ASIA-PACIFIC FORESTRY SECTOR OUTLOOK STUDY

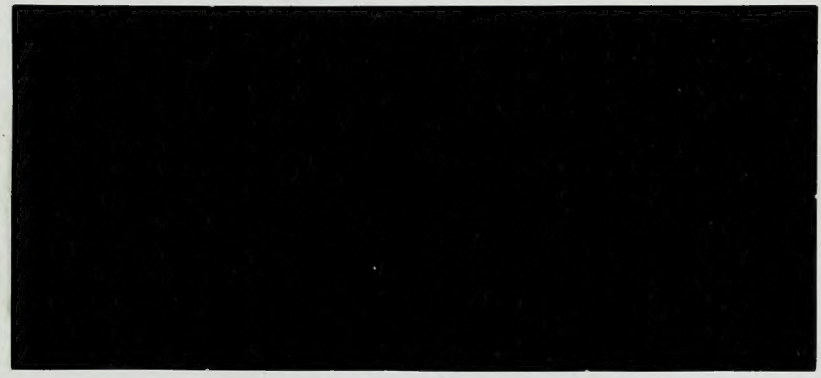
WORKING PAPER SERIES

Working Paper No: APFSOS/WP/04

STATUS, TRENDS AND FUTURE SCENARIOS FOR FOREST CONSERVATION INCLUDING PROTECTED AREAS IN THE ASIA-PACIFIC REGION

ASIA-PACIFIC FORESTRY TOWARDS 2010

Food and Agriculture Organization of the United Nations



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STATUS, TRENDS AND FUTURE SCENARIOS FOR FOREST CONSERVATION INCLUDING PROTECTED AREAS IN THE ASIA-PACIFIC REGION

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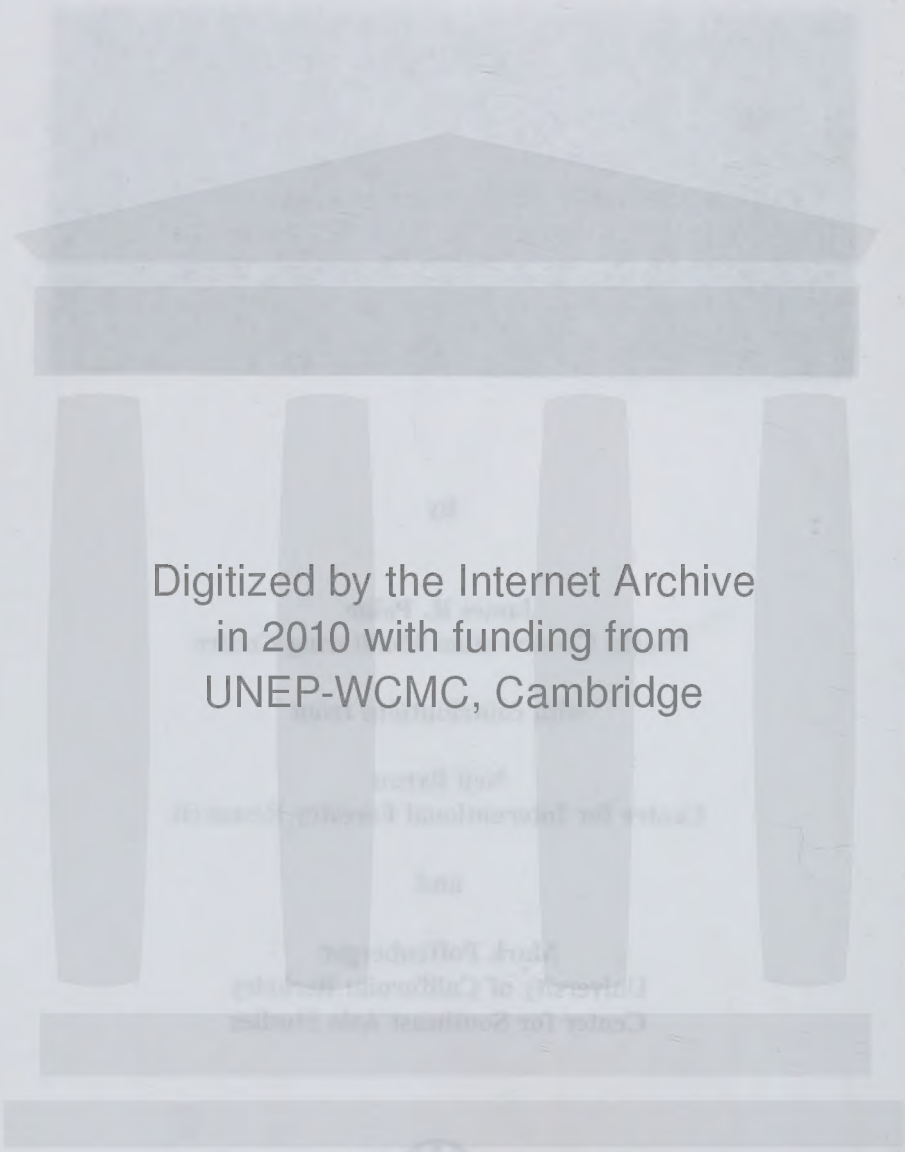

The Asia-Pacific Forestry Sector Outlook Study is being undertaken under the auspices of the Asia-Pacific Forestry Commission.

This report comes under Workplan Number E25.6.

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INFORMATION NOTE ON ASIA-PACIFIC FORESTRY SECTOR OUTLOOK STUDY

At its sixteenth session held in Yangon, Myanmar, in January 1996, the Asia-Pacific Forestry Commission, which has membership open to all governments in the Asia-Pacific region, decided to carry out an outlook study for forestry with horizon year 2010. The study is being coordinated by FAO through its regional office in Bangkok and its Headquarters in Rome, but is being implemented in close partnership with governments, many of which have nominated national focal points.

The scope of the study is to look at the main external and sectoral developments in policies, programmes and institutions that will affect the forestry sector and to assess from this the likely direction of its evolution and to present its likely situation in 2010. The study involves assessment of current status but also of trends from the past and the main forces which are shaping those trends and then builds on this to explore future prospects.

Working papers have been contributed or commissioned on a wide range of topics. They fall under the following categories: country profiles, selected in-depth country or sub-regional studies and thematic studies. Working papers are prepared by individual authors or groups of authors on their own professional responsibility; therefore, the opinions expressed in them do not necessarily reflect the views of their employers, the governments of the Asia-Pacific Forestry Commission or of the Food and Agriculture Organization. In preparing the substantive report to be presented at the next session of the Asia-Pacific Forestry Commission early in 1998, material from these working papers will be an important element but will be blended and interpreted alongside a lot of other material.

Working papers are being produced and issued as they arrive. Some effort at uniformity of presentation is being attempted but the contents are only minimally edited for style or clarity. FAO welcomes from readers any information which they feel would be useful to the study on the subject of any of the working papers or on any other subject that has importance for the Asia-Pacific forestry sector. Such material can be mailed to the contacts given below from whom further copies of these working papers, as well as more information on the Asia-Pacific Forestry Sector Study, can be obtained:

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INTRODUCTION

The Asia-Pacific Region, as defined for the purposes of this working paper covers an extremely large area[1], and includes a wide range of approaches to forest conservation[2] and protected areas.

The island nations of the South Pacific, the developed countries of Japan, Australia and New Zealand, the 'tiger economies' of Taiwan, South Korea or Malaysia, and the regional giants India, China and Indonesia create a highly diverse group of nations. The status, trends and prospects for forest conservation therefore will vary widely from country to country, driven by many cultural and political factors such as the availability of resources, particularly those that are shared such as water, the structure and performance of economies, the extent of remaining pristine habitat and popular pressure.

This paper considers the status and prospects for forest conservation to the year 2010, both in the wider context of forest management, and more narrowly in terms of protected areas. The three scenarios are considered, namely:

- assuming the present level of action and policy environment
- assuming sustained environmental campaigns
- assuming specific deterioration in policy and action related to conservation.

Although protected areas are a key aspect of forest conservation, by far the bulk of remaining forests, pristine or degraded to a greater or lesser extent, remain outside legally gazetted conservation areas. A comprehensive review can thus only be achieved by examining the activities and policies of a wider range of players, including the forestry sector and the wildlife sector and by considering the growing importance of joint forest management in which local community participation is given prominence.

The Asia-Pacific Region: Exceptional Biodiversity Value

The Asia-Pacific region covers four biogeographical Realms recognised under the Udvardy classification (Udvardy, 1975) including two in their entirety: Indomalaya and Australia. Most of East Asia lies in the Palaearctic Realm, but the southern boundary encompasses two biogeographical provinces that are included within Udvardy's Indomalayan Realms 'Taiwan' and 'South Chinese Rainforest'. South Asia is largely found in the Indomalayan Realm, although Pakistan, India, Nepal and Bhutan all have some northerly territory that is considered part of the Palaearctic Realm. The same is true in Myanmar, but

[1] See Annex 1 for list of countries, by WCPA regions

[2] Forest conservation in this paper is used to embrace a broad concept meaning the maintenance of forest cover and quality through active management and/or protection.

other countries in South-East Asia fall firmly within the Indomalayan Realm. The Oceania Realm is considered to start at the international border between the Indonesian province of Irian Jaya and Papua New Guinea and includes all Pacific nations considered in this review. New Zealand is considered by Udvardy to be part of the Antarctic Realm, but has until recently been considered by WCPA[3] to be part of the Pacific region. The ecological diversity of the Region is underscored by 13 Udvardy biomes being present, when only 14 are recognised world wide. Furthermore, of the 193 individual biogeographical provinces recognised under the Udvardy system, approximately 70 occur in Asia-Pacific. Identifying biogeographical provinces that are unprotected, or poorly protected, is one of the cornerstones in setting priorities for the further development of protected areas networks.

The very considerable contribution to global biodiversity made by the Asia-Pacific region is underscored by the data in Table 1. This lists the twenty richest countries in the world in terms of species diversity, and includes eight in Asia-Pacific.

Table 1 A global perspective: world ranking of the top twenty mega-biodiversity countries, ordered by number of native mammals

	Mammals	Birds	Flowering plants
Mexico	450	1,026	25,000
Indonesia*	436	1,531	27,500
Zaire	415	1,096	11,000
Brazil	394	1,635	55,000
China*	394	1,244	30,000
Colombia	359	1,695	50,000
Peru	344	1,678	17,121
India*	316	1,219	15,000
Venezuela	305	1,296	20,000
Ecuador	302	1,559	18,250
Cameroon	297	874	8,000
Malaysia*	286	736	15,000
Australia*	252	751	15,000
South Africa	247	790	23,000
Panama	218	926	9,000
Papua New Guinea*	214	708	10,000
Viet Nam*	213	761	7,000
Costa Rica	205	850	11,000
Philippines*	153	556	8,000
Madagascar	105	253	9,000

* indicates Asia-Pacific country

The exploitation of natural resources forms a major part of many national economies in the region. In the five countries of India, Indonesia, Nepal, Philippines and Thailand alone it is estimated that as many as 400 million people are directly dependant upon forests for at least part

[3] WCPA: IUCN World Commission on Protected Areas (formerly CNPPA - Commission on National Parks and Protected Areas).

of their livelihoods. The value of natural resources, including those outside forests, is estimated at several hundred dollars *per capita*. This suggests that across the region as a whole the equivalent economic value of biodiversity may well run into several hundred billion dollars annually.

Policy Issues

Virtually every country throughout the Asia-Pacific Region has adopted a stated policy of protecting environmental standards, wild habitats and species. However, implementation of these policies is often poor. A policy of words, not supported by action, may have negative effects, as it hides the true situation. Putting biodiversity into "real" development policies will be one of the major challenges of the next ten years.

Legal Issues

Almost all countries have adequate conservation legislation on paper. Those without are fast adopting suitable legislation. For example, Bhutan revised its Forest Law in 1992, Viet Nam approved its long-awaited Law on Environment in 1993 and Lao PDR and Cambodia are both redrafting and revising hunting regulations that remain from their colonial periods and Thailand has recently (1992) revised the Wild Animals Reservation and Protection Act 1960 to incorporate more modern concepts of habitat protection.

In some countries legislation relating to biodiversity conservation is complex and scattered in separate laws on forestry, marine regulations, pollution regulations and environmental law. This may often be further confused by conflicts between national law, state or provincial laws and religious laws and local customs. Such countries which include China, Viet Nam, India, Indonesia, Philippines and several others should be encouraged to streamline the relevant rulings so that these can be better known by the public, developers, law enforcement agencies and the judiciary.

A major problem is law enforcement which must be tackled as one of the major hurdles in achieving the sustainable management of renewable resources. Most biodiversity is generally out of sight or in sparsely populated areas where law enforcement is a distant irrelevance to daily life. Villages make up their own rules to control their own daily affairs and edicts from a distant central government are almost meaningless. A new approach must be developed so that villagers themselves adopt suitable rules and control methods to ensure that natural resources are used wisely.

International Obligations

One unifying theme that is manifest throughout Asia-Pacific, is the adherence to one or more international conventions and programmes (Annex 2). Many states are party to The Convention on Biological Diversity, the World Heritage Convention, the Ramsar Convention and the UNESCO Man and the Biosphere programme. The Convention on Biological Diversity entered into force during December 1993, and Article 8 places clear obligations on signatory states to conserve biodiversity, both within protected areas and elsewhere. These international obligations will act as a driving force between now and 2010 for the further development of protected areas networks and the adoption of conservation practices throughout forestry.

Forest Conservation in the Asia-Pacific Region

Forests are currently conserved through two main means: protected areas established for the conservation of biodiversity, and through the activities of forestry agencies. A third and growing conservation trend is the management role played by local communities.

Not all original habitats in the region were forests, although this is largely the case in the tropical regions and the wetter temperate regions. Not all protected areas are established solely to protect forest ecosystems. Nevertheless, it assumed in this paper that protected areas in the Asia-Pacific region are directly related to the *in-situ* conservation of forests, even though some protect grasslands, deserts, marine ecosystems.

Data from the WCMC Protected Areas Database shows that there are nearly 3,000 protected areas in the region, covering more than 8% of the land area, most being under strict protection. The forestry sector also makes a significant contribution to nature conservation through the establishment of conservation and protection forest reserves. The tropical portion of the Asia-Pacific has the most extensive forest sector in the world covering one-quarter of all land area. Of this, some 3% of land area is reserved for conservation by the forestry sector. Much of this comprises the forest reserves in Malaysia and the protection forests in Indonesia. The forestry sector has very much more extensive land holdings in the form of production reserves (covering about one fifth of the tropical Asia-Pacific) and the extent to which these are managed in a way that sustains biodiversity is critical.

The third and increasingly important approach to conservation is community forest management. Beginning in the later part of the 19th century much of Asia's forest land was legally placed under the authority of the state with bureaucratic agencies established to oversee management. As forest nationalization policies were strengthened and field management systems implemented, the forest rights and practices of forest-dependent communities were steadily eroded (Richards and Tucker, 1988). However, many Asian government forest agencies currently face static budgets, or are under pressure to cut staff. At the same time, the population of forest-dependent communities continues to grow. While Asian communities have protested and struggled against the attempts of outside authorities and interests to gain control over forests and other resources, in recent years community perspectives have begun to gain ground.

Starting in the 1970s, villages in eastern and northern India began voicing growing concerns over forest degradation and the role of forest departments and private companies. India, Philippines, Indonesia and Thailand are all extending management rights and responsibilities to local communities, but Nepal has probably gone furthest in developing this approach, perhaps rediscovering some of the benefits of the traditional *shingi nawa* or local forest guard system. The top-down approach has largely failed, due to lack of resources and a high level of forest dependency. Community forestry is the logical answer to relieving the burden of the government controlling and protecting forest area, whilst also promoting rural development and allowing the enlightened self-interest of local communities to drive management (McDermott, 1996). Communities throughout Asia have played and continue to play important roles in forest management and growing demographic and resource pressures are making intensified forest management increasingly attractive to communities, stimulating local interest to invest in sustainable use systems.

Prospects for Forest Conservation to 2010

Community forestry management dovetails with the expanding role of protected areas, accommodating the needs of local people and the development of conservation practice in the forestry sector. Although there will continue to be a role for strict protection in certain critical areas, a balanced approach between protected areas, improved forestry practice and a greater role for community forest management is the most likely route for good prospects for forest conservation to 2010.

1. PROTECTED AREAS IN THE ASIA-PACIFIC REGION: AN OVERVIEW

Protected areas make a vital contribution to the conservation of the world's natural and cultural resources. Values range from retention of representative samples of natural regions and the preservation of biological diversity, to the maintenance of environmental stability of surrounding regions. Protected areas can provide an opportunity for rural development and rational use of marginal lands, for research and monitoring, for conservation education, and for recreation and tourism. As a result, most countries have developed systems of protected areas which meet a variety of needs.

A definition of a protected area has been internationally agreed (IUCN, 1994a) as:

> *An area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means.*

1.1 Management Categories: A Basis for International Comparison

This definition provides a strict criterion against which land use management can be tested. In order for a site to be considered as a 'protected area', it must have the conservation of biological diversity as a primary objective, although some sustainable exploitation is permissible within this definition, provided it does not adversely detract from the primary objective. Areas

that are managed for other purposes, for example soil or watershed protection may have biodiversity conservation values to a greater or lesser extent, but would not meet the strict IUCN definition. The conservation of forests therefore will be pursued both through the establishment of protected areas in the strict sense, through sustainable forestry management regimes, and through the development of areas focused on community-oriented conservation and development.

The purposes for which protected areas are managed differ greatly, including:

- Scientific research
- Wilderness protection
- Preservation of species and genetic diversity
- Maintenance of environmental services
- Protection of specific natural and cultural features
- Tourism and recreation
- Education
- Sustainable use of resources from natural ecosystems
- Maintenance of cultural and traditional attributes

In order to allow protected areas with similar objectives to be internationally compared, IUCN has developed a system of management categories. These are summarised briefly below (Box 1), and more fully in Annex 3.

Box 1 IUCN protected areas management categories

Ia Strict Nature Reserve (Strict protection)
Ib Wilderness Area (Strict protection)
II National Park (Ecosystem conservation and recreation)
III Natural Monument (Conservation of natural features)
IV Habitat/Species Management Area (Conservation through active management)
V Protected Landscape/Seascape (Landscape/seascape conservation and recreation)
VI Managed Resource Protected Area (Sustainable use of natural ecosystems)

Protected areas may range from strictly protected sites where natural ecological processes are unchecked, through varying degrees of management intervention and exploitation, to areas that are managed to provide a sustainable supply of goods and services to local communities.

Category VI protected areas allow for a degree of exploitation of natural resources. As will be discussed, such protected areas will probably play a growing role in the development of protected area systems to 2010. However, IUCN (1994a) clearly states that Category VI sites are those which contain predominantly unmodified natural systems, under management to ensure

the long term protection and maintenance of biological diversity, whilst providing at the same time a sustainable flow of natural products and services to meet local community needs. The definition therefore precludes sites under commercial forestry management, where the ecosystems have been or will be, substantially altered, or where the conservation of biodiversity is not the overriding management objective.

Categories are applied by IUCN as means of classifying protected areas with broadly similar objectives together, regardless of national designation. In practice, much of the work of classification is carried out in collaboration with WCMC, especially during the periodical preparation of the **United Nations List of Protected Areas** (for example, IUCN, 1994b). This definitive audit of the world's protected areas network is derived from the global WCMC Protected Areas Database. Many of the statistics presented in this paper have been derived from the WCMC database.

1.2 Management Categories: Policy Implications

The IUCN Management Category system implies, and indeed is intended to encourage, a variety of protected area types, typified by a broad spread of management objectives.

