

**What can be learnt
from the past?
A history of the
forestry sector in
Papua New Guinea**

Papua New Guinea Forest Studies 1

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Summary of Findings

This paper looks at five aspects concerning the development of the forestry sector in Papua New Guinea. It begins by describing traditional use and ownership of the forests; then documents the evolution of the legal framework that governs forest use; analyses the national benefits that have accrued as a result of the international trade in PNG's timbers; describes the governance challenges that have faced the sector since independence and, finally, reflects on the evidence base needed to demonstrate sustainability. The intent is that lessons can be learnt from the past.

Incorporated Land Groups (ILGs) were an innovatory mechanism designed to empower landowners and allow them to assert their ownership rights established under customary law in a contemporary setting. However, the implementation of ILGs associated with large forestry projects has met with significant constraints. The first of these concerns the issue of prior informed consent; the second the following of due process; and the third how to manage the interaction of large numbers of ILGs within one project area. (Section 1.2)

The involvement of landowners in decisions concerning timber harvesting within their forests has gone through a number of phases of experimentation. The Forestry (Private Dealings) Act of 1971 attempted to give landowners more autonomy to negotiate timber sales directly with buyers. This was complemented by working through Forest Development Corporations and, more recently, Landowner Companies. However, none of these mechanisms has a strong record of success. Small-scale, community based timber harvesting (eco-forestry) has developed, in part, as a reaction to these failings. (Section 1.3)

The evolution of the legal framework has seen a tussle played out between the State's desire to control timber harvesting and landowners' desire to be involved in the sale of a customary-owned asset. The 1991 Forestry Act re-asserted the State's monopoly over timber sales. Yet conflicts continue to characterise the forest sector, suggesting that an equitable balance has yet to be found and secured under the law. (Section 2)

A forest development model of large-scale, industrial operations was established in the post-war period, strongly supported by the World Bank in the early 1960s. This model has only recently been questioned by proponents of eco-forestry, who have yet to gain policy support. However, the longevity of the Jant project has demonstrated that industrial-sized wood production for export is possible in PNG, although it comes with a social cost. Equally, forestry projects provide tangible benefits in terms of rural service provision in many areas, filling a gap caused by the non-provision of such services by the State. (Section 3)

Governance failings have been a noticeable characteristic of the PNG forest sector for the last twenty years. The influential Barnett Report starkly described a sector 'out of control'. More recently a succession of Independent Reviews commissioned by government has continued to question the way that timber licenses are issued and subsequently operated. For many observers, the reforms initiated in the early to mid-1990s are incomplete. (Section 4)

Finally, the issue of sustainability appears to have received less attention than the importance of this policy goal warrants. There has been little development of the strategic planning tools necessary to guide sustainability and the absence of a project-level Forest Management Plan appears to be a significant gap in an otherwise comprehensive management system. Further information is badly needed for evidence-based forest management to be credible, including current estimates of forest cover. (Section 5)

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Introduction

A paper of almost the identical title to this one was presented by Johnson Mantu twenty years ago, at the 1985 seminar on the future of forestry in Papua New Guinea (PNG), held at the University of Technology in Lae. His paper concluded *'I am pessimistic for the future of forestry and the forest industry in Papua New Guinea. In particular, the rapid and uncontrolled development of the log export sector of the industry, coupled with low investment on reforestation programmes is not a desirable trend and will in the long run destroy the forest industry'*. (Mantu, 1985: 9). A question to be posed at the beginning of this paper is, therefore, has the present day sector learnt from its past?

“...has the present day sector learnt from its past?”

There have been several comprehensive research studies of the forestry sector (e.g. Filer, 1997; Filer with Sekhran, 1998; and Hunt, 2002), all of which have documented the considerable tensions within the country as a local definition of sustainable forest management has been sought. This paper, in a small way, continues this exploration, by describing the historical development of some elements of the PNG forestry sector. It does not attempt to provide a comprehensive overview, but aims to establish some of the facts relating to several key areas that have influenced the direction of forestry development. It is based largely on a review of the literature.



1 Forests and Tradition

1.1 Traditional use of forest resources

The forests of Papua New Guinea are not only a source of supply for timber. As in many countries, the forests are a repository of a wide range of goods and services that underpin the rural economy. These traditional values and uses of the forest have been reasonably well documented. In a country where many rural people continue to rely on traditional medicines, medicinal plants have been described in a number of publications (e.g. Holdsworth and Rali, 1989; Woodley *et al.*, 1991; Nick *et al.*, 1995); and Horiguchi and Sakulas (1990) described the establishment of a computer database of medicinal plants used in Papua New Guinea, established at the Wau Ecology Institute. However, there appears to have been little investigation to-date to evaluate how to maintain the supplies of these plants and in determining how their supply may be affected by timber harvesting. Croft (1987) and Saulei and Aruga (1994) reviewed the status of other non-timber forest products and their potential (including copal gum, Vatica gum, *Cryptocarya* bark, tannins, rattan, sandalwood, mushrooms, etc.).

Other forest values, including watershed protection, slope stability and erosion control appear to have been much less studied.

1.2 Forest ownership

Approximately 97% of the country (and 99% of forest lands) is held under customary ownership. The precise nature of this ownership varies from one culture to another. What this means in practice is that boundaries are not surveyed, title has not been registered and the applicable law is customary law. Following Independence in 1975, this form of ownership was guaranteed under the Constitution, Section 53 (protection from unjust deprivation of property). In this context, a major challenge associated with economic development is to identify the membership of customary landowning groups and thus determine the owners of any particular forest area. Disputes between government (the PNG Forest Authority), forestry companies, and landowner groups have often come down to whether the PNG Forest Authority and the companies entered into contractual relations for the use of land with the true owners.

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Incorporated land Groups (ILGs)

A major innovation concerning customary ownership took place with the enactment of *the Land Groups Incorporation Act of 1974*. This Act empowered landowners within a group to form a single legally constituted body, the Incorporated Land Group (ILG). An ILG formally identifies itself by listing current members and membership criteria, supported by genealogies. Membership lists can be reviewed on an annual basis to allow flexibility in group membership. Each ILG is required to identify its properties, which must be verified through consensus with neighbouring clans (Holzknecht, 1996). While the Act does not register land in the ILG's name, it does record the ILG's interest in, and control of, the properties listed in its constitution (including named land areas, forests and rivers). None of these measures interfere with the customary arrangement of temporary access rights to land resources for certain individuals.



Fuelwood remains an important energy source for rural people

Despite this seemingly appropriate mechanism of engaging customary landowners with large-scale development projects, problems associated with the implementation of ILGs associated with large forestry projects were identified by both the 2001 and the 2004 PNG Independent Forestry Review Teams. Two major shortcomings in particular have been noted. The first concerns the issue of prior informed consent. In theory, the Registrar of Land Groups should assist the communities in negotiating the ILG process. However, in forestry projects, this is undertaken by the PNG Forest Authority due to lack of capacity within the office of the Registrar. In some instances logging companies have undertaken this role, raising the danger of conflict of interest. The second concern is that ILGs are obtained without following the correct procedures. Many ILGs are not registered by the Registrar of Land Titles in the Department of Lands and Physical Planning, as the office lacks the capacity to process them. Thus, logging projects may proceed without the landowners having been issued with ILG certificates.

