



Environmental and Socio-Economic Baseline study – Papua, Indonesia

Study 4/2009



Norad

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Norad's Evaluation Department decided in April 2008 to carry out baseline studies in order to better measure the results of its development efforts supported, with regard to Norway's Environmental Action Plan. It contracted Scanteam to implement studies in Tanzania, Malawi and Papua, Indonesia.

Aside from Scanteam's overall leadership role, the Indonesian NGO Sekala and the consultancy firm Archipelago Ecoservices carried out the main data gathering and analyses of this report.

Sekala provided especially the geographical data, an overview and description of government policies and services, as well the descriptions of local and international environmental NGOs. Archipelago Ecoservices added information and analyses on government policies and actions as well as international aid organizations, and provided analyses on environmental and socioeconomic impacts.

Scanteam is responsible for the contents of the report. The views and conclusions do not necessarily correspond with those of Norad or its Evaluation Department.

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1. Executive Summary

1.1 Environmental Baseline

Around 85% of the Indonesian part of New Guinea (i.e. Papua and West Papua) is covered in forest according to land cover maps generated from spatial data. Modis satellite imagery analysis conducted by the South Dakota State University's Geographic Information Science Centre of Excellence in partnership with the Indonesian Ministry of Forestry, the World Resources Institute, Sekala and the United States Geological Survey has revealed that deforestation has been minimal in Papua over the last decade (just 1% of the national total). The island groups featuring the most change continue to be Sumatra and Kalimantan where 95% of Indonesia's deforestation occurred between 2000 and 2006 (Hansen et. al. 2006).

This confirms the inference from ambiguous sectoral data reviewed earlier that large-scale conversion of forest to oil palm and pulp wood, which appears to have been about to occur at the end of the Soeharto Regime, was all but stalled and has since been left more or less in limbo. This appears to be due in part to the difficulty of developing coherent policies in the present political context because of differences in interests between the central forestry authorities and the provincial government, and between the latter and *kabupaten* governments, all of whom have a statutory say. It may also in part be due to companies already possessing concession licences being deterred from proceeding with their investments because of the political risk posed both by policy uncertainties and by potential conflicts with the local people, who claim customary rights to the areas concerned. Indeed, this has also affected logging concessions, whose number and activities have drastically declined.

In contrast, investments in marine fisheries, which are not in the same way affected by policy and political risk, appear to have thrived to the point of their revenues having surpassed those from the forestry sector. Although some catch species may be over-harvested and littoral resources are being damaged by illegal fishing methods, alternative species and areas still support a viable commercial fishing industry as well as artisanal fisheries, though there is no cause for complacency.

The montane forests of the Central Highlands are being degraded and reduced because of overpopulation and unsustainable intensification of agriculture on increasingly marginal and very steep lands, which is ecologically destabilizing. Meanwhile, in the forests of the lowlands, certain key economic resources are being unsustainably harvested and in a few years may become depleted to the point of no longer providing much-needed cash. These are especially crocodiles, which are

hunted for their valuable skins, and eagle wood. Although there is a lot of uninformed talk about all the valuable resources of the rain forest, there are in fact very few such resources that can provide sustainable incomes. Synthetic mass produced products have largely replaced the many natural products that were valuable in the past.

Although the Papuan bodies of water are on the whole in a good shape, glaring exceptions to this characterization are the rivers affected by tailings from the giant Grasberg mine in Mimika. While one river has been especially selected to act as the primary sedimentation bed, which covers a huge area right next to Timika City, it seems that a number of other rivers also have an abnormally high rates of sediment transport. Even so, rivers draining the highlands and coming down very steep mountainsides thousands of meters high, have great power to erode, and the lowlands have been largely created by erosion materials, such as the riverine fauna is adapted to cope with periodic turbidity.

This relatively benign state of Papua's environment could now be at the cusp of rapid transformation, which, however, may be ameliorated if certain policy priorities win through. The strongest forces of environmental transformation are essentially those that promote the implementation of large-scale forest conversion, which has very drastic immediate effects, but also set in train effects that would entail continuing large changes down the road. It is not at all clear at the moment who may win out, or what kind of compromise will be reached.

On the other hand, it is clear that large-scale infrastructure development will proceed, and this will begin to produce very significant changes in the areas affected during the next few years. The existence of large-scale infrastructure certainly is a factor that could help tip the scales in favour of those who want to use it for large-scale resource exploitation. On a scale that is more limited, but which could over time become cumulatively very significant, pioneering cultivation by smallholders will also be greatly facilitated by road infrastructure.

Mining is another sector that awaits expansion, and policies appear to be more clearly in favour here. If very large revenues could be obtained there would be less need to generate forest-based ones, although damage to river systems could be high, especially since many of the concessions seem to focus on the large, integrated and vulnerable Mamberamo river system rather than on isolated lesser ones. Reduction of the political risk through political approximation between the indigenous and immigrant communities might be a factor that could speed up the operationalisation of mining.

1.2 Socio-economic Baseline

The great majority of the people in Papua are poor by almost every definition. If they were living in very tradition-bound cultures, labeling them as poor might not be strictly relevant. But the Papuans of the lowlands and the highlands alike, with few exceptions, have adopted a modern orientation which has been facilitated by their conversion to a world religion. They certainly desire the goods that modern life can bring and regret being unable to obtain what they wish. Prices in parts of the interior

without roads can be up to four times the level in external markets, reflecting transport costs, but also high margins of traders. The prices of goods sold are concomitantly low, dealing family finances a double set back. The only way out of this dilemma is to gain better access to markets through improved infrastructure, or to migrate—an option open to some, but not all.

Most Papuans remain poorly served by health facilities, something that contributes to a life expectancy that is the lowest in Indonesia. Access to treatment and prevention facilities is extremely important in areas where infectious diseases such as malaria, dengue, cholera, typhoid and now even HIV/AIDS are endemic. Moreover, as people in many parts of the interior have been moved to dense settlements, health problems associated with lack of sanitation and clean water have increased.

The difficulty of getting teachers with sufficient motivation in the remoter parts of Papua is the major reason for widespread low education levels. Lifestyle and livelihoods are also a problem in some areas where children are part of a mobile provisioning regime, such as hunting. School attendance suffers.

People in the lowlands where sago swamps are abundant and rivers remain well stocked with fish, have a high degree of food security. In many parts of the Central Highlands, where combined intensification and extension of cultivation onto increasingly marginal lands, agriculture is being destabilized and becoming increasingly vulnerable to crop failures and even starvation, because of frost or drought.

Indonesia was elected onto the 47-member UN Human Rights Council for a four year term in 2007. However, in spite of dozens of Indonesian government statements, pledging a new approach in Papua and positive developments on some fronts, security forces, including special Mobile Brigade police units, continue to engage in abuses in remote highland regions with virtual impunity.

Under Special Autonomy, Papuans are now, to a very much greater extent than under the New Order Regime, secure in their rights to their lands and resources. They have a long and very forceful political tradition of defending such rights by war, if necessary.

This does not mean that the present situation will not change. For the time being local identities remain rooted in their tie to the land. But as Christianity introduced an extremely important modification of traditional identities before, so integration into the market economy with its global values will inevitably bring further modifications. As traditional people elsewhere in Indonesia, Papuans will at some stage come to see their forests and lands as commodities, whose values should be maximized. The real questions are how and on what terms.

Communities alone can hardly be parties to agreements over the use of large areas of forests. Their customary authorities are not in a position to provide investors with legal certainty. Joint deals involving different levels of government will be necessary, with the newly emerging *kabupaten* playing a key role.

Informal transactions between customary owners of land and individual migrants are a very different matter. Such transactions are already taking place and provide a template for wider change. If land becomes fully commoditized in the sense that people with customary access may alienate their holdings to outsiders, without reference to collective rights or clan authorities, whose status and role are very variable as between tribes and areas, sustainable forest management will become more difficult.

The unprecedented wild card is now REDD programs and other compensation schemes for carbon sequestration. The question is how competitive they will be compared to the full economic benefits of both clear-cutting and utilizing the forest lands with investments that may have high rates of return. If the Papuans lose their emotional bond with their forests and see resources as mere commodities, they will certainly go for the highest bidder.

2. Introduction

2.1 Naming Conventions

The name Papua as used here refers to the western half of the island of New Guinea as well as the smaller islands off the north and west coasts, mainly within Cendrawasih Bay and in the Raja Ampat Archipelago respectively. It is the same area that constituted Papua province, formerly Irian Jaya, province, before the westernmost parts were separated out as a separate province called West Irian Jaya in 2003. The larger remaining part of the original province retained the name Papua. West Irian Jaya was later renamed West Papua, creating some confusion in so far as this term was already well established as a reference to Indonesian part of New Guinea as opposed to the independent country of Papua New Guinea, which occupies the eastern half of the island. To avoid confusion, when one or the other of the provinces is referred to this will be made explicit.

2.2 Objectives

The Norwegian Action Plan for environmental support to development cooperation includes an evaluation of the results when the implementation period ends around 2015. In order to facilitate a quality impact evaluation, Norad's Evaluation Department has decided to carry out a Baseline Study related to the Norwegian Action Plan in three case countries: Indonesia, Malawi and Tanzania.

The main goal of the baseline study is to supplement existing data and insights that are already available and will be delivered through new monitoring and evaluation systems in Malawi, Tanzania and Papua/Indonesia on the:

- Environment related behaviour of the most significant actors;
- State of the environment on national level, and especially selected programmes in the three case countries; and
- Effects on the socio-economic situations of the programme participants.

2.3 Problems of Data Availability

The data contained in this report on Papua's environment and socio-economic conditions was collected from multiple sources. It includes available primary and secondary literature, government statistics and spatial data, in addition to being based on observations during a number of field trips to many parts of Papua in the 2006-2008 period. Much of the spatial data was collected at the provincial and national levels by Sekala and its partners for a strategic environmental assessment of spatial planning options for Papua in 2008 (Sekala et al. 2008). District specific data is scarce and considerable effort is required to improve this data. Collecting district data was beyond the scope of this study. Historical data on soil, particularly

peat soil, and rainfall is also lacking and some data still needs to be verified and checked. This is particularly the case for the soil data as detailed ground-truthing has not been carried out to verify this data. Detailed studies on Papua's biodiversity are also lacking, however, WWF Indonesia and Conservation International (CI) have undertaken a number of studies on the biodiversity in the areas in which they work: Mamberamo, Birdshead, Lorentz and the Transfly. These studies have confirmed that Papua is rich in diversity and is home to a large range of endemic species (Marshall et. al. 2007; Filer et. al. 2007; Kemp et. al. 2006; Petocz 1987; Polhemus et. al. 2004).

Reliable baseline data on Papua is also lacking. Only a few comprehensive studies have been undertaken in the past. One of the most well known was undertaken under the auspices of the Regional Physical Planning Program for Transmigration (RePProt) in the late 1980s. This study is still referred to as it is one of the few studies to provide data on soils, rainfall, topography, forest cover and biodiversity. The study also identified areas that were most appropriate for certain crops estates based on a range of criteria (i.e. slope, rainfall, soil types etc). The baseline data contained in this important study has been continuously improved, however, much is still unknown and vast areas in Papua have not been ground-truthed because they are difficult to access. This is particularly the case for the large areas of peat soil found in the south of Papua province. These soils are estimated to be more than 3 metres deep and to be vastly extensive in this area (Sekala et al. 2008). However, this has not yet been systematically verified.

Baseline data has also been compiled by organisations working in Papua, i.e. WWF Indonesia, CI International, IUCN, the World Bank and USAID. This information has been used to inform project design and to determine appropriate interventions that can help to facilitate sustainable development that does not significantly jeopardize Papua's unique environment. These studies have drawn upon provincial and district statistics to provide information on health, education, food security, poverty and other development issues. Some of these studies have also collected primary data on biodiversity, particularly in the Mamberamo region, the Transfly region, Lorentz and the Coral Triangle. The most comprehensive study to date on Papua has been undertaken by CI which has compiled a range of information on Papua's environment and into a two series volume entitled 'The Ecology of Papua'. These two volumes contain articles from a number of contributors on a range of topics including Papua's environment, geology, topography, biodiversity and climate (Marshall & Beehler 2007).

Baseline data on Papua's forest cover, carbon stocks and GHG emissions is also now being collected by a range of organisations (including WWF Indonesia and Flora and Fauna International) to provide information for Reduced Emissions from Avoided Deforestation and Forest Degradation (REDD) projects. This data is being collected through remote sensing and through ground based measurement taking. All REDD projects are required to ensure that they are resulting in avoided deforestation and reducing GHG emissions and their interventions have to be measured against a Reference Emission Level (baseline) which provides an historical account of land use change since 1990. The methodology for determining a REL is still

being determined in UNFCCC negotiations, but it seems likely that the methodology will require a historical baseline of land use change since 1990 as well as a projection of planned deforestation over at least a 10 year period.

