from timber production under current Government policy.	2000+	130 000

Note: The areas listed are not cumulative as a number of the separate measures in many cases applied to common areas of natural forests. For example, State-owned forest areas in the pre-1987 measures were also affected by the 1987 changes. Again, the forests affected by the 1990 export ban were also subject to the later 1993 Forests Act measures.

The restrictions generally applied to forest practices, although the export ban was an indirect measure to limit the scope for unsustainable commercial milling of timber for export. Other policies also served to limit logging in natural forests such as the RMA and the 1991 New Zealand Forest Accord.

Through the 1986 West Coast Accord, the Government withheld decisions on the future of about 300 000 ha of forests in the remote South West Coast area and 28 000 ha of beech forests in Southland. In 1988, 12 000 ha of the Southland forest were allocated to production, and in 1989, the South West Coast area was placed in the conservation estate.

Approximately 37 000 ha of forests on Māori lands and 130 000 ha of West Coast Accord production forests were exempted under the Forests Act. The Government subsequently negotiated protection for an estimated 9 000 ha of natural forests with the Māori owners in 1995 and 1999.

Policy implications

The Forests Act amendment introduced in 1993 established specific controls on commercial timber harvesting, milling and exporting. The Act sought to establish a balance between a limited sustainable timber harvest and the retention of natural forest values. Sustainable forest management is defined in the Act as:

“The management of an area of indigenous forest in a way that maintains the ability of the forest growing on that land to continue to provide a full range of products and amenities in perpetuity while retaining the forest’s natural values.”

Debate at the time of the Act’s introduction focused on the rights of property owners and their responsibilities to ensure long-term conservation of forests on their lands. The Act exempted some forest categories including forests on Māori land, which had been set aside under legislation in 1906 in recognition of lands taken by the Crown during the nineteenth century. The Act also exempted State-owned production forests under the West Coast Accord, managed by TWC under a separate Deed of Appointment with the Government. The Act provided transitional allowable timber volumes to mills cutting natural forest timber to enable a progressive reduction in cut.

After the end of transitional measures in 1996, the Act restricted export to specific sawn timber dimensions of two species, beech and rimu. The export restrictions sought to limit woodchip felling which generally resulted in near-clearfelling. The Act reflected a policy of encouraging low-volume, but high-value, specialty use of timber for the domestic market.

The Act’s provisions are very prescriptive for timber management, but are not explicit regarding methods and limits for sustainable management of non-timber values. There is continuing debate over the extent to which timber harvest can modify the forests without compromising their natural value.

The Forests Act was amended several times but did not substantively alter the key restrictions on landowners, mills and exporters. However, further proposed amendments would allow export of timber provided it is from approved sustainable management operations. Amendments to remove exemptions under the Act have also been proposed. This would include removing the exemption on State-owned natural forests under the West Coast Accord. This exemption was created because of the existing arrangements (including unsustainable logging) provided for under the Accord when the Forests Act was amended in 1993. The exemption generated tensions over the “different rules applying” to State-owned forests. Nevertheless, TWC’s work on refining techniques in sustainable forest management is considered by many to be at least up to the standard achieved on private forests under the Forests Act.

In 2000, the Government considered that State-managed natural forests have a key role in conservation and moved to halt all remaining logging in these areas. The forests affected by this policy were all within the West Coast region. The forests included those where unsustainable logging had continued for a specified period in the interests of the regional economy under the West Coast Accord. The new policy also included the intent to phase out even the sustainable management harvest. Forests under this regime include about 9,500 ha of podocarp forests that were designated for sustainable management in 1984.

Supporters of sustainable management argue that there are fundamental differences between the two categories – unsustainable logging (as a transitional accommodation), and sustainable forest management. Nevertheless, the policy change is driven by the Government’s view that the State-managed West Coast forests are of sufficient conservation importance to warrant their total exclusion from logging.

The policy change will effectively lead the Government to remove itself from any involvement in production forestry, although it continues to support sustainable forest management provisions which regulate harvest on about 1.3 million ha of private lands under the Forests Act. The policy change has also fueled the public debate. Much of the pro-logging support is from the affected West Coast region. However, there is also support from some representatives of the scientific community for the recent work on sustainable management of natural forests by TWC. Some argue that the Government should at least offer the opportunity for critical review and discussion of the TWC work.

Role of the West Coast Accord

The West Coast Accord was seen at the time of its signing as a solution to the earlier years of protracted debate over the region's forests. However, recent court action has resulted from challenges to the Government by West Coast interests to uphold Accord provisions that allowed the "overcut," or unsustainable logging of rimu from part of the region (see footnote 3). This drew judgments that the Accord was contractual in nature and its main provisions binding on the Government as a party to the Accord. However, portions or "recitals" under the Accord were also judged to be matters related to Government policy and not bound by contract. Following the court decision, the Government changed the policy to shorten the period of the "overcut" provision in the Accord.

The litigation by the West Coast Accord parties and Government policy changes subsequent to the agreement raise questions about how long such an agreement, involving the Government as a party, can remain effective. Despite its importance in 1986 as an agreement between disparate parties on issues of the time, the provision under the Accord for production natural forests is now counter to Government policy following its decision to phase-out logging on the Accord forests. The Government is, therefore, currently proposing to cancel the Accord.

Consistency of the logging ban with New Zealand's positions on international agreements

New Zealand takes an active role in a number of international forums including the Intergovernmental Forum on Forests, Montreal Process, and International Tropical Timber Organization (ITTO). The main thrust of the country's position is mainly to emphasize New Zealand's dependence on timber largely from planted forests and to ensure the conservation of remaining natural forests.

New Zealand has argued strongly that its planted forests, natural forests that are not already fully protected (including those subject to the Forests Act) and State-managed forests under sustainable management are in accordance with international agreements. In general, the standard of sustainable management sought in the natural forests is well within guidelines of international conventions.

The decision to cease logging in the natural forests under the West Coast Accord reflects the Government's view that despite the development of environmentally sound timber harvesting techniques, the uniqueness of these forests warrants their full protection.

Effectiveness of the timing of implementing the logging ban

The changes that occurred in the 1980s followed a protracted period of closures of mills dependent on wood from the natural forests. So, although a large State-owned area was transferred to full protection under the Conservation Act of 1987, the impacts on the industry were less severe than might be expected. (Figure 11).

Despite changes to its State forests, previous rationalization of mill cuts and the agreement under the 1986 West Coast Accord had helped the West Coast region establish its future level of timber supply when decisions on apportioning forests to full protection and production were made.

The 1990 export ban, applying to both State and private forests, was introduced relatively quickly to restrict clearfelling for woodchip export. With no progressive introduction, the Government provided compensation in proven cases of frustrated existing contracts. On the other hand, private forests under the Forests Act Amendment of 1993 were granted transitional allowable cuts based on the individual quotas of mills. In giving the industry a chance to adjust to lower cuts, the landowners also had a chance to sell their timber before the full sustainable forest management provisions came fully into force. The relatively large volume of timber produced concurrently from the State-owned forests cushioned the effect of the reductions from private forest milling.

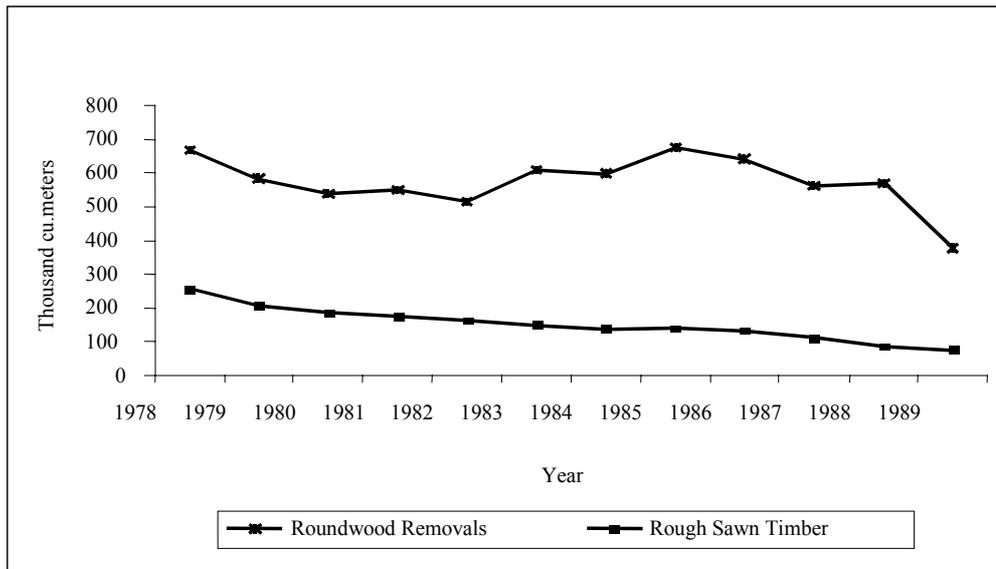


Figure 11. Timber production from New Zealand's natural forests, 1978-1989

The allowable cut mechanism provided registered mills a volume of timber over a four-year period equivalent to two years' cut in a preceding period. Many mills took advantage of the provision, with close to 400 mills being registered, many of them portable mills with small individual cuts. Progressive reductions also applied to production from the remaining State-owned West Coast forests managed by TWC (Figure 12).

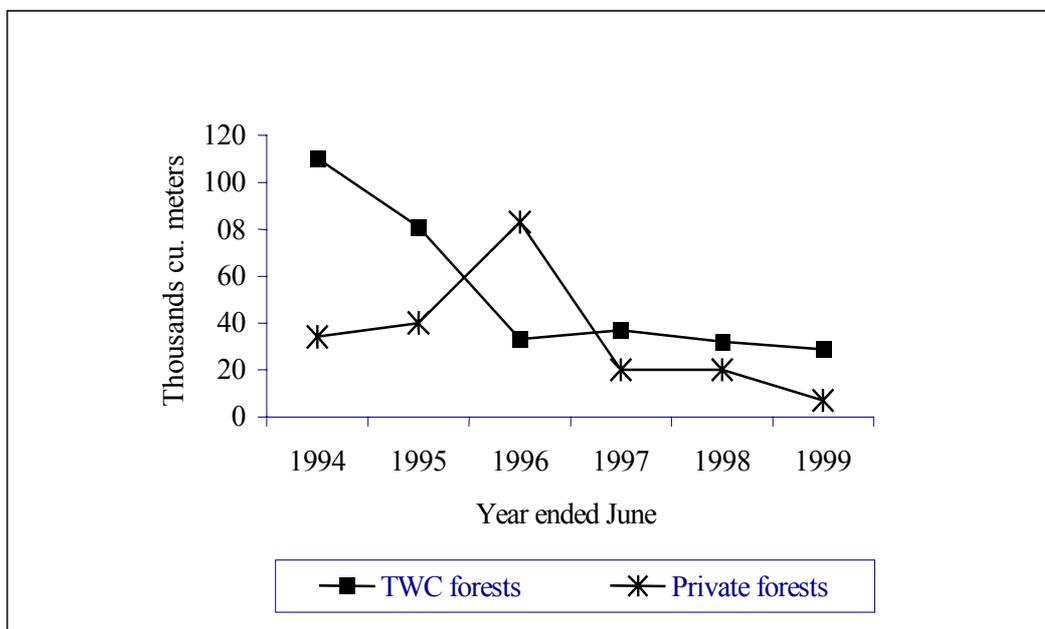


Figure 12. Production from TWC and private forests in New Zealand, 1994-1999

The role of planted forests as a substitute wood supply

The prospect that fast-growing introduced tree species grown in planted forests would, in large part, substitute for a dwindling supply of natural forest timbers was known after the first review of the forest resource in 1913. At that time, the known slow growth rates of native softwoods, coupled with the rapid rates of forest removal, hastened the concern to provide for alternative future timber supplies.

By the time concern over natural forest depletion had grown significantly, the place of planted forests was well established and New Zealand was beginning a “second planting boom,” which was building on the successes of the maturing first rotation. By 1970, about 470,000 ha of planted forests (State and private) had been established and roundwood production from planted forests was about 6.8 million m³, or six and a half times the production from natural forests.

Over several decades, planted forest timber progressively replaced the natural forest cut (see Figures 13 and 14). Under the pre-1987 forest administration, substitute volumes were made available through the Government timber sale process. The relatively large volumes of planted forest timber easily replaced the reduced natural cuts in most areas. Planting targets established and implemented in separate regions of New Zealand by the Government from the late 1960s ultimately provided a replacement resource in most areas.

After the sale of its planted forest timber in the late 1980s,⁶ the Government was no longer involved in selling timber to processing mills. Large companies with planted forests began to supply their own processing outlets. Other growers, including those owners of small- and medium-sized forests, have continued to supply other mills, including the regionally-based mills that previously relied on natural forest timber.

Enforcement of logging restrictions

The Forests Act provides for penalties imposed for illegal cutting of timber from private lands, which are administered by the Indigenous Forest Unit of the Ministry of Agriculture and Forestry. The DOC has powers under the Conservation Act 1987 to prosecute for the removal of timber from conservation lands. There have been isolated incidents of timber trespass on public lands and private forests. The Indigenous Forestry Unit of the Ministry of Agriculture and Forestry has successfully prosecuted six illegal timber trespasses since the Forests Act came into force. The prospect of substantial or continuing illegal trade in wood products is considered unlikely on private land within New Zealand. Export restrictions are controlled through approval provisions and port controls.

Additional measures, resources and capability building

Policy changes to halt State-owned forest timber supply will put pressure on private forest resources as current mills and processors investigate new sources of supply of specialty timbers. Capability building is likely to be needed to ensure that adequate and consistent supplies of preferred species are available from these alternative sources, which will probably include imported timber, private natural forests, and planted forests in New Zealand. There is also a developing and buoyant market for recycled timber, although the life of this resource is unknown. At present, there is little detailed information about New Zealand’s planted species of alternative hardwoods and other specialty species. Private growers on a farm-forest scale undertake most planting of these species. Research on management and processing of these species is limited.

⁶ The Government sale of the forests, also termed “privatisation,” involved sale only of the forest assets – the tree crop, buildings etc. The land remained under Crown ownership with provisions for lease of the land to the new owners for a rotation (35 years) and in some cases, a longer period. There was also provision for review of any claims to the land and, in the case of successful claims, return of the land after the lease expiry. The forest sales commenced in 1989 and were largely completed by 1996.

Economic implications

Timber products from natural forests

Natural forest timber production declined steadily after a peak in 1953. The main output of milling has been sawn timber for a range of purposes including construction and finishing. Softwoods from the natural forest have long been favored over hardwoods for their range of utility and finishing purposes, including the popular podocarp species: rimu, totara, and matai. Tawa and beech are popular for specialist and finishing purposes. Beech has also been sought as hardwood pulp, principally for export markets.

Veneer production has been less significant. In recent years, veneer has been produced by a small number of mills located primarily in urban areas. The increasing price and scarcity of timber during the 1990s has resulted in better prospects for veneer, particularly for display end-uses.

Other uses for natural forest timber are limited, although some trade in export logs arose during the 1970s. Fuelwood is sourced from the natural forests, but harvesting operations are generally small in size and favor native hardwoods such as manuka and kanuka.

Natural forest areas available for production

In 2000, the area available for natural forest timber production comprised about 142 000 ha of State-owned forests, including both logged and unlogged areas. This area will be reduced to about 12 000 ha following the removal of 130 000 ha of West Coast forests from production. The total area of private natural forests is about 1.3 million ha, but much of the area is not accessible or has been placed under protection. Approximately 670 000 ha of private forests were previously considered potentially available for production. Currently only about 124 000 ha are considered economically accessible for timber production.

Natural forest roundwood removals

Roundwood logged from natural forests is about 90 000 m³ annually. About one-third of this is harvested from State-owned forests on the West Coast. Half is harvested from Māori lands not subject to sustainability restrictions. The balance is harvested from Forests Act-approved cuts on private land.

An overall downward trend in the harvest of natural forests since 1995 is the result of the reduction in the harvest from State-owned forests in 1995, and the reduced cut on private lands at the close of the Forests Act transitional period in July 1996. The supply from private lands is now entirely from the Forests Act approvals. There has been a steady increase in the area of private forests approved for harvest under the Forests Act. Still, the supply from private forests is only about 14 percent of the total roundwood production derived from natural forests.

Production of roundwood from natural forest has been declining steadily over a much longer period, in part largely due to the substitution of planted forest resources from the maturing plantings established in the 1930s. Later reductions, however, can be attributed to logging restrictions on State-owned forests in the 1970s and 1980s and on all forest tenures after 1987 (Figure 13).

Timber processing

Most natural forest timber is processed into sawn timber. Veneer takes a small proportion from the increasingly expensive premium grades. In recent years, some hardwood (beech) has been exported as chipwood.

Current estimated annual production of rough-sawn timber from the natural forests (year ended 31 March 1999) is 50 000 m³, also exhibiting a steady long-term downward trend in volumes

produced. The comparison of sawn timber and roundwood shows the former follows a steadier decline over the same period, probably reflecting an eking out of supplies by smaller mills cutting indigenous timber as forest resources diminish (Figure 14).

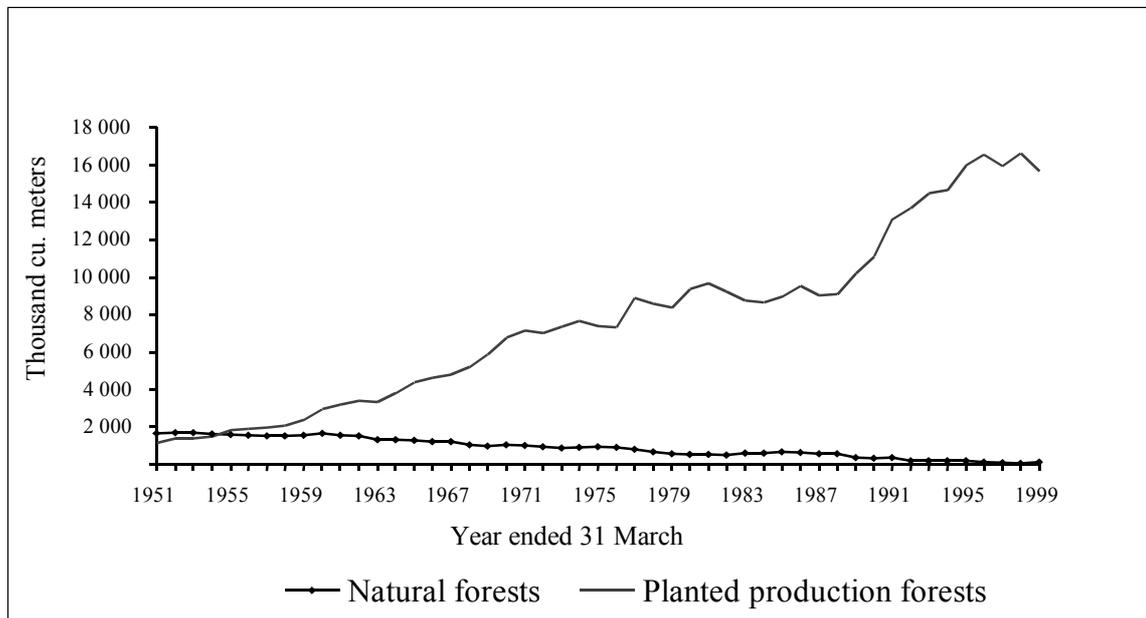


Figure 13. Roundwood removals from natural and planted forests in New Zealand

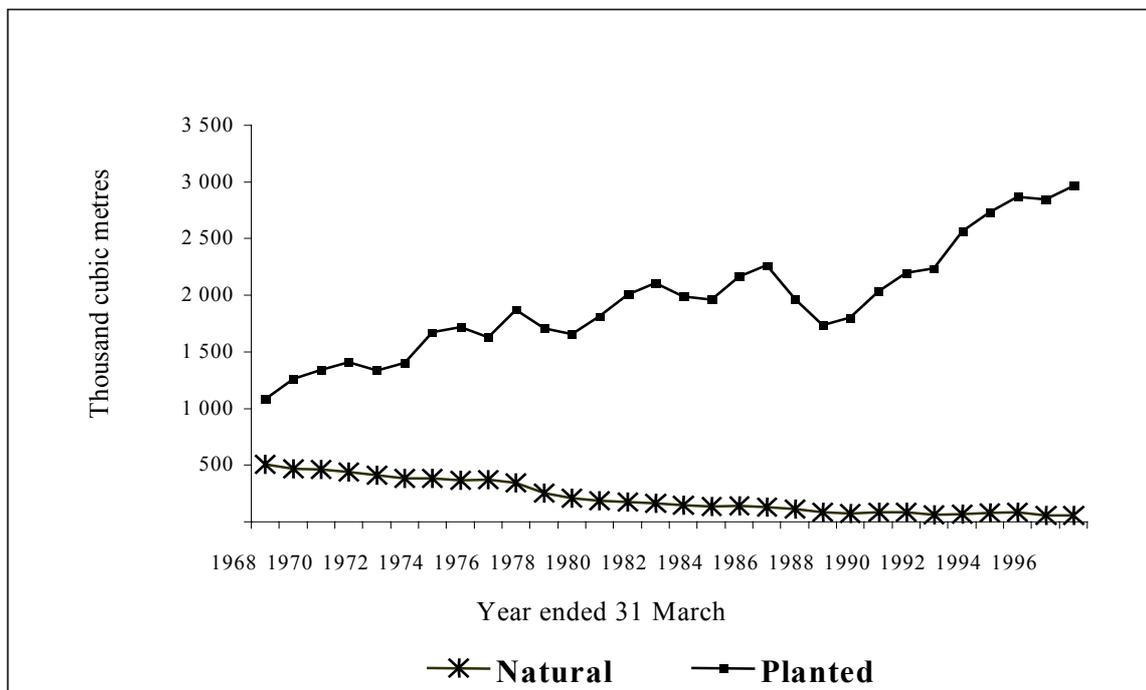


Figure 14. Production of rough-sawn timber in New Zealand

Other sources of timber

Restricted supply from the natural forests has generated incentives to obtain timber from other sources. Podocarp stumps salvaged from previously logged forestland produce a small amount of timber for various decorative end uses. Former kauri forests, long buried in wetlands, also provide “swamp kauri” timber for specialist decorative end-uses. Recycled timber from demolished buildings is a further source generally used in furniture or building renovation materials.

Price effects

The overall log price has shown a steady and gradual increase. The Forests Act restrictions undoubtedly caused price changes, although these were cushioned by the high timber stocks generated by forest sales towards the end of the transitional period. Evidently, some forest owners sold at lower prices while they were allowed to cut. The supply from State-owned West Coast forest maintained relatively high timber stocks, although prices increased following the reduction in cut from these forests after 1995.

By 1998, prices for processed softwood sawn timber had approximately doubled since the Forests Act came into force in July 1993, with the popular and sought-after rimu costing an average of NZ\$2 000 per m³. The price increase has been affected by the premium for high-quality decorative grades. A recent study of rimu prices indicates a consistent increase from 1995 to 2000 as supplies diminished (Figure 15). In comparison, prices for radiata pine have fallen over the same period – a factor of international price trends. This indicates the special market enjoyed by rimu, which is strongly favored by the domestic furniture market.

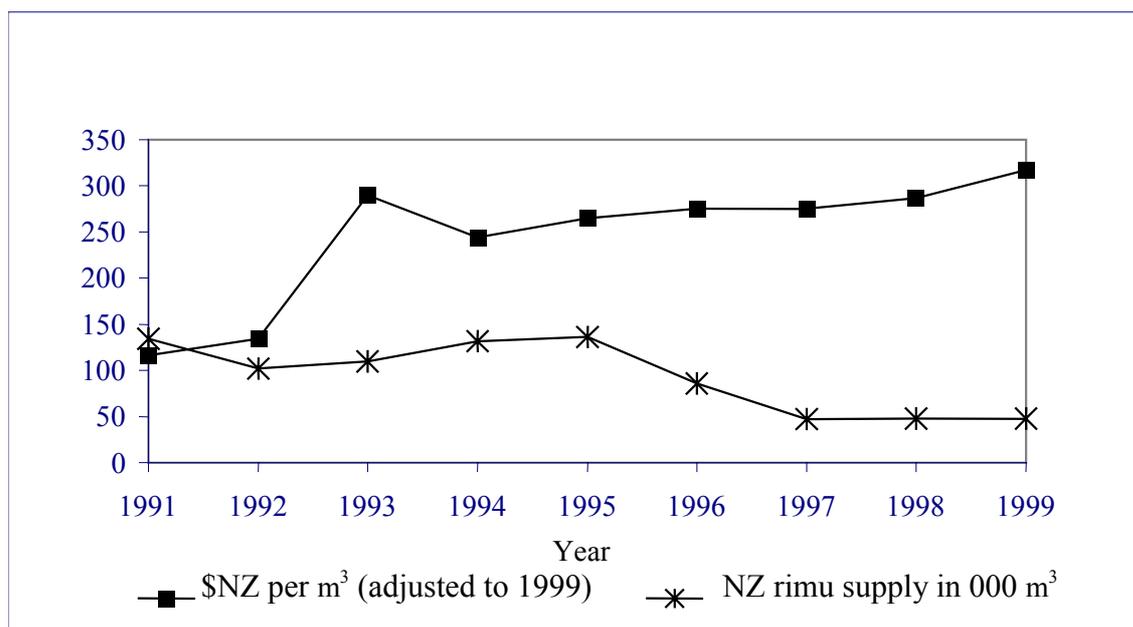


Figure 15. Comparison of New Zealand's rimu price and log supply

Hardwood species comprise about 10 to 12 percent of sawn timber production volumes. Their prices have moved more slowly. Beech timber supplies a small but established niche market, but TWC expanded the market at the end of 1999.

Economics of planted forests

During the 1970s, intensive work was undertaken on existing stands to optimize management of, and the timber production from, radiata pine planted forest. By the 1980s, the economic benefits of planted forests, particularly shorter rotation radiata pine, were well understood. Sophisticated economic modeling techniques, improved knowledge of the benefits of tending, improved quality planting stock, and the increasing availability of higher quality sites (often previously restricted by land-use controls favoring farming), all served to enhance the economic prospects for planted forests. Based on current information from a range of New Zealand sites, radiata pine can achieve average internal rates of return (IRR) of between 6 and 9 percent.

IRR information for other planted forest species such as Douglas fir, cypress, acacia, and eucalyptus suggests that similar returns can be achieved. They require longer rotations than radiata pine and some need good quality sites, but the wood can potentially command premium prices.

Growth rates of natural forest species are comparatively slow. Rotation lengths are generally over 100 years, although research has indicated that on optimum sites beech can be managed successfully from natural regeneration to produce millable trees after 60 years, and in less than 100 years for kauri.

Substitution of planted forest species

Due to their comparatively high productivity, planted forest species have substituted for the natural forest species in many utility and specialty roles. The excellent timber properties of radiata pine were well known and accepted by the construction industry well before restrictions on logging natural forests became prominent. Despite its lack of natural durability, features such as better drying, ease of nailing, development of treatment processes, weight, and handling of radiata timber all served to favor it over natural softwood species in general construction. It is also appropriate for the manufacture of reconstituted wood products, pulp and paper and various engineered solid wood products.

There is little doubt that these features were a strong economic incentive for the construction industry to use radiata pine. Its place as the mainstay utility timber was well established before the price controls maintained by the Government on natural forest species were lifted. In the South Island, however, the use of rimu in construction persisted for a longer period due to its relative abundance and lower prices.

More recent data also indicate that there have been marked changes in the recovery of premium grades of rimu, pointing to a continuing reduction in the use of rimu for construction, and efforts to maximize the amount of timber for high-value display uses. For example, between 1988 and 1995 the percentage of industrial grades reduced, on average, from 50 percent of total recoverable yield to about 5 percent, and display grades increased by a comparable amount.

The annual sustainable cut from planted forests is projected to increase from 17 million m³ in 1999 to over 30 million m³ by 2010. In volume terms, planted forest resources will be more than adequate to meet the declining natural forest cut. More pertinent for New Zealand is the future supply of timber species that can substitute for natural forest timbers.

Role of the private sector in planted forest development

The privatization of State-planted forests after 1987 was undoubtedly facilitated by the existence of an established private sector forest industry. Private planting of radiata pine and other species paralleled the efforts of the State during the first decades of the twentieth century focusing on sites in the central North Island. The area of private planted forests initially exceeded that of the State and through to the 1980s continued to expand, lagging only slightly behind the State during the period. By 1987, private forestry had well-established commercial forest management, processing and marketing practices in place.

Supply shortfall of specialist species

Radiata pine cannot substitute easily for specialist or decorative timber species. There is currently no consistent supply of other planted species to effectively substitute for the sought-after natural forest softwoods.

About 91 percent of the total planted forest area comprises radiata pine and 4.5 percent with Douglas fir. The balance is made up of a range of other softwood and hardwood species, including cypress, eucalypt and acacia, which are potential substitutes for specialty natural forest timbers. However, many existing stands are of variable or uncertain quality and produce inconsistent volumes. For example, cypress is sought for its high-quality decorative finishing characteristics. Quality grades can command high prices although much of the existing mature resource is in poor-quality untended farm shelterbelts.

There is, however, interest among small (farm-scale) and medium-size forest growers in these species with research and management co-operatives targeting improved species, stand management and timber quality. New planting rates have indicated an increase in the percentage of area planted with Douglas fir and eucalypts, especially in the south, due to the activities of a number of overseas companies that are strategically positioning themselves as growers of these species.

Larger companies, which manage the bulk of the existing planted forests, continue to favor radiata pine. The choice of the “mainstream” species reflects the strong legacy of research, established management knowledge, and current technical developments for the species.

The silvicultural regimes for planted forests are also changing. Some growers perceive the intensive management typically associated with high returns as financially risky. Alternative regimes with minimal tending are possible with the use of genetically modified tree stocks.

There is continuing debate over the need for a more diversified forest estate (in terms of choice of species, silvicultural regime and location) compared to the existing predominantly radiata pine forests. Some argue that a more diversified forest estate may reduce future growing, marketing, and processing risks and uncertainties, creating a potentially more robust and stable industry. The counter argument is that radiata pine provides its own diversity, inherent within its suitability for a wide range of end markets, and that radiata pine is a proven, highly profitable species. By diversifying its forests, New Zealand may actually reduce profitability.

The cessation of State-owned natural forest timber supplies will lead to greater dependence on private land resources or other alternatives. A supply shortfall concerns processors such as furniture makers who have relied on natural forest softwoods, particularly rimu.

Effect of the logging restriction on imported substitutes

The main categories of sawn timber imports are Australian hardwoods and North American softwoods. Only about 18 percent are from Pacific Islands and Southeast Asian sources. Imported sawn timbers generally have specialist applications such as for industrial construction, weatherboards with a natural finish, decorative furniture, paneling, and boat building. Imports of forest products for the year ending June 1998 were valued at NZ\$880 million (NZ\$830 million in 1997). Current prices for imported sawn timbers, across a range of species, average a little over NZ\$1 000 CIF per m³. Specialty pulps, paper, and paperboard accounted for 77 percent of imports.

Import volumes have not changed for five years and there is no evidence of substitution for natural forest timbers as a result of logging restrictions over that period (Table 4). Furniture makers claim, however, that a cut in rimu supply from State-owned forests will lead to import substitution since there is no reliable supply from any other natural species timber source or no suitable alternative domestic species.

Table 4. Volume of New Zealand's timber imports (thousand m³)

Year ending 30 June	Hardwoods	Softwoods	Total	Logs and poles
1994	8	23	32	3
1995	10	23	34	2
1996	13	24	38	2
1997 P*	10	21	32	3
1998 P*	11	19	32	3

Source: Ministry of Agriculture and Forestry

* P = provisional figure

Timber processing industry – impacts of logging restrictions

In the 1970s the Government began to rationalize or renegotiate existing long-term contracts for timber supply from State-owned forests. In part, the mounting pressure to conserve the forests and the resulting limits on supply were pushing the Government to encourage the smaller mills with circular-saws to merge with larger capacity bandsaw-equipped mills with drying and finishing capabilities. However, substitution of planted forests and introduction of newer products such as wood-based panels were also factors of change. The limits on timber supply merely hastened the process of inevitable change. In 1954, there were 500 registered sawmills cutting natural forest timber. By 1972, less than 100 of these mills depended solely on natural forest timber.

Mill closures affected the milling-dependant communities of the central North Island, South Island West Coast, and Southland. In some regions, planted forest resources were available to maintain supply, although this was not the case in the West Coast area where the small area of largely immature planted forests meant a continued dependence of the industry on natural forest timbers.

Many significant changes to mills dependant on State-owned natural forests took place when the Government agencies were restructured in the 1980s. The West Coast Accord provided long-term sustained supplies for some remaining mills within the region. It also made additional timber volumes available from unsustainable operations to maintain supply until planted timber was available. However, further restrictions on cutting in the West Coast led to additional mill closures in the late 1980s.

Mills utilizing private forest resources tended to be smaller units. By the late 1980s, the handy portable sawmills were popular for small on-property operations. Sawmill registrations under the Forests Act amendment of 1993 varied between 350 and 400 mills. About two-thirds of these were portable units with small annual quotas.

Current capacity

Current processing capacity includes conventional sawmills and a number of specialized manufacturers producing veneers, components, and other products. In 1998-1999, 82 676 m³ of indigenous logs were milled from all sources (including Forests Act-exempt tenures).

In December 1999, 260 mills were registered under the Forests Act. Approximately 25 percent were fixed mills; the rest were portable mills. Twenty-eight registered sawmills each milled in excess of 100 m³ of logs annually, producing a combined log volume of 79 293 m³, or 96 percent of the total log volume milled. Six companies produce specialist timbers.

On the West Coast, the only region where State-owned forest timber production continued, the levels of cut were adjusted to those specified under the Accord. Currently, there are 16 mills cutting between 500 and 5 000 m³ per year, drawing on both State-owned and private forest resources.

In 1990, TWC assumed management of West Coast State-owned natural forests. Some further cut reductions in the region occurred with the closure of some interim unsustainable operations in softwood milling in 1995. Existing unsustainable operations were scheduled to cease in December 2000. Contracts secured in 1996 by TWC, based on both interim unsustainable and sustainable softwood resources, supply the local mills and specialist manufacturers outside the region.

Exports

There is a small but high-value export market for timber from natural forests. Government regulation under the Forests Act restricts the commercial export of indigenous timber to rimu and beech sawn timber. Final products of any species can also be exported. Natural forest sawn timber exports were about 1 100 m³ (NZ\$1.2 million FOB) for the year ending 31 March 1996 and 1 900 m³ for 1997 (NZ\$1.6 million FOB).

Furniture industry

New Zealand furniture makers have voiced concern at the prospect of reduced supplies of rimu, sought for high-quality furniture. The industry relies on an annual supply of 20 000 to 30 000 m³ and considers that securing and maintaining this will be difficult without State-owned forest supplies. The industry also argues that reduced tariff barriers will increase the prospect of competing imports.

Other issues facing the industry

The Forests Act provided transitional allowable cuts for the industry to adjust or exit the business. Many forest owners took advantage of the transition and sold timber. Four years after the transition ended approximately 58 000 m³ of timber were under the Forests Act approval for harvest, covering 52 000 ha on 230 separate private land holdings. The current annual production from these private lands is, however, barely 5 000 m³. The uncertainty of future supply is creating difficulties for processors seeking continuity of supply.

Some processing specialists have updated their equipment for producing veneer. Most express doubts about investment given the uncertainty in supply. Export markets are likely to remain small and specialized. International pressure to ensure "green labeling" may be a factor. Imported specialty timbers currently compete on price and first stage processors are concerned about this. The extent to which international pressure for sustainable management standards affects these imports is still unclear.

Impact on Government revenue

Government revenues arise from taxation and from income generated from Government assets. The logging restrictions applying to private lands are likely to have resulted in some reduction in tax revenues due to the reduced capacity for forest owners to sell timber. Local Government continues to impose taxes on such lands, but the level varies by location.

TWC pays royalties and dividends (Government Ministers as shareholders). Royalties of NZ\$150 000 to NZ\$165 000 were paid to the Crown during 1998 and 1999 although no dividend was paid.

Costs of implementing logging restriction

Identifiable costs to the Government include about NZ\$4 million in compensation payments for logging restrictions prior to 1987 and about NZ\$30 million paid to compensate timber exporters affected by the 1990 export ban. The Government is currently offering NZ\$120 million as

development assistance to the West Coast region. This coincides with the decision to phase out the State-owned natural forest milling in the region, although the assistance is not regarded as direct compensation. Other measures generally did not include direct payments, although indirect assistance to landowners, in various forms, accompanied the implementation of the 1993 amendments to the Forests Act.

Environmental and conservation implications

The success in achieving protection can be assessed as follows:

- ◆ The effectiveness of restrictions applied to State-owned lands, including its full protection of most forests and continued timber production on limited areas in the West Coast and Southland.
- ◆ The effectiveness of restrictions applied to private lands.
- ◆ Physical success in protecting the forests, measured in terms of area reserved, and protection of specific habitats or forest types; and the quality of the protected forests relative to the losses that would likely have occurred if the areas had been logged.
- ◆ Recognition for the protected forests measured in terms of public education, international recognition for protected areas and the devotion of management and resources to ensuring that conservation values are maintained.

Pre-1987 measures

Assessing the effectiveness of the pre-1987 measures is difficult because of the administrative changes that followed. There is no way to know with certainty whether or not the logging restrictions applied prior to 1987 would have achieved the degree of forest protection sought under the prevailing administration. Approximately 300 000 ha of State-owned forests had permanent logging bans imposed prior to 1987. These forests later became national parks or similar protected areas and included gazetted forest sanctuaries, ecological areas, and other dedicated reserves and recreation areas. Whether these forests would have had the sustained management input or conservation focus to achieve the objectives cannot be determined precisely.

Approximately 80 000 ha of State-owned production forests were subject to logging restrictions through required changes in harvesting techniques from the time of the 1977 Forest Service Indigenous Forest Policy. Techniques included selection-logging methods and the adoption of zoning to identify harvestable and non-harvestable stands. The impact on protection values is variable and current conditions depend on both harvesting and roading techniques used at the time, as well as forest and soil conditions and the extent to which the forests have recovered. Such areas could be compared with forests subject to earlier clearfelling, although no precise or nationally consistent measures can be applied. Factors such as forest type, species, regeneration rate, influx of introduced weeds and pests affect recovery and current forest condition.

Post-1987 measures covering State-owned forests and their effects

The effectiveness of the post-1987 measures can be reviewed in the context of the DOC management of natural forests, including the estimated 1 million ha of State-owned forests previously having the potential for timber production but subsequently placed under the DOC's administration. Timber production was effectively diverted to planted forests and the 142 000 ha of State natural forests that were set aside for this purpose.

The newly established DOC had a stated mission to "conserve the natural and historic heritage of New Zealand" under three goals which sought to:

- ◆ protect and preserve the intrinsic values of the natural and historic resource heritage of New Zealand;

- ◆ promote and provide for the sensitive use of the natural and historic resource heritage of New Zealand; and
- ◆ promote public understanding of and create support for the protection of the natural and historic resource heritage of New Zealand.

The DOC operates under two broad financial programs concerned with conservation management and science and advocacy. With a single agency managing a total of about 4.9 million ha of State-owned forests, and focusing on conservation management, some key opportunities exist, such as:

- ◆ assembling information on the full ecological diversity of New Zealand represented through a network of protected areas covering the natural forests; and
- ◆ enabling conservation management including recreational, pest/weed control and other management issues concerned with protection, over about 75 percent of New Zealand's natural forests.

The new department was faced with some complex administrative issues. In particular, it had to draw together the conservation functions of three former departments as well as address issues of establishing management systems and identifying tasks under the new Conservation Act.

The 1987 changes can be considered a success in the context of a large and significant area of natural forests being placed in reserve. These areas include the steep land forests, and the lowland protection and former lowland production areas. There is, however, poorer representation of certain lowland forest types more common on lands in private ownership.

Conservation by the DOC has achieved some notable successes. These include the endangered species breeding programs, restoration programs, research, education and a heightened public awareness about natural forest conservation. Other programs include development of the "mainland islands", areas where efforts are made to restore natural flora and fauna habitats, and control of introduced pests and weeds. However, some adverse effects continue, notably damage to both forest vegetation and native bird populations by pests and introduced species, particularly the widespread damage caused by the Australian brush-tail opossum.

Post-1987 measures covering private forests and their effects

The Forests Act indigenous forest provisions prohibit unsustainable commercial timber harvest from private forests. The Act is not a land-use control since owners may choose to clear forest for other reasons, although such generally expensive operations are greatly restricted by removal of commercial incentives. Other restrictions on forest clearance or logging are imposed on private forests through the local Government-implemented RMA. Currently 52 000 ha of private natural forests are under Forests Act-approved plans and permits.

Private owners of natural forests can also choose to fully protect their forests through covenanting arrangements such the Queen Elizabeth II Trust, Nature Heritage Funds and Nga Whenua Rahui. Many landowners have taken advantage of the incentives offered to fence and protect forest remnants on their land and currently about 300 000 ha of private land are reserved under these arrangements.

Impact of logging restrictions on watershed conservation

New Zealand is geologically active and approximately one-third of the land area is considered "steepland." The need to minimize soil erosion and catchment damage was recognized during the extensive land development era and large areas of forested land in these steep areas were established as protection forests. Protection forests cover about 4.3 million ha, mainly within the Conservation estate. Damage to steep land forests by introduced mammals, has been a major cause of induced erosion in many areas.

The first systematic approach to soil erosion control was under the 1941 Soil Conservation and Rivers Control Act. Subsequently, timber-harvesting operations became subject to controls under regulations, legislation and guidelines setting standards for operations. Local Government-administered control through planning was under the Town and Country Planning Act 1977. This was replaced by the current RMA, administered by the 7 Regional Councils throughout New Zealand. Many of the larger urban areas rely on forest catchments, protected under local Government legislation, for water supplies.

Land clearance for farming during the nineteenth and first half of the twentieth century resulted in widespread erosion and soil loss in the North Island East Coast. The problem prompted the establishment of planted forests in critical headwater areas of the region. Current tree planting incentives are targeting 60 000 ha of erosion-prone lands in the region.

The logging restrictions are not considered to have had a major effect on the incidence of erosion or on water supply or quality, although the reservation of the extensive State-owned forests in 1987 may have had local benefits. Contemporary methods of timber harvest, in some cases by helicopters, further minimize ground disturbance and the likelihood of other adverse effects.

Impacts of logging restrictions on biodiversity conservation

Biodiversity loss is a key issue in New Zealand. The 1997 State of the Environment Report listed the following as key requirements:

- ◆ halting the loss of species biodiversity which has resulted from the extinction of many species from New Zealand's unique flora and fauna due to human influences particularly in the last 200 years;
- ◆ devising ways to maintain biodiversity values outside public protected areas;
- ◆ restoring the condition of ecosystems and indigenous species within them affected by introduced pests and weeds;
- ◆ improving technical knowledge and community understanding; and
- ◆ balancing the introduced species-based primary productive environment (farms, forests and horticulture) with natural forests and habitats.

New Zealand has prepared a draft Biodiversity Strategy reflecting its ratification of the 1993 International Convention on Biodiversity. The Strategy sets out the issues, objectives and proposed actions to be taken. The Government is currently reviewing the preparation of a national policy on biodiversity, which will consider the approach for biodiversity on private lands.

The 1997 Report and the Biodiversity Strategy both reflect a continuing concern about the extent and quality of New Zealand's indigenous species habitats. The report states that although one-third of the land area is under the conservation estate, at least 1.8 million ha of the natural forests are threatened by introduced species. A further concern is the loss of biodiversity through reduction of lowland forests to smaller remnants by land development.

Legislation provides specific protection requirements. The Forests Act sustainable forest management provisions require forest owners under approved plans for timber harvest to also provide for the retention of natural forest values. The Act also provides for the reservation from logging of up to 20 percent of forest areas when specific needs are identified.

Under the RMA, councils are required to provide for protection of nationally important natural forest areas and significant habitats of indigenous fauna.

Social implications

The impacts on employment and income generation from logging restrictions have been felt most in the smaller milling-dependant communities. The pre-1987 restrictions especially affected people living in communities in the central North Island, South Island West Coast, and Southland, which served older mills cutting natural timber. Some smaller isolated towns, notably those serving larger mills, lost substantial populations or closed completely. Some regional communities also supported farming and other activities, or alternative employment was available in the planted forest operations.

The social impacts of the post-1987 restrictions have been largely from the changes to the State-owned forest administration. The South Island West Coast was particularly affected because it is geographically isolated from other regions and about 80 percent of its land area is State-owned, much of which is natural forests. The area has a wet climate, generally poor soils, with a relatively small area of good farmland. At the time of the 1987 changes, arrangements provided for both conservation of natural forest areas and some continuing harvesting from the State-owned natural forests. The West Coast Accord allocated forests for both protection and continued sawmilling. At present, it is the only region with State-owned forests still producing timber, although the Government has now determined that this timber production will also cease.

After 1987, employment for West Coast people was available in some communities with the newly established DOC and with the continuing production forestry, which was eventually taken over by TWC. Time series studies of the effects on employment are limited and the degree to which skilled workers moved to other employment in the region is not clear. However, studies on the contribution from tourism to employment in the West Coast region show that, in 1992, about 8 percent of the local full-time jobs in the West Coast region were supported by tourism. Figures also indicate that expenditure on tourism in the region increased substantially between 1987 and 1994, suggesting equivalent increases in employment. By 1994, the tourism sector in the region, in terms of total numbers employed, was second only to pastoral farming and was substantially ahead of forestry.

Economic multipliers from a 1986/87 survey of the West Coast region also showed that tourism had greater capacity to boost household income than forestry, but less capacity than forestry to contribute to the total regional economy or employment.

The extensions to national parks and the establishment of World Heritage Park status in South Westland have boosted visitor numbers in the area. The extensive and spectacular tracts of natural landscapes suggest that the region has a high capacity to expand its tourism economy. Local businesses and services in a number of the smaller communities appear to have also benefited. The larger communities have increased accommodations, restaurants and other tourist services.

More recent surveys of local attitudes regarding forest management in the region suggest mixed support for conservation. But there is some concern that the region could become too dependent on tourism and related service-oriented employment unless other (non-timber) production activities are also developed.

SUSTAINABLE FOREST MANAGEMENT AND FOREST PROTECTION – THE CURRENT DEBATE

The most recent phase of New Zealand logging restrictions has been the Government's decision to phase out remaining timber production in State-owned natural forests. The forests affected are all within the West Coast region, comprising approximately 130 000 ha of beech and podocarp natural forests, areas under sustainable management, and "overcut" forests.