Fragmentation of ILGs is increasingly commonplace and disputes between neighbouring ILGs are frequent. The administrative burden of dealing with ILGs, nominally held by the Registrar of Land Groups, has been taken on by the National Forest Service without any formal mandate to do so. At present, the whole system appears to be under severe strain. The 2003/2004 Review Team made the following recommendation with regard to ILGs:

It is the view of the Review Team that in the interest of ensuring more democratic and accountable management of landowner financial benefits, there needs to be some form of direction (perhaps regulation) regarding a logging project wide body which properly represents the Incorporated Land Groups. In addition it behoves the State, as part of its responsibility for the well-being of its citizens, to provide some form of administrative assistance and guidance to the representative bodies until such time as they prove that they can manage their own affairs.

(RT, 2004: 32)

1.3 Involvement of landowners in the decision to exploit their forests

The involvement of landowners in the forest industry does not have a good record. Under the previous Forestry Act (repealed in 1992), the State acquired timber harvesting rights by dealing with clan agents representing the landowners. Timber royalties were paid directly to the clan agents, who were then responsible for distributing the funds amongst the clan members according to custom. Landowner were very rarely involved in forest management decision making. Under the Forestry (Private Dealings) Act 1971 (also repealed in 1992) landowners were permitted to set up a company and enter into direct agreements with logging companies to arrange the harvesting and marketing of their timber. However, as the 1989 Independent Commission of Inquiry reported, this system led to abuse as landowners were often not in a position to negotiate equitable settlements with large logging companies.

The involvement of landowners in the forest industry does not have a good record



The forests provide many valuable tree products

As part of the 1979 national forest policy, the concept of the Forest Development Corporation was developed. The aim of these corporations was to assist landowners to participate and share in the benefits of timber operations occurring on their land. It was also intended that these landowners groups would be assisted by the government in their formation and application to harvest and export logs free of most of the mainly 'infrastructure' conditions that were imposed

on foreign-owned companies. Mullins and Flaherty (1995) describe one of the earliest attempts to implement this arrangement. The Kumil Timber Project involved establishing a local Forest Development Corporation (the Ulingan Development Corporation, UDC) to manage the logging and initiate development activities so that the landowners would retain a greater share of the benefits. This process was meant to enable the landowners to regain control over the land they had relinquished by signing a Timber Rights Purchase (TRP) Agreement with the national government. In practice, this institutional arrangement was judged to have failed to generate authentic local participation, with the key players in the arrangement being foreign logging companies (in this case Australian), expatriate UDC management, and provincial and national government officials.

The 1991 National Forest Policy then identified the Landowner Company as the key mechanism to allow for local participation in the ownership and control of large-scale logging operations. However, most landowners companies have been found to be deficient in their accountability to the wider community. Public meetings of such companies are rare, statutory returns to the Registrar of Companies are frequently not made, and financial reports of income and expenditure are not presented to resource owners in the project area (Holzknecht, 1996). The 2003/2004 Review Team questioned whether ‘the landowner companies genuinely represent the landowners’ (RT, 2004: 33). Despite this criticism, landowner companies remain the main expression of community voice in the commercial forestry sector (Mayers and Vermeulen, 2002). Alternative ways of involving landowners in the decision making process concerning timber utilization have been limited to-date. Recently, some experience with small-scale, community-based timber harvesting – labelled ecoforestry – has been gained, through the support of NGOs and donors.

Gessesse (1994) described the broader neglect of extension services to rural areas since independence, including the lack of support to involve landowners in planting, managing and utilizing their own trees. Gessesse highlighted the need for closer cooperation between the relevant institutions, while appropriate technologies should be developed for sustained management of resources and to help towards the achievement of self reliance.

1.4 What might be learnt from past experience?

Customary ownership is no panacea to safeguard the interests of many rural communities

Customary ownership is no panacea to safeguard the interests of many rural communities. The above evidence suggests that the mechanism developed to bring customary landowners into the market place, allowing for the commercial sale of standing trees, has experienced significant implementation constraints and should be reformed. However, at present there is no consensus on what direction this reform should take (Curtin and Lea, 2006), which may be one reason why government has yet to act. Unfortunately, continuing conflicts can be expected to undermine the development of the forestry sector until a new model of expressing ownership is found.

2 Forests and Law

2.1 The Constitution: sustainable and small-scale

After independence, the development goals of Papua New Guinea’s natural resources (including its forests) were enshrined in the National Goals and Directive Principles under the National Constitution. Application of those principles required that forests be protected and developed as a national resource. However, this immediately set up a tension between the customary ownership of the resource and the State’s duty to control forest use. This is an issue that continues to exist within PNG forestry to the present day.

“We declare our fourth goal to be for Papua New Guinea’s natural resources and environment to be conserved and used for the collective benefit of us all, and be replenished for the benefit of future generations. We accordingly call for - (1) wise use to be made of our natural resources and the environment in and on the land or seabed, in the sea, under the land, and in the air, in the interests of our development and in trust for future generations;” Section 4.



Papua New Guinea retains large expanses of tropical rainforest

What is less well highlighted in many critiques on PNG forestry is the direction given in the following section of the Constitution, which directs that economic development should be consistent with national norms of organization. This emphasis on small-scale development is one that government - and in particular the PNG Forest Authority - has not given high priority when it comes to the development of the forest industry.

“We declare our fifth goal to be to achieve development primarily through the use of Papua New Guinean forms of social, political and economic organization. We accordingly call for - (2) particular emphasis in our economic development to be placed on small-scale artisan, service and business activity;” Section 5.

2.2 Forest laws – first steps

During the early colonial period, there were two separate pieces of legislation in place to control the exploitation of the forest resources in the two territories: the Timber Ordinance, 1909 Papua and the Timber Ordinance, 1922 of the Territory of New Guinea. By the 1930s increasing pressure on the easily accessible forest for sawmilling purposes led to the passing of the Forestry Ordinance, 1936-37 to control utilization and for the establishment of a forest industry (Mantu, 1985). The main sections of the Ordinance provided for:

- The purchase of forest lands from traditional owners, the vesting of such lands in the Government, and the creation and management of timber reserves.
- The purchase of timber rights and other forest products from traditional owners.
- The granting of permits and licences over acquired forest resources.
- The collection of royalties on forest produce removed.
- The making of regulations pursuant to the Ordinance.



Poor tree felling

It was this legislation (the Forestry Ordinance) that became widely used to cover both territories and was applied (with amendments) right up to when it was replaced by the Forestry Act, 1991. It had provisions whereby the Administration could conserve forests by dedication either as Territory Forests or Timber Reserves (yet neither category was developed to any extent). It was also under this legislation that the concept of timber rights came to be used, by which the Administration could purchase timber rights under a timber rights purchase (TRP) agreement from the customary landowners, and then control and supervise the issuance of timber permits and timber licences over such areas (Turia, 2005).

