

PAPUA NEW GUINEA

Area 462,842 sq. km

Population 3,900,000 (Population Reference Bureau, Washington DC, 1989)

Natural increase: 2.7% per annum

Economic Indicators

GNP: US\$ 790 per capita (1988)

Policy and Legislation

An Environment and Conservation Policy was adopted by the National Parliament in 1977, in recognition that development must be ecologically, socially and culturally suitable for Papua New Guinea. The Policy was drawn up in response to the Fourth Goal of the National Constitution:

"4. Natural Resources and Environment. We declare our fourth goal to be for Papua New Guinea's natural resources and environment to be conserved and used for the collective benefit of us all, and be replenished for the benefit of future generations."

The Fourth Goal provides for: (1) wise use of natural resources, (2) conservation and replenishment of the environment and (3) protection of flora and fauna for the benefit of present and future generations (SPREP, 1985b).

In order to implement the constitutionally-based policies, various laws have been introduced. Of particular relevance to the establishment of protected areas are the National Parks Act, Conservation Areas Act and the Fauna (Protection and Control) Act (Venkatesh *et al.*, 1983) (see Annex).

The National Parks Act (1982) replaced the amended 1971 Act, which in turn superseded the original National Parks and Gardens Act (1966). It provides for:

"the preservation of the environment and of the national cultural inheritance by - (1) the conservation of sites and areas having particular biological, topographical, geological, historical, scientific or social importance"

and thereby upholds the Fourth National Goal and Directive Principle of the Constitution.

The Act contains provisions for reserving government land and for leasing and accepting gifts of land. Powers to make regulations to control hunting, fishing, sports, vehicles and domestic animals, and law enforcement provisions are contained in the Act. Although comprehensive in its coverage of different types of protected area, the Act does not define or even list the various categories nor is there any statutory requirement for the provision of park management plans (Eaton,

1985; SPREP, 1985b). The procedure for establishment of protected areas under this Act involves three stages: proposal, approval and declaration (Kwapena, 1984).

The Conservation Areas Act (1978) has similar objectives to the National Parks Act but is more comprehensive and, to some extent, remedies deficiencies in the other legislation. For example, provisions include the establishment of a National Conservation Council to advise on the identification and management of protected areas, and the formation of management committees for each area to be responsible for *inter alia* the production of management plans. Conservation areas may be established on land under public, private or customary ownership. The Act awaits implementation due to financial constraints (Eaton, 1985; SPREP, 1985b).

Although concerned primarily with the protection of endangered species, the Fauna (Protection and Control) Act (1966) provides for the establishment of wildlife management areas (WMAs) on land held under customary ownership, of which there are three categories, defined in the Annex. The Act provides for the setting up of wildlife management committees to administer them, thereby involving customary land-owners in the control of wildlife resource exploitation. The committees advise on the provision of specific rules for each area for "the protection, propagation, encouragement, management, control, harvesting and destruction of fauna" (Eaton, 1985; SPREP, 1985b). The procedure for the establishment of WMAs is fully described by Kisokau and Lindgren (1984) and Asigau (1989), and also outlined by Eaton (1986). The WMA concept recognises customary land ownership, and places landowners in direct control. Further, the establishment of WMAs is invariably initiated by the local landowners. The major failings in the WMA system are the generally inadequate size of each area, lack of local resource management expertise, delays in responding to requests for WMA establishment, leading to apathy and weak enforcement of regulations (Asigau, 1989).

The following are the principal classifications and general criteria for protected areas (SPREP, 1985b):

National parks are extensive areas of outstanding scenic and scientific interest which are of national significance. They should be of at least 1,000ha and preferably in excess of 2,000ha. Ideally, the whole range of land-forms and environments found in Papua New Guinea should be represented. National parks have two main functions; first for public use and education and second, for the conservation of nature through protection of undisturbed habitat.

Provincial parks are less extensive natural areas than national parks; frequently less than 2,000ha and often

less than 1,000ha. Not necessarily of national significance, they are of scenic and recreational importance at provincial level. Their main role is to provide for outdoor recreation in a natural setting close to urban centres.