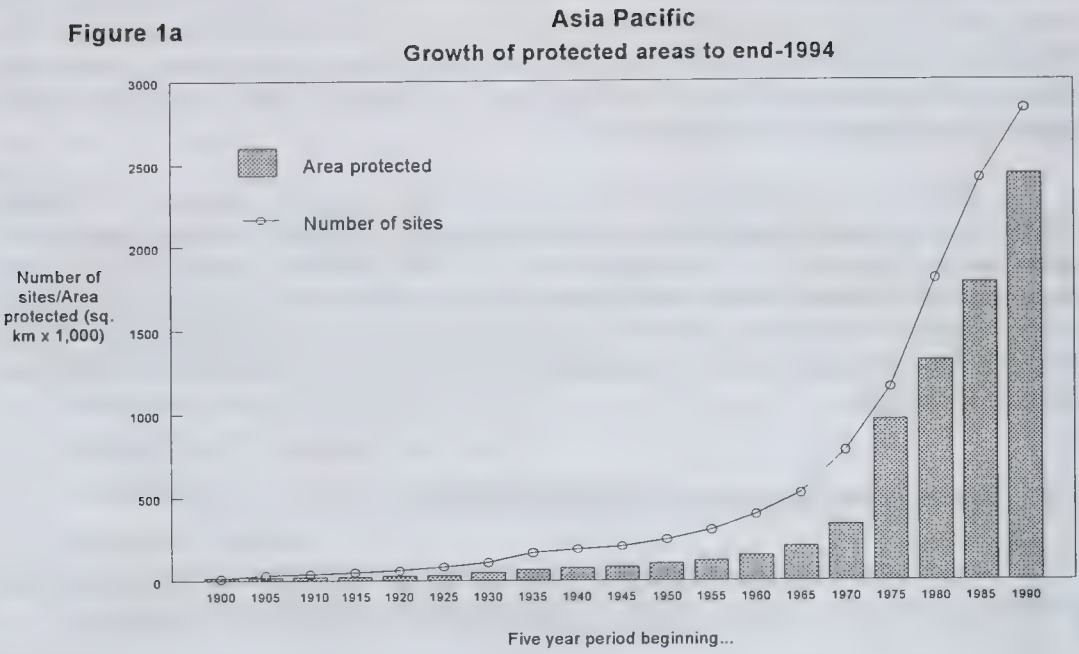
As an example, the draft WCPA Regional Protected Areas Action Plan for Australia and the Pacific (IUCN, 1996) argues that protected areas established in isolation from the surrounding landscape have no long term future. Long term viability of protected areas can only be ensured if protected areas are managed and promoted as an integrated component of marine and terrestrial ecosystems; are managed and integrated into regional administrative frameworks; and only if the social and cultural aspirations of local communities are supportive of protected areas.

In other words, it is increasingly likely that the conservation of forests in the Asia-Pacific region towards 2010 will not be based upon a rigid demarcation between protected areas and all other forms of land use. Instead, protected areas should form part of a landscape or ecosystem-wide management matrix, where the conservation of nature is the highest priority, surrounded by areas where other activities take place, up to and including sustainable commercial exploitation.

1.3 Growth of Protected Areas in Asia-Pacific

A brief review of the historical development of protected areas provides a basis for considering current trends, and identifying prospects for the future.

Figure 1a



Taken as a whole (Figure 1a), or as sub-regions (Figures 1b-1g), the growth of protected areas tends to follow a similar pattern. Growth from the turn of the century to about 1960 was very modest, but then increased dramatically during the last two decades. This regional picture disguises the 'stop-go' progress that is seen in individual countries. Indonesia for example established many large protected areas in the late 1980s, with relatively little progress in recent years. Several other countries have radically transformed their protected area systems in a short space of time: Lao PDR and Cambodia, for example. There is also a trend towards larger protected areas being established, in accordance with conservation biology theory (Leader-Williams, *et al.*, 1990).

Most other countries have made improvements to both their protected area systems and to standards of management, although this frequently falls short of that necessary for long term conservation. Some countries, for example Myanmar and Korea PDR, have yet to make a serious attempt to protect biodiversity through protected areas.

Figure 1b

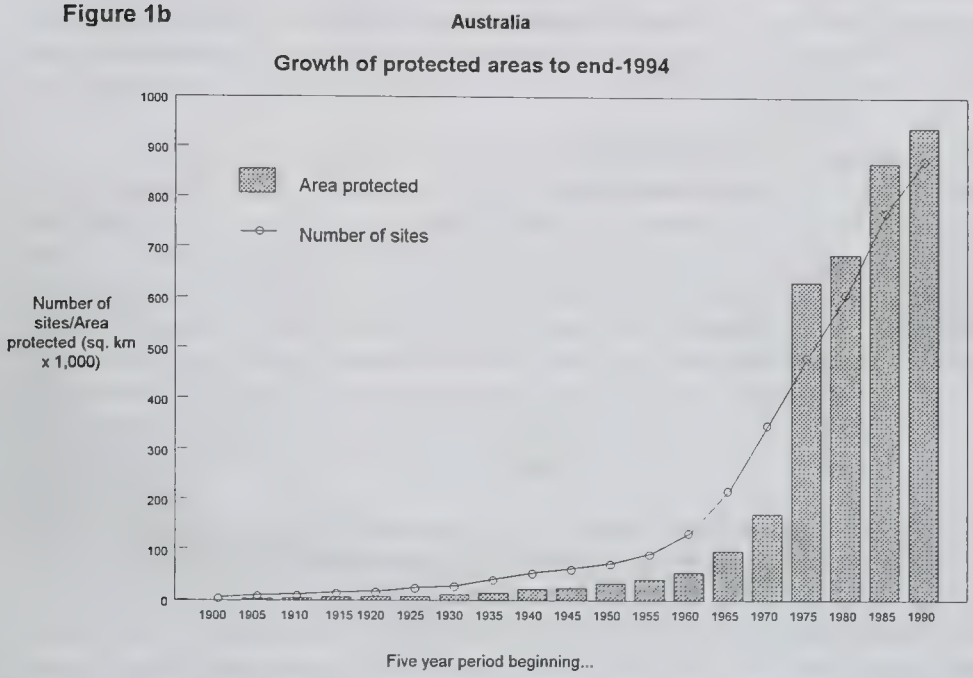


Figure 1c

Figure 1d

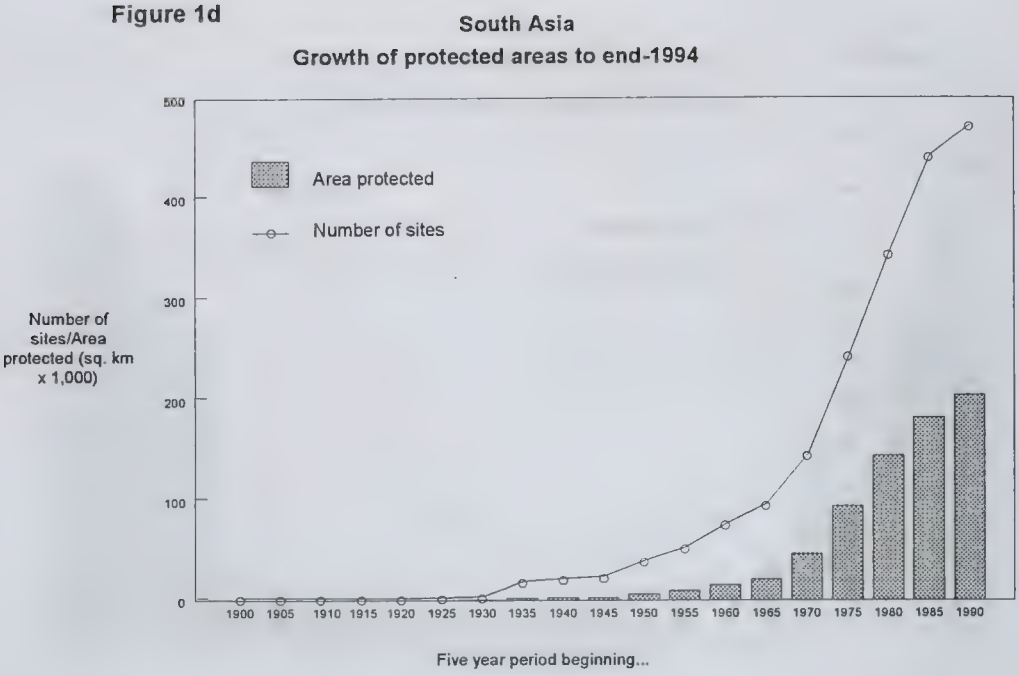
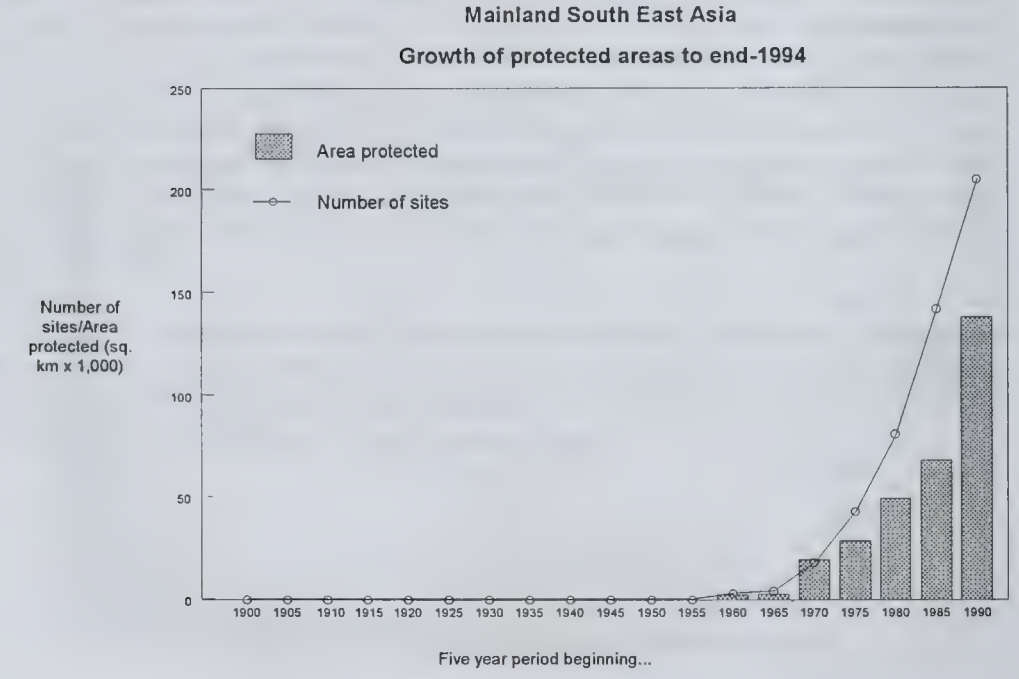


Figure 1e



There are significant differences in the rate of development over the most recent period. Both Insular South-East Asia (Figure 1f) and South-East Asia (Figure 1e) both show unusually large gains in both numbers of sites and area covered in the period 1990-1994. Lao PDR and Cambodia have both established extensive networks of protected areas during the last 3-4 years,

and this is revealed in Figure 1e. Governments, even in the least developed nations in the region, are prepared to reserve substantial tracts of land for conservation, suggesting that the case for biodiversity conservation has been accepted, at least on a superficial basis. The longer term challenge will be to provide the resources to maintain these sites as viable protected areas.

Figures 1d and 1g (South Asia and Pacific) both show a 'flattening' of the growth curve during the period 1990-1994. This may reflect poor availability of data or a real effect. In the latter case it may be that the opportunities and motivation for establishing more protected areas is being exhausted, in which case the importance of conservation outside legally established protected areas is highlighted. India provides two-thirds of the protected areas in South Asia, and yet has less than 5% of its land area in protected areas. The opportunities for establishing new protected areas in India will diminish in the future as the population continues to grow and the extent of remaining natural habitat (currently approximately 17%) continues to shrink. The prospects for further development of the network to 2010 will diminish with time in which case it is unfortunate if progress has already declined.

The development of protected areas in Australia (Figure 1b) is strongly marked by the dramatic growth in the period commencing 1975, growing from some 200,000 sq.km to more than 600,00 sq.km of protected area. More than half of this increase is accounted for by the creation of the Great Barrier Reef Marine Park in 1979; covering some 348,000 sq.km it is the second largest protected area in the world. It is unlikely that such a large single protected area will be established again at any point in the future, and the growth in Australia has, in comparison, been relatively modest since then.

China's first protected area was established in 1956, with a limited number being created in the years following and by 1966 some 6,500 sq.km were protected. The Cultural Revolution brought a complete halt to the further development of protected areas from 1966 to 1972. Progress was made during 1973 to 1978 but this was overshadowed by the dramatic increases after 1979, with nearly 100 new reserves being established annually. Today there are more than 700 nature reserves, the principle protected area type, covering 680,000 sq.km or 7.10%. Much of this is evident in Figure 1c.

1.4 Current Extent of Protected Areas in the Region

The extent of protected areas, classified by IUCN management category, in the Asia-Pacific region is summarised in Table 2. Annex 4 presents more detailed national statistics, grouping countries into sub regions.

The data presented in these two tables have been restricted by two criteria: IUCN management category and size. Only those protected areas qualifying for a protected areas management category, and covering at least 1,000 ha, are included. These restrictions help to ensure that only those areas meeting the international definition of a protected area are included. The use of a minimum size criterion ensures consistent international comparison, as information on smaller sites is frequently lacking. One disadvantage however is that the smaller island nations of the South Pacific tends to be under represented because protected areas in such countries are relatively small.

Figure 1f

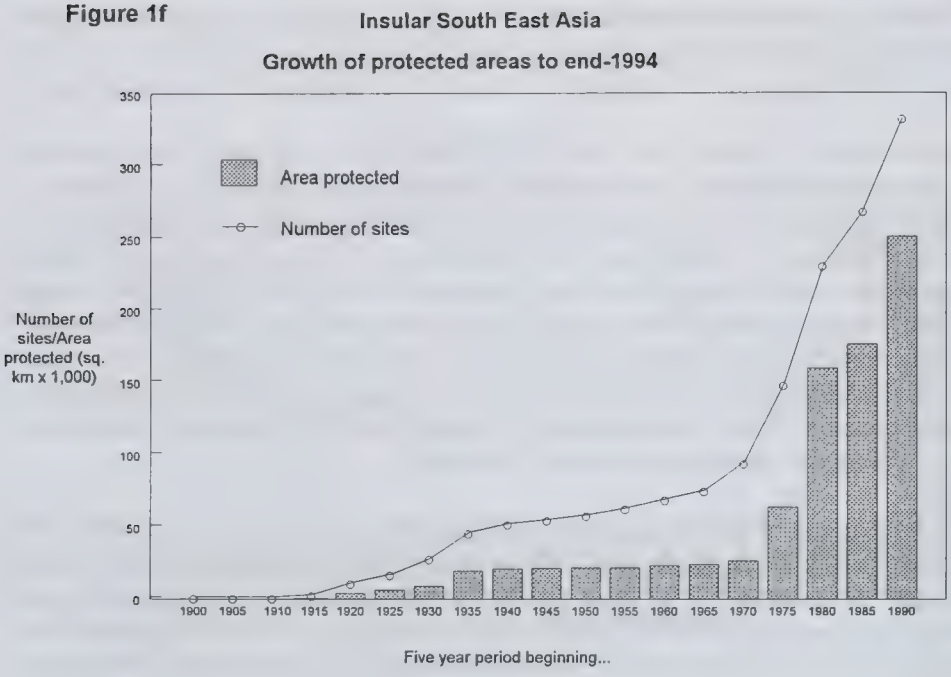


Figure 1g

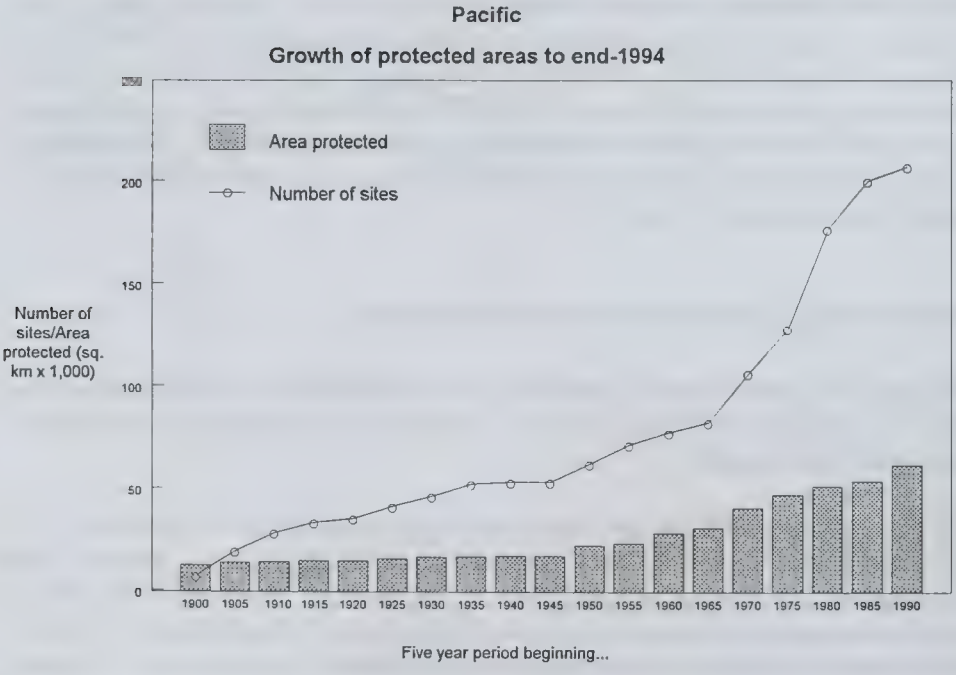


Table 2 Summary of Protected Areas (IUCN Management Categories I-VI) in the Asia Pacific Region

Category	No.	Protected Area		% country land area protected
		(Sq.km)	%	
Ia/Ib	330	672,629	27	2.35
II	788	636,198	26	2.22
III	106	16,637	1	0.06
IV	1,074	450,947	18	1.57
V	192	554,347	22	1.94
VI	445	154,366	6	0.54
Total	**2,935**	**2,485,127**	**100**	**8.86**

Given these inclusion criteria, some 2,935 protected areas have been established in the-Asia-Pacific region, covering a total of 2.5 million square kilometres, approximately 8.86% of land area. This is higher than the global average (approximately 6% of land area), due to the well developed networks in large countries such as Indonesia (12.33%), Australia (12.30%) and to a lesser extent China (7.10%). These three countries alone account for 1.9 million square kilometres of protected areas in the region or three-quarters of the total.

Table 2 makes apparent the emphasis on strict protection in the Asia-Pacific region, with 1.3 million square kilometres in protected recognised as either Category I or Category II. Such sites are based on principles of strict protection, in the case of Category Ia/Ib, to the extent of excluding all intervention other than carefully regulated scientific research. Category II sites accommodate extensive tourism, but in both cases there should be little, if any, provision for exploitation. Exploitation is permitted to a very limited extent in protected areas classified under the IUCN system as being Category III, IV or V. Category VI are relatively rare, numbering only 445, and contributing only 154,366 sq.km to the overall network (equivalent to 6% of all Asia-Pacific protected areas).

Sub-regional highlights

Australia is unique in that a single country represents one entire sub-region and continent. The protected areas network is well developed, covering 12.3%[4]. Even so, most ecosystems lie outside protected areas, and many ecosystems within protected areas are inadequately represented (Thackway and Cresswell, 1995). Most IUCN Management Categories are used, indicating an even spread of management practice, from strict protection through to multiple use although Category VI sites are relatively rare (Thackway, 1996). The Commonwealth government is collaborating with State and Territory nature conservation agencies in the development of a National Reserve System (NRS). A bioregional planning

[4] Note that this figure is inflated by the very large Great Barrier Reef Marine Park being included in the calculation of percent 'land' area protected. Thackway (1996) reports 7.8% protection for terrestrial habitats.

framework encompassing all of Australia's major ecosystems, known as the Interim Biogeographic Regionalization of Australia, has been developed and endorsed by all agencies involved. This provides the basis for identifying gaps, and is used to set priorities for filling these gaps. In addition to establishing protected areas, the creation of indigenous protected areas, for example on Aboriginal and Torres Strait Islander freehold land, could herald a more participatory approach to protected areas than has usually been the case (Thackway, 1996).