Socio-economic baseline data is also scarce in Papua although the World Bank and the United Nations Development Programme (UNDP) have dedicated resources to improving this situation. Baseline socio-economic data is limited and of questionable quality because much of Papua's population are living in isolated regions and are not included in regular consensus studies. Access problems also make it difficult for international organizations, such as the World Bank and the UNDP to gather primary data from the highlands or from other isolated regions. Some of the following information was compiled by Sekala and its partners in 2008 to determine spatial planning priorities and options for Papua (Sekala et al. 2008). Some of the information was updated in early 2009 for this study. Data sources included provincial and district statistics as well as reports from the UNDP and the World Bank and other secondary literature

2.4 Analytical Baseline Construction

A baseline is, for present purposes, understood as a description of the current state of the environment and socio-economic conditions in Papua against which changes caused by specific interventions can be understood and measured a number of years into the future. To do such a measurement of effects, it is also necessary to account for and separate out the changes that are caused by other factors than the interventions in questions. Such factors can be interventions by other change agents whether policy makers, government agencies, international organizations, commercial firms, cultural bodies, or by significant environmental change.

Given that the information available for Papua is generally fragmentary and inconsistent, it would be fruitless to attempt a systematic quantitative construction of a baseline. What can be achieved is a partial qualitative description anchored to some quantitative data which should also help illustrate magnitudes. The most important part of the exercise is to provide analytical understandings of the current environmental and socio-economic state, how it has come about and how it may change. Without this even good data will be of limited value and limited data may be almost useless.

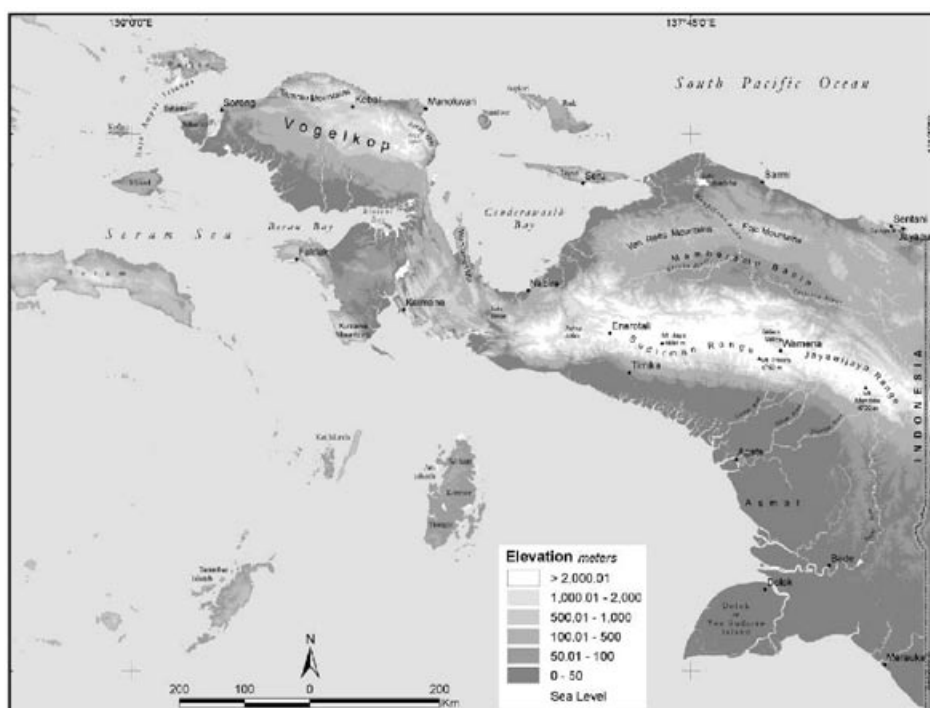
An effort has therefore been made, unfortunately within tight constraints on time and therefore also available sources, to develop some analytical perspectives pertaining to the current situation and how it may change in the coming years. In other words, an attempt is made to produce an analytical baseline rather than primarily a data-based one. To make up for a paucity of sources, extensive use has been made of field experience in many parts of Papua over the past years.

3. Geographical Overview of Papua

3.1 Geographical Zones

In gross physiographic terms, Papua can be divided into five distinct zones: Central Highlands, Southern Lowlands, Northern Lowlands along with the minor ranges Foja, Van Rees and Cyclops, the Bird's Head (Vogelkop) Peninsula, and finally the offshore islands surrounding the latter in Cenderawasih Bay and the Raja Ampat Archipelago. These major divisions along with their key features are readily discerned in a topographical map such as the one provided in Fig. 1.

Figure 1 Prominent geographical feature of Papua and West Papua



Map created by Sekala. Topography data obtained from the Shuttle Radar Topographic Mission (SRTM).

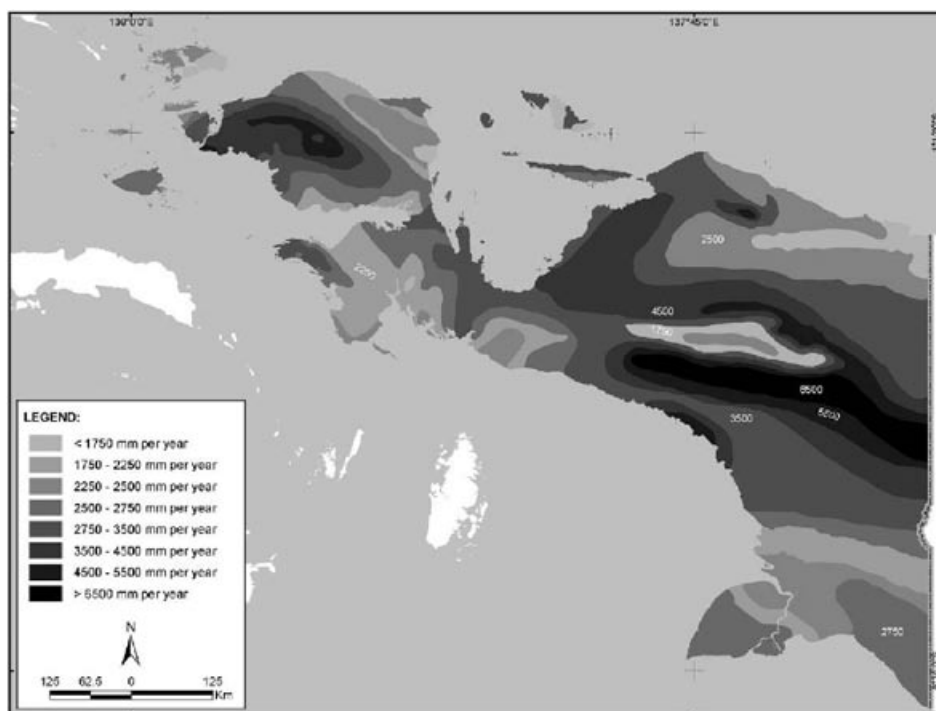
- The Central Highlands are a massive cordillera of generally parallel ranges with heights mostly 2-3,000 m, but in some parts exceeding 4,000 m, the highest peak being 4,884 m. River-formed valleys are generally deeply cut with very steep sides, a major exception being the wide and flat Baliem valley. The northern parts of the highlands are drained by tributaries of the Mamberamo River, whereas the southern parts are drained by a number of separate river systems.

- The Southern Lowlands are very flat and predominantly swampy with mostly a narrow foothills zone containing an abrupt transition to exceedingly steep mountains that are the highest in the cordillera. The easternmost parts of the lowlands are the widest and best drained.
- The Northern Lowlands comprise a coastal plain and a large inland plain which are separated by a minor range, the Foja/Van Rees Mountains. The inland plain is a wetland area which is drained by Mamberamo's two major tributaries, Taritatu and Tariko. Major coastal wetlands are formed around the Mamberamo estuary.
- The Bird's Head Peninsula including the "neck" or isthmus which connects the major northern part of the peninsula to the Papua mainland. With the main exception of the wide south western coastal plain and the Bintuni wetlands, the zone is dominated by a highly serrated mountain terrain with deeply cut river valleys.
- The offshore island zone comprises mountainous islands, such as Yapen to the north and Waigeo to the west, as well as islands that are essentially uplifted coral terraces such as Biak and Numfor. The island areas comprise extensive coral reefs.

3.2 Climate

Papua's climate is equatorial with seasonal variation dominated by the northwest monsoon and the southeast trade winds. The former produce increased rainy weather from November to March, whereas the latter brings drier weather from April to September. However, there is very considerable variation in microclimates and rain shadows exist in some parts of the highlands, the Bird's Head Peninsula, the northeast coast, and especially the southeast where rainfall is less than 2.000 mm/yr. The areas of highest rainfall are the mountains, especially the southern and to a lesser extent the northern scarps of the Cordillera and the interior of the Bird's Head Peninsula where it may exceed 5.000 mm/yr. As the climate is tropical, variation in temperature is essentially diurnal and related to elevation with regular night frosts above 4.000 m and periodic snowfalls above 4.500 m (Prentice and Hope 2007).

Figure 2 Annual rainfall in Papua and West Papua

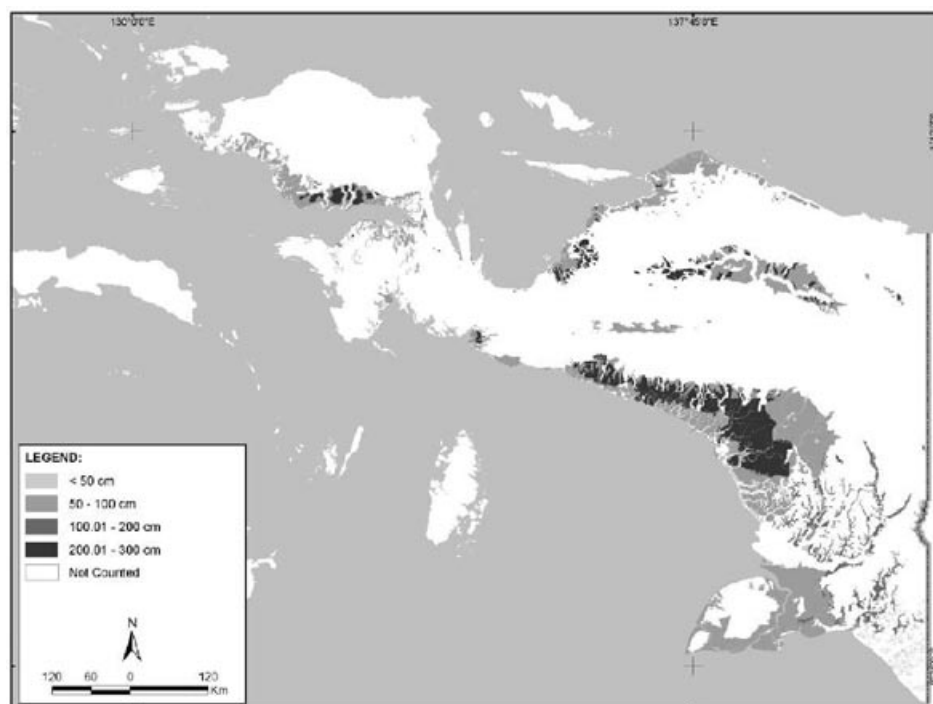


Source: Map created by Sekala. Spatial data sourced from REPPROT (1987).

3.3 Soils

The most common soils are entisols, young soils which cover a quarter of total area. They are especially prevalent on hills and foothills with alluvial deposits, reflecting erosion resulting from high rainfall and steep slopes, and in highland basins on alluvial fans. Also in the mountains, but in more stable settings there is also fairly widespread occurrence of so-called inceptisols, which can be rich organic soils. Mollisols are formed on limestone and are also widespread in parts of the Central Highlands, as well as in the Arfak Mountains and on Biak and Numfor Islands. Alfisols, which are moderately weathered acid soils, are prevalent on the northern slopes of the Central Highlands. Ultisols, which are strongly weathered, acid and thus infertile soils, cover a quarter of the land area in Papua, and are especially prominent on the southeastern plain. The peaty histosols, which are formed in high moisture or water-saturated conditions, are especially prevalent in the inland Mamberamo basin and around the estuary, and cover a third of the Southern Lowlands where some 5 million of Papua's total of 6.9 million ha of peat soils are found (Hope and Hartemink 2007). Depth and location of soils is presented in Figure 3 below.

Figure 3 Depth and location of peat soils in Papua and West Papua



Source: Map created by Sekala. Peat data sourced from Wetland International (2002), digitized by Sekala.

3.4 Vegetation

Due to its equatorial location and topography, the natural vegetation of Papua covers the full range of tropical forests from lowland to alpine, and freshwater and peat swamp to mangrove. Taking forests to be land with greater than 10% canopy cover (tree or shrub), a remote sensing survey involving Forest Watch Indonesia and Conservation International determined that roughly 85% if Papua was forested in 2000. More than 60 % of this land cover (corresponding to 51% of Papua' total area) was found to be lowland rain forests (also referred to as lowland evergreen forest) when the standard elevation limit of 650 meters for this ecosystem was applied. Above this limit, montane forest amounted to about 10% of forested land, while in the lowlands swamp ecosystems accounted for nearly 20% of forested areas and mangroves around 4%. Since the objective was to classify natural vegetation, the non-forested 15% of the land area was a treated as residual category of bare ground, rice paddies and transmigration settlements (Marshall 2007). Details are shown in Table 1.