Historical sites are areas of historic significance, covering prehistory and recent history. They may be of any size and, in many cases, adjacent areas will be developed for recreational purposes. They should provide for the preservation of areas of historic and prehistoric significance and their interpretation to the public.

Nature reserves can be areas of any size in which samples of ecosystems and habitats are preserved, either for their intrinsic value or for the protection of wildlife. Scientific research is permitted, but access by members of the public is very limited.

National walking tracks are physically challenging and scenic primitive routes through natural landscape that provide for walking in natural surroundings over long distances. Wherever possible, there should be a minimum easement of 10m of natural vegetation on either side of tracks. Advantage may be taken of existing national parks or other large areas of reserved natural landscape.

Sanctuaries are areas set aside primarily for breeding and research on indigenous wildlife and its display to the public for education and recreation purposes. They can be of any size but should contain some natural habitat in addition to the display area.

Wildlife management areas are areas reserved at the request of the land-owners for the conservation and controlled utilisation of the wildlife and its habitat. Declaration of a wildlife management area does not in any way affect ownership of the land, only the way in which resources are used. Thus, wildlife management areas represent an attempt to develop conservation on a customary basis, using traditional methods of resource management (Eaton, 1986).

The customary land tenure system and associated subsistence economy traditionally contains many forms of resource management and conservation. The shifting cultivation system, for example, with its long periods (10-35 years) of fallow helps to maintain soil fertility. Customary rules may prevent the felling of trees along river banks. There are also prohibitions against cutting down trees near villages, while other trees of special economic value or of particular importance for certain types of wildlife may be protected from indiscriminate felling. In addition to controls consciously imposed by village societies, there are a great many associated traditional beliefs and practices that have often proved extremely effective in protecting certain habitats and species. In many Papua New Guinean societies there are prohibitions or *tambu* against entering certain areas or hunting or felling trees within them. These may be sites of old settlements, burial grounds or physical features,

such as mountain tops, caves, ponds and forests. Some areas may be protected permanently, in others the restriction may be for a limited period as may happen after a death in the group (Eaton, 1985).

While traditional beliefs and customs have helped to protect the environment in the past and are often still operative, the integrity of the environment is under increasing threat from pressures associated with population growth, increased mobility and growth of the cash economy. The establishment of a protected areas system has proved to be extremely difficult on account of the traditional land tenure system. New legislation and novel approaches to environmental management have proved necessary.

Other environmental legislation is reviewed by Eaton (1985). Some of this legislation is relevant to protected areas. The Forestry Act (Amalgamated) (1973) is the main legislation responsible for the conservation and management of forest resources. Under this Act the government purchases timber rights from customary landowners for a certain period and then grants a licence to commercial companies to extract the timber. Royalties are paid to the government and a proportion of these is passed on to the provincial government and landowners. Environmental safeguards are provided for in the agreements between the government and logging companies. For example, logging is not allowed within 20m of permanent watercourses, or 50m in the case of major rivers, nor on gradients above 25-30. The interests of customary land-owners are also protected. They retain rights of access for gardening, hunting and collection of wood for fuel and construction purposes. Reforestation is not provided for in the forestry legislation but depends on arrangements between the landowners and permit-holders. The Forestry Act is seen to be inadequate to cope with the modern system of provincial government, and is readily circumvented by recourse to the provisions of the Forestry (Private Dealings) Act which enables landowners to enter into private agreements with logging companies with few if any statutory controls over the scale and manner of the operations (TFAP, 1989). The Act is also discussed further by Sargent (1989). An important statute is the Environmental Planning Act (1978) which calls for an assessment of the impact of a development project on the environment. Both the Environmental Planning Act and permits issued under the Forestry Act may also require logging companies to leave certain areas undisturbed as reserves for wildlife (Venkatesh *et al.*, 1983). There is evidence, however, that much of this legislation is not effectively enforced, with some 70% of logging companies continuing to operate despite the mandatory provision of environmental impact assessments (Anon., 1990).