The importance of integrating local people into conservation planning is repeated in the biologically rich Wet Tropics World Heritage Area. Although these forests cover only 0.1% of the continent, they support, for example, more than half of all Australia's fern, bat and butterfly species. Support from local landowners, economic benefits to local communities, and involvement of indigenous land owners are seen as key elements in the continuing conservation of the area (Hitchcock, 1996).

Insular South Asia is physically dominated by Indonesia, which covers a greater land area than all other countries in this sub-region put together. Consequently, Indonesia's protected areas network dominates the sub-regional statistics as well, the bulk falling into the relatively strictly protected IUCN Categories II and IV. Malaysia, Philippines and Singapore all have only modest protected areas networks. Brunei has give over nearly 20% of its land area to nature conservation, the heavily forested Ulu Temburong National Park alone covering a significant proportion of the country.

Although the Philippines established its first protected area in 1932, it has one the least successful systems in the region. Many areas were established without regard to the needs of local communities or long term defensibility against commercial exploitation. The protected areas network faded at the same time as natural forest cover was radically reduced, leaving a highly diverse and frequently endemic and threatened flora and fauna unprotected. The passage of the 1992 National Integrated Protected Areas System Act has paved the way for a fresh start, and eighteen priority areas have been identified. Given the pressures that exist and will continue to grow, the priority for the Philippines to 2010 will be to establish a genuinely secure protected areas representing adequate samples of remaining natural habitats. This will require sustained international funding (currently *via* the Global Environment Facility and the European Union) and government commitment, but the single most important factor will be the successful participation and support of local communities living in and around protected areas (Isberto, 1996).

Community-based management of protected areas is also being developed in Indonesia (Dias and Indiani, 1996) in a project that was intended to introduce new mechanisms through which people can meet their needs without encroaching or over-exploiting resources in protected areas. Pilot projects included income generation, for example butterfly ranching, eco-tourism, creation of community forests and stabilising land use and park boundaries. Although it will take several years to establish the long-term success of the project, a notable development has been the building of links between local people and park or forest staff who frequently regard each other with a mutual mistrust.

South-East Asia's protected areas were until recently largely found in Thailand and to a lesser extent, Viet Nam. However, two countries have recently developed extensive protected areas networks, Lao PDR and Cambodia. Lao PDR is one of the poorest nations on earth, with

an economy largely based on the exploitation of natural resources. Consequently protected areas are expected to play a role in not only conserving biodiversity but also in sustaining economic growth (Chape and Inthavong, 1996). Some 17 National Biodiversity Conservation Areas have been established, all regarded as IUCN Category VI multiple use areas. The very strong integration of protected areas into the development process may be a model that other countries in the region should consider to meet both development and conservation imperatives. Viet Nam has made significant progress with only very modest resources and under the pressure of international isolation. Government policy is to further double the existing network (currently 3%) by the end of the century. Most problematic is Myanmar. Subject to extensive recommendations by FAO for new protected areas in the early 1980s (Nature Conservation and National Park Project FO:BUR/80/006), little if any progress has been made in implementation. Myanmar enjoys a very high level of biodiversity, and failure to provide for its protection is of international significance, although the Forest Department has established a significantly increased target for protected areas.

South Asia is dominated by India which although possessing a network that covers less than 5% of land area, contributes over half the sub-regional total. There is a tendency towards the more strictly protective management categories, especially II and IV, with only a very modest use of the Category VI. An important exception to this is Nepal which has developed two major Conservation Areas: Annapurna and Makalu Barun. These place the needs of local people high amongst management priorities and may act a model for the further development of protected areas. The Environmental Management in Forestry Development Project in Sri Lanka (Green, 1995). This entailed a review of all remaining natural forests with respect to ecosystem and species diversity, and soil conservation and hydrological value, with the objective of identifying an optimum network of conservation areas to protect the country's biodiversity within forests and its important watersheds.

The **Pacific** region is characterised by strong contrasts. Two nations, Papua New Guinea and New Zealand, account for more than 90% of the land mass and the great bulk of the biodiversity in the region. Protected areas, however, are largely restricted to New Zealand, with only modest development in other countries. The summary percentage protection figures are particularly prone to inflation in the case of the Pacific, where marine protected areas are included in figure calculated as a percentage of land area.

One of the main constraints to the development of 'western' concept protected areas, based on the principle of exclusion of local people by governments, is the overriding importance of customary land tenure in the Pacific. One solution to this has been the development of Wildlife Management Areas (WMA) in Papua New Guinea. These are established, at the request of local landowners, to regulate hunting, for example of birds of paradise, and to protect habitat. The government provides legal recognition to WMA, but land ownership remains in the hand of local people. The WMA concept accommodates the particular conditions that prevail in many Pacific nations, although there is little to stop commercial logging in a WMA if the landowners so desire. It is reported that the 1996 National Forestry Plan sets aside more than half the country's forests (200,000 sq.km) for logging without regard for existing or proposed conservation areas, or areas identified as priorities for biodiversity conservation. The expansion of logging is set in the context of poor forest management and scant regard for environmental controls (WWF, 1996).

Following the Fifth South Pacific Conference on Nature Conservation and Protected Areas in 1993, the concept of community-based protected has been promoted as the most promising approach for conservation in the Pacific region. The development of protected areas in the Pacific is likely to be slow in the period to 2010. Solutions are needed to address conservation of natural resources outside protected areas, by firmly establishing the principle and practical application of sustainable use. The GEF-funded South Pacific Biodiversity Conservation Programme has lead to the pioneering of number of conservation areas in which human activities will be guided to protect important ecological features and to enable sustainable use of natural resources. The Programme brings together local communities and government officials in a cooperative way, avoiding some of the unproductive confrontations of the past (Reti, 1994).

East Asia's protected areas are found largely in China, although all countries, with the exception of North Korea have well developed systems. Although the summary statistics are dominated by the presence of a limited number of very large and strictly protected areas in China, there is a good spread of sites through the IUCN management categories, suggesting that governments are implementing a variety of management strategies in protected areas. Although the summary statistics suggests that the region is approaching the 10% target established by IUCN, there remain serious deficiencies. It can be shown that entire ecosystems remain poorly or even entirely unprotected. For example, in China there are only three provinces in which nature reserves cover more than 10% of total area and six provinces in which their coverage is less than 1%. Such deficiencies are being addressed as China implements its *Biodiversity Conservation Action Plan*, formulated in 1994. By the year 2000, there will be up to 1,000 Nature Reserves, of which 150 will be administered at national level. By then the protected area system will cover 1 million km^2 or 10.4% of the country.

The representativeness of the protected areas system in China (Taipei) has not yet been assessed but is unlikely to be adequate, given that levels of species diversity and endemism are extremely high (e.g. 27% of 4,000 vascular plants are endemic). Natural areas are being inventoried by the Forestry Research Institute and will contribute to a national systems plan. Japan's protected area system is considered to be representative of all major ecosystems, although protection of marine and coastal habitats require further evaluation. After more than a decade of little or no development, Mongolia's protected area system has more than doubled recently as part of an ongoing GEF-funded biodiversity conservation project.

The imperative for the further development of protected areas and the conservation of forests to 2010 is to ensure that the existing gaps in networks are identified and filled. In addition, gross coverage figures give no indication as to the long term viability of sites in the face of growing population and development pressures, or the effectiveness with which management objectives are achieved.

1.5 The Contribution of the Forestry Sector to Forest Conservation Through the Establishment of Conservation and Protection Forest Reserves

A study by WCMC provides an insight in to the contribution that the forestry sector makes to the conservation of biodiversity in the tropical Asia-Pacific region. Forest Departments were contacted for information on the function to which gazetted forest reserves were put,

namely production, protection (e.g. watersheds and soil) and conservation. Table 3 provides a summary of the findings.

Table 3 Tropical Asia & Pacific - Extent of Notified Natural Forests (e.g. forest reserves), Classified by Forest Function

Sub-region	Notified Natural Forests by function							
	Production		Protection		Conservation		Total	
	Area	(%)**	Area	(%)**	Area	(%)**	Area	(%)**
South Asia	594	14.4	10	0.2	3	0.1	607	14.7
Continental SE Asia	201	10.6	97	5.1	198	10.4	496	26.1
Insular SE Asia	717	29.3	331	13.5	67	2.7	1,115	45.6
Pacific*	0	0.0	0	0.0	0	0.0	0	0.0
Total	1,512	16.9	438	4.9	268	3.0	2,218	24.9

All areas are given in sq.km x 1,000
Source: WCMC (1992)
* Insufficient data
** Percentages are of total land area in each sub-region.

Notified natural forests in the various categories account for 24.9% of the total land area and range from 14.7% in South Asia to 45.6% in Insular SE Asia. For lack of data, the proportion in the Pacific has not been reported. Production forest reserves in Tropical Asia-Pacific cover 16.9% of the region, compared to 4.9% assigned to protection and 3.0% to conservation functions.

There are opportunities to extend the forest sector contribution to nature conservation, especially in those sub-regions that retain a high percentage of forest cover. Where forest reserves predominate over wildlife conservation areas, there is a clear need to review their role. In Sri Lanka, for example, much of its biological diversity in terms of species richness is found in the rain forests of the south-west wet zone which fall mostly within the jurisdiction of the Forest Department. These rain forests have become increasingly fragmented and isolated due to population pressures, with the result that logging has now been banned in the wet zone until the conservation importance of these forests has been assessed. Already, the largest rain forest, Sinharaja, has been strictly protected under new conservation legislation introduced within the forestry sector (National Heritage Wilderness Areas Act 1988). Furthermore, some 30 forest reserves in the lowland wet zone have been designated as conservation forests.

It is evident that the forestry sector already plays a significant role in the conservation of biodiversity. The extent of this contribution outside the tropics is at present unknown, and is an important gap in current knowledge. It is an established fact that protected areas networks are far from comprehensive in their coverage, and collaboration between wildlife and forestry departments in system design would be an important and low-cost step in filling gaps. The data in Table 3 were collected during the early 1990s, and clearly show that the forestry sector does make a significant contribution. It would therefore be timely to repeat the exercise in order to fill any gaps in the data, and to ensure the data are up to date.

2. PROSPECTS FOR FUTURE DEVELOPMENT OF PROTECTED AREAS IN THE ASIA-PACIFIC REGION TO 2010

Experience over the last 20 years shows that protected areas are accepted by virtually all Asia-Pacific governments as a means to achieve conservation objectives. There are strong driving forces, discussed in this paper, that will act to keep protected areas as part of government policy. For example, at least 29 countries in the region have signed the Convention on Biological Diversity, Article 8 of which recognise *in-situ* conservation as the primary approach to biodiversity conservation. The Convention calls upon contracting state parties to establish a system of protected areas, as well as striking a balance between conservation within and beyond protected areas (Glowka, *et al.*, 1994). At a national level, many countries in the region have developed conservation strategies or national environmental management strategies (Wendt, 1993). Whilst such documents cover environmental conservation at a wider perspective than protected areas alone, they lend weight to the argument that the commitment to *in-situ* conservation is strengthening.

The approach taken here is to make a number of informed assumptions based on previous experience and in the light of the best judgement of how policy and action might develop. There is no attempt to justify these arguments on the grounds of 'science', as forecasting the future has yet to be so refined, but they do reflect what has happened in the recent past. There is an expectation that as governments have established protected areas in the past, and to a considerable extent in the previous two decades, there are reasonable grounds for assuming that they will continue to do so in the future.

Annex 5 provides a brief summary of the major conservation priorities in the Indomalayan Realm, and this provides a measure of the country-specific challenges. It is evident from this brief summary that some countries have only very limited opportunities to improve the state of biodiversity conservation, for example Bangladesh. Conversely, other countries have a wide range of options in terms of remaining natural habitat, but also a much greater task simply due to the very high level of biological diversity, for example Indonesia. Indonesia will therefore have to devote both absolutely and proportionately much greater resources to achieve an adequate conservation 'result' than Bangladesh.

It is considered that the possibility of governments de-gazetting extensive proportions of protected areas networks is unlikely. Although individual sites may be reduced in size or even degazetted, the possibility of wholesale cancellation of protected areas networks is not considered in this paper.

2.1 Future Scenarios

2.1.1 Scenario 1. Assuming the present level of environmental action and policy

Scenario 1 envisages a continuation of current policies and levels of actions. This suggests that there will be little change in the attitude of governments, the public or media to environmental issues, or any significant change in the current balance between conservation and development. At the same time, advances that have been made in recent years, as mentioned

elsewhere, including legal enactments, adherence to international legal instruments, national biodiversity planning and so on would remain.

Given no further strengthening of environmental policy and action, it is likely that protected areas networks will continue to grow in size, but that the quality of the systems will remain poor and continue to deteriorate, as is happening in many cases today. Management, already weak or even non-existent in many reserves, will continue to be a major failing. Insufficient consideration of forest and biodiversity conservation in other sectors will lead to a proliferation of "paper" parks. Protected areas will continue to be located on the basis of expediency (minimum land use competition) and not scientific study. There is likely to be a failure to recognise the full value of protected areas in supporting rural development, leading to increased and expensive conflict and a failure to secure the potential benefits for rural development, such as clean water. It is also likely that the economic value of protected areas will continue to be underplayed in national accounts, with a consequently low priority in the eyes of government.

Under this scenario it is likely that there will be a failure to link protected areas *via* habitat corridors, leading to ecological failure of all but the largest sites. Continued uncontrolled hunting or poaching will remove key species such as carnivores or ungulates, also leading to unpredictable ecological change and possibly collapse. Although these effects may take many years, decades or even centuries to be fully expressed, those forests that remain will in time become biologically less rich than they are at present.

Given the very strong forces of population growth and economic development, continuation of current policies and the level of conservation action, will result in a situation not dissimilar to that envisaged in Scenario 3, although the decline would be less precipitate.

2.1.2 Scenario 2. Assuming sustained environmental campaigns

Adherence to the Convention on Biological Diversity and other international or regional instruments, and the establishment of the Global Environment Facility as an international source of funds are both factors driving in the direction of this scenario. Pressures are also developing from national priorities, such as the need to achieve equitable and sustainable development, growing environmental awareness and public pressure, to suggest that environmental issues will be more prominent in the future.

Optimistically, governments will act on the increasingly clear message that protected areas underpin development processes, and as populations grow the demand for secure water supplies, flood control, soil protection and other 'off-site' benefits, will act as a positive driving force. The Ministerial statements quoted in Section 5 indicate that there is a wish to promote biodiversity conservation, within protected areas, forestry operations and land use management in general.

Economic growth, and perhaps more importantly economic transition from primary to the secondary and tertiary sectors, could have two positive effects on conservation. First, the pressure to exploit natural resources directly will be eased, and second, increasing wealth will provide wider options for governments to allocate resources to conservation. Brunei Darussalam is an example of a country whose revenue from other sources have been so high that there has

been little or no need to exploit natural forests on a large scale. Intensive agriculture may reduce the impetus to clear forest, although there are likely to be attendant increases in the release of toxic chemicals into the environment, increased energy consumption and increased rural unemployment all of which directly or indirectly could have significant consequences for forest conservation.

In order that increased economic activity is a positive driving force governments will need to seriously address policies, legal instruments and enforcement to protect the environment from pollution and uncontrolled development. Pessimistically, there is a risk that demand for agricultural and urban land driven by development pressures, may prove to be irresistible and that the current policy statements may not be translated into actions. Coupled with declining opportunities to secure natural habitat fragments, governments may retreat from the protected areas concept.

There is evidence throughout much of the region of a growing public awareness of environmental issues, driven by the activities of NGOs and a receptive media, which will focus the attention of democratically elected governments and the private sector on good practice and other conservation measures such as expanding protected areas networks.

The nature of protected areas is likely to migrate during the course of the next 15 years away from the strict protection model and this will act as a very positive force for growth. Accommodating rural development needs will resolve many of the conflicts and difficulties currently facing the strictly protected areas in the Asia-Pacific Region and make for cost-effective conservation and development solutions.

Scenario 2 therefore assumes a growing commitment to protected areas from government. It is unlikely that the total number and extent of protected areas will be significantly greater than that achieved under the conditions considered in Scenario 1. At least 11 major countries in the region have yet to reach the IUCN target of 10% (see Table 2), and if they were to do so then an additional 750,000 sq.km of protected areas would have to be established. Whether all governments would be willing to establish such extensive areas remains to be seen. The use of less strictly protected multiple use areas, conservation designation of areas in the forestry sector and others and an appreciation of the substantive benefits coming from protected areas may make such growth achievable. A greater awareness of the importance of scientific method in designing protected area networks will make systems more effective at conserving a wider range of biodiversity, without necessarily having to gazette disproportionately large new areas.

This rate of growth is considered unlikely if it requires virtually all remaining natural forest cover, and extensive proportions of other habitat types, to be placed under strict protection. However, where extensive areas are placed under less restrictive landscape management regimes in which biodiversity conservation and sustainable use are combined then this scenario becomes plausible.

The single biggest change that can be envisaged in this optimistic scenario is that management will be greatly strengthened and shown to be effective. Whether the emphasis is placed on strict protection by government, or community management will depend on local circumstances. At present however, many existing protected areas, especially in the biologically

rich developing countries in the Asia-Pacific Region are in danger of being rendered worthless through conflict and ineffective management.

The policy implication of this scenario is therefore that governments should consider the greater application of scientific system design methodologies, a wide range of protected area types, and not only the relatively rigid strict protection model, and place a much higher emphasis on effective management through community involvement.

2.1.3 Scenario 3. Assuming specified deterioration in policy and action related to conservation

Although there is little evidence at present to suggest that there will be a precipitate deterioration, the pressures of population growth and the requirement for increasing areas of land for development may overwhelm the case for conservation. Deterioration is more likely to be a result of powerful social and economic forces, such as population growth, poverty, land hunger, social inequality and , unregulated development rather than specific and explicit changes in government policy and action.

Inequitable land distribution will continue to drive people to colonise forested areas and to encroach upon protected areas. Consequently, governments will need to find ever greater resources to resist these very powerful social dynamics, and it likely that under such circumstances the drive to establish more protected areas than currently exist will drop away. It is likely therefore that governments will focus what limited resources are available on a few, isolated and supposedly 'prestige' areas, to the neglect of the wider network. Whilst this approach will win a degree of popular appeal, it will fail to a very great degree to conserve biodiversity or to reap the wider benefits of a well founded protected areas network. Protected areas agencies, already a weak part of government administrations will fail to win concessions from more powerful departments: conservation will be a low government priority.

The management of existing protected areas will become weaker than it is at present, due to chronic under-funding and under-staffing, and many parks will be destroyed. Areas of forest will remain but they will be depleted of much of their biodiversity value.

Other forces driving in this direction could be severe economic recession, possibly leading to social disturbance, and a curtailment of government funding. In the most extreme forecast war could erupt, for example over territorial disputes or resource conflicts leaving conservation as a virtually non-existent priority, diversion of financial and human resources, and the collapse of tourism and other revenue streams. This is effectively what happened during the recent history of Cambodia, and for many years, protected areas that had been established under the French colonial regime ceased to have any practical meaning. Ethnic disturbance in north-east Sri Lanka and in north-east India have also lead to protected areas being abandoned by management agencies.

There may also be a radical departure from the direction indicated by the Ministerial statements quoted in Section 5, although this is not considered likely due to unfavourable international reaction. However, under deteriorating conditions the gap between policy statements and implementation could grow wider.

Scenario 3 therefore is one in which the rate at which new protected areas are established tails off. Newly protected areas, as in the case of Scenario 1, are likely to be planned on the basis of minimum competing land use, and without recourse to scientific study. The quality of protected areas will also be very poor, a reflection of inadequate investment, incorporation into wider land use policies and pressure from other sectors.