Table 1 Forest cover in Papua (year 2000)

Forest land classes by size	Area (km ²)	% of forested land	% of total land
Mangrove forest	15,124	4.3	3.6
Swamp	7,465	2.1	1.8
Swamp brush	10,559	3.0	2.5
Swamp forest	50,288	14.3	12.1

Forest land classes by size	Area (km ²)	% of forested land	% of total land
Lowland evergreen rainforest	213,627	60.8	51.3
Lower montane rainforest	8,658	2.5	2.1
Upper montane rainforest	27,373	7.8	6.6
Subalpine forest	4,226	1.2	1.0
Brush	4,490	1.3	1.1
Savanna	9,298	2.6	2.2
Total Forest Cover	351,147		84.4
Bare ground, rice paddies, transmigration settlements	64,982		15.6
Total Land Area	416,129		100.0

Source: Marshall 2007.

All land classes are presented below in Table 2, based on spatial analysis by Sekala and data prepared by FWI, CIFOR and Conservation International.

Table 2 All land classes in Papua

Land class	Area (ha)	% of total land
Lowland forest	21,601,783	52.34
Mangrove	1,573,085	3.81
Swamp forest	6,229,655	15.09
Montane forest	4,843,836	11.74
Savannah	1,014,023	2.46
Shrub	938,168	2.27
Swampy shrub	1,194,849	2.89
Total forest area	37,395,399	90.60
Plantation forest	223,594	0.54
Estate crops	88,528	0.21
Rice field	9,267	0.02
Dry farming mixed with scrub	809,889	1.96
Dry farming area	97,040	0.24
Transmigration	127,874	0.31
Settlement	33,729	0.08
Mining	1,969	0.00
Aquaculture	385	0.00
Others	2,255,544	6.02
Total non forest area	5,780,836	9.38
Total land area	41,043,218	99.98

The above registration analysis carried out by Sekala, holds that lowland rainforest constitute 52%, mangrove forests 3.8%, swamp ecosystems 18%, and montane forest 11.7%. This analysis also includes details on man-made forms of land cover, amounting to about 9% of Papua's total area.

3.5 Biodiversity

Papua's forests are characterised by extremely high biodiversity. In fact they account for almost 50% of the biodiversity that places Indonesia among the world's most biodiverse countries. More than 600 species of birds are found in these forests, among them more than 25 species of birds of paradise, three species of cassowaries, and some two dozen each of parrots, pigeons, raptors and kingfishers. There are over 180 species of mammals, including fruit bats, insectivorous bats, tree kangaroos, possums and rats; 150 species of frogs; over 61 species of snakes and 141 species of lizards. Moreover, there are at least 100,000 species of insects, the prominent of which are the huge and beautiful bird-wing butterflies, the giant phasmid stick insects, several lineages of giant beetle (longicorn, dynastine) and the world's largest moth (Beehler 2007).

Botanical biodiversity is also extremely high with 15,000 species of vascular plants. Among these are some 2000 species of orchids, more than 100 species of rhododendrons and the rare Kauri pine (*Agathis labillardierei*). In contrast to western Indonesia, Dipterocarp trees are relatively uncommon, but this is to some degree compensated by the occurrence of other valuable timber species, such as *Intsia bijuga* (merbau), *Pometia pinnata* (matoa), *Pterocarpus indicus* (rosewood) and *Dracontomelon* (black walnut) (Beehler 2007).

The seas surrounding Papua are part of a global centre of marine biodiversity which is one of the world's top priorities for marine conservation. Extraordinary numbers of hard corals, mollusks and reef fishes can be found here. This so-called Coral Triangle also contains nesting sites for migratory sea turtles, passages for migrating mammals and mantas, and feeding ground for large populations of tuna.

3.6 Indigenous Population

The earliest ancestors of the peoples of New Guinea, as well as the aboriginal peoples of Australia, arrived from Africa more than 40,000 years ago (Pasveer 2007). In the course of this enormous span of time, the languages spoken in this relatively limited area have differentiated to an extreme degree with some 900 languages recognized, amounting to nearly 20% of the world total, most of them in Papua New Guinea. Some 150 of these languages belong to the Austronesian family, which also comprises all the languages of the Pacific, the Philippines, and, with a few exceptions, the indigenous languages of Malaysia and Indonesia outside Papua. In Papua, Austronesian languages are found mainly on the islands surrounding the Bird's Head Peninsula as well as along the north coast. All the other languages spoken throughout New Guinea are, for want of an unambiguous unifying term, usually referred to as Non-Austronesian, though "Papuan" is also used (Muller 2008).

Despite this diversity, the Papuans are relatively united, as it were, by certain principles of traditional social organization. Most striking is the so-called Big Man political organization in which community leaders emerge through competition to fulfill a number of criteria, the most important of which are courage and skill in war, inspirational oratorical skill, and also skill in managing resources and debt. The latter implies the ability to provide food, especially protein rich food, through feasting, thereby creating indebtedness whose currency of repayment is political support. This ability is connected with polygamy, accumulating many wives who provide the necessary labour to produce large surpluses. It might also entail ability to manage debts through the accumulation and exchange of prestige articles. Interestingly, this system has been significantly modified or even replaced in some coastal areas, which largely correlate with the areas in which Austronesian languages are spoken. Thus on the north coast from Humbolt Bay to Demta, traditional leadership known as *ondoafi* is based on succession and hierarchy. In the Raja Ampat Islands and the Bintuni Bay as well as some adjacent coastlines, i.e. the areas closest to the Moluccas, whose kingdoms had considerable influence in these areas, the political systems are indeed based on kingship. Finally, in the Cendrawasih Bay area, the traditional political systems display a mixture of Big Man achievement and inheritance of rank as in *ondoafi* and kingship (Mansoben 1995).

Another widespread if not universal principle of social organization is patrilineal descent, which is generally used to form lineage groups or clans that claim collective ownership of territories with the forests, lands and various natural resources that they contain. Individual members of such groups have access to their lands and resources. Although there can be a great deal of sharing among close relatives, the basic economic unit of production and consumption is the household consisting of married couples and their offspring. As a general rule, a female move in with the husband's family upon marriage.

The traditional systems of livelihood production differ very greatly between the lowlands and the Central Highland. In the lowlands, harvesting carbohydrate from the sago palm (*Metroxylon sago*), which occurs naturally in swampy areas and can easily be concentrated into denser stands, and this is combined with hunting and fishing. To generate large amounts of protein for a feast, sago trunks are left to rot so as to generate vast numbers of larvae. Small-scale planting of bananas and tubers provide a supplement. Consistent with what is essentially a foraging economy, population densities in the very extensive lowland areas have been very low. In the Central Highlands, in contrast, food production is based on cultivation of tubers, mainly sweet potato, and husbandry of pigs, which also are fed tubers and in this economy are the key ingredient in feasting. This system of food production requires a lot more work input than the lowland one but is also more highly intensifiable. As a result of this and other factors, population growth has been far greater in the highlands than in the lowlands. This is of considerable importance to environmental and socio-economic issues in Papua today.

3.7 Immigrant Population

The immigrant population are Indonesians from other islands, who have come in two very different ways. First, they have arrived as state-sponsored migrants in the

so-called transmigration programme, which resettled large numbers of mainly rural Javanese families, with inadequate access to land at home, in very large pioneering agricultural settlements in the outer islands of Indonesia, including Papua. As far as Papua is concerned, this programme began in a small way in the 1960s, expanded greatly in the 1980s, and came to an end around the year 2000. Second, migrants have come without official assistance, indeed beginning to arrive before transmigration began, and continue to come to this day. These migrants are a very diverse group ethnically and socially, having come as missionaries, traders, entrepreneurs, job seekers and of course as government servants. Many of them have come to stay, though some return home after making enough money to retire or start businesses. In Papua they mostly work in urban settings, some becoming pioneer traders in small towns in the remote interior.

3.8 Demographic Overview

The present population of Papua is shown in Table 2 where the figures are given per *kabupaten* which are arranged with their respective regions or the geographical zones described earlier. The Bird's Head region plus the Raja Ampat Islands constitute West Papua Province, the remainder Papua Province. However, the Raja Ampat Islands have been included here in the geographical Islands zone. What should be noticed is the high population density in the Central Highlands, 9,5 persons per square kilometre, which is nearly three times that of the Southern Lowlands at 3,4 and well over twice the density of the Northern Lowlands at 3,9 when the Jayapura City is excluded. The figures for the lowlands still include a number of sizeable cities as well large transmigration settlements, thus obscuring the extremely low population densities for the indigenous populations there. It can also be seen that the overall population density of the Bird's Head peninsula (which includes mountains as well as lowlands) is equivalent to the lowland densities of the Papuan mainland. Finally, the population density of the islands is very high even by comparison to the central Highlands. However, as fishing people and collectors off coral reefs, these islanders exploit marine resources over much larger areas.

Population growth has been relatively rapid over the past three decades. Papua had less than 1 million people in 1971 but has now about 2.7 million people. However, during roughly the same period, the proportion of indigenous people has fallen from 96% to about 66% (Paull et al. 2006). The transmigration program has made a very significant contribution to this change. Although available figures vary, it has been estimated that up to 75.000 families were facilitated under this programme before it came to an end (Sumule 2005). Self-supported immigration has, however, continued, although it very likely slowed after the fall of the New Order, but may have increased again recently.

Table 3 Population of Papua by regions and kabupaten

Regions and kabupaten	Area (sq. Km)	Population	Density
Central Highlands			
Jayawijaya	12680	224572	
Paniai	14215	120622	
Puncak Jaya	10852	120207	
Yahukimo	15771	147935	
Pegunungan Bintang	16908	94780	
Tolikara	8816	48021	
Total	79242	756137	9.5
Northern Lowlands			
Jayapura City	940	215609	
Jayapura	15309	98028	
Sarmi	25902	34326	
Keerom	9365	42582	
Waropen	24638	23022	
Nabire	16312	171422	
Total with Jayapura City	92466	584989	6.3
Total w'out Jayapura City	91256	360380	3.9
Southern Lowlands			
Merauke	43979	168513	
Boven Digoel	28471	33995	
Mappi	27632	70123	
Asmat	18976	66580	
Mimika	20040	139036	
Total	139098	478247	3.4
Islands			
Yapen Waropen	3131	76168	
Biak Numfor	2360	107351	
Supiori	775	12624	
Raja Ampat	6084	40912	
Total	12350	237055	19.2
Bird's Head			
Sorong City	344	167589	
Sorong	28894	97819	
Sorong Selatan	29810	60934	

Regions and kabupaten	Area (sq. Km)	Population	Density
Manokwari	14448	171222	
Teluk Bintuni	18637	53664	
Teluk Wondama	12146	22936	
Kaimana	18500	41660	
Fak-Fak	14320	66254	
Total with Sorong City	137099	682078	5.0
Total w/out Sorong City	136755	514489	3.8
Grand total	460255	2738506	5.9

Source: Compiled from BPS 2008a, 2008b.

4. Government Policies and Interventions

4.1 New Order Background

Papua remained a minimally developed region under the Dutch Colonial Government. The Indonesian Government adopted far more interventionist policies and actions when it assumed responsibility for the territory in 1963. A key reason for this was military, especially after Papua was declared a Military Operations Zone in 1971 to suppress the Papua Independence Organization whose armed struggle had become significant. The Indonesian Government, which had been virtually bankrupted in the mid-1960s, reaped a financial windfall with the rise in the price of oil in the mid-70's and was able to finance transmigration resettlement programs which were designed to bring development to Papua, which, however, to a very limited extent involved Papuans, although the latter actually surrendered their lands. With the local government reform of 1979 throughout Indonesia, Papua village government, too, was reorganized according to a Javanese model. Even so, traditional leaders retained important roles, in part because of the limited resources and reach of government agencies and in part because of the continuing strong position of the descent group organization.

The government made some effort to develop education and health facilities during the New Order period but greatly benefited from the large-scale extraction of forest and mineral resources. During this period, most of the revenue generated from mining and logging was reaped by the central government. Indigenous Papuans and local governments benefited little from large-scale resource extraction and this reality resulting in growing discontent with the status quo.

4.2 Decentralization and Special Autonomy

After the fall of the Soeharto Regime in 1998, political decentralization was introduced in 2001 in part to help forestall national disintegration and growing discontent with the status quo. Calls for independence in both Aceh and Papua also resulted in both regions being granted Special Autonomy status. Of particular importance was the provision for a Papuan People's Council (Majelis Rakyat Papua or MRP) to promote the rights of indigenous Papuans. After years of deliberation, this provision was implemented only in late 2004 after Susilo Bambang Yudhoyono had won the presidential election. Of even greater importance are the greatly increased revenues received by the province and its constituent districts from the extraction of natural resources from Central Government General Allocation Funds as well as the Special Autonomy Funds, which have sunset provisions.