International Activities Papua New Guinea is not yet party to any of the international conventions or programmes that directly promote the conservation of natural areas, namely the Convention concerning the Protection of the World Cultural and Natural Heritage

(World Heritage Convention), Unesco Man and the Biosphere Programme and the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention).

At a regional level, Papua New Guinea signed the 1976 Convention on the Conservation of Nature in the South Pacific on 12 June 1976. Known as the Apia Convention, it entered into force during 1990. The Convention is coordinated by the South Pacific Commission and represents the first attempt within the region to cooperate on environmental matters. Among other measures, it encourages the creation of protected areas to preserve indigenous flora and fauna.

Papua New Guinea is also party to the South Pacific Regional Environment Programme (SPREP) and has signed (3 November 1987) and ratified (15 September 1989) the 1986 Convention for the Protection of the Natural Resources and Environment of the South Pacific Region (SPREP Convention). The Convention entered into force during August 1990. Article 14 calls upon the parties to take all appropriate measures to protect rare or fragile ecosystems and threatened or endangered flora and fauna through the establishment of protected areas and the regulation of activities likely to have an adverse effect on the species, ecosystems and biological processes being protected. However, as this provision only applies to the Convention area, which by definition is open ocean, it is most likely to assist with the establishment of marine reserves and the conservation of marine species.

Other international and regional conventions concerning environmental protection to which Papua New Guinea is party are reviewed by Venkatesh *et al.* (1983).

Administration and Management The Department of Environment and Conservation, headed by a Secretary and with its own Ministry, was originally established in 1974 as the Office of Environment and Conservation, Department of Lands, Surveys and Mines. It successively passed through the departments of Natural Resources, Lands, National Mapping & Environment, Lands, Surveys & Environment, and Physical Planning & Environment before being upgraded to departmental status in 1985. The constitutional basis for the existence and operations of the Department of Environment and Conservation is the Fourth Goal of the National Constitution. The Department is divided into four main divisions: Environment, Nature Conservation, Water Resources and Management Services (DEC, 1988).

Administration of acts directly concerned with protected areas, i.e. Fauna (Protection and Control), Conservation Areas, National Parks, is the responsibility of the Nature Conservation Division, which comprises three branches: Conservation Surveys, National Parks, and Wildlife Conservation (DEC, 1988). Under the National Parks Act, 1982 the First Assistant Secretary of the National Parks Service is responsible for the administration and management of national parks, marine national parks,

provincial parks, historical sites, nature reserves, national walking tracks and other protected areas. This differs from the previous Act whereby powers were assigned to a National Parks Board (Eaton, 1985; SPREP, 1985b). The National Parks Service internal revenue, collected from park entrance fees, totals some K 30,000 (approximately US\$ 35,300). Wildlife management areas, which are declared by the Minister for Environment and Conservation under the Fauna (Protection and Control) Act, are managed by the landowners themselves, who are also responsible for making the rules (SPREP, 1985b; Eaton, 1986).

Systems Reviews Papua New Guinea lies between the Equator and latitude 12°S and between longitudes 141°E and 164°E. It comprises the eastern half of New Guinea and includes the Bismarck Archipelago (principally New Britain, New Ireland, New Hanover and Manus), d'Entrecasteaux Islands, the Louisiade Archipelago and the North Solomon islands of Bougainville and Buka. The western half of New Guinea forms the Indonesian province of Irian Jaya.

Forest of some sort, including successional forest, covers 71% (328,617 sq. km) of mainland Papua New Guinea. Undisturbed rain forest constitutes 65% (300,847 sq. km) of the total area and man-disturbed lands (grassland, gardens, degraded forest, plantation) some 20% (92,568 sq. km) (Beehler, 1985). Summary estimates for 1990 indicate natural forest cover of 78% (361,250 sq. km), including 420 sq. km of forest plantation (FAO, 1987). Discrepancies between the two sets of data can probably be ascribed to different definitions of forests, and different survey and analytical techniques. Approximately 20% of the total land area of Papua New Guinea is currently used for agriculture and 10%, or 46,000 sq. km, is under intensive cultivation (Freyne and McAlpine, 1985). An account of the forests, the threats to them and maps depicting current distribution is given in Collins *et al.* (1991).