The policy was published in the pre-election Labor Party manifesto and confirmed by the new Government after the November 1999 election. The policy was implemented immediately with the decision to halt further consideration of the beech forest management proposals. The consents for beech management, under the RMA, were to be considered in local Government council hearings.

The new Government has also confirmed the previous Government's decision to halt the remaining unsustainable logging of State-owned natural forests. Additionally it has decided to phase-out timber harvest from the natural forests under sustainable management. Measures include proposed legislation to cancel the West Coast Accord and early completion dates for existing timber-supply contracts.

The Government acknowledges that this decision was made as a "matter of judgment." It highlights the overriding determination that cessation of timber production is necessary for forest conservation of State-owned natural forests in the West Coast region, given that:

- ◆ the decision applies to all timber harvests (unsustainable and sustainable);
- ◆ concurrent with the measures, the Government has offered a package of economic assistance to the region; and
- ◆ the decision also pre-empted any discussion or analysis of the relative merits of full protection (no logging) versus the integration of timber harvesting and conservation measures.

Opponents of the Government's decision criticize the lack of debate of merits or demerits of timber harvesting through sustainable management of beech forests. This resulted from TWC withdrawal from the RMA consent hearings. Harvesting advocates argue that new harvesting methods have minimal impacts on the forests. These methods follow the natural dynamic processes of tree growth and senescence applied in conjunction with aerial extraction of logs. They argue that management oriented to ecological processes would also lead to a broadening of the scope for biodiversity conservation, integrating "conservation through sustainable management" and management of other forests under full protection. They dispute that timber harvesting is the major cause of biodiversity loss, but instead blame invasive pests for forest decline and species loss.

Similar arguments apply to the management of rimu forests, including the 9 500-ha area designated for sustainable management in 1984, from which the current commercial timber harvest is also scheduled to cease. Critics of the Government's decision argue that timber production based on low-impact extraction and management techniques that follow natural patterns of growth and mortality are key developments in sustainable management. They further point out that there is a strong distinction between these forests and the areas being logged under unsustainable regimes, and from which timber harvest will also cease.

Supporters of the Government's decision believe that full protection of the State-owned natural forests is required if the remaining natural forests are to contribute effectively to key conservation goals. They argue that timber harvest removes key habitat trees, facilitates weed and pest introduction and creates habitat disturbances affecting both vegetation and native fauna. They also note that the production forests are a particularly significant part of the relatively extensive lowland forests of the region and that timber harvest, despite methods proposed for sustainable management, is an unacceptable risk to the forests.

Despite its decision relating to State-owned West Coast natural forests, the Government continues to support timber harvest from private natural forests in accordance with the sustainable forest management principles of the Forests Act.

The Government decision also pre-empted further scheduled changes to the Forests Act that would have finally removed the exemption for State-owned forests under the Act's sustainable forest management provisions. That exemption maintained the inconsistency between policies applying to private forests and those applying to State-owned forests.

The West Coast policy change was undoubtedly made easier by the region's unique conservation qualities and the inconsistencies in existing forest policies. However, the West Coast is also the only remaining area of New Zealand with State-managed production natural forests. Other regions either lost natural forest cover many years earlier or any remnants of State-owned forests were fully protected previously. Technical advances in sustainable management of the West Coast forests have been achievable under incentives such as high timber value, and the necessity to manage forests according to natural processes and conservation imperatives, rather than to meet production demands. Ironically these achievements have been clouded by the debate and controversy that has characterized the West Coast forests in recent years.

CONCLUSION – LESSONS LEARNED FROM NEW ZEALAND'S EXPERIENCE

Progressive restrictions

Natural forest logging restrictions have spanned about three decades and resulted in a progressive reduction of the role of natural forests for timber production. They include the measures imposed before, and after, the substantial restructuring of the Government in 1987. After 1987, the measures became more focused on meeting forest protection goals.

Historic circumstances

Early research and assessment of the natural forest resource led to the establishment of planted forests. The issues of the "environmental era" could not have been foreseen in the 1920s. However, the limitations of the natural forests to produce considerable timber volumes in perpetuity were certainly expected. This knowledge provided a major impetus to create planted forests to meet timber demands.

Most of the better quality, accessible land was cleared for farming. However, much of New Zealand's first major State forests, and the earliest large-scale private forest planting during the 1920s and 1930s, occurred on relatively accessible, flat land with friable pumice soils in the volcanic plateau area of the Central North Island. The forest establishment was made possible principally because of the failure of livestock farming on these lands due to cobalt deficiencies in the soil. Later farm practices were able to correct the problem but planted forest had already gained a major boost.

The extensive national forest surveys during the first half of the twentieth century, and the applied research into planted forest, provided knowledge on the shrinking extent of natural forests and supported the successful development of planted forests.

Planted forests

The planted forests have been vital as a substitute for natural forest timbers and in creating the alternative "production forests" in New Zealand. They were established during several "planting booms" assisted by research and development. Nevertheless, it took time for radiata pine to be accepted as the mainstay timber. By 1987, the planted forests' capacity to replace the natural

forests as a production resource gave greater impetus to the environmental arguments for reducing natural forest logging.

The success with radiata pine has been an undoubted key to the overall success of planted forest. However, other species should play a strategic part in planted forest as substitutes for a declining supply of specialty timbers from natural forests. A number of introduced hardwood and softwood species, potentially able to meet this role, are currently only a small component of the planted forests. However further development of New Zealand's planted specialty timbers may be hastened by the reducing supply of natural forest timber.

Restructuring of the forestry administration

The 1987 Government restructuring led to the privatization of the public-owned planted forests and the progressive withdrawal of the Government from production forestry. Under the current policy, the Government will continue this change by halting the remaining timber production in the State-owned natural forests.

The restructuring was a fundamental reorganization of New Zealand's Government, including the institutional arrangements for environmental administration. The transfer of Government-owned natural forests to the DOC created a clear physical and functional difference between natural and planted forests.

Economic considerations

Due to the step-by-step implementation and the concurrent adaptation of the milling industry to planted forest resources, the impacts of the logging restrictions have been manageable. Transitional arrangements, such as the provision of bridging timber volumes to enable industry and forest owners to adapt, played a key role. In some instances, arrangements were not possible, such as with the 1990 export ban. In this case, the Government incurred direct costs in order to compensate for terminated contracts.

The industry currently processing natural forest timber faces considerable uncertainties. The current policy changes will further reduce supply from State-owned forests. The industry will need to rely on the smaller private forests, planted forests, or imported timber instead. Imports may, however, shift towards processed items, reducing the dependence on domestic processing.

The increase in the price of natural forest timbers reflecting high-value specialty uses has occurred in line with the reduced supply and adaptation of processing towards higher valued products and end-user markets.

The economic and social impacts have been most prevalent in the forested South Island West Coast region. Debate concerning the role of the natural forests in the region has spanned several decades and has defied any apparent permanent solution. The region contains extensive natural forests including lowland forests, largely under State ownership. Its economy historically relied on coal and timber. The adaptation to more sustainable natural resource use paralleled a strong public push for forest protection.

The debate continues over issues of regional self-reliance, obligations of the Government, social and economic circumstances and whether some State-owned forests should continue to be harvested for timber or be solely devoted to protection. The New Zealand Government is also considering an economic development package to assist the region during the transition period.

Forest policy measures

Forest policy measures through the period have generally been discrete and narrowly focused. The pre-1987 Forest Service policies were developed in response to mounting concern over exploitative logging and clearance of the natural forests. Post-1987 measures focused on the

private forests. By the 1990s, a number of statutes affected the natural forests under various tenures. This created a complex and uncoordinated framework of legislation. Although an umbrella Forest Policy was proposed in the late 1980s, this was not developed further.

SUMMARY

New Zealand has benefited from a number of advantages in developing and implementing the logging bans. They include:

- ◆ New Zealand's largely unpopulated natural forests contrast with those in other countries of the Asia-Pacific region where local communities impose pressures on the natural forests for timber and other produce;
- ◆ the extensive planted forests were well established and offered a readily available alternative resource by the time that the natural forest logging began to diminish; and
- ◆ the privatization of planted forests placed these forests on a totally independent commercial footing.

The New Zealand experience would suggest that policies relating to the establishment and implementation of logging bans should include:

- ◆ good information and inventory of existing forest resources;
- ◆ a conservation strategy with clear, focused goals and objectives;
- ◆ formulation of a comprehensive forest policy that considers a broad array of issues (management, information, research, conservation, timber production, and forests of all tenures) to generate appropriate, long-term strategies for forestry development;
- ◆ planned progressive implementation, coupled with establishment of planted forests with a commercial focus;
- ◆ transitional mechanisms, with incentives and allocated volumes, to reduce impacts on industry and compensation claims; and
- ◆ an established private-sector involvement in forestry, covering the full range of forest management, wood processing, and product marketing.

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IMPACTS AND EFFECTIVENESS OF LOGGING BANS IN NATURAL FORESTS: PEOPLE'S REPUBLIC OF CHINA

Yang Yuexian

BACKGROUND

Distribution of natural forest resources

The fourth inventory of national forest resources in China indicated that natural forests total 87.3 million ha, representing 65 percent of the 133.7 million ha of total forest area. These forests can be divided roughly into three categories: natural forests under protection, scattered natural forests, and natural forests that urgently require protection. Natural forests under protection total approximately 20 million ha and account for 23 percent of natural forests. Scattered natural forests total 17.7 million ha and account for 20 percent. Natural forests urgently requiring protection are concentrated near major rivers such as the Yangtze, Yellow and Songhuajiang Rivers, around large-scale water control projects, and at the core zones of important mountains. These are located in the provinces and autonomous regions of Tibet, Sichuan, Yunnan, Guizhou, Hunan, Jiangxi and Hubei (the Yangtze River basin); Qinghai, Gansu, Ningxia, Shaanxi and Shanxi (the Yellow River basin); and Jilin, Heilongjiang and Inner Mongolia (the Songhuajiang and Nenjiang River basins). Together, these forests total 49.6 million ha, or about 57 percent of all natural forests in the country.

The Chinese Government and the State Forestry Administration (SFA) have always given significant attention to natural forest protection and several laws and regulations have been formulated to protect these forests. Forest protection includes monitoring and control of timber harvesting, establishment of nature reserves, development of integrated wood utilization and afforestation. These activities play important roles in reducing the loss and depletion of natural forests, but extensive utilization has yet to be adequately resolved.

In 1998, the Government imposed logging bans on natural forests in the upper reaches of the Yangtze River and the middle and upper reaches of the Yellow River to halt the deterioration of the natural environment and safeguard sustainable development. As part of this plan, the Natural Forest Conservation Program (NFCP) to cover China's chief natural forest areas was formally initiated.

Current state of natural forest resource protection

The Government and the SFA, executing forest management on behalf of the State, have initiated laws, regulations and programs to enhance natural forest protection, including:

1. Normalizing felling systems and controlling the consumption of wood from natural forests. Timber output has been reduced systematically since the early 1980s; selective cutting is replacing traditional large-scale clear cutting.
2. Expediting the development of nature reserves and parks with natural forests as the main constituent component. China has already successfully established the Xishuangbanna and Hainan tropical rainforest nature reserves. The Changbai Mountain, Wuyi Mountain and Shen Nong Jia nature reserves emphasize the protection of different forest vegetation types. The Wo Long and Di Qing nature reserves protect rare and endangered animal species, such as the giant pandas, golden monkeys and Manchurian tigers. The national forest parks of Er Mei Mountain, Huangshan Mountain and Zhang Jia Jie highlight forest-based ecotourism as a priority. Several forestry centers stress research and teaching.
3. Developing the wood-based panel industry to reduce dependence on natural forests. As of the end of 1998, the annual output of fiberboard and particleboard made from logging and processing residues totalled 1.4 million m³ and 1.1 million tons respectively, which helped reduce the annual consumption of standing timber by approximately 5.1 million m³.

4. Cultivating additional planted forest resources to reduce the reliance on natural forests. China has established timber and fuelwood plantations since the early 1950s. By the end of 1998, 17.5 million ha of timber plantations and 610 000 ha of fuelwood plantations had been established. These types of plantations play an important role in reducing harvests in natural forests.

Due to the lag in the development of timber substitutes and comprehensive timber utilization, as well as the rapid pace of economic development, the commercial timber output targets set by the State could not be fully reduced to sustainable levels. The industrial timber deficit during the planned adjustment period could not be met from domestic sources alone. Moreover, the redeployment of laid-off workers in the forest areas became increasingly difficult; the financial burden on local Governments, schools, hospitals and judiciaries in the forest areas grew heavier; and the enterprises had little choice but to over-log the natural forests to generate revenues and meet timber production targets.

In mid-1998, the Government decided to remove large areas of natural forests from timber production. This was carried out first in the ecologically fragile upper reaches of the Yangtze River, the middle and upper reaches of the Yellow River and the upper reaches of the Songhuajiang River. Strengthening the management of natural forests to maintain and restore ecological functions, China began large-scale protection of natural forests.

Evolution of macro-policies relevant to natural forest protection since 1949

Since founding the People's Republic of China in 1949, the Government focused mainly on developing the economy. Forestry science and technological information received relatively lower priority. The consequent lack of public awareness about the importance of forest resources resulted in a dramatic decline in China's natural forest area. From the 1950s to the 1990s, forest harvesting took place in virgin forests and natural secondary forests. China has recently raised awareness about the importance of preserving the natural environment. The country has subsequently shifted from a mentality of exploitation to one of preservation.

While the forests were being harvested to fuel the developing economy, certain sectors of the Government were concerned with the level of timber consumption. Several events and initiatives illustrate support for forest protection, even during early stages of the country's economic development. At the first national forestry conference, held in 1950, a guiding principle of "protecting forests in an all-round way, afforestation in key localities, rational felling, and rational utilization" was formulated. In 1962, the late Premier Zhou Enlai stressed the need to reconcile better forest management and utilization with forest protection during an inspection of northeast China's forest area.

In the 1970s, the Ministry of Forestry (MOF) revised the "Management Measures of Felling and Regeneration." The main components of these measures include banning clearcuts around large reservoirs, lakes and near major rivers and their first and second order tributaries. Clearcuts were also restricted in natural forests and ecologically fragile areas.

In 1979, China promulgated the Forest Law,¹ Wildlife Protection Law, and Regulations on Wildlife-based Forest Reserves. These laws were the first to use legal means to enforce forest protection. They include clear stipulations about the felling and utilization of forests and natural resources, especially the protection of tropical rainforests and wildlife. After participating in the United Nations Conference on Environment and Development (UNCED), Rio de Janeiro, Brazil in June 1992, the Chinese Government formulated several forest protection directives, including the "Guidelines of Forest Activities," and the "Action Plan on Biodiversity Maintenance."

¹ The draft forest law was prepared in February 1979 and became official on 1 January 1985.

Unfortunately, the guiding principles, policies, and regulations regarding the protection of natural forests and the control of over-cutting were not effectively implemented. More than two-thirds of the natural forests have suffered varying degrees of destruction. Protected natural forests are less than one-third of China's total forest area, the majority of which are nature reserves designated as special purpose areas, or natural forests in Tibet that are very difficult to access by loggers. In 1993, Hainan province first proposed a logging ban for its 320 000 ha of tropical rainforests, which was subsequently approved by the People's Congress in 1994.

In 1997, President Jiang Zemin called on the people to rebuild a beautiful northwest China by restoring degraded natural areas. The following year, the Government decided to ban logging in natural forests in the upper reaches of the Yangtze River, the medium and upper reaches of the Yellow River, and in State-owned forests in 17 provinces of northeast China, Inner Mongolia and Hainan by establishing the NFCP. The decision was reflected in the "Suggestions of Central Committee and State Council on Reconstruction after Flood, Harness of Rivers and Lakes and Water Conservancy Project Construction."

To effectively implement the logging ban of 1998, the following measures are being taken. First, a special team of forestry police and full-time guards is being employed to enforce forest protection and suppress illegal cutting. Second, forest workers are being re-deployed and resettled. Third, several small investment projects are being introduced in phases to demonstrate the potential for new profitable State-owned and private activities. Fourth, provincial Governments are receiving funds from the national Government to assist workers unemployed as a result of the logging bans. Fifth, retirees receive a pension from the national Government to reduce the cost to State enterprises. Sixth, the Government is offering tax and credit breaks to encourage commitment to development projects.

Experiences of natural forest resources protection

During China's 50 years of organized forestry and forest protection activities, there have been both successful experiences and bitter lessons. The main successes are:

- ◆ a policy framework for balancing protection with harvesting and utilization of the natural forests was gradually elaborated;
- ◆ the country's forestry development strategy was adjusted to gradually increase afforestation and systematically reduce timber output;
- ◆ measures were taken to ensure that forest regeneration would keep pace with logging;
- ◆ large-scale establishment of tree plantations was launched, especially for producing timber and fuelwood;
- ◆ industries were encouraged to use logging and processing residues to reduce waste and dependence on natural forest resources;
- ◆ forest enterprises were encouraged to develop non-forest and non-wood industries to reduce the reliance on natural forests; and
- ◆ nature reserves and forest parks were established to expand the protection of natural forests.

The main mistakes and lessons drawn from the experiences in natural forest protection are:

1. Since the overriding goal of forest management in China has been timber production, sustainable management principles have not been fully accepted. Between 1949 and the mid-1980s, exploitable resources in most State-owned forest bureaus sharply declined and the country entered a "resource crisis." China's overall "economic difficulty" encouraged ever-increasing harvests of forest resources to generate revenue. This vicious circle intensified the destruction of natural forests.
2. The integration of administrative and commercial activities in the State forest bureaus was an important cause of over-harvesting natural forests. During the initial phase of operation,

almost all the 136 State-owned forests were natural forests. The forest bureaus had to generate funds for public security, courts and schools, but they were also responsible for carrying out Government functions. As the population in forest areas continued to increase, the amount of funds needed for public services also grew, and the forest bureaus were compelled to harvest more timber to generate revenue.

3. The issue of separating ownership from operation rights has not been solved. The forest bureaus are responsible for both forest production and cessation of illegal felling. In the past especially when they encountered issues that conflicted with their interests, they usually acted in favor of economic returns. In addition, since the bureaus have been ineffective in enforcing timber harvest laws, farmers continued to indiscriminately clear forests to create farmland.

Outstanding environmental issues

Hundreds of years of warfare, climatic changes and human activities have diminished the area and quality of China's natural forest resources. This decline has continued to worsen, as manifested in the following ways:

1. Soil erosion has seriously affected 3.7 million km², with an increase of 10 thousand km² per year. Heavily eroded areas in the Yangtze and Yellow River basins alone totalled 1 million km². Excessive siltation is not only a threat to the normal operation of key water control projects such as the Gezhou Dam, Three Gorges and Xiao Long Di, but also affects agriculture and economic development.
2. China's desert has reached a size of 2.6 million km² and is increasing by more than 2 460 km² each year. Water flow in major rivers has also become more erratic, with some rivers ceasing to flow or flowing intermittently for long periods.
3. From the 1950s to the 1990s, natural disasters increased both in terms of area impacted and rate of occurrence (Table 5). In 1998, an extraordinary flood in the Yangtze River valley resulted in a direct economic loss of 166.6 billion yuan², a level of destruction seldom seen in history.
4. Fifteen to twenty percent of China's plant and animal species are threatened by habitat deterioration. Of the 97 animal species under the Government's first-class protection, 20 are on the verge of extinction.

Table 5. Area affected by natural disasters and floods in China, 1952-1997
(thousand ha/year)

Year	Area affected by natural disasters	Area affected by floods
1952-1959	10 466	4 963
1960-1969	17 731	5 854
1970-1979	11 584	2 243
1980-1989	20 390	5 528
1990-1997	24 982	8 544

Source: China Calamity Report

² US\$1 = 8.27 yuan (January 2001).

GOALS, SCOPE, TASKS AND MEASURES OF THE NFCP

The goals of the NFCP are to:

- ◆ achieve basic improvements of the natural environment in the upper reaches of the Yangtze River in 5 years and a remarkable improvement in 10 years;
- ◆ achieve basic improvement of the natural environment in the middle and upper reaches of the Yellow River in 10 years and a remarkable achievement in 20 years, including reforestation and greening of waste lands;
- ◆ implement forest protection measures in northeast China, Inner Mongolia, Hainan and Xinjiang to rehabilitate the natural forests, improve stand quality and ecosystem functions; and
- ◆ ensure that programs to rehabilitate China's natural environment are successful and ongoing for several decades.

The specific objectives are to:

- ◆ reduce timber harvests from natural forests by 19.9 million m³ from 1997 to 2003;
- ◆ conserve 41.8 million ha of natural forests in the upper reaches of the Yangtze River, upper and middle reaches of the Yellow River, and in Inner Mongolia, Northeast China, Xinjiang Uigur Autonomous Region and Hainan Province; and
- ◆ establish 21.3 million ha of timber plantations from 2000 to 2005 in the upper reaches of the Yangtze River and the upper and middle reaches of the Yellow River.

The total forest area covered by the NFCP is 123.7 million ha that includes 56.2 million ha of natural forests and 11.8 million ha of plantations (Table 6).

Table 6. Area of forests covered by China's National Forest Conservation Program (thousand ha)

Region	Forest area	Natural forests	Plantations	Open woodland & shrub-land	Land with immature trees	Non-forested land	Other forest-land
Yangtze basin	55 150	22 800	5 890	15 680	960	9 810	10
Yellow basin	34 400	7 580	3 870	7 130	960	14 830	30
N. E. & Inner Mongolia	31 690	24 390	2 050	580	1 370	3 270	30
Hainan	410	320	0	10	10	70	-
Xinjiang	2 040	1 100	0	600	20	260	60
Total	123 690	56 190	11 810	24 000	3 320	28 240	130

Nearly all commercial logging in natural forests in 13 provinces in the upper reaches of the Yangtze River and the middle and upper reaches of the Yellow River will be banned by the beginning of 2000. This will ensure protection of 30.4 million ha of natural forests. In 2000, the timber output in this area will be decreased to only 1.1 million m³, a 91.6 percent reduction.

A significant decrease in State-owned timber output in northeast China and Inner Mongolia will continue past 2000. At the same time, the timber output in the Xinjiang forests will also decrease significantly. In 1997, the timber output from these forests was 18.5 million m³. By 2003, the projected output will be 11 million m³.

In 1997, the timber output from all the natural forests included in the NFCP was 32.1 million m³. It decreased to 29.3 million m³ in 1998, and to 22.8 million m³ in 1999. It is expected that timber output will be further reduced to 12.1 million m³ by 2003 (Figure 16).

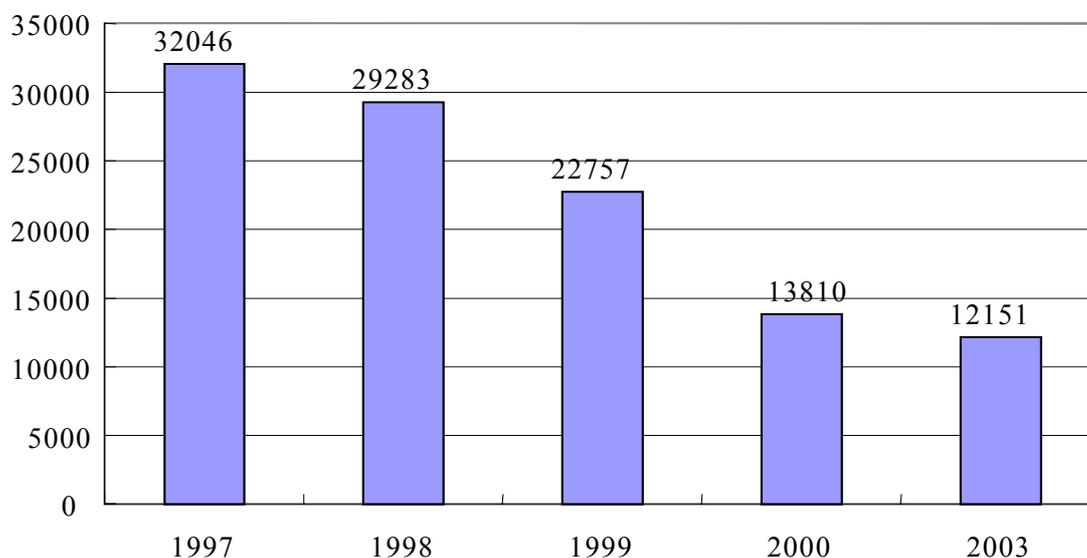


Figure 16: Timber output from natural forests under China's National Forest Conservation Program

According to NFCP plans, strict logging bans will be implemented in 41.8 million ha of natural forests. Protection and management of these forests will be strengthened either through specially assigned personnel or with contracted local forest workers or forest farmers. Small groups will be established to work in restricted forests, remote mountainous regions, and less accessible and sparsely populated areas. Individual contractors will be hired to oversee densely populated areas, and those that are adjacent to farmlands. The individual contractors will be given rights to use forest resources in their assigned areas. Profits will accrue to them as long as the protection and management of the natural forests are not compromised. Natural forests without marketable resources will be monitored by special patrols. Logging bans are also expected to be imposed in other forests, open woodland, shrubland and afforested land with immature trees.

To control soil erosion and improve the natural environment of the Yangtze and Yellow River basins, logging of natural forests will be banned and protection and management activities will be intensified. About 21 million ha are expected to be afforested from 2000 to 2010.

The State-owned forest bureaus will have to lay off 1 million workers as a result of the logging bans. A key issue is the generation of alternative employment opportunities. Some workers formerly engaged in harvesting will be employed in protection and management jobs. Employment will be generated in the plantation sector and by developing non-timber forest product industries. Workers not interested in alternative jobs will be paid a lump sum settlement allowance of up to three times their previous year's average wage. Forest industrial enterprises will establish, as and when needed, a redeployment service center to retrain unemployed forest workers and provide them with basic living expenses and medical care, as well as old-age and unemployment benefits.

Policies and measures

Administrative measures

Local Governments will adopt an administrative system to ensure proper implementation of the NFCP. Task forces will be formed and group leaders identified at the provincial and local Government levels.

Government documents mandating specific logging bans will be issued in support of the NFCP. After the catastrophic floods in 1998, logging of natural forests was banned along stretches of the Yangtze and Yellow Rivers, as well as in Sichuan, Yunnan, Chongqing, Gansu, Shaanxi and Qinghai, with resolutions from local Governments to strengthen protection of their natural resources.

Monitoring natural forest protection efforts by grassroots units will be stressed. Field visits by Premier Zhu Rongji, as well as officials of the SFA, State Council, provincial and local Governments are being made to ensure firm commitment to forest protection under the new program.

Financial measures

Funds for the NFCP will be provided primarily by the central Government, with supplementing input from local Governments. The Center for NFCP under the SFA is currently formulating regulations and rules for allocation and use of funds. Local Governments will also be required to bear approximately one-third of the loss of local revenues resulting from the logging bans and restrictions.

Technical support measures

Since the 1970s, the forestry sector has developed many innovations through collaborative research and has used them in natural forest protection. Further research should be promoted, along with field application of suitable knowledge and technologies.

A sound management system and monitoring at all levels will be necessary for proper implementation of the NFCP. A system for quality control will also be established, accompanied by technical standards for project construction, scientific index system, expert consultation, and feedback, in accordance with the NFCP design and standards.

Training is crucial to implement the NFCP. Training will be programmed at three levels. The central forestry department is responsible for training managerial and key technical personnel at the provincial level. The provincial divisions will train managerial and key technical personnel at the prefecture, county, and forestry bureau levels. Finally, county units will focus on the training of forestry cadres, key technicians and farmers at township and village levels.

ECONOMIC ASSESSMENT OF THE NFCP

Impacts on timber production

An analysis of China's historical timber production and supply reveals distinct regional characteristics. The proportion of timber production from 1949 to 1997 by forest area and regions³ is shown in Figures 17 and 18, based on data from the former MOF and the SFA.⁴ The majority of the domestic timber was from State-owned forests in the northeast, northwest, and southwest.

³ China is divided into three economic zones: The eastern region includes Liaoning, Beijing, Tianjin, Shanghai, Hebei, Shandong, Jiangsu, Zhejiang, Fujian, Guangdong, Guangxi, and Hainan. The central region includes Heilongjiang, Jilin, Shanxi, Inner Mongolia, Anhui, Jiangxi, Henan, Hubei, and Hunan. The western region includes Sichuan, Yunnan, Guizhou, Tibet, Shaanxi, Gansu, Qinghai, Ningxia, Xinjiang and Chongqing. Hainan and Chongqing are newly established and their data are incomplete, so they are included in Guangdong and Sichuan respectively. This aggregation does not influence the results.

⁴ Collated in accordance with the collections of National Forestry Statistics by Ministry of Forestry (1949-1987, 1988-1997) and China's Yearbook of Forestry (1990-1998).

The implementation of the NFCP will have divergent impacts on timber production in different regions. Timber output from the southwest and northwest State-owned forests will decrease significantly. This may stimulate southern China and other areas to expand timber production. In fact, the southern collective forest area has increased its supply of timber and is currently the leading source of timber produced in the country. The proportion of timber from plantations will also be increased. The central and western regions, which used to be China's main timber producing areas, will very likely be most affected by the NFCP. Implementation of the NFCP also provides a great opportunity for the eastern region to cultivate forest resources and develop timber production.

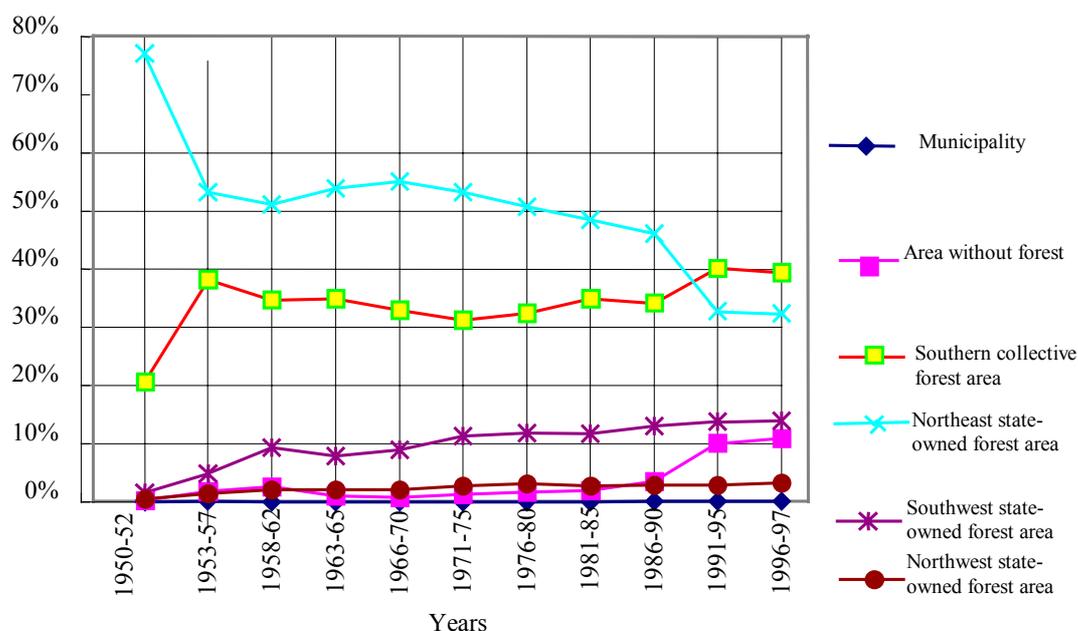


Figure 17. Proportion of timber production by forest area in China, 1950-1997

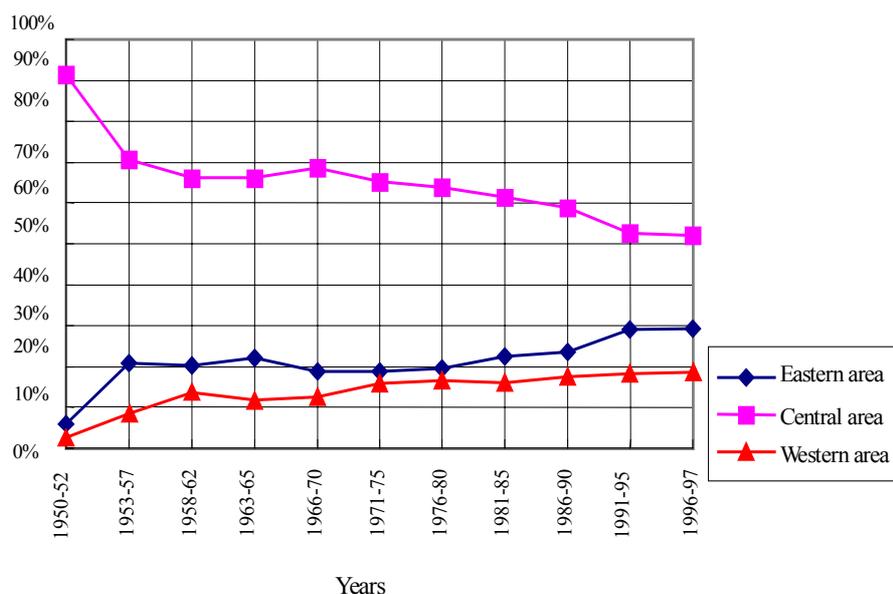


Figure 18. Proportion of timber production by region in China, 1950-1997

Impacts on industrial timber supply

China's timber comes chiefly from domestic producers, and includes that which is harvested from both State-owned and non-State forests. The targeted annual harvest of State-owned forest timber was 61.7 m³ from 1983-1997. The lowest amount actually harvested was 52.3 million m³ in 1983, while the highest was 67.7 million m³ in 1995. Timber from non-State sources, which was not included in annual harvest targets, totalled more than 19 million m³ per year between 1984 and 1991, and was over 20 million m³ per year from 1992 to 1997 (Table 7).

Table 7. Volume of China's domestic timber production, 1983-1997 (million m³)

Year	State-owned forest production	Non-State forest production	Total
1983	52.3	-	52.3
1984	63.9	19.7	83.6
1985	63.2	19.5	82.7
1986	54.8	17.0	71.8
1987	64.1	19.8	83.9
1988	62.2	19.2	81.4
1989	58.0	19.7	77.7
1990	55.7	18.9	74.6
1991	58.1	19.7	77.7
1992	61.7	20.9	82.6
1993	63.9	21.7	85.6
1994	66.2	24.4	90.6
1995	67.7	25.0	92.7
1996	67.1	24.8	91.9
1997	64.0	23.6	87.6

Note: Source for State-owned forest production: Statistics Department of SFA
Non-State forest production: estimated from various sources

The greatest demand for industrial timber is for construction, furniture, coal mining, paper, stationery, railway sleepers, matches and for use in chemical industries. This demand fluctuated annually, with consumption averaging 90.3 million m³ from 1993 to 1997 (Table 8). Demand for plywood also increased dramatically from 5.3 million m³ in 1993 to 19.3 million m³ in 1997, an annual increase of 37.9 percent.

Table 8. Industrial timber consumption by sectors in China, 1993-1997 (thousand m³ and percent)

Sector	1993		1994		1995		1996		1997	
	Volume	percent								
Construction	57 240	67.7	63 390	66.2	52 300	59.0	56 850	62.2	58 300	63.9
Furniture	2 550	8.9	12 190	12.7	12 680	17.2	12 680	13.9	12 000	13.2
Coal mining	6 860	8.1	8 050	8.4	7 900	8.8	7 900	8.6	7 640	8.4
Paper	5 770	6.8	3 780	6.0	7 610	7.9	7 610	8.3	6 950	7.6
Stationery	3 290	3.9	2 460	2.6	2 330	2.6	2 480	2.7	2 500	2.7
Vehicle & ship	2 130	2.5	2 190	2.3	2 210	2.6	2 210	2.4	2 160	2.4
Chemical	700	0.8	720	0.7	750	0.8	730	0.8	710	0.8
Sleepers	700	0.8	560	0.5	540	0.6	540	0.6	530	0.6
Chemical fiber	2 130	0.4	390	0.4	390	0.5	390	0.4	380	0.4
Total	84 610		95 730		88 620		91 390		91 170	
Plywood	5 320		6 520		18 980		12 260		19 250	

Sources: Yearbook of Light Industry; Strategy of Forestry Development in 21 Century; Economic and Technological Indices of Peasant Used Timber

Relatively small volumes of timber are exported from China. Total exports were 8.6 million m³ in 1997. Using data from Table 7 as well as export and import data, the volume of timber available for domestic consumption can be derived as shown in Table 9, showing an average volume of 91.3 million m³ per year from 1993 to 1997.

Table 9. Volume of timber available for China's domestic consumption (million m³)

	1993	1994	1995	1996	1997
Domestic timber production*	85.6	90.6	92.7	91.9	87.6
Imports	8.2	7.5	6.9	7.3	9.1
Exports	4.5	5.8	7.9	7.3	8.6
Timber available for domestic consumption	89.3	92.3	91.7	91.9	88.1

Note: Timber available = domestic timber supply + imports - exports

Comparing the volume of timber available (Table 9) against the actual volume consumed (Table 8), it can be seen that the volume of timber available is on the decline, while domestic consumption is increasing slightly (Table 10). During the years when there was a deficit in the balance (1994 and 1997), the balance from previous years were used to meet the demand. However, if the trend of decreasing supply and increasing demand were to continue, then the surplus from previous years would not be sufficient to keep up with demand.

Table 10. Volume of timber available for China's domestic use and actual consumption (million m³)

	1993	1994	1995	1996	1997
Timber available for domestic consumption	89.3	92.3	91.7	91.9	88.1
Actual domestic consumption	84.6	95.7	88.6	91.4	91.2
Balance	4.7	-3.4	3.1	0.5	-3.1

By 2003, the NFCP targets to reduce timber production from the natural forests by 19.9 million m³. Under such circumstances, the gap between supply and demand would become more acute and China would very have to seek alternative supply sources, most likely through expanding its forest plantations and imports.

Impacts on timber prices

Despite the projected declines, existing stocks and imports will keep timber supplies stable until 2003. Therefore, domestic timber prices are not expected to change drastically in the short-term, except for the occasional price fluctuations. For example, timber prices were only slightly higher during the annual Fall Timber Trade Fair in Nanjing in 1998. Common tree species were approximately 5 percent more expensive after the logging ban was announced, and prices for species for special uses were approximately 10 percent higher. Prices are likely to continue to increase because the gap between supply and demand will widen.

Impacts on local non-industrial timber

Non-industrial timber is used mainly as fuelwood, or by farmers for general household purposes. Historically, consumers rely mainly on the natural forests to fulfil such needs. Fuelwood accounted for about 30 percent of yearly total consumption of forest resources, while household activities, including construction, utilized 20 percent. The NFCP, therefore, will also reduce non-industrial timber supply.

The Government is adopting a number of measures to encourage people to build brick and concrete homes instead of wooden framed houses. It is also promoting the establishment of fast-growing fuelwood plantations, development of alternative energy such as coal, gas, solar energy, biogas, and hydroelectricity, and improved stoves.

Sources of timber supply

Apart from its domestic sources, China has also relied on imports to meet its timber demands. However, the high foreign exchange rate makes this approach unattractive as a long-term measure. The NFCP logging bans, coupled with the deteriorating environmental conditions of the timberlands, render the domestic timber supply quite unpredictable. The optimum solution is a two-pronged approach of increasing imports and maximizing domestic timber production.

More intensive thinning and tending regimes of middle-aged and immature timber stands can help improve their productivity. Scientific and technological advances can also be used to increase the utilization rate of forest resources. Utilizing small-dimension logs for wood-based panels and pulp and paper offers further opportunities, and demands can be partially met by ensuring the use of non-timber substitutes. In addition, increasing the growth and yield of timber plantations through the use of improved planting stock and better management should not be overlooked.

These approaches, in conjunction with the imports of medium- and large-diameter timber and high-grade pulp and its products, can resolve the supply and demand imbalance. Other remaining issues include improving the levels of afforestation and silviculture, and identifying suitable land to extend the forest area.

Timber plantations as an alternative source of supply

After nearly 50 years of development, the area, stock and productivity of China's timber plantations have increased significantly. Today, China has the largest area of plantations in the world, amounting to 34.3 million ha, of which 17.5 million ha are industrial timber plantations, with a growing stock of about 578 million m³.

The Government plans to gradually shift timber production from natural forests to plantations. However, the output from plantations is still below expectations and needed volumes. Plantations will supply 13.5 million m³ in 2000 and 39.3 million m³ in 2005 (Table 11). Chinese fir, Masson's pine, larch, Chinese pine and cypress account for 88.5 percent of coniferous plantations. Poplar, eucalyptus, soft broadleaves, hard broadleaves and mixed broadleaves account for 92.8 percent of broadleaf species. Based on these projections, it may be possible for the plantations to become the main source of industrial timber if forest management practices are improved and the plantation areas and species structure are adapted to market demands.

Impact on the timber industries and international trade

Impacts on the wood industries

China's wood industry consists mainly of sawmills, woodchip processing, and wood-based panel producers. The success of the industries is directly related to the availability of timber. The main source of raw material is timber from nearby forests under the control of the provincial departments of forestry and their affiliated local organizations.

Table 11. Volume of China's timber plantation production by species (thousand m³)

	1994-1996	1997	1998	1999	2000	2005
Chinese fir	2 780.0	2 780.0	2 780.0	5 280.0	5 280.0	17 850.0
Masson's pine	39.0	39.0	39.0	39.0	390.0	2 290.0
Larch	83.0	83.0	83.0	83.0	83.0	83.0
Chinese pine	0.4	0.4	0.4	0.4	0.4	60.0
Cypress	0.0	0.0	0.0	0.0	0.0	37.5
Others	263.0	263.0	263.0	263.0	263.0	1 580.0
Conifers subtotal	3 165.4	3 165.4	3 165.4	5 665.4	5 665.4	21 900.5
Poplar	1 750.0	1 750.0	5 760.0	5 760.0	5 760.0	14 580.0
Eucalyptus	170.0	110.0	110.0	110.0	1 290.0	1 990.0
Soft broadleaves	490.0	490.0	490.0	490.0	490.0	620.0
Hard broadleaves	32.0	32.0	32.0	32.0	32.0	32.0
Mixed broadleaves	60.0	60.0	60.0	60.0	60.0	120.0
Others	150.0	150.0	150.0	150.0	150.0	100.0
Broadleaves subtotal	2 652.0	2 592.0	6 602.0	6 602.0	7 782.0	17 442.0
Total	5 817.4	5 757.4	9 767.4	12 267.4	13 447.4	39 342.5

In 1998, shortly after the NFCP came into effect, State-owned wood processing enterprises were badly affected by the decline in production and export volumes. China's output of wood-based panels declined by 35.9 percent to 10.6 million m³, sawntimber by 11.1 percent to 17.9 million m³ and woodchips by 17.4 percent to 4.4 million m³. The value of the State-owned wood processing industries decreased by 6.5 percent to 6.2 billion yuan, and that of related sawntimber and woodchip production by 4.8 percent to 2.6 billion yuan. Similarly, the export value of sawntimber and woodchips suffered a serious setback of 51.9 percent, dropping to 454.5 million yuan. Only the export value of wood-based panels, valued at 103.8 million yuan, showed an increase of 3.6 percent.

Many small-scale enterprises had operated with outdated equipment and inefficient management. There had been little accountability for costs and revenues, and basic elements of competitiveness were frequently lacking under the former centrally planned system. However, they managed to maintain profitable production levels because raw material was inexpensive and easy to acquire. Since the implementation of the NFCP, harvested volumes have declined significantly forcing several enterprises to reduce or halt production.

Several private forest product companies have also been affected by the NFCP. In 1998, the production levels for wood-based panels, sawntimber and woodchips decreased by 5.9 million m³, 2.5 million m³ and 730 000 m³ (44.5, 14.0 and 40.3 percent) respectively. Located near economic centers and along the coastal areas, they are more exposed to market forces, and derive their raw material from domestic and international suppliers. Nonetheless, many firms had to sharply curtail their production.

Impacts on the international trade of timber products

China increasingly depends on timber imports, particularly hardwood logs and wood-based panels (Table 12). Log imports from 1981 to 1997 totalled 93 million m³, averaging 5.5 million m³ per year, or 9.4 percent of the country's timber supply. The greatest volume of log imports was 10.7 million m³ in 1988, accounting for 19.1 percent of the total log supply that year. During the 1980s, overall timber and wood product imports increased at an average annual rate of 8 percent, except in 1981. However, while the volume of imports generally increased during the 1990s, the share of imports as a percentage of total wood supply declined at a rate of about 8 percent per year. One exception was imports of sawntimber, which exhibited a reverse trend. Sawnwood imports, which averaged about 1 percent of domestic production in the 1980s, increased noticeably in the 1990s.

Table 12. Volume of China's major forest product imports, 1981-1997 (thousand m³)

Year	Log	Sawntimber	Plywood
1981	1 871	75	259
1982	4 652	132	514
1983	4 413	162	304
1984	7 956	600	573
1985	9 820	148	824
1986	7 818	165	621
1987	7 180	98	1 406
1988	10 675	392	1 352
1989	6 410	125	1 073
1990	4 193	252	1 377
1991	4 097	306	1 463
1992	4 670	974	1 585
1993	3 459	1 208	2 229
1994	3 335	896	2 109
1995	2 583	851	2 083
1996	3 186	933	1 777
1997	4 471	1 325	1 489
Total	92 989	8 642	21 038

Source: China Customs Statistics

With limited commercial timber resources, China's log export volume is low and has generally declined since 1988 (Table 13). On the other hand, exports of processed products, such as plywood, are increasing due to the opening of domestic markets, market liberalization and rapid growth of companies with foreign investments. Nevertheless, China's wood product imports outstrip its exports.

Table 13. Volume of China's major forest product exports, 1988-1997 (thousand m³)

Year	Logs	Sawntimber	Plywood	Veneer
1988	314	3	8	-
1989	475	4	9	-
1990	91	86	21	2.
1991	135	98	22	4.
1992	237	923	238	72
1993	155	330	45	16
1994	91	390	106	17
1995	97	408	129	21
1996	64	383	177	20
1997	63	387	438	3

Source: China Customs Statistics

To counter the reduction in harvests from the natural forests, timber production can be augmented by intensifying management and thinning practices and increasing supplies from plantations and imports. The Government eliminated the tariff on logs in 1999 to boost imports (Tables 14 and 15). In an apparent response to the tariff reduction, import volumes increased substantially in 1999 compared with 1988.