One effect of a deteriorating government commitment to conservation might be an enhanced role for NGO activity. This could take the form of protecting reserves through outright purchase, especially in the wealthier parts of the region, or through helping develop community based solutions.

2.2 *Cost of Increasing the Protected Areas Estate*

Increasing the area under protection, or improving the management of new or existing protected areas, will have significant implications for resourcing.

Protected areas budgets and staffing will have to be increased if the existing network is to be properly supported, whilst the burden of an enlarged system will be even greater, especially for the least developed nations. James, *et al.* (1996) found that, globally, protected areas are financed at the rate of US$776 per square kilometre (see Section 4). This suggests that something in the order of US$1.9 billion[5] (approximately 0.1% of the Gross Domestic Product of the region) is spent by governments on protected areas. (A weighted average for the Asia-Pacific region indicates a lower figure of about US$290 per square kilometre. However, as data are not available for China this figure is very tentative.)

Governments will be reluctant to see major increases, when faced with many other economic priorities. One imperative therefore in the period to 2010 is to encourage governments to see the relatively modest investment in protected areas being in part an insurance policy for the protection of a very much greater revenue stream. Thomas, *et al.* (1996) point out, as only one of a number of examples, that the Australian economy benefits by US$2 billion in expenditure in eight national parks, at a cost to government of only $Aus60 million (approximately US$47 million). The economic values associated with these protected areas include water feeding hydro-electric schemes, tourism, commercial fishing, research, defence training and others. Although the primary purpose of protected areas is to conserve biodiversity there are frequently substantive economic benefits, even when in their natural state. Thomas, *et al.* (1996) argue that assessing the economic benefits of protected areas can lead to a re-integration of the economy and the environment. This will strengthen the case for conservation and encourage governments to provide sufficient resources for the establishment and management of protected areas.

James, *et al.* (1996) found that, globally, protected areas are staffed at a rate of 24.5 personnel for every 1,000 square kilometres protected. Applied crudely across the entire Asia-Pacific Region, this suggests that 60,000 personnel are employed by government. Again, if the growth in protected areas networks suggested in the three scenarios is achieved, and is to be

[5] One billion is taken to mean one thousand million or 10^9

sustained, there will be a high demand for additional staff. Further, given that lack of training or inappropriate training for staff is a significant factor in the poor management of protected areas in many countries, there will be a strong imperative for governments, or inter-governmental agencies to invest in training. The number of staff that would be required, given existing staffing levels, will be in excess of 100,000 staff. This has clear implications for government policy and commitment to establishing or further supporting existing training institutions, or adapting the curricula of existing institutions, such as forestry schools, to include training appropriate for protected areas staff. The cross-sectoral training adopted in Bhutan is a working demonstration of this approach, providing field staff with a common grounding in agriculture, forestry and wildlife theory and practice.

2.3 An Evolving Protected Areas Strategy: Developing Community and Landscape Oriented Solutions

There are strong driving forces to move away from the conventional style of strictly protected areas, and more towards to community-based solutions. These may take the form either of multiple-use protected areas, or sustainable land use outside protected areas that also accommodates biodiversity conservation. The degree to which these forces can be successfully harnessed to drive a paradigm change will be a major determinant in the success or failure of forest conservation and protected areas in the future.

IUCN has identified a specific type of protected area that will be of increasing importance in the years towards 2010 as the need to reconcile resource exploitation and biodiversity conservation increases. Protected areas containing predominantly natural systems, managed to ensure the long term protection and maintenance of biological diversity, while providing at the same time a sustainable flow of natural products and services to meet community needs (IUCN, 1994a) are classified as Category VI sites.

On the basis of current information, there are 445 Category VI sites in the Asia Pacific region, covering 0.54% of land area and accounting for 6.2% of all the land protected in the region. The contribution of these protected areas is therefore modest at present. However, there are indications that the rate at which managed resource protected areas are established could increase. All the recently created National Biodiversity Conservation Areas (NBCA) in Lao PDR (Berkmuller, *et al.*, 1995) are considered to be Category VI, although the intention is to establish more strictly protected core zones in due course. Participatory management, to the extent of negotiating boundaries and participating in the field management are some of the key aspects of protected areas development in Lao PDR. This may serve as a precursor for further community oriented solutions (see Fuavao, 1993; Kothari, 1996) although there will be a continuing need for strictly protected areas where no exploitation can be tolerated.

The concept of 'bioregions' has been developed as a step towards wider landscape-level management to satisfy both development and conservation priorities (WRI/IUCN/UNEP, 1992). Human needs are reconciled with biodiversity conservation, and protected areas integrated into natural and semi-natural surroundings in a bioregion. A variety of protected areas ranging from strict protection, national or state parks, areas of controlled extraction and areas of permanent forest estate for timber production are key elements in a bioregion. The concept moves away from the strictly protectionist model to a more community-oriented solution, and will, in an

optimistic outlook, play a growing part in securing conservation and development objectives to 2010 and beyond.

As an example, the use of buffer zones and corridors is being actively promoted in Europe as a means of securing the conservation value of core protected areas. The Natura 2000 policy is designed to promote the creation of a coherent network of protected areas across Europe, and the development of wider, landscape level management is seen as an important tool in achieving this target (Felton, 1996). Such developments have been approved at Ministerial level under the Pan-European Biological and Landscape Diversity Strategy (CoE/UNEP/ECNC, 1996). The Strategic Action Plan 1996-2000 specifically identifies the establishment of an international network of protected areas, coupled with the integration of biodiversity conservation into other sectors. This integration process holds considerable promise for other parts of the world, including Asia-Pacific. A resolution passed at the October 1996 IUCN World Conservation Congress draws attention to the global significance of ecological networks, connected by areas of natural and semi-natural habitat, in which protected areas, corridors, rehabilitation zones and sustainable land use can be reconciled.

3. REPRESENTATION OF ECOSYSTEMS IN EXISTING PROTECTED AREAS NETWORKS, AND PRIORITIES FOR THE FUTURE DEVELOPMENT

3.1 Forces Driving Protected Areas in Asia-Pacific to 2010: System Design Principles for a Successful Outcome

All three scenarios indicate there will be more protected areas in the future. The question remains therefore as to where these new protected areas should be located and how should they relate to existing areas. Since it is impossible to predict what species will be useful in the future, and because almost all habitat types on the planet contain some unique species, conservation strategies should attempt to preserve viable examples of all distinct ecosystems and all species. To implement such a policy there should be at least one, and preferably more, protected areas in each distinct biogeographic zone and within each zone every major habitat type should be represented in a protected area. The following model for an effective protected areas system design is recommended for consideration. The design is based on regional objectives, but the respective responsibilities of individual countries will depend on their size and content.

1. Major biogeographic divisions must be identified and a representative system of protected areas established in each.

2. Within each biogeographical division, the main priority should be the establishment of large, major ecosystem protected areas selected to include a continuum of many habitat types including, if possible, the richest examples of those habitats, major ecotones and viable wildlife populations.

3. Smaller protected areas should augment these major reserves by protecting additional habitat types or covering regional variants of habitats.

4. Small protected areas may be included in the system to provide additional recreational, educational or research facilities or to protect unique sites of special interest.

The policy message is that effective conservation areas, that capture adequate samples of biodiversity throughout the region must be based on scientific studies, and not political expediency. Such studies may produce results that are uncomfortable for governments, such as placing land with high development potential under protection for biodiversity. In many cases, existing protected areas have been chosen on the basis of minimum competing land use pressures, but this has lead to imbalanced networks (even when these are extensive) and the omission of those habitats that are actually under the greatest threat.

Even protected areas systems that fulfil these design principles will still be destined for failure if there is insufficient consideration given to effective management. What comprises effective management will be specific to each protected area. The IUCN management category system encourages governments to consider a wide range of management strategies, appropriate to meet clearly defined objectives.

Perhaps more important than the extent to which protected areas networks might or might not grow from the present day to 2010 are questions concerning the efficiency with which the fullest complement of biodiversity is included in protected areas. In addition, many protected areas throughout the Asia-Pacific Region are considered to be 'paper-parks', being conservation areas in name only. Emphasis should therefore be put on good system design, and ensuring that those areas that have been or will be established receive sufficient support such that the objectives for which they were set up can be achieved in both the short and long term.

There has been no single study of all ecosystems found in the Asia-Pacific region, and their representation with protected areas networks. However, there have been several national or sub-regional studies, covering for example, South and South-East Asia (Murray, *et al.*, 1995), the very similar Indomalayan Region as defined by Udvardy (MacKinnon, 1996), China (MacKinnon, *et al.*, 1996) and the Pacific (Dahl, 1986). Other global studies have been carried out, designed to identify areas of the highest conservation potential, and which should be regarded as priorities by governments in establishing new or enlarged protected areas. These include identification of endemic bird areas (ICBP, 1992) and centres of plant diversity (WWF/IUCN, 1995). If the growth of protected area systems indicated in all the scenarios is realised, then these studies should provide the basis for identifying the location of new or extended sites.

3.2 Analysis of Current Protection by Ecofloristic Zone

Murray, *et al.* (1995) carried out a pan-tropical review of protected areas coverage which permits a discussion of not only the adequacy of representation in existing protected areas, but also comparisons with other parts of the world. The study provides for the first time a comprehensive assessment of the conservation status of terrestrial biodiversity throughout the tropics. Using the classification system of ecofloristic zones developed by the Centre National de la Recherche Scientifique (University of Toulouse, France) and that of closed moist forests developed by WCMC and IUCN, the protected area coverage of tropical habitats was examined and gaps identified in five regions: tropical Africa, South and South-East Asia, Insular South-

East Asia, tropical South America, and Central America and the Caribbean. Tropical China, Australia and the South Pacific were not included.

The classification system of ecofloristic zones (EFZs) was developed in order to standardise the existing vegetation classifications and is based on climate, physiognomy and vegetation structure, edaphic factors and dominant or characteristic forest species of indigenous flora. A classification of moist forests was developed by WCMC and IUCN to integrate national datasets and produce a pantropical forest map. The system is currently limited to closed moist forest, except in Latin America where closed dry forest and pine forest is also recognised. Open forest/woodland and savanna woodland have not been included. Datasets are mostly from the late 1980s but some are earlier than this.

The study identifies EFZs and forests with little or no protected areas coverage. It also distinguishes countries with *de facto* sole responsibility for conservation of an EFZ by virtue of their near exclusive territorial jurisdiction of that EFZ.

Globally, it was found that 7.7% of tropical regions and 12.2% of moist tropical forests are conserved within protected areas. Protected area coverage of ecofloristic zones is shown to be uneven, with better protection of moist zones and forests compared with dry ones. Future conservation actions should focus on improving the management of existing protected areas in moist zones, and on expanding protected area networks in drier zones. Regarding moist forest types, over 20% of sub-montane and montane forest types are protected but only 5% of inland swamp forest is protected. Some 12.4% of lowland rain forest occurs within protected areas.

The lowest regional level of representation in protected areas (3.6%) was in South and-South-East Asia. Tropical South America has the highest level of protection (9.8%). Protection of the other regions is intermediate, some zones being poorly represented and others well represented in protected areas. Moist forests are least protected in Africa, where 7.6% of all moist forests are under protection and only 6.9% in the case of lowland rain forest. Tropical South America has the highest level of regional protection, with 15.1% of all moist forests and 14.4% of lowland rain forest within protected areas.

3.2.1 South and South-East Asia

Twelve countries in South Asia and South-East Asian were considered (Bangladesh, Bhutan, Cambodia, India, Lao PDR, Malaysia (Peninsular), Myanmar, Nepal, Pakistan, Sri Lanka, Thailand and Viet Nam).

Ecofloristic zones

The EFZs of South and South-East Asia vary in size from a small patch of sub-tropical hill forest in Sri Lanka (EFZ 36) to a large area of dry deciduous forest in India (EFZ 18) which is some 5,100 times greater in area. Of the 39 EFZs in the region, only five have more than 10% of their area protected by conservation areas, 11 have less than 1% of their area protected, including four with no protection at all (evergreen and semi-evergreen forest in Viet Nam; deciduous and mixed forest in Cambodia; temperate and alpine forest and scrub in Pakistan; and sub-tropical hill forest in Sri Lanka).

India is much the most diverse country with 26 EFZs represented. Seven countries in the region (Cambodia, India, Peninsular Malaysia, Myanmar, Pakistan, Sri Lanka and Viet Nam) each contain entire EFZs within their territories and, therefore, are ultimately responsible for their protection. India contains over 50% of 15 EFZs, and four of these are found nowhere else, emphasising the regional importance of this country for habitat conservation.

There are compelling arguments for national conservation action where a country has a high proportion of an EFZ and little of it is currently protected by that country: the priority in such cases is to expand the exiting protected areas network. In cases where there is already good representation in protected areas, or where an EFZ is spread over several countries, the priorities may lie in strengthening management.

Moist forests

The majority of moist forest in South and South-East Asia consists of lowland rain forest and lowland monsoon forest, which occur in all countries in this sub-region, with the exception of Pakistan. A negligible amount of lowland rain forest occurs in Bhutan. Inland swamp, lowland rain forest and montane monsoon forest are well represented in protected areas in South and South-East Asia, but mangrove, montane rain forest and lowland monsoon forest are less adequately protected.

Myanmar contains over 50% of montane rain forest but none of it is protected; it also contains large areas of lowland rain forest with virtually none protected. Large areas of mangrove are found in Bangladesh and Thailand with little protection. India has large areas of lowland and monsoon rain forest with relatively small amounts protected. Peninsular Malaysia has large areas of inland swamp forest with little protection.

3.3 Insular South-East Asia

The six countries of Insular South-East Asia included in this analysis are Brunei Darussalam, Indonesia, Malaysia (Sabah and Sarawak), Papua New Guinea and the Philippines.

3.3.1 Ecofloristic zones

The EFZs of Insular South-East Asia vary in size from a small patch of evergreen forest on Sumba (EFZ 6) to a large area of lowland evergreen forest west of Wallace's line (EFZ 1), which is some 475 times greater in area). Of the 17 EFZs in the region, eight have greater than 10% of their area protected by conservation areas and only one (EFZ 12 - Alpine grasslands and scrub in Irian Jaya and Papua New Guinea) has less than 1% under protection.

Indonesia is much the most diverse country with all 17 regional EFZs represented, and Indonesia, Papua New Guinea and the Philippines each include 50% or more of some EFZs. Five EFZs are found exclusively within Indonesia, emphasising the international importance of this country for conservation of unique habitats.

3.3.2 Moist forests

The majority of moist forest in Insular South-East Asia consists of lowland rain forest which occurs in all the countries in this sub region. Mangrove, montane rain forest and montane monsoon forest are well represented in protected areas, but inland swamp, lowland rain forest and lowland monsoon forest are less adequately protected.

Indonesia contains over 50% of five types of forest: mangrove, inland swamp, lowland rain forest, lowland monsoon forest and montane rain forest, three of these being less than adequately protected. The Philippines has over 50% of montane monsoon forest, over half of which is protected. Papua New Guinea has large areas of montane rain forest which are poorly protected.

3.4 Discussion

The analysis identifies priorities for conservation interventions at national and regional levels. A number of EFZs fall entirely within the territory of single countries, highlighting their exclusive responsibility for conservation in Cambodia, India, Malaysia, Myanmar, Pakistan, Sri Lanka, Viet Nam and Indonesia. It has also been shown that the level of protection of EFZs varies widely and that some have no protection at all. Given the likelihood that governments are still willing to establish new protected areas, analyses such as this should form the basis for deciding where such areas should be located. Green *et al.*, (1996) cite specific national priorities. As just one example, the analysis shows that the highest priority for the conservation of lowland evergreen and hill forest in South-East Asia rests with Thailand and Malaysia. The analysis also provides a scientific basis for international cooperation, where ecofloristic zones cross political boundaries.

3.5 Review of Indomalayan Protected Areas Systems

3.5.1 Aims and scope

The Review aimed to examine the existing system of protected areas of the Indomalayan Biogeographical Realm, with a view, *inter alia*, of evaluating representational coverage, identifying gaps; evaluating proposed reserves and other important areas and identifying priorities for strengthening protection. This approach can help provide information additional to that developed in the EFZ analysis as it considers issues such as the rate at which natural habitats are being lost and the effectiveness with which existing protected areas are managed. Two key indices were used to identify priorities: the biodiversity index and conservation importance index.

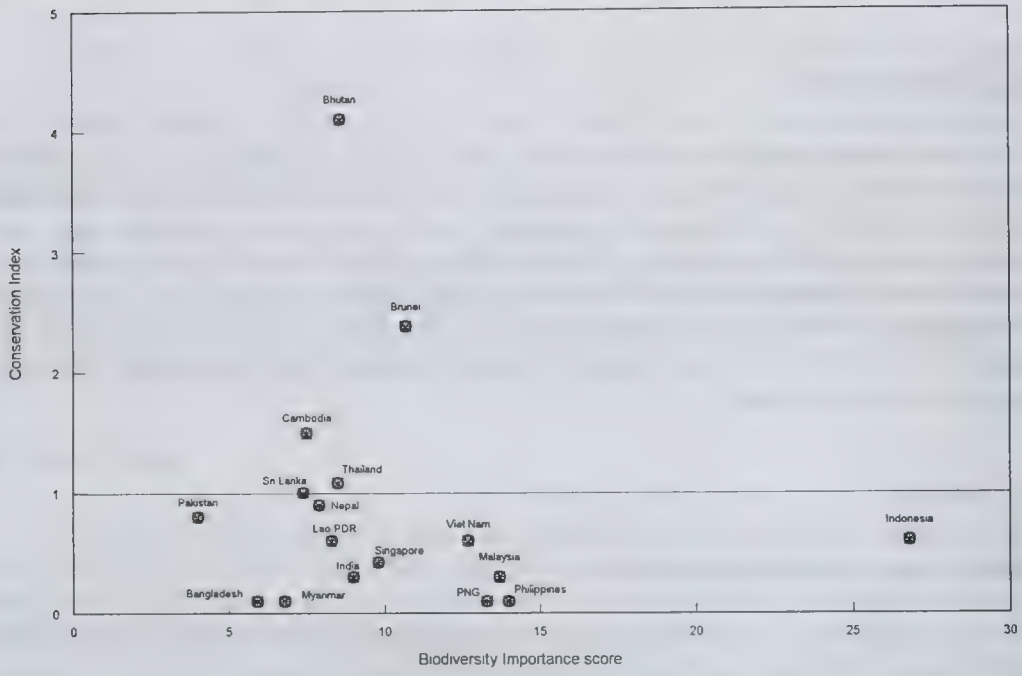
3.5.2 Results

Biodiversity and conservation indices

The Biodiversity Index (BI) reflects the relative importance of a country for biodiversity conservation, per unit area. The Conservation Index (CI) gives a measure of how well a country is protecting its biodiversity, relative to the expected need. Thus, a relatively low diversity country with a good protected areas system will have a high CI score (>1.0), whilst a high diversity country with a weak protected areas system will have a low CI (<1.0). Countries that have a high Biodiversity Index must do proportionately more, in terms of the size of protected areas networks, or the effectiveness of management, compared to countries with a lower Biodiversity Index. As Figure 2 illustrates, the greatest conservation burden within the Indomalayan Realm falls on Indonesia, due to its very high biological diversity. In contrast Bhutan, which is a medium diversity country by Asia-Pacific standards, has recently redesigned its protected areas network in line with best conservation practice and is also achieving relatively good management effectiveness. Consequently, it scores a very high Conservation Index, indicating a situation that, at present, is satisfactory. Most countries at present however are falling short of the conservation effort required to adequately protect their biodiversity.

Table 4 provides the Biodiversity Importance and Conservation Index scores for tropical countries in the Asia-Pacific Region. This table includes a spread of BI values, from Indonesia scoring by far the highest at 26.8, to Pakistan scoring 4.0. Other high scoring countries include Philippines 14.0; Malaysia 13.7; and Papua New Guinea 13.3. These correspond with well-recognised biodiversity hot spots and reflect the add-on richness of countries which span several biogeographical units.