The following description of the vegetation, based on Johns (1982) and an unpublished account by M.D.F. Udvardy reflects marked altitudinal zonation. A fringe of mangrove occurs along much of the coastline. Inland, swamps are extensive and covered by high forest with screw "palm" *Pandanus* and sago palm *Metroxylon sagu* forming a lower canopy. On drier land, mixed lowland rain forest is widespread and comprises complex communities, with epiphytes, orchids, tree and ground ferns. In contrast to rain forests elsewhere in Malesia, dipterocarp species are poorly represented. Throughout the lowlands, rain forests have been extensively destroyed or modified by shifting agriculture. Few areas of rain forest have escaped some form of cataclysmic destruction over the past 200-300 years (Johns, 1982). Areas having a markedly seasonal climate support monsoon forest which is characterised by the presence of a number of species that remain leafless for prolonged periods. Savanna vegetation, a degraded form of monsoon forest, occurs in areas receiving an annual rainfall of less than 1000-1300mm.

Dominated by *Eucalyptus* spp., it is quite distinct from lowland alluvial plains vegetation elsewhere in Papua New Guinea and resembles that of northern Australia.

Above 700m coniferous trees appear in the rain forest. Various altitudinally overlapping forest types can be distinguished within the montane zone, which usually extends from 700m to 2,700-3,000m. The upper montane forest, which may extend to 3,300m, is a cloud forest, with 10-25m tall moss-covered trees and a dense understorey. In the subalpine zone, the "high mountain forest" has a closed canopy at about 10m, with moss carpeting the forest floor. Ericaceous (heather family) shrubs supplant the forest near its upper limit at 3,800-4,100m, and are in turn replaced by grasslands, tarns and bogs (Smith, 1982). These are supplanted by tundra, which extends from about 4,400m to 4,700m. With the possible exception of the montane grasslands around Henganofi, all grasslands below 3,000m probably originate from a combination of agriculture and firing. The vegetation of the various island groups is mainly lowland rain forest, and at higher elevation, montane rain forest. The enclaves of grasslands and savannas are likely to be anthropogenous.

The various types of wetlands are described by Paijmans (1976) and Scott (1989), the latter providing detailed accounts of 33 wetland sites. Among the most extensive are mangrove swamps which occupy large parts of the coastal areas of Papua New Guinea, predominantly along protected bays and near the mouths of rivers. The largest expanses are in the south, notably in the Gulf of Papua with 162,000-200,000ha of mangroves. The north coast is not as rich in mangroves as the south coast.

The coral reefs of Papua New Guinea are virtually pristine compared to those of many countries, although they are coming under increasing threat from higher siltation and effluent loads in coastal areas and from commercial exploitation (UNEP/IUCN, 1988). The total area of reefs and associated shallow water to depths of 30m or less is estimated to be 40,000 sq. km (Wright and Kurtama, 1987; Wright and Richards, 1985), with the greatest concentration (12,870 sq. km) lying off Milne Bay Province (Dalzell and Wright, 1986).

The present protected areas system is very inadequate, particularly for a country of such biological importance as Papua New Guinea. Together with the rest of New Guinea, it ranks third in importance to Lord Howe and New Caledonia among 226 Oceanic islands of particular conservation interest (Dahl, 1986). The other islands within Papua New Guinea that fall within the top 12 most important Oceanic islands for conservation are New Britain, Goodenough, and Bougainville in descending order.