Table 14. Volume of China's log and sawntimber imports, 1998 and 1999 (m³)

Category	1998	1999	Percent increase
Logs	4 190 000	9 010 000	115.0
Sawntimber	1 468 905	2 428 743	65.3
Total	5 658 905	11 438 743	102.1

Source: China Customs Statistics

Table 15. Value of China's wood and wood product imports, 1998 and 1999 (thousand US\$)

Category	1998	1999	Percent increase
Wood and wooden products, charcoal	1 725 551	2 615 575	51.6
Softwood and softwood products	11 603	12 054	3.9
Wood pulp and other pulp	1 000 872	1 478 052	47.7
Total	2 738 026	4 105 681	50.0

Source: China Customs Statistics

The United States, Canada, and Western and Northern Europe are leading suppliers of logs and sawntimber to China. The main species imported include oak, maple, beech, Douglas fir and hemlock from the United States and Canada. North America also provides the bulk of China's imports of pulp and paper products.

Russia is also emerging as an important supplier of logs and forest products to China. Currently, China mainly imports logs and pulp from Russia. South American and African countries are important sources of selected tropical hardwood logs. Southeast Asian countries such as Indonesia, Malaysia, Laos, Cambodia and Myanmar are also important due to their close proximity. China has imported particularly large volumes of plywood and dipterocarp logs from Indonesia and Malaysia, and high-quality timber from Myanmar. It is expected that China will also look to Australia and New Zealand as suppliers of timber imports in the future.

Impact on Government tax revenue and budgets

Government tax revenue and budgets will definitely be affected by the logging restrictions and the subsequent decline in timber production, particularly in areas where timber is a main source of income. Tax revenue from timber production and sales is earned primarily through Agriculture and Forestry Special Production taxes, value-added taxes, income taxes, business taxes, and other fees in accordance with local conditions. The Agriculture and Forestry Special Production tax is set at 16 percent, the value-added tax at 17 percent, income tax at 33 percent, and the business tax between 3 and 20 percent.

According to a survey conducted by the SFA after the implementation of the NFCP, the revenue for Lijiang prefecture of Yunnan province decreased by 126.83 million yuan annually. Estimates for Sichuan province indicated that its revenue was expected to decrease by 680 million yuan in 1998. Income from timber-related industries in the Ganzi, Aba and Liangshan prefectures averaged 80 percent of their total revenues, with Xinlong County in Ganzi topping the list at 98.3 percent. Xiangtang and Heishui counties in Aba (two poverty-stricken areas) are also highly dependent on timber revenues, which accounted for 91 percent and 86 percent of their total revenues, respectively. After the logging bans were implemented, the total revenue for Aba decreased by 30 million yuan in 1998. The Wenchuan paper mill, an affiliated enterprise of the Aba prefecture, with fixed assets of 130 million yuan, has stopped operations due to raw material shortages. Similarly, Leshan, whose forestry sector accounted for 61.42 percent of local revenue, lost 200 million yuan in 1998. Ermei, a famous timber-producing county, saw a decline of more than half its revenue (about 120 million yuan).

Such discouraging impacts need to be addressed and resolved for the NFCP to be successful. Looking from a broader and long-term perspective, the NFCP will have positive and far-reaching impacts on the sustainable development of the national economy and society as a whole. It will effectively help slow down the deterioration of China's environment and reduce the frequency and adverse impact of natural disasters, thereby lessening the strain on the national economy and budgets.

Serious soil erosion has caused increased siltation in the Yangtze River and created a "suspended river" in the Jinjiang River section. The water level of the river is several meters higher than the

riverbanks during the flooding periods, and is held back only by embankments. During the past four decades, Jinjiang has spent a huge amount of resources to build a 3 600 km wall along the Yangtze River and 30 000 km of embankments along its branches and tributaries.

The catastrophic floods in 1998 affected hundreds of millions of people and caused extensive damages to riverine areas. The State reacted by greatly increasing funding for flood control projects. During the months before the onset of the next flooding season, the State invested 46.5 billion yuan in water conservation projects. The cost for the embankment projects on the Yangtze River alone totalled 7.8 billion yuan.

Despite efforts to control flooding, serious economic and social costs continue to plague China. Flooding of the Yangtze River is increasing in frequency from about once to four times per decade. At the same time, water flow has become more erratic. In 1997, the river ceased to flow for 226 days, causing severe droughts, which again affected the economy adversely.

The NFCP, therefore, represents one way to help reduce the enormous financial and social costs of natural disasters. China's overall economy is currently being restructured and capital resources are scarce. Expenditures redirected to deal with natural disasters only reduce China's ability to address necessary restructuring issues. The NFCP will ultimately free capital resources for China's development.

If the economies of forested areas are to improve, the local economy must also be restructured to focus on a broader-based and diversified system. Along with the traditional forest-dependent processing activities, new economic growth points and industries, including the development of tourism, cash tree crops and other suitable forestry and animal husbandry, need to be considered.

To counter the financial difficulties associated with the logging ban in the Sichuan province, members of the provincial Political Consultative Conference identified the following priorities:

- ◆ develop the province's water resources, mining, and tourism and stabilize these sectors of the economy;
- ◆ establish stable agriculture and animal husbandry sectors by selecting and improving leading financially-viable enterprises, adjusting product and output structures to provide for a broader mix of goods and services, and integrating agricultural enterprises and farm households into the market economy;
- ◆ promote animal husbandry within the rural economy;
- ◆ apply modern forest management technologies to enhance the environmental functions of forests such as soil and water conservation; and
- ◆ fully utilize natural plant resources as a source of edible fungi, wild food and medicinal herbs.

The Aba prefecture decided to promote tourism to offset the timber revenue losses. It attracted 163 000 tourists in 1998, earning 152 million yuan, a 128 percent increase in revenue from 1997 and a 130 percent increase in the number of tourists. Revenue earned from tourism is now 30 percent of the prefecture's GDP.

Distribution of the costs of implementing the NFCP

Several diverse activities, involving a large number of all stakeholders, are necessary to facilitate the implementation of the NFCP. Authorities directly overseeing the affected forests will have to simplify the administrative structures and cut expenses. The national Government will have to compensate local Governments for losses incurred as a consequence of the logging ban. Industries will need to implement managerial and economic reforms, re-deploy and compensate unemployed workers. Small private processing firms using timber from protected forests must find alternatives to continue operations or dissolve their companies and settle their obligations to creditors and employees.

The Government must also deal with the widespread rural dependence on fuelwood. Substituting coal or electricity for fuelwood may be an option in some places. The development of fuelwood plantations should also be encouraged.

The costs associated with implementation of the NFCP will be borne by the State, local Governments, private firms and individuals. Most of the compensation will be borne by the central Government, while the provincial Governments will pay a lesser portion. The direct cost to the State and local Governments is the loss of tax revenue from timber and other forest products. The central Government spent 4.3 billion yuan in 1998 and 6.1 billion yuan in 1999 to help implement the NFCP. Private firms will bear the cost of lowering or halting production. Workers will be affected by redundancies. Forest farmers lose by not being able to harvest timber and fuelwood.

ASSESSMENT OF ENVIRONMENTAL IMPLICATIONS OF THE NFCP

Biodiversity

According to the bio-geographic zoning criteria used in the *Summary of China's Biodiversity Protection*, key protected natural forests include:

- ◆ Northeast China: Heilongjiang, Jilin;
- ◆ North China: Shaanxi, Shanxi, Henan, Hubei
- ◆ Northwest China: Inner Mongolia, Ningxia, Gansu, Xinjiang;
- ◆ Tibet-Himalaya: Qinghai, Tibet;
- ◆ Southwest China: Yunnan, Sichuan, Chongqing;
- ◆ Central China: Guizhou; and
- ◆ South Tropical China: Hainan.

China's forests contain some of the richest biodiversity in the world due to the country's large size and the extremely variable geographic conditions. Unfortunately, humans have destroyed much of the natural forests. More than half the habitats have disappeared in nearly two-thirds of the provinces. Protection of natural forest resources is therefore urgently needed as a means to conserve biodiversity.

China has ranked its provinces according to their relative priorities and importance for protection of biodiversity, with Grade A provinces being accorded the highest priority, Grade B second priority, and Grade C the last priority. The country's four Grade A priority provinces (Yunnan, Sichuan, Xinjiang and Jilin) and seven Grade B priority provinces are all included the NFCP (Table 16).

Table 16. Status of protected natural forests by provinces in China

Province	Land area (km ²)	Forest area (km ²)	Plant species close to extinction	Reserves		Priority
				Area (km ²)	Number	
Heilongjiang	455 000	152 944	16	4 172	16	B
Jilin	189 000	60 789	24	7 999	7	A
Shaanxi	207 000	44 714	36	1 842	7	B
Shanxi	157 000	8 100	14	624	4	C
Henan	167 000	14 199	25	723	16	C
Hubei	186 000	37 790	44	1 467	6	B
Inner Mongolia	1 158 000	137 401	20	0	0	C
Ningxia	66 000	951	6	935	6	C
Gansu	450 000	17 690	32	10 374	19	B
Xinjiang	1 650 000	11 209	24	100 021	21	A
Qinghai	721 000	1 945	10	7 731	4	B
Tibet	1 228 000	63 203	31	2 097	7	B
Yunnan	383 000	91 965	154	11 635	30	A
Sichuan	566 000	59 108	78	27 019	63	A
Guizhou	176 000	23 093	65	1 335	9	C
Hainan	34 100	2 420	-	737	31	B

Note: Sichuan's data include Chongqing

Most provinces under the NFCP are species-abundant regions. The impact of the NFCP can already be witnessed by the reappearance of the rare grand panda and takin in the former logging area of the Long Chao Ping Forest Industry Bureau of Shaanxi province.

Soil erosion and fertility

Soil erosion has been one of China's main environmental problems hindering the development of the national economy. According to a 1990 remote sensing survey, the area affected by erosion amounted to 3.7 million km², or 38.3 percent of China's total land area. The annual amount of eroded soil was 5 billion tons. This is the equivalent to 1 centimeter of surface soil of the total area of farmland, with a further loss of nitrogen, phosphorus and potassium that is equivalent to over 40 million tons of standard fertilizer. The implementation of the NFCP should reduce soil losses substantially.

The Yangtze and Yellow River basins encounter the most severe soil erosion in China. The area affected by erosion in the Yangtze River basin increased to 620,000 km² in the early 1990s from 360 000 km² in the 1950s. The middle and upper reaches of the Yellow River cover 640 000 km² of the loess plateau, and soil erosion has affected 450 000 km² of the area.

Desertification

The western central region of China is affected by severe desertification, with grave impacts on industrial and agricultural production. In northern China, there are approximately 30 days of strong winds with very high dust levels per year, damaging more than 14 million km² of farmland and reducing grain production. The Lanzhou Institute of Desertification of the Chinese Academy of Sciences reported that 31.8 percent of desertification was induced by the destruction of natural vegetation, 28.3 percent by overgrazing, 25.4 percent by over-reclamation, and 8.3 percent by improper utilization of water resources. Direct economic losses caused by desertification total approximately 54 billion yuan per year.

Water resources

The average discharge of the Minjiang River in Sichuan decreased from 14.8 billion m³ when the People's Republic of China was first founded in 1949 to 13.1 billion m³ in 2000, a drop of 11.5 percent. Between 1988 and 1997, the discharge of the Qinghai River, the source of the Yellow River, declined by 4 billion m³. From 1978 to 1987, the lower reaches of the Yellow River dried up seven times, the longest drought lasting 20 days. In recent years, droughts have become successively longer, lasting 226 days in 1997 and affecting 100 cities and 100 million people. Since China's natural forests are located primarily in important watersheds of major rivers (Table 17), forest protection is crucial in solving the country's water shortage.

Table 17. China's natural forest resources by river basin

River basin	Area (thousand km ²)	Percent of total area	Stock (billion m ³)	Percent of total stock	Forest cover (percent)
Yangtze	25 510	29.2	2.351	28.1	22.0
Yellow	2 790	3.2	0.179	2.1	5.9
Zhujiang	7 060	8.1	0.327	3.9	26.7
Heilongjiang	31 440	36.0	2.873	34.3	40.2
Huaihe	540	0.6	0.016	0.2	8.3
Haihe	500	0.6	0.015	0.2	8.1
Liaohe	1 020	1.2	0.049	0.6	14.6
Songhuajiang	16 050	18.4	1.395	16.7	33.2

ASSESSMENT OF SOCIAL AND ECONOMIC IMPLICATIONS OF THE NFCP

Impacts of the logging ban on the employment of forest workers and forest farmers

Employment statistics indicate that 1.1 million forest workers, including those involved in road construction, mechanical repair, transportation, log depots, log processing, wood processing and logging, will lose their jobs when the logging bans are implemented. This will increase the pressure on China's social welfare system. Proper redeployment of these workers is critical for the success of the NFCP. State and local governments and relevant private firms are developing several strategies to minimize the impacts on employment and, consequently, on China's social welfare system.

Forest ownership is mainly held by the State, with minimal collective tenures. Private ownership of forests is limited mainly to mountainous plots maintained by farmers and trees scattered around their houses. These farmers would not be much affected by the logging ban and subsequent closure of small wood processing plants unless they are employees or seasonal loggers.

Efforts will be made to re-deploy laid-off employees to work in forest management and protection, afforestation and silviculture. It is estimated that one person will be re-employed in forest management or forest protection for every 187 to 380 ha of natural forests. The central Government will pay the salaries of employees in forest management and protection, whereas salaries of workers involved in afforestation, silviculture, and exploitation of resources will come from the capital improvement investment funds, private firms, and bank loans. Laid-off employees can also seek alternative employment on their own or through Government re-employment centers. They will receive a lump-sum severance pay equivalent to three times the average local wages from the central finance department. Finally, workers with private companies who cannot be reassigned and do not want to voluntarily terminate their contracts, can consult re-employment centers funded by the central financial department. They will also receive monthly unemployment benefits for up to three years. If they cannot find another job within three years, they will be given social welfare support to cover minimum living expenses. Local governments and private firms are also encouraged to retrain and help workers upgrade their skills, and to create new job opportunities.

Recent evidence indicates that laid-off production workers re-employed in forest management and protection are happy to accept the offer because the work is easier with almost the same pay. Those who found new jobs through the job centers often receive higher wages because they have acquired new skills through re-training.

Economic impacts

Impacts on the income of Government and private enterprises

Subsidies paid to State enterprises by the central Government and local financial departments as a result of the logging bans are higher than their foregone profits. For example, the Government paid the Da Xing An Ling Forestry Company in Heilongjiang province a 330 million yuan subsidy in 1998. Even after deducting workers' social security costs, the firm's actual net income was still 2.2 times more than the losses incurred by decreased production. Many other forest products firms have had similar experiences.

Impacts on the income of forest workers and farmers

Approximately 60 percent of the central Government funds paid to affected areas are used to subsidize employment costs for State enterprises. Workers re-employed in forest management and protection are paid approximately 8 000 yuan per year, which is between 700 and 5 511 yuan higher than their former wages. Although forest farmers would be losing income from seasonal harvesting and timber processing, it is likely that they can be contracted for other forestry-related work. To stabilize their income, the central Government will also give preferential credit and tax breaks for alternative income-generating activities such as tree breeding and forest nurseries.

Many laid-off workers seeking new jobs elsewhere do not find work quickly. These workers often have few skills and little experience. Therefore, the Government and private sector should offer technical guidance, training, and services to mitigate social impacts.

Impacts on social welfare

Currently, the State is responsible for many social services and amenities, including pension, education and medical care. Some forest bureaus and enterprises even pay local government expenses. However, forest revenues that previously subsidized these benefits have declined due to reduced harvesting and environmental deterioration even before the logging bans were imposed.

Despite that scenario, the central and local governments guarantee that policies will be developed and funds made available to help forestry enterprises and communities to deal with social welfare problems. One measure includes transferring education, medical care, public security, legal institutions, and the people's courts to the jurisdiction of local governments. Central and local financial departments will jointly bear the expenses of these programs with the local departments providing most of the funds. The central Department of Finance will also give high priority to secure investments in affected areas.

CONCLUSIONS

Protecting the natural forests supports China's policy of environmental protection and helps the country meet its commitments under international conventions. With an unevenly distributed forest cover of only 13.9 percent of the total land area, China needs more forests. Deforestation has not been effectively checked in many locations. Approximately 2 million ha of forestland have been converted to open woodland, shrubland, denuded land, and land for non-forest

purposes each year. The Chinese Government considers environmental protection a basic national policy. Logging bans or restrictions are important for achieving this policy. In addition, the implementation of the NFCP is one of the Chinese Government's means to fulfil its commitment to international agreements and global efforts to accelerate environmental protection.

The upper reaches of the Yangtze River and the middle and upper reaches of the Yellow River are the birthplaces of the Chinese civilization. They are sources of valuable raw materials and energy for economic development and the source of water for inhabitants in the valleys. However, overuse of the natural resources has slowed economic and social development. Deforestation is one of China's greatest problems. Logging bans, afforestation and greening of degraded and sloping land are necessary to rehabilitate the Yangtze and Yellow River watersheds.

State-owned forests are important sources of income. Much of China's timber comes from the Northeast and Inner Mongolia, and the Songhua and Nenjiang Rivers. The country's main tropical rainforests are located in Hainan, a popular tourist region. The Xinjiang forest is an important water conservation area. Logging bans or reductions are necessary to rehabilitate the forest resource, improve the stand quality, and improve the ecological functions of these forest areas.

The NFCP is an important step to realize the country's strategic objectives to protect and improve the natural environment. It also plays an important role in maintaining China's social stability and in safeguarding sustainable development. In support of the NFCP, the Chinese Government has formulated relevant policies, endorsed enabling laws and regulations, and set up administrative, budgetary, and scientific structures to ensure that the NFCP objectives and tasks will be accomplished.

China's NFCP will not only protect 56.2 million ha of natural forests but will increase the forest area by 22.7 million ha. It will help maintain China's rich biodiversity, prevent soil erosion, and reduce the incidence of natural disasters. It will play an important role in reducing the financial pressures on the Government to provide relief for emergencies and disasters. It will help safeguard people's lives and property and maintain social security. It will bring new opportunities and vitality to the economy, and transform economic growth patterns. China's large-scale implementation of logging bans will also elevate the standard of living for many citizens.

Several countries have established successful forest protection programs. China has made a significant step in the right direction, thus attracting the attention of several developed countries. The next move is to participate in technical exchanges and cooperation with the international community to achieve the joint goal of natural forest protection.

POLICY OPTIONS AND NEW MEASURES

Prior to the 1980s, public awareness of the importance of protecting natural forests was poor and over-consumption of natural forest resources was common. Since then, China has strengthened its Forest Law, developed a logging quota system and made considerable progress in protecting its forests. With rapid economic development and ineffective enforcement, however, the logging quota was not observed and other forms of forest destruction took place, raising great concerns that the NFCP would fail. One assurance to prevent this from happening is to enforce supporting laws when implementing the logging bans.

Hainan and Sichuan provinces have formulated provincial regulations for natural forest protection that have gained enthusiastic support. Their positive experiences are now the basis for formulating national policies. Laws and regulations will be passed to give natural forests legal protected status. Organizations responsible for carrying out the duties will be identified, thus disassociating them from politics.

The NFCP is implemented by the SFA but involves numerous departments at the State, provincial, county and local levels. Proper planning and coordination are, therefore, very important. The objectives, scope, policies, responsibilities and implementing measures at each

level must be clearly outlined and conveyed to all participants. The order of authority and command has to be identified and established at the State, provincial and county levels. Rules governing the management and funding of the NFCP should be formulated and an audit of the NFCP management and financial bodies should be incorporated. In addition, audits, public bidding, and supervision must be institutionalized.

Participation from all segments of society should be encouraged. A national campaign to raise public awareness of the importance and benefits of natural forest conservation is necessary. The State should fund the NFCP adequately. The reduction in local Government funds, loans and the redeployment of unemployed workers should be solved properly to instill the faith of the local Governments, forest industries and forest workers in the NFCP.

Although natural forest management and protection are very important for many aspects of the national economy and societal well-being, no permanent budget has been set aside for maintaining nature reserves. A policy must be formulated to mandate that the costs of maintaining the natural forest environment and forest protection are a public responsibility. Secure, long-term funds should be provided for these purposes. After years of deliberation, the prospects of establishing an adequate funding system are good. The relevant authorities should capitalize on current favorable public awareness and support, and implement such a policy to draw these funds from the national Government. The 1997 national Government revenue was about 150 billion yuan. If 3 percent would be used for ongoing management costs, 4 to 5 billion yuan per year would be available.

The means to achieve multiple-use forests have not received much attention at the local level. Several important questions are still to be answered:

- ◆ Should natural forests be managed for diversity?
- ◆ How should the forests be managed to maximize diversity?
- ◆ Should mature or over-mature forests be felled and utilized, or left to nature to take its own course?
- ◆ How should natural forests with logging bans be managed?
- ◆ Should non-timber resources in natural forests with logging bans be utilized?
- ◆ If yes, how should these forests be utilized?
- ◆ Should tourism, hunting and science education activities be allowed in protected natural forests?

Scientific research and development must support the implementation of the NFCP and find answers to these questions. The Government should fund research and development of non-wood substitutes for the construction, furniture and other wood-based industries to reduce the domestic demand for timber. For example, Longshen New Materials Co., Ltd. in Hunan province, has developed a non-wood substitute that has the appearance, feel and durability of wood. The product has surpassed the performance of some other products from Japan and has passed the scrutiny of the Chinese Commission of Science and Technology. Such products have the ability to substantially reduce the pressure on the natural forests and the Government should encourage their use.

Approximately one-third of the country's wood consumption is for fuelwood. Solving the rural energy problem is an important issue. Rural biogas projects, and the use of coal and electricity should be promoted. Projects to develop wind, solar and geothermal energies should also receive Government support.

Logging bans in the natural forests are not the ultimate goal of the NFCP. Rather, the overall goal is to improve the economic, social and ecological benefits that forests can provide to society.

Logging bans have considerable economic impacts on forest industries. Redeployment of forest workers and support for non-wood and other non-forest-based industries will be important.

Restructuring the economy and developing new industries must also be undertaken. The State should provide special loans and tax breaks to consolidate and expand natural forest protection. The key to effective forest protection in collective forests is support for farmers to find employment with wages comparable to those in forest industries. National commercial banks should use Government funds to provide special loans to farmers to support necessary economic restructuring.

It is also necessary to establish a preferential policy to support the cultivation of fast-growing and high-yielding plantations. Forestry authorities should select appropriate areas, and use good planning, design and technical approaches. Banks should provide special loans accordingly.

IMPACTS AND EFFECTIVENESS OF LOGGING BANS IN NATURAL FORESTS: PHILLIPINES

Ernesto S. Guiang

INTRODUCTION

The Philippines' forestry sector has been the subject of numerous studies and analyses over the last two decades. Among these studies are those of Revilla (1998); USAID (1989), World Bank (1989), Bautista (1990), Sajise and Pacardo (1991), DENR (1990a and 1990b), FMB/DENR (1999), ESSC (1999a), FMB/DENR (1998), Pollisco (1999), Abracosa (1999), Angeles (1999), de los Angeles (2000), and various annual reports of the wood industry association. They confirmed that the Philippine forests were abundant in the 1950s and a major source of export revenue in the 1960s and 1970s. The country's forests, however, were largely deforested in the 1970s and converted into agricultural areas in the late 1970s and 1980s. The forests and deforestation became a major focus of democratization and biodiversity preservation movements in the 1990s (Bernas 1990; Sanvictores 1997a and 1997b; Garrity *et al.* 1993; Guiang 1993; Angeles 1999).

Deforestation affects upland and lowland communities alike, and causes many problems including increased open access, marginalization of the uplands, migration of lowlanders to the uplands, inadequate livelihood opportunities in the uplands, decreasing forest productivity, increased erosion and siltation, loss of biodiversity and deterioration of watersheds. The impetus for the massive deforestation includes inconsistent policies, resource allocation that favors the rich and politically influential, illegal cutting, and a centralized and ineffective bureaucracy. The problems are exacerbated by "quick fix" solutions, and poorly designed and implemented reforestation and industrial tree plantation programs.

Forest cover

The forest cover of the Philippines ranks as one of the 11 poorest among 89 countries in the tropics with a per capita forest cover of about 0.085 ha. It declined from 70 percent of the total land area in 1900 to about 18.3 percent in 1999, or just over 5 million ha of residual and old-growth forests (ESSC 1999a) (Figure 19). Old-growth forests are estimated to cover less than 1 million ha (Table 18) and are mostly located in protected areas, reserves, concession areas, and cancelled/suspended/expired concession areas. The forest cover is projected to decline to 6.6 percent of total land area by the year 2010 without commitment and budgetary support for programs that recognize and address the interests of the rural poor living in the forest. Conversely, the forests are expected to increase to 19 percent of total land area by 2010 with appropriate governmental support and commitment.

Deforestation decreased from an all time high of 300 000 ha annually in the years between 1977 and 1980, to approximately 100 000¹ ha per year in the 1990s. Besides the environmental and economic impacts, deforestation also means that the dipterocarp forests that have been the world's primary source of "Philippine mahogany," may eventually disappear. In 1988, costs associated with forest loss were estimated to exceed 800 million pesos. Deforestation also directly and indirectly impacted fishery resources and has been a major factor in the depreciation of upland soils. Losses to these two resources alone were estimated to be approximately 1 billion pesos for 1996-1997.²

¹ Based on discussion with Director Bert Argete of DENR Policy and Planning Services, the 100 000 ha per annum deforestation rate of the Philippines was based on projections using two forest cover data points. The points are the forest covers in 1980/81 (based on aerial photos) and in 1987/88 (based on SPOT imagery). This deforestation rate is oftentimes contested in public meetings and fora; however, it is used in this paper for lack of other reliable information.

² US\$ 1 = 49 pesos

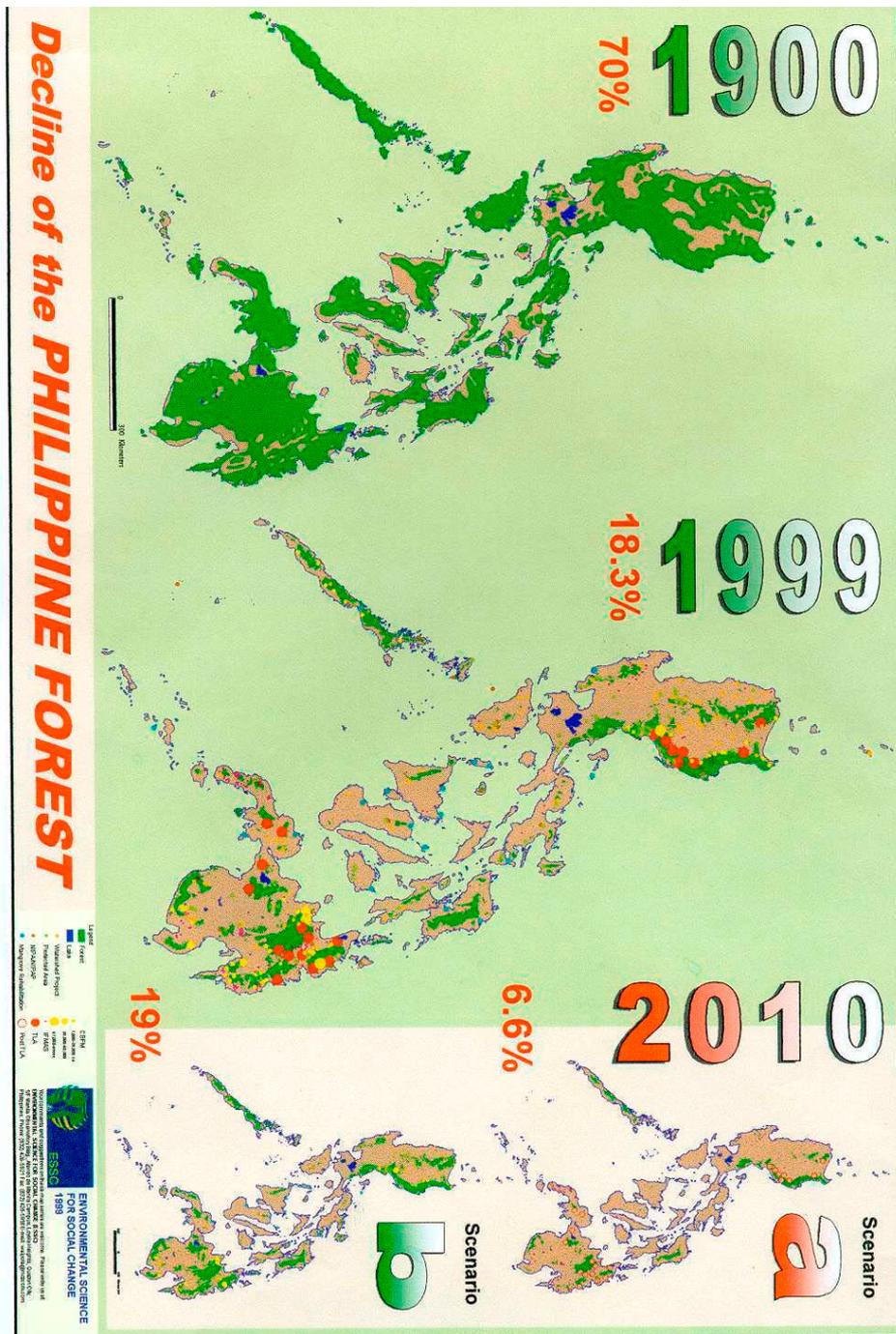


Figure 19. Decline of the Philippine forest, 1900-2010

Table 18. Forest area of the Philippines, 1997

Types of forests or forestlands	Area (thousand ha)
Forest	5 391
<i>Dipterocarp – old-growth</i>	804
<i>Dipterocarp – residual</i>	2 731
<i>Pine</i>	227
<i>Sub-marginal forest</i>	475
<i>Mossy</i>	1 040
<i>Mangrove</i>	112
Brushlands	2 232
Other land uses	22 375
Total area	29 996

Source: FMB/DENR 2000

Many environmentalists blame irresponsible logging practices for the accelerated deforestation. There is no doubt that many of the holders of timber license agreements (TLAs) logged beyond the sustainable volume, practiced clearcutting, used heavy equipment during logging operations and road construction, and did not sufficiently protect logged-over areas after harvesting. The concessionaires were accused of having a “cut-and-run” attitude and setting bad examples for the slash-and-burn farmers (Generalao 2000).

Analyses have shown that deforestation cannot be solely blamed on the TLA holders and their logging operations (DENR 1990; Garrity *et al.* 1993; van den Top 1994; Tenorio 1999; Tomboc and Mendoza 1993). However, logging opened access to the primary forests for slash-and-burn farming, agricultural expansion, and illegal logging activities. According to an FAO study (also the FMB/DENR 1999; cited by Tenorio 1999), extensive slash-and-burn farming in logged-over areas and brushlands caused at least 60 percent of forest denudation, while agricultural expansion accounted for at least 30 percent of forest cover loss. The Forest Development Center – University of the Philippines at Los Baños (FDC-UPLB) – estimated that out of the 100 000 ha deforested every year, commercial logging only accounted for approximately 10 percent or 10 000 ha. Rather, the leading cause of deforestation is the increased access to old and residual forests – the target areas of illegal loggers (Mickelwait *et al.* 1999; de los Angeles 2000).

In the past, many TLA holders had more incentives to overcut. Forest harvesting charges were very low. From the 1950s to the mid-1990s, forest charges were applied as an *ad valorem* rate that ranged from 2 to 6.3 percent of the wholesale log value (Bautista 1990). The Government charged little more than US\$1 per m³ while Indonesia was charging more than US\$15 per m³.

Accountability and responsibility have not been clearly mandated because timber harvest permits for TLAs have been a patronage-biased system. Unstable and unpredictable forest policies and inconsistent regulations have also made transaction costs high. Harvesting under the selective logging system has also unintentionally allowed overcutting in the natural forests. This has favored many TLA holders.

Other factors that contributed to accelerated loss of forest cover include government policies of “land for the landless” and generous equipment financing, which created opportunities for importing heavy machinery for logging, road construction, and conversion of forestlands into agricultural areas.

The Government adopted short-term, highly regulated, and privilege-driven criteria for allocating and managing forest resources. This was followed by a flurry of commercial logging and extraction activities that opened up opportunities for land conversion, upland migration, agricultural expansion, and slash-and-burn farming. Widespread poverty, increasing population, export opportunities, low forest charges, and pro-deforestation policies further aggravated the loss of forest cover over time. A comprehensive and holistic approach is, therefore, necessary if the country is to recover the forests it lost during the last four decades.

Upland population

The upland population of the Philippines (including some 6.3 million indigenous people) already exceeds 20 million people. The University of the Philippines Population Institute estimated the total to be 25 million upland people in 2000, with an annual growth rate of 2.8 percent in the uplands. The upland residents, considered the “poorest of the poor,” are highly marginalized, and treated as squatters on public lands.

Related Government and non-government social services are mostly ineffective in helping upland people because of poor accessibility. Most upland residents are highly vulnerable to the vagaries of natural disasters such as floods, drought, pests and diseases. They are also often the victims of market imperfections and inefficiencies. Moreover, few have benefited from the high GDP growth that took place during the 1994-1997 period (Balisacan 2000). Upland residents, living on both public and private lands, have been the major targets for donor-assisted poverty alleviation programs (World Bank 1999a).

Widespread poverty in the rural areas, the slow implementation of agrarian reform, and limited “economic magnets” (from light and medium industries) in the urban areas left few options for the growing population except to migrate to the forestlands. Migration of lowlanders to the uplands, combined with the widespread commercial logging, has displaced many of indigenous people who traditionally inhabited the uplands. The Government has begun to recognize the legitimate claims of indigenous people over their ancestral lands.

Poverty, limited economic opportunities and the need for agricultural land have driven the growing population to become the *de facto* resource managers for the forests and forestlands. Increasing access through logging roads has exacerbated the migration problem and will therefore require a re-thinking of strategies for development and management of the forests, as well as other resources.

Forest management systems

The absence of operational and effective management systems for many of the forestlands and forest resources characterizes the Philippine situation. Most forests and forestlands are now under no effective management (de los Angeles 2000). In most areas, “check points” and “forest monitoring stations” are the only visible signs of forest management. Most forests and lands set aside for protection do not have approved, legitimized, and funded resource management plans (CPPAP/DENR 1999; Guiang *et al.* 1999; Mickelwait *et al.* 1999; FMB/DENR 2000). The only areas for which the Government demands comprehensive long-term resource management and annual operational plans are those held by TLAs, Industrial Forest Management Agreements (IFMAs), Community-based Forest Management Agreements (CBFMAs), and Certificate of Ancestral Domain Claims (CADCs. The resource-use permits of these holders are highly dependent on the Department of Environment and Natural Resources’ (DENR) approval of the operational plans.

Approved and legitimized comprehensive resource management plans with funds for the periodic monitoring of performance and outcome indicators are the key to successfully managing the Philippine forestlands. If there is effective on-site management, the dipterocarp forests may be relied upon as a sustainable source of wood (Tagudar 1997; Reyes 1999). Otherwise, following Poore *et al.*’s (1998) argument that there is “no forest without management,” *de-facto* resource management by communities and outsiders would take place and prevail, as is the case now.

Table 19 presents an estimate of the extent and status of forest management in the Philippines. It is probable that the 0.9 million ha of forests under 18 active TLAs are effectively managed. The TLA holders, with their annual allowable cuts (AACs) of 0.6 million m³ are generating revenues to finance forest protection and management (FMB/DENR 2000). The same is not necessarily true for CBFMA and CADC areas with resource management plans because the resource-use rights of these communities were suspended by the DENR Secretary effective September 1998 (Mickelwait *et al.* 1999). When the suspension was recently lifted, it was replaced by a highly restrictive policy on utilizing timber from residual forests (DENR DAO 2000-29).

Table 19. Estimate of the status of forest and forestland management in the Philippines

Type of forestland	Area (million ha)	Status of plans and on-site management	Remarks
Protected areas (national parks, game refuge and bird sanctuary, and wilderness area)	1.34	Ad-hoc and highly dependent on availability of funds. Most, if not all, do not have adequate protected area management plans.	The World Bank and European Union are currently funding the preparation, validation, and legitimization of the protected area management plans in at least 18 sites.
Established forest reserves	3.27	Ad-hoc and highly dependent on availability of funds. Most, if not all, do not have approved, legitimized, and funded resource management plans.	Most declared watershed reserves, even those that are considered to be critical, such as the Ambuklao and Binga Watershed, Pantabangan, and Magat are not under effective on-site management systems.
Established timberland	10.02	Only timberlands covered by active TLAs, IFMAs, CBFMAs and CADCs are under some kind of on-site management. It is estimated that at least 5 million ha under this category are considered open access.	The on-site management systems of the TLAs, IFMAs, CBFMAs and CADCs are highly dependent on the approval and award of resource-use rights to the holders of these tenure rights. These areas probably cover only around 1.8 million ha (0.9 million from TLAs, 0.4 million from IFMAs, and 0.5 from communities).
Civil/military reservations, fishponds, and unclassified lands	1.25	Highly variable; some civil reservations are under some form of management; most forests in military reservations are not effectively managed. This also applies with some of the large fishpond lease agreements in mangrove areas.	Some LGUs are taking a closer look at how these reservations are being managed. The LGU of Nueva Vizcaya, for instance, established on-site forestland management for the Lower Magat Forest Reserve.
TOTAL	15.88		

Source: Extrapolated from FMB/DENR (2000)

Almost all Protected Areas Projects funded by the World Bank or European Union have approved, legitimized, and funded Protection Area Management Plans. However, most, if not all, of the country's major watershed forest reserves, covering a total area of 1.38 million ha, have no plans or financial support. There are doubts whether Government funds can continue the protection and management activities after the end of the European Union and World Bank projects. Alternative mechanisms for managing protected areas are being discussed, but it will take time before the dominant approach of "protect, prohibit, and punish" is fully replaced by a philosophy of "protect, participate, and profit" (Larsen 2000). In summary, out of the total 15.9 million ha of public forests and forestlands, only 20 to 25 percent are probably under some kind of effective forest and forestland management.

More than 5 million ha of public forestlands in the timberland category are not covered by any form of tenure, and are considered "open-access" areas (Table 19). Institutional arrangements

covering land rights include co-management agreements, special-use permits, co-production or production sharing agreements and presidential declarations. The Government has become the largest absentee landlord in the uplands (Mickelwait *et al.* 1999; Hyde *et al.* 1997; Johnson 1997). Under *de-facto* management, the forests and forestlands are not covered by any kind of tenure to establish “ownership” or stewardship for protection, development or management.

Angeles (1999) summarized the present forest management situation this way: “There is no other more serious danger that threatens the sustainability of our forest than neglect or abandonment of its protection and development.” This “warning” has been the major message since the 1980s. In spite of this, policy makers, environmentalists and Government officials are not mobilizing resources to establish effective management systems for allocated forestlands. It does not re-align resources to accelerate the process of “closing the open access” to forestlands. The mentality of governmental “command and control” still prevails. Instead of devising appropriate incentive systems that could fit with the Regalian Doctrine,³ the forestry sector has become a victim that is further sacrificed and complicated by the lack of clear division of responsibility at the municipal and provincial levels (Argete 1998). Key forest stakeholders are demanding the clear delineation and actual on-site validation of the protection and management of natural forests and forestlands (Angeles 1999). This cannot happen overnight. It will take a massive organizational undertaking, commitment by both the elected and appointed officials, a participatory approach to obtain consensus, and considerable funding to start, continue, and complete the process.

An inadequate system requiring preparation and submission of comprehensive resource management plans has weakened the Government’s ability to monitor forest protection and management. Monitoring systems based on key performance indicators and outputs such as forest cover, biodiversity indices, water quality and quantity, and forestry investments are not presently available or applied (Johnson 1999).

Supply and demand

Several studies and estimates (Angeles 1999; Dy and Bautista 1999; Cadiz 1999; Foronda *et al.* 1999) show that the existing domestic wood supply from natural and plantation forests is insufficient to meet the increasing domestic demand. In 1989, the Philippines started to import logs, initially about 0.4 million m³. By 1997, log imports had risen to more than 750,000 m³ per year (Table 20). Imports of logs and processed forest products rose to about 2.8 million m³ in 1998. The share of imported logs in total supply increased from 5.5 percent in 1989 (based on total volume) to about 16 to 20 percent in 1997.

Table 20. Import of logs and processed forest products in the Philippines, 1988-1997 (thousand m³)

Year	Logs	Lumber	Plywood	Veneer	Total
1997	768	411	1.0	86.0	1 266
1996	877	567	0.9	94.0	1 539
1995	694	378	0.2	26.0	1 098
1994	404	298	0.9	0.6	704
1993	603	462	0.3	2.8	1 068
1992	530	43	0.3	0.3	574
1991	395	10	1.7	0.08	407
1990	381	3	3.0	0.09	387
1989	397	12	2.7	0.06	412
1988	7	2	0.2	0.09	9

Source: FMB/DENR (2000)

³ Under the Regalian Doctrine, all lands of the public domain, waters, minerals, coal, petroleum, and other mineral oils, all forces of energy, fisheries, forests or timber, wildlife, flora and fauna and other natural resources are owned by the State (Section 2, Article XII of the 1987 Constitution).

Rising domestic consumption, the growing export-oriented furniture industry, and economic recovery and expansion contributed to the surge in imports of lumber that started in 1993 when the Philippines imported more than 1 million m³ of wood. Furniture manufacturing consumes approximately 95 percent of the imported wood. The increase may be largely attributed to the shift in preference from domestic to imported logs by the domestic plywood and veneer industry. Imports of logs and lumber accounted for 67 and 29 percent of total imports from 1986 to 1997, respectively.

Imports supplied most of the domestic demand when the AAC were reduced from 5 million m³ in 1990 to about 0.5 million m³ in 2000 (FMB/DENR 2000). The reduction in AAC was the most significant consequence of the logging ban in old-growth forests, the passage of the National Integrated Protected Area System (NIPAS) law in 1992 (RA 7586) and a decrease in the number of active TLAs from 114 in 1989 to 21 in 1998. These restrictions on the harvest of natural forests and the limited supply of wood from forest plantations have turned the Philippines into a net importer of wood.

The country's increasing dependence on imports underlines its ongoing wood crisis. Domestic demand for wood products is growing at an average of 2 to 5 percent annually. By the end of 2000, demand for industrial roundwood (mainly for sawntimber, plywood/veneer/blockboard, fiberboard/particleboard, poles and paper and paperboard) ranged between 4.5 to 5.8 million m³ per year.

Table 21 shows the different supply sources of domestic wood demand in 1998. The AAC from the natural forests and existing plantations supplied less than 13 percent of the estimated 5 million m³ annual demand, while coconut lumber provides more than 14 percent. Between 1995 and 1999, the Philippine Coconut Authority (PCA) reported that more than 3.6 million coconut trees were cut for processing (PCA 2000). Imports supplied almost 16 percent, but the bulk came either from illegal sources or was due to the increasing the use of steel and cement in the construction sector.

Coconut lumber and imports are very unpredictable sources. The PCA has taken a more restrictive and regulatory stance as mandated in RA No. 8043, PCA DAO No. 01 Series of 1995, and PCA DAO No. 01, Series of 1998. Countries that export wood products to the Philippines may shift exports to more lucrative markets.

In the end, the only reliable local sources of wood are forest plantations and sustainably managed residual forests. Unfortunately, these sources do not receive adequate attention. From 1986 to 1996, the Government and the private sector developed approximately 773 000 ha of forest plantations. Only 36 percent are available for harvesting and utilization. These lands could potentially supply 5 to 7 percent (at the most around 300,000 m³) of the annual domestic demand (Cadiz 1999; Dy and Bautista 1999). Areas reforested by the public and private sectors have generally decreased from 1991 to 1997 (FMB/DENR 2000). Forest management incentives and government programs to accelerate the development of small-, medium-, and large-scale forest plantations have accomplished only the minimum of the initial targets and objectives. In 1990, the DENR projected that plantations would need to produce at least 2.77 million m³ of timber annually to meet the demand for sawlogs, peeler logs, poles, and local construction timber. The annual timber production from plantations is only 45 000 m³ and far below the DENR projection (Cadiz 1999; FMB/DENR 2000).

Based on projections from the Philippines' National Forest Resource Inventory (NFRI) conducted from 1979 to 1988 (FMB/DENR 1988), the total volume of timber in the commercial forests in 1997 was estimated to be around 400 million m³ for all residual dipterocarps and pine forests. Estimates of the remaining secondary forests vary, ranging from 2.85 to 4.36 million ha (Angeles 1999). Researchers agreed that at least 2 million ha of the remaining residual forests may be covered by the sustainable forest management scheme. These areas are considered productive, with adequate residual forest stands. The DENR (1990a) recommended timber harvests in the residual forests be permitted only under three situations – by timber license holders, communities, and through conversion to other land uses. Estimates of potential annual sustainable yields from the remaining residual forests range from 1.7 to 5.1 million m³ (Table 22). Angeles (1999) recommends a maximum annual harvest of 2.0 million m³ from the natural forests on a 35-year

rotation, extracting only trees with a dbh of 60 cm and above. Commercial harvests in the remaining residual forests have ignited a variety of debates among the different stakeholders – the private sector, communities, policy makers, lawmakers, local government units (LGU), and environmentalists.

Table 21. Sources of Philippines' industrial roundwood supply, 1998

Source	Estimated volume (thousand m ³)	Percent based on total	Remarks
Annual allowable cut from natural forests (residual)	588	11.8	AAC of 18 active TLAs
Harvest from forest plantations	45	0.9	Extrapolated from Table 2.21 of the Forestry Statistics, 1998 (Total log production – TLA and IFMA production). It was assumed that most of the CBFM production came from more accessible and existing forest plantations.
Imports	796	15.9	Taken from Table 3.20 of the Forestry Statistics
Coconut lumber	721	14.4	Computed from Philippines Coconut Authority data. Number of coconut trees cut per annum, based on data from 1995-1999, was at least 721,000 with the assumption that each tree yields at least 1 m ³
Others (illegal cuts and other substitutes)	2 850	57.0	The total estimated demand of 5 million m ³ minus the amount of the 4 sources above.
TOTAL	5 000	100.0	

Sources: FMB/DENR (2000); PCA (2000); Cadiz (1999)

Table 22. Area and potential timber yield from Philippines' natural secondary forests

Source	Area of secondary forests (ha)	Tentative annual yield (thousand m ³)
RP-German Project (1987-1989)	1 000	1 715 *
Master Plan for Forest Development (MPFD)	2 180	4 300 - 5 100 **
Modified MPFD	3 365	2 000 ***

Source: Adopted from Angeles (1999)

* Based on 60 + m³/ha, cutting cycle of 35 years. TSI-treated 0.5 million ha not included.