Figure 2
Country Scores of Biodiversity Importance (BI) and Conservation Index (CI)



The results of the CI analysis show those above 1.0 consist of Brunei (2.4), Bhutan (4.1), Cambodia (1.5), Sri Lanka (1.0), and Thailand (1.1). In other words, these countries are doing as well as can be expected in providing for conservation of biodiversity, at the present time. However, as more habitat is lost and development pressures grow, these scores may fall, unless there is compensatory action in the form of better management or additional protected areas. A number of other countries come close but the lowest scoring countries are Bangladesh (0.1), India (0.3), Myanmar (0.1), Malaysia (0.3), Philippines (0.1), Papua New Guinea (0.1) and Viet Nam (0.2), all falling short of the conservation effort required to secure their biodiversity. From a global perspective, of these low scoring countries, India, Viet Nam, Papua New Guinea, Philippines and Malaysia are all in the top twenty biodiversity countries in the world (Table 1).

It is a reasonable expectation that all countries could reach a Conservation Index of 1.0 or higher by 2010 and specific measures to do are very briefly summarised in Annex 5.

3.6 China: Priorities for the Future

China occupies a special place in the Asia-Pacific Region, on account of its very large human population, physical size and exceptional biodiversity. China contains a very wide range of physical conditions, ancient centres of evolution and dispersion, and many areas that have served as Pleistocene refugia during glacial periods. China faces severe environmental problems, not least due to a massive and growing human population that is largely dependant on natural resources for its livelihood. There are also important hurdles in the form of a lack of awareness

amongst government officials, and a subsequent dearth of financial support and training for environmental protection programmes. To identify key areas for protection, China has been the subject of a biodiversity review (MacKinnon, *et al.*, 1996) using a methodology similar to that used for the Indomalayan Realm.

MacKinnon, *et al.* (1996) reviewed the extent of original and existing vegetation, and the success with which it is protected. This is used in conjunction with information on biogeography and biodiversity hotspots to make recommendations for additional reserves, or extensions to existing sites, on a province-by-province basis.

It is government policy, in line with the *Biodiversity Conservation Action Plan*, formulated in 1994, to further extend the existing protected areas system to between 800 and 1,000 nature reserves covering 10% of the country by the end of the current decade.

The most important sites, considered to be of global significance are identified in the biodiversity review. The 40 sites are well distributed to cover the best possible spectrum of ecosystems and many are formed by linking or extending existing sites. The priority for protected area development in China in the period to 2010 will be the implementation of the recommendations made in this assessment.

Table 4 Country scores of Biodiversity Importance (BI) and Conservation Index (CI)

Country	BI	CI
Bangladesh	5.9	0.1
Brunei	10.7	2.4
Bhutan	8.6	4.1
Indonesia	26.8	0.6
India	9.0	0.3
Cambodia	7.5	1.5
Lao PDR	8.3	0.6
Sri Lanka	7.4	1.0
Maldives	5.2	0.6
Myanmar	6.8	0.1
Malaysia	13.7	0.3
Nepal	7.9	0.9
Pakistan	4.0	0.8
Philippines	14.0	0.1
Papua New Guinea	13.3	0.1
Singapore	9.8	0.6
Thailand	8.5	1.1
Viet Nam	12.7	0.2

4. INVESTMENTS IN PROTECTED AREAS IN ASIA-PACIFIC

Data presented in Table 2 and Annex 4 indicate the extent of national protected areas networks. These data can be interpreted in quantitative terms of the physical extent of system, and to a greater or lesser extent, the natural ecosystems and species that are contained within their boundaries. However, there are important qualitative dimensions missing from such an analysis, including the level of commitment from governments to maintaining established sites as viable conservation areas. One indirect measure of commitment can be derived from levels of investment made by governments, in terms of both financial support, and the number of staff. Since the 1992 UN Conference on Environment and Development, the flow of financial resources for biodiversity conservation has emerged as an area of key concern for the international community. There is now widespread recognition of the need for cross-country data on such financial investments.

A recent study (James, *et al.*, 1996) has for the first time provided internationally comparable data on national investments in protected areas, covering financial and human resources. As prior to this study there were no equivalent data, trends cannot be estimated.

Results from the survey indicate that some US$6.2 billion are invested annually in protected areas around the world, with a mean of US$776 per square kilometre. The global mean level of staffing is 24.5 per 1,000 square kilometres.

Data collected from protected areas management agencies in the Asia-Pacific region is briefly summarised in Annex 6. Of the 39 countries in the Asia-Pacific Region, data were collected from 22. In a number of cases, for example Malaysia and Australia, data from sub-national agencies has been aggregated. Information was not forthcoming from two of the most significant countries in the Asia-Pacific region in terms of biodiversity, namely India and Indonesia. In addition, data were not available for Japan, the wealthiest nation in the region. Consequently, the finding of this survey should be treated with caution.

Table 5 Summary: protected areas budgets by IUCN Commission on National Parks and Protected Areas (CNPPA) regions

Region	Mean budget (US$ per sq. km protected)	Mean staff per 1,000 sq.km protected
South Asia	175	81
South-East Asia	509	29
East Asia	197	432
Australia	359	2.6
Pacific	1,015	14.98

Table 5 compares the regional budgets on the basis of mean expenditure per square kilometre of protected areas (defined as those sites classified as IUCN Management Category I-V), and the number of staff available to management agencies per 1,000 square kilometres of

protected areas. These two measures can be taken as reasonable indicators of the intensity of management and the level of commitment.

One region has mean rates of investment higher than the global average of US$776 (Pacific) whilst all others are lower. The mean figure for East Asia (US$197) masks very wide discrepancies. Some East Asian nation's budgets are in fact the highest in the world in terms of investment per square kilometre, especially those of Taiwan, Hong Kong and South Korea. The inclusion of China reduces the mean figure considerably, although it is likely that Japan also has a higher than average rate of investment. Besides reflecting the availability of financial resources, the high rate of investment also reflects the intensity of pressure on protected areas, requiring an intensive management response. The level of staffing in countries in East Asia for which data are available is the highest in world.

In contrast, the mean rate of investment in Australia is amongst the lowest of all the developed regions in the world at US$359. However, it would be a mistake to assume that this indicates a low level of commitment as there is substantial evidence, both from the size of the protected areas estate in Australia, and through numerous policy statements and legal enactments to indicate a generally high level of commitment. Instead, the low figures in Table 5 are a reflection of the low level of pressure on protected areas. Sites often comprise extensive areas in remote regions, thus requiring minimal management input. The provision of staff at a rate of only 2.6 personnel per 1,000 square kilometres of protected areas is a further reflection of the high level of natural protection enjoyed by many of Australia's protected areas.

The mean figure of US$509 for South-East Asia disguises wide discrepancies within the region. Investments varies from as little as US$1 (Lao PDR) to US$3,769 (Brunei Darussalam) per square kilometre. These two countries have very different backgrounds, the former being one of the poorest nations and the latter one of the richest. Furthermore, protected areas have existed in Brunei for a number of years with an established legal and administrative framework. In contrast, Lao PDR has only initiated a protected areas programme in the last three years and is still heavily reliant on international donors. It remains to be seen whether countries such as Lao PDR, Cambodia and Viet Nam, countries of considerable international importance for biodiversity conservation, can find sufficient resources during the next 15 years to replace the tenuous support of international assistance. It is worth noting that even in instances where the financial inputs are modest, the level of staffing is still relatively high. Indeed both Myanmar and Thailand have staffing levels greater than the global average.

A similar pattern emerges in South Asia, where in general budgets are low on a world scale, but staffing is high. What is not revealed in these data is whether or not the higher levels of staffing compensate for the lack of financial resources. Infrastructural support, such as vehicles, radios and training, may be inadequate or absent, thus leaving staff relatively powerless.

Data for the Pacific are dominated by a limited number of countries, two of which, Fiji and New Caledonia, have high levels of mean investment and staffing, due in the former case to having only a very modest protected areas network. The Pacific includes New Zealand which has characteristics typical of a developed country (a relatively high mean investment of US$898 but relatively low staffing at 15 per thousand square kilometres). Papua New Guinea, a mega-diversity country, stands out as priority for international assistance. Despite only a modest

formal protected areas network compared to the size of the country, the level of investment is low (US$211) and the level of staffing is low (14 per thousand square kilometres).

4.1 Trends and Prospects to 2010

James, *et al.* (1996) have shown that there is a strong correlation between national income and financial investments in protected areas. On this basis, it likely that the availability of resources will be largely driven by economic growth in the region. The benefits accruing from such a trend may be offset by increased resources exploitation, pollution and increasing recreational pressure on protected areas from mobile and urbanised populations. It may also be the case that pressure on forest resources will be deflected from national resources and towards those overseas in other nations.

The principle difficulty in projecting likely trends to 2010 is that there are no historical and comprehensive data upon which conjecture can be reliably based. However, it is hoped that this information gap will be filled in due course, as state parties fulfil the reporting obligations under the Convention on Biological Diversity.

5. CONSERVATION, SUSTAINABLE USE AND MANAGEMENT OF FORESTS OUTSIDE PROTECTED AREAS IN THE ASIA-PACIFIC REGION

5.1 The Economic and Social Significance of Forests in the Asia-Pacific Region

There is a great diversity of contexts in which both conservation and destruction of tropical forests occur in the vast Asia-Pacific region. There are many actors involved (societies, governments and industries), responding to very different pressures. Only by understanding the interactions between them, will it be possible to understand the broad trends and to identify the potential to modify the driving forces through reform of existing policies or institutions, or by international monitoring or compensatory arrangements, to achieve socially and environmentally preferred outcomes.

It is difficult to assemble comprehensive evidence of the importance of forest products to rural people in Asia-Pacific. Official statistics provide little assistance, because most production, consumption and marketing of non-timber forest products (NTFP) is outside the formal economy. However, as one example, a study in Sri Lanka (IUCN-Sri Lanka, 1993) suggests that as many as 90% of rural communities are dependant on firewood for cooking. While there are probably very few who survive solely from forests, evidence presented by Lynch (1992) suggests that several hundred million people in the Asia-Pacific region earn much of their subsistence and/or incomes, from-non-industrial forest products, through collection, marketing or simple processing activities such as handicrafts, furniture making or food-processing. While most of these people are in rural India, Bangladesh, Pakistan, western China and outer Islands of Indonesia, such people are also found in virtually every developing country in the region.

Forests are also of great cultural significance to many communities throughout the region, illustrated by the Sacred Groves of India, and very conservative management practices of many cultural minorities in Yunnan or the Philippines, Dyaks in Borneo, and many peoples throughout Melanesia[6].

Both upland and lowland populations benefit from watershed management and catchment protection functions of all forests. These and other amenity values are explicitly recognised by societies and governments in such diverse contexts as the Indian Himalayas, northern Thailand and the Philippines. This has even led to logging bans in the latter two countries[7] and severe local restrictions in most[8], in order to protect highly-valued (but non-monetary) benefits from retaining forests in catchments.

The cultural importance, subsistence value and environmental protection, all provide an ethical basis for local users to have a strong voice in management of such forests, including those found in protected areas. Furthermore, there is evidence that community management systems in many countries (e.g. Fisher 1989, 1990 from Nepal) can be sustainable, productive and equitable.

5.2 Forest Conservation Outside Protected Areas - Major Trends and Driving Forces

5.2.1 Major trends

Governments across the region recognise a spectrum of forest uses ranging from:

- Preservation and complete protection on the basis of strictly protected areas
- Protection Forests (typically catchment areas in which collecting NTFPs, but very little or no logging or clearing, is permitted)
- Production forests (notionally multiple use but timber is usually the primary or only objective in practice) and

[6] "Forests, particularly in developing countries, are intimately interwoven with the lives of hundreds of millions of people with bonds that are equally social and economic" Statement by Indian Minister of Forests, Kamal Nath, to Ministerial Meeting of the FAO Committee on Forestry, Rome, March 16, 1995.

[7] "A ban on logging operations in the old growth or virgin forests and shift of timber harvesting to second growth or residual forests have already been effected. All virgin forests are now considered part of the Integrated Protected Area System and shall be managed for biodiversity conservation. Simultaneously, buffer zone areas are also being established to prevent people from encroaching into NIPAS while limited production forests within proclaimed watersheds are being introduced to provide alternative livelihood opportunities to people already occupying these areas." Statement by Philippines Minister of Environment and Natural Resources, to Ministerial Meeting of the FAO Committee on Forestry, Rome, March 16, 1995.

[8] "At the 25th South Pacific Forum meeting, Australia, New Zealand, Fiji, Papua New Guinea, Solomon Islands and Vanuatu agreed to have a common code of conduct governing logging of indigenous forests to which companies operating in these countries have to adhere." Statement by Fiji Minister of Agriculture & Forests, to Ministerial Meeting of the FAO Committee on Forestry, Rome, March 16, 1995.

- Conversion forests where clearing and colonisation is permitted or even encouraged.

In many countries, emphasis has been on industrial logging and conversion, while forest conservation outside formal reserves and protected areas has not been a priority. Pressures to convert some forest lands to agricultural, infrastructural, industrial and urban uses persist, as these are often considered signs of economic development. However, India has been extremely successful in stopping diversion of forest lands to other uses, through new Forestry legislation of 1990.

In the more affluent countries of the region, there is no net deforestation now. Rather there are continuing expansions of their forest estates through: the cessation of land clearing for agriculture (Australia and New Zealand); the addition of new plantations; through (consequently) much lower rates of logging of natural forests; and accelerated regeneration of successional forests on lands that have previously been cleared for agriculture or pasture. This trend of declining importance of natural forests for timber production, but increasing conservation, habitat, amenity and watershed values, is beginning to emerge in the rapidly developing countries of the region.

5.2.2 Driving forces for deforestation

The process of deforestation occurs at two levels: agents and causes. The agents of deforestation refers to those who physically (or through instructions to their employees) convert forests to non-forest uses: small-holder farmers; owners of plantations and estates; forest concessionaires; infrastructural development agencies). FAO has characterized deforestation in Asia as a combination of relatively large operations (as in Latin America) and rural population pressure (as in Africa), involving a conversion of closed forest to long and short fallow, and to plantations and non-forest uses. Often, various kinds of agents operate in the same location, making it impossible to segregate them analytically one from the other. Some operate inter-dependently (cattle ranchers supplying small-holders with chain saws) or sequentially (small-holders occupying abandoned timber concessions).

Causation refers to all the factors that shape the agents' decisions to deforest. These factors may be market-driven (e.g., international prices of agro-export commodities), economic (e.g., a sudden large currency devaluation), legal or regulatory (e.g., a change in land tenure laws), institutional (e.g., decision to deploy more forest rangers to particular area), or political (e.g., a change in the way forest concessions are allocated). It is necessary to understand these underlying causes in order to influence the behaviour of agents and lessen the deforestation rate.

The evidence suggests that individuals and businesses deforest inappropriately because it is their most profitable alternative. To get them not to deforest, either deforestation must be made less profitable or other alternatives must be made more profitable. Deforestation can be made less profitable by reducing the demand for products produced on cleared land, increasing the unit costs and riskiness of production, or eliminating speculative gains in land markets. Alternatives to deforestation can be made more profitable by increasing the profitability of maintaining forests and increasing the opportunity costs of labour and capital. Each national situation is different, much uncertainty remains about key cause and effect relations, and there

are usually trade-offs between policies' effectiveness, ability to be targeted, political viability, and direct and indirect costs.

Conversion to unsustainable land uses and serious degradation of tropical forests[9] thus occurs due to a number of driving forces.

- Migration, colonisation and land grabs: The creation of permanent or temporary farms (legally or illegally) through spontaneous migration or under official schemes, occur in many parts of Asia-Pacific. Often, the traditional swidden agriculture or 'forest farming' activities of small numbers of indigenous forest people are included in this category, though usually the impacts on Biodiversity are quite different.

- Alternative land uses at landscape level: Ranching, pasture development, plantation agriculture tree-crops (rubber, cinnamon, cocoa, oil-palm, etc.), or even exotic timber plantations (e.g. *Acacia mangium, Eucalyptus camaldulensis*) are common in many parts of South and Southeast Asia.

- Significant industrial logging for the international tropical timber trade now occurs only in seven developing countries of the region[10], although most still have commercial logging operations for domestic markets (which are very large for China and India).

- Fuelwood gathering may be a predominant contributor in drier or high-altitude parts of Asia (e.g. parts of Nepal, China and Pakistan; Eastern Indonesia).

Most authorities highlight the roles played by shifting cultivators, the expansion of agro-export crops, the use of fire, controlled as well as uncontrolled logging activities, and fuelwood gathering. Uneven land distribution, civil unrest, infrastructural development, industrialisation and urbanisation are sometimes mentioned, but population growth is often listed as the major force increasing pressure on natural resources, leading to conversion from forest to unsustainable agriculture or degradation of both conservation and timber values.

5.2.3 Determinants of these trends

Forest policies (or more generally, policies affecting land use directly or indirectly) are critical to conserving forest resources as well as improving the situation of people most dependent on the resource. Poffenberger (1990) has argued that, for Southeast Asia, the gradually intensifying conflict between State land management policies and local forest use systems is a major obstacle to conservation and sustainable management. Instead, it has been a cause of deforestation and mismanagement of forest resources. If so, better mutual

[9] Deforestation is taken to mean a permanent change of land use. If one hectare of secondary forest is cleared by swidden cultivators, and allowed to re-grow towards a mature forest, after one or two years of cropping, that is considered disturbance or degradation, but not deforestation. Degradation means a substantial decrease in the ability of the forest to supply particular *specified* benefits, so the term needs to be qualified e.g. degraded with respect to timber production potential, or for watershed protection, or for conservation of biodiversity.

[10] Specifically, Indonesia, Malaysia, Myanmar, Cambodia, Laos, Papua New Guinea and Solomon Islands (and to a small extent, in a few others).

understanding between governments, foresters, indigenous forest dwellers, migrant farmers and loggers will be essential for managing forest resources and reforming inappropriate forest policies.

Government forest policies focusing on timber production and, more recently, on plantation establishment (i.e. the pro-industrial approach) may have damaged the forestry economic base. Exploitation of the once-abundant resource has only rarely resulted in the expected economic growth and industrialisation in the areas where the forest resources were located. (Westoby, 1987).

In the Asia-Pacific region, the forestry sector has been progressively changing from a-"pro-industrial" approach to more of a "development from below" approach (Gilmour and Fisher, 1991), sometimes leading to partial handover of forests to local control.

Despite the successes of Joint Forest Management in India and land-tenure reforms in China, the idea of rural communities having secure access to NTFPs within forest boundaries is still generally considered radical, (Malla 1992, for Nepal). The implementation of Joint Forest Management in India still places quite strict limits on role of the community and their share of the benefits, the degree of community influence on management, and even which forests are eligible. Finally, the Forest Department can unilaterally cancel the agreement at any time, and for unspecified reasons.

Thus, while forest policies are slowly changing, the predominant focus still is on production forestry and then on protection, though it is obvious that forest industries and particularly logging operators can rarely be controlled adequately. An exception is the recent forestry policy on Sri Lanka which places top priority on conservation.

The industrial focus on wood products and the appropriation of forests by state governments, and neglect of traditional forest uses for timber and non-wood forest products has led to-land-use changes despite forest policy efforts aimed at resource conservation. The process of resource degradation was made worse by restricting peoples' rights to use land and neglecting their traditional uses as well as their capacities to protect and preserve forests.

Attempts by national governments to protect forests of high conservation value from local people, without engaging them in the process and without ensuring that local populations actually benefited from such conservation, have frequently failed, or even had the opposite effect. Indigenous shifting cultivators are widely blamed by governments and industry throughout Asia (but not in the Pacific where shifting cultivators are the ethnic and political majority) as the major cause of forest destruction. Many government foresters thought that rural people were incapable of conservation, forest management and tree growing.