Although Dahl (1986) assesses the conservation importance of the different islands within Papua New Guinea and the extent of protected areas coverage, gaps in the protected areas system are not highlighted at national level. Previously (Dahl, 1980), an attempt was

made to identify whether the various habitat types within Papua New Guinea are conserved within protected areas, but this review no longer reflects the present situation because many protected areas (notably wildlife management areas) have since been established.

It is instructive to compare the existing network of protected areas with that proposed by Diamond (1976). This proposed system, although more extensive, is largely analogous to a scheme earlier outlined by Specht *et al.* (1974) in which areas of habitat that might be expected to incorporate an almost complete range of biogeographical and ecological patterns are defined. The majority of existing protected areas lie outside the 22 areas of conservation importance identified by Diamond (1976); moreover, most of these conservation areas are not even represented in the protected areas network.

The protected areas network proposed by Diamond (1976) is based largely on bird distributions because these have been studied in most detail. (Available information suggests that fairly similar patterns hold for other animals and for plants.) Less ambitious and focused principally on conserving birds of paradise and their rain forest habitat throughout New Guinea is a 4,882 sq. km system of eight reserves proposed by Beehler (1985). Similarly, Parsons (1983) has proposed the establishment of a network of 20 reserves to meet the conservation requirements of birdwing butterflies. Many of these proposed sites coincide or overlap with those recommended under the schemes already discussed.

An action strategy for protected areas in the South Pacific Region has already been launched (SPREP, 1985a). Principal goals of the strategy cover conservation education, conservation policies, establishment of protected areas, effective protected areas management, and regional and international cooperation. Priority recommendations for Papua New Guinea are as follows: review conservation legislation; develop public awareness programmes in environmental education; review administrative structures to effect efficient implementation of environmental and conservation policies; review "protected areas register"; draw up a list of endangered species of plants and animals; review the effectiveness of the current system of protected areas; undertake a comprehensive survey of terrestrial and marine ecosystems and design a representative system of protected areas; secure assistance and support for the preparation of management plans for Mt Wilhelm National Park, McAdam National Park and Mt Gahavisuka Provincial Park; and develop a national conservation strategy. The outline of an environmental management programme for sustainable developed has been compiled (Kula, 1989), including a timetable for its implementation by 1992. However, the degree of progress with this programme is not known.

Of paramount importance is the need to develop a national conservation plan and identify priorities for the establishment of a comprehensive protected areas

network. Not only are more protected areas required to conserve the great diversity of life on the mainland, but attention should also be directed towards developing the network on other large islands such as New Britain, New Ireland, Manus, Goodenough, Fergusson and Bougainville. Smaller islands with significant levels of endemism, such as Ninigo Islands and Luf (Hermit) Islands, may require priority action, however, because they may be under greater relative human threat (Dahl, 1986). Similarly, marine sites need to be identified and incorporated within the protected areas network (Dahl, 1986; Genolagani, 1984). Preliminary recommendations from the 1989 Tropical Forestry Action Plan donor coordination mission suggest that improvements in the existing protected areas network should receive a higher priority than the establishment of new areas. Twenty protected areas are identified as suitable for rehabilitation under any TFAP operations (Srivastava and Bützler, 1989).

The most significant natural resource problems facing Papua New Guinea are forest depletion, soil loss and soil fertility in the mid-montane valley systems, degradation from large-scale mining and agricultural activities, and exploitation of reef fisheries which are among the richest in the world (ADB, 1987; UNEP, 1987; Viner, 1984). Forests are being destroyed at an estimated rate of 80,000ha per year, commercial logging accounting for some 60,000ha yearly, and shifting cultivation 10,000-20,000ha yearly (ADB, 1987; WEI, 1988). This rate is increasing: in 1981-1985, it is estimated to have been 22,000ha per year (Repetto, 1988). These estimates contrast with the more conservative FAO figure of some 12,000ha deforestation annually, with a further 60,000ha disturbed in some way by logging (FAO, 1987). About 1,000,000ha of former forest have now been converted to grassland as a result of over-intensive shifting agriculture (Collins *et al.*, 1991). Papua New Guinea is relatively free from industrial pollution, except in coastal areas where much of the industry is sited. Considerable environmental damage has also been caused by mining activities, notably those of New Guinea Goldfields near Wau, Bougainville Copper in the Jaba catchment area and Ok Tedi in the Fly River region (ADB, 1987; Hughes, 1989; Viner, 1984; WEI, 1988).