An important aspect of decentralization is the accelerating trend of dividing up existing autonomous entities, and, subsequently, their successors. This started with the establishment of Irian Jaya Barat province in 2003 and the simultaneous creation of 8 new *kabupaten* (regency) as well as concomitant increases in their internal subdivisions, namely districts and villages. Since then, a considerable number of additional *kabupaten* have been established, some with very small populations and very little infrastructure. A certain minimum number of *kabupaten* is a prerequisite for the establishment of a new province, which creates a linked dynamic since new provinces, though put on hold for the time being, are also in the making. The southern lowlands may be a prime provincial candidate as may part or all of the central highlands.

The establishment of a *kabupaten* mandates certain administrative, educational, and health facilities and greatly increases the likelihood of road infrastructure being built. In fact here is a widespread belief, which may well be justified by experience, that decentralization with local access to and control of resources is a prerequisite for development. A problem with this rationale is that the requisite human resources for such a rapid reduplication of autonomous entities are scarce and may incur tremendous inefficiencies and waste. A further problem is the need beyond the sunset provisions of current funding to generate local revenues to maintain bureaucracies and facilities. A very likely consequence of this is that local authorities will need to facilitate or promote more intensive utilization of lands, forests, and other resources, including mining, logging, plantation establishment and so forth. Although it may now be hoped that potential carbon sequestration funds may alleviate this problem, the question remains as to what extent such funds will compensate for economic growth generated by investments and infrastructure, which will permit local populations to fully participate in the globalizing economy.

4.3 Environmental Impact Management

According to Government Regulation 27/1999 about environmental and social impact assessment, a company is obliged to conduct a physical, social and environmental assessment (known as AMDAL in Indonesia), before obtaining a license for any large-scale extractive activity or development. This is the case for all logging, mining, estate crop and industrial timber plantation development. It is also the case for road and other infrastructure developments, such as dams. Unfortunately, in reality these assessments rarely mitigate environmental impacts of large-scale extractive activities or developments because conducting them is the responsibility of the company in question rather than an independent body, which tends to make them merely a pro forma exercise. Moreover, the monitoring of operations by government agencies is limited, especially at remote sites. While independent monitoring is permitted, getting access to the relevant documentation, whether from the companies concerned or the Ministry of Environment is difficult. (Casson et al. 2007b)

Even so, some progress may occur. It is reported that Indonesia's government is planning to issue a regulation in the near future that will make it compulsory for all provincial and *kabupaten* level government to undertake a Strategic Environmental Assessment of spatial plans (Ibu Hermin Rosita from the Ministry of Environment,

personal communication, 3 Dec 2008). This will require governments to undertake spatial planning in a more participatory fashion and to assess the possible environmental impacts of a range of development scenarios before licenses are issued to companies for large-scale logging, mining etc.

But then a range of laws and regulations already contain provisions to protect Indonesia's environment and they are poorly enforced and rarely result in convictions or penalties. For instance, Indonesia's Basic Forest law (UU 41/99) provides for a series of penalties for logging infractions, including using fire to clear forest, logging outside the permitted logging blocks, logging in conservation areas, etc. However, only a few cases have ended up in court and only one or two high profile cases have resulted in conviction. This poor law enforcement record is largely the result of corruption, inadequate capacity to collect and follow cases through to prosecution, vague and poorly drafted laws and direct involvement of law enforcers in illegal activities (Casson et al. 2007b).

4.4 Forestry

4.4.1 Spatial plans

Policy foundations in the form of forestry spatial plans were created by the central government under the Soeharto regime. A network of conservation areas was established, mostly in mountainous areas with low potential for exploitation or large-scale plantation agriculture. National Parks include Lorentz and Cendrawasih and the Wasur. Strict Nature Reserves include Tamrau Utara, Tamrau Selatan and Arfak in the Bird's head Peninsula. Mamberamo and Rouffaer are wildlife reserves in the northern lowlands and associated minor ranges. The Raja Ampat Archipelago has a number of minor reserves, and Supiori – the northwestern part of Biak island – which after the creation of a tiny *kabupaten* means that three quarters is protected. Even larger areas have been designated as Protection Forests, meant to protect steep slopes, watersheds and thick peat.

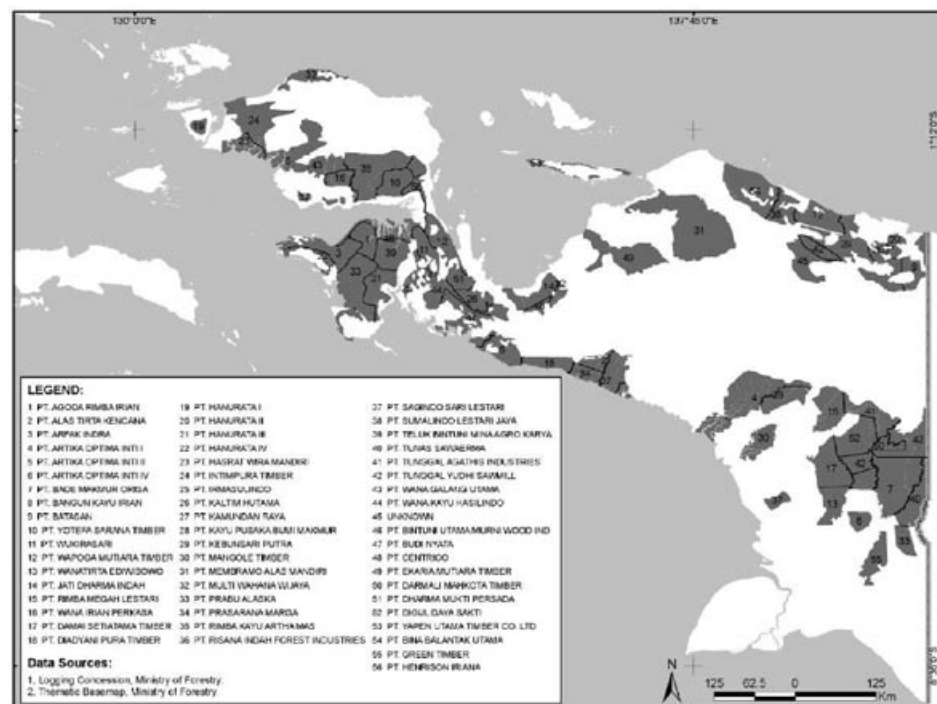
Most of the remainder has been classified as Production Forest in which concessions for selective logging can be granted. Much of this constitutes Conversion Forest, which can be clear-felled and replaced with agriculture oil-palm plantations. The remainder, Permanent Production Forest, can also be clear-felled and replaced with forestry plantations, especially rapid-growing wood to feed pulp mills. Some of this forest, in particular on the steepest terrain, is nominally Limited Production Forest, in which some restrictions apply such as a higher minimum allowable diameter of timber felled. According to official statistics dating from 2001 (quoted by Anggraeni 2007), forests areas designated for production amounted to 22 million ha, of which 10 million ha was designated for conversion and 12 million ha for permanent production, 2 million ha of the latter assigned for limited production

4.4.2 Concessions

Logging concessions were gradually granted since 1984. By 2003 their number had reached 56 – covering a total area of about 12 million ha – roughly half the designated production forest area (Anggraeni 2007). By 2003, production was stagnating and many concessions became inactive. This reflected increasing conflicts between logging concessionaires and local communities, as the latter

began to assert their rights to forest resources after the fall of the Soeharto Re-gime. As a means to ameliorate this problem, the so-called Kopermas (i.e. Koperasi Peran Serta Masyarakat) policy was established, under which forest based communities—organized as cooperatives—were granted logging licenses covering forest areas of up to 1,000 ha each by provincial and district governments. As the extrac-tion would in reality be carried out by logging companies or various contractors, with the local communities as sleeping partners cum legal guarantors in return for payments, which might have been less than equitable, this policy was extensively abused, leading to widespread timber extraction (Anggraeni 2007). In 2007, the Ministry of Forestry released a regulation (PP 6/2007) that clearly stated that only the Ministry of Forestry could issue licenses to fell timber for commercial sale and the Provincial government ceased issuing small-scale logging licenses shortly afterwards. The location and area of land allocated to large-scale timber conces-sions for logging are presented in Figure 4.

Figure 4 Location of logging licences in Papua and West Papua



Source: Map created by Sekala.

4.4.3 Timber plantations

Forestry policies also provide for the establishment of timber plantations. These are not to be located in conversion forest, which are meant for agricultural including plantation development, but in permanent production forest as timber plantations indeed are classified as production forest. This is despite the fact that they bear no resemblance to natural tropical forest they replace and do not support substantial biodiversity.

Detailed official data on timber estates designated in 1999 indicate that more than 3 million ha were allocated to 13 companies – very largely in the southeast of

Papua (Anggraeni 2007). This reflects the situation at the end of the New Order repression which certainly could hardly have been maintained. In fact, according to official provincial Forestry Office data (2008), only 150,507 ha of land have been allocated to industrial timber plantations to date in Papua and West Papua. However, anecdotal data suggests that a much greater area remains allocated to this purpose. It is also rumoured that the Ministry of Forestry is considering granting special land allocation criteria for Papua that would allow areas with high timber stocking densities to be converted to industrial timber plantations. This could potentially make expansion of industrial timber plantations in Papua more attractive to companies.

4.4.4 Emerging policies

The Papuan provincial governments have pledged to promote more equitable extractive activities in the forestry sector that benefit the indigenous people of Papua. Among the initiatives are a review of logging concessions with a view to eliminating inactive concessions, and a recalculation of existing forest resources to set a benchmark for the annual allowable cut and the need for reforestation. This recalculation includes an assessment of the carbon stored in certain forest areas, and annual rates of emissions. There is also an intention to optimize wood processing industries by banning log shipments and developing local industries to match the forest off-take. Local communities may also be assisted to become involved in sustainable forest management and wood processing industries (Papua Provincial Government 2006).

Another plan put forward is to reduce the area of forest allocated for conversion to plantation development from 5 to 2 million hectares and give permits to companies with adequate financial and technical capability and a willingness to develop the skills and economy of local communities. Reduction of conversion forest would relate to an expressed interest in developing a system of payments for environmental services, which may store forest carbon and reduce CO₂. Also very relevant in this context is the interest shown by both the Papuan and West Papuan provincial governments in participating in REDD programs that seek to reduce carbon emissions from deforestation and degradation as a post-Kyoto mechanism to combat climate change. At the national level, it may still take some time before a national regulation on REDD implementation is established, and it is unlikely that the national government will give priority to REDD projects in Papua (Rainforest Foundation Norway 2008).

The provincial government of Papua has developed a provincial regulation (*Perdasus*) that aims to regulate customary management of forests and a provincial regulation on the rights of customary communities in natural resource management. Both of these regulations seek to clarify provincial government authorities regarding natural resource management in accordance with Papua's Special Autonomy status and consequently have significant symbolic importance. Unfortunately, neither regulation has been approved by the Ministry of Forestry or the provincial parliament. The draft of the *Perdasus* has been approved by the Papuan People's Council and is awaiting final approval from the provincial assembly (DPRP). Consequently, ambiguity about the rights and responsibilities of indigenous people

with regard to natural resource use and management continues. This situation often results in poor forest management and over-exploitation of natural resources.

Regional autonomy and Papua's Special Autonomy Law have also encouraged local governments and local people to assert control over natural resources and to exploit these resources for economic development or personal gain. Some of these powers have been reigned in by the central government when it reasserted its right to issue large-scale logging permits, processing permits and concessions through the issuance of the main implementing regulation for Indonesia's Basic Forest Law (PP6/2007). Nevertheless, the central governments attempts to maintain control over natural resource management in Papua have been hotly disputed by Papuan governments, organizations and community representatives and resulted in a tug-o-war over natural resources (Sekala 2006).

4.5 Agriculture

4.5.1 Transmigration settlements

In addition to allocating areas to large-scale forest clearance for agricultural development, the Soeharto Government directly funded and implemented large-scale transmigration settlements in Papua. These settlements are located mainly on the coastal plain in the far southeast, on the northern coastal plain as well as on the plains south of Jayapura, on the coastal plain of Cendrawasih Bay, and western and northeastern coastal plains of the Bird's Head Peninsula. In the few cases where perennial tree crops, mainly oil palm, rather than annual food crops were planted, plantation companies implemented the schemes. The large-scale alienation of land to these schemes from the traditional tenure of local clans was made possible largely by the heavy repression of the Soeharto regime. The largely Javanese settlers remain uncomfortably aware that local rights to their lands have not been forgotten. Apart from land capability, there seems to be a correlation between the size of transmigration settlements with international boundary areas where the military presence and role is larger than elsewhere. This situation is particularly well illustrated in the Merauke area.

4.5.2 Plantations

According to Casson et al. (2007a), Indonesia is expected to establish another 5.6 million hectares of oil palm over the next 13 years. While most of this expansion is expected to occur in Sumatra and Kalimantan, some will also occur in Papua to compensate for the dwindling areas available on the other islands. It is suggested that up to 200,000 ha of land is on offer. However, reliably indicative figures are hard to come by. Some years ago, it was reported in Indonesia's premier newspaper that location permits had already been allocated to develop around 500,000 hectares of land in Papua, and that the then provincial government had declared that 3 million hectares of land were being set aside for oil palm plantations with the aim of making Papua the largest palm oil producer among the provinces of Indonesia (Kompas, 12 May 2003).