2.3 The Timber Rights Purchase (TRP) Concept

The timber rights purchase (TRP) was introduced as a mechanism for the State to gain access to timber within areas of customary ownership. The guidelines to secure a TRP that were applied from 1951 onwards were:

1. An application was made for a Timber Permit on a prescribed form, under Regulation 4 of the Forestry Ordinance 1936-37, Territory of New Guinea, and applicable to the Territory of Papua under the Forestry (Papua) Ordinance 1950.
2. A local Forest Officer made a resource survey of the area to be acquired; this was not necessarily limited to the area applied for as a Timber Permit.
3. On consideration of the report received under (2), a recommendation was made by the Director of Forests to the Administrator as to purchase or otherwise of Land and/or Timber Rights.
4. On approval of (3), funds were obtained from Department of the Treasury under procedures laid down for the control of departmental expenditures.
5. The Department of District Services and Native Affairs then proceeded with the 'purchase'.
6. If the Land Rights were required, the transaction was finalized by the Department of Lands, Surveys and Mines; if Timber Rights, then it became a matter for the Department of Forests; and
7. On the recommendation of the Director of Forests, the timber sale then proceeded, subject to the Administrator's approval of sale and conditions to be applied.

The timber rights purchase (TRP) was introduced as a mechanism for the State to gain access to timber within areas of customary ownership

In line with the above guidelines, the standard procedure when acquiring timber areas was that landowners were paid installment payments until the area was granted to an investor and was being logged. When this occurred, the Administration recouped the amount already paid to the landowners, following which it started to pay the regular timber royalty – if there were still sufficient forest resources available to complete the process (Turia, op cit.).



Logs that have been tagged for export

A dilemma for the colonial Administration, even after adopting the concept of TRP was that this arrangement did not allow the Administration to go into long-term forest management as it only had rights to utilise the trees but not the land. In addition, the natural forests proved a challenge to manage for sustained timber yield and the Administration looked to the establishment of pure plantations instead. This was at a time when forestry development internationally was very much focused on plantation development. Attention in many countries, including Papua New Guinea, was directed at examining how to deliver the potential gains in yield that plantations seemed to offer over low-yielding natural forests.

2.4 Forestry (Private Dealings) Act, 1971

The Forestry (Private Dealings) Act 1971 granted customary owners the right to apply to have their forests declared a Local Forest Area (LFA) and to sell their timber direct to outsiders, subject to the approval of the Forestry Minister. This Act thus bypassed the timber rights purchasing (TRP) procedures that had previously governed all exploitation of timber. The origin of this Act lay in two proposals put forward in the legislature at the time leading up to independence. First, a new forestry bill was introduced in the House of Assembly to allow landowners to dispose of their timber as they would like. At the same time that this new legislation was being debated, further amendments to the Forestry Ordinance were recommended:

for the purpose of clarifying the rights of native owners of land who have disposed of the right to remove timber from that land, to provide adjustment of the purchase price of timber rights in certain circumstances, to remove out of date provisions, to provide for reforestation, to provide for advisory services and assistance to be made available by the Administration to stimulate economic development in certain areas, and for related purposes (House of Assembly Debates, 10 June 1971: 4357)

This new legislation became the Forestry (Private Dealings) Act, 1971 which enabled the customary owners of timber to dispose of their timber to any person, subject to certain safeguards. The debates over self determination which featured at this time led to other general desires being voiced by Papua New Guineans in the House of Assembly to see their people involved in the development of the country. This piece of legislation, which was later repealed by the 1991 Forestry Act, can therefore be seen as being a product of its time - as the imperative of national (and local) control began to be voiced in the years that led up to independence.

2.5 The Forest Industries Council Act, 1973

The Forest Industries Council Act, 1973 was passed by the House of Assembly on the 28th September 1973. It established the Forest Industries Council, which was financed by a production levy paid by the major forest products operators, and collected in conjunction with royalty payments. The role of the Forest Industries Council was to advise and assist in the promotion and marketing of major forest products, in keeping with similar marketing boards and councils that were a feature in many timber-producing countries at that time. Few of these boards remain today, with the function of marketing and promotion generally seen as a private-sector competence. This Act was repealed by the 1991 Forestry Act, after the operation of the Forest Industries Council had come under the scrutiny of the 1989 Commission of Inquiry and found to be seriously wanting.

2.6 The Forestry Act, 1991

The 1991 National Forest Policy and its associated Forestry Act (passed in 1991 and gazetted in 1992) responded to the call from the 1989 Commission of Inquiry (see page 16) for increased state control and planning in the forestry sector. The new Act incorporated the Papua New Guinea Forest Authority and vested it with responsibility for timber industry regulation under the guidance of a National Forest Board. Under the new Forestry Act, the state reserved to itself a monopoly on the right to enter a forest management agreement with landowners. As a result, if landowners cannot strike an acceptable deal with the Forest Authority, they are effectively barred from arranging industrial scale logging on their land. If a forest management agreement is concluded, it is the Forest Board, not the landowners, that selects a forest industry participant to implement the agreement and recommends to the Minister that a timber permit be granted. The new Act saved all projects and agreements approved under former legislation, but gave the new Forest Board power to make variations to bring them in line with the new regime (Section 137).

...some observers fear the pendulum may have swung too far in favour of the State



Commercial timber trees are skidded out of the forest

2.7 What might be learnt from past experience?

This section has described the shifting balance over the years between the State's desire to control timber harvesting and the landowners' desire to be involved in the sale of a customary-owned asset. At present, some observers fear the pendulum may have swung too far in favour of the State, disempowering the voice of local people. However, with the enormous power imbalances that are a feature of large-scale commercial timber harvesting, with international logging companies associating with the small-scale social structure of rural communities, many commentators agree that a mechanism needs to be found that protects the interests of those most disadvantaged. The continuing conflicts that characterise the forestry sector suggest that an equitable balance has yet to be found and secured under the law. Laws can, and do, change: the question is whether further legal reform should give the resource owners more say in the sale of their timber.