Yet recent analyses, for example, Warner (1991), Cramb (1993), Dove (1993) and Colfer, *et al.* (1995) have concluded that these allegations are unjustified: the number of such forest-dwelling people and the scale of their forest interventions is small, and they typically possess a considerable amount of indigenous ecological knowledge about how to meet their subsistence needs with minimal environmental impact.

A new approach to protected area management which actively engages local people in decisions and management for conservation, and which ensures they are not disadvantaged by forest conservation measures, is currently being applied and evaluated in many parts of Asia. But in some cases, market integration, modernisation and interventions are threatening a breakdown of traditional forest use and traditional communal decision making. Governments and their citizens need to jointly develop effective shared responsibilities for broad scale forest conservation. The most telling finding of these recent reviews is that the problems are much larger than just the conventionally defined forestry sector - the answers must be found in the relationships with other sectors.

5.3 Integration of Conservation with Multiple Use and Industrial Forestry

The broad policy thrust espoused by Asian-Pacific governments can be gleaned from the statements made to the Ministerial Meeting of the FAO Committee on Forestry in Rome, 16 March 1995.

> *"**Malaysia** has expanded its permanent Forest Estate from 12.7 to 14.1 million hectares and dedicated 4.7 million ha representing 24% of the total forested area of 19.1 million hectares for the protection of the environment and conservation of biodiversity."*
>
> *"To maintain biological richness we (**Indonesia**) have set aside 496 million hectares of forests, or 25% of our land area as Totally Protected Areas (TPAs)."*
>
> *"The **Vietnamese** Ministry of Forestry has carried out two big programs: a forest land allocation program to allocate at least seven million hectares to the rural people to protect, to manage and to develop; and another program to re-green the bare land to increase the forest coverage from 28% to 40% by the year 2000 and to reduce poverty among the rural people"*
>
> *"All classified forest lands of **Bangladesh** will be included in a national protection system and be managed under a number of Multiple Use Management Areas. This concept would introduce a systematic approach to forest land management with landuse designated according to land evaluation, land capability assessment and suitability assessment. The 'core-buffer-multiple use zone strategy' could be used for the management of these Multiple Use Management Areas, from which the protection of Biodiversity could be accomplished while still gaining more social and economic benefits".*

These statements clearly indicate a move away from trying to achieve national conservation goals just through isolated and strictly protected areas, surrounded by largely unregulated land use.

Some of the indications that much higher emphasis is being placed on conservation outside protected areas include:

- promotion or requirement of reduced impact logging techniques;

- certification of forest management units as 'sustainably managed';

- and engagement with local and indigenous peoples in forest management, including recognition of indigenous knowledge and management systems, and of the importance of NTFPs.

Logging company decisions about whether or not to log "benignly" and then manage sustainably, depend on expectations of future returns. Those with secure tenure may decide to sustain, even improve their forests, if they are confident future benefits will be greater than the alternatives. Unfortunately, in many countries, such conditions are not met: logging companies think future forest values will be low, costs will increase, they fear political uncertainty or they have other more attractive financial options. This is not true of all commercial forest interests and certainly not of the reputable forestry companies that do manage and protect the forests under their control. However, those who log and then abandon forests, are effectively admitting that neither continuing forest management, nor any other possible land use, is commercially attractive to them.

It is commonly argued that logging causes deforestation in Asia, if not directly, then because the roads that are constructed open up new areas for spontaneous colonisation. The greatest threats to the conservation of remaining forests may come through roads which create access. The link between commercial logging and the disappearance of forests may be the creation of access. For example, the highest rate of population increase in the Philippine uplands was in the municipalities with logging concessions.

This is especially noticeable when there is very poor enforcement of forest boundaries by government agencies (e.g. Forest Service or National Parks Service) and an institutional or legal context in which people expect that land which they occupy, claim or 'stake out', will eventually be recognised, even legalised by the government. In Asia, rapid forest clearance by 'squatters' tends to occur where enforcement has been weak or ineffectual and where there are many unemployed or landless people, with very low incomes and few alternative livelihoods. But without these conditions, forests have been logged and remained under management, they were not cleared or seriously degraded, for example in Peninsular Malaysia.

To this point the focus has been on colonisation and forest conversion to other land uses by smallholders. Industrial logging is most likely to lead to permanent deforestation if it is associated with spontaneous small-scale settlement and conversion, or with large-scale-agro-industrial conversion. Governments of many Asian countries have deliberately and explicitly encouraged forest conversion in the past, and some (for example, Indonesia) still do, in both large-scale and small-scale forms, as well as through official resettlement programs, such as transmigration.

A broad view of the threats to the continued existence of tropical forests must be developed, if effective solutions are to be devised. In the Philippines or Viet Nam, for example, even if there were no sawmills or logging operations, deforestation might still continue, as people move up into the mountains looking for somewhere to earn a livelihood, even if it is temporary, illegal and marginal. And this is not due only or primarily to population growth rates. Even if the population was static, whenever agricultural workers are displaced by

mechanisation in commercial agriculture, or if urban workers cannot find employment in the formal economy, then 'a livelihood of last resort' may be to clear forests to make an illegal farm (Garrity, *et al.*, 1993).

Recent policy experiments in Tonga and Fiji, where governments have leased lands from traditional-customary owners, to be used as National Parks, provide interesting possible models to how local people can directly benefit from forest conservation. These trials suggest that these people are keen to retain their forests, and to continue enjoying their cultural, NTFP and amenity benefits, provided it does not cost too much to do so.

5.4 Future Directions for Forest Conservation Outside Protected Areas

5.4.1 Assuming the present level of action and policy environment

For this study, it may be useful to assign some probabilities to the question of whether governments' priority to conservation and biodiversity will rise, fall or continue at about current levels. Based on policy pronouncements of governments, participation in international negotiations and field experience, we subjectively assess that the continuation of current policies and institutions has a probability of about 30%.

The Asia Pacific region, especially East and Southeast Asia, is the fastest-growing regional economy in the world. This has three principal effects:

First, with increased incomes and more industrialised and urbanised lifestyles, increasing number of Asian citizens will attach much higher values to environmental conservation - not only for recreation and aesthetics, catchment protection and wildlife, but for the more abstract 'existence values'[11].

Second, the same changes will greatly reduce the pressures to derive marginal incomes by clearing or degrading forests and protected areas, as more people move to higher paid urban jobs. This trend is already clearly demonstrated in Republic of Korea, Malaysia and on the eastern seaboard of China.

Third, with economic prosperity comes the ability (as well as the desire) to funnel resources into biodiversity conservation - that is, it becomes affordable as well as desirable.

The status of forest conservation outside protected areas is likely to remain largely unchanged. Forests will continue to be exploited, but adoption of reduced-impact logging techniques may spread slowly, reducing some of the damage to production forests. Conservation will perhaps still be seen as just a matter of refugia - isolated areas allocated for conservation

[11] *"Demands for forests in Korea have diversified as our economic life improved along with accelerated industrialisation. The benefits of forests such as clean water, fresh air and recreation are now indispensable factors for enhancing the quality of life."* Statement by Korean Forests Administrator to Ministerial Meeting of the FAO Committee on Forestry, Rome, March 16, 1995.

because they have no better use. Industries will continue to come into conflict with traditional rural societies, and increasingly urban people will suffering a deteriorating environment.

On the other hand, conservation may receive more priority in all natural forest areas, especially if fast-growing industrial plantations reduce the need or commercial feasibility of logging natural forests. Even with continuing population growth, fewer people will seek to derive their incomes from forest exploitation, and more opportunities are likely to emerge in eco-tourism and related service industries. Economic development may help achieve forest conservation.

It seems reasonable to assume that in traditional societies, the NTFP extractors might be progressively incorporated into the modern economy as employment opportunities arise and as many of their traditional products become less sought-after in the modern market-places. Is the 'extractivist option' merely a short-term transition, pending modernisation, or could it be a viable livelihood option in the long term? Part of the answer will depend on the future of green consumerism, both in the Asia-Pacific region and in global markets.

5.4.2 Assuming sustained environmental campaigns

The probability that there will be sustained and effective environmental campaigns is subjectively estimated at about 60%.

The outcomes of increasing affluence with greater environmental consciousness in Asian societies for tropical forest conservation is likely to be revealed in many ways:

Much more rapid adoption of (even more radical) low-impact logging techniques in production forests, such as greater use of helicopter or balloon logging will become evident. Unless very strict environmental protection standards can be attained, all logging in natural forests may well be banned, as has already happened for example in Thailand.

Simultaneously, forest industries are increasingly likely to move towards a plantation basis, as their production efficiency increases and unit costs continue to fall (while the opposite trends are likely for most natural forest logging). Such plantations are likely to be quite different from the current large-scale exotic monocultures, being based more on mixtures, and/or mosaics of smaller uniform patches of plantation forests, interspersed with more natural landscapes and agriculture. A greater proportion of the industrial timber supply might eventually come from farm-forests, but such changes in the scale, composition, ownership and importance of plantation forestry are likely to evolve gradually, not change suddenly. As part of the gradual evolution, it seems likely that increasing emphasis will be placed on "biodiversity-compatible" plantations which can be very productive, while also contributing to landscape scale conservation objectives, as part of the multiple-use matrix surrounding high-priority protected areas.

International pressures and support for conservation in the region would bolster internal demands for enhanced conservation of forests, and may provide direct and indirect commercial support through, for example: certification and eco-labelling; eco-tourism; compensatory mechanisms under the Convention on Biological Diversity, the Framework Convention on Climate Change and other international treaties; and debt relief or debt-for-nature swaps.

5.4.3 Assuming specified deterioration in policy and action related to conservation

The probability of there being a reduced emphasis or effectiveness of forest conservation is believed to be low, about 10%, and then only in conjunction with major international economic disruptions such as recession with high unemployment; major trade struggles between powerful regional economic groupings; or the collapse of international tourism for some unanticipated reason.

The outcomes of this development are basically the opposite to the above: greater conversion of remaining natural forests to agriculture or timber estates; continued failure to protect priority conservation areas against the onslaught of people looking for lands to cultivate or resources to exploit.

5.5 Community forestry in Asia in 2010

Over the past decade community forest policies and programs have started emerging in many Asian nations. This shift is being driven by a complex blend of demographic, socio-political, environmental, and economic forces. This section briefly describes the contexts generating community forestry policies and new operational management systems, the current status of existing and potential community management systems, and likely scenarios for the year 2010.

5.5.1 Context

Beginning in the later part of the 19th century much of Asia's forest land was legally placed under the authority of the state with bureaucratic agencies established to oversee management. As forest nationalization policies were strengthened and field management systems implemented, the forest rights and practices of forest-dependent communities steadily eroded (Richards and Tucker, 1988). Since many of these groups were, and are still, dependent on forests for hunting and gathering and long rotation agricultural land, their management practices were often disrupted by the expansion of government control over forest resources. While legally dis-empowered, community forest management systems continued to operate informally throughout Asia. At the same time, they continue to be under growing pressures from an expanding influx of lowland migrants and commercial interests.

During the post World War II era, the growth of the international timber trade greatly accelerated commercial forest exploitation. Unsustainable felling practices and lack of-post-logging access controls created a pattern of "boom and bust" in the Asia forestry sector. Commercial timber production in nations like the Philippines, Thailand, and India peaked in the 1970s, with many Asia countries now net importers. During the 1980s, a growing number of countries passed timber export bans to help develop their domestic wood-processing industries. Today, only a limited number of countries in the region remain major international timber exporters, and even those nations now possess extensive areas of logged-over forest.

Many Asian government forest agencies currently face static management budgets, or are under pressure to cut operational staff. At the same time, the population of forest-dependent communities continues to grow. In India, there are an estimated 600,000 rural communities, many of which are dependent on forest products to meet a wide range of subsistence needs. The population of India will expand from 935 million in 1995 to 1.2 billion by the year 2010, yet India possesses only 1.7 percent of the World's forest stock (WRI, 1994). This pressure is reflected in 90 percent of India's total wood consumption being used for domestic fuelwood.

In Java, the Philippines, and many areas of rural, mainland Southeast Asia growing local populations and upland migrants are placing similar pressures on forests. In the Philippines, the population of the uplands has reached 17.5 million and is growing at a rate of 4 percent annually. Seventy percent of upland residents are migrants from the lowlands, many of whom hope to convert forest land to agriculture (WRI, 1994). Lowland-upland migrant pressure is a common pattern throughout many parts of insular and mainland Southeast Asia and underscores the need for clarifying land and forest usufruct rights.

Analysis of deforestation patterns in Asia indicates that in many areas the usurpation of local rights and responsibilities by governments, followed by outside commercial exploitation, established an environment where poorly or uncontrolled use dominated. With few or no rights, communities that had once been oriented toward sustainable use saw their best opportunity was to capture economic benefits before they were taken by outside private operators or neighbouring villages. Migrants took advantage of newly developed logging road access and the absence of effective access controls to open forest lands for farming. Since the 1960's, the combined environmental impact of these forces on Asia's forests have been dramatic (Poffenberger and McGean, 1993a, 1993b, 1993c, 1996)

Between 1981 and 1990, Asia's forest receded at a rate estimated between 1 and 1.2 percent annually (WRI, 1994). In addition to deforestation, much of the region's forests are under pressures and experiencing degradation and biomass depletion. Due to steady declines in forest quality and cover many communities are observing unfavourable environmental changes including declining hydrological function reflected in uneven surface run off, erosion, siltation and falling groundwater level; adverse micro climatic change; and the disappearance of important flora and fauna. An increasing number of communities are experiencing growing shortages of critical forest products used for housing, agricultural tools, fodder, fuel, medicine, food, ritual, and raw materials for small industries. Due to the very low income levels of millions of Asian households, these necessary products cannot be obtained through outside markets. A national survey in India determined that 67 percent of rural households make less than US$357 (Rs.12,500) per year, less than one dollar per day for a family of five (Raod, 1993). As a consequence of limited access to cash, many goods needed for survival are grown and collected from agricultural and forest land. Sustaining environmental services and meeting the needs of rural communities will become the priority goal of forest management in the 21st Century for most Asian nations. Given current demographic trends, this will only be possible if effective partnerships can be established with millions of forest user communities.

5.5.2 Status of Community Forest Management

While Asian communities have protested and struggled against the attempts of outside authorities and interests to gain control over forests and other resources, in recent years community perspectives have begun to gain ground. The growing centralization of control over the public forest domain, reflected in forest policies and investments in building agency infrastructure, has slowed and even started to reverse in some countries. Emerging political systems are giving greater importance to the needs of large electoral blocks in rural areas, donor agencies have channelled billions of dollars into forestry programs with increasing emphasis on community involvement, and communities themselves are beginning to take action.

Starting in the 1970s, villages in eastern India began voicing growing concerns over forest degradation and the role of forest departments and private companies. Throughout the 1980s and 1990s, without policy approval or programmatic support an estimated 10,000 villages in Orissa, West Bengal, and Bihar took control of nearly two million hectares of largely degraded state forest lands, and through their protection began to restore its ecological health and productivity. Similar movements have emerged in the Himalayas, western India, and the eastern and western Ghats.

Grassroots forest protection and management systems are active in many other parts of Asia as well, some based on older indigenous practices, others through newly formed institutions responding to perceived environmental threats. In northern Thailand, ethnic minority groups along the Burmese border have entered into micro watershed agreements, delineating new controls and use practices in response to growing population pressures and resource conflicts. While donor-funded government projects and NGO efforts have often helped establish these dialogues, other cooperative resource management agreements are based solely on community initiatives.

In north-western Viet Nam, long administered by the government as a semi-autonomous zone, some traditional systems of forest management are still functioning among some of the 50 ethno-linguistic groups that inhabit the uplands. Such indigenous systems are also active among the 25 ethnic minority groups of Yunnan. Ifugao and Kalinga communities of Northern Luzon in the Philippines have evolved sufficient political power to restrict the intrusion of commercial logging into their areas. Yet, while many indigenous communities are engaged in forest management, others are still struggling to regain rights and responsibilities to control local forest use. During the 1990s, in Kalimantan and Irian Jaya in Indonesia some indigenous communities blocked logging roads and burned timber company base camps in attempts to halt commercial logging operations.

The challenge of reintegrating communities formally into the forest management sector is complicated by the vast diversity of ethno-linguistic groups present in the region. While indigenous cultural communities are often a small proportion of total national populations, they are frequently the dominant populations in remote forest areas and may already be playing important roles in resource management. A global study (Clay, 1993) documents the presence of over 3,000 distinct ethno-linguistic groups in the larger Asia region of varying sizes (see Annex 7).

National governments in China, Thailand, the Philippines, India and other Asian countries are attempting to establish dialogues with these groups and develop collaborative forest management agreements. The challenge is to create negotiation processes that can overcome cultural differences and link informal community resource governance systems with national societies. Formulating enabling policies that effectively allow for a devolution of management rights and responsibilities must be complemented with operational strategies that allow new policies to be implemented.

5.5.3 Emerging Policy and Programmatic Trends

Many Asia countries are in the process of formulating policies that provide communities with opportunities for involvement in the management of public forests. Community involvement may be authorized through laws that recognize claims to ancestral domain, leases and contractual arrangements, stewardship certificates, group management agreements, and formal registration processes. With the exception of Papua New Guinea and some Pacific Island nations, no Asian government has established private community-based property rights (Lynch, *et al.*, 1995). While such laws would extend the greatest legal authority to communities to manage forest resources, major land law reforms are unlikely to take place by the year 2010 given existing political environments.

The Governments of Nepal, India, the Philippines, Indonesia and Thailand are developing time-bound, leasing arrangements that extend management rights and responsibilities to local groups. These new collaborative management approaches, while widely supported by donor organizations, have often been formulated centrally and are necessarily imperfect. Often reflecting anxieties of government forestry agencies reluctant to loose legal control, most new community forestry policies are tentative, providing only limited tenure security. Further, forest departments often lack the will and capacity to actively implement new policies. As a consequence, only a very small percentage of the larger public forest estate of the Asia region had been formally brought under community control or some form of co-management by late 1996.

Knowledge of the critical policy and programmatic components necessary to extend management authority to communities is also limited. Community forest management policy is a new arena where experience with successful and problematic approaches is only now being acquired. Forest departments' commercial leasing practices, wildlife management policies, and major reforestation projects often undermine opportunities for communities to play a greater role in public forest management. Forestry and other related policies that are in conflict with community interests in management are just beginning to receive attention.

While much attention has been focused on formal community forestry policy development, experience indicates that field operations and staff interactions with local groups may be even more influential in determining opportunities for collaboration. "The process, not the paper, is the key to meaningful community participation in forest management..." The document itself, while meaningful, "is less important than the understanding, commitment, and good faith of parties to the agreement" (Seymour, *et al.*, 1993).

Establishing effective community forestry policies extends beyond the authority of national ministries of forestry. Preferential forest department policies towards the private sector are often heavily shaped by powerful political figures. Coalitions of political leaders, private sector interests and forestry agencies that shaped and directed commercially-oriented forest use policies and management systems remain very influential. It is likely they will continue to resist community-management devolution efforts through 2010. Accelerating transitions towards sustainable, community-based forestry as a major form of public lands management in 21st century will require the committed support of senior national leaders.

5.5.4 The Role of Forest Departments in Management Transitions

Bureaucratic reorientation is a complex and difficult process, but a fundamental element in creating conditions for significant community involvement in forest management by the year 2010. While forestry agencies have a mandate to move in new directions, they are constrained by tradition, procedures, attitudes, and incentives that resist needed policy and operational reforms. The forest services of India alone have over 150,000 salaried employees, many of whom require retraining to build agency capacity as the state departments shift to community-based forest management systems. Changes in attitudes are at least important as skill building. For decades communities have been viewed as a threat to the forest and its commercial production objectives. Bringing communities formally into management and devolving authority and rights to them is a dramatic shift of direction and will require considerable discussion if supportive staff attitudes are to be established. Without an institutional conviction among field and senior FD staff that new management directions are desirable, progress in implementing new community forestry policies will be slow and outcomes disappointing. Shifting attitudes require a commitment of the leadership, education, and new professional incentives including promotions based on merit. While donor-funded social forestry programs of the past twenty years have helped to reorient forestry agencies towards communities, fundamental institutional changes in most Asian forest departments have been limited.