A few years later, "*Down to Earth*" (No 75, 2007) relayed quite detailed information copied from the official website of the Indonesian Government's Investment Coordination Board (BKPM). According to the figures provided, the total area of land made

available for oil palm plantations in Papua Province was 1,935,000 ha. Of this, 1,500,000 ha were located in the three south eastern *kabupaten* of Merauke, Mappi, and Bovendigul. In the north, Jayapura stood for 90,000 ha and Keerom 100,000 ha, while somewhat curiously, no figure was provided for Sarmi. Nabire and Waropen in the west accounted for 85,000 ha of available land. Two districts in the Central Highlands – Paniai and Puncakjaya – were listed with 60,000 and 100,000 ha of available land, respectively. According to an article (*Oil Palm in Western Kenya*) published in 2002 on FAO's website, a new strain of oil palm has actually been developed that grows well up to 950 meters above sea level. As far as climate is concerned, oil palm plantations are a possibility in the Central Highlands of Papua. Considering the very limited areas of land with acceptable topography and the high population densities in these areas, it is difficult to conceive of large plantations there. And without processing facilities readily available it is also impracticable for farmers to plant oil palm on the side. Accessing BKPM's website now, the situation portrayed is dramatically different with only one *kabupaten*, Merauke, listed as having land available for oil palm, 482,000 ha (up from BKPS's earlier figure of 400,000).

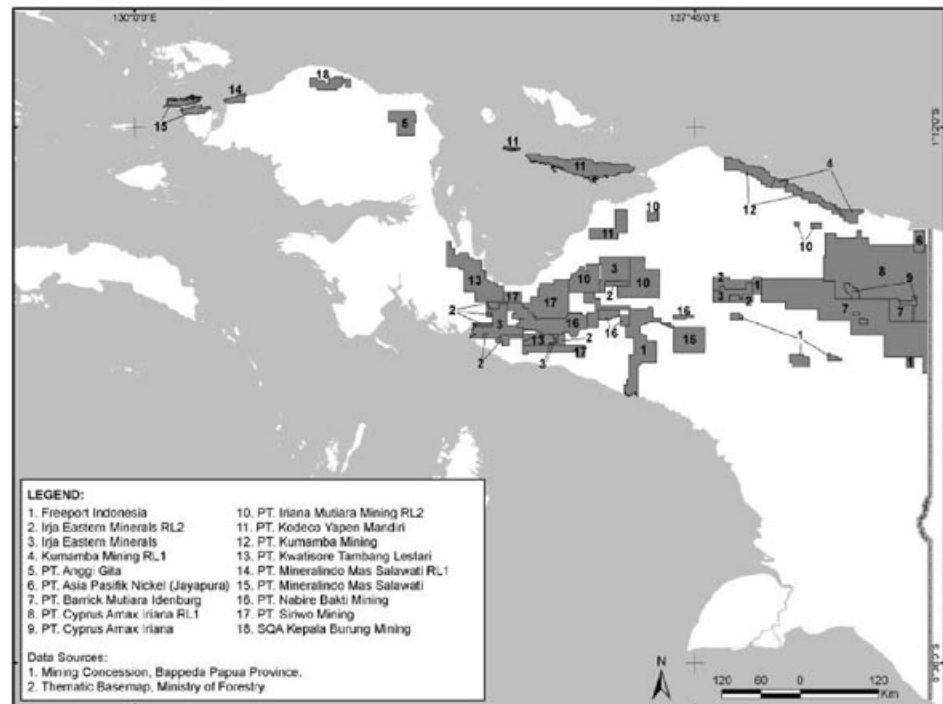
4.6 Mining and Energy

4.6.1 Concession allocations

The government places a high priority on the exploitation of mineral resources which are high potential revenue generators. By 2000 some 26 commercial mining concessions covering a total area of 11 million ha, mainly in the northern parts of Papua, had been granted for exploration and exploitation (Anggraeni 2007). A later survey found that some 18 companies had obtained a total of 7.1 million ha as production concessions, while another 16.2 million ha. have been allocated for exploration. (Sekala et al 2008). Figure 5 below presents the location of active mining concessions in Papua.

Only a few companies, however, appear to have actually started production. The slow development of this sector – beyond the Freeport operation and the super-size Tangguh gas field in Bintuni Bay – may also have to do with political risk. Besides, there is also the risk for smaller scale finds or lower value ore.

Figure 5 Active mining concessions in Papua



Source: Map created by Sekala.

4.6.2 Hydroelectric power

A special case is afforded by the plan to dam the Mamberamo river and get up to 20,000 megawatts of hydro electric power. This would provide abundant power to stimulate investments in mining, oil palm and pulp wood plantations, along with industries processing their raw material outputs. The larger versions of the dam plans would cause the flooding of large parts of the wetlands of the upper Mamberamo basin, along with the villages there. When the plan was broached at the end of the 1990s, it met with strong NGO protests. At the time it also stranded on the economic crisis and the political risks involved. A number of scaled-down alternative plans exist (Mudiyarso and Kurnianti 2008) and some of these might be brought forward if and when the conditions are deemed conducive and funding can be obtained. There are also plans for hydroelectric development in other parts of Papua. One of these is in the Oxibil area of the southeast, where the development of road infrastructure has been made a priority. Power generation in this area could serve industrial development in the adjacent lowlands where very ambitious plans for oil palm and pulp wood plantations are anecdotally known.

4.7 Transportation Infrastructure

4.7.1 Roads

Road infrastructure remains very limited in Papua. It is most extensive in the southeast, where concentrations of transmigration settlements are found, and the proximity to the international border makes roads and development a priority, because of security issues. The areas surrounding the provincial capital Jayapura are also relatively well endowed, involving transmigration settlements along the north coast and close to the international border. A road developed in the 1980s

linking Jayapura with Wamena in the Central Highlands was not adequately maintained and became impassable. This illustrates in particular the difficulty of constructing and maintaining roads in the extreme topography of the cordillera, but more generally also the impediments consisting of long distances, low population density and low economic activity which can make investment in roads difficult to justify financially (World Bank 2005). There is a fairly well developed network of roads in the Baliem valley around Wamena, and there is a road connection to Karubaga and Mulia, the capitals of the neighbouring *kabupaten*.

There is also some road infrastructure around Nabire on Cendrawasih Bay, where there are some transmigration settlements. A road has recently been completed between Nabire and Enarotali, which is the only passable public road that reaches into the highlands at present. To the south there is a road connecting Timika with a harbour on the coast and with the Freeport mining town Tembagapura in the direction of the highlands. The company's road reaches the Grasberg mine right at the southern scarp of the highest part of the cordillera.

In West Papua, in addition to some roads around Fak-Fak on the Bomberai Peninsula, and on the western plains near Sorong, where there are also extensive transmigration settlements, a network of roads also exists around Manokwari, the provincial capital. The main road in the latter area passes through the northern coastal plain with its transmigration settlements and continues into the Kebar Valley in the mountains. A road also connects to areas in and around the Arfak Mountains. Most of the roads in both provinces are not hard-surfaced and are often in a poor state of repair.

Short and medium term plans as well as long-term plans have been drawn up to extend the road infrastructure, although there seem to be somewhat differing versions that reflect different political considerations. One plan for Papua Province for the short and medium term indicates five top priorities (Papua Provincial Government, 2006). The first is to extend the south-eastern network to Oxibil in the easternmost parts of the highlands. The second is for a road to connect the harbour on the Brazza River to the Yahukomo kabupaten capital and its airport Dekai. The third is to reopen the Jayapura – Wamena Road. The fourth is improvement of the Wamena-Karubaga-Mulia Road and the construction of an extension from Karubaga to the adjacent Northern Lowlands so as to take advantage of the Mamberamo River for transportation. The fifth is to improve the road from Nabire to Enarotali in the Highlands.

The same document also indicates longer-term plans for a complete road connection in the Northern Lowlands between Jayapura and Nabire. This road is well underway in so far as it has already reached Sarimi on the north coast and is being pushed towards Mamberamo. Longer-term plans are also indicated for a road link between Tanah Merah on the Digul river in the southeast to Timika, as well as roads from Timika to Mulia and Enarotali. Although this extends into West Papua Province, a coming road connection is indicated to Nabire-Manokwari-Sorong, with a branching at Bintuni Bay also connecting to Sorong.

Road development can certainly facilitate greatly increased development, but roads are also associated with forest loss as they can increase access to pristine areas and encourage investors to frontier areas. The overall impact of one road can extend a considerable distance as land developers and loggers develop splinter roads off main roads to access timber and land. Spatial analysis carried out by Sekala indicates that around 8.4 million ha of Papua's forests could be threatened by Papua's current road plans (Sekala et al. 2008).

4.7.2 Shipping

In the relative absence of roads, shipping is extremely important to the coastal areas and their hinterlands, where there are roads or navigable rivers. The public shipping company PELNI operates six large ships, passenger and cargo, which call at the large ports at Jayapura, Nabire, Biak, Manokwari, Sorong, Fak-Fak and Merauke. PELNI also operates six smaller combined passenger and cargo vessels known as Pioneer Ships (*Kapal Perintis*) serving smaller harbours. This is considered very inadequate and an expansion of the harbours is a priority (Papua Provincial Government 2006).

The best rivers for navigation are in the south, where in particular the Digul and the Eilanden provide safe access far into the interior for sizeable ships. The provincial plan mentions harbours on the upper Brazza (tributary of the Eilanden) and on the Mimika coast as priorities. In the north, the Mamberamo River is a good thoroughfare for fairly large ships in its lower reaches, but has dangerous rapids in the middle reaches that make passage difficult, especially in the drier seasons when rocks are exposed. Even so, the provincial government's road plan justifies a road from Karubaga in the Highlands on the grounds that this will make use of the Mamberamo River a possibility.

Coastal areas and navigable rivers are also served by a variety of smaller, subsidized private cargo ships, which also take passengers. There is also a host of small vessels, including long-boats and speed boats, which are particularly ubiquitous in the southern lowlands, where such water-borne transportation can be very efficient. In coastal and riverine areas local people generally have canoes for fishing and transportation, mostly powered by paddlers, but increasingly also by outboard engines.

4.7.3 Air transportation

The interior of Papua was opened up largely through air transportation and largely by church missions who would organize isolated communities to resettle and build air strips on which they could be serviced with small planes. Except between the major airports Jayapura, Merauke, Timika, Wamena, Biak, Manokwari, and Sorong, where commercial airlines operate, and to some secondary hubs where the publicly owned airline Merpati operate smaller planes, the real workhorses serving the interior are the small planes belonging to church-affiliated organizations such as MAF and AMA. While they operate commercially, they remain committed to supporting local communities. In recognition of their crucial function, they receive some government subsidy. There are around 400 airports and airstrips of all sizes and classifications. Of these, 30 are airports proper with more or less requisite technical

standards, the rest being simple air strips. Dekai airport in the interior of the Southern Lowlands and Jayapura's airport at Sentani are identified as short term priorities for expansion (Papua Provincial Government, 2006).

4.8 Development Funding

A recent World Bank (2007) report provides an overview of sectoral allocations in Papua and West Papua (See Table 4).

Table 4 Estimated expenditures for 2008 in Papua and West Papua

Description	Infrastructure Expenditures in billion of Rupiah				Percentage contribution (added to table)
	National (APBN)	Province (APBD)	Kab/ Kota (APBD)	Total Nat/ Prov/Kab/ Kota	
Routine Expenditures:					
O&M (Road betterment, maintenance)	242.1	0.0	9.0	251.1	16.8
Development Expenditures:					
Road Construction	316.6	1.0	49.0	366.6	24.5
Water and Sanitation	0.0	11.0	36.0	47.0	3.2
Airport	321.7	0.0	0.0	321.7	21.5
Port (sea and river)	174.6	0.0	0.0	174.6	11.7
Land Transport (Buses/ Terminals,etc)	11.0	0.0	0.0	11.0	0.7
Energy	0.0	55.0	4.0	59.0	4.0
Telecommunication	0.0	40.0	0.0	40.0	4.4
Water Management/ Irrigation	74.6	0.0	0.0	74.6	6.0
Social Expenditures:					
Settlement	0.0	21.5	26.5	48.0	3.2
Communities	0.0	44.0	57.0	101.0	6.8
Total IDR	1,140.6	172.5	181.5	1,494.6	
Total USD Millions	125.3	19.0	19.9	164.2	

Of the estimated total expenditure of 1.5 trillion rupiah for 2008, maintenance and development of transportation infrastructure absorb no less than 75%. Of this, 18% is for improvement and maintenance of roads, 24.5% for construction of new roads, 21.5% for airports, and 11.7% for seaports.

Of the remaining sectors, telecommunications and energy infrastructure each account for 4%, water and sanitation and water management/irrigation account for

3.2% and 6%, respectively. Allocation to local community development, including construction of settlements, claims 10% of the budget.