Forests and Trade 3

3.1 Post-war reconstruction

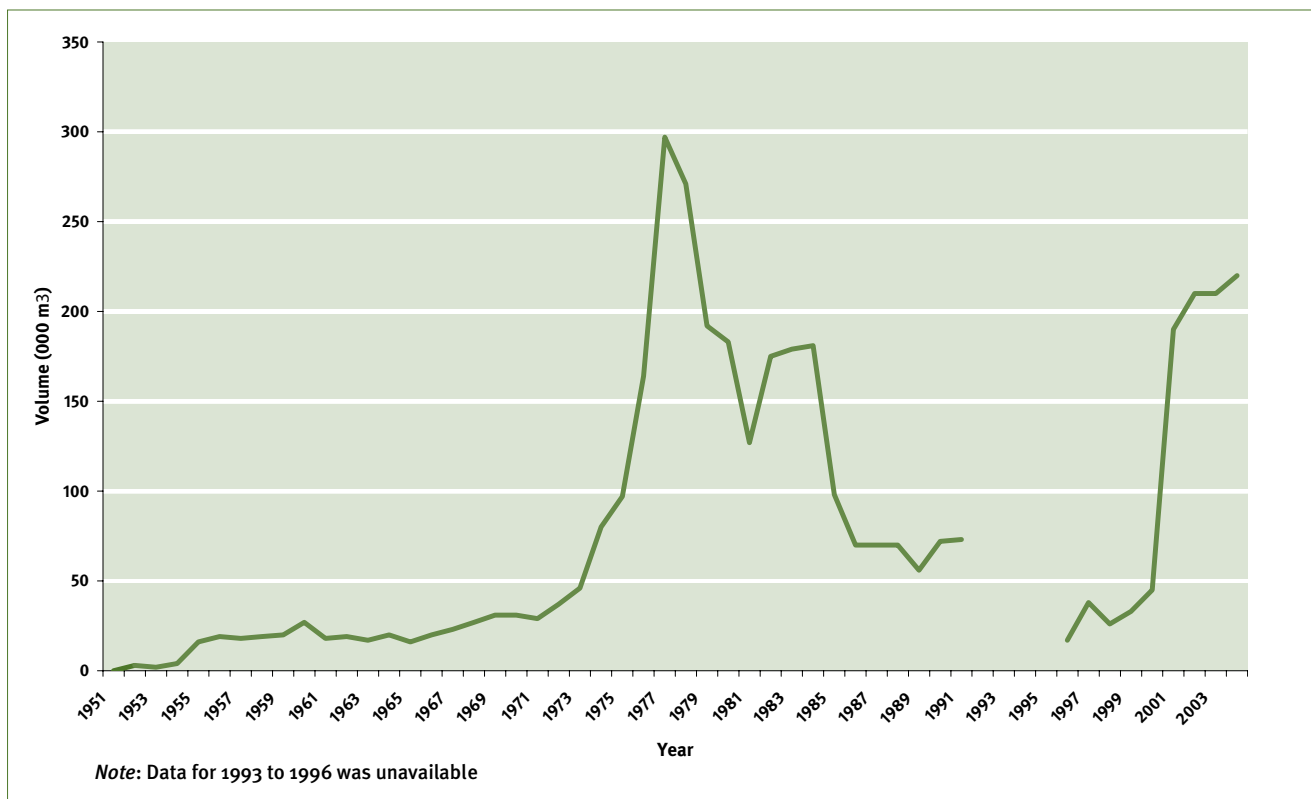
The exploitation and development of Papua New Guinea's extensive forests in the colonial period was limited. In the 1940s, the emphasis was on the development of a local processing industry to meet the needs of post-war reconstruction. Two government-run sawmills, one at Yalu near Lae, and the other at Keravat near Rabaul, provided sawn timber with which to rebuild the towns damaged by war-time action (Mantu, 1985). During this period, development of forest plantations by the government took place at Bulolo, Keravat and Brown River.

The economic importance of the forest sector grew in the 1950s, with a significant increase in the export of forest products occurring in 1955, when the plywood factory at Bulolo came on stream (see Figure 1). This trend was supported by the International Bank of Reconstruction and Development (IBRD) Mission Report of 1965, which stated that the timber potential of the territory was large enough to warrant an 'aggressive programme of commercial development' (IBRD, 1965). The objectives of the subsequent national forestry programme in 1968 reflected a model based on industrial, large-scale development of the commercial timber resource. Capital intensive and skilled foreign companies were seen to be necessary to achieve low-cost production. The consensus of the time was well summed up in the 1964 Annual Report of the Department of Forests:

'Whilst small-scale enterprise by Papuans and New Guineans is encouraged, economic exploitation of the major timber resources has and will devolve materially on overseas timber operators who are in the position to provide the capital, management and expertise necessary for large scale timber and processing operations.'

The upward trend in timber production was reflected in the area under TRP arrangements, which increased from around 317,000 ha in 1961/62 to over 1.1 million ha by 1967/68. The volume of logs harvested increased by 230% over the same period. However, log exports remained at a low level. The publication *New Horizons - Forestry in Papua New Guinea* was published by the Administration in 1973, immediately before independence, and provided a prospectus for the economic development of the forest resources of the country. This publication clearly emphasised large-scale development and the attraction of international timber operators with adequate financial backing and market contacts. Such a policy was supported by the House of Assembly, which endorsed a five-year development plan that included a substantial expansion of the timber industry, including a proposed three-fold increase in timber production.

Figure 1: Processed wood products exports from Papua New Guinea, 1951-2005



3.2 The Jant project

At a time when the rest of the national timber sector was experiencing a significant decline in demand for wood products brought about by a world-wide recession, the first major export-orientated development project started, with the export of woodchips from a plant at Madang operated by Japan and New Guinea Timbers Ltd (Jant) in 1974. For the next few years, the Jant operation transformed processed wood exports from PNG (see Figure 1.) It was the first project of its size and was ‘ground-breaking’ not only for the country but also more widely, as the concept of clear-fell logging was unknown in tropical forests outside of conversion projects.

However, the project soon became the subject of some controversy. Originally designed as a 20,000 ha *Eucalyptus degulpta* plantation scheme, this was reduced to 10,000 ha, out of which 1,200 ha was established in the first ten years of the project (Hilton and Johns, 1984). Concerns raised over this operation included (De’Ath and Michalenko, 1993):

- the low level of timber royalty payments (less than 0.5 kina per m³) made by the company
- the non-payment for road-building material by the company
- the negative impacts on gardening, cultivation and game
- an increased level in the water table, with increased incidence of malaria
- no opportunities for local people in company management
- limited information provided to local people (e.g. over logging plans)

The Jant Project was the first project of its size and was ‘ground-breaking’

Nevertheless, the longevity of this project (which is still in operation) has demonstrated that industrial-sized wood production is possible in PNG.

3.3 The shift to log exports

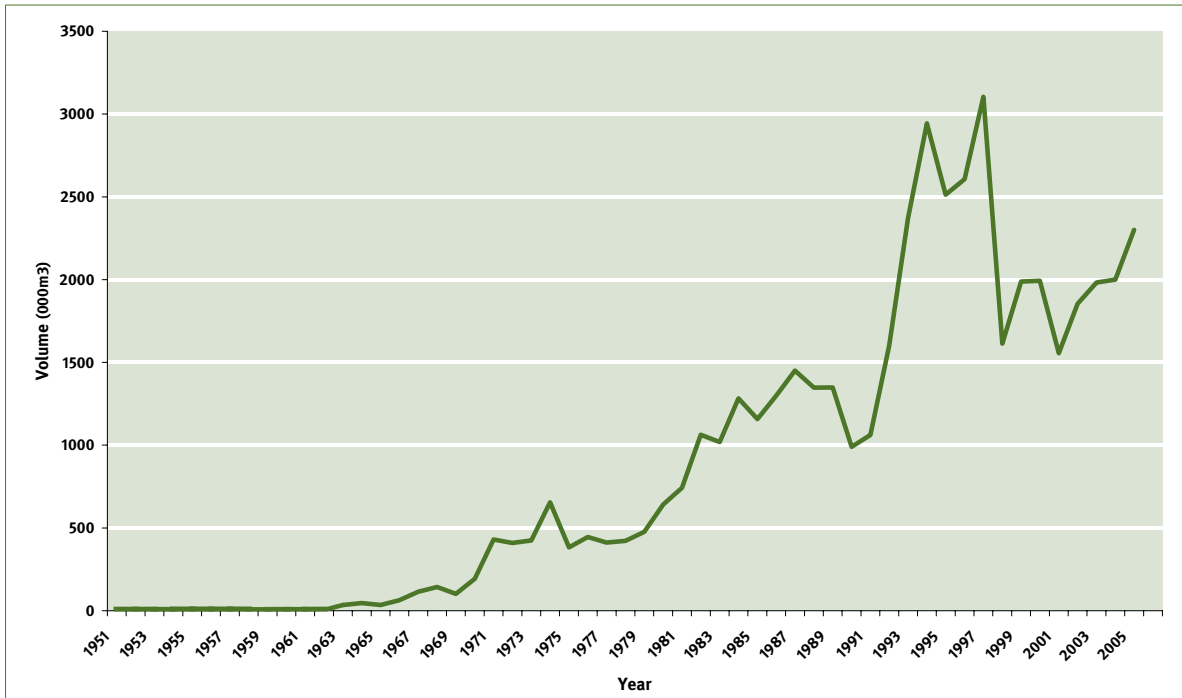
The Government's 1979 White Paper set out a revised forest policy in response to the world-wide recession, which had had a strong negative impact on PNG wood exports since 1974. The revision of the national forest policy focused on the export segment of the major forest products industry, and gave detailed policy guidance to four distinct types of wood producing operation:

- The establishment and operation of Papua New Guinea owned log exporting enterprises. Such ventures would be placed under national control and broad-based ownership; would have a commercial orientation of placing logs on-ship at least cost and maximise revenues by efficient marketing; and would have a commitment to follow-up agricultural development.
- Investment guidelines for foreign log export enterprises. Enterprises would need to demonstrate managerial experience, financial capacity and marketing expertise necessary to undertake all aspects of the venture. Specific measures were also listed to ensure that PNG received a fair price for all logs exported.
- Outlines for road building construction that allows the export of logs. This type of operation aimed to provide the State with new priority road infrastructure within a five year period. Based on the road length to be constructed a log quota would be determined by Government.
- Investment guidelines for timber processing operations. The policy suggested some relaxation of conditions relating to existing processing industries, a greater conformity of operating conditions, and a more rigid and consistent enforcement of operation conditions when the degree of uniformity was achieved.

the active promotion of log exports by government paved the way for an array of foreign logging companies to begin operation

This policy change towards the active promotion of log exports by government paved the way for an array of foreign logging companies to begin operations. As can be seen from Figure 2, it began the inexorable rise in log exports from a level of just below 500,000 m³ in 1979 to almost 2.5 million m³ in 2005. At the same time there was a marked reduction in processed wood exports, reflecting the changing structure of the forest industry. This five-fold increase in log exports was not matched by a similar increase in forest management capacity, however, and as a result much of the forest harvesting carried out exceeded estimated sustainable levels, as noted in the PNGFA Chairperson's report for 1993: 'The unfortunate reality, is that today, some areas of PNG's forests are being logged at unsustainable levels, largely as a consequence of past permit approvals in contravention of the official government moratorium' (PNG Forest Authority, 1993: 5).

Figure 2: Log exports from Papua New Guinea, 1951-2005



Vigus (2002) listed four difficulties associated with sustainable forestry development being based on the export of roundwood:

- Large quantities of logs (3,000 to 6,000 m³) need to be harvested in a short time to avoid degrade occurring between harvest and loading to fill log ships.
- The extraction of large-sized logs, often in excess of 25 metres, causes excessive damage to the residual stand during the extraction process, leading to a slower recovery of the stand.
- The premium on high quality logs results in much waste at the log yard, where logs are trimmed to cut off “defects”, which are then burned.
- Cultural ties, land-tenure systems and the geography of PNG preclude the setting aside of areas large enough to sustain export logging.

The huge surge in log exports in 1992/93 reflected the very high international prices for tropical hardwood logs following log export limitations imposed by the Malaysian states of Sabah and Sarawak, compounded by a spate of new permit approvals in the lead up to the gazettal of the new Forest Act in June 1992. On the day before the Act came into force, introducing a new regime of sustainable forest management, the Minister of Forests issued 17 timber permits under the old legislation (Wood, 1997). However, the vulnerability of roundwood log exports to international market conditions was clearly demonstrated in late 1997 with the first signs of the ‘Asian crisis’, which was to affect the region’s economies. A significant downturn in the tropical timber trade ensued and the price of logs fell. PNG, together with Indonesia and Malaysia, were the worst hit major tropical wood producers.

Since 2001 there has been a take-off in the amount of exported processed wood products (Figure 1). Much of this export production comes from the Rimbunan Hijau Timber Processing Ltd’s veneer plant at Panakawa in Western Province. As demonstrated by the Jant operation some 30 years earlier, one operation can have a huge impact on production levels of the national wood

processing sector. The challenge for such operations is to demonstrate long-term benefits at both the local as well as the national level.

3.4 What might be learnt from past experience?

The interplay between international market forces and the government regulatory regime has determined the development and structure of the forest sector over the past fifty years. PNG does not have a significant domestic market for wood due to a small population that has limited buying power. The export market is therefore the driving force in setting wood demand, and this is likely to continue. Yet, government can - and should - send signals through to the market using its policy and regulatory regime. The 1979 policy on log exports is one clear example of this.



Logs waiting to be shipped for exports

The low level of development in many rural areas has driven policy to seek early returns from forest development. In the absence of local government capacity, central government has looked to project operators to provide much rural infrastructure, including health care facilities, schools, roads and other forms of communication. Although such benefits may be transitory, declining as logging operations cease, they are also very tangible when and where they exist. To date, there appears to have been little study of how these benefits might be secured for the long-term, and how the transition in service provision from the private-sector to government might be managed. There is a pressing need for such study.

Many commentators suggest that large-scale forestry development in PNG has had a chequered history, with the distribution of benefits being generally difficult to track. One measure, however, is quite clear. From being an historic drain on the national treasury from the day it opened office in 1938, the national forest service finally broke even in terms of annual expenditure and revenue in the late 1970s. Since that time the sector has contributed very considerable sums to government through the tax regime, primarily the tax on log exports. Yet, there has been insufficient government investment in the sector to safeguard its future. The national forest service is forced to operate under a restrictive budget, which is one reason why the organization is unable to fulfill its mandated function of safeguarding the national forest patrimony for both present and future generations.

there has been insufficient government investment in the sector to safeguard its future

The debate on 'downstream processing' is taken up in Paper Three of this series.

4 Forests and Governance

4.1 The evolution of State control

In the colonial era, the administration of forestry legislation, supervision of operations and enforcement of permit conditions was undertaken by the Department of Forestry, a national forestry service reporting to the Director of the Department of Forestry. Colonial policy received its final statement in a 1974 white paper entitled, *The National Forest Policy (Department of Forests 1974)*, based on the Carson report of 1973/74. Carson's report emphasized the need for centralised control, which the 1974 policy framework reinforced, to protect the forest as a national resource under government control. However, as described above, this approach was challenged by the enactment of the *Forestry (Private Dealings) Act 1971*. This Act granted customary owners the right to sell their timber direct to outsiders, thus bypassing the timber rights purchasing procedures (TRP) which had previously governed all exploitation of timber. Despite its reforming intentions, the Act had the effect of undermining controls that had been placed on timber exploitation for both environmental and social reasons.