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ANNEX

Definitions of protected area designations, as legislated,
together with authorities responsible for their administration

Title: The National Parks Act

Date: 1982

Brief description: Replaced the amended 1971 Act, which in turn superceded the original National Parks and Gardens Act, 1966.

Administrative authority: Nature Conservation Division, Department of Environment and Conservation

Designation: Not defined

Title: The Conservation Areas Act

Date: 12 September 1978

Brief description: Provides (a) for the preservation of the environment and of the national cultural inheritance by (i) the conservation of sites and areas having particular biological, topographical, geological, historic, scientific or social importance; and (ii) the management of those sites and areas, in accordance with the fourth goals of the National Goals and Directive Principles; and (b) to give effect to those goals and Principles under Section 25 of the Constitution, and (c) to establish a National Conservation Council and (d) for other purposes.

Administrative authority: No information

Designation: No information

NB: The Act awaits implementation due to financial constraints.

Title: Fauna (Protection and Control) Act

Date: 1966

Brief description: Although concerned primarily with the protection of endangered species, the Act provides for the establishment of wildlife management areas (WMAs) on land held under customary ownership, of which there are three categories.

Administrative authority: The Act provides for the setting up of wildlife management committees, thereby involving customary land-owners in the control of wildlife resource exploitation. The committees advise on the provision of specific rules for each area for "the protection, propagation, encouragement, management, control, harvesting and destruction of fauna".

Designation:

Wildlife management area

- Category I WMAs are either terrestrial or marine areas reserved at the landowner's request for the conservation and controlled utilisation of all wildlife and habitat.
- Category II WMAs (sometimes referred to as "protected areas") are areas where only specific named species are protected.
- Category III WMAs (or "sanctuaries") are areas where most resources, excluding specific named animal species, are fully protected.

SUMMARY OF PROTECTED AREAS

Map [†] ref.	National/international designation Name of area	IUCN management category	Area (ha)	Year notified
	<i>National Parks</i>			
1	Jimi Valley	II	4,180	1986
3	McAdam	II	2,080	1970
5	Varirata	II	1,063	1969
	<i>Nature Reserve</i>			
7	Talele Islands (Bismarck Archipelago)	IV	40	1973
	<i>Wildlife Management Areas (Categories I to III)</i>			
13	Bagiai (I)	VIII	13,760	1977
14	Balek (III)	IV	470	1977
15	Baniara Island (II)	VIII	15	1975
16	Crown Island (III)	IV	5,969	1977
17	Garu (I)	VIII	8,700	1976
18	Iomare (I)	VIII	3,837	1987
19	Lake Lavu (I)	VIII	2,640	1981
20	Long Island (III)	IV	15,724	1977
21	Maza (I)	VIII	184,230	1978
22	Mojirau (I)	VIII	5,079	1978
23	Ndrolowa (I)	VIII	5,850	1985
24	Neiru (I)	VIII	3,984	1987
25	Nuserang (I)	VIII	22	1986
26	Oia-Mada Wa'a (I)	VIII	22,840	1981
27	Pirung (I)	VIII	44,240	1989
28	Pokili (I)	VIII	9,840	1975
29	Ranba (I)	VIII	41,922	1977
30	Sawataetae (I)	VIII	700	1977
31	Siwi Utame (I)	VIII	12,540	1977
32	Tonda (I)	VIII	590,000	1975
33	Zo-Oimaga (I)	VIII	1,488	1981
	<i>Provincial Parks</i>			
35	Nanuk Island	IV	12	1973
36	Talele Islands	IV	40	1973

[†]Locations of some protected areas are shown on the accompanying map.

Protected Areas of Papua New Guinea

