

Country Report for UNCED

Vanuatu

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Foreword

Human needs and desires demand economic development. Natural resources provide the physical basis for that development. But ever more evidence accumulates to show that human actions, whether through carelessness or through the necessity for development, are causing environmental degradation and resource depletion. This deterioration makes continued economic development more difficult both because damage to resources makes them less productive of economic goods and because funding and human effort must be diverted from development toward coping with environmental deterioration. In this situation there has come to be worldwide recognition that more attention must be given to keeping the environment healthy over the long term and to building safeguards into the development process to protect natural resources.

In other words, the goal is to achieve "sustainable development" so that our present-day needs can be met without damaging the capacity of resources and the environment to meet human needs far into the future. To make this goal central to economic policy and to development implementation everywhere in the world, the United Nations General Assembly called for the convening of the United Nations Conference on Environment and Development (UNCED), which will take place in Rio de Janeiro, Brazil, in June 1992. As part of the preparations for UNCED, each UN Member State is preparing a National Report that is to reflect national experiences and perspectives on environment and development.

At the Inter-government Meeting of the South Pacific Regional Environment Programme (SPREP) held at Noumea on 24-28 September 1990, the member countries reached a consensus on the importance of the United Nations Conference on Environment and Development (UNCED). In order to ensure that the particular priorities and the requirements for achieving sustainable development in the Pacific Island Developing Countries (PIDCs) will be clearly heard in Brazil, SPREP, with funding from the Asian Development Bank and the United Nations Development Programme, has provided technical assistance for the preparation of National Reports for UNCED by PIDCs. The following document is the UNCED National Report for Vanuatu. It is based upon relevant documents and upon

consultation with public servants, aid-funded advisors, members of NGOs, staff of ORSTOM, businessmen, educators, and others in the Vanuatu community. Earlier drafts of the National Report for Vanuatu have been considered at two meetings of an in-country UNCED Task Force, and the Report has been modified in the light of the oral and written comments made by members of the Task Force, who are listed in paragraph 4.3 of the Report. At its final meeting, on 26 July 1991, the Task Force recommended that the Report, following emendment, be submitted to the National Development Committee for endorsement.

The Report's format is based on guidelines provided by SPREP for all PIDC National Reports. The uniformity of the PIDC National Reports is intended to facilitate the preparation of the South Pacific Regional Report for UNCED. SPREP will coordinate the preparation of the Regional Report, which will be based on country-level concerns and aspirations as expressed in the National Reports.

The UNCED National Report is not intended to be a detailed description of how to implement sustainable development in Vanuatu. Rather, it is a first broad look at Vanuatu's situation with regard to sustainable development and at the country's aspirations and constraints in connection with sustainable use of resources and the environment. The UNCED Report can be seen as a step in the development of the Vanuatu National Conservation Strategy, which is now under preparation in the Environment Section of the Ministry of Home Affairs. When it is completed, the National Conservation Strategy will spell out in detail the means whereby the country hopes to achieve sustainable development.

VANUATU

NATIONAL REPORT FOR UNCED

Synopsis of Contents

1. DEVELOPMENT TRENDS AND ENVIRONMENTAL CONSEQUENCES

A. Natural-Resource Endowment and Development

The Republic of Vanuatu spreads across a group of volcanically active islands in the cyclone-prone, tropical southwestern Pacific Ocean. Vanuatu's population numbers about 150,000 persons, most of whom are indigenous Melanesians. Eighty two per cent of the population is rural, living in small villages scattered over about 67 occupied islands. (Paragraphs 1.1 - 1.3)

Initial settlement began three or four thousand years ago, leading to an elaboration of indigenous languages, cultures, and agricultural systems. Following occupation by British, Australian, and French planters and traders in the 19th century, European colonial rivalry resulted in the formation of a unique colonial administration, the joint Anglo-French Condominium of the New Hebrides, established in 1906. The plantation economy expanded, with copra as the major product, and coffee and cocoa as minor products. Other contributors to the economy after World War II were a tuna-fishing base and a manganese mine. The country gained independence in 1980. (1.4 - 1.9)