4.9 Services Delivery

4.9.1 The New Order legacy

The transition to the new order started in the 1960s. The situation in Papua today is still coloured by the long-running Soeharto regime, when large amount of resources was spent on transmigration projects as a means to develop and control Papua. Roads, schools, health clinics and agricultural extension services were funded, albeit they were often of poor quality, in part due to corruption.

Indigenous communities by comparison were subject to relative neglect, in part because of the very real constraints on physical access. Small scale resettlement projects for isolated communities were implemented on low budgets by the Department of Social Affairs, often with minimal facilities or follow-up. As in other parts of Indonesia, schools were built under a so-called Presidential Instruction program, but often remained empty because of the difficulty of getting teachers willing to serve in the interior. There were similar difficulties in manning health posts.

According to the UNDP (2005), only two thirds of Papua's children go to school. Children coming from indigenous groups such as the Asmat (67%) and the Marind (60%), tend to have the lowest school attendance rates. Women have a much lower attendance rate, especially in the highland regions of Jayawijaya (Timmer 2007).

Papua has the highest mortality rate and the lowest life expectancy rate in Indonesia. Infant mortality rates and maternal mortality rates are also four times the national average. Health services are poor and 9 out of 10 villages do not have a health centre, doctor or midwife. The Papuan people suffer from malaria, cholera, dengue, typhoid, pneumonia and leprosy. Papua is now also thought to have the highest rate of HIV/AIDS in Indonesia (UNDP 2005).

Sanitation is also poorly developed. According to a recent World Bank Infrastructure Report, only 21% of Papua's population has access to adequate sanitation (World Bank 2007). The overall low access to adequate sanitation was attributed to the high proportion of people living in distant rural areas (78%), where this issue has been inadequately addressed.

4.9.2 Decentralized delivery of services

Decentralization and special autonomy have now opened up entirely new possibilities for which the Papuans themselves are responsible. Getting the lion's share of revenues from natural resources exploited by megaprojects and large transfers from the central government, they also have the funds to realize their ambition to substantially raise the welfare of the indigenous people. Their chief emerging strategy for doing so is to progressively divide up the autonomous government entities and their internal sub-divisions. Several things promote this trend, including elite ambitions and politics, but distant communities find that real improvement in access to services can only come about by more direct sharing in the facilities and funds mandated for autonomous local government. This is presumed to be the only

guaranteed way to get roads, airports, harbours, markets, hospitals, primary and secondary schools, as well as to access the public services.

Although funds are available, adequately skilled and prepared personnel to man the new institutions is not. Buildings can be constructed, usually by non-Papuan contractors, but many may remain empty or underutilized. The potential for wasteful management of funds is large, and so is the risk of frustrated expectations of welfare improvement at the local level.

4.9.3 Human rights situation

The United Nations established the Human Rights Council in 2006. Indonesia was elected onto the 47-member Council, initially for a one-year period, and in 2007, successfully put itself forward for re-election for a three-year term. On its re-election in April 2007 Indonesia made 'voluntary pledges and commitments' in which it expressed itself 'proud of its vibrant and active human rights civil society organisations and its free and dynamic press' and declared that it 'attaches the greatest importance to the critical role of the non-governmental organizations and other civil society organizations in this endeavour' (Tapol, 30/11/2007). According to Human Rights Watch, justice has lagged, despite dozens of Indonesian government statements pledging a new approach in Papua and positive developments on some fronts. Security forces, including special Mobile Brigade police units, continue to engage in abuses in remote highland regions with virtual impunity (Human Rights Watch: World Report 2009 – Indonesia).

In order to conform with its obligations as a member of the Human Rights Council, the Indonesian Government agreed to permit several UN special representatives to visit West Papua, although this did not extend to permitting the UN Special Representative for Extra-Judicial Killings to visit Indonesia (Human Rights Watch, op cit).

In June 2008, Ms Hina Jilani, the UN Special Representative to the Secretary-General on Human Rights Defenders visited West Papua. She was quoted as saying that she was 'deeply concerned by testimonies... indicating the continuing activities of the police, the military and other security and intelligences agencies that are aimed at the harassment and intimidation of defenders or to restrict their access to victims and sites of human rights violations. She further stated that she heard credible reports of incidents that involve arbitrary detention, torture, harassment through surveillance, interference with the freedom of movement and in defenders' efforts to monitor and investigate human rights violations.' She was also quoted saying that 'when defenders have attempted to register their complaints, this has been denied and the defenders threatened' (Tapol, 3/11/2007).

Following the Special Representative's visit to West Papua, the Asian Human Rights Commission issued an "Urgent Action" in which it drew attention to a series of 'death threats, intimidation and attacks' on human rights defenders that occurred after Ms. Hina Jilani left, and who had informed her about human rights abuses in West Papua' (AHRC 2/18/2009).

The Asian Human Rights Commission has drawn attention to “the increasing number of arrests and detentions on political grounds in the Papuan provinces of Indonesia.... In recent months, several incidents were reported in which indigenous Papuans were arrested and charged with subversion and secession after engaging in peaceful political protests” (AHRC 2/18/2009).

The organization Franciscan International (9/3/2005) has stated that the rights of indigenous peoples to benefit from the natural resources in Papua are often violated. “Conflict between the indigenous peoples and the business sector is perpetuated by the non-existence of a legal framework to protect the indigenous people’s entitlements. In practice, while the business sector appeals to state law, the indigenous peoples rely on customary law”. The organization finds that this mismatch frequently leads to human rights violations.

5. Role of NGOs and International Organisations

5.1 Role of Churches and Missions

5.1.1 Identity change and organization

Missions and churches have played an extremely big part in the opening up and development of Papua and remain very important as service providers, especially in the remotest areas. Their most fundamental impact, which has facilitated thoroughgoing changes, has been at the ideological level through religious proselytization and the entailed membership in church organizations. This has provided ready-made identities superseding, though not obliterating, local ones and enabling Papuans to become part of globalized communities with shared values and the networks and institutions that sustain them. This has provided an important means to resolve and reduce conflicts that traditionally would feed cycles of violence or war. Moreover, the injunction against polygamy, which is widely though by no means universally observed, has undermined the economic organization of traditional leadership. The labour force made up of many wives would enable an ambitious leader to generate food surpluses to be distributed through feasting and feeding, thereby creating indebtedness to be repaid with political support.

5.1.2 Development support

Churches and their missions still remain crucial contributors to Papuan development. They have not only been pioneers in opening up all parts of the Papuan interior by building airstrips and serving them with small planes, but continue to be of key importance in maintaining regular services to a host of communities in the interior. In connection with the construction of airstrips, the missions were instrumental in facilitating voluntary resettlement within the constraints of the degree of dispersal compatible with local utilization of resources. To facilitate sedentary life, missions have also to some extent provided basic schooling and health services, the growing of perennial crops and marketing on a small scale, by flying out agricultural produce. Flights of course also serve fulfill pastoral duties.

5.2 Role of International Aid Agencies

5.2.1 Multilateral programs

The three main UN agencies present on the ground in Papua are UNDP, UNICEF and ILO. UNDP is responsible for the Papua Development Program (PDP) which during its first and current five year period is implemented in eight *kabupaten*. PDP is essentially concerned to improve governance and delivery of services to village communities through capacity building of government agencies and civil society organizations. Preparations for the program began with a needs assessment in 2004; actual implementation started two years later. The major current funding is

from the Netherlands. If additional funding can be secured, it is intended that the program should expand into more *kabupaten* and be extended for another five year period. One of the components of the program seeks to establish a degree of coordination with all other donor-funded programs in Papua (Government of Indonesia and UNDP 2005a). In general, the PDP does not focus on environmental action except, that is, in an associated component funded mainly by BP for a “Joint Management Area” comprising a number of *kabupaten* whose situation will be impacted upon by the “Tangguh” gas megaproject in Bintuni Bay (Government of Indonesia and UNDP 2005b). If and when UN-sponsored REDD forestry projects are initiated in Papua, it is expected that UNDP will be implementing them in cooperation with UNEP and FAO.

UNICEF supports a number of health-related project activities with an important focus on prevention and care related to HIV/AIDS, which has grown to become a major calamity in Papua, and is also targeted by Global Fund HIV/AIDS. UNICEF also focuses on prevention of malaria and is generally concerned with women’s and children’s health (Bappeda 2007). With a more limited presence, ILO supports local capacity development and gender equality for mainstreaming community based development and poverty reduction (Bappeda 2007).

The World Bank, through SOFEI (Support Office for Eastern Indonesia), supports a number of projects, the most important of which is the long-running nationwide Kecamatan Development Project, which has essentially supported village communities in implementing and managing small-scale infrastructure endeavours. The bank also supports a rural electrification pilot program, and program for strengthening institutional linkages and coordination between the various actors involved in anti-HIV/AIDS efforts. (BAPPEDA 2007) The Bank furthermore provides support for improvement of government financial management, through public expenditure analysis and capacity building (World Bank 2005).

5.2.2 Bilateral programmes

DFID was for a number of years a significant player in Papua through its nationwide Multi-stakeholder Forestry Program until it came to an end a couple of years ago. In addition to working with the forestry authorities on policy issues in the context of decentralization and Special Autonomy, this program involved the mapping of customary territories and land use systems just outside Jayapura, and in the Lorentz National Park buffer zone in the Central Highlands. This provided the basis for collaborative management of forest areas based on traditional local rights. Participants in this effort, in addition to local community representatives, were NGOs and forestry authorities. As a follow-up, DFID has provided funding for the Papua Civil Society Support Fund (PCSSF), and leveraged contributions from other donors including the Norwegian Embassy, which provides funding through its support to Partnership for Governance Reform.

Australian aid (AUSAID) supports projects aimed at HIV/AIDS prevention at the provincial and local levels, and has also been focusing on the earthquake areas in Nabire to upgrade water supplies, sanitation and health services. As part of its Eastern Indonesia commitment, AUSAID also supports capacity building for govern-

ment agency personnel to improve governance, economic development and delivery of basic services (BAPPEDA 2007).

Assistance from EU/SANIPLAN provides for training and equipment for health centers in a number of *kabupaten*, while also supporting government efforts nationwide to prevent an avian influenza pandemic. Finally, USAID also supports health programs against HIV/AIDS, malaria and tuberculosis, as well as improvements of basic education services (BAPPEDA 2007).

5.3 Role of NGOs

A number of organizations are currently working in Papua and attempting to assist both the governments of Papua and West Papua to promote sustainable development and protect Papua's unique biodiversity. Among the most significant are: Flora and Fauna International, WWF Indonesia, the Nature Conservancy, Conservation International, Sekala, IUCN and the Rainforest Foundation Norway.

5.3.1 Fauna and Flora International

Flora and Fauna International (FFI) is currently developing a REDD project in Papua, and has worked with the Papuan Provincial Government to prepare a REDD proposal for the Cyclops Mountains near Jayapura. The area is protected forest, but is being degraded by small scale agriculture by recent migrants from the highlands. The proposal seeks funding to support sustainable livelihoods for the traditional owners in the area, including funds to monitor and protect the area from further degradation. FFI plans to include compensation for relocation and alternative livelihoods for the migrants, as ways to avoid conflicts between the landowners and the migrants.

5.3.2 WWF Indonesia

WWF has carried out forest conservation projects in New Guinea since the 1980s. WWF Indonesia has decades of experience working on issues of forest conservation across the breadth of the Indonesian archipelago, and has been operating in Papua for more than 20 years. In Papua, the organization has worked extensively in Lorentz World Heritage Site, the Trans Fly and Southern New Guinea Lowland Forests eco-region, and has a marine program in the Birdshead Region.

In Papua, WWF is planning to undertake a large scale bio-visioning exercise for the entire island of New Guinea. This exercise will seek to assist the Papuan governments with spatial planning to ensure that areas known to have high conservation values are zoned for protection in spatial plans. WWF Indonesia is also planning to develop a REDD demonstration project in Papua and is currently considering sites for this project. Possibilities are Jayapura district, which is relatively accessible and districts where large areas of peat are found, i.e. Asmat and Mappi.

WWF Indonesia also focuses a great deal of attention on policy issues. For instance, WWF's forestry program is assisting the provincial government to review the HPH system in Papua to identify HPH's that are underperforming, failing to pay revenue, have boundaries that overlap with customary land rights and are involved in illegal logging activities. To support these two policy developments, WWF has

conducted a study on the Kopermas model of community based forest management units to determine how these units can be viable and sustainable and will assist the local government to develop an appropriate legal framework to legitimate these units. Support for spatial planning and community mapping has also been provided in the Merauke and Doven Digul regions.

WWF Indonesia works together with numerous organizations, including the Nature Conservancy, Conservation International, Sekala and Flora Fauna International.

5.3.3 The Nature Conservancy (TNC)

In Papua, the Nature Conservancy primarily focuses on marine conservation and has established a project in the Raja Ampat islands. TNC aims to: 1) contribute to a comprehensive conservation action plan to protect Raja Ampat's reefs and forests; 2) help incorporate marine protected area management into long-term planning and policy; and 3) establish a network of marine protected areas for Raja Ampat. The Conservancy's ultimate goal is to protect Raja Ampat's reefs while sustaining the livelihoods of local people. TNC has a long term commitment to working in Raja Ampat and plans to expand its marine conservation programme to cover the entire Bird's Head seascape in partnership with like-minded NGOs such as WWF, CI, the local government and local institutions. TNC's terrestrial programme is mainly located in Berau, East Kalimantan.