Three factors conspired to undermine the national forest control system immediately after independence in 1975. First, independence brought a new set of aspirations for national leaders which created an urgent requirement to increase the national income to finance them. This introduced a new dynamic into a public administration that had previously been very heavily dependent on external grants from the Australian government. In the early to mid-1960s, such grants had amounted to approximately 60 percent of total administration receipts (Anon., 1968). Second, was the rapid pace of localisation that took place in the public service, with the loss of many experienced foresters who took with them an in-depth knowledge of the application of forest control measures that could not be readily replaced. The third factor that had an impact on the functioning of the forest control system was the introduction of provincial government the next year, in 1976. Forestry became a concurrent function, meaning the power of legislation and control was shared between the national and provincial governments. However, there was no proper division of the concurrent functions. The implication of this was that staff posted to the headquarters in Port Moresby were responsible to the national minister, while those that remained in the Provinces came under the control of the provincial forestry departments, under the control of the Provincial premier. The policy and planning functions were retained by the Secretary of the Department of Forestry, while the implementers of these decisions were placed under the control of Provincial forestry officers responsible to the provincial governments. All of these factors combined started to erode previous controls that had operated in the forest sector, without empowering landowners (both individually and collectively) to assert and protect their rights of forest ownership.

4.2 The Barnett Inquiry

A Commission of Inquiry into Aspects of the Timber Industry was established in 1987 by the then Prime Minister, Pias Wingti, and chaired by Judge Thomas Barnett. This inquiry was established following persistent criticism of foreign-based timber companies operating in PNG, and in particular the probity of the Forest Industries Council. The findings of the enquiry, which concluded two years later in 1989, provided compelling evidence that some timber companies were operating illegally. A much quoted phrase describes what can only be described as an appalling situation:

“It would be fair to say, of some of the companies, that they are now roaming the countryside with the self-assurance of robber barons; bribing politicians and leaders, creating social disharmony and ignoring laws in order to gain access to, rip out and export the last remnants of the province’s valuable timber...” (Commission of Inquiry Interim Report No.4 Vol. 1: 85).

The Commission of Inquiry revealed (Anon., 1990):

- An imbalance of power between the Minister of Forests and the Department of Forests, that effectively gave the Minister of Forests total power over the allocation of concessions and licenses.
- An imbalance of power between the national Department of Forests and the provincial Divisions of Forests. The central structure held a right of veto and the right to force through projects against the wishes of local authorities.
- A high level of corruption amongst parliamentary ministers and, to a lesser degree, amongst the heads of the Department of Forests, the Forest Industries Council and the provincial governments.

The report called for:

- A slow down in timber harvesting.
- The reformulation of national forest policy.
- The establishment of a nationally integrated forest service.
- The development of consultation procedures in the allocation of permits.
- The formalisation of detailed requirements for sustained-yield forestry.

Barnett highlighted that the break between Port Moresby and the provinces had had an effect on the development of policy and the concept of cooperative planning. With no properly developed plans with predetermined projects in place, the door was open for ad hoc decision making. This gave some loggers the opportunity to bribe or influence customary landowners, provincial premiers, national and provincial ministers, politicians and public servants in order to gain access to the timber resource. Leaders tapped into the system and influenced or undermined the national Minister and Secretary for their own reward.

Government responded to the findings of the Barnett Report with a comprehensive programme of reform: a new forest policy was prepared through a consultative process, which included national and provincial governments, the forest industry and some civil society involvement. This policy was approved by the National Executive Council in 1990 and printed in 1991. In the same year the forest legislation was thoroughly revised, with new procedures for resource acquisition and allocation. In addition, the regulatory institution was transformed by the creation of the PNG Forest Authority in 1993 as a statutory authority to lead the forestry reform process and devise programmes to manage the forests. Since that time it has been the responsibility of the Authority to monitor and ensure compliance of the rules and regulations within the forest sector, including contracts between the State, landowners and investors. It consists of a statutory forest board, a unified forest service, a management committee in each province and special advisory committees as required. The current system of national forest control, as overseen by the PNG Forest Authority, is described in Paper Two of this series.

4.3 The independent forest reviews

In more recent years, the concern that commercial timber harvesting in Papua New Guinea was not providing long-term benefits to the country or its citizens re-surfaced. In response to this concern, and to assess the implementation and effectiveness of the new governance regime introduced by the 1991 Forestry Act, government commissioned five reviews on the administration and practice of the logging industry between 2000 and 2005:

- Review of Forest Harvesting Projects Being Developed Towards a Timber Permit or a Timber Authority (2000-01)
- Review of the Forest Revenue System (2001-02)
- Independent Review of Disputed Timber Permits and Permit Extensions (2003)
- Review of Current Logging Projects (2004-05)
- Compliance Audits (2004-05)

The different reviews set out a whole range of general governance and project specific recommendations. These range from a proposal to divide the PNG Forest Authority into two separate organizations and the implementation of a Commission of Inquiry with powers to summon documents and cross-examine witnesses, through to remedial actions to correct procedural errors in the development process for individual projects. The majority of these recommendations do not appear to have been acted upon.



The future of the forests depends upon dedicated foresters

The 2001 Review

The first review was conducted by an independent team to evaluate the level of compliance in 32 proposed forest harvesting projects that were being developed under the requirements of the Forestry Act 1991, its supporting regulations and guidelines. As such this review very much focused on the administration of the acquisition process undertaken by the national forest service. The review team's general conclusion was that, with the exception of four notable cases, the documentation concerning all other projects showed that 'general policies, laws and proper procedures were being observed' (IFRT, 2001: iii), whilst the team noted 'although due process has generally been observed, the quality with which some of the essential steps have been dealt with has been less than acceptable' (IFRT, 2001: ii). Out of the 32 intended projects assessed, the review team recommended that four should proceed subject to some remedial action being taken, six could proceed after more significant revision, and the remaining 22 should not be taken forward.



Timber harvesting need not be destructive

One of the significant observations of the review team was to question the retention of the forest authority, forest management and forest monitoring functions within one unified national forest service. The team's recommendation was:

'That consideration be given to a further restructuring of forestry administration through an amendment to the Forestry Act requiring the setting up of a distinct and separately funded Ministry of Forestry (or a broader natural resources Ministry). The Ministry to include the current National Forest Service's Policy Secretariat, and thereby achieve clear separation of the policy development function and the implementation, monitoring and control functions as required by good governance principles. The Ministry to be physically separated from the PNG Forest Authority.' (IFRT, 2001: iv)

The team also commented on the need for additional support - outside that given by the national forest service - to assist the formation of Incorporated Land Groups in support of involving landowners more fully in the planning of the use of their land:

'That consideration be given to the establishment of a Government institution to undertake expertly the incorporation of land groups for all purposes nationally, and the provision of general landowner support.' (IFRT, 2001:vi)

The 2002 review

The review of the financial revenue system investigated one major aspect of forest governance: the issue of transfer pricing. The team found ‘unexplained and substantial discrepancies between the declared fob prices plus freight and insurance and the destination cif (cost, insurance and freight) prices that warrant further investigation’ (FRRT, 2002: 11). This conclusion was based upon visits to Hong Kong, China and Japan to collect and verify data. There was clearly some suggestion that transfer pricing, by its nature a very difficult practice to observe, was a likely feature of some companies’ way of doing business when it came to log exports.