** Based on the yield in year 2000 and in year 2015 respectively assumed in the MPFD.

*** Based only on 682 000 ha for private sector and 500 000 ha for large community holdings recommended in MPFD and not on the entire area of 3 365 000 ha; also at 60 m³/ha, cutting cycle of 35 years. Based and checked by 380.6 million m³ of available volume of standing timber from 15 cm and above dbh in second growth forests as reported in the Philippine Forestry Statistics in 1997 and multiplied by 18.5 percent (ratio between commercial volume, 55 cm and above dbh and all tree volume, 15 cm and above dbh) equals approximately 2 million m³/year.

The Philippines should be able to supply almost 50 percent of its domestic timber demand over the next 10 years, assuming that the existing forest plantations can supply a minimum of 0.3 million m³ per year and that harvests in the residual natural forests will produce at least 2 million m³ per year. The supply of coconut lumber may also reduce the country's dependence on imported wood.

Furthermore, improving harvesting and utilization efficiency could reduce dependence on timber imports. In many cases, if foresters applied new harvesting technologies, the level of waste left after logging could be reduced by 50 percent. In processing, 50 percent of the harvested volume are waste materials. Hence, only approximately 25 percent of the volume harvested are actually processed into usable products (Angeles 1999).

Opportunities in the forestry sector

Despite the increasing timber shortage, the Philippine forestry sector has the potential to rebound and become a key player in local and regional economies for several reasons. First, key forestry policies are in place. Second, the forestry sector has pioneered the adoption and implementation of CBFM as the national strategy. Third, the country has ample human resources and the most ideal climatic conditions, such as in eastern Mindanao, for establishing fast-growing hardwoods and becoming a major exporter in Southeast Asia. Economic rotation and yields of key species such as albizzia, acacia, gmelina, and eucalyptus average 6 to 12 years and at least 200 to 300 m³ per ha at harvest. Smallholder tree crops could also positively impact the rural economies and ensure the supply of plantation timber (Dy 2000; World Bank 1999a, 1999b, and 1999c). The forestry sector could potentially generate more than US\$ 3 billion a year as opposed to spending US\$ 1 billion for imported forest products (Nuevo 1998 and 1999). Fourth, there are at least 25 forestry schools and colleges in the Philippines that can provide technical training in forestry development. Finally, there are thousands of professionally registered foresters who are waiting for new challenges and opportunities to emerge (Fellizar 1998). Major issues and constraints, however, still have to be addressed first.

THE POLICY ENVIRONMENT OF THE PHILIPPINE FORESTRY SECTOR

Key forestry policies

Several national policies affect the Philippine forestry sector (Table 23). In general, the intent, substance, and vision of the national policies are sound. Many may set a precedent for other ASEAN countries, especially those that concern CBFM (Bisson *et al.* 1997), decentralization and devolution, and protected area systems. However, the translation of the policies into operational programs for sustainable forest management needs to be improved.

The current forestry policies are best interpreted and analyzed in relation to the People's Power Revolution (EDSA) in 1986 combined with the emergence and upsurge of environmental consciousness and influential media (Fairman 1996). Except for the Revised Forestry Code of 1975 (PD 705), most of the policies were enacted after 1986. The 1987 Philippine Constitution, the highest law of the land, lays down the tenet of natural resources management. The Executive Orders (EOs) during the first year of the Aquino administration carried executive and legislative mandates in support of forestry policies. The Republic Acts (RAs) by the Philippine Congress from the Aquino to the Ramos regimes reflect deeply rooted concerns from the lawmakers and the executive branch on how the Philippines could conserve its forest resources and support sustainable natural resource development and management.

Table 23. Key forestry policies of the Philippines

Policy instrument	Form and year of issuance	Major focus and mandate
Revised Forestry Code	Presidential Decree No. 705 of 1975	Creation of the Bureau of Forest Development (BFD) with line authority. Mandates the adoption of multiple use, land classification and delineation of forestlands, key conservation and reforestation strategies, census and initial recognition of forest occupants.
The 1987 Philippine Constitution	1987 Constitution	Adoption of the Regalian Doctrine; the State may undertake on the development and utilization of natural resources or enter into co-production, joint venture, or production agreements.
Executive Order No. 192 on the Reorganization of the Environment and Natural Resources	Executive Order with legislative and executive powers issued in 1987	Downgraded the BFD from line into a staff bureau; DENR was mandated to conserve, manage, develop, properly use, license and regulate the use of natural resources.
Local Government Code	Republic Act No. 7160 of 1991	Partially devolved some functions of the DENR to the LGUs.
The Law on National Integrated Protected Area Systems	Republic Act No. 7586 issued in 1992	Allocation of forestlands and forest resources to protected area systems for biodiversity purposes, preservation of habitats, watershed protection, and maintenance of ecological balance.
The Law on Forest Charges on Timber and Other Forest Products	Republic Act No. 7161 issued in 1991	Mandated the Government to increase forest charges for timber and non-timber forest products up to 25 percent and 10 percent of FOB prices, respectively.
Executive Order No. 263 on Community-based Forest Management Strategy	Executive Order of 1995 with no legislative power	Mandated the DENR to adopt CBFM as the strategy for sustainable forestry and social justice.
Indigenous People's Rights Act	Republic Act No. 8371 in 1997	Mandated the Government through the newly created National Commission on Indigenous Peoples to recognize, protect and promote the rights of indigenous people.

The 1987 Philippine Constitution

The 1987 Philippine Constitution mandates in Article II, Section 16, “that the State shall protect and advance the right of the people to a balanced and healthful ecology in accordance with the harmony of nature.” The Constitution adopted the Regalian Doctrine and empowered the Congress to determine by law the specific limits of forestlands and national parks. The State has the right to undertake on its own the development and utilization of natural resources, or enter into co-production, joint venture or production agreements to achieve sustainable development and natural resources conservation objectives (Argete 1998). The Constitution has virtually stopped the practice of awarding concessions, leases, or timber licenses.

TLAs were also banned since they had been abused by favoring only large-scale operations (Wallace 1993; Porter and Ganapin 1988; Vitug 1993). The Constitution has supported and strengthened the Government’s efforts, to take drastic measures in dealing with holders of TLAs. Many TLAs were suspended, cancelled, modified or not renewed. These drastic actions reduced the number of TLA holders from 159 in 1986, to 26 in 1997, and less than 20 in 1998 (FMB/DENR 2000).

The Revised Forestry Code (Presidential Decree (PD) No. 705 of 1975)

The Revised Forestry Code provided the first formal forestry laws and policies in the Philippines. It mandated the Government to adopt a multiple-use approach to forestlands, accelerate land classification, delineate forest boundaries, rationalize wood-processing plants, enhance forest protection and development through industrial tree plantations, conduct a census and recognize some forest occupants, and continue to support the implementation of selective logging. The revised Code created the powerful BFD to formulate and implement forest sector policies, strategies, and programs.

Some provisions of the Code that have not been rendered invalid by the Constitution, EO 192, and succeeding laws, still apply. From 1975 to 1987, PD 705 dominated the thinking in the forestry sector. Twelve years of implementing the Code institutionalized many processes, regulations, operational guidelines, and organizational structures. PD 705 strengthened the regulatory powers of the BFD, reduced the focus on reforestation and rehabilitation of forestlands, and institutionalized the “timber-orientation” of many professional foresters. On the other hand, the Code allowed “occupants” to rehabilitate forests and provided an opportunity for forestry workers in the private sector to organize cooperatives and participate as co-owners of concessions.

Executive Order No. 192 of 1987

Executive Order No. 192 downgraded the powerful BFD, a line bureau of the former Ministry of Natural Resources (MNR), into a DENR staff bureau. The forestry sector’s concerns were taken over by the Forest Management Bureau (FMB) of the DENR field offices at the regional, provincial, and community levels. The DENR Secretary with the technical and policy advice of the Director of the FMB acts on all forest policy-related matters at the national level, while the DENR field offices execute the programs.

This Order mandated that the DENR formulate and implement administrative policies that support the Constitution and do not violate the relevant provisions of PD 705. The Order, with the legislative authority of former President Aquino, was penned in the context of the 1987 Constitution before the First Congress was convened. It stated:

“The Department shall be the primary government agency responsible for the conservation, management, development and proper use of the country’s environment and natural resources, specifically forest and grazing lands, mineral resources, including those in reservations and watershed areas, and lands of the public domain, as well as the licensing and regulation of all natural resources as may be provided for by law in order to ensure equitable sharing of the benefits therefrom for the welfare of the present and future generations of Filipinos.”

The DENR used the EO 192 under the 1987 Constitution when it formulated the Philippine Strategy for Sustainable Development (PSSD) (DENR 1990a; PSSD 1997). It adopted the PSSD to promote economic growth through adequate protection of the country's biodiversity, vital ecosystem functions and the overall environmental quality (Argete 1998). The PSSD has advocated proper pricing and natural resource accounting of all forest products and commodities, lesser dependency on forest product sourced from the natural forests, and CBFM with the participation of indigenous people and women.

The DENR was also guided by the EO 192 and the 1987 Constitution when it formulated the MPFD as a 25-year plan for the development of the forestry sector (DENR 1990; Pollisco 1999). The MPFD was a response to the massive deforestation and forest degradation, and the need for the sector to become a significant player in sustainable development, generating rural employment, and ensuring stable and continuing supply of domestic forest products. The MPFD presented a macro-level and holistic approach to the multi-dimensional concerns of forestry.

Republic Act 7161 of 1991 and Republic Act 7586 of 1992

The RA 7161 (Increasing the Forest Charges on Timber and Other Forest Products) and RA 7586 (National Integrated Protected Area System) were the first initiatives of the reorganized DENR under the EO 192. They were a response to a national demand to identify, delineate, and invest in the remaining protected areas of the country; and to the need of capturing acceptable economic rents. The implementation of these policies largely benefited from the studies of Mendoza (1991 and 1993), Mcketta (1992), Boado (1988) and Bautista (1992).

The NIPAS law strengthened the DENR's mandate to set aside forestlands as "protected areas" to preserve biodiversity and critical habitats, and to carry out its mandate under the EO 192. The framers of the NIPAS law saw the impending threat to the forestlands and the need to implement a logging ban. The preservation of the remaining 0.8 to 1 million ha of old-growth forests was included in the law.

The Forest Charges Law allows the Government to charge for the use of forest resources. The charges increased from as low as US\$1/m³ to as high as 25 percent of the FOB price for timber harvested on public lands in the early 1990s (Argete 1998; Wallace 1993). This law was only enacted in 1993, despite previous studies that highlighted the substantial amount of potential forest rent lost by the Government because the rates charged for use of the forestlands were well below the market rate (Boado 1988; Bautista 1992). The increase in forest charges was only adopted when the total AACs of TLAs were approximately a quarter of those in 1990, about one-seventh of the AAC levels of 1985, and only about one-twelfth the levels of 1980 (FMB/DENR 2000). Those in power or influence before and during the martial law years clearly benefited from low forest charges (Vitug 1993). The low rents also contributed to the mentality of "cut, cut, and get out quickly" of many concession holders.

Executive Order No. 263 of 1995

Consistent with the spirit of the 1987 Constitution, EO 192, and the PSSD, President Fidel Ramos signed the EO 263 mandating the adoption of CBFM as the national strategy for sustainable forestry and social justice. EO 263 recognizes the need for the Government to enter into long-term agreements with communities and the indigenous people for the protection, rehabilitation, development, conservation, and management of forestlands. The Government has to respond to the communities' need for long-term tenure and resource-use rights provided they employ low-impact and labor-intensive harvesting methods.

The signing of the EO 263 was a major milestone for the 20 million Filipinos in the uplands. Unlike previous community forestry administrative and presidential decrees, EO 263 enables the Government to allocate forestlands, even those with natural forests, to participating communities for protection, development, and management (Guiang and Harker 1998; Guiang 1996).

Republic Act 7160 of 1991

While the forest policies were becoming increasingly focused on social equity, sustainability, protecting biodiversity and environment, the RA 7160 (Local Government Code) opened the way for partial devolution of environment and natural resource functions to the LGUs (Brillantes 2000; IPC 1997; Salazar and Zenit 1993). The Code was designed to redress the skewed power relations between the central and local Governments.

The Local Government Code made it possible for the LGUs to share in the protection, conservation and management of forest resources, especially in assisting communities in social forestry (Marco 1992). The power to “allocate forestlands, and issue resource-use rights, environmental compliance certificates, and land titles” was not shared and remained with DENR (Guiang 2000). The Code, however, enabled the LGUs (provinces, municipalities, and barangays) to share income from forest charges. At least 40 percent of the forest charges were paid to the LGUs with territorial jurisdiction over the areas where the forest resources were extracted.

The Code also opened up opportunities for the LGUs to enter into co-management agreements with the DENR for the protection and management of forestlands, especially in areas that have been declared communal watershed reservations but were previously unmanaged (DILG-DENR 1998). For example, the Code paved the way for Puerto Princesa in Palawan to enter into an agreement with the DENR to protect and manage the St. Paul Subterranean National Park. The Code also inspired the provincial Government of Nueva Vizcaya and the DENR to agree to protect and manage a 24 000 ha forest reserve. Over the years, co-management has become the DENR’s modality for allowing LGUs to actively participate in the protection, development, and management of forestlands with communal management objectives.

Republic Act 8371 of 1997

The RA 8371 (Indigenous People’s Rights Act) mandates the recognition, protection and promotion of the rights of indigenous people. Its influence cuts across the forestry sector because the issuance of CADCs or Certificates of Ancestral Domain Titles (CADTs) are land allocations that include forestlands with or without forest resources. CADCs or CADTs are land allocations that have significant impacts on commercial or conservation forestry. These instruments are by themselves permanent tenure for indigenous people who have claims on the forestlands, including protected areas. The Act also created the National Commission for Indigenous Peoples under the Office of the President to assist the indigenous people.

Policy impacts

Table 24 provides a list of the perceived impacts of forestry policies over the years. As noted earlier, the RAs, the EOs, and the PDs are backed by the DENR through the implementation of rules and regulations as well as administrative orders, memorandum circulars, and memorandum orders. In the forestry sector, most of the orders and circulars have been meant to regulate instead of deregulate the use of forestland and resources. Consequently, the forestry sector was considered one of the most regulated industries in the country (Lu 1998; Olizon 1991; Guiang and Manila 1994; Seve 1995; Mickelwait *et al.* 1999). While the laws are stable and generally consistent, the operational policies embodied in the administrative decrees have almost always been revised with each change of administration and DENR leadership.

Table 24. Major impacts of Philippines' key forestry policies

Impact areas	Key policy determinants	Impacts
Forest cover	PD 705, 1987 Constitution and EO 192	The privilege-driven system of awarding resource-use access under PD 705 combined with low forest charges, increased upland migration, and expansion of agriculture accelerated forest degradation and loss of forest cover. The cancellation, non-renewal, and suspension of TLAs increased open access and contributed to illegal logging and cutting. These have greatly added to the loss of forest cover.
Open access	1987 Constitution and EO 192	Increased open access as a result of TLA cancellation, suspension, and non-renewal. Alternative instruments to close open access and stabilize tenure are not in place.
Biodiversity, watersheds, and habitat protection	RA 7586	Increase in protected area "set asides" and watershed reservations. These areas now comprise at least 15 percent of the total forestlands.
Supply of forest products	RA 7586 and 1987 Constitution	The gradual reduction of commercial harvesting in natural forests and the low investment in forest plantations due to poor incentives have made the country increasingly dependent on imports and substitutes.
Participation of key stakeholders – communities, private sector, LGUs, and environmental groups	RA 7160, EO 263, 1987 Constitution and RA 7161	The LGUs, communities and environmental groups are increasing their demands for sustainable forest management. The private sector has been marginalized but is not totally out of the picture.
Allocation of forest resources and forestlands	RA 8371, EO 263 and 1987 Constitution	Almost 4 million ha of forestlands have been allocated to upland communities, indigenous people, and LGUs. The private sector owns a little more than 1.3 million ha. The opposite was true in the 1970s and 1980s when TLAs controlled at least 10 million ha or two-thirds of the total forestlands.
Paradigm of forest management	EO 192, RA 7586 and 1987 Constitution	From a timber-oriented system of forest management to a people-oriented ecosystem and watershed approach of managing forestlands.

A closer examination of Table 24 reveals several key points:

- ◆ Before 1986, policies on implementing the PD 705 were consistent and predictable, although the industry was also highly regulated (Olizon 1991). After 1986, administrative decrees became erratic, inconsistent, and unpredictable. Before the EDSA revolution, policy changes were influenced mostly through patronage; after EDSA, the upsurge of environmental NGOs, powerful media, and newly rediscovered democracy greatly influenced the policies and governance of the environment and natural resources. Olizon (1991) claimed that from 1975 to the early 1990s, the administrative policies on industrial tree plantations changed 20 times. Indeed, the rate of policy change was much higher than the capacity to implement the policies. Regulations regarding timber harvesting are also restrictive. Harvesting timber from the natural forests has almost become a crime. Even to cut planted species in Eastern Mindanao now requires farmers to submit 11 documents to the DENR field offices before harvest and transport permits are issued.
- ◆ There are renewed efforts to shift forest management from a timber production orientation to community-based and multiple-use management (FMB/DENR 1998). There has also been an increased realization that forests yield non-timber forest products in addition to timber.
- ◆ The cancellation, non-renewal and suspension of many TLAs have resulted in an increase in open access areas, making the DENR the leading absentee landlord in the country (Hyde *et al.* 1996; Johnson 1997). More than 5 million ha of forestlands, with and without forest cover, are considered to be open access (FMB/DENR 2000; Mickelwait *et al.* 1999).
- ◆ Since the early 1990s, forest policies have increasingly allocated forestlands to communities and indigenous people, with the subsequent reduction of forestlands under TLAs. TLAs cover only 1.3 to 1.4 million ha, and CBFMAs and CADCs cover 3.8 million ha (FMB/DENR 2000). This shift has considerable implications, especially in the context of providing technical, financial and managerial assistance. Encouraged by the Local Government Code, more LGUs are requesting allocations of forestlands and resources for their own communal forests, watersheds and municipal parks. These allocations will continue to influence the formulation of operational policies (La Vina 1997 and 1998).
- ◆ The private sector's participation in formulating key administrative guidelines and regulations for the industry has been marginalized (Olizon 1991; Lu 1998). The private sector, to a certain degree, has become a victim of the upsurge of environmental advocacy and "democratization" process; it has yet to regain its damaged credibility in the management of forestlands. The private sector role in the protection, development and management of forest resources is presently not clear except where TLAs, IFMAs and other use permits are still active. Despite the growing demand for timber from plantations, with few exceptions, the private sector has hesitated to proceed with IFMAs. They feel constrained by a lack of long-term financing, and the need to collaborate with communities, as well as the unpredictable and changing forest policies.
- ◆ The current policies divert the focus from forest management to curbing abuses of TLA holders, preserving and conserving biodiversity and protected areas, shifting responsibility for forest management from commercial operators to communities, strengthening the bureaucracy, and large-scale rehabilitation efforts, especially with the funds from the Asian Development Bank (ADB 1998) and the World Bank. As a result, the process of creating the foundation for the long-term development of a stable wood and fiber supply has been neglected. Most recommendations of the MPFD (DENR 1990a) have not been realized or seriously implemented. As a result, the Philippines has been increasingly becoming dependent on imported forest products – both for furniture manufacturing and local consumption (FMB/DENR 2000; Sanvictores 1997b; Cadiz 1999).
- ◆ The post-EDSA forest policies allowed the participation of various stakeholders in the policy making process through consensus-building within and between the public and private sectors at different hierarchical levels (Malayang III 1998). This process gradually rendered the former "command and control" approach of forest management ineffective. The issue of "policy ownership" at the different levels of the DENR, LGUs and communities has taken center-stage. Time and government inputs in the "brokering" process have become critical factors before decisions are reached.

- ◆ The emergence of environmental NGOs and the increasing participation of LGUs in advocacy and direct protection and management of forestlands have strengthened forest conservation. The partial devolution of key environment and natural resource functions to LGUs has been raised as a major issue in recasting or modifying the Local Government Code (Brillantes 2000).

ISSUES LEADING TO THE BAN OF HARVESTING TIMBER IN NATURAL FORESTS

More than 70 percent of the Philippine's 77 provinces,⁴ now have logging bans or moratoria for a variety of reasons (Table 25) (FMB/DENR 1999; DENR 1999). These bans or moratoria are covered by administrative orders, letters of instruction from the Office of the President, radiogram orders or laws such as the NIPAS Law and the RA 7611 (Strategic Environmental Plan for Palawan). The logging bans "disallow the extraction of timber from the natural forests." The cancellation, suspension and non-renewal of TLAs have also supported logging bans in concession areas.

The DENR issued an administrative order in 1991, which banned timber harvests in all old-growth/virgin forests. The same order banned timber harvesting in areas above 50 percent slope and in areas located more than 1000 m above sea level. Old-growth forests should be delineated in the concessions of TLA holders. Holders are not allowed to harvest the old-growth forests; they are instructed to protect these areas as part of their forest management functions. These restrictions do not apply if the old-growth forests are located in protected areas and watershed reservations since they are part of the Government's direct responsibility (although, in reality, many of these areas and reservations are exposed because of the Government's limited resources). Old-growth forests located in cancelled, abandoned, suspended or non-renewed TLAs and the adjacent residual forests are most vulnerable to poachers, illegal cutters and slash-and-burn farming.

Current policies allow harvesting in residual forests that are covered by TLAs, CBFMAs and, to a certain extent, in CADCs if the forests are not located in protected areas, watershed reservations or areas above 1000 m above sea level and slope above 50 percent. There are at least 500 000 ha of residual forests under existing TLAs. The residual forests that are under CBFMAs or CADCs but outside the protected areas, reservations, or old-growth forests may also be harvested. In September 1998, however, the DENR suspended the harvesting rights of the holders of CBFMAs and CADCs. This suspension was only lifted in early 2000 when more restrictive provisions were established.

Based on the analysis of CBFMAs and CADCs, which were assisted by the USAID-funded Natural Resources Management Program, approximately 45 percent of residual forests in Luzon are covered by these tenures, while 30 percent of Mindanao's forests are residual (Mickelwait *et al.* 1999). At least 0.2 million ha of residual forests are still in open access areas.

The estimated 2 million ha of productive residual forests (TLA's 0.5 million ha, CBFMAs/CADCs' 1.3 million ha, and the 0.2 million ha of residual forest in open access forestlands) are the center of the ongoing debate about the logging bans. There is a proposal to ban timber harvests in all natural forests in the Philippines. The TLA areas comprise only 3 percent of the total forestland in the Philippines, or 25 percent of the 2 million ha of residual forests where logging is allowed. The total TLA area of natural forests (residual) that will be affected by the logging ban will gradually decline to only 72,000 ha by the year 2010 (Sanvictores 1997b). The residual forests that are within the existing CBFMAs and CADCs are areas where timber harvest may be allowed to augment local wood supplies. In summary, the ban of timber harvests from the natural forests will only affect the residual forests of the TLAs, CBFMAs and CADCs, or almost 70 percent of forestlands under the management of communities.

⁴ Figures vary. Wallace (1993) estimated that 60 out of 75 provinces were under logging bans; others say that about 48 out of 76 provinces have logging bans; the FMB/DENR data (1999) compiled a list of logging ban areas. The list is comprehensive and cuts across provinces and regional boundaries.

Table 25. Provinces and areas covered by logging bans in the Philippines

Affected areas	How the logging ban is imposed
25 km on both sides of the proposed Marikina-Infanta Highway	Presidential Proclamation No. 1636
All logging concessions and permits in all areas near or adjacent to Angat and Penaranda River Basin	Presidential Directive, 5 July 1968
Catanduanes	Telegram of the Acting Director, BFD, 19 October 1973
Provinces of Ilocos Norte, Ilocos Sur, Abra, La Union, Baguio City and within 50 km radius of Baguio City	Memorandum of MNR Minister Jose J. Leido, Jr., 20 March 1975
25 km radius of Baguio City	Memorandum for the President of the Philippines from Minister Jose J. Leido, Jr., 16 March 1976
Pangasinan, Zambales, Laguna, Quezon, and central Luzon areas and within 50 km of Greater Manila area	LOI 409 signed by President Ferdinand E. Marcos, 29 May 1976
Polillo Island	Order signed by then Sec. Jose Leido, Jr., 21 August 1978
Nueva Ecija	Order of Assistant Secretary for Field Operations for Luzon, Gregorio Magdaraog, 17 March 1989
All proclaimed watersheds, national parks, nature reserves, and wildlife sanctuaries	LOI 917, 22 August 1979
Negros Oriental	Order signed by then Minister Jose Leido, Jr., 4 October 1979
Small Islands	Memorandum of Presidential Staff Director Joaquin Venus, Jr. to the Minister of MNR, 5 November 1979
Leyte and Southern Leyte	MNR Administrative Order No. 31 signed by then Deputy Minister Arnold Caoili, 20 July 1982
Entire Philippines except Southern Cotabato, Northeast Davao, part of Zamboanga del Sur, part of Samar, Northern Kalinga-Apayao, Northern Cagayan, Eastern Isabela, part of Agusan del Sur, part of Palawan	Memorandum of Presidential Executive Assistant Juan C. Tuvera to MNR Minister Teodoro Pena as directed by the President of the Philippines, 4 August 1983
Entire Philippines except Region 2, Palawan, Samar, and the Islands of Mindanao	Memorandum of Minister Teodoro Pena to Director Edmundo Cortez, 9 August 1983
Negros Occidental	Radio message of Director Edmundo Cortez to BFD Regional Director, Region 6, 10 September 1984
Nueva Ecija, Nueva Vizcaya, Quirino, Ifugao	Ministry Order No. 2 signed by Min. Ernesto Maceda, 2 April 1986
South Cotabato	Ministry Order No. 3 signed by Min. Ernesto Maceda, 23 May 1986
Abra, Benguet, Laguna and Misamis Occidental	Ministry Order No. 4 signed by Min. Ernesto Maceda, 29 May 1986
Basilan	Ministry Order No. 8 signed by Min. Ernesto Maceda, 3 October 1986
Samar	Moratorium Order of Secretary Fulgencio Factoran, Jr., 8 February 1989
General Nakar, Quezon	DENR Order signed by Assistant Secretary for Regional Operations, Luzon G. L. Magdaraog, 13 June 1989
Gattaran and Baggao, Cagayan	Radiogram of DENR, Region 2, RED Baggayan to Sec. Fulgencio Factoran, Jr., 31 July 1989
Nueva Vizcaya	DENR Memorandum Order No. 2 signed by Sec. Fulgencio Factoran, Jr., 16 January 1990
Bukidnon	Order of Sec. Fulgencio Factoran, Jr., 30 April 1990
San Mariano and Ilagan, Isabela	DENR Order of Secretary Fulgencio Factoran, Jr., 23 March 1992
Real and Mauban, Quezon	DENR Order of OIC Secretary Victor O. Ramos, 13 April 1992
Palawan	DENR DAO No. 45 signed by Sec. Angel C. Alcala, 22 October 1992
Quirino	Order of Sec. Angel C. Alcala, 18 May 1993
Sarangani Province	DENR Memorandum Order No. 25 signed by Acting Sec. Ben S. Malayang III, 3 December 1994

Source: FMB/DENR (1999)

The major issues that led to the logging ban in all “open” natural forests are summarized below:

Continuing loss of biodiversity

The arguments in support of logging bans in conservation areas include: the continuing loss of biodiversity, the need to protect endangered and rare species habitat, and the increasing imbalance in the prey vs. predator population (Heaney and Regalado 1998; Bautista 1994; de los Angeles and Oliva 1996; UPLB Foundation 1996; CPPAP 1999; Alonzo 1993).

The Philippine forests have a very high degree of faunal endemism and host a rich and diverse flora. The fear of losing the diverse dipterocarp forest altogether has also been raised to argue for a logging ban in natural forests.

Destruction of watersheds

One potent argument for declaring “logging bans” in many provinces is the degradation of watersheds that support major hydropower schemes and river systems. The perception is that logging increases soil erosion and siltation of waterways, and ultimately endangers or shortens the life span of major infrastructure (FMB/DENR 1999).

There are also fears that there will be more lowland floods like the 1992 flood that killed 7 000 people in Ormoc City, Leyte. Logging bans are believed to reduce catastrophic floods in low-lying areas, and minimize the re-occurrence of Ormoc-type tragedies.

Graft, corruption and abuses by TLA holders

Earlier abuses by privileged TLA holders have left a lasting negative attitude towards this form of tenure. Logging opponents fear that a return to commercial logging would re-ignite abuses by privileged TLA holders, and that graft and corruption in the forestry sector would happen again. The perception remains that many of the TLAs overcut and did not practice sustainable forest management (Wallace 1993; Vitug 1993). Corruption, payoffs, and irregularities (e.g. over-harvesting, trespassing, and avoidance of forest charges) in the regulation, review and approval of resource-use rights and transport permits could spawn unholy alliances and collusion between the DENR, military and TLA holders (Seve 1995).

Destruction of coastal and marine resources

Only 4 percent of corals in the Philippine coastal areas are in good condition. Some 30 to 50 percent of seagrass beds have been lost, and two-thirds of mangrove forests were destroyed during the last 75 years. These impacts are believed to have been directly or indirectly caused by large-scale commercial timber harvesting and poor logging practices. Commercial timber harvests in the natural forests have been perceived to intensify deforestation and degradation, which accelerates siltation of estuaries and river mouths, and ultimately affects coral reefs, and marine sanctuaries.

Increasing migration

Upland migration is estimated to be 2.8 percent annually. Halting commercial logging operations may help to slow down this trend since loggers provide access roads to residual and logged-over areas. These areas have become highly vulnerable to conversion and settlement by migrants.

Displacement of indigenous peoples

About 6.3 million indigenous people live in the forestlands. Commercial logging practices have been blamed for the corruption of indigenous knowledge, attitudes, and traditional practices. Timber logging bans have also been suggested as a key strategy to ensure that the indigenous people are not displaced from their land and continue to have access to the natural environment.

GOALS AND OBJECTIVES OF THE LOGGING BAN

Goals and objectives

The logging ban or moratorium of commercial logging covers a wide range of goals and objectives. These are not clearly specified in statutes or directives, but are inferred from a review of FMB/DENR's list of logging bans as follows:

- ◆ Protect the critical watersheds or drainage areas of river systems supporting existing or proposed hydroelectric power facilities, irrigation works or existing water facilities in need of immediate protection or rehabilitation (PD 705).
Watershed protection is the basis of the logging ban in Benguet, Nueva Vizcaya, Angat and Penaranda, Quirino, and in other watershed areas.
- ◆ Protect the forest cover of areas that are highly prone to flash floods and hazardous flooding.
This is the basis for logging bans along the Marikina-Infanta Highway, in central Luzon, parts of Nueva Ecija, Catanduanes, Zambales, Leyte and Southern Leyte, parts of Cagayan, Pangasinan, Mizamis provinces.
- ◆ Preserve biodiversity and protect threatened habitats and sanctuaries of endangered and rare species.
This is the basis for logging bans on the island of Palawan, Negros Occidental, Sarangani, Siargao islands, and other protected areas.
- ◆ Allow natural regeneration and development of plantation forests.
This is the basis for logging bans in provinces with a timber deficit, or areas whose forest cover is below 40 percent of the total land area.

EXPERIENCES IN IMPLEMENTING LOGGING BANS IN NATURAL FORESTS

The effects of selected logging bans have been mixed and highly variable. The imposition of logging bans in most of the provinces, and the subsequent cancellation, non-renewal and suspension of logging activities, generally turned forestlands into open access areas (Fernandez *et al.* 1989; Bautista 1994; Lopez-Gonzaga 1995; Carandang *et al.* 1996; Ronquillo-Manila and Gallego 1992). This invited the entry of illegal cutters in response to the increasing demand for forest products. More than half of the cancelled TLA areas were completely destroyed (18 out of the 32 areas surveyed) despite the easing of social unrest (Fernandez *et al.* 1989). Imposing logging bans causes more damage to the environment because illegal cutters extract forest products without long-term interests or accountability (de los Angeles and Oliva 1996). Logging bans burden the Government with more forest protection efforts that are not as effective as those provided by land holders (Mickelwait *et al.* 1999).

Logging bans eliminated revenues from logging charges that the Government would otherwise collect. Assuming that 50 percent of the annual demand of 5 million m³ come from illegally harvested logs at an average forest charge of P500/m³, the Government losses amounted to about 1.25 billion pesos. Logging bans encourage illegal logging, which causes market imperfections and imbalances in the local prices for forest products. Logging bans also encourage illicit alliances among financiers, illegal cutters, the military, and DENR field personnel. For example, the imposition of the commercial logging ban in Nueva Vizcaya spawned the growth of a small-scale furniture industry that thrived on wood supplies from small-scale illegal loggers (Bautista 1994). In summary, logging bans do not guarantee forest conservation as long as domestic demand is strong and access to the forestland is open.

Proposed bills on logging bans

The proposed bill to enact a logging ban under Senate Bill S. No. 1067 (11th Congress of the Republic of the Philippines 1999) entitled, “An Act to Protect the Forest by Banning All Commercial Logging Operations, Providing Mechanisms for its Effective Enforcement and Implementation and for Other Purposes” intends to:

“Conserve and enhance the natural resources, not only of its economic or environmental role, but also because of its social and cultural importance; prevent environmental disaster and sustain for the succeeding generations the natural wealth of the nation. Towards this end, the State shall provide sufficient forestlands, vigorously pursue and support protection and conservation, promote and encourage the involvement of all sectors of society and maximize people participation in forest conservation and protection.”

The key provisions of this proposed bill are:

- ◆ prohibition of all commercial logging operations in all types of forest (old-growth and residuals) for a period of 20 to 30 years;
- ◆ provision of mechanisms and funding support for monitoring and evaluation, and increasing and strengthening forest protection activities;
- ◆ dependence on forest plantations and substitutes; and
- ◆ provision of social safety nets for the upland population and industry workers.

In this case, commercial logging means the “cutting, felling, or destruction of trees from old-growth and residual forests for the purpose of selling or otherwise disposing of the cut or felled logs for profit.”

The partial logging ban bill, particularly the “Act Providing for the Sustainable Management of Forest Resources and for Other Purposes” (Senate S.B. 1311) allows logging in residual forests but not in old-growth forests, areas above 50 percent slope, mossy forests, national parks and protected area systems. Good-performing and existing TLA holders may convert to co-production, joint venture or production sharing agreements after expiry of their current contracts. The partial logging ban approach embraces sustainable and integrated management and development of forest resources. It utilizes watersheds as the planning unit, adopts community-based and multi-sector participation in forest management, and provides for permanent forest boundaries. Reforestation and agroforestry are key interventions in marginal forestlands. Finally, the bill encourages professionalism in forestry, security of tenure, and the need to conserve biodiversity. This is also one of the private sector’s acceptable modalities for the future of forestry in the Philippines (Olizon 1991).

AN ASSESSMENT OF LOGGING BAN IN RESIDUAL NATURAL FORESTS

The residual forests in natural forest production areas are not explicitly covered by the logging bans and therefore are potential targets for future timber harvesting by either holders of TLAs, CBFMAs, IFMAs, and to a certain extent, CADCs.

Policy implications

Several policies and actions are required to effectively implement a logging ban in the Philippines’ residual forests. Whether a partial or complete logging ban is imposed, new and modified Government and DENR policies and support systems will be necessary to ensure that mechanisms, services, logistics, and structures and other relevant sub-systems are in place to implement and enforce the ban. Otherwise, as stressed by Fernandez *et al.* (1989), Bautista (1994), Carandang *et al.*

(1996) and Mickelwait *et al.* (1999), a logging ban policy for the residual forests could quickly become ineffective. Even enforcing the existing logging ban policies has almost been impossible. Unless Government resources are re-allocated, aligned and committed for enforcement, the logging ban in residual forests cannot ensure the protection and management of the remaining natural forests for ecological and biodiversity purposes.

The proposed logging ban in residual forests in active TLAs, CBFMAs, CADCs and open access forestlands would require the following:

- ◆ Empowerment of the LGUs to enable their participation in actively managing forestlands (Mercado 1998; Magno 1999): Although the LGUs have to ensure that their forests do not become an open-access resource, the Local Government Code currently has no provision to prevent this from happening. In fact, most LGUs with logging bans affecting their lands would be deprived of revenues. Currently, the LGUs also do not have enough incentives or interest to risk their own well-being to enforce forest protection. Policies are needed to empower the LGUs to more effectively protect forests under their jurisdiction.
- ◆ Provision of consistent and stable policies to provide incentives to communities to protect their own forestlands: Presently, this is not the case. Community access to resources, and stability of this form of tenure, are extremely vulnerable and subject to cumbersome regulations. They largely depend on the mood and perspective of the current DENR leadership (Mickelwait *et al.* 1999; DENR DAO 2000-29; Cadaweng and Guiang 1999; NRMP/Region 10, 1999; ESSC 1999b).
- ◆ Improvement of policies for private investments in tree plantations and related wood-processing facilities: The Philippines is 15 to 20 years behind in the establishment of industrial tree plantations as a means to augment wood supplies (Cadiz 1999; World Bank 1999c). Only stable, consistent and predictable forest policies and a system of deregulation and decentralization will attract private investments in tree plantations (Olizon 1991; Lu 1998; Oposa 1995). The present policies are highly regulatory in nature and transaction costs are too high. For instance, various local stakeholders in 13 regions reported that at each major checkpoint transporters were charged approximately 250 pesos for passage. In Region 4, a medium-sized truck carrying a load of wood pays 3 000 to 7 000 pesos at each of the 14 checkpoints from Dinadiawan to Bulacan. An audit report of the CBFMA holder in Lianga, Surigao del Sur showed that there was a “leakage of at least 30 percent of the total income as grease money.” There is extreme need to simplify and deregulate the harvest and transport of timber derived from plantations. Fast-growing hardwoods must also be reclassified as agricultural crops to minimize regulations.
- ◆ Provision of an appropriate incentive system to encourage field personnel to improve enforcement of DENR policies: The role of the DENR should shift from regulation to one of providing services to communities, the private sector, LGUs and NGOs. This change will require significant investments in training, re-orienting, re-engineering and modifying operational policies (Borlagdan 1998).
- ◆ Demarcation and identification of forest resources in communities where residents may harvest for construction and other domestic needs.
- ◆ Improving access to foreign exchange to facilitate the importation of forest products, particularly from within the Asia-Pacific region.
- ◆ Allocation of funds to support forest protection, monitoring, information and education, public awareness programs, and extension.

Economic implications

The economic implications of the logging ban policy on residual forests center on how the Government can:

- ◆ meet the demand of the domestic construction and furniture industries for forest products;

- ◆ generate enough revenues to support forest protection and law enforcement;
- ◆ minimize losses of resource values due to the expected increase in illegal cutting;
- ◆ encourage the use of non-wood substitutes; and
- ◆ generate sufficient foreign exchange earnings to pay for imported timber products.

The proposed logging ban will require the Government to take the responsibility to protect and manage the remaining natural forests, whether these forests are in protected areas and reservations, entrusted to communities and indigenous people, or under private sector control.

The logging ban will eliminate the financial incentives for the holders of CBFMAs, CADCs, TLAs and IFMAs to protect and manage their residual forests (Guiang and Harker 1998). Timber extraction from the remaining residual forests remains profitable at current prices (Laarman *et al.* 1995). Estimates indicate that the Government must increase its 1995 budget by 10 percent or P300 million annually to fund increased enforcement (de los Angeles and Oliva 1996). However, Hyde *et al.* (1998) and Mickelwait *et al.* (1999) estimate that it will cost considerably less if communities protect forestlands through long-term tenure agreements than if the Government protects these lands.

The major economic costs of a commercial logging ban include (de los Angeles and Oliva 1996; Bautista 1994; and Carandang *et al.* 1996):

- ◆ the foreign exchange outflow needed to import forest products;
- ◆ lost income from timber harvest when forestlands are converted to alternative uses;
- ◆ the increased cost of monitoring and enforcing the logging ban; and
- ◆ the costs of assisting displaced communities to shift to alternative income sources.

In 1997, approximately US\$1 billion was spent on imported forest products (FMB/DENR 2000). In addition, there are also opportunity costs (loss of value) related to converting high-value illegally cut forest products into low-value products, for example converting high-value wood planks in Quirino into wood tiles. It appears that under a complete logging ban policy both the national Government and the environment become the losers and the entire Filipino society would suffer.

Environmental implications

Adequate implementation of logging bans will definitely allow the degraded natural forests to regenerate over time. Under proper management and protection, the natural forests can recover and ensure a constant wood supply (Tagudar 1997). In theory, if a logging ban is adopted, there will be no further damage to the forest stand and soil from logging activities (Ludwig and Pena 1991). A logging ban with managed natural regeneration can have a positive impact on the wildlife population with the exception of flora (Alonzo 1993; CPPAP 1999). De Padua and Cardenas (1996) and Rojo (1996) found that residual forests have higher biodiversity than old-growth forests. Sustainable forest management will also improve the upper watersheds. Carbon sequestration in the residual forests and brushlands will accelerate since there will be less disturbance and destruction in the timber lands.

Analysts expect there will be an increase in illegal logging activities. As estimated, this will involve cutting on approximately 90 000 ha, constituting an important part of the annual average deforestation of about 100 000 ha. These illegal activities further complicate issues involved in slash and burn farming and the conversion of brushlands to upland farms.

Without necessary financial support mechanisms and “social fences,” the implementation of a logging ban for the residual forests will not achieve the desired positive environmental impacts. If

the logging ban is to be a success, there must be clearly defined and enforced property rights. Stable and consistent policies must be adopted, and appropriate incentives must be provided for communities, LGUs, and DENR field staff to enforce the logging ban (Sinues 1997; Knox 1999; Laarman 1994; Johnson 1997).

Social implications

The logging ban will have a positive effect on the implementation of the Indigenous People's Rights Act Law. Many indigenous people have been displaced as a result of commercial logging. There will also be less migration to the uplands because there will be fewer logging roads. This is not the case, however, in open access forestlands, where commercial logging has already taken place. Many logging roads are still functional and are being used by migrants to access the uplands.

The displacement of forestry workers and a decline in the economic vitality of areas dependent on commercial logging are the major social impacts of logging bans (de los Angeles and Oliva 1996; Ramirez and Laarman 1993). It was estimated that a reduction in log production from 4.1 million m³ to 2.7 million m³ from 1987 to 1993 resulted in 34,000 jobs being lost. If a total logging ban is adopted, the forest industry will miss numerous opportunities to create more jobs in the rural sector.

The logging ban policy will also significantly affect rural economies. Schools and clinics may have to close, road maintenance will be reduced, and power plants in many logging communities will probably shut down unless there is significant transfer of financial resources from the Government. The major source of "standing capital" and the livelihood for the CBFMA holders will cease to exist (DENR/CBFMO 1999). It will also mean that the Philippines has chosen to interpret sustainable forest management as consistent with the logging ban policy and not with sustainable utilization of forest values including timber. Indirectly, the Government will have opted not to respond by utilizing residual forests to address the increasing poverty in the uplands (FMB/DENR 1999).

Impacts of logging bans on neighboring and exporting countries

Imposing a commercial logging ban in residual forests will mean that more forest products will be imported from Australia, Malaysia, New Zealand, USA and South Africa. Imports of forest products totalled US\$1 billion in 1997 and are expected to increase (FMB/DENR 2000). Imports will continue for as long as the wood industry faces wood shortages (Fernandez 1997). The Philippine's dependence on imported wood will remain until the country has enough forest plantations to meet its domestic demand. At an average yield of 200 m³ per ha of fast-growing forest plantations, a total of 25 000 ha per year will be needed to meet the average annual demand of 5 million m³.

CONDITIONS NECESSARY FOR THE SUCCESSFUL IMPLEMENTATION OF A LOGGING BAN IN ALL NATURAL FORESTS

The results of this study suggest that logging bans must be supported by a number of factors if they are to be effective in meeting natural forest protection and conservation goals. Necessary and sufficient conditions include:

1. Empower the LGUs by including them in joint DENR land-use planning exercises. By empowering the LGUs to jointly plan and allocate forestlands and to issue resource-use rights based on the approved land-use plan, forestlands and forest resources will be better protected and managed.
2. Decentralize power, authority, accountability and responsibility within the DENR bureaucracy and adopt an appropriate incentive system for DENR staff. This should be accompanied by clear

definition of responsibilities, accountability, and authority for Community Environment and Natural Resources officers, Provincial Environment and Natural Resources officers and Regional Executive Directors (Tesoro 1999; Gaon *et al.* 1996).

3. Provide defined and stable tenure and resource-use rights for communities, legitimate individuals and the private sector for public forestlands. Co-management with LGUs, communities, NGOs and environmental groups may be the way to block open access (Johnson 1997; Hyde *et al.* 1997; Lopez-Gonzaga 1995). Tenure arrangements should provide economic incentives for communities, both indigenous people and upland migrants, to enable their participation in forest protection and management.
4. Set up a system to monitor the key indicators of sustainable forest management at the community, LGU and DENR levels (Johnson 1999). A self-governing multi-sector forest protection committee (DENR 2000) could help facilitate the community-based monitoring system.
5. Provide effective DENR Extension Delivery Systems for communities, forest occupants, LGUs and the private sector (Borlagdan 1998) to accelerate the establishment and development of tree farms, agroforestry systems, forest plantations, and natural regeneration. It will also be necessary to provide key economic infrastructure to upland communities. Accordingly, forestry education should focus on the science of multiple-use forestry, protection, rehabilitation and conservation of natural forests, forest plantation development, community participation and extension (Revilla 1998).
6. Make available long-term financing at acceptable terms for tree plantations, agroforestry systems and permanent crops.
7. Encourage international third-party certification of forest management under the tenure of TLAs, CBFMAs, LGUs and indigenous people. Third-party certification will gradually improve the credibility of the DENR, tenure holders and LGUs.
8. Demarcate forest boundaries, especially for forestlands that may be allocated for sustainable production and those that are designated for protection. This may be approached through a land-use planning exercise involving the DENR and the LGUs.
9. Implement predictable, consistent and stable operational forest policies (Seve 1995; Olizon 1991; Lu 1998) with strong stakeholder participation during the formulation and validation process.
10. Provide sufficient budgetary allocations to efficiently manage protected areas on the basis of sound zoning, technical interventions and clear institutional arrangements (CPPAP/DENR 1999).
11. Allocate sufficient foreign exchange for the projected imports of timber and forest products to meet domestic demand.
12. Establish and manage a “safety net fund” to cushion the negative social impacts of the logging ban and minimize further marginalization of the upland residents who are highly dependent on forest resources for their livelihood.