5.3.4 Conservation International

Conservation International's Indonesia (CI-I) programme focuses on two sites in Papua: 1) the Mamberamo Raya Corridor area; and 2) the Papuan Bird's Head Seascape. In both of these sites, CI-I focuses on conservation science and aims to avoid extinction of critically endangered species. CI-I places a great deal of emphasis on collecting and interpreting data about biodiversity to make a strong case for conservation with national, regional and local leaders in critical biodiversity areas. Consequently, CI has carried out a number of terrestrial and marine rapid assessments (RAPs) in the Raja Ampat islands and the Mamberamo Raya Corridor in Papua. These biodiversity assessments have identified a host of new species and drawn international attention to both areas.

In the Mamberamo region, CI Indonesia is working towards the creation of a conservation corridor which will link up several protected areas, namely the Mamberamo Foja Wildlife Reserve, parts of Jayawijaya Nature Reserve, Lorentz National Park and traditional protected forest areas. CI Indonesia plans to continue working in this area for the long-term and has undertaken a Social Feasibility Study to locate villages, with which it can partner to draw up long-term conservation plans.

In the Raja Ampat area, CI-I's marine program aims to conduct scientific research, facilitate collaborative management of marine and coastal resources, and establish a Raja Ampat Conservation corridor.

Conservation International Indonesia has partnered with a host of organizations including: Indonesian Institute of Science (LIPI), Cendrawasih University (Uncen), Papua University (UNIPA), the Australian Museum and the Raja Ampat regency

administration, TNC, WWF, the Commonwealth Scientific and Industrial Research Organisation (CSIRO), the Indonesian Foundation for the Advancement of Biological Sciences (YABSHI), ALAMI Foundation, Indonesian Ecotourism Network (Indecon) and Yayasan Cipta Citra Lestari Indonesia (YCCLI), the Australian Museum, Yayasan Perisai Laut Indonesia (YPLI - the Indonesian Sea Shield Foundation) and GSF (Sekala 2006).

5.3.5 Sekala

In Indonesia, Sekala specializes in forest governance, community mapping, spatial land use planning, geographic information systems (GIS) and remote sensing. It has extensive expertise on critical forestry issues, such as illegal logging and forest conversion, and is providing analyses to a number of organizations seeking to reduce carbon emissions through avoided deforestation and degradation (REDD).

In Papua, Sekala led a consortium of organizations (PCSSF and Nordic Consulting Group) to carry out a Strategic Environmental Assessment (SEA) for spatial planning in Papua province. The SEA assessed the economic, social and environmental consequences of different development scenarios and provided improved spatial information to the Papuan provincial government.

In addition to the above, Sekala regularly provides assistance with community mapping and spatial planning in Papua and it provides GIS and remote sensing training to government officials and NGOs in its training centre. Sekala also regularly works with WWF Indonesia and the Samdhana Institute in Papua and provides advice on community forestry, stakeholder analysis and spatial planning.

Sekala is presently establishing a Centre of Excellence to provide training and capacity building in spatial planning, remote sensing, GIS and modeling. It is also working with the World Resources Institute and Forest Watch Indonesia to facilitate independent monitoring and verification for REDD initiatives in Indonesia. In addition to this, Sekala is working with the World Resources Institute to identify available and suitable degraded lands for oil palm developments.

5.3.6 IUCN/Samdhana Institute

IUCN and the Samdhana Institute initiated jointly in 2007 a Landscape Livelihood Strategy (LLS) in Papua. The LLS has six objectives to be pursued in Bomberai and Wamena Landscapes, namely: (1) poverty reduction; (2) increased household incomes; (3) sustainable local markets established for forest products for the poor; (4) one set of best practice guidelines on forest products recognized as an industry standard and adopted by the business sector; (5) tenure for community-based natural resource management arrangements made more secure; (6) facilitation of adoption by multi-stakeholders and the lessons learned from the project. Sekala, WWF Indonesia and several local NGOs are also involved in the development of the LLS strategy.

Several workshops have been conducted for benchmarking, knowledge sharing and rallying for a common interest for the LLS goals, in particular to explore market scenarios for timber, non-timber and carbon products under a Sustainable Forest

Management strategy, and to explore governance and tenure arrangements in potential landscapes.

Efforts to develop markets for community-produced forest products have been underway. Surveys have been conducted to study market potentials, issues, local institutions' preparedness and the policy environment. The project brought a group of potential Papuan community managers to observe the first certified community teak community farm lots in Southeast Sulawesi. This work has elicited a strong interest by the Governor, who is engaged in finding prospective buyers of Papua's community forest products.

A number of research activities are under way, including value analysis for coffee and cacao. Other research topics cover poverty assessments linked with the rights based approach, independent impacts review, properties of various landscapes, environmental costing as well as carbon trading. Furthermore, the strategy includes reviews of policies on forest and ecosystem management and multi-stakeholder participation.

5.3.7 Rainforest Foundation Norway

The Rainforest Foundation Norway (RFN) has been working in Southeast Asia and Oceania since 1997. It focuses on sustainable forest management and securing land right for forest dependent people. RFN has obtained funding from Norad to work in Papua. From 2006 till 2008 RFN made a number of pilot assessments of local NGO capacity, threats against the Papuan rainforests, the conflict level, tribal relations and local political agendas in order to identify potential partners and sites for intervention. It is currently working with a number of local NGOs to conduct initial baseline studies on forest management, local livelihoods and indigenous people's land rights in Papua (with Foker LSM Papua), in the Mamberamo basin (with YALI), and on Tamrau and Arfak mountains (with Yayasan Paradisea). The studies, which are carried out through extended field work in local villages, started in 2008 and will continue in 2009 because local political conditions have proved to be very complex.

The local NGOs regularly review the need for further action in a close cooperation with RFN. Status of ownership to land and traditional forest management as well as the relationship between tribes/clans and local government are keenly documented in order to make project interventions relevant and realistic. Foker LSM Papua, a network of 108 local NGOs, is also involved in policy and advocacy work and gives input to the special regulations (*Perdasus*) on natural resource management and indigenous people's rights that the Papuan government is developing.

The projects in Mamberamo and Arfak/Tamrau aim to find practical models for how the new special regulations can work at the field level. RFN's has so far concluded that there is low government capacity below the province level and that capacity building at the regency and district levels will be crucial to ensure long-term sustainable management of forest resources.

RFN is also engaged in Reducing Emissions from Deforestation and Forest Degradation (REDD) in Indonesia. In a report on REDD in Indonesia, RFN highly recommends that Norway considers supporting REDD initiatives in Papua and West Papua provinces because the governors of both of these provinces have expressed their interest in substantially reducing the forest area classified as conversion forests and to engage the civil society and respect their rights in forest matters.

RFN will measure overall REDD success by the degree that the present forest cover is maintained, while livelihood opportunities for indigenous people improve. In areas with strong social conflicts over land and forest resources, special indicators will be developed to measure to which degree project interventions succeed in solving conflicts.

5.3.8 *Telapak and the Environmental Investigation Agency*

Telapak, an Indonesian NGO based in Bogor, has partnered with the Environmental Investigation Agency (EIA - an international NGO) to investigate, expose and campaign against the illegal trade in wildlife and timber in Indonesia. Both of these organisations have unveiled illegal logging in national parks in Kalimantan and in Papua.

In 2005 EIA and Telapak released an influential report on illegal logging in Papua, entitled “The Last Frontier”. The report asserted that 300,000 cubic metres of Merbau logs are smuggled out of West Papua per month to factories in China. It also alleged that the US\$900 million dollar a year trade is supported and managed by high-ranking Indonesian military (TNI) officers plus other government officials and law enforcers. This report prompted a massive law enforcement operation named *Hutan Lestari* in March 2005, which temporarily dried up supplies of Merbau, particularly within Indonesia, but did not result in any prosecutions. The operation cost the Indonesian government Rp 12 billion (US\$1.3 million). Neither EIA nor Telapak have a permanent presence in Papua, but both organizations regularly monitor illegal logging operations in the area and are linked to local NGOs working on environmental issues in Papua.

5.3.9 *The Papuan Civil Society Strengthening Foundation*

The Papuan Civil Society Strengthening Foundation (PCSSF) is a new regional small grant-making institution that was formed to continue the work of DFID’s Multi-stakeholder Forestry Programme (MFP) in Papua. MFP built upon the experience of a USAID funded project—BSP Kemala. MFP aimed to add value to existing initiatives and to strengthen the existing multi-stakeholder networks working towards policy reform in natural resource management. The MFP Papua strategy was based on the shared objectives of a set of stakeholders in local government, NGOs and indigenous people’s (adat) organizations. MFP supported seven active partners who worked in close collaboration with a network of stakeholders including local communities, support groups, universities, NGOs and local government offices. Its activities focused on:

- Facilitating better understanding of poverty issues among adat communities.
- Mapping and documenting adat land claims.
- Strengthening adat confederations.

- Re-designating forest use boundaries.
- Raising public awareness on adat rights.
- Securing adat forest management rights by law.
- Providing funding mechanisms to sustain progress for securing adat rights.

PCSSF has taken on many of the functions of DFID's MFP programme and will continue with the process of strengthening community institutions, facilitating multi-stakeholder dialogues, providing support for networking and shared learning, monitoring partners, giving technical assistance and creating space for negotiations with regency, provincial and national level decision makers. By drawing upon the network of partners established by DFID's MFP programme and the BSP Kemala programme, PCSSF is able to represent 100 organizations from civil society, religious groups and government agencies from six geographic regions in Papua.

PCSSF recently worked together with Sekala and the Nordic Consulting Group to interview stakeholders and determine their economic, social and environmental priorities for Papua.

6. Impacts of Commercial Operations

6.1 Mining

Large-scale mining is a driver of deforestation where it brings with it extensive road construction and other development. This is evident in the case of Freeport where large urban and road developments have stimulated the opening up of surrounding areas to oil palm developers, logging and industrial timber plantations (Paull et. al. 2006). However, the largest direct threat to local ecosystems is the disposal of waste materials (Filer 2007). Tailings and other waste materials are often dumped into rivers and coastal areas and cause coral mortality, sedimentation and dieback (Filer 2007). Even small-scale illegal mining operations can also threaten the health of river systems, humans and wildlife, especially when mercury is used.

Freeport's operation at Grasberg, the largest gold mine and the third largest copper mine in the world, is of course unusual in almost every respect, including the scale of its impact. And it seems that despite all the mining concessions that have been granted, few if any other companies have reached the stage of significant production. The dramatic security issues associated with it illustrate some of the local level political risks faced by mining companies. It is likely that these risks and the very high costs associated with ameliorating them are a factor in the slow operationalization of mining concessions in Papua. Even the enormously well endowed Freeport Company is only now, more than a decade after its discovery, beginning to develop a goldmine at Sugapa, where the impending establishment of a new kabupaten consolidates the political and security context. These and other developments could indicate that mining may have an upswing, with very considerable environmental and socio-economic impacts.

6.2 Logging

The impact of selective logging, conducted strictly according to the rules with time for forest regeneration, is supposed to be within the limits of sustainability. Unfortunately, with technically weak and corrupt government institutions being responsible for oversight, the outcome has often not been as hoped. Although some 56 logging concessions have been established, only about half of these are designated for logging. Many of the concessions were established in the waning years of the Soeharto regime. Since then many logging companies had to scale back or cease operations altogether, because of the increasing conflicts with the rights of local communities. Approximately 24 of the timber concessions have now become inactive. Timber production has declined drastically, as has revenues from the timber sector. Concession logging has therefore till now had a relatively small

impact on Papua's forests, except where it has been part of conversion to other uses.

However, illegal logging was extensive before strong measures were taken to suppress it as a result of the outcry, caused by the exposure of the huge international smuggling operations with which it was connected. The well-intended Koper-mas system, which was designed to facilitate and benefit forest dwelling communities and be limited in scale, was coopted into larger-scale unregulated logging which would have been destructive in the areas affected. However, it was brought to and end by the Ministry of Forestry before operations had time to become very extensive.

However, mangrove forests have been very seriously degraded by commercial logging. The tree species adapted to these intertidal environments are very specialized and relatively few. Unlike selective felling in the lowland rainforest, in which only a few trees are taken out from each hectare such that the forest matrix is left substantially in place, mangrove trees tend to be felled in ways that border on clear-felling. The huge mangrove forests in Bintuni Bay have reportedly been seriously damaged by logging in this way. If alternative land is available, mangrove swamp is one of the last options for land development, and if left alone the mangroves will in time regenerate.