The 2003 review

The third review examined the administration associated with four timber permits and two timber authorities that had been the subject of considerable dispute. In one of their reports, the review team presented their conclusions in these terms:

‘In his Report in the late 1980’s Justice Barnett made reference to “Robber barons” of the forest industry roaming the countryside at will. The overwhelming conclusion of the Review Team, following its inquiry into the Kiunga-Aiambak, Bonua Magarida and Simbali matters, is that the robber barons are now as active as they ever were. They are not only free to roam, but are in fact encouraged to do so by persons whose proper role is to exercise control over them’ (FCPRT, 2003: 1).

A fundamental problem highlighted by this review was that corruption and disregard for due process remained a continuing problem in the forest sector, with sections of the Forestry Act being ignored in the administration of Timber Permit extensions and Timber Authorities. If this is the case, then it is worth noting that such malpractice goes beyond the forest sector in PNG - corruption seems to pervade much of public life, as a reading of the daily newspapers suggests. PNG was ranked 135 out of 159 on the Transparency International Corruption Perceptions Index 2005, reflecting a very poor level of national governance.

...corruption and disregard for due process remained a continuing problem in the forest sector...

The 2004 review

The review of 14 on-going logging operations in 2003/04 also presented a gloomy picture of non-compliance within the forest industry. The overall conclusion made by the review team was that under the current market and fiscal conditions, the current non-compliance with environmental standards, and the inadequate monitoring and control, timber production as being practised was not sustainable. Having said that, 12 of these projects had been authorised prior to June 1992 under the previous forestry legislation, at a time when sustainable timber production was

not stated as an explicit national forest policy objective. The report underpinned its conclusion with a number of broad but definitive findings (The 2003/2004 Review Team, 2004):

- Logging has little long-term beneficial impact on landowners, although they bear the environmental costs.
- At stated log prices, the logging industry is not profitable and companies are not replacing their field equipment. This is not sustainable and it is estimated the current logging capacity will cease to exist within 10-15 years.
- Many breaches of the logging standards go unreported and are not actioned. Field based officers have lost faith that their attempts to impose sanctions will be backed up by senior management, who take their cue from political leaders.
- The capability of the Forest Authority has declined significantly with a ‘notable lack of strategic thinking and planning, and significant internal divisions.’
- The Department of Environment & Conservation is ‘ineffective in the forestry sector’ and its ability to undertake effective monitoring and control has been ‘fatally damaged.’

The picture was clearly seen as unpromising, but not uniformly so. Two exceptional projects, at Open Bay (TP15-53) and Watut West (TP13-33), were singled out for praise. They are differentiated by their long-standing nature (having been in operation for over 40 years); the commitment of the operators to a single project rather than acquiring more concessions; partial State ownership; mostly local workers and a focus on training and localisation; and a long-term commitment to establishing plantation areas to ensure continuity of supply.



Felling damage can cause severe damage to residual trees

The 2005 audits

Eight audits were conducted (by the same team undertaking the external review of current projects) between February 2004 and March 2005, to assess compliance with applicable laws for new Timber Permits and Permit Extensions. The results of the audits were presented in six separate reports. Major failings were identified in all the audits, with the Permits being in breach of the 1991 Forestry Act.

4.4 What might be learnt from past experience?

This section has described the governance problems that have confronted the development of the forest sector since independence. Despite the reforms of the early to mid-1990s, which constituted a rational response to the concerns raised by the 1989 Commission of Inquiry, there would appear to be continuing significant instances of unlawful behaviour. This suggests that reform within the sector is nothing but difficult and slow. It may also reflect a more general malaise in Papua New Guinean society that tolerates such behaviour. Finding solutions under such circumstances is bound to be take time and requires strong political leadership to carry the reform process forward.

...reform within the sector is nothing but difficult and slow

Forests and Sustainability 5

5.1 A simple concept?

Historically, and right up to the 1991 National Forest Policy, the broad issue of sustainability – and the more limited definition of sustained timber yield – was not high on the national policy agenda. Logging of natural forest was largely determined by economic considerations and the perceived extent of production forest suggested that any concerns over ‘over-harvesting’ were not significant at the provincial or national level.

Two important factors need to be considered when examining sustainability. First is the geographic extent over which sustainability is assessed. The classic concept of sustained yield management developed within local forest areas (e.g. Knuchel, 1953), requiring those same areas to be permanently in production. However, there has been an argument that more intensive felling could be consistent with sustainability if such sites (i.e. forests) are subsequently ‘rested’. In practice this has never happened in tropical timber producing countries, where non-forest land-use has often been the result of such practices. There is no doubt that sustainable forest management practices require a stand of trees to be managed in such a way that the stand can re-grow after logging and produce a second (and subsequent) harvest. In the context of PNG this means that each ‘set-up’¹ should be logged in this way.

Second is the means by which sustainability is assured. The long-term sustainability of tropical forest, where most logging occurs, depends on the unassisted natural recovery of the harvested stand. However, this can be complemented in terms of increasing management inputs (and often scale of operation): by supporting the re-growth of favoured trees; by tree planting within the residual stand; or by complete reforestation. Vigus (1996) described the first of these assisted regeneration techniques, as applied in Kimbe, West New Britain. To-date, reforestation has proceeded at a very low level in Papua New Guinea. The most recent estimate suggests a total of 62,000 ha (Kiki, 2006), over half of which is in long standing plantations managed by the national forest service. Without a major reforestation programme being in place at the project level, sustainability currently depends on there being sufficient trees in the stand that survive the logging operation without being damaged, that are commercial species, and are not moribund.

The PNG Forest Authority has adopted the approach of dividing the total estimated volume of commercial species within a project area by 35 (the proposed cutting cycle period) as its

¹ The smallest forest management unit, of approximately 100 ha.

main strategy to secure sustainability. The resultant volume estimate is termed the annual allowable cut (AAC). It is this estimate that is currently entered in each Timber Permit and sets the maximum level of harvest that the operator can cut in any one year. However, there are two problems with this approach; first it depends on an accurate inventory of the harvestable trees over a huge area, which has proven very difficult to achieve; and second, it depends on 35 years as being a sufficient time period for the forest to rebuild to a similar level of commercial tree volume.

5.2 The underlying science

The science exists to guide improved practice. In particular, two areas of research carried out in recent years have the potential to guide sustainable forest management in PNG.

First is the work of the University of PNG to develop a satellite coverage database containing information on the present forest cover, the condition of the forests and an assessment of the spatial impact of large-scale forest activities. This research will complement the earlier vegetation mapping of PNG (Paijman, 1975) and should allow for mapping areas of production forest in each project area considered suitable for large-scale forest development.