CONCLUSIONS

This case study concludes that:

- ◆ Banning timber harvests in the remaining productive residual forests will not guarantee forest conservation or protection of remaining biodiversity.
- ◆ The LGUs are probably in a better position to implement logging bans, provided they are empowered and supported by the national Government. In this case, the DENR should provide the LGUs with technical assistance.
- ◆ The DENR, LGUs, communities, NGOs and the private sector do not have appropriate incentives or support systems to enforce a commercial logging ban in all natural forests.
- ◆ The open access conditions prevailing on almost 5 million ha of forestlands make it almost impossible to enforce a logging ban in those areas.
- ◆ The increasing domestic demand for logs and construction materials is the main incentive to log illegally. As long as the marginal revenue is higher than the marginal cost of extraction and transport, especially in easily accessible natural forests, illegal logging will continue.
- ◆ Inconsistent, highly regulated and unstable government policies on tenure and resource-use rights, combined with the lack of long-term financing and high interest rates have constrained the development of forest plantations.
- ◆ Concerns about biodiversity, ecological sustainability, administrative and management costs and adverse social and economic impacts could be best addressed if the Government would strategically invest its limited resources to:
 - (a) protect forest resources that have high levels of biodiversity, endangered, threatened and rare species and habitats, and sanctuaries of highly endemic species; and
 - (b) provide incentives to communities to participate in conservation and preservation. The Government and environmental NGOs must gradually shift their land protection strategies from a philosophy of “protect, prohibit, and punish” to “protect, participate, and profit.”
- ◆ In the short-term, the Philippines will continue to depend on imports of timber and forest products until domestic wood supply sources have been better developed. In the meantime, the country may optimize yields from the remaining productive residual forests, while accelerating the establishment and development of forest plantations over the next 10 years.

POLICY OPTIONS

There are two major options for the forestry sector of the Philippines.

Maintain and strictly enforce the existing legislative and administrative logging ban policies

This option continues the existing administrative and legislative logging bans and urgently calls for accelerated efforts to block open access natural forests by entering into joint ventures and agreements with LGUs, communities, NGOs and the private sector to protect and manage these forestlands.

The remaining residual forests outside specifically designated closed areas will not be protected and managed without organized and sustained efforts to halt access to open forestlands. The TLAs, CBFMAs and CADCs will continue supplying timber from the residual forests but with more effort to increase supplies from forest plantations. This approach will empower communities to protect and manage their natural forests, provide them with economic incentives, and ensure that property rights are recognized and formalized.

There is an urgent need to open certain areas to the private sector under joint production or joint venture agreements, provided that the holders of these agreements strike a fair arrangement with the communities involved. The CBFMA holders would be allowed to harvest from the natural forests as part of the arrangement.

The estimated 2 million ha of productive residual forests could easily provide 2 million m³ of wood annually under the assumption of a 35 year cutting cycle and a conservative annual growth increment of 1 m³. While timber harvests are allowed in the residual forests, there should be a parallel strategy and program to promote the establishment of forest plantations to reduce the long-term dependence on natural forests.

Complete logging ban in all natural forests

Under this option, all holders of TLAs, IFMAs, CBFMAs and CADCs would be restricted from harvesting timber from any natural forests. These areas would be permanently taken out of timber production. The Government will have to decide how to:

- ◆ meet domestic demand through imports, plantations and non-wood substitutes;
- ◆ design and provide incentives for upland communities to participate in protecting and managing natural forests;
- ◆ solely bear the burden of forest protection and management in all allocated and unallocated forestlands;
- ◆ design and implement a decentralized and devolved system of protecting and managing all natural forests;
- ◆ design and implement a performance-based system to monitor key indicators of the logging ban policy;
- ◆ strengthen the DENR to enforce the logging ban policy; and
- ◆ accelerate the establishment and development of forest plantations.

Under this option, the Government takes upon itself the gargantuan job of protecting and managing the remaining natural forests, whether these are within or outside the protected area systems, forest reserves, areas covered by various rights and those areas considered as open access.

RECOMMENDATIONS

This case study recommends that the Philippines adopt a strategy that incorporates the major features of the first option above. The Government should seriously consider four areas for urgent action:

- ◆ Invest in blocking off open access forestlands at all cost.
- ◆ Deregulate, decentralize, devolve, standardize, simplify and stabilize policies on tenure, resource-use rights, forest products processing, financing for forest plantations and delivery of extension services in support of protection and management of forest resources.
- ◆ Establish a monitoring system for key performance indicators of the forestry sector including forest cover, forest area, supply and demand of forest products, biodiversity, open access, management systems and investments.
- ◆ Allocate funds to protect and manage key protected area systems, reserves and sanctuaries and let other stakeholders protect and manage the remaining forestlands and resources by providing appropriate incentives.

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IMPACTS AND EFFECTIVENESS OF LOGGING BANS IN NATURAL FORESTS: SRI LANKA

H.M. Bandaratilake

INTRODUCTION

Land area and forest cover

Sri Lanka has a land area of about 6.5 million ha. Its closed canopy forest cover has dwindled rapidly from about 84 percent in 1881, to 44 percent in 1956 and subsequently to 27 percent in 1983. According to the Forest Cover Map of Sri Lanka prepared by the Forest Department in 1992 (Figure 20), Sri Lanka's total natural forest cover, including sparse forests, was around 2.0 million ha (30.9 percent of the land area). Closed canopy natural forest cover was 1.5 million ha, or 23.9 percent of Sri Lanka's total land area (Table 26). This suggests that the average rate of deforestation during the past few decades, both planned and unplanned, had been around 42 000 ha per year. Per capita forestland declined from 0.32 ha in 1956 to 0.09 ha in 1992 (Table 27).

The decline in forest cover is primarily due to rapid population growth and resulting land shortages and poverty. Agricultural production has increased mainly by converting natural forests to farmland. Nearly 809 000 ha of natural forests have been lost to agricultural and residential use since 1948. The Mahaweli Development Project alone replaced 243 000 ha of forests.

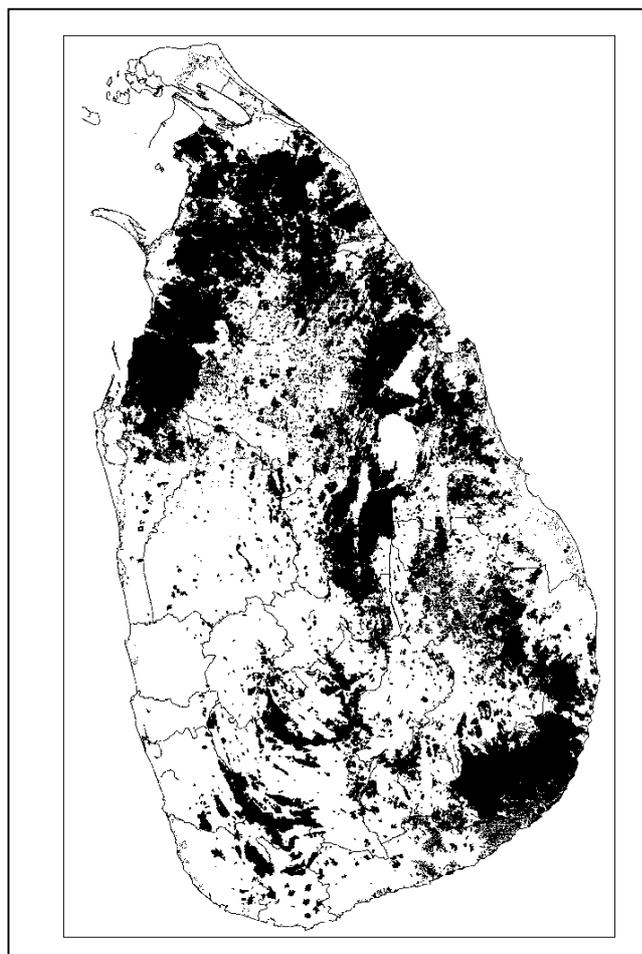


Figure 20. Sri Lanka's forest cover

Table 26. Natural forests in Sri Lanka, 1992

Forest type	Total area (ha)	Total land area (percent)
Closed canopy:		
Montane	3 108	0.05
Sub-montane	68 616	1.04
Lowland rain	141 506	2.14
Moist monsoon	243 886	3.69
Dry monsoon	1 090 981	16.49
Riverine	22 435	0.34
Mangrove	8 688	0.13
Sub-total	1 579 220	23.88
Open canopy:		
Sparse	464 076	7.01
Total	2 043 296	30.89

Source: Ministry of Agriculture, Lands and Forestry, Forestry Sector Master Plan (1995)

Table 27. Population increase and depletion of natural forest cover in Sri Lanka

Year	Population density (persons/km ²)	Forest cover (million ha)	Forest cover (percent of land area)	Per capita forest area (ha/person)
1900	54	4.5	70	1.3
1956	131	2.9	44	0.3
1983	230	1.8	27	0.1
1992	269	1.6	24	0.1

Source: Forest Department

Sri Lanka is one of the smallest but most biologically diverse countries in Asia. Much of the country's biodiversity is found in its forests, particularly those in the wet and intermediate zones of the southwest. The National Conservation Review found that from 20 to over 50 percent of species in selected plant and animal groups are found in the lowland rainforests and moist monsoon forests of four districts in the wet zone (Table 28). Many species are endemic and several are rare with extremely localized distributions in remnant forest fragments. For example, 119 woody plant species (8 percent) are restricted to single forests, and 49 of these rare species (3 percent) are endemic.

Table 28. Sri Lanka's diversity and status of selected flora and fauna groups in lowland rainforests and moist monsoon forests of Galle, Matara, Kalutra and Ratnapura districts

Selected group	No. of species in group	No. of species recorded in rain/moist monsoon forests			
		Total	Rare [#]	Endemic	Rare endemic
Woody plants	1 496	619 (41%)	119 (8%)	299 (20%)	49 (3%)
Butterflies	>242	50 (21%)	14 (6%)	2 (1%)	0 (0%)
Molluscs	266	*>27 (10%)	9 (3%)	22 (8%)	6 (2%)
Freshwater fishes	65	21 (32%)	10 (15%)	13 (20%)	3 (5%)
Amphibians	48	27 (56%)	8 (17%)	14 (29%)	3 (6%)
Reptiles	162	44 (27%)	13 (8%)	22 (14%)	5 (3%)
Birds	419	109 (26%)	22 (5%)	19 (5%)	1 (+%)
Mammals	89	25 (28%)	5 (6%)	3 (3%)	0 (0%)

Source: FD/IUCN (1997)

Rare species are defined as those recorded in only one forest.

* This total is an underestimate because many more species await identification.

In the light of the increasing demands placed upon the forestry sector, its diminished capacity to meet the various needs of the people sustainably has become a major problem. The most serious consequences of deforestation and forest degradation have been identified as:

- ◆ reduction in biodiversity;
- ◆ irregular water supply;
- ◆ shortened life span of irrigation channels and reservoirs;
- ◆ soil erosion and associated loss of soil fertility;
- ◆ reduction of wood supplies and the resulting price increase of wood and wood products;
and
- ◆ scarcity of fuelwood in some localities

Forestry in the national economy

According to Central Bank of Sri Lanka statistics, in 1998 the Sri Lankan forestry sector contributed about SL Rs 15 billion to the national economy, or 2 percent of the total gross domestic product (GDP). However, the actual contribution of the forestry sector is much higher than what is reported. The national income and product accounts concentrate only on market-oriented activities. Even these activities are not noted properly due to a lack of data. The statistics also fail to account for non-market production of sawnwood, fuelwood, and various forms of non-wood forest products (NWFPs). According to estimates by the Forestry Sector Master Plan (FSMP) (1995), the forestry sector contributed approximately 6 percent of the total GDP if the values of all the forest products, services, and employment generated are included. The FSMP also estimates that the forestry sector employs approximately 331 000 people, doubling the official employment figure. Although wood and charcoal are the country's main sources of energy, the contribution of the forestry sector to the energy sector is poorly recognized. Fuelwood supplies approximately 40 percent of Sri Lanka's energy, and 90 percent of the country's population use fuelwood as the main source of fuel.

The forests also provide beneficial non-extractive services, including clean water, grazing land, ecotourism, recreation, carbon sequestration, climate control, biological diversity, and cultural values.

Forestry sector institutions

Four ministries are involved in the forestry sector in Sri Lanka:

- ◆ The Ministry of Forestry and Environment is the main agency involved in the sector through the Forest Department and the State Timber Corporation (STC).
 - The Forest Department is responsible for managing production forests and protection forests that include around 135 000 ha of forest plantations and 60 percent of the natural forests. The Protected Area System, under the Forest Ordinance (FO) and National Heritage and Wilderness Areas Acts, are also protected and managed by the Forest Department.
 - The STC, established in 1968, is a Government corporation responsible for harvesting and marketing wood from State-owned forests and forest plantations. With a monopoly on timber from State forests, it operates sawmills, impregnation and seasoning plants, furniture factories, and timber sales depots.
- ◆ The Ministry of Public Administration, Parliamentary Affairs and Plantation Industries, through the Department of Wildlife Conservation (DWLC), Rubber Control Department, Coconut Cultivation Board, Rubber and Coconut Research Institutes and the forestry activities in the Tea Estate Sector.
 - The Department of Wildlife Conservation is responsible for conserving fauna and flora in approximately 13 percent of Sri Lanka's land area. The DWLC is also responsible for enforcing the Fauna and Flora Protection Ordinance, which has declared approximately

30 percent of the forests under its jurisdiction as National Reserves and Sanctuaries (Protected Areas).

- ◆ The Ministry of Education, providing forestry education at the University of Sri Jayewardanapura and Post Graduate Institute of Agriculture at the University of Peradeniya.
- ◆ The Ministry of Industries that controls forest industries.

FORESTRY POLICIES

Sri Lanka has a long history of religious, cultural and social practices that have accorded a prominent place for tree planting and nature conservation. The British Colonial Government introduced large-scale clearing of natural forests to make room for coffee, tea, rubber and coconut plantations. The exploitation of timber was instituted through the adoption of felling rules in 1835, and timber-cutting licenses and a management system in 1879. FO No. 10 of 1885 enabled the declaration of reserved forests, sanctuaries and controlling the felling and transport of timber. In 1887, the British Colonial Government appointed a Conservator of Forests, whose duties included establishing the Forest Department. This initiated a trend towards forest conservation and an approach to scientific forest management. FO No. 16 of 1907 is the cornerstone of the present law relating to forests.

The first forest policy formulated in 1929 was considered groundbreaking because it introduced new objectives for forest management, including the export of forest products, creating self-sufficiency in construction lumber and fuelwood, conservation of soil and water, and preservation of indigenous flora and fauna. The process of mapping forest reserves began in 1931 and the concept of working plans for forest management was presented in 1933. The Forest Department also conducted forest inventories during this period. Extensive plantations were established with teak, eucalyptus, mahogany, albizzia, pines and *Artocarpus* (jak). The Fauna and Flora Protection Ordinance, which was enacted in 1937, protected wildlife in national reserves and sanctuaries. The forest policy was further clarified in 1938 when all natural forests above 1 500 m (5 000 feet) were designated climatic and protective reserves.

Forest policies during the post-independence period (1948-1979)

Prior to 1948, the Forest Department was responsible for wildlife conservation, protected area management and forestry. After Sri Lanka gained its independence, wildlife and protected area management were transferred to a newly established Department of Wildlife Conservation (DWLC). These two departments continued to be a part of the Ministry of Lands until the 1970s.

Influenced by the FAO declaration of the principles of forestry policy in 1951, the Government introduced the following comprehensive sectoral forest policy objectives in 1953:

- ◆ Maintain, conserve and create forests for the preservation and amelioration of the environment, soil and water resources, and the protection of the local fauna and flora when required for aesthetic, scientific, historical and socio-economic reasons.
- ◆ Ensure and increase, as far as possible, the supplies of small wood for agricultural requirements and fuelwood for domestic consumption.
- ◆ Maintain, as far as possible, a sustained yield of timber and other forest products for general housing, industrial, communication, and defense requirements.
- ◆ Work the forest to the highest possible economic advantage consistent with the foregoing objectives.

Following these objectives, many forest management activities covering conservation, establishment of industrial forest plantations, forest administration, legislation, forestry research and education

were carried out by the Forest Department from 1950 to 1970. The working plans for sustained yield management were extended to cover forests in most forest divisions, thus placing all management planning and operations in the hands of the Forest Department.

A resource assessment (1965-1967) and a pre-investment study on forest industry development carried out in 1969 concluded that with appropriate forest management, the country could enjoy an adequate supply of timber and protective forest cover. This led to the establishment of domestic forest industries (e.g. Ginthota plywood factory, Kosgama plywood complex, Boosa sawmill and impregnation plant, and the STC). In the 1970s, with the commencement of the UNESCO Man and Biosphere (MAB) Program in Sri Lanka and the Government decision to conserve Sinharaja Forest, the Forest Department began to place greater emphasis on forest conservation.

Recent forest policies

Until the 1980s, forestry was considered to be a State responsibility. Increasing population pressure on forest land led to an amendment of the 1953 forest policy to involve local communities in developing private woodlots and forestry farms through a social forestry program. The implementation of the Community Forestry Project funded by the Asian Development Bank (ADB) from 1982 to 1990 reflected this policy change.

Following criticisms of the 1986 Forestry Master Plan (FMP)'s proposals for logging natural forests in the wet zone, an environmental management component was added to the five-year investment program. Thus, the Forestry Sector Development Project was launched in 1990. This established the Environmental Management Division in the Forest Department. A moratorium on logging operations in wet zone natural forests and subsequent logging bans in all the natural forests were imposed in 1990.

The National Heritage and Wilderness Areas Act was enacted in 1988 to preserve unique ecosystems and genetic resources, physical and biological formations. It precisely delineated areas constituting the habitats of threatened plant and animal species. The Sinharaja Forest, a primeval rainforest, was declared a national heritage under this act and UNESCO listed it as a World Natural Heritage site in 1988.

The need for a wildlife conservation policy was long recognized but a National Policy for Wildlife Conservation was only adopted in 1990 in response to the Sri Lanka National Conservation Strategy. The objectives, based on those of the World Conservation Strategy, are to:

- ◆ maintain ecological processes and life-sustaining systems;
- ◆ preserve genetic diversity, especially biodiversity and endemic biota; and
- ◆ ensure the sustainable utilization of species and ecosystems of immediate and potential importance to support the people.

This policy emphasized the urgent need to redress the drastic imbalance of protected areas, most of which are located in the dry zone (in 1990 around 90 percent of the protected areas under the DWLC were located in the dry zone).

The Forest Ordinance was amended in 1995 to incorporate a new category called "conservation forests" to cover forests set aside for conservation after implementation of the logging bans in natural forests.

The National Forest Policy of 1995

The National Forest Policy, formulated and approved by the Government in 1995 governs all forestry activities in the country except for the management of protected areas under the DWLC. The policy acknowledges that the natural forests are heavily depleted, and expresses concern for safeguarding the remaining natural forests for posterity to conserve biodiversity, soil and water resources. It emphasizes the importance of retaining the present natural forest cover, and increasing the overall tree cover. A large part of the natural forests should be completely protected. Multiple-use forestry is to be promoted, and the natural forests outside the protected area system are to be used sustainably to provide for the growing demand for bio-energy, wood and NWFPs, especially for the benefit of local people, while ensuring that environmental objectives are met.

The National Forest Policy recognizes that homegardens, other agroforestry systems and trees on non-forest lands have a crucial role in supplying timber and fuelwood. It also acknowledges the importance of public participation in forestry development and conservation. It emphasizes the need to develop partnerships with local people, communities, non-governmental organizations (NGOs) and the private sector in protecting forests, growing trees to meet household needs, supplying raw material for wood-based industries, harvesting, transporting, processing and distributing various forest products. The policy aims to broaden the institutional framework for forest management, with clearly defined roles and responsibilities for the various partners.

The overall objectives of the National Forest Policy are to:

- ◆ conserve forests for posterity, with particular regard to biodiversity, soils, water, and historical, cultural, religious and aesthetic values;
- ◆ increase the tree cover and productivity of the forests to meet the needs of present and future generations for forest products and services; and
- ◆ enhance the contribution of forestry to the welfare of the rural population, and strengthen the national economy, with special attention paid to equity in economic development.

Forestry Sector Master Plan (1995)

The main objectives of the Forestry Sector Master Plan (FSMP) are to prepare a comprehensive long-term development framework, ensure that the forestry sector can provide environmental services and various forestry products to meet the needs of the people, and contribute sustainably to the nation's economic and social development. The plan covers the 1995-2020 period, and includes 10 development programs outlining short-, medium-, and long-term actions to develop forest conservation, multiple-use management of forests, commercial forest plantations, agroforestry, NWFPs and bio-energy. In addition, institutional support programs comprise development of legislation and institutions, human resources, research, extension services, and monitoring and evaluation.

The Five Year Implementation Program (FYIP) of the FSMP was developed by the Ministry of Forestry and Environment in 1997 to conserve forests and enhance the forestry sector's contribution to the welfare of rural population and the national economy. The components of the FYIP include forest conservation, forest land allocation and macro-level zoning, commercial plantation development, multiple-use management of natural forests, social forestry, agroforestry, extension, forest-based industry and institutional development.

Key policy, legislation and institutional changes concerning the management of forest resources are summarized in Table 29.

Table 29. Key policy, legislation and institutional changes concerning management of Sri Lanka's natural forests during the twentieth century

Year	Policy/legislation/ institutional changes (Authority)	Provisions for forest management
1907	FO No. 16 (FD)	Protection of forests and their products within reserved forests and village forests, primarily to control exploration of timber.
	Amended several times from 1912 to 1995	Removed the requirement for import and export licenses. Introduced a provision for a reward fund and to eject encroachers Increased fines.
1995	FO (FD)	Incorporated a new category of forest reserves called conservation forests.
1929	First authoritative Forest Policy	Export of timber and forest products, self-sufficiency in timber and fuelwood.
1938	Amended	Preservation of indigenous fauna and flora. Clearing of forests prohibited above 5 000 ft (1 500 m).
1937	Fauna and Flora Protection Ordinance No. 2 (FD)	Protection of wildlife in national reserves and sanctuaries and outside protected areas.
1964	Amendment Act No. 44 (DWLC)	Nature reserves and jungle corridors incorporated in national reserves.
1970	Amendment Act No. 1 (DWLC)	Intermediate zone, envisaged as a buffer zone for controlled hunting, was removed from the Ordinance.
1993	Amendment Act No. 49 (DWLC)	Refuges, marine reserves, and buffer zones incorporated with national reserves.
1948	Establishment of Department of Wildlife Conservation	Administration of Fauna and Flora Protection Ordinance. Management of protected areas declared under the Fauna and Flora Protection Ordinance.
1953	National Forest Policy	Emphasis on conserving forests, increasing supplies of small-dimension wood, maintaining sustained timber yields.
1980	Amended	Involve local communities in forestry development through social forestry.
1995	Reformulated (Approved by the Government)	Conserve forests, increase tree cover and productivity of forests and enhance the contribution of forestry to the welfare of the rural population and strengthen national economy.
1968	Establishment of State Timber Corporation	State organization for harvesting and marketing of timber from State-owned natural forests and forest plantations.
1970	UNESCO Man and Biosphere Program	Establishment of arboreta.
1982	Mahaweli Environment Project	Network of protected areas established to mitigate the impact of the Mahaweli Development Project on wildlife and to protect catchment areas.
1986	Forestry Master Plan	A long-term framework for development of the forestry sector.
1995	Forestry Sector Master Plan (approved by the Government)	A comprehensive long-term framework for sustainable development of the forestry sector.
1988	National Heritage and Wilderness Areas Act No. 3 (FD)	Protection of State land with unique ecosystems, genetic resources, or outstanding natural features.
1990	National Policy for Wildlife Conservation (approved by the Government)	Maintenance of ecological processes and preservation of genetic diversity.
1990	Forestry Sector Development Project - Environmental Management component	Logging of natural forests banned. Accelerated and National Conservation Reviews carried out (assessment of conservation values of natural forests).
1993	National Environmental Regulations No. 1 (Under the National Environmental Act) (CEA)	Requirement of environmental impact assessment (EIA) for extraction of timber from forests and forest plantations exceeding 5 ha and conversion of forests into non-forest uses exceeding 1 ha.
1997	Five Year Implementation Program of the FSMP	Short- and medium-term development program for the forestry sector.

ISSUES LEADING TO LOGGING BANS IN NATURAL FORESTS

Placing greater emphasis on forest conservation

Prior to the 1970s, the key functions of the Forest Department were to provide for sustainable production of timber and fuelwood and to establish new forest plantations. In 1970, when the MAB program was established, 36 biosphere reserves were set aside as arboreta for Sri Lanka's different natural forest ecosystems. In 1972, public outcry against logging in the Sinharaja Forest Reserve prompted the Government to appoint a cabinet sub-committee to examine the problem. Subsequently, all commercial timber harvests were halted when the reserve was designated a conservation area in 1977. Since then, the Forest Department has placed greater emphasis on forest conservation.

Over-exploitation and recommendations of the 1986 Forestry Master Plan

The FMP in 1986 over-emphasized the use of natural forests for timber production and paid very little attention to forest resource conservation. Public interest in environmental and forest conservation increased in the mid-1980s as a result of large-scale deforestation during the previous two decades in areas such as the Mahaweli. The earlier forest management approach, which was based on the commercial selection system, was characterized by the removal of all commercial species of over 60 cm dbh at the end of a 20-30 year cutting cycle. This led to a severely degraded stand structure and species composition. In the early 1980s, it became clear that this could not be sustained. In 1998, selective felling in the dry zone forests was suspended pending the compilation of forest inventories and forest management plans. The suspension became a complete ban in 1990 at the time of the overall ban on logging in all natural forests.

Notwithstanding Sri Lanka's severely depleted natural forests, the FMP recommended harvesting in 119 000 ha (43 percent) of wet zone natural forests and 954 000 ha (65 percent) of dry zone natural forests. As expected, the FMP evoked considerable criticism from environmentalists, academics, NGOs, the general public, and some officials of the Forest Department for not giving adequate attention to environmental and forest conservation considerations.

The Government responded by commissioning an environmental study to evaluate the FMP proposals, with assistance from the World Bank and the World Conservation Union (IUCN), resulting in the following strategies for the conservation of natural forests:

- ◆ introduce a moratorium on logging operations in natural forests in the wet zone;
- ◆ survey and evaluate the conservation value of natural forests in the wet zone (Accelerated Conservation Review);
- ◆ establish a special committee (Conservation Review Committee) appointed by the Minister of Lands, Irrigation and Mahaweli Development to advise the Government on the conservation of natural forests;
- ◆ prepare management plans for all of Sri Lanka's natural forests; and
- ◆ incorporate an environmental management component to the five-year investment program of the FMP to:
 - establish an Environmental Management Division in the Forest Department (Forest Conservation Unit);
 - implement a National Conservation Review to evaluate the conservation values (biological diversity and hydrological importance) of all the natural forests; and
 - identify an optimal protected area network.

The 1989 study concluded that commercial and political pressures had determined logging practices in Sri Lanka, resulting in severe degradation of the growing stock in many areas. The report also noted that deforestation was a serious threat to the conservation of forest biodiversity, endemism, and watershed protection in Sri Lanka.

In response to the study's recommendations, the Forest Department designated 13 forests in the wet zone (totalling 24 000 ha) as conservation areas. This was roughly 50 percent of the forests within the zone that had been marked for exploitation under the five-year investment program of the FMP.

The Government also imposed a complete logging ban in all natural forests in 1990 following recommendations of the Conservation Review Committee. This ban is still in place, and there is strong public support to maintain the ban until the depleted forests are rejuvenated.

GOALS AND OBJECTIVES OF IMPOSING THE LOGGING BAN AS A STRATEGY FOR FOREST CONSERVATION

The goals of the logging ban are to:

- ◆ prevent further degradation and loss of natural forest cover;
- ◆ rehabilitate forests that have been heavily degraded;
- ◆ protect and maintain biodiversity;
- ◆ maintain environmental and hydrological functions of forests; and
- ◆ preserve recreational, aesthetic and cultural values.

Since almost all the natural forests are State-owned, the institutions involved in implementing the logging ban are limited to the Forest Department and the STC, operated under the Ministry of Lands, Irrigation and Mahaweli Development.

The National Environmental Regulations control timber harvests on areas exceeding 5 ha and prevent the conversion of forests exceeding 1 ha to non-forest uses. The main purpose of these regulations is to ensure environmental protection in various development activities. Although the environmental regulations are not directly relevant to the implementation of the logging ban, logging operations in natural forests and forest plantations require an EIA.

The logging ban in natural forests is still in place except along the roadsides in the north where forests can be logged or cleared for security purposes. Permission to clear natural forests has also been granted for development projects subject to the National Environmental Regulations. The Forest Department has a firm commitment to enforce the logging ban. However, illegal cutting in natural forests still occurs on a small scale. The threat of illegal cutting is much greater in forest plantations than in natural forests. The Forest Department had recorded an average of 670 forest offenses per year for illegal cutting in natural forests (about 1 000 cases from plantations) from 1991 to 1995. The volume of timber involved in these illegal cuttings was about 1 130 m³ per year, valued at around US\$ 80 000 (SL Rs 5.2 million).

ASSESSMENT OF THE POLICY, ECONOMIC, ENVIRONMENTAL, AND SOCIAL IMPLICATIONS OF THE LOGGING BAN IN NATURAL FORESTS

Policy implications

Strategies to implement sustainable forest management

The Government seeks sustainable management for all its forests by encouraging State agencies, local people, user groups, rural communities, NGOs, the estate sector and local industries to work together. However, natural forests should be managed only by the State agencies in cooperation with local people and communities, possibly assisted by NGOs.

State forest land is being zoned into the following four categories for conservation, multiple-use management, agroforestry and forest plantation development:

- ◆ Class I forests preserved to protect biodiversity, soils, and water, and historical, cultural, religious, and aesthetic values, and for research;
- ◆ Class II forests for non-extractive uses such as scientific research, protection of watershed and wildlife habitat, regulated nature-based tourism, and controlled collection of dead fuelwood by people residing in the forests;
- ◆ Class III forests for sustainable multiple-uses including production of wood (based on State management plans) and NWFPs for communities; and
- ◆ Class IV forests consisting of forest plantations and agroforestry systems for wood and non-wood products on State lands.

Management plans are also being formulated in consultation with relevant agencies and stakeholders according to the principles of “bottom-up planning” and transparency to indicate management priorities and operational approaches for managing forest resources. The Protected Area System will include Class I and II forests, covering flora and fauna biodiversity, critical watersheds, and forests with special cultural, religious, historic and aesthetic values. The Protected Area System will be demarcated based on biodiversity surveys, other scientific studies and approved criteria, and managed by the State in co-operation with local people and NGOs.

Protection and production forests

The 1985 forest inventory report identified two categories of natural forests:

- ◆ protection forests, on slopes greater than 30 degrees (60 percent) gradient and with elevations over 1 500 m (totalling about 122 000 ha); and
- ◆ production forests, classified into seven types based on their productive potential (estimated to total about 852 500 ha).

By 1986, management plans had been prepared for 9 management units of the wet zone natural forests. As specified in the strategies for implementing the National Forest Policy, the Accelerated Conservation Review (ACR) and National Conservation Review (NCR) were carried out by the Forest Department, with the assistance of IUCN/UNDP, from 1990 to 1996. The main objectives of these two reviews were to define a national system of conservation forests (Class I and II forests).

All natural forests exceeding 200 ha were studied except those inaccessible in the north and east of the country. Of 281 forests assessed for watershed characteristics, 85 were identified as extremely important for protection. Out of the 204 forests assessed for biodiversity conservation, minimum sets of 108 and 49 areas were identified for protecting woody plant and endemic woody plant species, respectively. Woody plants and animal diversity were represented in a total of 133 forests. Based on these results, 31 new conservation forests in the wet zone, covering around 61 300 ha, were included in the protected area network. Assessments of conservation forests in the dry zone have not been finalized.

An additional 25 000 ha of montane and sub-montane forests are located above 1 500 m. The natural forests in the Protected Area System extend over nearly 1 million ha, representing 49 percent of Sri Lanka’s total natural forests (Tables 30 and 31), and covering approximately 15 percent of the country’s total land area. According to the IUCN regional review of protected areas in 1992, Sri Lanka has an extensive national protected area network that provides adequate coverage of most major forest habitat types.

The DWLC is responsible for 40 percent of Sri Lanka’s forests designated exclusively for conservation. The Forest Department is responsible for 56 percent of the natural forests, which include both production and conservation areas. Local administrators manage a small area of production forests. Fifty-one percent of the forests are considered production forests subjected to the logging ban (Table 31). The FSMP and the FYIP classified these forests as multiple-use management forests for “sustainable management primarily for the production of wood and non-wood forest products.”

The ban on commercial logging operations in the natural forest will continue until the growing stocks are fully recovered and the forests are again ready for harvesting. The 1986 Environmental Study of the FMP, which recommended a moratorium on logging operations in the wet zone forests in 1989, prescribed a rest period of up to 100 years for the growing stock to recover. The EIA of the Forestry Sector Development Project in 1991 recommended a rest period of at least 10 years for the wet zone forests. Any decision to lift the logging ban would be made only after a complete review of the situation.

Table 30. Sri Lanka's protected areas administered by the Forest Department and Department of Wildlife Conservation

National designation	No.	Area (ha)
Forest Department		
International Biosphere Reserves	2	9 376
National Biosphere Reserves	39	63 384
National Heritage and Wilderness Areas	1	11 187
Conservation Forests	32	76 525
Sub-total	74	160 472
Sub-total Corrected*	74	149 909
Department of Wildlife Conservation		
National Parks	12	462 448
Nature Reserves	3	33 372
Strict Natural Reserves	3	31 574
Sanctuaries	52	284 117
Sub-total	71	821 871
Total	145	971 780

Source: FD/IUCN (1997)

* Corrected for International and National Biosphere Reserves that are located in National Heritage and Wilderness Areas and Conservation Forests.

Table 31. Sri Lanka's natural forests by production and protection classifications (thousand ha)

Management agency	Production*	Protection	Total
Forest Department	975.6	174.9**	1 150.5
Department of Wildlife Conservation	0.0	821.9	821.9
Local administration	74.1	0.0	74.1
Total	1 049.7	996.8	2 046.5
Percentage of the total forests	51.3	48.7	100.0

*Currently subjected to the logging ban

**Figure includes natural forests above 1,500 m

Legislative arrangements for the logging ban

No formal policy revision, amendment to the Forest Ordinance, regulation or special legal provision was enacted in imposing the logging ban in 1990. As the Forest Department is the major forest owner, the logging ban could be imposed without legal provisions in the Forest Ordinance. However, the National Environmental Regulation No. 1 of 1993 legally controls the extraction of timber from forests through the EIA procedure. Accordingly, environmental clearance is needed for extraction of timber from any forest exceeding 5 ha. This requirement imposes controls on logging operations in both natural forests and forest plantations.

On the whole, the logging ban has been implemented effectively throughout the country, except where forests had to be cleared for security reasons and development projects. Nonetheless, illegal felling of trees and encroachments in State forests are taking place regularly and the Forest Department and DWLC officers are fully involved in curbing such activities. To date, law enforcement remains a primary preoccupation of forest officers.

Management strategies for multiple-use production forests

The National Forest Policy emphasizes the allocation of natural forests firstly for conservation and secondly for regulated multiple-use production forestry. However, the FSMP recommends a continuation of the ban on commercial logging operations in the natural forests until management plans are prepared with the active participation of local communities that should derive benefits from the multiple-use forests.

Economic implications

Demand and supply of wood before the logging ban

In the mid-1980s, Sri Lanka was virtually self sufficient in industrial wood and fuelwood. Over 90 percent of the demand was for fuelwood, of which 85 percent was consumed by households and 15 percent by industry. Industrial wood represented only about 10 percent of Sri Lanka's total wood demand. Exports were negligible. Approximately 35 000 m³ of sawnwood were imported annually. According to the wood demand and market study conducted for the 1986 FMP, the demand for industrial logs was 980 000 m³ with an estimated annual increase of 14 000 m³ (Table 32).

Table 32. Sri Lanka's wood demand, 1985 (thousand m³)

Assortment	Wood demand
Logs	
Sawlogs, sleeper logs	385
Peeler logs	80
Transmission poles	5
Coconut logs for rafters	60
Total logs	980
Fuelwood*	
Household	11 500
Industry	1 610
Total fuelwood	13 110
Total wood demand	14 090

Source: Ministry of Lands and Land Development, Forestry Master Plan (1986)

* 0.7 tons fuelwood = 1 m³ fuelwood

The STC had a monopoly on the supply of timber from State forests and forest plantations, while timber from the non-state sector (i.e. homegardens, rubber and coconut plantations, etc.) was marketed by the private sector. The STC's average log production in 1984/1985 was about 110 000 m³, representing 11.5 percent of the total industrial wood supply. The STC sold about 70 percent to private sawmills and wood-working industries. Approximately 920 sawmills were operating in Sri Lanka during 1984 and 1985. Most were private ventures or partnerships. From 1985 to 1989, the STC owned the most sawmills, operating 16 sawmills in all, including 3 major sawmills at Minneriya, Madawachchiya and Thimbolkatiya. The sawmilling industry bought the bulk of its logs from the private sector while the STC supplied just 17 percent of the total log intake. Sri Lanka produced 380 000 m³ of sawnwood in 1984, about 10 percent of which was produced by the STC.

The Ceylon Plywood Corporation's (CPC) two mills (Kosgama and Gintota) are Sri Lanka's only producers of plywood and particleboard. CPC was the country's major wood processing enterprise. The total annual capacity of its two mills was around 35 000 m³ per year. During the 1980s, CPC utilized only about 50 percent of its capacity due to log shortages. From 1984 to 1986, CPC produced around 19 000 m³ of plywood annually.

About 83 000 m³ of plywood were imported each year during the mid-1980s, primarily from India, Southeast Asian countries and the former Soviet Union. Import duties were 60 percent. The Kosgama Complex was the only producer of particleboard in Sri Lanka during the 1980s, producing around 3 000-3 500 m³ annually to meet the local demand. Very small quantities of particleboard were imported. The import duty of particleboard in the 1980s was 35 percent.

In 1984, fuelwood represented 71 percent of Sri Lanka's total energy supply. Annual fuelwood and biomass fuel use in 1984/1985 was 7.9 million metric tons, 85 percent of which was domestically consumed, primarily for cooking. Consumption of fuelwood for industrial use was around 1.1 million metric tons per year (15 percent of the total). The tea industry consumed 33 percent of the total industrial fuelwood supply. The main types of fuelwood used in the domestic sector were rubberwood (28 percent), coconut wood (24 percent), wood from natural forests (23 percent), and wood from homegardens (11 percent). The main types of fuelwood in the industrial sector were rubberwood (49 percent) and wood from natural forests (38 percent).

The log supply from natural forests in 1985 was estimated to be around 425 000 m³, the bulk of which came from wet zone natural forests. Industrial logs from natural forests made up approximately 44 percent of the total industrial log supply. Non-forest wood resources from homegardens and rubber, coconut and palmyrah plantations supplied approximately 455 000 m³ (47 percent of the total supply). Forest plantations supplied only 80 000 m³ of Sri Lanka's industrial logs in 1985, or 8.3 percent of the total supply (Table 33). The harvest plan for 1986 to 2000 estimated the supply of logs from natural forests would be about 320 000 to 350 000 m³ per year, or 21 percent of the total supply. The FMP attributed this reduction to minimizing over-harvesting in the natural forests. It was expected that the availability of logs from forest plantations, non-forest resources, rubber and coconut/palmyrah plantations would be increased to compensate for the reduced log supply from the natural forests. Balance II in Table 33 indicates a slight shortage in the industrial log supply during the 1986-1990 period, which was predicted to increase after 1990.

The 1986 management plans for the 9 units in the wet zone had prescribed a 30-year harvest cycle with intermediate improvement cutting 15 years after selective cutting. The average yield from selective cutting was 30 m³/ha (maximum 40 m³/ha) of log volume and the average yield from intermediate cutting was 15 m³/ha. After 1986, the STC harvested an average of 922 ha of natural forests in the wet zone each year. In addition, the CPC was permitted to selectively harvest 11 000 ha of the Kanneliya-Dediyagala-Nakiyadeniya natural forest complex that yielded an average of 30 000-40 000 m³ per year from 1987 to 1988. The felling operations in wet zone forests continued until the logging ban was introduced in 1990.

Table 33. Availability and demand for Sri Lanka's industrial logs, 1985-2000 (thousand m³/year)*

Source	1985	1986-90	1991-95	1996-2000
Availability				
Natural forests	425	350	335	320
Existing forest plantations	80	135	130	178
Homegardens and other non-forest	260	267	287	350
Rubber plantations	120	591	514	300
Coconut/palmyrah plantations	75	361	326	338
Total log availability	960	1 704	1 592	1 486
Demand	980	1 050	1 230	1 390
Balance I	-20	654	362	96
Rubber and coconut logs not accepted by markets		674	477	224
Balance II	-20	-20	-115	-128

Source: Ministry of Lands and Land Development, Forestry Master Plan (1986)

*Estimated by the Forestry Master Plan of 1986 prior to the decision to impose the logging ban.

During 1986 and 1987, about 9 400 ha of dry zone natural forests in the Monaragala district were released to the STC for selective logging until such harvesting was suspended in 1988. In 1990, the suspension became a complete ban.

However, the logging operations in the forests were replaced by various development activities such as irrigation and settlement schemes (i.e. the Mahaweli Development Project) carried out by the STC. Large volumes of timber were harvested from the natural forests in the Mahaweli Development areas by the STC (e.g. 53 300 m³ in 1980 and 55 000 m³ in 1981). After 1986, approximately 90 000 ha of dry zone natural forests were cleared to make way for the Mahaweli System C and Padaviya Developments. About 130 000 ha of natural forests in the dry zone were logged for the Mahaweli System B Development. Some forests in the Mahaweli Development Scheme were logged until about 1995, even after the logging ban had been implemented.

The STC's timber production from 1986 to 1995 is shown in Figure 21 and Table 34. Since 1985, the STC has halted logging operations in the Northern and Eastern districts due to the ethnic disturbances in those areas. The STC's logging operations in the Galle, Matara, Ampara, and Anuradapura districts were also hampered during 1988 and 1990 due to ethnic unrest. The STC timber harvest from the natural forests during 1985-1995 is shown in Figure 22.

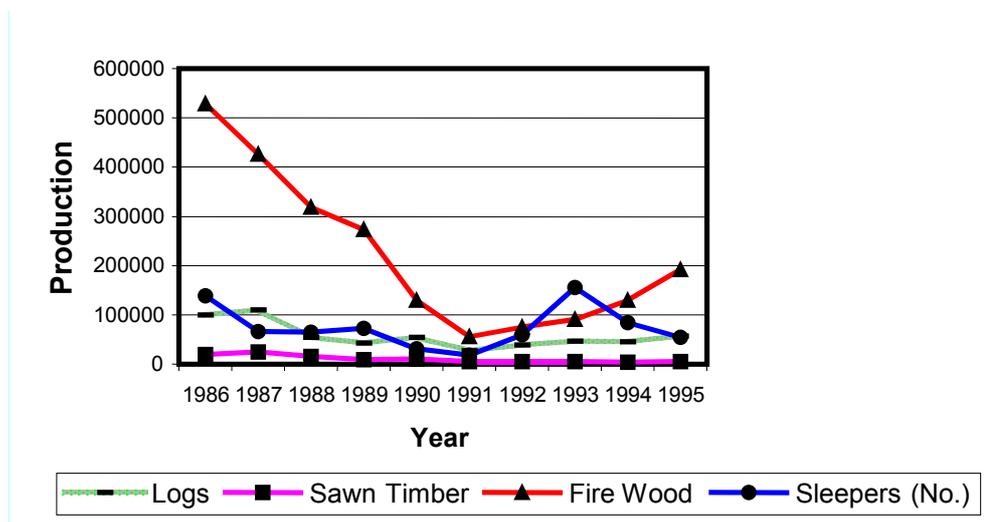


Figure 21. STC's timber production in Sri Lanka, 1986 – 1995

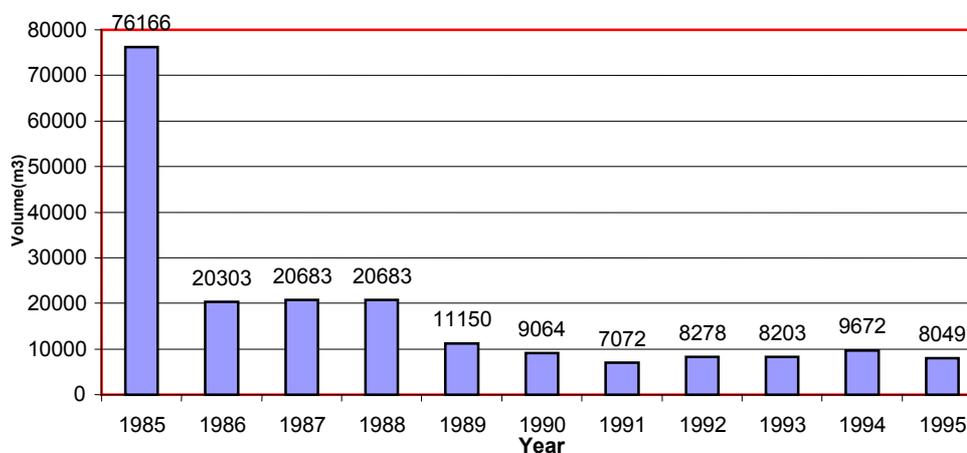


Figure 22. Sri Lanka's timber extracted by STC from natural forests, 1985 – 1995

Table 34. State Timber Corporation's timber production in Sri Lanka, 1986-1995

Item	Before the logging ban					After the logging ban				
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Logs (m ³)	99 358	109 796	54 710	42 237	54 967	27 804	38 797	46 797	45 678	56 467
Peeler Logs (m ³)	5 584	4 283	1 210	171	-	115	33	-	-	290
Sawn timber (m ³)	19 384	24 388	15 247	8 766	9 862	5 447	5 038	4 822	3 996	5 705
Fire wood (m ³)	529 212	426 452	318 210	273 267	129 868	56 232	75 164	90 909	130 193	191 436
Pulp wood (m ³)	-	10 686	22 242	7 777	5 384	5 932	648	-	-	-
Sleepers (Nos.)	138 316	65 661	64 874	72 247	31 688	18 171	59 779	154 887	83 849	54 035
Tree poles (Nos.)	19 827	16 793	5 045	3 744	10 323	11 709	26 929	4 613	10 554	20 729
Poles (Nos.)	484 213	520 070	393 974	412 874	113 308	70 354	146 570	22 017	221 173	206 731
Charcoal (m. ton)	3 045	1 514	991	1 142	683	469	621	119	213	153

Source: State Timber Corporation, Annual Reports (1986-95)

Demand and supply of wood after the logging ban

Roundwood logs

Sri Lanka's total industrial roundwood consumption in 1993 was estimated to be 1.3 million m³. Ninety percent was used for sawnwood production (Forestry Planning Unit 1994). Wood consumption depended almost entirely on domestic log supply, the majority of which originated from non-forest lands. Imports totalled only approximately 7 000 m³ (Table 35). The relative importance of non-forest lands as a source of timber has increased substantially (Table 36).