5.5.5 The Role of Donor Agencies

Donor agencies have redirected much of their forestry sector assistance towards supporting the greater involvement of communities in forest management over the past 5 to 10 years. Yet, while donor loans and grants often regard communities participation as a fundamental strategy, ODA institutions are constrained by their programming modalities. Most major donors work through forest departments, and must structure their project in a rigidly time-bound format, relying on quantitative targets for monitoring the transfer of capital and technologies. While forest sector grants and loans are still dominated by financial and technical components, forest management transitions in Asia are being shaped by social and political factors. Because donor projects are designed for short-term (3-5 year) periods, they can not strategically support longer term institutional changes that need to take place in Asian forest departments.

Donor requirements for the formulation of rigid and detailed program plans also limits flexibility and adaptation to changing environments and learning. Learning is also constrained by donor tendency to work in relative isolation from other donor agencies working in the same

sector. As a consequence donor projects have generally had limited impact in responding to the needs for organizational reorientation apparent in many Asian forest departments. In some cases, large donor programs have reinforced and strengthened conventional procedures and hierarchies allowing them to resist pressures for change from below.

Effective donor support for community forest management transitions will require coordinated and long-term ODA assistance that is designed to facilitate fundamental institutional transitions in administrative structures and functions. Institutions designed for unilateral custodial control and commercial timber production will need to function as centres of planning, monitoring, and technical and marketing expertise and be able to reach out to forest managing communities to serve their needs. If these new capacities are to be developed, donor assistance must shift funding flows to emphasize training and applied research components, rather than continue investing in agency controlled reforestation projects.

5.5.6 The Role of NGOs

NGOs are playing a diversity of roles in the Asian community forestry sector reflecting their own highly varied locations, size, capacities and goals. Some grassroots NGOs largely comprise community leaders. In some cases environmentally oriented, village-based youth clubs have catalysed community forest protection initiatives. Village leaders and school teachers have also helped mobilize communities to address resource management problems, often forming into local non-governmental organizations. These types of organizations are also providing foundations for larger networks and federations that coordinate forest management over larger territories. In eastern India these networks are already emerging, as they are in Central America, providing a framework for linking communities with formal governance structures in managing public forest lands.

Urban-based NGOs are playing diverse roles, both in community and forest department training and in diagnostic research. Other NGOs act as advocates for community forestry groups, placing pressure on planners and donors for government policy and operational change. Asian NGO support groups have already held thousands of meetings with communities and foresters, accelerating discussions and the search for alternative approaches to management. With their urban base, these groups also help bring community perspectives to Asian capitals, and even into global policy discussions. They will likely become increasingly influential as their expertise in the sector and their numbers grow.

In much of Asia, the efforts of NGO advocacy groups have drawn national and international attention to policy and operational failures of existing forest policies and programs. The work of such groups will increase in the coming 15 years developing stronger linkages with environmental groups in the North. Both NGO support groups and advocacy organizations need outside support. They represent important human resources that can seek alternatives in the difficult process of designing new forms of forest management. International conservation organizations have also shifted their attention towards community participation in resource management. At the October 1996 World Conservation Congress (IUCN) in Montreal, for example, collaborative resource management was adopted as a major strategy by Union's 800 members covering 125 participating countries.

5.5.7 Prospects

Communities throughout Asia have played and continue to play important roles in forest management. In some cases they do so as part of unbroken traditions, in others to regain forest control and stabilise environments upon which their lives and livelihoods depend. Growing demographic and resource pressures are making intensified forest management increasingly attractive to communities, stimulating local interest to invest in sustainable use systems. Given growing forest resource scarcities common throughout much of Asia, effective forest management will become a necessity for community groups and provide opportunities for local economic development. Whether government policy makers and planners will respond effectively to growing demands by communities to develop greater forest resource rights and responsibilities to their informal and local governance structures remains a question. It is also uncertain how quickly community organizations will develop capacities to administer these resources, given the immense land areas requiring careful custodianship.

In looking towards 2010, the scale of the transition towards substantive community engagement in Asia's forest management is immense. Approximately 40 to 50 percent of the entire land area of the South and Southeast Asia is under the jurisdiction of forest departments. The process of negotiating management agreements between communities, forest departments, and local governments is a formidable task. The huge numbers of people estimated to be either forest dependent or actually residing in forest environments is reflected in Table 6.

Table 6 Estimates of Forest Dependent Populations in Five Asian Countries - 1990

Nation	People Directly Dependent upon Forest Resources (millions)	Peoples Living on Land Classified as Public Forest (millions)
India	275	100
Indonesia	80-95	40-65
Nepal	18	8.5
Philippines	25-30	17.5
Thailand	20-25	14-16

Source: Lynch (1992)

These statistics imply that up to 200 million people (or 40 million households) in the five Asian countries listed require negotiations regarding their forest occupancy, while up to 500 million forest dependent people (or 100 million families) need engagement in some aspects of management decision making. If the remaining nations in Asia are included, the numbers probably double. If effective efforts are not made to bring these groups into meaningful dialogues, existing conflicts and insecurities will continue to drive unsustainable use practices and much of the region's forests will remain open access.

The most plausible scenario is one of mixed-outcomes. The implementation of effective community forest management is smoothest for forests already under *de facto* community control. In the north-eastern Indian state of Tripura, for example, a few years after joint forest management policies were passed in the early 1990s, over one-third of the forest domain was

reported to have been officially registered with tribal communities. Nepal recently targeted 61 percent of the nation's total forest area for community management supported by interlocking policies and extension programmes developed over the past two decades. While it will take a decade or more for Nepal to fully implement current plans, it will probably be the first Asian nation to bring over half of its forest lands under community control.

While only 2 to 3 percent of India's public forest estate is estimated to be under community protection recognized by state forest departments, this could increase to 25 percent by 2010 if forest departments and NGOs can expand capacities to negotiate, demarcate, and register forest dependent communities. The challenge in India, as elsewhere in Asia, is to allocate rights and responsibilities in ways that are responsive to historical rights and needs of rural forest users. Politically dis-empowered low income tribal communities and women need effective representation as new forest management agreements are formulated.

The emergence of a national system of operational community forestry management systems in the Philippines has moved slowly over the past 15 years, despite the fact that the nation possesses some of the most progressive policies in Asia. Recent efforts to remove constraints to program implementation and integrate local government and agency field staff may allow the pace of decentralization to accelerate.

Throughout Asia, the success of community forestry strategies in stabilising the region's forest resources will probably rest on synchronising national strategies with grassroots community efforts. National inventories assessing the roles and areas where communities are already informally managing forests would establish a baseline from which supportive transition strategies could be formulated. National working groups are needed to bring field experiences into the development of long term transition programs, requiring the coordinated support of donor agencies. It is likely that public forest land reform processes and the role communities will play in management will still be at an early stage of definition in 2010, but will continue well into the 21st century.

5.5.8 Conclusions

To date, "forest policies" have often been focused primarily on the relationship between government forestry agencies and the gazetted forests directly under their control, or the relationship between forestry agencies and private or State companies engaged in industrial activities such as timber extraction. These policies and related practices, while clearly not yet perfect, already are (on paper) quite reasonable in most countries in the Region - but they are frequently ignored, poorly implemented or lack public support.

While existing policies and regulations, if enforced properly, deal adequately with the trees in reserved forests, and with companies that harvest and/or plant trees, they have dealt very poorly with people. Most forests in Asia Pacific are surrounded or populated by people who use them. The behaviour of these people responds to many "external forces" and these are often much stronger than the policies and policing of the forestry agencies or protected areas agencies. Depending on these forces, ordinary household behaviour may be either constructive or destructive.

The industrial production or conservation policies of forestry agencies may become marginal, irrelevant, or even be directly contradicted, by policies outside the forestry sector such as agricultural pricing and subsidies, population and employment policies, infrastructure developments, the spread of the market economy and hence all the impacts of macro-economic and international factors. The problems of forest-dependent communities, the conservation of biodiversity and deforestation can only be resolved by considering these wider issues, and others such as population movements, land reform and disparities in income distribution.

Perhaps the previous concentration on industrial logging and timber is a reflection of conventional forestry concerns, of the linkages between the forests, the loggers, the processing industries, and the domestic and export markets. This whole chain is indeed affected by government policy decisions. Nevertheless, the evidence is strong that tinkering with policies within this chain of affairs is unlikely to significantly reduce the extent of forest clearance, or enhance forest conservation significantly, or to improve the livelihoods of poor, forest-dependent people. It may reduce adverse localised environmental impacts, enhance biodiversity conservation slightly, generate more income and employment for local workers, or capture more of the potential revenues and foreign exchange earnings for government. These are all worthwhile objectives, but all marginal gains if the greatest threats to tropical forests comes from any direction other than legal, export-oriented, large-scale, industrial logging.

To stop forest conversion and achieve conservation, it may not be necessary to stop logging outright, or to stop logging in all new areas, but rather to reform the policies that presently make forest colonisation attractive. This might include the pull factors (reduce the profitability of illegally clearing forests, or of speculating in land that was supposed to be kept as forest) or the push factors (increase the limited employment or livelihood options outside of forests). The evidence from the rapid economic growth of Asian tiger economies is that as employment and income prospects outside the agriculture sector improve, fewer people want to undertake the dangerous, illegal, difficult and often unprofitable activities of temporary agriculture in forest lands. However, if the new land use is very profitable (e.g. growing cocoa, coffee, cinnamon, rubber, fruit trees) and the potential capital gains from capturing some real estate from the government forests are high, it might be very difficult to slow the rate of forest conversion.

Forests will be permitted to remain when the people deciding the forests' fate conclude that the continued existence of forests is more beneficial (e.g. generates higher incomes or has cultural or social values) than their removal. If not, forests are cleared. Some natural forests remain because they are not worth exploiting as they lack commercially valuable species, are remote or inaccessible. In other words, it would cost more to exploit them than their current commercial value, so it is economically sensible to leave them for the time being. People living in such remote and 'uneconomic' forest areas may be permitted to enjoy the many traditional, non-commercial benefits of forests, but may also be denied access to many modern goods and services by the very inaccessibility that protects their forest.

6. CONCLUSION

The Asia-Pacific Region covers a vast diversity of geography, biodiversity and social and economic conditions. Asia-Pacific is also the most economically dynamic region

in the world with some nations repeatedly achieving nearly 10% annual economic growth. Some estimates suggest that by 2050 China and South-East Asia will equal or even exceed the gross domestic product of Europe and North America. It may well be the case that the Asia-Pacific Region in 2010 will have three distinct groups of nations: post-industrial Japan, Australia and New Zealand, a fully industrialised group (the current 'tiger' economies, and parts of China) and developing countries (for example the currently poorest nations of Nepal, Cambodia, Myanmar). It is likely that the economic, demographic and social transitions in these countries will have a far larger impact on the conservation of forests than government policy on forests and the environment, or environmental campaigns.

Environmental policies and legal instruments have been created in every country in the region. However, implementation is often poor and may often be further confused by conflicts between national law, state or provincial laws and religious laws and local customs. The willingness of governments to uphold stated objectives and legal regulations is, at best, sporadic and highly variable. Although extensive areas have been set aside in protected areas and forest reserves, many exist on paper alone. One positive factor in favour of conservation is the willingness of governments to make international commitments, especially through the ratification of the Convention on Biological Diversity. Again, however, there remains a question over the urgency with which governments will provide the resources to fulfil the obligations placed upon them by such international instruments.

Regional studies show that there remain opportunities for the further development of protected areas networks throughout the region, allowing more comprehensive representation and conservation of forest biodiversity. There is ample evidence to show however that many protected areas exist on paper alone and a key test in the period to 2010 is the extent to which protected areas can be developed into fully functional conservation units with a long term future. One avenue that it likely to be explored more fully will the development of multiple use areas that accommodate local exploitation. Industrial forestry is likely to become more environmentally benign, with the development of low impact logging techniques and the development of more extensive plantations. Such plantations might in time evolve in to diverse mixtures that can meet timber requirements whilst also fulfilling a biodiversity conservation role.

By far the greatest legal problem is law enforcement which must be tackled as one of the major hurdles in achieving the sustainable management of renewable resources. Legal instruments and formal law enforcement is a distant irrelevance to daily life in many remote, rural areas. Villagers make up their own rules to control daily affairs and edicts from central government are carry very little weight. A new approach is developing such that local communities themselves adopt suitable rules and control methods to ensure that forest resources are used correctly. Community forest management (or some form of joint management between the community and the state), and local participation in protected areas, is becoming increasingly important. For a host of reasons, conventional top-down land use management has failed in many cases and in many aspects. Not only are forests threatened by uncontrolled use, but protected areas set aside for biodiversity conservation frequently do not have local support and are therefore also subject to uncontrolled exploitation.

This paper has attempted to forecast the prospects for the future of forest conservation, including protected areas, in the Asia-Pacific region to the year 2010, on the basis of three scenarios:

1. assuming a continuation of the present level of action and policy environment ('status quo')

2. assuming sustained environmental campaigns and a heightened role for conservation than is currently the case ('better')

3. assuming specified deterioration in policy and action related to conservation ('worse')

Table 7 summarises the main effects that are likely to emerge in the next 15 years or so under these three scenarios and in three broad themes: protected areas, forestry sector and in community forest management.

In the period to 2010 it is likely that the role of government will change in the face of socio-economic change, the globalizing economy and a trend towards liberalising national economies. Government departments are likely to be less involved directly in land use management and will act more as regulatory agencies steering and harnessing free-market forces, and the energies and abilities of social-voluntary actions by civil society.

This effect might be seen most visibly in those nations with the most rapidly growing economies. Others, yet to make the transition from a largely rural based to industrial economy might retain aspects of land use management that often has it roots in the nineteenth century, with powerful forest departments executing government policy. Promoting the role of local communities involves a paradigm shift in the attitudes of governments. Such a change is likely to occur, if only because it may enable governments to deliver conservation and sustainable use targets for a relatively low investment.

It is already evident that governments are relative powerless in the face of the global economy, and it is likely therefore their role will change. The short term view of a self interested and free market will in time lead to the removal of all but the most remote and inaccessible forest resources. Government's role will still be crucial in securing longer term and wider social priorities.

The impact of growth in the wider economy will have on forest conservation is likely to be very different under these differing socio-economic conditions. As populations in these nations become wealthier and tend to urbanise, direct pressures on natural resources might ease and be substituted by intensive agriculture and industry. Communities currently engaged in a subsistence and forest-based livelihood may abandon their traditional homes and migrate towards better paid, urban-based employment, a process that is well established in Peninsular Malaysia. This could have the positive effect of reducing pressure on forests or the negative effect of reducing the value of forests in the eyes of a community that has ceased to depend upon it for their income and subsistence.

Populations are growing throughout the region and there will be greater demand for land for development, hydroelectricity production, export crops and so on. Economic growth will also lead to technological change. There is likely to be very considerable growth in the use of private motor cars, and other energy-expensive manufactured goods such as air conditioning and refrigerators, and nations will take on many of the attributes currently regarded as typical of western societies. Forest conservation could therefore be supplanted as a priority environmental issue by air and water pollution and urban congestion.

Table 7 Summary

Scenario/driving forces	Protected areas	Production Forestry sector	Community management
'Status quo'	Increase in area under nominal protection Management of most PA will remain weak and 'paper parks' will proliferate. Funding requirements climb and may not be met Need for additional commitment to training, extension and other services Significant opportunities to 'capture' biodiversity in PA possibly based on existing or new reviews may be missed. Category VI will slowly become more common. Conflicts with local communities will proliferate	Forest exploitation continues Some improvements to forestry practices reduce impacts on productions forests. * '(conflict with rural communities will continue. Conservation areas still perceived as 'islands'. Industrial plantations may reduce pressure on natural forests. Economic development may reduce pressure on NTFP Forest department culture continues to be largely focused on production issues.	Forestry policy and legislation continues to exclude local communities Minor policy or legal changes lead to only modest conservation and community development gains. Illegal forest colonisation continues to follow logging operations.
'Better' Sustained and equitable economic growth Switch to secondary and tertiary economic activities Urbanisation Growth in NGO activity Media receptive to environmental concerns International obligations, e.g. CBD	Increase in PA networks, based on existing or new scientific studies PA network design improves Nature of some Pas will change to accommodate people's needs more and Category VI sites become common; bioregional management developed Considerable increase in costs, reflecting higher investments in staffing, etc.. Urgent need to address staffing and training requirements Management of existing PA will improve Conservation integrated into other sectors.	Much improved management and strict environmental standards will reduce logging impacts. All logging in natural forest may be banned Industrial forestry shifts to plantations. Plantations will be based on mixtures or mosaics with natural forest/agriculture International pressures (e.g. certification will augment internal demands for conservation. Forest Department culture changes to accommodate broader vision.	Government policy shifts from industrial forestry/national economy focus towards a conservation/rural development focus. Substantial increase of proportion of forests under community management Effective representation of local communities Informal community management legitimised and form basis for transition strategies
'Worse' Economic collapse War Social upheaval International trade war Collapse of tourism industry Rural poverty Inequitable land distribution	Some increase in area covered expected but existing scientific work ignored so biodiversity representation will remain patchy. Effectiveness will drop away as inadequate legal, administrative support provided by government PA will cease to have conservation value, paper parks will proliferate, encroachment will increase Down stream impacts will increase e.g. poorer water security, diminishing NTFP Strict protection models based on a top-down approach will continue to be the norm. Increased conflict with local communities	Increased conversion of natural forests to other land uses. Impacts of logging natural forests not stemmed Priority conservation areas lost. Conflict with local communities. Failure to meet development needs of local communities. Forest Department culture remains focused on narrow vision.	Forestry overwhelmed by external macro-economic and international factors, community forest management marginalized.

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Annex 1 List of Asia Pacific countries and territories, by WCPA Region

South Asia
Bangladesh
Bhutan
India
Nepal
Pakistan
Sri Lanka

South East Asia
Brunei Darussalam
Cambodia
Indonesia
Lao P.D.R
Malaysia
Myanmar
Philippines
Singapore
Thailand
Viet Nam

Pacific
American Samoa
Marshall Islands
Nauru
New Zealand
New Caledonia
Niue
Northern Mariana Islands
Palau
Papua New Guinea
Solomon Islands
Tokelau
Tonga
Tuvalu
Vanuatu
Western Samoa

Australia
Australia

East Asia
China
Hong Kong
Japan
Korea, DPR
Korea, Republic
Macau
Mongolia
Taiwan

Annex 2 Adherence to International and Regional Conventions and Programmes

REGION	SIGNATORIES TO:					PARTICIPATION IN:
Country	Convention on Biological Diversity	World Heritage Convention	Convention on Wetlands of International Importance Especially as Waterfowl Habitat	Convention on Conservation of Nature in the S. Pacific (Apia)	Convention for the Protection of the Natural Resources and Environment of the South Pacific Region (SPREP)	UNESCO Man and the Biosphere Programme
SOUTH ASIA						
Bangladesh	x	x	x			x
Bhutan	x					
India	x	x	x			x
Maldives	x	x				x
Nepal	x	x	x			x
Pakistan	x	x	x			x
Sri Lanka	x	x	x			x
SOUTH EAST ASIA						
Cambodia		x				
Lao P.D.R.		x				
Myanmar	x	x	x			x
Thailand		x				x
Viet Nam	x	x	x			x
INSULAR SOUTH EAST ASIA						
Brunei Darussalam						
Indonesia	x	x	x			x
Malaysia	x	x				x
Philippines	x	x	x			x
Singapore	x					
PACIFIC						
American Samoa		x	x		x	
Cook Islands	?	?	?	x	x	
Fiji	x	x		x	x	
Guam		x	x		x	
Marshall Islands	x				x	
Micronesia (Federated States of)	x				x	
Nauru	x				x	
New Caledonia	x	x	x	x	x	
New Zealand	x	x	x		x	x
Niue	x	x	x		x	
Northern Mariana Islands						
Palau					x	
Papua New Guinea	x		x	x	x	x
Western Samoa	x			x	x	
Solomon Islands	x	x			x	
Tokelau	?	?	?		?	
Tonga						
Tuvalu					x	
Vanuatu	x				x	
EAST ASIA						
China	x	x	x			x
Hong Kong						
Japan	x	x	x			x
Korea, DPR	x					x
Korea, Republic of	x	x				x
Macau						
Mongolia		x				x
Taiwan						
AUSTRALIA						
Australia	x	x	x	x	x	x

Annex 3 1994 Protected areas management categories[12]

CATEGORY I Strict Nature Reserve/Wilderness Area: protected area[13] managed mainly for science or wilderness protection

CATEGORY Ia Strict Nature Reserve: protected area managed mainly for science

Definition Area of land and/or sea possessing some outstanding or representative ecosystems, geological or physiological features and/or species, available primarily for scientific research and/or environmental monitoring.