The science exists to guide improved practice

Second, is the work of the Forest Research Institute (FRI). FRI, supported by the ITTO project *'Intensification of growth and yield studies in previously logged forest'* started to establish a large number of permanent sample plots widely distributed throughout Papua New Guinea in 1992. A forest growth model (PINFORM) was then developed, which has provided considerable insights for the practical application of forest management. The model demonstrated that current logging levels, using a felling cycle of 35 years and a 50 cm diameter cutting limit, results in an initial felling that is excessively heavy. Subsequent cycles have lower yields and the initial post-logging period shows substantial stand damage with the attendant risk of initiating a cycle of stand degradation (Alder, 1999). The computer model determined that over a wide range of felling cycles, an allowable cut of 0.5 m³/ha/yr may be sustained on average sites, falling to 0.3 m³/ha/yr on poorer sites, or rising to 0.7 m³/ha/yr on the best. The model indicated that a reduced level of extraction, e.g. on a 20-year cycle cutting 10m³/ha on each felling coupe, with 1/20th of the concession area cut each year may be sustainable in terms of tree growth (Alder, op cit.).

Using the PINFORM model, Alder (1998) demonstrated significant site variability in stand growth. He developed a site multiplier for each province to take account of the variation observed in the FRI/ITTO data set. Such site variation in tree growth is likely the result of a combination of total rainfall, dry season severity, and soil fertility. This emphasises the inadvisability of treating large forest areas as homogeneous blocks; rather forest mapping of the type mentioned above needs to be taken up as a matter of urgency in the forest management planning of each project.

5.3 What can be learnt from past experience?

This final section has shown that the adoption of a minimum diameter felling regime, where all commercial trees greater than 50 cm dbh² can be harvested, may likely lead to the impoverishment of the residual forest. Too much is harvested at one time.

If sustainability is to be better guaranteed, then strategic planning needs to be strengthened. Since the 1990s, the government has invested in improving the quality of logging controls with a range of publications and guides on best practice. Yet these tend to focus on the tactical, short-term issues of planning and carrying out logging operations. There appears to be a large gap in the long-term planning that is required to ensure sustainability. Elsewhere, this planning is formulated and described in a Forest Management Plan. Landowners may be unclear of the implications of the 50-year Forest Management Agreements that they currently sign in the absence of such plans.



Forest management depends on well trained technicians

In areas of natural forest coming under formalised forest management for the first time the management system has to deal with considerable uncertainty. Forest planning should reflect this uncertainty and initially adopt an adaptive strategy. In this context the reliance on one control mechanism – volume control – is a high risk strategy. As suggested above, the combination of volume and area control would likely provide a better guarantee of sustainability within any one project area.

Too much is harvested at one time

Finally, although logging damage attracts most attention, perhaps a more invidious factor that can undermine forest sustainability is the incidence of fire. The recovery of fire damaged stands is slow and a downward spiral to non-forest cover is one potential outcome. There is very little published on this aspect of forest management in the literature on PNG, but it is a danger that should attract increasing attention as global temperatures rise and the spread of forest fires within the region becomes a more common phenomenon.

² dbh: diameter at breast height (1.3 m above ground level)

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Appendix: Chronology of forestry development in Papua New Guinea

Phase 1: Origins of colonial forest policy

- 1922 No forest policy in existence. Control on the cutting and removal of timber exercised through the Timber Ordinance 1909 in Papua and the Timber Ordinance 1922 in New Guinea. C E Lane-Poole commenced assessment of the forests of Papua and then New Guinea.
- 1925 Lane-Pool published a report on The Forest Resources of the Territories of Papua and New Guinea. He recommended that a Forest Service be established and a programme of afforestation be started. No action was taken on either recommendation.
- 1936 Timber Ordinance of New Guinea superseded by the Forestry Ordinance 1936.
- 1938 The Forest Service was established in New Guinea, with the appointments of two Australian foresters.

Phase 2: Post-war reconstruction

- 1944-1946 Forestry matters including cutting and milling of timber controlled by the Army through the 1st Australian C.R.E., New Guinea Forests.
- 1946 First announcement of a formal forest policy. Army forestry records and some equipment taken over by the administration. Former army personnel recruited to form the nucleus of the Forestry Department.
- 1949 Report of Royal Commission on New Guinea timber lease transactions (in reference to the Bulolo Timber area).
- 1953 Forestry Ordinance 1936-37 of New Guinea applied to Papua and a uniform policy applied in both Territories.
- 1955 Establishment of Bulolo plywood mill.
- 1958 Adoption of new Forest Policy.
- 1962 Department of Forests begins new round of forest resource surveys. Establishment of Bulolo Forestry College.

Phase 3: Drive for Development

- 1964 First World Bank (WB) mission to PNG, with a Report published in 1965 as The Economic Development of the Territory of Papua and New Guinea (1965).
- 1968 Inception of five-year economic development programme following World Bank's report. Timber permits and log harvest both increase significantly.

Phase 4: Transition to Independence

- 1971 Passage of Forestry (Private Dealings) Act.
- 1974 Carson Report on Forestry and Forest Policy in Papua New Guinea (1974). Publication of the White Paper "National Forestry Policy" 1974. Passage of Land Groups Incorporation Act and Land Acquisition Act.
- 1975 Political Independence for PNG.
- 1976 Creation of 19 Provincial Governments
- 1979 Adoption of new Forest Policy, relaxing previous restrictions on log exports.

Phase 5: Barnett Inquiry and its Aftermath

- 1987 Establishment of Commission of Inquiry into Aspects of the Forestry Industry.
- 1988 PNG requests Tropical Forest Action Plan (TFAP).
- 1989 Report of Commission of Inquiry into Aspects of the Forestry Industry (The Barnett report) published. Second World Bank led mission to PNG under the auspices of the TFAP.
- 1990 World Bank produces Tropical Forestry Action Plan Review for PNG. TFAP Roundtable. Inception of National Forestry Action Plan (later renamed as National Forest and Conservation Action Program). Draft Forest Policy prepared and approved by the NEC.
- 1991 Publication of new National Forest Policy and passage of new Forestry Act, 1991.
- 1992 Gazettal of Forestry Act, 1991
- 1993 Amendment and application of the Forestry Act (as amended), 1993.
- 1996 Introduction of new forest revenue system.
- 1998 WB mission arrives in PNG to design the Forestry and Conservation Project (FCP).
- 2000 WB submitted a project concept document for the FCP to the Global Environment Facility (GEF) for co-financing. A pre-appraisal mission from the WB arrives in PNG to discuss the FCP, resulting in a revised document submitted to the GEF and made available to national stakeholders.

- 2001 Moratorium on issue of new timber concessions included in conditions of new Structural Adjustment Programme. Signing of loan agreement for the FCP.
- 2002 First independent forestry review begins.
- 2003 Moratorium lifted. WB suspends the FCP project loan and GEF Grant in August.
- 2004 The second independent forestry review team submits draft reports to public for comments.
- 2005 Government requests cancellation of FCP loan in May. WB cancels the FCP loan and GEF Grant in June.
- 2006 Forest Trends report containing all the 2002 -2005 independent reviews of the forest sector published internationally in March. Regional seminar on forest law enforcement and governance held in Port Moresby in October.

Adapted from Montagu, 2002, and Turia, 2005