Table 35. Estimated supply sources for logs in Sri Lanka, 1993

Source	Volume (thousand m³)	Percentage of total
Homegardens	500	39.2
Rubber plantations	230	18.0
Clearing of natural forests	5	0.5
Palms	150	11.8
Tea estates	50	3.9
Forest plantations	47	3.7
Unrecorded (incl. illegal)*	286	22.4
Imports	7	0.5
Total	1 275	100.0

Source: Ministry of Forestry, Irrigation and Mahaweli Development (1994a)

*An undetermined part of the unrecorded supply includes illegal cuttings from natural forests and forest plantations.

Table 36. Sri Lanka's domestic supply of logs before and after the logging ban (thousand m³)

Supply	1985	1993
Natural forests	425 (44.3%)	5 (0.4%)
Forest plantations	80 (8.3%)	47 (3.7%)
Homegardens and other non-forest sources	260 (27.0%)	550 (43.4%)
Rubber plantations	120 (12.5%)	230 (18.1%)
Coconut/palmyrah plantations	75 (7.8%)	150 (11.8%)
Unrecorded (including illegal supplies)	-	286 (22.6%)
Total domestic log supply	960 (100%)	1 268 (100%)

Note: Brackets show percentage of total.

The supply of industrial logs from natural forests in 1993 had been further reduced to negligible levels (5 000 m³) due to the introduction of the logging ban and the allocation of increased areas for conservation. But the supply of timber from natural forests due to illegal cutting should be considered to provide a more accurate account of the timber supply from the natural forests. The Forest Department's 1993 forest offense records noted 639 offenses of illegal harvests that produced 706 m³ of timber from the natural forests. However, this volume would be much higher if unrecorded offenses were also taken into account. Due to the reduced supply of timber from natural forests, the availability of sought-after hardwood species such as ebony (*Diospyros ebenum*), hora (*Dipterocarpus zeylanicas*), satin (*Chloroxylon swietenia*), and milla (*Vitex pinnata*) has drastically fallen. The reduction in supply from natural forests was compensated mainly through non-forest sources, which doubled from 1985 to 1993 (Table 36). The industrial utilization of rubberwood has also greatly increased within the last few years. Rubberwood is mainly used by furniture makers and the plywood industry. Coconut logs are mainly used for low- and medium-quality construction works.

Sawnwood

Total sawnwood consumption in 1993, including railway sleepers, was 544 000 m³. Being almost self sufficient in sawnwood, Sri Lanka imports only about 29 000 m³, or 5 percent of its supplies. Total sawnwood production in 1993 was 515 000 m³, including approximately 14 800 m³ of railway sleepers.

Construction is the major end use for sawnwood in Sri Lanka, consuming approximately 75 percent of production. The furniture industry (15 percent) and other wood-based industries (10 percent) make up the balance. The sawnwood demand is projected to grow by about 12 600 m³ per year, or an average growth rate of 2 percent.

Sri Lanka's increasing demand for sawnwood is expected to be met by increasing domestic production, relying mainly on the supply of logs from non-forest lands. In 1997, 90 percent of Sri Lanka's total sawnwood consumption were produced domestically and approximately 10 percent were imported. The FSMP indicated that domestic forest industries are very dependent on supplies of wood from sources other than natural forests.

Wood-based panels

Plywood consumption in 1993 totalled approximately 28 000 m³. About 5 000 m³ (18 percent) were produced locally and 23 000 m³ (82 percent) were imported. Fiberboard consumption in 1993 was about 2 500 m³, and that of particleboard was about 1 500 m³, all of which were imported. Approximately 20 000 m³ of roundwood logs were consumed annually by plywood industries, most of which was rubberwood. The consumption of plywood is expected to grow at a rate of 2.7 percent per year.

Impact on the STC supply of timber

The STC contribution to Sri Lanka's total timber supply from 1986 to 1995 illustrates the impact of the logging ban on STC and the shift in its share of the domestic timber market (Table 37). Prior to 1985, the STC supplies were much higher due to the large logging operations in the Mahaweli Development areas, which provided approximately 54 000 m³ of timber per year. The average annual STC timber supply between 1980 and 1985 was around 210 000 m³, representing over 24 percent of the domestic timber demand. After the suspension of logging operations in the dry zone in 1988 and the imposition of the logging ban in 1990, the STC's annual timber supply declined markedly to between 42 000 and 73 000 m³. The STC's contribution to the domestic timber supply fell below 5 percent.

Table 37. STC's contribution to Sri Lanka's total timber supply, 1986–1995

Year	Total timber consumption (thousand m ³)	Supply by STC (thousand m ³)	STC's contribution to the total consumption (percent)
1986	1 000	140	14.0
1987	1 020	130	12.7
1988	1 050	85	8.1
1989	1 100	70	6.4
1990	1 150	80	7.0
1991	1 200	42	3.5
1992	1 250	54	4.3
1993	1 300	62	4.8
1994	1 320	60	4.5
1995	1 340	73	5.5

Source: State Timber Corporation, Annual Reports (1986-1995)

From 1985 to 1990, STC's average annual timber production from the natural forests was 27 000 m³. After logging was banned, it fell to about 8 000 m³ per year. Its natural forest timber

after 1991 originated mainly from the Mahaweli System B in the dry zone, which continued until about 1995.

Prior to 1991, the STC only supplied timber extracted from State forests, but the logging ban drastically reduced its log supplies. In fact, the STC's total roundwood production volume has declined by about 25 percent. Since 1990, the main source of STC timber is from State forest plantations, with a small amount (7-8 percent) derived from private sources. Small quantities of timber also come from natural forests cut for security purposes and small-scale development schemes. There has been no decline in the production of sleepers and transmission poles as these are produced mainly from forest plantation supplies.

Import, export and price trends

Logs

About 6,700 m³ of logs valued at SL Rs 73.8 million (US\$1 = SL Rs 49.5 in 1993) were imported in 1993, and imports have increased only slightly since. During the 1980s, there were no imports at all.

The increasing scarcity of logs has resulted in substantial price increases for some species (Table 38). The largest price increase was for the super luxury class grade, which includes teak (*Tectona grandis*), ebony (*Diospyros ebenum*), bedun (*Pericopsis mooniana*), and calamander (*Diospyros quaesita*). All species in this class, except teak, originate from the natural forests. The average price increase of super luxury class logs from 1985 to 1997 was about 35 percent annually, and 50 percent just before and after the imposition of the logging ban (1988 to 1992). The average annual price increase of luxury class logs of species such as satin (*Chloroxylon swietenia*), halmilla (*Berrya cordifolia*) and milla (*Vitex pinnata*) was 25 percent from 1988 to 1992, compared to the average annual increase of 17 percent during 1985 and 1997. Plantation species included in this class are narrow-leaved and broad-leaved mahogany. The average annual price increase of other classes (i.e. special class, classes I, II and III) from 1985 to 1997 was about 20 percent, with no significant increase attributable to the logging ban.

Table 38. Average prices for grade "A" logs at depot sold by STC in Sri Lanka

Classification of Logs	Price per cm ³ (SL Rs)					Average annual price increase, 1985-97 (percent)	Average annual price increase, 1988-92 (percent)
	1985	1988	1992	1993	1997		
Super luxury class	5.70	10.00	30.00	30.00	31.80	35	50
Luxury class	5.60	5.60	11.30	16.60	17.70	17	25
Special class	3.40	5.20	9.60	11.40	12.30	21	21
Class I	1.90	2.90	5.20	6.40	6.80	21	20
Class II	1.40	2.10	3.80	4.60	4.90	21	20
Class III	1.10	1.20	2.20	2.60	2.80	13	21
US\$1 = SL Rs	27.40	33.00	46.00	49.50	61.30		

Source: State Timber Corporation

Sawnwood

Sri Lanka is a net importer of sawnwood (Table 39). Import volume has fluctuated widely over the years and annual imports between 1985 and 1995 ranged from 21 000 to 38 000 m³. In 1997, import volume reached 62 300 m³. Statistics do not indicate a significant increase in imports as a result of the logging ban. However, data on imports after 1997 are not yet available and it is believed imports have increased substantially after the lifting of import duties in 1997.

Table 39. Sri Lanka's sawnwood imports and exports, 1985-1997

Import/Export	1985	1988	1990	1991	1993	1995	1997
Imports (m ³)	38 000	34 800	27 100	21 500	28 700	27 500	62 300
Exports (m ³)	150	500	600	1 300	150	290	20
Net trade (m ³)	- 7 850	- 4 300	- 6 400	- 0 200	- 8 550	- 7 210	- 2 280
Imports:							
US\$ million	10.3	5.7	4.2	3.9	4.3	5.9	5.3
SL Rs million	282	188	169	165	215	317	322

Source: Department of Customs, External Trade Statistics (1985-1997)

Malaysia, Singapore, South Africa and Indonesia are the major sources of sawnwood imported by Sri Lanka. The leading imported species are kempas (*Koopassia malaccensis*) and balau. In 1997, about 80 percent of the sawnwood imports were from Singapore and about 10 percent from Malaysia. About 95 percent of the imports are for the construction sector and the balance is used in the furniture industry. The import duty on sawnwood was 60 percent in the 1980s. It was reduced to 10 percent in 1993, and eliminated altogether in 1996. Since 1997, there has been a sudden increase in the volume of imported sawnwood.

Imports of sawnwood did not increase immediately after the logging ban, although sales of imported sawnwood by the STC more than doubled between 1989 and 1991 (Table 40). This was probably due to the immediate shortage of timber from natural forests. The STC imported an average of about 10 to 20 percent of Sri Lanka's total sawnwood from 1986 to 1995.

The increased demand and reduced supply have increased the price of luxury and special class sawnwood by an average of 15 percent per year, or more than 100 percent since 1985. Prices for Class I, II and III sawnwood have increased since 1985 by an average of 12 percent, 11 percent, and 15 percent per year, respectively. Sustained strong demand for sawnwood is expected to continue driving up prices.

Table 40. State Timber Corporation sale of imported timber in Sri Lanka, 1986-1995

Year	Volume (m ³)	Annual increase (percent)
1986	3 170	- 0.9
1987	3 830	20.8
1988	3 020	-21.1
1989	4 070	34.7
1990	5 210	28.0
1991	10 100	93.9
1992	8 110	-19.7
1993	2 840	-65.0
1994	2 620	-7.7
1995	4 070	55.3

Source: State Timber Corporation, Annual Reports (1986-1995)

Wood-based panels

Sri Lanka is a net importer of wood-based panels, primarily from Malaysia, Indonesia and India. Plywood imports increased from 6 700 m³ in 1987 to 30 000 m³ in 1995. The increase of plywood imports immediately after the logging ban was 9 800 m³, a 60 percent increase from the previous year.

In the 1980s, wood-based panels were rather expensive in Sri Lanka, especially when compared to sawnwood prices. During the last 10 years, the prices of the most common sawnwood species have increased rapidly (about 15 percent annually), making plywood more competitive. At present, the prices of domestic plywood are slightly lower than the prices of imported plywood. The price of imported plywood (12 mm) is about SL Rs 55 000/m³ (US\$770/m³).

Demand and supply projections

Wood requirements of the Sri Lanka forestry industry will depend on the future demand for various forest products and development of the domestic forestry industry. According to projections made for the FSMP, the total demand for industrial roundwood is expected to reach about 2 million m³ in the year 2020, compared with 1.3 million m³ in 1993.

Under management programs advocated by the FSMP, the increasing demand for sawnwood is to be met mainly from domestic sources, with imports representing only about 5 percent of the total. Production would increase from about 514 000 m³ in 1993 to about 880 000 m³ by 2020. Raw materials are expected to be derived primarily from non-forest resources. Sawnwood consumption, production and imports, under current trends and FSMP scenarios, are shown in Table 41.

Table 41. Scenarios for consumption, production and imports of sawnwood in Sri Lanka (thousand m³)

Scenarios	1995	2000	2005	2010	2015	2020
<i>Current trends</i>						
Consumption	567	626	688	753	820	885
Production	539	563	585	640	646	646
Imports	28	63	103	113	174	239
<i>FSMP</i>						
Consumption	567	626	688	753	820	885
Production	539	595	654	730	804	876
Imports	28	31	34	23	16	9

Source: Ministry of Agriculture, Lands and Forestry, Forestry Sector Master Plan (1995)

The FYIP of the FSMP is scheduled to be implemented in 2001. Sawnwood consumption has already increased, but production has not kept up with the levels expected. As a result, sawnwood imports in 1997 (Table 39) already reached the previously projected import levels for the year 2000. A key factor for this increase was the 1996 import duty waiver for timber, leading to an increased availability of imported timber at relatively low prices. Another factor was the removal of the transport permit requirements for imported timber in 1999.

Alternative wood supplies

The role of non-forest wood resources

Homegardens, rubber and coconut plantations supplied over 70 percent of the wood in 1993. Only about 4 percent came from forest plantations. In 1995, homegardens contributed around 49 percent of the total sawlog supply derived from non-forest resources (40 percent of the total log supplies) and this proportion is expected to reach about 54 percent by 2020. Rubber plantations are expected to contribute an average 21.5 percent and coconut plantations an average of 15.2 percent between 1995 and 2020.

Although non-forest lands will continue to play a very important role in Sri Lanka's future wood supplies (Table 42), the share of wood coming from non-forest lands will likely decline as total wood demand increases and supplies from non-forest lands remain relatively constant. The additional demand may potentially be met by sourcing another 250,000 m³ from plantations and from natural forests that are cleared for security purposes or development.

Table 42. Potential contribution of non-forest lands to national sawlog supply in Sri Lanka, 1995–2020

Year	Demand (thousand m³)	Supply from non-forest lands (thousand m³)
1995	1 357	1 119
2000	1 444	1 178
2005	1 576	1 248
2010	1 653	1 279
2015	1 763	1 267
2020	1 868	1 286

The role of forest plantations

The Forest Department started managing forest plantations in the latter part of the nineteenth century, but most of the planting was done only after 1950. By 1998, the Forest Department managed 92 340 ha of forest plantations. The private sector manages another 5 000 ha. The most common species planted is teak (*Tectona grandis*), followed by pine (*Pinus caribaea* and *P. patula*), eucalyptus (*Eucalyptus grandis*, *E. microcoris*, *E. robusta*, *E. globulus*) and mahogany (*Swietenia macrophylla*) (Table 43). In addition, *Acacia auriculiformis*, *Eucalyptus tereticornis* and *E. camaldulensis* are planted for fuelwood. Smaller areas of albizzia, *Acacia mangium* and indigenous species such as kohomba (*Azadirachta indica*), halmilla (*Berrya cordifolia*) and godakirilla (*Holoptelea integrifolia*) have also been planted for timber.

Table 43. Forest plantations established by Sri Lanka's Forest Department

Species	Area (ha)
Teak	31 700
Pine	16 440
Eucalyptus (for timber)	9 180
Eucalyptus and acacia (for firewood)	19 100
Mahogany	3 700
Mixed species	12 220
Total	92 340

Source: Forest Department

The STC has a monopoly for harvesting and marketing timber from State-owned plantations and natural forests. Therefore, all the timber from forest plantations owned by the Forest Department is extracted by the STC. In the late 1980s, the average annual production of logs from forest plantations was 37 700 m³. The average volume actually declined to 27 100 m³ per year after 1990 logging. Apparently, the logging ban did not result in any significant increase in the production of timber from forest plantations. Similar results have been reported for transmission poles, sleepers and other products.

According to the FSMP, approximately 50 000 m³ of wood were to be harvested from the Forest Department's forest plantations in 1995. This volume was expected to increase to about 150 000 m³ by 2000 and to 260 000 m³ by 2005. However, the Forest Department's management plans for teak, eucalyptus, pine and mahogany plantations considered these estimates too high. Instead, annual timber production from plantations is expected to be only around 90 000 m³ (Table 44). Insufficient management and inappropriate species selection in the past, as well as encroachment, fire and elephant damage have reduced the quality of forest plantations.

Table 44. Projected timber production from forest plantations in Sri Lanka, 1999-2005 (m³)

Year	Teak	Eucalyptus	Pinus	Mahogany	Thinning	Total
1999	24 220	32 540	8 050	4 870	22 500	92 180
2000	32 850	25 150	12 000	5 280	19 500	94 780
2001	34 420	27 930	10 150	6 950	21 000	100 450
2002	25 650	26 180	9 720	5 600	23 000	90 150
2003	28 370	25 340	8 620	4 730	20 500	87 560
2004	27 500	16 200	9 300	5 480	21 500	79 980
2005	28 200	15 600	9 800	6 200	22 000	81 800

Source: Forest Department

The more realistic Forest Department forecast indicates a potential gap between the total demand and supply of logs in the future. According to the current Forest Department estimates, forest plantations are capable of producing around 36 percent (90 000 m³ per year) of the indicated supply shortage. Non-forest sources may provide 82 percent of expected domestic demand, while the Forest Department's plantations can supplement approximately 6.2 percent of needs from 2000-2005. The balance (11.8 percent of the national demand), totalling about 160 000 m³ per year, will have to be derived from areas cleared for security and development purposes, imports, and unrecorded supplies (including illegal cuttings).

Impact on the forest industry

The number of registered private forest enterprises increased from 645 in 1983 to 4 500 in 1995 (Table 45), even though timber supplies from State forests declined. The enterprises rely mainly on timber from private non-forest sources. This includes sawmills, timber depots, carpentry shops, furniture shops and firewood depots. There were 4 000 sawmills, most of which were very small, and 380 major industrial sawmills.

While the number of private sector sawmills has increased, the number of State-owned enterprises has declined. From 1985 to 1992, the number of sawmills operated by the STC declined from 16 to 8, producing only 3.8 percent of Sri Lanka's sawnwood. The STC attributed the closure of its three large mills at Minneriya, Madawachchiya and Thimbolketiya directly to the supply shortage. The CPC also closed down their Kosgama mill after the imposition of the logging ban in the wet zone forests when raw materials became scarce. The other CPC plywood factory was sold to the private sector, and is currently utilizing mainly rubberwood.

Table 45. Number of private forest enterprises registered with Sri Lanka's Forest Department, 1983–1997

Year	No. of enterprises	Annual increase (percent)
1983	645	16.5
1985	754	8.5
1987	1 391	42.2
1989	1 666	9.9
1991	1 786	3.6
1993	2 578	22.2
1995	4 500	37.3
1997	6 190	18.8

Source: Forest Department, Administration Reports of the Conservator of Forests (1983-1997)

The FMP noted that the biggest challenge for the forest industry is the shortage of wood. It estimated that within 10 to 15 years, the shortage of sustainable wood resources would limit production of the domestic sawmilling and plywood industries. The industry is already suffering from the supply shortage. Although the number of forest enterprises in the private sector has increased since 1995, the volume of sawlogs from non-forest lands is expected to increase by only about 1 percent per year. As the supply from State forest plantations will not significantly increase during the next five years, the Government must identify and carry out suitable remedial measures to avoid a supply shortage in the next 10 to 15 years.

Impact on Government revenue

The main source of Government revenue from the forestry sector is from royalties or stumpage and other taxes paid by the STC. Prior to 1990, the State forests were the only source of STC timber supply. Since 1991, about 7 to 8 percent of the STC timber sold were derived from private sources. Until 1994, royalties paid to the treasury by the STC were 10 percent of the lowest unit sale value of the logs sold at a depot. In 1995, this royalty was converted to a payment of stumpage, calculated at 40 percent of the sale value of the logs sold at a depot. The STC also pays a Business Turnover Tax (BTT), Defense Levy, Income Tax and withholding tax. Government revenue from the STC increased considerably from 1986 to 1997 (Table 46). Royalty/stumpage receipts are direct Government revenues, while other taxes are related to the sale of timber based on the profits earned.

Table 46. Sri Lanka's government revenues from the STC (thousand US\$)

Year	Royalty/stumpage	Total taxes	Total revenue	US\$1=SL Rs
1986	743	2 381	3 124	28.5
1987	663	2 221	2 884	30.8
1988	420	775	1 195	33.0
1989	334	947	1 281	40.0
1990	370	978	1 348	40.2
1991	217	1 074	1 291	41.6
1992	262	1 263	1 525	46.0
1993	272	1 825	2 097	49.6
1994	245	4 317	4 562	50.0
1995	1 105	5 093	6 198	54.0
1996	1 433	4 346	5 779	56.7
1997	1 957	6 135	8 092	61.3

Source: State Timber Corporation (1986-1994: Royalty; 1995-1997: Stumpage)

A significant reduction in the timber production led to a decline in sales revenues and Government royalties from 1991 to 1994. The royalties paid in 1991 (US\$ 217 000) were about 40 percent of that paid in 1990. This difference is not reflected in the total revenue because of the variations in taxes. However, since the conversion to the 40 percent stumpage charges in 1995, revenues increased nearly eight-fold.

Environmental implications

Impact on forest protection

According to Forest Department records, incidences of illegal cuttings increased after the imposition of the logging ban. Illegal harvesting was more prominent in forest plantations than in natural forests, however. Some analysts believe the trend of increasing illegal harvesting can be attributed to socio-economic issues such as poverty, unemployment and changes in the political environment that are not related to the logging ban.

The average number of forest offenses in the natural forests from 1985 to 1989 and 1990 to 1994 was 478 and 649 per year, respectively (Table 47). However, the volume of timber involved in these offenses dropped by 23 percent from 1990 to 1994. The average number of illicit cuttings in forest plantations from 1985 to 1989 and 1990 to 1994 was 825 and 1360, respectively. Teak plantations are the most vulnerable to illegal cuttings because of their high value and easy accessibility. The recorded average rate of encroachments in natural forests between 1985 and 1989 was about 340 ha per year. After the imposition of the logging ban, it declined to 300 ha per year.

Table 47. Forest offenses recorded in Sri Lanka's natural forests and plantations, 1985-1994

Type of offense	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Natural forests										
Illegal harvests	598	576	445	446	328	578	746	684	639	598
Encroachments	720	1 080	1 223	906	1 089	1 306	1 478	1 002	898	638
Forest plantations										
Illegal harvests	633	680	837	823	1 156	1 014	1 156	1 505	1 558	1 565

Source: Forest Department

Beside the logging ban, several other factors influence illicit harvests and encroachment, such as increasing population, unemployment, and changes in the political environment. This complexity makes it difficult to relate forest offenses directly to the logging ban in natural forests.

The forest types protected under the logging ban

The current logging ban covers 1 049 700 ha of production (multiple-use management) natural forests, which represents approximately 51.3 percent of all natural forests. The forest types include 18 percent of lowland rainforests, 27 percent of the moist monsoon forests, 65 percent of the dry monsoon forests and 54 percent of the sparse forests. Other forest types – montane, sub-montane, riverine and mangrove forests – were all previously included in protected areas and were therefore unaffected by the ban.

The lowland rainforest that is located below 1 000 m in the wet zone is the most important forest type from a biodiversity and hydrological perspective. These forests have very high species diversity and are located in the upper catchments of several important rivers. In comparison, the moist monsoon forests located below 1 000 m in the intermediate zone and the dry monsoon forests in the dry zone are relatively low in biological diversity and hydrological importance. The sparse and open forests are highly degraded as a result of past over-logging and other adverse human interference. All these forests need a long period of rest to replenish the growing stock before any logging operations can resume.

Impact on watershed conservation

In 1995, the Forest Department, in collaboration with IUCN, assessed the importance of the natural forests for soil conservation and hydrology in 281 tracts that are each over 200 ha in area. The study found that the natural forests in the wet and intermediate zones are more important for soil conservation than the ones in the dry zone. Similarly, the study found that over 50 percent of the forests in the wet and intermediate zones are critical for flood control, compared to only 23 percent in the dry zone. This analysis illustrates the relative importance of the natural forests for soil conservation and hydrology in different climatic regions.

Impact on biodiversity conservation

Over-exploitation of the natural forests for timber production and population pressure are the main causes of deforestation and forest degradation in Sri Lanka. The loss of natural forest cover has been most pronounced in the wet and intermediate zones, producing extremely fragmented forest remnants. The impact of loss and degradation of forests on species diversity cannot be quantified because little or no baseline information exists for many areas. However, some forest species may already have been lost. Of 58 dipterocarp species originally found in Sri Lanka, one is thought to have become extinct. Data also indicate that at least 11 percent of the native snakes have not been observed since at least 1950. Thirteen of the 14 possibly extinct species are endemic forest species. Threatened valuable species include satin wood (*Chloroxylon swietenia*), ebony (*Diospyros ebenum*), calamander (*Diospyros quaesita*) and nadun (*Pericopsis mooniana*). Madara (*Cleistanthus collinus*) may already be extinct.

Medicinal and ornamental species such as orchids may also be over-exploited. Of the 170 species of orchids in Sri Lanka, 13 are likely to become extinct. In addition, 74 of the 200 species of Sri Lanka's medicinal plants are threatened. Only two decades ago, most of these plants were abundant, indicating that if present trends continue, another 20 to 30 species will become threatened over the next two decades.

Over-harvesting has also affected the animal population. The elephant population has declined from more than 10 000 at the beginning of this century to less than 3 000 in 1993. The remaining elephants are now restricted to the moist monsoon, dry monsoon and sparse forests in the dry and intermediate zones. Their natural habitats are increasingly being fragmented, disrupting movements and dispersal patterns.

The logging ban protects the biodiversity in about 51 percent of various forest types. Studies have shown that regeneration of threatened, endemic woody plant species is poor in selectively logged forests. Similar observations have been made for endemic small mammals. The National Conservation Review, however, suggests that some logged-over areas can regenerate well and possess ample biodiversity. The management of forests for the conservation of biodiversity is a key national forest policy objective. Hence, after complete replenishment of growing stocks in forests affected by the logging ban, sustainable forest management should be practiced in a manner that prevent species extinction and further biodiversity erosion.

Social implications

About 70 percent of Sri Lanka's 18.3 million people still live in rural areas, and 30 percent of the rural people live near the forests. They depend at least partly on forest resources. It is estimated that about 4 million people in Sri Lanka derive some benefit from NWFPs. The value of NWFPs from the lowland rainforests have been estimated to be SL Rs 15 000/ha/year (US\$ 210/ha/year).

The social implications of the logging ban have been evaluated in this study mainly in four key areas:

- ◆ impact on employment and income generation;

- ◆ impact on forest dependency;
- ◆ perception of village communities including religions and cultural values; and
- ◆ impact on scenic beauty and public recreation values

Impact on employment and income generation

Before 1990, the STC operated 16 sawmills and 35 timber sales depots. In 1992/1993 the STC closed down 8 sawmills and 16 timber sales depots mainly because of timber shortages, and partially due to the reduction of Mahaweli forest clearing areas and security problems in the north and east.

The number of STC employees declined from 2,990 in 1990 to 1,720 in 1996. Most of them were mid- to lower-level workers who were involved in sawmill operations, timber sale depots and logging. About 820 employees left voluntarily and received incentive packages that cost the STC around SL Rs 42 million (US\$ 850 000).

In 1994, the FSMP estimated that 40 000 people were employed either full- or part-time in the sawmilling industry, out of which 10 000 to 12 000 were in the private sector. Since 1994, the number of enterprises has increased 25 percent annually. The total employment in forest industries, including sawmills, in 1997 was estimated to be around 60 000 workers. The private sector mainly uses raw materials from non-forest sources. Hence, the impact of the logging ban on them is not as significant as with STC employees. The private sector jobs are mainly labor and field supervisory levels.

Impact on forest dependency

The ban has no impact on the extraction of NWFPs by village communities, and thus, their dependency on natural forests has not been affected except where people lost their jobs in former logging operations. The present legislation provides for collection of fuelwood and NWFPs by village communities, and this practice continues in natural forests except in some protected areas.

Impact on the perceptions of people

Sri Lankans have a strong tradition of conservation with close religious, cultural and spiritual links to natural forests. Buddhist philosophy has had a great influence on the conservation of forests and wildlife in the country. The Buddhist monks use small blocks of natural forests – forest hermitage areas or *aranya* – as places for meditation. A practice that started before 1500, it has become a good method of forest protection. Even now, no illegal felling takes place in forest hermitage areas. At present, forest hermitages exist in many natural forests and many villagers do not support logging of natural forests for this reason.

Impact on public recreation

Both local and foreign tourists visit many forests, especially the protected areas, for recreation purposes. There are 12 national parks managed by the DWLC, one World Heritage Site (National Heritage and Wilderness Area) and 2 conservation forests managed by the Forest Department for recreation and conservation. The number of visitors to 5 national parks managed by the DWLC in 1997 was around 300 000 and the revenue generated was SL Rs 40 million (US\$ 700 000). Visitor arrivals to the Forest Department's protected areas were recorded at 45 000, while the revenue generated was around SL Rs 1 million (US\$ 17 000). Some forests within the protected area system have great potential for nature-based tourism, and management plans are being prepared for this purpose.

CONDITIONS NECESSARY FOR SUCCESSFUL IMPLEMENTATION OF THE LOGGING BAN AS A STRATEGY FOR ACHIEVING FOREST CONSERVATION

Main reasons for the success of the logging ban

- ◆ Monopoly of the STC for extracting timber from State forests:
The Forest Department releases the forests for extraction only to the STC. No other private or State institution is authorized to extract timber from State forests. Any other form of tree felling is considered illegal. This monopoly facilitates effective implementation of the logging ban even without a written policy or special legislation.
- ◆ Contribution from non-forest lands:
Non-forest wood resources are a major source of timber. Since the bulk of timber comes from sources outside the State forests, the pressure on natural forests and the impact on forest industries are significantly less.
- ◆ Commitment of the Government:
The decisions regarding the logging ban were taken by the Government as a result of strong environmental lobbying against logging in the natural forests. Against this background, the Government has had a firm commitment for effective implementation of the logging ban.

Constraints to the effectiveness of the logging ban

- ◆ Lack of policy on the logging ban:
The Ministry of Lands, Irrigation and Mahaweli Development in 1990 gave a directive to the Forest Department to implement the logging ban without any policy statements or amendments to the existing forest policy. A formal policy statement would have provided better guidance for effective administration.
- ◆ Clearing of forests in the Mahaweli Development area:
Some of the natural forests in this area were cleared for development even after the logging ban was implemented and continued until about 1996.
- ◆ Clearing of forests for security reasons:
Clearance of natural forests along roads in the northern and eastern parts of the country has been allowed for national security reasons in spite of the logging ban. Logging by STC, with prior approval of the Forest Department, has continued as requested by the defense institutions.
- ◆ Illegal felling of trees in the natural forests:
Illegal cutting continues at a considerable rate. The threat of illegal cutting is even greater in forest plantations due to easy access and higher valued species (teak and mahogany). Enforcement is not effective due to the lack of financial and human resources, lack of motivation, etc. The magnitude of illegal fellings may be greater than recorded.

Conditions necessary for the successful implementation of the logging ban

Based on the Sri Lankan experience, the following aspects have been identified as necessary conditions for the successful implementation of the logging ban.

- ◆ Development of appropriate policy, legislative and institutional frameworks:
The development of appropriate policies with clear and functional definitions of conservation goals followed by the development of suitable legislation and institutional arrangements are crucial. Furthermore, political will, Government commitment and support are necessary for effective implementation of the logging ban.
- ◆ Development of alternative wood resources:

Non-forest wood resources along with forest plantations can provide a viable alternative to timber from natural forests. Incentive schemes are necessary to encourage the private sector to establish forest plantations and plant trees in homegardens and agroforestry systems.

- ◆ **Demarcation of forest boundaries:**
Survey and demarcation of forest boundaries is essential to prevent illegal felling and encroachment. Programs have been prepared to survey and demarcate the large number of proposed forest reserves and other State forests, between 2000 and 2010, with financial assistance from the ADB.
- ◆ **Relaxation of the private timber transport permit system:**
Sri Lanka's private timber transport permit system has been identified as a disincentive for private sector involvement in homegardens, agroforestry systems and other non-forest tree resources. Even though permits have been recognized as important to the domestic timber supply, relaxation of the present system to promote private sector and community involvement in tree planting and forestry development has been proposed.
- ◆ **Adequate resources for forest protection and law enforcement:**
If the natural forests are to be protected against illegal felling and encroachment, the number of cadres from the DWLC and the Forest Department has to be increased. Training should be provided to the field staff to strengthen their law enforcement capabilities.
- ◆ **Political and public awareness and forest extension:**
Decision makers need to be familiar with the benefits of conservation. The current extension and awareness programs implemented by the Forest Department, DWLC, and NGOs, should be strengthened and expanded to cover all levels of the target groups.
- ◆ **Community and participatory forest management:**
The National Forest Policy recognizes that the State alone cannot protect and manage the forests effectively. People's participation in forestry development and management should be promoted as one of the main strategies for forest conservation.
- ◆ **Improvement of the efficiency of forest industries:**
Old and inefficient equipment that has not been designed for small-dimension logs, and inadequate management and labor skills, are major problems in the forest industry. This leads to low recovery rates and poor overall productivity, particularly in the sawmill sector. The present average recovery rate has been estimated to be around 40 percent. Raising efficiency rates of wood-processing technologies is necessary to reduce waste.
- ◆ **Increase the range of timber species utilization:**
Forest products and timber utilization research needs to be strengthened to carry out more coordinated, product-oriented research and to disseminate information with greater emphasis on lesser-known timber species.
- ◆ **Development of a monitoring system for sustainable forest management:**
Development of criteria and indicators for sustainable forest management is an important aspect. Although there have been several international initiatives on the development of criteria and indicators, Sri Lanka is still in the initial stages of this process.

CONCLUSIONS

The logging ban in the natural forests, which was imposed in 1990, can be generally considered as a success in achieving forest conservation in Sri Lanka. The key factors that contributed to the success of the logging ban are the monopoly of the STC in extracting timber from State forests, commitment of the Government, and the large percentage of wood supplied by the non-forest sector. However, the logging ban has not been completely successful. Some of the ban's major obstacles include the lack of supportive policies, continued timber removals under the Mahaweli Development scheme, and illegal timber removals in other natural forests.

Several conditions that can help a logging ban succeed have been identified. They include:

- ◆ strong Government commitment and support;
- ◆ development of appropriate policy, legislative, and institutional frameworks;
- ◆ development of alternative wood resources;
- ◆ demarcation of natural forest boundaries;
- ◆ relaxation of the private timber transport permits system;
- ◆ adequate resources for forest protection and law enforcement;
- ◆ extension and public awareness;
- ◆ community and participatory forest management;
- ◆ improvement of the efficiency of forest industries;
- ◆ increased utilization of less-known species; and
- ◆ development of a monitoring system for sustainable forest management.

POLICY OPTIONS

The following two policy options are proposed to guide the implementation of Sri Lanka's logging ban as a strategy for achieving forest conservation. They are also relevant for other countries.

Option 1: Complete logging ban with appropriate policy and legislation

The proposed option is a complete logging ban in natural forests after developing appropriate policies and relevant legislation, along with the institutional framework to support the ban. This option proposes a complete halt to commercial timber extraction from all natural forests. Other relevant conditions – such as political will, development of alternative wood resources, demarcation of forest boundaries, adequate resources for forest protection and law enforcement, extension and awareness, participatory forest management and development of a monitoring system – are also needed to more effectively achieve the objectives of forest conservation. The main disadvantage of this option is the lack of any provision for harvesting and utilization of timber from natural forests or integrated sustainable multiple-use management. This suggests the possibility of a modified option to provide both forest conservation and more flexible future management and use of the natural forests.

Option 2: Commercial logging ban with an optimal system of protected area network and community-based forest management

The present protected areas system should be reviewed and expanded to establish an optimal protected area network to conserve biodiversity in all forest ecosystems and habitats, and to protect watersheds. The forests outside the protected area system should be managed on a sustainable basis through community-based forest management for a variety of goods and services. Communities may develop management plans to prohibit extractive uses in selected parts of these forests to protect specific habitats, prevent soil erosion, protect water resources, or enhance recreational and aesthetic values. This approach will empower communities to protect and manage natural forests, provide them with economic incentives and maintain suitable harvesting rights. In addition, conditions should be implemented to achieve long-term conservation objectives. The main advantage of this option is the partial utilization of timber from natural forests while conserving biodiversity and protecting soil and water resources under adaptive and flexible sustainable management.

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IMPACTS AND EFFECTIVENESS OF LOGGING BANS IN NATURAL FORESTS: THAILAND

Sureeratna Lakanavichian

INTRODUCTION

Thailand has a total land area of 513 115 km² and a population of 61.1 million people (1998) with an annual growth rate of 1.1 percent (World Bank 2000). The economy consists of a diverse mix of agriculture, manufacturing and service industries. Rapid urbanization has taken place since the 1980s. The population density is about 120 persons/km² (RFD 1998) and 23 percent of the population live in urban areas.

Government estimates indicate that Thailand's forest cover declined from 53.3 percent of the total land area in 1961 to 25 percent in 1999 (Table 48). FAO (1999) estimates place forest cover at only 22.8 percent in 1995. Annual deforestation rates have exceeded 3 percent for much of the time since 1961 (FAO 1998) and reached 3.9 percent between 1976 and 1982 (Jantakad and Gilmour 1999). Reforestation did little to stem the trend. A total of only 850,000 to 900,000 ha were planted between 1906 and 1996 (RFD 1998; Green World Foundation 1999).

Table 48. Status of forest area in Thailand

Year	thousand ha	percent
1961	27 363	53.3
1973	22 173	43.2
1975	20 525	40.0
1976	19 842	38.7
1978	17 522	34.2
1982	15 660	30.5
1985	15 087	29.4
1988	14 380	28.1
1989	14 342	28.0
1991	13 670	26.6
1993	13 355	26.0
1995	13 149	25.6
1998	12 972	25.3
1999	12 839	25.0

Sources: Figures for 1961-1998: Charupatt (1998)

Figures for 1999: Author's calculation based on current Royal Forest Department's data.

Past attempts by the Royal Forest Department (RFD) to rehabilitate degraded forests met with little success due to overwhelming constraints posed by "illegal encroachers" residing in the forests (Jantakad and Gilmour 1999). These "illegal encroachers" were bolstered by incoherent and uncoordinated Government policies regarding natural resources and agricultural expansion. An estimated 1.3 million households are living on the surveyed (official) forestlands (TFSMP2 1993).

Policy environment concerning the forestry sector

Major forest policies

Since the establishment of the RFD in 1896 until the imposition of the logging ban, Thailand enacted four main forest policies, according to a few forestry acts and national plans. The Forest Protection Act of 1913 set out principles for the long-term exploitation of forests benefiting the State. The 1961 First National Economic and Social Development Plan (NESDP) aimed to protect 50 percent of Thailand's areas as forests. The second NESDP (1967) reduced the area to be protected to 40 percent. Finally, the first formal National Forest Policy was "announced" in 1985, emphasizing economic or production forests and conservation or protected forests. It divided the 40 percent of land under forests into 25 percent for economic forests and 15 percent for conservation forests. The seventh NESDP (1992-1996), following the imposition of the logging ban, reversed the allocations to 25 percent of conservation forests and 15 percent of economic forests to emphasize conservation objective.

Due to various pressures, in particular the devastating floods in southern Thailand (1988), the Royal Thai Government (RTG) officially imposed a "total logging ban" in natural forests in January 1989. Since then, the National Forest Policy has been amended to encourage forest protection. In 1991, conservation forests were gazetted to cover 27.5 percent of Thailand's total land area. However, considerable areas of conservation forests exist only on paper.

Conservation measures have consequently played a major role in Thailand's forestry policy, especially after 1989. Since then, officially designed conservation forests have increased rapidly, and now comprise up to 79 percent of the country's total area. Protected forests total 40.5 million ha, including both the core conserved forests (34 percent) and additional conservation areas, such as forest reserves, forestlands awaiting reserve status, botanical gardens, and designated forestlands still under cabinet resolutions. The core legally designated conservation areas are national parks, wildlife sanctuaries, forest parks, non-hunting areas, watershed Class 1, and mangrove conserved forests (declared by Cabinet Resolution), which total 17.4 million ha (Table 49).

Table 49. Forest conservation and reserve areas in Thailand

Conservation Type	Number	Area (million rai)	Area (million ha)
Conserved area under laws and cabinet resolutions, including:			
National Park	87	27.61	4.42
Wildlife Sanctuary	46	20.42	3.27
Forest Park	65	0.54	0.09
Non-hunting Area	44	1.94	0.31
Watershed Class 1	25	58.24	9.32
Mangrove Conserved Forest	-	0.27	0.04
<i>Subtotal</i>		<i>109.02</i>	<i>17.45</i>
Additional conservation area	1 221	143.98	23.04
Total		253.00	40.48

Sources: RFD (1998), Green World Foundation (1999)

Policies and other aspects of the forestry sector

The RTG has been concerned about deforestation and forest degradation for many years. It has passed several forest acts, including the Forest Protection Act in 1913, the Wildlife Protection and Preservation Act in 1960, the National Park Act in 1961 and the National Forest Reserve Act in 1964. In 1989, the national "logging ban" in natural forests was declared. The Forest Plantation Act

was enacted in 1992, and the Community Forest Act was drafted in 1990. This last act has yet to be enacted. The logging ban has reduced the domestic supply of legally harvested wood available to wood-processing industries, forcing domestic industries to import logs and sawnwood from neighboring countries. This reliance on imports has created a negative image of Thailand as a destroyer of its neighbors' forests (TFSMP5 1993). Furthermore, the high prices for logs have increased illegal logging in Thailand.

In addition to the enactment and expansion of conservation forests, one of the RTG's main responses to deforestation has been to encourage the development of large-scale commercial forest plantations (TFSMP5 1993). Forest plantations have been incorporated in the economic forest zone. They have been promoted largely because the RTG expects that large-scale private plantations can help mitigate deforestation, improve the ailing forestry sector, and supply wood for domestic consumption. However, while deforestation occurred in natural forests, reforestation focused on open land or degraded forests. The RFD provided long-term leases (30 years) at the rate of 10 baht/rai (62.5 baht/ha) annually. Such low rental rates have caused resentment among villagers and NGOs, as commercial plantations threaten the livelihood of many local communities (PER 1992).

Thailand's local farmers and environmental NGOs claim that monocultures of fast-growing forest species are no substitute for the natural forest biodiversity, which many local people depend on. When conflicts between local people and the large-scale plantation sector escalated, commercial reforestation was stopped (TFSMP5 1993). This has led to the present impasse in reforestation in Thailand, although the RTG has continued to promote small-scale private plantations. However, the success of small-scale tree farms remains doubtful due largely to the insufficient incentives and long gestation periods. It also requires lengthy procedures to legalize tree felling and sale of wood, and relatively sophisticated establishment and management technologies for some tree species (e.g. teak, dipterocarps). Unfortunately, the RFD has been unable to support and strengthen the development of markets for small-scale plantation owners and wood-product enterprises.

However, there is also a serious concern that Thailand will become overly dependent on imports of both wood and non-wood products. Some researchers and involved parties have suggested that parts of the deforested areas should be reforested for the production of wood and non-wood products (TFSMP2 1993). The forest plantation program will include local people in the development plans. It will also consider appropriate scale, technology and finance from available sources to build up new partnerships with the local people. It is suggested that since Thailand has enough land, technology, and perhaps finances to support silviculture activities, it may not be necessary to import wood in the future (TFSMP2 1993).

Strategies promoting forest conservation

With the implementation of the logging ban, the main objective of forestry in Thailand shifted from production to conservation. The major strategies include:

- ◆ demarcate and declare conservation forests, such as national parks, forest parks, wildlife sanctuaries, non-hunting areas and forest reserves;
- ◆ strengthen law enforcement and strict forest patrolling;
- ◆ relocate people residing in forest reserves or conservation forests; and
- ◆ attempt to limit the occupation of the upland and highland areas by local people.

THE NATIONAL LOGGING BAN IN THAILAND

Background

Between 19 and 24 November 1988, heavy rains triggered massive landslides that affected 16 villages in southern Thailand. Three villages were buried under 1 to 3 m of sand and debris. All of Thailand's eastern coastal provinces from Chumphon to Narathiwat were affected. The 1988 floods were particularly unusual because disastrous floods were previously rare in southern Thailand. Total damages from the flood were estimated to be 7 357 million baht (Natalaya 1991)¹. The severe floods also caused the death of 373 people, injured hundreds and rendered thousands homeless in Nakorn Srithammarat Province.

The following factors caused the flood (Nalampoon 1991):

- ◆ Excessive rainfall of 1 051 mm during 6 days: The center of the damage, resulting from flash floods, was in the mountains of Khao Luang, which included several villages. The most heavily affected villages were Baan Kathun Nua, Phi Pun district; Baan Huay Ko, Phi Pun district and Baan Kiriwong, Larn Saka district, all located in Nakorn Srithammarat. The peak flows at Klong Kathun and Klong Thadi were over 300 and 400 m³/second, respectively.
- ◆ Topographic conditions: Khao Luang Mountain Range consists of several high peaks (up to 1 518 m) with steep slopes. Natalaya's study (1991) showed that steeper areas had more landslides in the 1988 catastrophe.
- ◆ Soil conditions: Khao Luang has a granite core under loose soils. On steep slopes, the soils were saturated with water and were the cause of many landslides.
- ◆ Conversions of forests into para-rubber plantations: Many forests in the Khao Luang Mountain were converted into para-rubber plantations. The soils of these plantations are unstable and prone to landslides under heavy rainfall. Large quantities of rubber tree debris as well as previously stockpiled timber were found at the foot of Khao Luang Mountain.