6.3 Timber Plantations

The substitution of natural forest by timber plantations to support the development of a pulp and paper industry would have an enormous impact on forests designated for permanent production. The huge paper pulp mills of the APP/Sinar Mas group and PT RAPP in Sumatra illustrate dramatically the deforestation impact of such an industry. Generally, it is not easy to co-opt local communities into participating in timber plantations as it relatively is in the case of oil palm plantations for the simple reason that the former cannot provide a continuous stream of income. However, given the small scale of communities in Papua, it should not be difficult for the companies concerned to provide monetary and other incentives that eventually might prove very persuasive. For the moment, investment plans seem to be on hold even for the roughly 150,000 ha that reportedly have been approved. Again, political risk remains a deterrent, but may decrease. The anticipated establishment of South Papua Province, where most of the suitable lands and potential concessions are located, could trigger a change.

6.4 Oil Palm Plantations

Large-scale oil palm plantations have the potential to improve the economy of local communities, if they follow environmental and other legislation. However, it is well known from other parts of Indonesia that some companies play the game of getting plantation concessions in order to exploit the timber in the land-clearing phase and then cut and run, leaving the land devastated. It is not known to what extent this may happen in Papua, but the risk is there. Conducive official pronouncements notwithstanding, it is not yet clear to what extent operators are being prevailed upon by the government to ensure that this may not happen.

The areas that have been suggested for oil palm development are enormous, and to a great extent covered by primary or degraded forests. Great uncertainty exists as to what is actually happening. Information, that according to *Down to Earth* (No 75) was posted on BKPM's website in 2007, showed that 89,827 ha has been planted to oil palm in four *kabupaten* of Papua Province. In 2008, however, *Down to Earth* (No. 78) published figures derived from the Agriculture Department, quoted by *Business Indonesia* 3 June 2008, which showed that 13 concessions, amounting to a total of 332,180 ha had been granted in eight *kabupaten* in Papua and West Papua provinces, 179,500 ha in three *kabupaten* around Jayapura and 118,800 ha in Merauke and two neighbouring *kabupaten* in the south east. However, only six of these companies had planted oil palms, reaching a total area of 41,378 ha, while seven other were said to be in the site preparation phase. Three of the companies listed belong to the giant Sinar Mas Group.

6.5 Fishing

The commercial fisheries sector in Papua is very significant in economic terms. In 2002 it contributed about 6.2 % to GDP in Papua, which in fact was higher than the forestry sector's estimated contribution. Its prominence was due to foreign investment fishing and fish export companies establish in harbour cities around the entire coast with the greatest concentration in Merauke and Sorong, which together accounted for nearly 60% of total production.

Its environmental impact is difficult to judge. On the one hand, the recorded total catch in 2001 was only 34% of the estimated total Maximum Sustainable Yield and 43 % of the Total Allowable Catch. But some products including demersal fish, reef fish, shrimp, lobster and squids, exceeded their Maximum Sustainable Yields. (Anggraeni 2007).

The marine resources in the Raja Ampat Islands near Sorong are especially vulnerable to negative impacts as they are within reach of vessels from the informal fishing fleet of the nearby islands of the Moluccas. There has been considerable use of illegal methods including fish-bombing and cyanide harvesting which local fishermen complain they cannot prevent, with the end result that they too engage in the same practices in a "tragic-of-the-commons logic". While the Raja Ampat islands are considered of especially high conservation value, marine and coastal resources throughout many parts of Papua are threatened by illegal or unsustainable practices. Marine scientists have also argued that Papua's marine resources are vulnerable to increased extraction and are threatened by plans to expand fisheries in the area (Mous et al. 2005). The newly established Ministry of Marine Affairs and Fisheries has indicated that they plan to improve the management of marine protected areas in Papua, but will primarily focus on expanding Indonesia's marine protected area system to rectify the current imbalance between terrestrial and marine protected areas. The current protected area coverage of Indonesia's terrestrial environment is 10.60% of total land area as compared to 1.27% for Indonesia's marine environment (Sekala 2006).

7. Impacts of Human Populations

7.1 Immigrants

7.1.1 Transmigrants

Transmigration settlements in Indonesia were often established without sufficient lands to make room for additional farming families. This has created problems when, within a short space of time, a whole new generation has come of age and have established new and very rapidly growing settlements by buying land from locals, often in ecologically sensitive areas. This trend seems not to have come about in Papua, where transmigrants are more mindful of local resentment over loss of lands, which remains high, and collective control on land alienation is still operative. In other parts of Indonesia, it has become the norm that people with birth rights to local lands now are free to sell the land they themselves have cultivated, or sometimes only marked out in forests not yet cleared. As a result, a significant proportion of transmigrant offspring may establish themselves in the urban economy, or more likely furnish readily available work force in the forestry and plantation sectors. In time, if the injunction to sell land is weakened, and there seems to be good reason to assume that in time it will be, the potential for agricultural expansion is very considerable.

7.1.2 Self-supported migrants

Even before the transmigration program, Papua has been the target of migrants who have come as traders, entrepreneurs or as job seekers mainly in the urban economy, but also spreading out into the interior as pioneering traders and shopkeepers. Even in the most remote interior lowlands or the highlands shopkeepers are almost invariably migrants, and very often muslims from South Sulawesi. People with a Christian faith from the Moluccas, North Sulawesi and Toraja are also numerous. Papua is seen as a land of opportunity where good money can be made relatively quickly. The economy is expanding rapidly due to high investments, and migrants with skills and experience that are rare among the Papuans, have great opportunities to succeed. Some plan to be in Papua until they have accumulated enough savings to go home and establish themselves in business or to retire. Others are committed to remain in Papua, and their children born there know of no other place. Migrants also work in government, although there is now an active policy at all levels of employing and promoting Papuans, even at the cost of considerable inefficiencies or risks, where there are few qualified candidates. Migrants, especially from the Moluccas, are also prominent in the ministries of the various churches.

All in all, while the Papuans are now very much in control of politics, migrants from other parts of Indonesia very much control the economy. In fact, as the Papuan economy expands the influx of migrants increases. With road infrastructure about to undergo a radical expansion along with investments in large-scale exploitation of resources and forest lands, it is hard to see that immigration will not follow suit, given the general lack of preparedness on the part of indigenous Papuans to participate, unless, that is, very strong policies and measures are developed to facilitate them.

7.2 Indigenous Communities

7.2.1 Central Highlands

The forest of the inhabited parts of the Central Highlands and Lowlands of Papua Province are subject to very different kinds of pressures and possible scenarios for the future. In the Highlands, the population subsists on cultivating tubers, mainly sweet potato, and pig husbandry. As long as the population density is sufficiently low, swidden or shifting cultivation with fallow periods of sufficiently long duration for the forest cover to regenerate can be a very sustainable agricultural system with low demands on labour. Population growth and agricultural intensification, however, will reduce the fallow period, eventually to the point forest cover does not regenerate and is replaced by brush, bracken or grasses. Montane forests are more vulnerable in this regard than lowland forest, as they regenerate more slowly. This gives rise to a greatly increased weeding problem, and to overcome it it eventually becomes necessary to turn the soil, a far more laborious process than swiddening. Indeed, the increased demand for labour thus created may tend to stimulate population increase, while the increase in turn creates more need for intensification. This is assuming that there are no new, only marginal areas of forest to move into.

Intensification also very much concerns the pig husbandry. In a forest rich situation with swidden cultivation and relatively low levels of labour investment in the fields, a certain amount of pig damage to the crops is acceptable, especially since the pigs are going to be fed some anyway. Domesticated pigs also feed in the forest and on residual food in fallows. With investment of labour in the fields increasing, pigs will eventually need to be kept out, and the only way may either be constructing elaborate and extremely solid fences or by keeping them penned. But doing so will increase the cost of feeding as they can no longer forage themselves. Limiting the number of pigs may cause inadequate supply of animal protein as rivers in the highlands are without fish and game is extremely scarce. This is to some extent compensated for by copious consumption of salads.

In the highlands the environmental deterioration processes are dramatically visualized by exceedingly steep mountain sides, which are bare and eroding; in places marked by enormous landslides and the tree line progressively receding to high altitudes. In other areas, this process is at an earlier stage, with a mosaic of vegetation and bare areas still in evidence, and the tree line much lower. There is no good reason to assume, however, that population increase, agricultural intensification and extension onto increasingly marginal lands will not continue, with deforestation driving cultivation at increasing altitudes in simplified ecosystems. This brings with it

increasing vulnerability to frost and drought, which can have devastating effects and is particularly likely to occur during year of co-called El Nino events, as in 1997-98, when a major famine was avoided only by major assistance provided by the government and aid organizations.

Construction of road infrastructure, which will radically improve access to markets, and new needs for cash are likely to lead to additional pressures on the lands and forests. A way out of this conundrum is for highlanders to migrate to the lowlands, as they now increasingly do. They are used to grindingly hard work to make a living and to husbanding their resources. When it comes to cultivating for markets in the lowlands, they have presently many advantages over the lowlanders.

7.2.2 Lowlands

The indigenous population in the lowlands typically have very different ways of producing livelihoods. They have traditionally relied far more on harvesting food from nature rather than producing food through agriculture, but are now changing. While the lowland forests are very species diverse, this does not at all make them an abundant source of food for human foragers. Their diversity correlates with a paucity of food sources that are significant enough to sustain human communities in the absence of cultivation. What makes all the difference in the lowland forests of Papua, as in adjacent parts of the Moluccas, is the natural occurrence of the sago palm (*Metroxylon sago*). This palm tree produces huge quantities of starch, which are fairly easily extracted. Moreover, the palm is readily propagated and can grow with little or no tending, both in the swampier parts of the lowland and along rivers.

The disadvantage with sago is that it is pure starch and thus lacks nutritional value. This is no problem as long as fishing and hunting is adequate, which it generally has been in the lowlands given their low population density and the highly dispersed and mobile nature of human habitation. This, however, tends to become a problem when larger permanent settlements are established. Forest game within a reasonable distance from the settlement soon becomes depleted. This will also, though maybe to a lesser extent, be the case of fish in inland waters. The problem is in part solved by regularly spending periods away from the settlement in hunting and gathering camps. However, if the movement involves the whole family including children, education and other community functions will suffer. Another alternative will be to begin cultivating more nutritious crops. Missionaries who pioneered settlements in the lowlands also assisted in the development of gardens, though in most cases local people were by no means unaware of such possibilities, their choices being more a reflection of preferences within a set of ecological and social constraints.

Another prominent aspect of lowland forest adaptations is the extraction of commercially valuable products for sale. In the Southern Lowlands, the main good is co-called eagle wood, the fragrant product of a fungal infection in certain species of tree. In pristine forests the value of eagle wood, though always unpredictable, can be very high. Regeneration is slow such that when extensively collected and over a long enough period, this resource will no longer be viable (which has happened in

Sumatra and is happening in Kalimantan). Exhaustion of the resource is accelerated when local communities lease out collecting concession to migrants from outside Papua, which they normally do in addition to collecting themselves. Reportedly, although the reserves are declining in the southern forests, there are still adequate supplies for this to be a mainstay of cash earning in many areas.

In the forests of the Northern Lowlands, the eagle wood is much less of a resource for the inhabitants. Crocodile hunting for skins is a mainstay in these areas; the Mamberamo swamps being the centre of this activity. When this commercial hunting started a few decades ago, the crocodiles were plentiful although the price for their skin was concomitantly low. The price has increased as the crocodiles have become scarcer, but because the crocodiles are a threatened species and this trade is tightly regulated, the price is not rising fast enough to compensate for the increased work involved in catching these animals. In fact, crocodile hunters are faced with a situation where they may soon be unable to earn enough money from this activity to justify the efforts. However, the swamps and the rain forest seem to offer few products which can be sufficient and suitable substitutes and having a high enough value to weight ratio to be transported over the long distances to reach markets.

7.2.3 Migrants

Very little data exists on the migration from the highlands to the lowlands. However, there are perennial reports in the local media that Dani cultivators are causing a deforestation problem in the Cyclops Mountains, a nature reserve, near Jayapura. With their strong background as cultivators, in contrast to that of the local people, they may be set to prosper in this area, where they have ready access to a large urban market. Presumably, the migrants and the lowland people seem to have come to a customary arrangement, where land can be used temporarily or even for a longer term, but not claimed in ownership. Land-rich lowlanders may in fact be very open to such arrangements, which far from making them resentful may be all too pleased about reciprocal benefits probably entailed.

There is the question, though, whether these arrangements will progress to an actual sale of land with transfer of full ownership. At present there is a very strong collective control of customary lands, just as was the case in most parts of Indonesia. The sale of land by locals, whose traditional birthright it is to access this land, has in a relatively short period become an almost universal practice throughout Indonesia outside Papua. It is sometimes assumed that Papuans are immune to such a development because of their strong ideological tie to their lands, and because they have descent groups or clans to manage and defend their common rights. This hinges on the ability of clan leaders to sanction traditional norms when values become increasingly blurred from one generation to the next. If land is commoditized and alienation in sale becomes an increasingly acceptable and indeed attractive option to people who are land-rich but poor, many may be attracted to this way of obtaining a great deal of money quickly and easily. And many also from outside Papua may be attracted to this possibility as they have on other islands in Indonesia.

Annex



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