CATEGORY Ib Wilderness Area: protected area managed mainly for wilderness protection

Definition Large area of unmodified or slightly modified land, and/or sea, retaining its natural character and influence, without permanent or significant habitation, which is protected and managed so as to preserve its natural condition.

CATEGORY II National Park: protected area managed mainly for ecosystem protection and recreation

Definition Natural area of land and/or sea, designated to (a) protect the ecological integrity of one or more ecosystems for present and future generations, (b) exclude exploitation or occupation inimical to the purposes of designation of the area and (c) provide a foundation for spiritual, scientific, educational, recreational and visitor opportunities, all of which must be environmentally and culturally compatible.

CATEGORY III Natural Monument: protected area managed mainly for conservation of specific natural features

Definition Area containing one, or more, specific natural or natural/cultural feature which is of outstanding or unique value because of its inherent rarity, representative or aesthetic qualities or cultural significance.

[12] For further information on the management categories, readers should consult the *Guidelines for Protected Area Management Categories* (IUCN, 1994).

[13] A protected area is defined in the new *Guidelines for Protected Area Management Categories* as: *An area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means.*

CATEGORY IV Habitat/Species Management Area: protected area managed mainly for conservation through management intervention

Definition Area of land and/or sea subject to active intervention for management purposes so as to ensure the maintenance of habitats and/or to meet the requirements of specific species.

CATEGORY V Protected Landscape/Seascape: protected area managed mainly for landscape/seascape conservation and recreation

Definition Area of land, with coast and sea as appropriate, where the interaction of people and nature over time has produced an area of distinct character with significant aesthetic, ecological and/or cultural value, and often with high biological diversity. Safeguarding the integrity of this traditional interaction is vital to the protection, maintenance and evolution of such an area.

CATEGORY VI Managed Resource Protected Area: protected area managed mainly for the sustainable use of natural ecosystems

Definition Area containing predominantly unmodified natural systems, managed to ensure long term protection and maintenance of biological diversity, while providing at the same time a sustainable flow of natural products and services to meet community needs.

Annex 4 National and Sub-Regional Protected Area Network Summary

Region / Country	Area (km²)	Ia/Ib No.	Ia/Ib Area (km²)	II No.	II Area (km²)	III No.	III Area (km²)	IV No.	IV Area (km²)	V No.	V Area (km²)	VI No.	VI Area (km²)	Total No.	Total Area (km²)	%
AUSTRALIA																
Australia	7,682,300	88	39,801	437	284,302	64	2,583	291	133,507	33	482,805	20	2,117	933	945,118	12.3
Total	7,682,300															

Category	TOTAL No.	P.A. Area (km²)	% countries
Ia/Ib	88	39,801	0.52
II	437	284,302	3.7
III	64	2,583	0.03
IV	291	133,507	1.74
V	33	482,805	6.28
VI	20	2,117	0.03
Grand Total	**933**	**945,118**	**12.3**

Region / Country	Area (km²)	Ia/Ib No.	Ia/Ib Area (km²)	II No.	II Area (km²)	III No.	III Area (km²)	IV No.	IV Area (km²)	V No.	V Area (km²)	VI No.	VI Area (km²)	Total No.	Total Area (km²)	%
EAST ASIA																
China	9,597,000	37	486,282	20	8,156	9	1,197	149	56,210	50	46,222	330	83,724	595	681,794	7.1
Hong Kong	1,062	0	0	0	0	0	0	3	51	12	372	0	0	15	423	39.87
Japan	369,700	8	244	15	12,959	0	0	29	4,776	13	7,522	0	0	65	25,502	6.9
Korea, Democratic People's Republic of	122,310	0	0	9	1,501	4	105	6	1,540	0	0	0	0	19	3,146	2.57
Korea, Republic of	98,445	0	0	0	0	0	0	5	345	20	6,473	0	0	25	6,818	6.93
Mongolia	1,565,000	10	85,253	6	46,399	16	12,260	1	900	0	0	0	0	33	144,812	9.25
Total	11,753,517															

Category	TOTALS No.	P.A. Area (km²)	
Ia/Ib	55	571,779	4.86
II	50	69,017	0.59
III	29	13,562	0.12
IV	193	63,823	0.54
V	95	60,589	0.52
VI	330	83,724	0.71
Grand Total	**752**	**862,497**	**7.34**

Region		Ia/Ib		II		III		IV		V		VI		Total		
Country	Area (km²)	No.	Area (km²)	No.	Area (km²)	No.	Area (km²)	No.	Area (km²)	No.	Area (km²)	No.	Area (km²)	No.	Area (km²)	%
SOUTH ASIA																
Bangladesh	144,000	0	0	0	0	0	0	6	833	2	134	0	0	8	967	0.67
Bhutan	46,620	1	644	4	6,606	0	0	4	2,411	0	0	0	0	9	9,661	20.72
India	3,166,830	2	1,960	63	31,618	0	0	272	104,828	1	186	1	464	339	139,057	4.39
Nepal	141,415	0	0	8	10,144	0	0	4	941	0	0	2	3,490	14	14,575	10.31
Pakistan	803,940	0	0	6	8,821	0	0	45	27,166	4	1,220	2	181	57	37,390	4.65
Sri Lanka	65,610	0	0	22	4,363	0	0	31	3,280	0	0	0	0	53	7,643	11.65
Total	4,368,415															

TOTALS			
Category	No.	P.A. Area (km²)	% countries
Ia/Ib	55	571,779	4.86
II	50	69,017	0.59
III	29	13,562	0.12
IV	193	63,823	0.54
V	95	60,589	0.52
VI	330	83,724	0.71
Grand Total	**752**	**862,497**	**7.34**

Region		Ia/Ib		II		III		IV		V		VI		Total		
Country	Area (km²)	No.	Area (km²)	No.	Area (km²)	No.	Area (km²)	No.	Area (km²)	No.	Area (km²)	No.	Area (km²)	No.	Area (km²)	%
PACIFIC																
American Samoa	197	0	0	1	37	0	0	0	0	0	0	0	0	1	37	18.91
Fiji	18,330	5	189	0	0	0	0	0	0	0	0	0	0	5	189	1.03
Guam	450	0	0	0	0	0	0	0	0	0	0	1	61	1	61	13.63
Kiribati	684	2	201	0	0	1	65	0	0	0	0	0	0	3	266	38.93
New Caledonia	19,105	0	0	2	101	0	0	8	726	1	27	0	0	11	856	4.48
New Zealand	265,150	87	16,895	29	41,403	6	233	60	2,136	0	0	0	0	182	60,668	22.88
Niue	259	0	0	0	0	0	0	0	0	0	0	1	54	1	54	20.85
Palau	0	0	0	0	0	1	12	0	0	0	0	0	0	1	12	0.00
Papua New Guinea	462,840	0	0	3	73	0	0	2	746	0	0	0	0	5	820	0.18
Samoa	2,840	0	0	1	28	0	0	2	72	0	0	0	0	3	100	3.55
Tonga	699	0	0	0	0	0	0	0	0	0	0	1	28	1	28	4.06
United States Minor Outlying Islands	658	3	411	0	0	0	0	0	0	0	0	0	0	3	411	62.61
Total	771,212															

TOTALS			
Category	No.	P.A. Area (km²)	% countries
Ia/Ib	97	17,697	2.29
II	36	41,644	5.4
III	8	310	0.04
IV	72	3,682	0.48
V	1	27	0
VI	3	143	0.02
	217	**63,506**	**8.23**

Region		Ia/Ib		II		III		IV		V		VI		Total		
Country	Area (km²)	No.	Area (km²)	No.	Area (km²)	No.	Area (km²)	No.	Area (km²)	No.	Area (km²)	No.	Area (km²)	No.	Area (km²)	%
SOUTH EAST ASIA																
Cambodia	181,000	0	0	7	7,362	0	0	10	20,300	3	970	3	4,039	23	32,672	18.05
Lao People's Democratic Republic	236,725	0	0	0	0	0	0	0	0	0	0	17	27,563	17	27,563	11.64
Myanmar	678,030	0	0	1	1,605	0	0	0	0	1	126	0	0	2	1,732	0.26
Thailand	514,000	0	0	74	39,473	0	0	37	27,275	1	131	0	0	112	66,880	13.01
Viet Nam	329,565	0	0	9	2,024	0	0	43	7,919	0	0	0	0	52	9,944	3.02
Total	**1,939,320**															

TOTALS			
Category	No.	P.A. Area (km²)	% countries
Ia/Ib	0	0	0
II	91	50,467	2.6
III	0	0	0
IV	90	55,494	2.86
V	5	1,227	0.06
VI	20	31,602	1.63
Grand Total	**206**	**138,792**	**7.16**

Region		Ia/Ib		II		III		IV		V		VI		Total		
Country	Area (km²)	No.	Area (km²)	No.	Area (km²)	No.	Area (km²)	No.	Area (km²)	No.	Area (km²)	No.	Area (km²)	No.	Area (km²)	%
INSULAR SOUTH EAST ASIA																
Brunei Darussalam	5,765	9	662	1	488	0	0	0	0	0	0	0	0	10	1,151	19.97
Indonesia	1,919,445	56	38,864	35	114,708	1	50	48	46,632	37	4,100	66	32,387	243	236,743	12.33
Malaysia	332,965	23	872	17	8,153	0	0	9	5,797	1	10	1	206	51	15,040	4.52
Philippines	300,000	0	0	11	2,623	5	197	8	3,197	13	4,044	1	109	38	10,172	3.39
Singapore	616	0	0	0	0	0	0	1	27	0	0	0	0	1	27	4.54
Total	**2,558,791**															

TOTALS			
Category	No.	P.A. Area (km²)	% countries
Ia/Ib	88	40,399	1.58
II	64	125,974	4.92
III	6	247	0.01
IV	66	55,655	2.18
V	51	8,155	0.32
VI	68	32,703	1.28
Grand Total	**343**	**263,135**	**10.28**

Annex 5 Summary of conservation priorities identified in the Indomalaya Protected Areas Review (MacKinnon, 1996)

1. Bangladesh currently scores very low on protected area, with few options to acquire large new areas. All remaining original vegetation should be brought under protection, and further improvements could be made to management effectiveness.

2. Bhutan is already well over the CI=1 score with a huge proportion of the country already protected whilst plenty more natural habitat remains also. The country does not need new reserves but resources should be focused on management effectiveness.

3. Brunei Darussalam is well over the CI = 1 point. There are a few habitat gaps in the PA coverage however and some improvements can be made to management and opening up some of the excellent reserves to visitors and scientists.

4. Cambodia is above CI = 1.0 by virtue of the enormous reserve system recently declared. However, there is virtually no management and priority must go on personnel development and management planning. A greater area of freshwater swamp and lake should be transferred from category VI (multiple use) to category IV (managed nature reserve).

5. India would achieve the increase in CI score required if it gazettes the many outstanding proposals of Rogers and Panwar (1988) and raises its standards of management. Areas of particular importance are the Himalayan forests and forests of North-east India.

6. Indonesia has the largest task to do. It is by far the most important country in the realm for biodiversity conservation and will need to protect a high proportion of its area to reach a CI score of 1. However, the target is easily within range. There are many excellent proposed sites reserved for conservation on government land-use maps but never gazetted. In addition, the country has an extensive system of hydrological protection forests. Emphasis on new gazettement should focus on the Mollucas and Lesser Sundas with several important revisions to be made to boundaries of some Irian Jaya reserves.

7. Lao PDR has recently declared a large system of protected areas and still has many large proposals on the table. However, these sites are currently unmanaged and many overlap with production forests, hydroelectric projects and so on. It is recommended that about half the system where competing land-use is minimal be declared as Category IV reserves. Major investment in manpower development to manage an excellent PA system should be the key priority and more emphasis should be paid to transfrontier reserve linkages, for example with Viet Nam.

8. Sri Lanka is already doing a good job in conserving its biodiversity. However, most of the reserves are in the less biologically valuable dry zone. All remaining lowland forest patches in the wet zone should now come under protection.

9. Maldives has little terrestrial biodiversity of value (a few endemic pandans). A minimal terrestrial reserve system would be adequate. In contrast, the marine resources are remarkable and a large protected area system is needed in the sea. The marine section of the Review will give more details.

10. Malaysia. Protected area networks in Sabah and Sarawak have been growing steadily although the forest area has also shrunk over the past decade. Peninsular Malaysia has an inadequate system of reserves with many large proposals outstanding and ungazetted for many years. Malaysia has the financial resources and personnel to ensure good management but it is important to get more land into the protected areas system in this biologically very rich part of the realm.

11. Myanmar is still very slow in developing a protected areas system. The total area protected is small and contains a lot of secondary habitat and important proposed areas remain unprotected. Under the new policy of the Forestry Department a major increase in the area under protection is planned.

12. Nepal has an adequately large protected areas network, but there is a bias towards high mountain reserves and tropical terai reserves with a gap in the temperate middle hills. Many reserves are category VI and are therefore scored quite low in the CI index. In many cases the percentage of area used for tourism and other uses is very small and with a zoning system most reserves could be upgraded to category IV.

13. Pakistan scores relatively low on biological richness and thus does not require a very large protected areas system. Network size has already been achieved by adding huge areas of desert and wasteland to the PA system. What is needed is a more strategic central approach to development of the PA system and a major increase in management standards.

14. Philippines is one of the most biologically important countries but also the most seriously degraded and under-protected. As a result of the NIPAS (National Integrated Protected Areas System) project a new system of conservation areas has been proposed. A few of these priority areas have already been gazetted but it is urgent to get on with this important job. Major improvements in management of protected areas and law enforcement are also needed. A period of stability is required so that technical work can be completed.

15. Papua New Guinea is one half of the single most important biogeographical unit in the whole realm, yet it has less than 2% of its land area under protection. Major opportunities remain to develop an excellent system, but the government must reconcile numerous and contradictory proposals. The system of sites recommended in the Review would provide complete coverage of habitats and biounits. The second problem is to find a formula whereby the government can invest in major conservation areas with the co-operation of local communities who by tradition retain all land ownership. Poor communications, high operational costs and severe manpower shortages are a serious constraint.

16. Singapore has lost almost all its natural habitat. Tiny remnant forest patches are already protected together with a large area of secondary forest. The most useful improvements to be made are to process the proposed additional reserves which will add important mangrove forests and wetlands to the system.

17. Thailand has already protected almost all available natural habitats. There remain a few key habitat gaps such as mangroves and freshwater swamps, but the priority must be on law enforcement and improving management.

18. Viet Nam has achieved a well-balanced system but it is too limited in area. The government has agreed to double the size of the existing network and excellent proposals have been made to do this. There is so little original forest left that all remaining areas should be taken into the protected areas system. Production forestry should become based on secondary forests and plantations. Poverty among the population and inability to buy imported timber forces the continuing policy of exploiting the dwindling resource of original forests. More attention needs to be paid to currently neglected freshwater and wetland systems. Major improvements in management effectiveness are possible.

Annex 6 Investments in Protected Areas by Government

Region	Country	Agency	Budget year	Budget (US$)	Protected areas	Budget/ US$per sq.km	No. of staff	Staff/1000sq.km protected area
South Asia	Bangladesh	Forest Directorate	1995	233,446	949	246	197	208
	Bhutan	Nature Conservation Division (Forest Department)	1994	612,903	6,606	93	51	8
	India							
	Nepal	Department of Wildlife and National Parks	1994	1,197,299	15,025	80	879	59
	Pakistan	Aggregate national total	1991	193,135	31,337	6	3206	102
	Seychelles	Conservation and National Parks Section	1995	38,873	40	972	26	650
	Sri Lanka	Department of Wildlife Conservation	1994	8,548,888	7,864	1,087	670	85
South East Asia	Brunei Darussalam	Forest Department	1995	3,904,653	1,036	3,769	171	165
	Cambodia							
	Indonesia							
	Lao PDR	Protected Areas and Wildlife Division	1994	12,224	24,400	1		
	Malaysia	Aggregated national total	1991	7,424,148	14,848	500		
	Myanmar	Nature and Wildlife Conservation Division	1995	251,194	3,622	69	674	186
	Philippines							
	Singapore							
	Thailand	National Parks Division	1995	35,330,416	40,216	879	1683	42
		Wildlife Conservation Division	1996	10,094,339	27,840	363	758	27
	Viet Nam							
East Asia	China	Various	1993	600,000	681,794	1	20000	29
	Japan							
	Mongolia							
	Korea, DPR							
	Korea, Republic	National Parks Authority	1993	56,499,000	7,568	7,466		
	Taiwan	Department of National Parks	1996	45,390,126	3,222	14,088	668	207
	Hong Kong	Agriculture and Fisheries Department	1996	27,561,439	417	66,095	1326	3180
Australia	Australia	Aggregated data from ten agencies	1990	160,066,372	445,600	359		
South Pacific	CNMI							
	Fiji	Fiji National Trust	1991	360,934	8	46,274	8	1026
	FSM							
	New Caledonia	Environment, Parks and Reserves Management Service	1994	19,229,433	518	37,122	11	21
	New Zealand	Department of Conservation	1996	80,792,056	89,978	898	1350	15
	Nuie							
	Palau							
	Papua New Guinea	Department of Environment and Conservation	1993	2,205,882	10,448	211	147	14
	Solomon Islands							
	Tokelau							
	Tonga							
	Tuvalu							
	Vanuatu	Environment Unit	1993	33,155	33	1,005		
	Western Samoa	Department of Agriculture, Forestry and Fisheries	1990	49,803	234	213		

Annex 7 Number of Ethnolinguistic Groups in Asia Countries

	Size of Populations					
Country	**1-5000**	**5001-50,000**	**50,001-250,000**	**250,001-1 million**	**Over 1 million**	**Other***
Cambodia	9	5	1	1	1	7
China	28	24	29	19	27	99
India	92	122	56	25	39	152
Indonesia	367	171	62	24	15	79
Laos	40	21	8	1	1	64
Nepal	29	26	6	6	3	55
Philippines	44	63	26	8	9	22
Thailand	26	19	4	1	7	54
Vietnam	33	26	10	8	1	56
Other Asian Nations	203	151	69	49	121	412
Total	**871**	**628**	**269**	**142**	**164**	**1,000**

Source: Clay (1993)

* Size unknown or cross-border groups

List of Working Papers already printed

APFSOS/WP/01	Regional Study - The South Pacific
APFSOS/WP/02	Pacific Rim Demand and Supply Situation, Trends and Prospects: Implications for Forest Products Trade in the Asia-Pacific Region
APFSOS/WP/03	The Implications of the GATT Uruguay Round and other Trade Arrangements for the Asia-Pacific Forest Products Trade
APFSOS/WP/04	Status, Trends and Future Scenarios for Forest Conservation including Protected Areas in the Asia-Pacific Region

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