Prior to the disaster, NGOs and the media had tried to pressure the Government to conserve the country's natural resources. For example, the Project for Ecological Recovery (PER 1992) stressed that the anti-logging sentiment had started long before the catastrophic floods, but gained momentum from two events. One was the juridical ruling that granted logging rights to 22 companies in areas designated as national parks or wildlife sanctuaries. The Huay Kha Kaeng Wildlife Sanctuary, awaiting declaration as a World Heritage Site by UNESCO, was at the center of this controversy. The second event was the 1988 devastating floods and landslides.

The enormity of the disaster, coupled by persistent public pressures from NGOs and the media, finally convinced the Government to impose a logging ban on 17 January 1989 in the form of a Cabinet Resolution (Order number 32/2532). This revoked all logging licenses in natural forests, effectively banning commercial logging, particularly in the uplands (Jantakad and Gilmour 1999).

A policy paper, "Ten Measures to Save the Forests," submitted to the RTG (PER 1992), highlighted three areas for action:

- ◆ a comprehensive plan for protecting forest areas that had been part of the concessions;
- ◆ the administration of "economic" and "conservation" forests under separate regulations; and
- ◆ the rights for local villagers to own and manage their ecosystems as community forests.

In response, the RTG reassigned the national target areas for conservation and economic forests to 25 and 15 percent, respectively. Between 1990 and 1995, the Thai Forestry Sector Master Plan (TFSMP) was formulated. It attempted to strengthen sustainable management and conservation of natural forests and ecosystems, develop a strategy for policy implementation through sustainable and participatory methods, and enhance capacity building for monitoring and evaluating the progress (TFSMP2 1993). Unfortunately, opposition from various groups (environmental NGOs

¹ US\$ 1 = 45 baht (May 2001; in 1989 it was about 25 baht)

were among the leading opponents of the TFSMP) and other obstacles prevented the implementation of the TFSMP.

Goals and objectives of the logging ban

The logging ban was the RTG's most drastic form of forest protection ever attempted in Thailand, although logging in plantations and mangrove forests was not affected. The ban officially terminated the relationship between the RFD and logging concessionaires, and caused uncertainty about the RFD's future role in forest management (IUCN 1996).

The goal of the ban was, in the first instance, to protect the remaining natural forests and secondly, to enforce rules and punishment of encroachers in the protected forests. There was general consensus that logging had contributed to or actually had caused severe nation-wide deforestation, although it was recognized that appropriate logging practices do not cause deforestation directly (FAO 1998). However, logging roads indirectly provide access for illegal loggers and the rural poor in search of new land. Some individuals and environmental groups viewed the ban as an opportunity to shift towards integrated participatory development with proper conservation measures.

Although the conservation objectives of the ban were never clearly announced, its main objectives, according to various sources (TFSMP5 1993, IUCN 1996, Jantakad and Gilmour 1999, Phonpanpua 1999), appear to be:

- ◆ protection and rehabilitation of natural forests;
- ◆ improvement of degraded forestland to sustainable and productive land uses;
- ◆ securing livelihoods for forest-dependent people;
- ◆ increasing the RFD's capacity to implement the new strategies through sustainable and participatory methods; and
- ◆ conservation of soil and water resources, and biodiversity.

The cancellation of concession licenses in upland natural forests was a hasty response to fears of more landslides and flash floods. In 1996, the RTG also revoked logging licenses in mangrove forests to halt their destruction, which was especially excessive during the 1980s and early 1990s when mangrove forests declined from 312 000 ha (1979) to 53 000 ha (1993). Still, with concessionaires leading the campaign to oppose the ban, logging operations continued in mangrove forests. In April 2000, the RFD Director General announced that the RFD aimed to discontinue the concessions once their licenses expire. The effectiveness of the ban in mangrove forests has been questioned not only for ongoing logging, but also because of illegal encroachment for prawn farming, construction of resorts and other non-timber uses, which are destroying the mangroves.

Twelve years after imposing the ban, illegal logging and upland encroachment remain barriers to forest conservation. Upland watershed deterioration with all its negative externalities and resulting economic impacts continues, particularly affecting Thailand's water resources. Many concerned stakeholders have not yet embraced the idea of participatory approaches and decentralized forest management and conservation. The roles of the public administration directly responsible for forest policies (such as the RFD) still need to be redefined, and innovative partnerships with local communities and NGOs must be clearly specified.

Apart from the logging ban, other activities in Thailand's forests can potentially contribute to conservation objectives too. The Government, through the RFD, is focusing its activities on forest rehabilitation aimed at forest restoration and biodiversity conservation. The area set aside for conservation has steadily increased (Table 50), law enforcement has been strengthened, and people residing in the conservation forests have been relocated to buffer zones or other designated areas, although this last strategy has resulted in numerous conflicts (Phantasen 1995).

Table 50. Natural conservation and recreation areas in Thailand

Category	1994		1995		1996		1997		1998	
	No.	thousand ha								
National park	79	4 022	81	4 174	82	4 233	82	4 233	87	4 418
Forest park	42	53	42	63	57	76	66	86	65	87
Wildlife sanctuary	37	2 889	38	2 939	42	3 099	44	3 201	46	3 267
Non-hunting area	43	296	42	296	44	322	43	297	44	310
Botanical garden	13	2	15	6	15	6	15	6	15	6
Arboretum	44	3	47	3	47	3	49	3	53	3
Total	258	7 265	265	7 481	287	7 739	299	7 826	310	8 091

Source: RFD, Forestry Statistics of Thailand (1998)

Relocating people living in the conserved forests has been problematic since the residents are concerned that the RFD will relocate them to degraded or marginal lands that are unsuitable for farming. Examples such as the *Khor Jor Kor* Project (Project for Land Allotment to the Poor in the Degraded Forest Reserve) and the relocation of hilltribes to "Forest Villages" in north and upper northeast Thailand have not diminished their fears. Protests by the poor relocated farmers in the *Khor Jor Kor* Project led to the failure of the project, which was consequently revoked in 1992 (Phantasen 1995).

Organized groups of villagers have also moved into prohibited forest reserves such as the *Dong Yai* Forest Reserve in Northeast Kalasin Province in late 1999, and to *Phu Pan* National Park in the Northeast Province of Sakol Nakorn in March 2000. Even though villagers of *Dong Yai* have customary land rights to the area, they vacated the forest to allow the Government to put the area to good use. When the land was converted to commercial plantations of *Eucalyptus* spp., it caused intense resentment among the displaced villagers. They finally decided to move back to their own parcels of land, raising severe conflicts with the RFD, which has tried to evict the villagers.

The incident in *Phu Pan* National Park was caused by the unrealized promise from the Government through the RFD, that arable land would be granted to villagers. In fact, the villagers, who joined the Communist Party of Thailand at the time, had moved out to give way to the Government. The forest was later named the *Phu Pan* National Park. After 20 years, the villagers claim they have limited means of making a living since they are landless.

About 16 percent of the Thailand's total land area is included in the protected area system (Jantakad and Gilmour 1999). Additional national parks are waiting for the Royal Decree to be declared, which would be a significant increase of the national conservation and recreation areas. This is one of the strategic improvements related to current conservation efforts by the RFD, although substantial gaps in the protected area system (PAS) remain (Ingles 1999, cited by Jantakad and Gilmour 1999) and their management remains problematic.

Many measures to restrict utilization of the upland forests and to control shifting cultivation have been ineffective due mainly to increasing population pressures. In addition, lowland people have continued to encroach into the forest reserves, conservation forests and upland watersheds. This has led to further conflicts between ethnic minorities and Thais, particularly in the North, and between Government officials and local villagers in the Northeast, where both parties are very suspicious of each other. Government officials think that the villagers are incapable of managing the forestland, while the villagers believe that the Government officials are unreliable and ineffective.

Many Thai people seem to understand and are interested in various national policy agenda and activities related to natural resources and the environment. The current Constitution enacted in October 1997 emphasizes the rights of rural people to actively participate in the management and utilization of natural resources (Thailand Constitution Drafting Council 1997). Participation has been viewed as a strategy to implement policies and ensure sustainability. Moreover, the local people and NGOs emphasize the need for a real partnership between the RFD and local people.

POLICY, ECONOMIC, ENVIRONMENTAL AND SOCIAL IMPLICATIONS OF THE LOGGING BAN

Policy implications

Suitability of current policy and legislative arrangements to assure logging ban effectiveness

Thailand's forestry sector has been affected by the imposition of the logging ban and civil society feels that the ban should not be revoked in the near future. The implementation of the ban has been hindered by a lack of clear policies and strategy, a shortcoming of the RTG's previous efforts to manage Thailand's natural forests sustainably. In the past, many efforts were *symbolic* without well-developed strategies and appropriate internal management structures. Hence, public opinion is that "the logging ban should remain [or] the forest will just be destroyed" (TFSMP2 1993).

However, the ban on commercial logging has not prevented further deterioration of the natural forests. In addition, neighboring countries have blamed Thailand for the destruction and degradation of their domestic forests. There has never been any pre- or post-implementation legislation regarding the logging ban. As discussed earlier, the only apparent adjustment was to demarcate more protected areas and to strengthen law enforcement. Sustainable forest management, decentralization and devolution of natural resource management have been discussed among Thai academics and civil society since the 1980s, but the impact of the discussions remains unclear.

Significance of timing on the effectiveness of the logging ban

The 1989 logging ban took many people by surprise. The Chatchai Government had neither formulated an appropriate policy nor developed legislative structures or technical preparations when the ban was announced. Ultimately, the decision to revoke logging permits was political. Such an overnight policy shift contributed towards Thailand's present critical situation. The economic implications of the logging ban were unacceptable to many people who were concerned that the neighboring countries were using income earned from their timber exports to finance their ethnic wars.

On the other hand, some response from the Government should have been expected. During the late 1980s, the environmental movement had gained momentum and NGOs increasingly influenced policy makers. While most people in Thailand and the international community appreciated the RTG's decision to ban logging, concessionaires and the wood-based industries were forced to import raw materials, although illegal domestic harvesting continued to put pressure on Thailand's forest resources.

Since 1990, the RFD has attempted to protect the remaining forests and to encourage private sector involvement in establishing plantations. To some extent, awareness of the importance of local participation in forest management has increased in the RFD. In practice, however, the RFD's rigid technocratic structure and top-down approaches continue to prevail. This inability to change has jeopardized several projects involving local people in collaborative management of forest resources and the environment.

Consistency of sustainable forest management with international conventions

Despite its serious deforestation, Thailand ratified some international conventions and has followed the outcomes of the 1992 United Nations Conference on Environment and Development (UNCED). In general, Thai officials, researchers and NGOs are aware of the significance of Chapter 11 of Agenda 21 ("Combating Deforestation"), sustainable forest management and biodiversity conservation, although the ratification of the Biodiversity Convention by Thailand has been delayed. The main points of the conventions have been incorporated in many national policies and the NESDP, which has been the backbone of Thailand's economic planning and development, particularly the 7th and 8th Plans. As a result, the involved agencies, local people and NGOs are playing a more significant role in natural resource conservation and forest management.

Requirements for the effective implementation of the logging ban

The experience in implementing and enforcing the Thailand logging ban suggests a number of actions are still needed to effectively achieve forest protection and conservation objectives, such as:

- ◆ Reassess and modify RFD's role and the professional attitudes of forest officers. The RFD needs to develop a vision for the future, restructure accordingly and rethink its responsibilities.
- ◆ Strengthen institutional capacity to facilitate collaborative decision-making, and increase transparency and accountability in forest management.
- ◆ Establish security of land tenure, and provide access to resources for local people.
- ◆ Pass the Community Forestry Bill to clarify people's rights in using and managing forests.
- ◆ Develop capabilities within local institutions and acknowledge local villagers' traditional rules and regulations. This should facilitate the preparation of natural resource management planning and implementation through the Tambon Administrative Organization (TAO)², under the TAO Act in 1994.
- ◆ Foster cooperation and coordination among the involved agencies in policy formulation, planning, and natural resource management, monitoring, and evaluation, and clarify the responsibilities of stakeholders.
- ◆ Demarcate forestlands on the ground and develop skills in conflict resolution.
- ◆ Revise or abolish conflicting, inappropriate or obsolete legislation/regulations.

Economic implications

Wood production, consumption and trade of major wood products after the logging ban

The official statistics on wood production, consumption, exports and imports published by the RFD are somewhat unreliable. Although the production figures include confiscated timber, fuelwood and charcoal, much of the illegal activities are not captured in the current statistics. In 1994, the Forest Industry Organization (FIO) estimated that Thailand's demand for all types of wood, including teak, dipterocarps and para-rubber, was about 25 million m³ (Forestry Research Center 1994). However, only 4.1 million m³ were consumed in the same year (Table 51). The RFD Data Center reported that only 1.2 million m³ were consumed in 1998, while the Committee on Agricultural Cooperatives Policy and Planning estimated that 25.2 million m³ were consumed in that year. Not surprisingly, many people are critical of the figures published by the RFD.

Table 51. Thailand's domestic wood production, imports, exports and consumption (thousand m³)

Year	Wood production (1)	Wood imports (2)	Wood exports (3)	Domestic wood consumption [#]
1987	2 149.0	725.2	112.0	2 762.2
1988	2 048.1	1 123.3	181.1	2 990.3
1989	919.0	2 508.0	53.3	3 373.7
1990	491.6	3 340.9	48.6	3 783.9
1991	231.5	3 280.8	57.8	3 454.5
1992	119.4	3 814.4	45.1	3 888.7
1993	64.9	3 168.2	53.8	3 179.3
1994	62.3	4 065.7	62.4	4 065.6
1995	34.9	3 463.6	80.5	3 418.0
1996	43.9	3 151.8	45.4	3 150.3
1997	59.7	2 358.6	79.7	2 338.6
1998	54.8	1 239.7	108.2	1 186.3

Sources: (1) Royal Forest Department (1998); (2) and (3) Department of Customs
[#] (net consumption) = (1) + (2) – (3)

² The TAO is the elected local body responsible for all local administration and management of tambons (prefectures), replacing the local administration to some extent as part of the decentralization process.

Thailand has been a net importer of wood since the mid-1970s. The gap between imports and exports increased steadily even before the logging ban, due to the rapid economic development. With the imposition of the logging ban, official records of imports grew even faster, particularly in terms of its value (Table 52). However, this growth was severely curtailed by the financial crisis that hit Thailand in June 1997. Imports slumped to pre-logging-ban levels.

Table 52. Thailand's export and import of logs and sawnwood

Year	Wood Exports		Wood Imports	
	Volume (thousand m ³)	Value (million baht)	Volume (thousand m ³)	Value (million baht)
1987	112.0	716.33	725.2	3 602.46
1988	181.1	1 278.50	1 123.3	5 211.80
1989	53.3	1 170.02	2 508.0	10 602.50
1990	48.6	1 214.14	3 340.9	13 776.10
1991	57.8	1 340.36	3 280.8	16 074.37
1992	45.1	1 244.46	3 814.4	18 315.67
1993	53.8	1 411.73	3 168.2	18 808.19
1994	62.4	1 793.26	4 065.7	23 729.94
1995	80.5	2 216.13	3 463.6	27 017.88
1996	45.4	1 946.10	3 151.8	23 518.57
1997	79.7	2 230.09	2 358.6	18 633.94
1998	108.2	2 577.07	1 239.7	8 919.94

Source: RFD (1998)

Note: US\$ 1 was approximately 38 Thai baht in 1998

The most affected sub-sector was the sawmill industry. In 1990 alone, 188 enterprises closed down (PER 1992), while the remaining sawmills (687 factories in 1998) adjusted their procurement methods (RFD 1998). Many industries shifted to higher-value processing, and converted the sawnwood production to furniture and crafts (PER 1992). However, this change was triggered more by the 1975 log export ban than the 1989 logging ban (Kashio 1995). The wood-based enterprises that survived the ban rely heavily on the plantation-grown timber from the FIO and confiscated timber, in addition to imported wood.

The FIO is a semi-private enterprise operating sawmills, wood-product factories, plantations and forest villages. Since the imposition the logging ban, the FIO has played a major role in processing the confiscated logs. It conducts its own logging operations but has been severely affected by the prohibition of logging in the natural forests and has been threatened with bankruptcy. At present, the Government has to support the FIO fully, as it has been unable to remain economically viable as a semi-autonomous entity. However, it is still the responsibility of FIO to balance wood production and consumption for the whole country.

Illegal logging and trade

The RTG reduced log import tariffs and promoted wood imports particularly from Myanmar, Laos and Cambodia. In 1991, Myanmar was the most important timber supplier (PER 1992). Illegal timber trade was taking place along the Thai-Cambodia border, although it was officially "closed" in late 1994 following the murder of 22 Thai timber workers (Global Witness 1995). However, a great number of logging trucks continued to cross the border in 1995.

Conflicting claims about the importance of exports to Thailand abound. The five major exporters include Cambodia, Laos, Malaysia, Myanmar and the United States. According to official statistics, in 1998 Thailand imported sawlogs and sawnwood from Malaysia totalling 4 396 million baht, or US\$ 115.69 million (823 627 m³), and from Myanmar 1 250 million baht or US\$ 32.89 million (94,676 m³) the same year (Table 53).

Table 53. Thai imports of wood by country of origin, 1994-1998

Countries	1994		1995		1996		1997		1998	
	Volume m ³	Cost million \$								
Malaysia	2 407 463	366.44	1 934 828	359.92	2 127 979	384.41	1 274 392	261.88	823 627	115.69
Myanmar	539 382	3.36	252 363	120.04	173 571	72.76	126 035	45.66	94 676	32.89
Cambodia	578 633	81.45	596 752	102.83	113 873	28.81	296 466	52.18	67 354	19.67
Laos	278 272	40.54	273 934	38.98	240 740	37.24	199 062	33.98	110 115	19.96
U.S.A.	54 075	18.99	63 091	25.44	77 580	25.25	72 676	27.89	43 830	22.01

Source: RFD (1998)

Unfortunately, official statistics are usually incomplete. For example, Global Witness (1996) claimed that Cambodia was the largest source of timber imports for Thailand. It reported that up to 750 000 m³ of illegal timber entered the Thai harbor of Kalapangha, Trad Province annually, which Thai and Cambodian officials ignored. In fact, Cambodia imposed a timber export ban in December 1996 (Global Witness 1997), although Thai companies continued to operate illegally in Cambodia.

However, illegal logging did not intensify only across Thailand's borders in neighboring countries (see Box 1). Investigations in a number of cases show that collusion among influential people still facilitates illegal logging within Thailand. In some cases, it involves companies purportedly operating in Myanmar who actually log on Thai territory.

Generation of alternative wood supplies

In 1992, the RTG enacted the Forest Plantation Act, allowing the private sector to establish plantations on degraded forestland. As an incentive, investors are exempted from paying royalty fees for plantation-grown wood (Kampiraparb 1993).

Various other schemes were initiated to expand the plantation area. One of the most popular programs was the *Forest Plantation Project to Commemorate the King's Jubilee Reign*, which invited all Thai and non-Thai residents to plant trees. Planned for 1994-1996, the project was extended to 2002 upon request from the RFD because the 5-million rai (800 000 ha) goal could not be achieved within the time specified. By 1997, only 2.7 million rai (436 800 ha) had been reserved for establishing plantations. Trees had been planted on only 1 million rai (164 800 ha), or 37.7 percent of the target (Green World Foundation 1999), which suggests that the incentives provided were not sufficient to stimulate investments in plantations. In fact, land-use conflicts in many areas increase the risk for investors, and numerous public campaigns against plantations and particular species such as *Eucalyptus camaldulensis* also discourage the private sector.

The cumulative total area of reforestation by both the RFD and private sector during 1906-1996 is shown in Table 54. The figures indicate that the forest plantation policy was ineffective for sustaining the forestry sector. Most importantly, forest degradation and deforestation have continued at or near the rate of around 2-2.6 percent annually (FAO 1999). Eventually, pressures will grow stronger and the PAS or conservation forests will be affected more significantly. It is clear that in the short- to medium-term, Thai wood-processing industries will continue to be dependent on imports and illegally cut domestic timber.

Box 1: Case studies of illegal logging

Song district of Phrae Province and Ngao district of Lampang Province

Northern Thailand has the highest proportion of forest area in the country, and also the highest rate of illegal logging. The booming tourism industry in the North has created conditions for the growth of furniture and crafts industry. Arts and crafts made from wood are encouraged by the Thai Government. All provinces in the North that attract many tourists, particularly Chiang Mai, are centers for woodwork factories.

Phrae Province has the highest rate of illegal logging in Thailand. It is well-known for its abundant teak forests. The logging business in this area has existed for a long period of time. Logging was first undertaken by the Veterans Organization, and later by *Phrae Karn Mai* and *Chartphaiboon* Companies. The nation-wide logging ban has had little or even no effect on the logging activities in this area, which have been extended to other rich forest areas in Lampang, Payao and Nan Provinces.

The two groups of people involved in illegal logging are from the Song district of Phrae Province and Ngao district of Lampang Province. The cut logs are sent to Song and Sungmen districts of Phrae. Sungmen is a well-known illegal timber market among wood traders. The villagers in Song cut trees in Maepung, Maepou and Mae Ten National Forest Reserves, and adjacent forests, while Ngao's villagers logged trees in Mae Yom National Park and nearby forests.

Illegal logging is practiced all year round, with wood being transported by land and water. Tree felling is sometimes undertaken during the rainy season, as it is easier to transport the logs via the Yom and Ngao Rivers when water levels are high. Nevertheless, the rate of tree felling is highest during the dry season, which coincides with the off-farm period for the villagers. In the past, the villagers tied the logs together as rafts and floated them down the river. Nowadays, the mode of transport is by the "submarine method" of sinking the logs under water and having them float up to the surface in Song, where they are retrieved by the middlemen and transported to Sungmen.

Eleven villages in the area are involved in the illegal logging.

Sources: PER (1992); Tantiwittayapitak (1992)

Table 54. Reforestation by the Royal Forest Department and private sector in Thailand

Duration	Area (rai)	Area (ha)
1906-1960	50 984	8 157.44
1961-1966	142 500	22 800.00
1967-1971	171 820	27 491.20
1972-1976	294 861	47 177.76
1977-1981	1 357 615	217 218.40
1982-1986	1 901 180	304 188.80
1987-1991	764 750	122 360.00
1992-1996	943 750	151 000.00
Total	5 627 460	900 393.60

Source: Green World Foundation (1999)

Environmental implications

Effects on the Protected Area System, biodiversity and watershed conservation

An important positive impact of the logging ban is the increased awareness of the need for effective forest conservation. Unfortunately, this has yet to impact positively on the rate of deforestation. First, Thailand needs to understand the root causes of the problem and include all stakeholders in the planning process prior to taking remedial actions.

It should be recognized that the logging ban has been a catalyst for the RTG in general, and the RFD in particular, to develop more purposeful management activities for forest conservation. The protection of scenic, amenity and public recreation areas has received more attention. Numerous Royal Decrees were passed to declare permanent forest reserves, national parks, forest parks, wildlife sanctuaries and other designated areas since the imposition of the logging ban. What is crucial now is the organization of multi-partite cooperation in maintaining the reserved and protected forests. Equally important is the effective management of available forests and biodiversity conservation without ignoring the needs of forest-dependent people (i.e. to balance the needs of conservation with sustainable livelihoods in rural Thailand).

To conserve biodiversity effectively, it is necessary to protect the remaining forests, produce alternative wood supplies from plantations, and focus on natural regeneration. Enhanced conservation and effective management and protection of national parks and wildlife sanctuaries are also important. The World Bank (1998) has suggested a number of key measures including:

- ◆ more effective enforcement of the logging ban through enhanced policing capabilities (surveillance, logging monitoring and trade control technologies), better prosecution and tougher penalties;
- ◆ more frequent monitoring of forest cover changes using satellite images and ground verification;
- ◆ increased staff capacity;
- ◆ effective demarcation of protected areas, in consultation with local communities;
- ◆ participatory development of management plans for protected areas and buffer zones;
- ◆ involvement of local communities and NGOs in implementing management plans; and
- ◆ full financing of the recurring costs of appropriate conservation and protection management through increased user and service fees, or concession fees where appropriate.

The causes of watershed degradation are quite similar to those of deforestation. Although the logging ban should have boosted management of critical watersheds, conflicts between upland and lowland residents, and between the Government and forest-encroachers, have increased (in some areas) the deterioration of watersheds instead. Policies are irregular and unique in some specific watersheds. Watershed areas are categorized into 5 classes (see Box 2). Class 1 watersheds, including both 1A and 1B, are mainly conservation forests. Watersheds in this category are considered so important that the upper watersheds (Class 1, greater than 35 percent slope) cannot be utilized in any way and no humans are allowed to reside in these areas. Class 1B watersheds are slightly less restrictive than Class 1A. Many are “disturbed watersheds” that are in need of rehabilitation.

Ethnic minorities, or hilltribes as they are usually referred to, and their shifting cultivation practices have often been blamed for destroying watershed forests. The total hilltribe population in Thailand is estimated to be almost 1 million (Public Welfare Department 1998; cited by Phonpanpua 1999). The debates about the agricultural practices of the hilltribes have been going on for the past 40 years. Research and development projects have been undertaken for the last 20 years to implement sustainable agriculture, although the success rate of such efforts has been disappointing. On the other hand, shifting cultivation practices have been reduced or have stabilized with permanent cropping, due to several factors:

- ◆ shifting cultivation in the “protected” watershed areas is considered illegal;
- ◆ limited land is available in the mountainous regions of the country;
- ◆ the huge number of hilltribes is disproportionate to the available arable land; and
- ◆ the Government, through several agencies, has attempted to restrict shifting cultivation for at least 20 years.

Box 2: Watershed classifications in Thailand

Thailand's watersheds are generally categorized into five watershed classes (WSC) as follows:

WSC1: Protected or conservation forest and headwater source. This class is divided into 2 sub-classes

- ◆ **WSC1A: Watershed protection forest** includes the headwaters of rivers. Usually at high elevations and very steep slopes, and should remain as permanent forest cover.
- ◆ **WSC1B: Disturbed WSC1** areas have similar physical and environmental features to Class 1A, but parts of the areas have been cleared for agriculture, thus requiring special soil conservation measures. Where possible, the areas should be replanted as forest or maintained as permanent agroforestry.

WSC2: Commercial forest is for protection and/or commercial use, where mining and logging are allowed within its boundaries. Usually at high elevation with steep to very steep slopes. It may be used for grazing or crop production with soil conservation measures.

WSC3: Fruit-tree plantation covers uplands with steep slopes and less erosive landforms. It may be used for commercial purposes, grazing, fruit trees or certain agricultural crops with soil conservation measures.

WSC4: Upland farming areas cover those with gentle sloping lands suitable for row crops, fruit trees and grazing with a moderate need of soil conservation measures.

WSC5: Lowland farming covers gentle slopes or flat areas needed for paddy fields or other agricultural uses with few restrictions.

Source: Tangtham (1996)

Impact on institutional arrangements for forest conservation

Originally, the institutions involved in the implementation of the logging ban were the RFD, FIO, and the Ministry of Agriculture and Cooperatives. The latter was responsible for overseeing the policy implementation. The RFD's main policy objective, as emphasized by the current Director-General, is forest protection and strict enforcement of the relevant laws. The RFD administered the logging ban according to the administrative structure of the RTG at four levels:

- ◆ The central office in Bangkok is responsible for overall administration, overseeing all offices including regional and provincial offices.
- ◆ There are 21 regional offices, although plans to reduce this number to 15 in the near future are being considered.
- ◆ There are 76 provincial offices.
- ◆ About 5 000 district offices are under the umbrella of local administration offices at the district level.

The RFD's central office is divided into 6 programs as follows:

- ◆ Forest Administration;
- ◆ Forest Conservation;
- ◆ Forest Extension and Development;
- ◆ Forest Research;
- ◆ Tourism Development and Promotion; and
- ◆ Environmental Quality Control.

Only 4 of the 6 programs were granted budgets in 1998. Of the total US\$ 222.59 million, Forest Extension and Development received the largest allocation (US\$ 93.59 million), followed by Forest Conservation (US\$ 90.17 million), Administration (US \$31.68 million) and Forest Research (US\$ 7.15 million). Prior to 1997, the Forest Extension and Development program was inactive.

The role of the FIO in forest conservation is limited to expanding the plantation areas.

Social implications

Impact on employment

The most immediate impact of the logging ban on employment has been the closure of many sawmills and wood-product factories and provincial logging companies. Many employees were dismissed. Most of them looked for alternative employment, but few succeeded in locating new jobs nearby. Some have likely encroached further into the forests or turned to illegal logging either on their own, or as employees for others. Some have returned to their rural homelands and become full-time farmers. The logging concessionaires and wood industrialists have been affected to a certain extent, although most have moved operations to neighboring countries.

The provincial logging concessionaires, sawmills and wood-product factories had to reorient operations towards furniture manufacturing, woodworking and woodcrafts. Nearly 200 sawmills were closed down because of rising log prices that made operations too expensive to be viable. In 2000, about 687 sawmills were in operation, almost similar to the number in 1960 with 680 sawmills (de Backer and Openshaw 1972).

While it is clear that the unexpected logging ban led to hardships for some people, the social impacts have never been fully quantified. No detailed studies of the illegal logging business and the impact on income generation of the wood-industry workers have been conducted. This is probably because the years following the logging ban were characterized by extremely high economic growth in Thailand. Employment generated by this growth far outstripped the job losses due the logging ban. The assumption that laid-off workers would have found alternative employment in other sectors of the industry remains untested, but is likely true in many cases.

CONSTRAINTS TO THE EFFECTIVE IMPLEMENTATION OF THE LOGGING BAN

The impacts of the logging ban have never withstood an in-depth review, but it has been criticized by many as being futile, fruitless, and even counter-productive. The unwillingness to critically review the impacts of the ban may be due to a reluctance on the part of the RFD. For more than a decade, the issue of the logging ban has been rarely raised, but the RFD has generally played down the policy. Some RFD officials are still ashamed or angered until today because the ban was introduced instantaneously without their input and a proper strategy for implementation. It is obvious that the implementation of the ban suffers from a number of constraints including:

- ◆ In announcing the logging ban, the RTG reacted to a natural disaster without spending the time to discuss an appropriate strategy and to involve key stakeholders in the design of the policy.
- ◆ No supportive legislation was enacted after the declaration of the total logging ban in natural forests.
- ◆ Little sustained political will and effort followed the declaration. Only limited staff and funding were available to implement a comprehensive protection and conservation program and enforce the logging ban.
- ◆ There was only limited understanding of the potential economic and social impacts of the logging ban. The RFD was not put into a position to prepare any nation-wide programs to assist in, monitor and evaluate the adjustment process.
- ◆ The logging ban has been largely treated as a sacred action, beyond deliberate and open discussion or debate. The policy agenda and goals were not critically discussed. Individuals and organizations initially involved with developing and implementing the ban have been relatively passive in terms of evaluating and assessing the actual accomplishments, impacts and difficulties. To date, there has been no systematic analysis of the impacts of the logging ban.
- ◆ Although the RFD has attempted to involve local people in reforestation and forest conservation schemes to some extent, the results have been dismal, mainly because the villagers see few incentives for their participation.

A strong desire to combat deforestation and to rehabilitate the degraded forests has been apparent among RFD officials, in particular the Director General. It is also recognized that the RFD alone cannot effectively implement the logging ban. The challenge for the future of Thailand's forests is to define new roles and responsibilities based on partnerships with civil society and to focus on the rehabilitation of the degraded forest landscape and conservation of the forest remnants (Jantakad and Gilmour 1999). In short, RFD officials must abandon their past centralized authoritarian role, which emphasized policing and licensing functions. Instead, a new role focused on facilitating community-based forest management and technical support for large and small-scale forest plantations is likely to be much more effective.

Conclusions

The impacts of the logging ban in Thailand have been mixed. Although all are inter-related, forest policy and the environment appear to be most seriously affected, followed by economic and social aspects. Minimal preparation and the lack of a comprehensive strategy prior to the launch of the logging ban have caused confusion, difficulties in balancing wood production and consumption, and major challenges in achieving forest conservation.

It is apparent that Thailand has been unable to cope with the imbalance of timber and wood products, imports and exports. In economic terms, Thailand's forestry and forest-product industry have reduced production and have foregone considerable income. Markets have responded with higher prices, which have led to increased imports and expenditure of foreign exchange. Shortages and higher prices have caused the private sector and involved parties to increase illegal harvesting and deforestation in Thailand and its neighbors, sometimes with encouragement from the RTG to log forests across the borders.

Socially, the logging ban has directly affected employment and personal income. In some areas, villagers were forced to turn to illegal activities, further threatening the already degraded forest ecosystems.

Nevertheless, the logging ban has been useful in two ways:

- Experience with implementing and moving forward after the ban has led the RTG to issue a policy on forest conservation and PAS. If the logging ban had not been implemented,

conservation efforts may have come about much too late to be effective. Legal enforcement of conservation legislation has not yet met with expected outcomes. This issue is highly complex, involving socio-economic, political and cultural factors.

- Important lessons have been learned that can be of benefit to other countries. It must be emphasized that the Thai experience may have been quite different if sound legislative and technical preparation had been in place, based on suitable planning and a broad public consensus. It is, therefore, suggested that any country intending to implement a logging ban should study past experiences diligently, set up the policy planning process carefully and pursue implementation gradually, with consideration of environmental and socio-economic impacts, and the livelihoods of forest-dependent people.

POLICY OPTIONS

It is feasible to adjust logging and conservation policies with consideration of the above impacts. As many researchers, RFD and FIO officials have suggested, Thailand must produce more of its own timber and wood products for domestic consumption, yet at the same time protect its natural forests and environment. This can only be possible by involving forest-dependent people including forest dwellers, illegal loggers and city dwellers in forestry activities. The responsible Government agencies, such as the RFD, must alter the attitudes and behavior of its personnel to facilitate collaboration with local people. Many local communities in Thailand have proven that they can protect and manage community forests effectively. Thus, the following suggestions propose two alternatives for setting up sustainable forest management in support of forest conservation while fully implementing the logging ban.

Option 1: Community-based forest management with timber production

Establish community-based forest management, which incorporates small- and medium-scale plantations for commercial production, with technical assistance from the RFD. This option would integrate all groups of users and the population dependent on natural forests. Participation in forest management and planning, leading to closer cooperation between the State and people would be implemented. The TAO, local groups, and local people would be the center of operations on available land, either degraded forest belonging to the State or community lands. The necessary components of such an approach would include:

- ◆ the RTG must adjust its rental procedures for State-based forestlands to make land readily accessible to small farmers and communities;
- ◆ the Community Forestry committee/working group must be elected to work on sustainable timber production in communities, incorporating social and environmental services, and management plans for such units should lead to sustainable forest management;
- ◆ favorable land taxes and incentives to promote reforestation, conservation and intensive land use are needed to promote sustainability;
- ◆ exemptions or minimum logging royalty fees should be used as an incentive to encourage conservation and sustainable management practices;
- ◆ training on nursery techniques, plantation maintenance, and harvesting is necessary, and the RFD must simplify guidelines, rules and logging procedures for non-Government forestry operations;
- ◆ an effective, transparent and accountable open market system operated by the TAO and RFD, with equitable sharing of costs and benefits is needed; and
- ◆ trees should be integrated into farming systems throughout the country so that agroforestry can contribute to economic and environmental goods and services.

Option 2: Collaborative forest rehabilitation

Undertake forest rehabilitation in the degraded forest area by Government agencies, incorporating the opinions and collaboration of local people. Arrange partnerships with local communities, which focus on sustainable forest management with a sustainable flow of wood outputs. Requirements of such an approach would include the following components:

- ◆ A forest rehabilitation program should be developed with clear laws, policies, and operating procedures, including provisions for cost- and benefit-sharing among the partners.
- ◆ The RFD would administer the program. New legislation and policies to guide the harvesting of wood, and the production and consumption of forest products, as well as wood imports and exports, would be developed based on broad participation and consensus. Local partners would help formulate the working processes in the field.
- ◆ Select native species for forest rehabilitation, with high survival rates, and easy maintenance by the local people. Also set up co-managed forest nurseries to produce high-quality seedlings for establishing the new commercial plantations.
- ◆ Allow timber utilization and collection of non-timber forest products from healthy natural forests, based on rural subsistence uses first, and then allowing additional timber production for industrial utilization if forest resources and sustainable capacity allow.
- ◆ The RTG should simplify the administrative procedures for logging permits and develop an effective legal framework based on sustainable logging legislation. Thailand's 1941 Forest Act and 1992 Forest Plantation Act, which control logging operations, would need to be updated to reflect the current forest situation.
- ◆ The RTG should provide favorable conditions and incentives, such as low forest-use and rental fees to small farmers on the State's degraded forests to facilitate rehabilitation, and contract small farmers to do the work. Other incentives would include exemption of royalty fees on harvested timber, and low land taxes.

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IMPACTS AND EFFECTIVENESS OF LOGGING BANS IN NATURAL FORESTS: VIET NAM

Vu Huu Tuynh and Pham Xuan Phuong

INTRODUCTION

Viet Nam's total land area is 33 million ha. About 10.9 million ha (33.3 percent) are covered with forests, out of which 9.4 million ha (86.5 percent) are natural forests. In recent years, the Government of Viet Nam has enforced strong measures to protect the natural forests through new policies. These include land-use allocation, contracting forestland to individuals, investments in plantation development, preferential interest rates for forest protection, regeneration and afforestation, and a ban on the export of logs and lumber. The planted forest area has recently increased and the pace of natural forest removal has slowed. However, Viet Nam has many challenges such as high population growth, increasing demand for food, and spontaneous migration. Particularly in the sensitive economic zones where agricultural production is profitable, natural forests have been encroached and converted to agricultural land. The area and quality of these forests have declined unabated, directly threatening the lives of people in the mountainous areas and causing an array of other impacts. Approximately 100 000 ha of forest area are lost annually.

The Government imposed a partial logging ban in the early 1990s to address these issues, but is facing concerns about timber production losses and the livelihood of local workers. A range of questions about the impacts of the logging ban have been posed, such as:

- ◆ Where will raw materials for the forest industries come from to replace the wood supplies previously harvested from natural forests?
- ◆ How much wood can forest plantations produce?
- ◆ Does forest plantation wood meet the needs of local forest industries?
- ◆ Is the wood industry sector in need of re-structuring?
- ◆ How much investment is necessary to develop adequate supplies of plantation timber and techniques for processing it?
- ◆ What policies are needed to ensure stable production and income for forest industries?

This study of the implications of the logging ban in the natural forests of Viet Nam for forest industry, local livelihoods and the environment was conducted to partly answer these important questions. Its specific objectives were to:

- ◆ review the current situation of Viet Nam's forests and wood product industries;
- ◆ evaluate the forestry sector's role in relation to socio-economic development and the environment;
- ◆ identify the constraints, trends and factors affecting the development of forest products, and the capacity of the natural forests in meeting domestic demand for commercial wood and non-wood forest products;
- ◆ evaluate the impacts of the logging ban on policies and measures concerning natural forests, future forestry activities, various stakeholders and forest conservation and protection; and
- ◆ recommend complementary measures and policies to encourage the development of Viet Nam's forest industry.

Viet Nam's forest resources

In 1943, Viet Nam had 14.3 million ha of forests, which dropped to 11.2 million ha in 1976 and 9.3 million ha in 1995. In 2000, forests covered 10.9 million ha, or 33.3 percent of Viet Nam's total land area. Natural forests totalled 9.4 million ha and plantations covered 1.5 million ha. Between 1990 and 1995, annual wood production from the natural forests declined by approximately 3 million m³. The area of natural forests harvested for wood production is approximately 4 million ha, now producing only about 1 million m³ of timber annually.

In 2000, planted and natural forests were categorized into three types based on utilization (Table 55):

- ◆ **Special-use forests** classified into 87 protected areas, comprising 7 national parks, 49 nature reserves and 31 historical, cultural and environmental sites, covering some 1.5 million ha.
- ◆ **Protected forests** covering 5.4 million ha. They are classified into forests for coastal protection and forests for watershed protection.
- ◆ **Production forests** include those areas where logging is allowed. They cover about 4 million ha (including plantations) and contain 261.1 million m³ of timber.

According to official data from the Ministry of Agriculture and Rural Development in 2000, the total timber stock was 751.5 million m³. Viet Nam's per capita forest area and timber stock are low, with only 0.15 ha and 10 m³ per capita, respectively. If the forest area used for forestry production is considered alone, Viet Nam's average timber stock is only approximately 0.35 m³ per capita.

The quality of vast areas of Viet Nam's natural forests has rapidly deteriorated. In 1995, only 5.5 percent of all remaining natural forests were considered "rich forests," meaning they had over 120 m³ per ha of growing stock. Another 16.8 percent of natural forests are categorized as "medium-quality forests" with between 80 and 120 m³ per ha of growing stock. The remaining natural forests are considered to be poorly stocked (less than 80 m³ per ha) or recently rehabilitated (Table 56). Forest plantations, concentrated mainly in the central and northeast regions, totalled about 1 million ha in area in 1995. Slightly over 600 000 ha of plantations containing almost 1 million m³ of timber were classified as production forests (Table 57). In 2000, the area of natural forests was 9.4 million ha, and for planted forests 1.5 million ha.

In 1997, the Government planned to set aside 107 special-use forests, covering an area of 2.1 million ha of which 898 000 ha are forested, to consist of 10 national parks, 65 nature reserves, and 32 historical and cultural places. It further designated 6 million ha for protection purposes, of which 3.5 million ha are forested. Under current plans, a total of 9.6 million ha, of which 5 million ha are forested, will be designated as production forests in the future, but much of this area is currently non-forested land that requires reforestation.

Demand, supply and trade of forest products

Data on the supply and demand for roundwood in Viet Nam are unreliable. The annual roundwood production from natural and planted forests, including the State and private sector, is about 2 million m³ per year (Figures 23 and 24). The annual demand for wood is approximately 4 million m³, suggesting a gap of 1.5 to 2 million m³. Domestic supply is estimated to come mainly from existing natural and planted forests after 2005. Based on the projected rate of population and economic growth, and changing trends in consumer tastes, the estimated annual demand for industrial wood products will be approximately 9.5 million m³ by 2005, double the level of current demand. This estimate excludes the demand for exports.

Table 55. Viet Nam's forest area by function, 2000 (thousand ha)

Areas	Special-use forests			Protected forests			Production forests			National total		
	Natural forests	Forest plantations	Total	Natural forests	Forest plantations	Total	Natural forests	Forest plantations	Total	Natural forests	Forest plantations	Total
Northeast	214 375	10 346	224 721	1 235 445	172 219	1 407 664	440 775	295 822	736 597	1 890 595	478 387	2 368 982
Northwest	171 469	360	171 829	666 313	47 250	713 563	46 627	31 422	78 049	884 409	79 032	963 441
Red River Delta	19 425	8 187	27 612	24 828	24 288	49 116	1 080	5 830	6 910	45 333	38 305	83 638
North of central	337 576	11 740	349 316	951 444	102 987	1 054 431	546 613	185 289	731 902	1 835 633	300 016	2 135 649
South central coast	109 071	6 068	115 139	600 715	64 102	664 817	259 530	99 805	359 335	969 316	169 975	1 139 291
Central highland	310 526	677	311 203	672 880	9 649	682 529	1 355 761	23 623	1 379 384	2 339 167	33 949	2 373 116
Southeast	258 119	9 753	267 872	642 683	80 489	723 172	515 841	74 115	589 956	1 416 643	164 357	1 581 000
Mekong River Delta	43 185	13 991	57 176	18 363	37 013	55 376	1 554	156 369	157 923	63 102	207 373	270 475
Total nationwide	1 463 746	61 122	1 524 868	4 812 671	537 997	5 350 668	3 167 781	872 275	4 040 056	9 444 198	1 471 394	10 915 592

Source: Ministry of Agriculture and Rural Development, 2000

Table 56. Forest area and growing stock in Viet Nam, 1995

	Area (thousand ha)	Volume	
		Wood (thousand m ³)	Bamboo (million stems)
Tropical evergreen broad-leaved forest	5 182	438 378	
<i>Rich forest</i>	(490)	(90 713)	
<i>Medium forest</i>	(1 389)	(170 131)	
<i>Poor forest</i>	(1 648)	(107 713)	
<i>Rehabilitated forest</i>	(1 655)	(69 821)	
Deciduous forest	936	52 486	
<i>Rich forest</i>	(12)	(1 745)	
<i>Medium forest</i>	(138)	(12 867)	
<i>Poor forest</i>	(475)	(27 823)	
<i>Rehabilitated forest</i>	(311)	(10 051)	
Coniferous forest	155	18 169	
Mixed forest	71	8 451	
Mangrove forest	35	312	
Acid sulfate forest	14	426	
Limestone mountain forest	395	16 454	
Wood forest (sub-total)	6 788	534 676	
Bamboo forest	846		4 032
Mixed forest	619	34 440	2 182
Special product forest	1		
Total natural forest	8 254	569 116	6 214
Wood forest	999	14 542	
Bamboo forest	29		145
Special product forest	21		
Planted forest	1 049	14 542	145
Forestland*	9 303	583 658	6 359

Source: Ministry of Agriculture and Rural Development, 1997

* Forestland = Natural forest + Planted forest

Projected annual timber harvests are as follows:

- ◆ Planted forests: 200 000 ha, producing 6 to 8 million m³. By 2005, if the area of forest plantations is double the area planted in 1995, it will be possible for plantations to meet timber demands.
- ◆ Natural forests: 300 000 m³.
- ◆ Scattered trees: These are planted by people in fields and along the banks of dams, roadsides and in homegardens. Possible production estimates range from 1 to 1.5 million m³ per year by 2005.

It is estimated that by 2005, it will be possible to meet wood demand from domestic sources. However, in the short term, a shortage of 1.5 to 2 million m³ will exist if Viet Nam does not increase imports or the use of non-wood substitutes. This will especially be the case when harvesting in the natural forests is restricted and illegal logging is stopped.

Most industrial timber in Viet Nam is used for housing and construction. However, the 1.5 million m³ of sawnwood production (Table 58) meets only 60 to 70 percent of the demand.

Table 57. Area and stock volume of production forests in Viet Nam, 1995

	Area (thousand ha)	Stock volume	
		Wood (thousand m ³)	Bamboo (million stems)
Tropical evergreen broad-leaved and semi-deciduous forest	2 676	193 380	
<i>Rich forest</i>	(222)	(41 825)	
<i>Medium forest</i>	(557)	(57 747)	
<i>Poor forest</i>	(946)	(52 569)	
<i>Rehabilitated forest</i>	(951)	(41 239)	
Deciduous forest	648	37 670	
<i>Rich forest</i>	(8)	(1 110)	
<i>Medium forest</i>	(105)	(9 557)	
<i>Poor forest</i>	(330)	(19 456)	
<i>Rehabilitated forest</i>	(205)	(7 547)	
Coniferous forest	38	3 969	
<i>Rich forest</i>	(13)	(2 282)	
<i>Medium forest</i>	(8)	(859)	
<i>Poor forest</i>	(4)	(225)	
<i>Rehabilitated forest</i>	(13)	(603)	
Mixed forest	15	1 694	
Mangrove forest	1	8	
Acid sulfate forest	6	226	
Lime-stone mountain forest	3		
Wood forest (sub-total)	3 387	236 947	
Bamboo forest	454		3 275
Mixed forest (wood, bamboo, rattan)	303	17 961	1 162
Special product forest (birch, anise)	1		
Natural forest	4 145	254 908	4 437
Planted forest	632	9 664	145
Total	4 777	264 572	4 582

Source: Ministry of Agriculture and Rural Development, 1997

Forecasts of the annual consumption for lumber for residential construction from 2005 to 2010 range from 1 to 1.5 million m³ (Table 59). The total volume of wood used for furniture production in rural areas in 1994 was 276 325 m³, and the expected annual consumption between 2005 and 2010 is 292 000 to 326 000 m³. The demand for school furniture is 47 200 m³. Forecasts project that after 2005, the demand for furniture will be between 2 and 3.5 million m³ of sawnwood annually. In 1997, the boat-building industry used approximately 30 000 m³ of timber; this use is expected to increase to 130 000 m³ by 2010. In addition, 350 000 to 500 000 m³ of timber will be needed for other purposes.

Current demand for paper is 150 000 tons per year, requiring 0.75 million tons of wood raw material. By 2010, annual paper demand is predicted to be 1.2 million tons. This will require 6 million tons of wood raw materials. Forest plantations will provide 4.8 million tons or 8 million m³. To meet the demand, 160 000 ha of forest plantations will need to be harvested annually.

An annual harvest of 700 000 m³ from 200 000 ha of forests can produce 300 000 m³ of wood-based panels, which will meet 60 to 70 percent of the domestic demand. After 2005, the demand for panels is projected to increase to 1.1 million m³ per year. Therefore, 4 million m³ of raw material, the equivalent of harvesting 500 000 ha of *Acacia mangium*, eucalyptus, and pine plantations, will be needed.

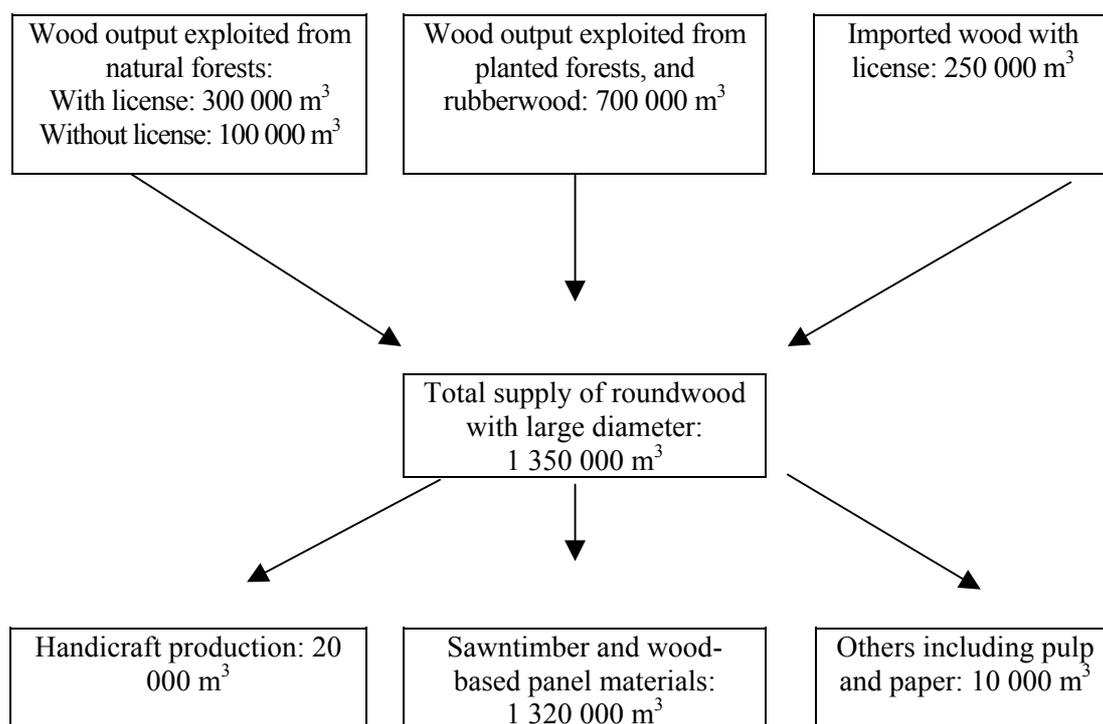


Figure 23. Viet Nam's supply and use of logs, 1998-1999
(logs with large diameter >30 cm)

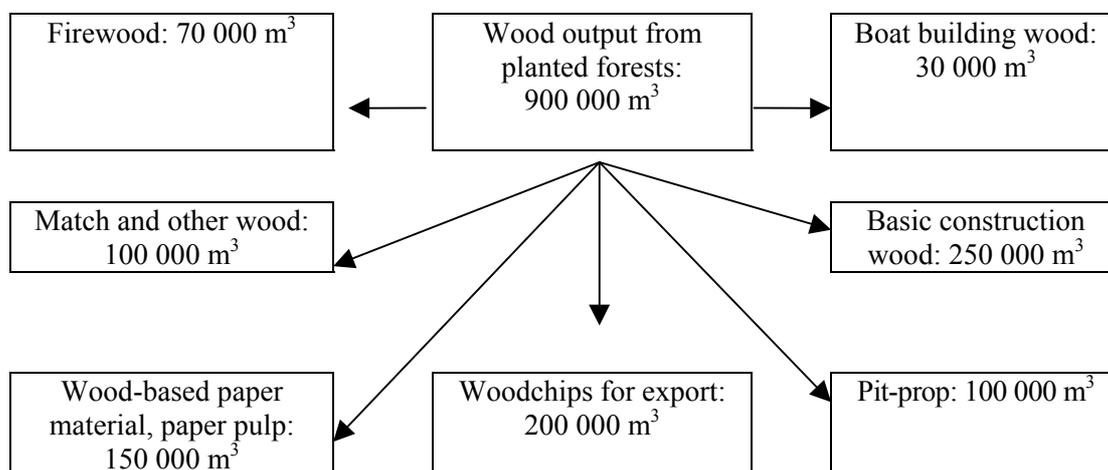


Figure 24. Viet Nam's supply and use of small diameter roundwood, 1998-1999
(logs with large diameter < 30cm)

Table 58. Sawnwood production for rural housing construction in Viet Nam, 1996

Region	Total (m ³)
Northern highlands and midlands	339 561
Northern delta	99 703
Former Region No. 4	313 895
Central coast	175 444
Central highlands	211 647
Southeast	211 458
Mekong River Delta	177 985
Total	1 529 693

Table 59. Predicted consumption of forest products in Viet Nam, 2005 and 2010 (thousand m³)

	2005	2010
Basic construction wood	1 000	1 500
Paper pulp	4 000	8 000
Wood-based materials	-	-
Plywood	2 000	4 000
Wood for furniture	2 000	3 500
Other specialized purposes	350	500
Fuelwood	14 400	10 000
Total forest products	23 750	27 500

Since wood-based panels are mainly produced in factories with low production capacities, domestic production cannot meet the demand. Local enterprises have to import 35 000 to 40 000 m³ of wood-based panels from regional suppliers, particularly Malaysia. In addition, Viet Nam imports approximately 10 000 m³ of finished products made from wood panels. The recent growth in the demand for wood-based panels illustrates the shift in consumer preferences and the shortage in the domestic wood supply.

The current annual demand for fuelwood is 17.3 to 18.4 million m³ (30 to 32 million steres¹). Domestic annual supply is only 14.4 million m³, a gap of 3 to 4 million m³. About 8.7 million m³ of fuelwood come from natural forests, and another 5.7 million m³ from forest plantations and scattered forests. To make up for the shortage, alternative energy sources such as coal and gas are used. Biomass produces 90 percent of the energy consumed in the rural areas, of which about 70 percent are fuelwood. Coal is also commonly used in many areas and accounts for about 4.9 percent of total fuel.

Viet Nam's total domestic wood processing capacity is 1.6 million m³ annually. The forest industry employs about 95 000 workers. In 1995, there were a total of 874 large- and medium-sized wood-processors, of which 371 were State-owned and 30 were foreign ventures. There were also 2 000 small wood-processing firms. By 1997, there were 759 large- and medium-sized wood processing firms, 473 private firms, 53 joint ventures, and 1 200 small firms, including cooperatives. The small firms employed between 10 and 100 workers. In addition, thousands of individual households produce furniture and handicrafts.

¹ 1 m³ = 1.74 steres

Rationale for the logging ban

Between 1943 and 1995, 5.7 million ha of natural forests were deforested, or about 110 000 ha annually. Between 1976 and 1990, deforestation accelerated to around 190 000 ha per year. Between 1991 and 1995, a total of about 100 000 ha was lost (Table 60). This represents not only a loss of forest area, timber volume and capital for development, but also a depletion of tropical plant and animal species that will be difficult to recover.

Table 60. Loss of natural forests in Viet Nam, 1990-1998 (ha)

Location	1990	1995	1996	1997	1998
Red River Delta	3	2	66	492	16
Northeast	1 872	1 051	324	292	2 944
Northwest	417	1 852	155	278	1 725
North of central	2 905	141	122	69	748
South central coast	2 028	1 832	741	670	681
Central highlands	1 640	8 568	2 149	3 002	91
Southeast	8 828	7 651	1 966	1 866	4 080
Mekong River Delta	20 080	4 585	7	455	10 190
Total	37 773	25 682	5 530	7 124	20 475

Source: Statistical yearbook (1994, 1996, 1997 and 1998)

Prior to 1945, forests were relatively evenly distributed throughout Viet Nam. However, deforestation occurred with different speeds across the country, leading to a scattered distribution of healthy forests. Northwest Viet Nam was severely deforested, leaving only 8 to 12 percent forest cover. The quality of the natural forests has also declined. Timber species with a high market price are especially scarce.

The Government faces several challenges in protecting forest resources, such as:

- ◆ Population growth and insufficient arable land are leading to spontaneous migration and a low standard of living. Two million farmers among the 20 million people living in the forested areas are converting forests into agricultural land.
- ◆ The increasing demand for wood and forest products has encouraged illegal logging in natural forests.
- ◆ Low educational attainment, limited awareness of forest laws, and the belief that forests should be for human use, contribute to continued deforestation of Viet Nam's forests.
- ◆ Out-dated technology and timber-processing methods that produce excessive waste accelerate the country's rate of deforestation.

The Government has recognized that stronger measures must be introduced to protect and develop the natural forests, stabilize forest ecosystems, and ensure sustainable development. As a result, it imposed logging restrictions and banned the export of wood products in the early 1990s. In 1997, logging was banned in most natural forests.

IMPLEMENTATION OF THE LOGGING BAN

The export of roundwood, sawnwood and rough-sawn flooring planks was banned in 1992. Logging in watershed protection and special-use forests, and forest exploitation in seven provinces in the north was also halted. Five years later, the Government imposed a logging ban to further strengthen forest development and reforestation of barren hills. A permanent logging ban was imposed in special-use forests, and a 30-year logging ban was instituted in critical watersheds. All commercial logging was also prohibited in remaining natural forests in the northern highlands and midlands, the southeast, and in the Mekong River and Red River Delta provinces. The long-term objectives of the logging ban and forest conservation programs are to:

- ◆ improve Viet Nam's wood production capacity by protecting and improving 9.3 million ha of existing forests, and reforesting an additional 5 million ha;
- ◆ increase forest cover by 45 percent and double the land area of long-term agricultural crops;
- ◆ create jobs, increase personal income, and improve the standard of living for more than 20 million farmers in the mountainous areas by allocating agricultural and forestland to encourage them to participate in forest protection and development;
- ◆ provide farmers in these regions with the resources to plant 3 ha of trees each to generate an estimated annual income of US\$ 1.5 to US\$ 2 billion, enabling each person to eventually earn US\$ 70 to US\$ 100 per year and each household to receive US\$ 350 to US\$ 500 per year from the sale of timber; and
- ◆ provide enough fuelwood and other forest products to meet domestic demands.

The logging ban covers 4.8 million ha of forestland, accounting for 58 percent of the country's natural forests. The Government has also formulated policies to allocate forestland to Government organizations (such as the Forest Management Board), State-owned forestry and agricultural enterprises, households and individuals for long-term and sustainable use. Government organizations were allocated special-use and protection forests in critical and very critical areas. Households and individuals were allocated up to 30 ha each in less critical areas for a maximum of 50 years. Rights can be transferred, inherited, mortgaged or leased. An extension of rights may be granted if the land is used according to Government goals. Government organizations are permitted to subcontract land to other users.

The Ministry of Agriculture and Rural Development (MARD) determines harvest volume, intensity and locations. Selective logging permits are granted in some less critical natural forests with a high timber volume in the central highlands and central coast. MARD has also directed local forestry agencies to consolidate the management of transport and trade of forest products. It is developing a national network of control stations for land, ship and rail transport at strategic locations for the collection and distribution the forest products.

Under the new policy, logging is permitted in only 19 provinces. The Government aimed to reduce timber harvesting in selected areas from 25 000 to 12 000 ha, and to reduce harvest volume from 620 000 to 300 000 m³ by 2000 (Table 61).

Currently, there are at least 3.1 million ha of bare land in the country urgently requiring reforestation. The national land-use plan includes a target of reforesting more than 2 million ha and regenerating 5 million ha by 2010. From 1998 to 2000, more than 3 million ha were to be planted for commercial use. Approximately 2 billion trees are to be planted in small stands around residential areas, schools and roadsides by 2010. It is estimated that eventually these trees will annually produce 2 million m³ of timber for processing and 5 million m³ of firewood.

Table 61. Logging ban progress indicators in Viet Nam, 1996-2000

Basic indicators	1996	1997	1998	1999	2000
Number of forest enterprises with logging permits	241	204	170	140	105
Number of forest blocks with logging permits	1 252	-	-	-	515
Volume permitted to be logged from natural forests (m ³)	620 000	522 700	300 000	160 000	300 000
Annual permitted logging area (ha)	25 000	22 000	19 300	15 600	12 000

Source: Ministry of Agriculture and Rural Development

From 1997 to 2000, the Government had planned to provide credit to enterprises to build and upgrade selected paper mills with capacities of 50 000 tons and above, and wood-based panel factories with capacity above 35 000 m³ per year. Credit is also being provided to improve the quality of rattan and turpentine-processing facilities with expected capacities of 2 000 to 4 000 tons per year.

Institutional arrangements for implementing the logging ban

The Forest Management Board is responsible for managing and protecting Viet Nam's national parks and nature reserves. Wherever possible, the Board will move the people who live in the national parks and reserves to alternate locations, providing them support to improve their lives. When it is not feasible to relocate people, the Board will contract them to carry out forest protection and management activities. Several types of arrangements are available to encourage people to protect forest resources. An annual salary of up to 50 000 VND² per ha may be provided for forest protection for a maximum of 5 years. People can also collect fuelwood and use wood residues from areas under protection. People are also provided timber for home construction and repair, and they may be allocated agricultural and forestland for farming.

Local Administrative Boards are also being established to manage and protect "critical" and "very critical" forests that are environmentally sensitive and degraded. The Boards contract local residents living in these areas to protect, regenerate and improve forests under similar arrangements and salaries. In addition, the contractors have access to selectively cut timber, up to a maximum of 20 percent of the stock volume until the forests are fully mature. They receive financial aid from the Government to plant and manage the forests for the first three years, after which they will use their own funds. These forest managers are allowed to use industrial tree crops and fruit trees for commercial purposes as long as they maintain a 50 percent forest cover on the protected lands.

Individuals who have received land-use certificates for the less critical protected forests are also given the right to use forestland for agricultural purposes as long as the forest canopy is left intact. They are allowed to selectively harvest mature trees. Individuals allocated land with no forest cover can use such land for commercial purposes. If they establish timber plantations, they are entitled to the timber harvested.

The Government encourages all organizations and individuals, including foreigners, to invest in plantations. It extends loans for such investments at an annual interest rate of 7 percent. Loans can be for 10 years and are repayable when the plantation is mature and commercially viable. All wood-processing enterprises must provide funds for community-based planting of

² US\$ 1 = 12 500 VND

forests on allocated land within the area planned by the Government. The enterprises sign contracts with households for planting the forests and are responsible for utilizing the harvested forest products.

The Government plans to plant 400 000 ha of forests to supply Viet Nam's wood-based panel industry. Since these plantations can be harvested on 10-year cycles, 40 000 ha can be harvested each year, yielding 2 to 3 million m³ of timber annually. This is estimated to be sufficient to produce over 1 million m³ of panels annually.

To meet the needs of the paper industries, 1 million ha will be planted. Eucalyptus, mixed with other perennial trees, will cover 400 000 ha. Other species will cover approximately 600 000 ha.

The demand for wood imports is projected to increase by 500 000 m³ annually. Therefore, other sources of wood products should be identified to help meet domestic demand, including suppliers such as Malaysia, Laos, Cambodia, Myanmar and Russia. The Government should also help domestic forest processors obtain licenses to import raw and finished wood products. It should impose tariffs on wood products imported for consumption or for re-manufacturing for export.

The logging ban will result in a sharp drop in the volume of fuelwood from the natural forests. Meanwhile, fuelwood demand will continue to increase as Viet Nam's population and average annual income increase. To meet the demand, the following measures will be necessary:

- ◆ encourage farmers to plant fast-growing trees, with seedlings and technical support provided by the Government;
- ◆ supply affordable electricity to rural areas;
- ◆ develop reasonably priced farming equipment and train farmers in the use of biogas; and
- ◆ impose a high tax on the transport and trade of fuelwood to restrict the commercialization fuelwood. Encourage consumers to use cheaper fuels. Limit the use of fuelwood for brick making, tiles, pottery, and porcelain.

The Government has introduced socio-economic development programs in 4 central highland and 14 northern mountainous provinces aimed at eliminating poverty, generating employment opportunities, increasing income and improving the living standard. Special attention has been placed on resettling the 3 million individuals displaced by the logging ban by the year 2000.

Approximately 300 forest enterprises will have to redirect their activities to afforestation and forest management under the Forest Management Board. About 15 000 workers are to be allocated land by the "People's Committees" for appropriate activities or be forced to find other employment outside the forests. In the meantime, workers are to be contracted to protect special-use forests and manage commercial forests.

To offset supply shortages to forest industries, the Government will also have to make loans available at low interest rates for reforestation, improving processing technologies and relocating their facilities. Tax exemptions for firms that have suffered from the logging ban need to be considered.

IMPACT ASSESSMENT OF THE LOGGING BAN

Demand, supply, trade, and export of Viet Nam's major forest products

After the imposition of the logging ban, Viet Nam's roundwood production declined by about 1.2 million m³ from previous levels (Table 62). The annual shortage of roundwood in the mid-1990s was between 500 000 to 800 000 m³. Some forest enterprises were forced to import timber. Others had to reduce processing volumes or resort to alternative products.

Table 62. Roundwood production in different regions of Viet Nam, 1990-1998 (thousand m³)

Region	1990	1995	1996	1997	1998
Red River Delta	237.8	264.2	180.3	153.6	150.6
Northeast	733.6	563.6	690.6	486.7	469.0
Northwest	280.3	254.0	237.9	226.7	219.5
North of Central	505.0	323.4	367.1	290.7	224.1
South Central Coast	213.5	280.1	287.1	316.9	259.4
Central Highlands	529.6	327.3	345.7	279.2	215.5
Southeast	484.1	259.8	230.7	198.3	174.3
Mekong River Delta	461.6	381.5	494.1	527.9	494.0
Total	3 445.5	2 653.9	2 833.5	2 480.0	2 206.4
Volume from State natural forests	1 100.0	700.0	620.0	522.7	300.0

Since the establishment of the logging ban, forest plantations are supposed to be the main supplier of timber. However, most of the planted trees are still immature, and the bulk of the supplies are from scattered trees instead. In 1993 and 1994, the annual volume harvested from State plantations was 220 000 m³. Since 1995, the average harvest from State-owned plantations has been 250 000 to 300 000 m³ annually.

Illegal logging activities are common close to population centers, along streams and in isolated areas. Forests with many high-valued species are being degraded rapidly. About 100,000 m³ of illegally harvested logs are confiscated each year.

Viet Nam's fuelwood production declined by over 3 million m³ between 1990 and 1998 (Table 63). Annual fuelwood production capacity is estimated to be around 21 to 24 million steres, falling short by 9 to 10 million steres. If the 5 million ha afforestation project is successful, then the domestic supply of fuelwood will meet demand after 2005.

Table 63. Viet Nam's fuelwood output, 1990-1998 (thousand steres)

Region	1990	1995	1996	1997	1998
Red River Delta	575	501	494	484	464
Northeast	9 681	10 224	9 822	9 165	9 373
Northwest	3 272	3 169	2 810	2 772	2 700
North of Central	7 576	7 838	7 612	7 354	7 067
South Central Coast	2 757	2 013	1 923	1 796	1 687
Central Highlands	2 651	2 182	1 907	1 745	1 203
Southeast	2 650	1 107	1 587	1 361	1 058
Mekong River Delta	2 897	2 912	2 672	2 680	2 418
Total	32 059	29 946	28 827	27 357	25 970

Note: 1 m³ = 1.74 million steres

Viet Nam's leading forest product exports and their revenues have declined continuously since logging restrictions were imposed in the early 1990s (Tables 64 and 65).

Table 64. Viet Nam's leading wood product exports, 1990-1996 (thousand m³)

Products	1990	1991	1992	1993	1994	1995	1996
Logs	435	349	394	397	390	400	390
Flooring planks	43	36	19	41	4	4	-
Sawnwood	280	504	259	284	78	-	-

**Table 65. Value of Viet Nam's forest product export revenues, 1990-1996
(million US\$, current price)**

	1990	1995	1996	1997	1998
Wood and wood products	150	115	160	187	120
Total value of forest product exports	270	153	212	240	150

The Government recently began to strictly regulate imports of wood products. The Viet Nam Forestry General Corporation (VINAFOR) is responsible for coordinating the import and supply of wood for domestic forest product manufacturing firms. However, in some provinces near the border, wood is still imported to meet provincial demand through Government and import/export organizations with established ties to suppliers in Laos and Cambodia. Viet Nam's total annual wood imports are estimated at approximately 300 000 m³. Roundwood alone makes up between 200 000 and 250 000 m³, the bulk of which is imported from Laos.

Prices of forest products

Reduced timber volumes as a result of the logging bans combined with the growing demand for wood products have increased prices. For example, the average price for pit-props in Quang Ninh, in northeast Viet Nam, doubled from 1991 to 1997 (Table 66). Roundwood and fuelwood prices have increased 25 to 100 percent between 1991 and 1998 depending on the product and species (Table 67). The price for sawnwood from natural forests has also increased by up to 81 percent (Table 68).

Table 66. Average prices of pit-prop at Quang Ninh (thousand VND/m³)

Pit-prop types	1991	1996	1997	1998	Ratio of change (1998/1991)
Pit-prop for support of workings (2.2-2.4 m long, Ø 13-19 cm)	250	356	407	445	1.7
Pit-prop for chocking (1.2 long; Ø 6-10 cm)	200	292	308	350	1.7
Average pit-prop price	220	345	405	434	1.9

Table 67. Viet Nam's domestic prices for roundwood and fuelwood, 1991 and 1998

Product	Location	Price		Ratio of change (1998/1991)
		1991	1998	
Firewood (VND/stere)	Lang Son	120 000	150 000	1.25
Species under group 5-8 (VND/m ³)	Hoa Binh	350 000	550 000	1.87
Species under group 5-8 (VND/m ³)	HCM City	420 000	850 000	2.02
Acacia (VND/m ³)	Tuyen Quang	220 000	300 000	1.36
Rubberwood (VND/m ³)	HCM City	450 000	600 000	1.50
Styrax (Ø = 14 cm; VND/m ³)	Yen Bai	250 000	360 000	1.44
Others (VND/m ³)	HCM City	350 000	500 000	1.42

Table 68. Sawnwood prices in Viet Nam, 1991 and 1998 (VND/m³)

Product	Location	Price		Ratio of change (1998/1991)
		1991	1998	
Pine	Lang Son	550 000	1 000 000	1.81
Pine	HCM City	1 600 000	2 500 000	1.58
Species under group 3-4	Quang Nam	1 500 000	2 500 000	1.66
Species under group 5-8	-	1 000 000	1 500 000	1.50
Species under group 4	Hoa Binh	1 300 000	2 000 000	1.50
Mixed species	HCM City	1 100 000	1 800 000	1.60

The price of wood for paper increased up to 1.5 times between 1991 and 1994. From 1995 to 1998, however, the price was relatively stable because supplies from forest plantations and scattered trees supplemented imported paper pulp.

Development of wood and associated industries

Logging in Viet Nam is implemented primarily by State enterprises. Approximately 10 000 workers were employed in logging during the 1980s. By 1997, only 2 000 individuals were employed in the logging sector and the number of available jobs is declining further.

From 1993 to 1998, the structure of the forest industry changed dramatically. Around 120 logging enterprises that did not own forestland were contracted by the Government to protect and manage State reforestation projects. However, due to recent changes in the Government's objectives, from a goal of afforestation to one of protecting special-use forests, these enterprises are facing difficulties in redirecting their operations.

The wood supply shortage has led wood-processing companies to consider new technologies to improve product quality, utilizing lesser-used species and plantation timber, extending the use of raw materials and wood residues, and encouraging alternative activities that use less wood. Enterprises have increased investments in processing technologies, diversified their product mix, shifted to higher value products, expanded the market and changed consumer tastes for wood products.

The shortage of timber has had a substantial effect on the performance of wood product companies. Their numbers declined substantially in Ho Chi Minh City between 1993 and 1998, especially the smaller establishments (Table 69). Many found it difficult to adapt to shortages of raw materials or invest in new technologies to utilize lesser-used species and timber from plantations.

Table 69. Number of wood product enterprises in Ho Chi Minh City, 1993-1998

Year	State enterprises	Non-State enterprises	Joint venture enterprises	Small enterprises
1993	46	78	-	680
1994	53	92	5	500
1995	53	92	5	500
1996	53	91	6	660
1997	36	78	6	324
1998	33	60	7	300

Source: Ministry of Agriculture and Rural Development

Table 70 shows the shift in timber supply sources for processors in Ho Chi Minh City. Timber from forest plantations appears to have successfully replaced supplies from natural forests. Total raw material supply increased from 1993 to 1998, as the volume of plantation-grown timber tripled and timber from natural forests declined by 57 percent. By 1998, timber from plantations accounted for 78 percent of the total volume of wood used in the processing industry in Ho Chi Minh City.

Table 70. Volume of wood used by the wood-processing industry in Ho Chi Minh City (m³ roundwood)

Year	Volume of wood used for processing			
	Natural forests	Forest plantations	Total	Percentage from plantations
1993	129 000	63 000	192 000	32.8
1994	135 200	202 300	337 500	60.0
1995	136 000	224 000	360 000	62.2
1996	135 300	195 000	330 000	59.0
1998	55 765	194 235	250 000	77.6

During the 1990s, the wood-processing sector in Ho Chi Minh City employed approximately 35 000 workers. By 1997, the number had declined to 30 630 workers and only 24 170 were employed full time. This decline does not include workers in small cottage industries who were forced out of business as a result of the timber supply shortage.

The changes in the number of wood-processing enterprises and in the volume of wood consumed are shown in Table 71. In many provinces, some enterprises have reduced production and shifted to other products. Many establishments have closed completely or operate only several months a year, thus affecting the efficiency of capital investment and employment of many workers. Overall, however, the number of non-State companies increased significantly (Table 72).

The drastically reduced number of small-scale establishments in Ho Chi Minh City excludes the hundreds of family businesses that were forced to close either because there was no timber available or because the price for raw materials became too high. The higher cost of timber also reduced the profit margin of many small firms, although there are some notable exceptions. The number of processors increased in some provinces because they found alternative timber sources. Gia Lai province is one example. In 1994, the province had 13 private wood processors; by 1997, there were 22. In Hoang Anh province, private wood processors have begun to regularly import logs from Myanmar and Laos, and lumber from Malaysia and Brazil. They contributed 2.1 billion VND to Government revenues in 1996, and nearly 3 billion VND in 1997.

Due to the raw material shortages, private enterprises in the wood-processing sector have started to obtain much of their raw materials from forest plantations and international suppliers. They are also beginning to import processed components such as hardwoods, fiberboards and woodchips, for further processing. While stable supplies of softwood logs and lumber from North America and Scandinavia are available, Vietnamese imports are still not organized enough to access these sources.

If Viet Nam's private wood-processing industry is to continue operations and be successful, companies must redesign their production lines to meet domestic demand. However, the few private firms that have done so have low processing capacity, and their equipment is outdated. Technological innovations and upgrading of facilities require a large amount of capital. However, the Government has no system to provide loans to private wood-processing firms. Programs needed to promote domestic production of wood-based panels include temporary

tax exemptions for processors, reduction of turnover and equipment taxes, and government subsidies to offset processors' land rental costs.

One way to develop the wood-processing industry is to encourage foreign investment, including joint ventures. However, since the logging ban, foreign investors are concerned over the stability of the domestic timber supply and Viet Nam's overall economic development. Many joint ventures were short term with only limited foreign participation. This situation is in sharp contrast to the investor expectations for viable industrialization and the necessary modernization of the sector. As a consequence, the level of foreign investment mobilization is low.

The logging ban, low regeneration rates in natural forest, limited industrial capacity and rising demands have led to a nation-wide paper shortage. In 1990, the average annual consumption of paper per capita was only 1.8 kg. While domestic paper production has increased in recent years, domestic production volume is still about 30 to 40 percent below domestic demand. The serious paper shortage has even reached the point that there is not even enough paper for students' notebooks and textbooks.

Primary materials used as raw materials by the paper industry are wood, bamboo and rattan. The forests that supply the country's paper mills are centered in five provinces: Ha Giang, Lao Cai, Yen Bai, Tuyen Quang and Phu Tho. The forest plantations were developed at the same time that the Bai Bang paper mill was built (1971-1972). Since 1991, the wood volume harvested from the natural forests has been reduced in contrast to the increasing volume from forest plantations. It is estimated that the current annual capacity of the Bai Bang and Viet Tri mills is 70 000 tons. Despite the logging ban, the surrounding plantations have the capacity to supply the mills in the future.

Table 73 shows the domestic pulpwood supply in comparison to demand. According to the Government's plan to develop Viet Nam's paper industry, by 2010 the country's paper mills will have an annual production capacity of approximately 250 000 tons. Without developing plantations further there will be a pulpwood supply shortage.

The logging ban also affects other non-wood industries. For example, from 1991 to 1998, Viet Nam's annual pit-prop production was only 70 to 80 percent of domestic demand (Table 74). The domestic shortage of pit-props relative to demand increased from 20 000 m³ in 1991 to 50 000 m³ in 1998. By the end of 2000, the shortage is estimated to be approximately 58 000 m³ of pit-props and after 2000, it is expected to be 60 000 m³.

Table 71. Changes in wood processing enterprises in selected provinces of Viet Nam, 1993 and 1998

Province/city	1993					1998				
	Total no. of firms	State-owned	Non-State	Joint venture	Volume of wood consumed (m ³)	Total no. of firms	State-owned	Non-State	Joint venture	Volume of wood consumed (m ³)
HCM City	145	53	92	5	377 500	100	33	60	7	250 000
Dong Nai	53	14	39	4	42 400	63	11	41	11	43 000
Quang Tri	13	2	11		5 750	20	3	17		14 000
Gia Lai	29	16	13		33 000	35	13	22		43 000
Binh Dinh	12	10	21		21 300	35	13	22		43 000
Nghe An	34	13	21		21 450	34	14	20		14 000
Ha Tinh	24	11	13		20 000	30	15	15		14 000
Thua Thien Hue	32	4	28		6 000	35	8	27		7 750
Da Nang	30	20	10		26 350	18	14	4		21 700
Kon Tum	20	8	12		16 800	19	10	9		27 500
Khanh Hoa	19	10	9		24 000	19	15	4		17 130
Dac Lac	45	32	13		93 700	60	42	18		80 000
Ha Noi	73	45	28		120 000	-	-	-	-	-

Table 72. Changes in non-State wood-processing enterprises in Viet Nam, 1990-1995

	1990	1991	1992	1993	1994	1995
Wood-processing enterprises (number)	131	146	207	358	400	473
Small-scale household and wood-processing industries (number)	59 500	70 375	69 898	86 358	90 000	95 000
Value of output from non-State wood-processing industry (billion VND)	427.2	448.2	470.2	480.3	675.3	882.6

Table 73. Supply and demand for paper pulp in Viet Nam, 1991-1996

Year	Demand (thousand tons)	Supply (thousand tons)	Supply/demand (percent)
1990	160	134	83.8
1991	195	217	111.3
1992	195	179	91.8
1993	170	158	92.9
1994	185	154	83.2
1995	190	233	122.6
1996	200	199	99.5

Table 74. Supply and demand for pit-props in Viet Nam, 1991-1998

Items	1991	1995	1996	1997	1998
Output of underground coal (million tons)	2	2.8	3.2	3.6	3.7
Pit-props used (m ³ /1,000 tons of coal)	50	50	50	50	50
Total demand for pit-props (thousand m ³)	100	140	160	180	186
Total supply of pit-props (thousand m ³)	80	120	130	130	136
Balance (shortage)	- 20	- 20	- 30	- 50	- 50

Income and contribution to the gross domestic product

In 1992, Viet Nam had about 420 forest enterprises with permits to harvest natural forests and plantations. By 1998, only 231 of these enterprises generated sufficient revenues to pay workers' wages and insurance. Some workers employed by these enterprises earned more from farming and contract logging. These income sources of income were reportedly more stable.

About 120 enterprises were involved in protecting and managing the natural forest. Prior to the logging ban, some of these firms had been forest owners and derived their income from logging. Several had participated in the "327 program," a national program for re-planting cut-over forestlands and barren hills. These enterprises earned only 60 to 70 percent of their previous logging income by participating in the program's forest management and protection activities.

Some State forest enterprises are no longer permitted to exploit natural forests, their planted forests have not yet matured, and land is not available for agriculture. Loans for planting additional production forests are difficult to obtain. Workers are only able to obtain contracts for forest protection in very small areas. In the absence of sufficient budgets and revenues, the workers' monthly income has dropped to only about 50 to 60 percent of the minimum wage regulated by the Government.

The logging restrictions have also affected the income of around 90 000 people participating in forest product processing. About 30 000 workers in the large and medium enterprises have been severely affected. Since the early 1990s, the export of sawnwood was banned and the annual logging quota has steadily decreased. The annual production of wood from forest plantations increased, but not enough to offset reduction in harvests from natural forests. Some establishments adapted by exporting only the permitted secondary finished wooden products. The output value of wood and forest product processors (including both State and private enterprises) fell markedly. Most enterprises operated at only 50 to 60 percent of their capacity. Workers' incomes declined to 70 to 80 percent of the 1990 to 1991 levels. The income from forest products processing dropped by 60 to 70 percent. Thousands of family, village and cooperative wood-processing establishments stopped production or operated for only a few months each year. As a result, they lost a notable part of their former income.

From 1990 to 1998, gross forest product revenues in 1994 prices increased only 15 percent overall and only 2 percent annually (Table 75). Growth of Viet Nam's forestry output also slowed. From 1990 to 1998, Viet Nam's income from processing forest products decreased, while that from forest plantations and other forestry activities increased (Table 76). However, the rate of growth in these two sectors was low. According to Government statistics, the forestry sector contributed approximately 1.8 percent to the country's GDP and employed 3.9 percent of the labor force.

The logging ban has particularly affected the forest harvesting (exploitation) and wood processing sub-sectors. Revenues from timber harvests and wood products processing declined from 4 265 billion VND in 1990 to 3 698 billion VND in 1998 (1994 prices), a 13 percent decline in revenue (Table 75). Their contribution to total forestry revenues declined from 86 percent to about 68 percent (Table 76).

From 1990 to 1998, the share of revenues derived from forest plantations and development went from 13.3 percent to 20.3 percent. From 1992 to 1998 the value of this sub-sector varied, but averaged about 1.1 billion VND annually, demonstrating that the level of investment in forest plantations was low.

Gross revenues from exploitation declined by almost 8.8 percent between 1990 and 1995. Revenues from State-owned forests declined significantly from 411.5 billion VND to 335.2 billion VND, a decline of almost 19.5 percent. On the other hand, revenues from the private processing industries increased from 427.2 billion VND in 1990 to 882.6 billion VND in 1995, an increase of more than 106 percent (Table 77).

Table 75. Viet Nam's gross forest product revenue, 1990-1998 (billion VND)

Year	Plantation and development of forest	Forestry products exploitation and processing	Other forestry	Total
1990	652.3	4 265.1	51.6	4 969.0
1991	877.3	4 180.1	100.0	5 157.4
1992	1 172.0	3 821.9	99.5	5 093.4
1993	907.9	3 984.7	148.9	5 041.5
1994	1 146.2	3 907.6	153.1	5 206.9
1995	1 224.7	3 996.1	313.0	5 533.8
1996	1 135.6	4 216.7	277.7	5 630.0
1997	1 058.1	3 717.8	671.9	5 447.8
1998	1 102.0	3 697.6	1 170.7	5 970.3

**Table 76. Structure of Viet Nam's gross forestry output by sub-sector, 1990-1998
(1994 prices) (percent)**

	1990	1995	1996	1997	1998
Forest plantation and development	13.3	20.3	20.2	19.4	20.3
Forest products exploitation and processing	85.7	77.0	74.9	68.2	68.0
Other forestry	1.0	2.7	4.9	12.4	11.7

**Table 77. Viet Nam's gross revenue from logging and wood products processing
(1989 prices) (billion VND)**

	1990	1991	1992	1993	1994	1995
Wood and forest products exploitation	1 182.1	1 159.4	1 140.6	1 093.7	1 068.0	1 078.6
Wood exploitation	411.5	385.2	313.5	346.2	346.6	335.2
Firewood	476.9	453.5	430.9	475.1	455.3	449.2
Forestry products processing						
State sector	145.5	147.4	140.8	126.3	127.9	169.6
Non-State sector	427.2	448.3	470.1	480.9	675.3	882.6

Forest conservation

Many provinces have closed access to the natural forests and have strengthened measures for regeneration and protection of the forests through implementation of the logging ban. From 1992 to 1997, the Government conducted regeneration programs on 2 198 ha of natural forests. According to estimates, 55 percent of the total area identified were protected through the logging ban.

As a result of the measures taken, the forest cover increased by 1.5 percent per year on average. After Hoa Binh province imposed the logging ban, its natural forests increased from 112 789 ha (1993) to 117 843 ha (1998). Phu Tho province regenerated more than 32 000 ha of land, of which over 14 000 ha were depleted secondary forests. In the central highlands, implementing appropriate silvicultural measures in the depleted forests helped rehabilitate 6 000 ha of natural forests between 1994 and 1998. The annual forest cover destroyed by fire also declined (Table 78). In part, this is due to blocking access to the natural forests, reducing logging residues, and implementing conservation and protection measures. Unfortunately, the continuing deforestation and destruction of the natural forests far exceed the rates of afforestation and development of plantations.

Table 78. Annual forest area destroyed by fire in Viet Nam, 1990-1998 (ha)

	1990	1995	1996	1997	1998
Red River Delta	3	-	69	-	16
Northeast	237	340	1 554	150	1 035
Northwest	-	364	1 355	55	1 634
North of central	630	94	128	247	642
South central coast	-	80	41	257	606
Central highlands	395	1 046	424	123	370
Southeast	3 450	3 433	608	603	2 950
Mekong River Delta	15 560	1 072	20	314	10 156
Total	20 275	6 429	4 198	1 749	17 409

RECOMMENDATIONS

Although the logging ban has provided important benefits, negative impacts have resulted in the areas of employment, income generation, and availability of fuelwood and timber. The logging ban was instrumental in closing many natural forests from further exploitation, yet additional adjustments and policy changes are required to assure a strong forest economy and adequate protection and conservation. Some recommendations to bring about long-term success are noted below.

Restructuring and developing the forest industry

- ◆ Create a mechanism within the wood-processing sector for diversifying production and products.
- ◆ Encourage coordination aimed at making the most efficient use of the wood processing enterprises' capacities.
- ◆ Encourage the use of timber from forest plantations and imports.
- ◆ Improve processing technologies to enable the production of higher valued products from lower volumes of raw materials; investments should be in technology for processing wood from forest plantations.
- ◆ Establish key enterprises as models of modern wood processors, which manufacture quality products that can compete in regional and international markets.
- ◆ Set up a network of satellite enterprises around these key enterprises to support production and to make full use of their capacities.
- ◆ Purchase only necessary and modern equipment.
- ◆ Build clusters of integrated facilities for processing wood-based panels, including pressed fiberboard, and increase the rate of utilization of available wood.
- ◆ Establish processing facilities for laminated and bamboo boards to fulfill special and export demands.
- ◆ Facilitate joint ventures, producer associations, and expand technical cooperation with other countries by allowing owners to borrow capital externally at competitive interest rates. The restructuring of the forestry sector also needs to be supported by policies that allow enterprises to rent or lease production machinery from foreign countries.
- ◆ Develop a stable and clear legal framework, and simplify import and export procedures for wood-processing enterprises.

Restructuring of State-owned wood harvesting and forest product enterprises

- ◆ Restructure State-owned forest enterprises into three categories:
 - a. State forest enterprises that manage and harvest natural forests. These enterprises should operate according to free market practices. The main duties of the enterprises should include protection, regeneration and enrichment of forests, and timber harvesting in accordance with sustainable production principles and economically efficient operations.
 - b. State forest enterprises that manage closed natural forests for regeneration, but are not allowed to harvest. These enterprises require budgetary allocations from the Government and are responsible for silvicultural activities (e.g. protection, regeneration and enrichment of forests).
 - c. State forest enterprises responsible strictly for forest protection. It is possible to transfer these functions to the Forest Management Board forestry extension stations. Alternatively, these protection duties could be transferred to households or village/hamlet/communities.

Development of new incentive schemes

To achieve the goals for natural forest protection and conservation, organizational and individual incentives need to be provided. To achieve national objectives, more use needs to be made of the considerable potential and contributions of individual farmers, local cooperatives and associations, private enterprises, foreign investors and joint ventures, as well as local and national governments. Incentives for greater participation in the forestry sector are needed in the following areas:

- ◆ Wood imports: It is difficult to link imports with the needs of individual companies since their demands for raw materials are quite heterogeneous. Although some have established direct contacts with suppliers, they still need better information on market prices and forecasts of trends and market outlooks.
- ◆ Policies and measures on biomass energy sources: The Government should invest more in the development of biomass energy sources. It is necessary to include biomass in national energy planning and to stimulate new investments in production and marketing of biomass energy, particularly for rural areas.

CONCLUSIONS

The logging restrictions in combination with the major national afforestation program of 5 million ha by 2010 are timely. These pertinent policy decisions are of strategic significance in raising the national capacity for protecting Viet Nam's natural forests, its environment and biodiversity. They create the pre-requisites of sustainable forest resource management and contribute to global environment protection. At the same time, better government policies and policy guidelines are needed to facilitate closer links between raw material suppliers in the region and the processing industries. Restructuring of the forest product industry, improved efficiency, together with the planned shift towards plantation timber can help Viet Nam meet export and domestic demands, generate employment, increase incomes and stabilize the livelihoods of more than 20 million rural people living in the forests.

The logging restriction policy has also had some undesirable impacts on the wood-processing industries, including the following:

- ◆ There is an increasing deficit in raw materials, without effective and timely measures to supplement supplies through imports. This has resulted in an imbalance in supply and demand, increasing competition in the market.
- ◆ The current market mechanisms are preliminary and macro-economic controls are poorly developed. The Government has created market distortions through past policies of production and distribution of timber products, and has restrained market efficiencies. Unstable wood prices have reduced wood-processing operating capacities to only 50 to 60 percent of the designed capacities. Some companies were forced to shift their line of production, thus affecting capital investments. The Government has planned to restructure the network for wood-processing establishments. However, in practice this is still based on previous patterns of timber supplies coming from the natural forests. Planning has not yet adequately considered forest product consumption and markets for raw materials. Furthermore, reforms have only been initiated for State-owned enterprises, and not for the private sector.
- ◆ Due to the shortage of wood from natural forests, the wood-processing enterprises have to rely on wood from forest plantations, which is often of different species, size, quality and end-use attributes. These companies have sought to develop their capacities to produce wood-based panels and composites that can utilize the lower grade materials. To enhance profitability, they have also sought to improve secondary or value-added products. Nevertheless, the current production levels of both State and non-State sectors

are low. Only a few establishments have integrated equipment, while the remaining enterprises are still using outdated and inefficient machinery. Thus, a considerable amount of capital investment is required to innovate and modernize the enterprises.

- ◆ Due to the logging ban, enterprises authorized to log from natural forests now receive significantly lower annual logging quotas than before. Some enterprises have nearly ceased harvesting. Since the Government has not reorganized the timber supply system properly, many enterprises have to rely on their own resources. In spite of such difficulties, they have sought to generate employment for workers, and to shift to other activities such as forest protection and establishing plantations. However, Government budgets for these activities are limited and only a small number of jobs can be created for the employees previously working in wood-processing enterprises.

For the reasons outlined above, the Government needs to facilitate the comprehensive adjustment of both State-owned and private enterprises to re-orient their production or reduce output, and assist workers who are unemployed because of the logging ban.