Vanuatu has abundant agricultural land per capita on the average but local areas of comparatively high population densities so that expansion of commercial agriculture would take land needed for subsistence production. About a third of the arable land is in use. The 185 plantations produce coconuts, coffee, cocoa, and cattle. Smallholders and village people practice a varied agriculture, with subsistence gardening of tropical root crops on the one side, and smallholder cash cropping and cattle farming on the other. Indigenous systems of agroforestry are highly developed. (1.10 -1.19)

About 75 per cent of the country's land is under natural forest, but damage from frequent cyclones limits the commercial value of the timber resource. Small logging companies operate now, but clearing for agriculture and pasture is a greater cause of forest loss. Plantations of exotic trees are being established. By Pacific-island standards, Vanuatu's flora and fauna does not have a great

bio-diversity rich in endemics. Some of its coral reefs have exceptional aesthetic appeal. Nearshore, reef-slope, and pelagic EEZ (which contains stocks of tuna) are all fished at generally moderate levels. The saltwater crocodile is rare in Vanuatu, but the dugong population appears safe. There are no mines operating now; potential exists for development of manganese, gold, and undersea oil. The modern sector depends on imported fuel; the development of a small hydro-electric installation is under study; and the potential of geothermal and wave energy is being investigated. (1.20 - 1.31)

B. Economy

Vanuatu's small economy provides urban dwellers and expatriates with much higher incomes than those received by rural workers. The economy rests on agricultural exports, tourism, and a finance/tax haven centre. GDP in 1987 was 135 million US\$. Imports of a wide range of goods have a value about 4 times larger than export receipts. The trade deficit is largely balanced by foreign aid, and the country has a very small external debt. (1.32 - 1.39)

C. Demographic Trends

The ni-Vanuatu (indigenous people) population grew at 2.8 per cent per year from 1979 to 1989. Heavy rural-urban migration led to an urban ni-Vanuatu population growth of 7.5 per cent per year over the same period. In 1990, the Government initiated procedures to establish a formal population policy. (1.40 - 1.44)

D. Natural-Resource and Environmental Issues

Widespread environmental degradation is not yet severe, but potentially serious problems threaten. The country has the opportunity to take preventive action before remedial action is required. Environmental issues include the impact of the land-tenure system on environmental management, localized population pressure and high national population growth rate, damage to ocean or reef resources, sea-level rise, soil erosion, loss of forest and associated bio-diversity, falling soil fertility in the subsistence sector, pasture degradation, water pollution, waste disposal, rapid urbanization, and depletion of trochus shells, coconut crabs and the mangrove resource. (1.45 - 1.67)

2. RESPONSES TO ENVIRONMENT/DEVELOPMENT ISSUES

A. Government Policies and Legislation

Vanuatu's Constitution and Second Development Plan set out obligations and objectives with regard to protection of the country's natural resources and environment. Vanuatu is a party to CITES but not yet to the SPREP Convention or the Apia Convention. A recent thorough review of environmental law indicates the emendments needed to achieve a comprehensive coverage. Departments are working on the needed legislation. (2.1 - 2.5)

B. Institutional Developments

An Environment Section was established in 1986. It has prepared EIA guidelines, carried out wildlife surveys, worked on environmental education, and organised a conference on resources, development, and environment. Its major task now is preparation of a National Conservation Strategy. An inter-departmental National Advisory Committee on Environment was formed in 1987 but has not yet established effective liaison with the planning process. (2.6 - 2.8)

C. Specific Programmes and Projects

The Forest Resource Information System, an environmental data base to become operational in 1992, will offer a useful tool for planning sustainable development. Other significant projects are initiatives to set up protected zones, rehabilitation of degraded pastures, and trials to develop sustainable systems of food cropping. (2.9 - 2.15)

D. Training, Education, NGOs, and Public Awareness

Work is in progress on environmental training and education. Several NGOs work in the environmental field. Environmental awareness is increasing in the country. (2.16 - 2.20)

E. Private-Sector Initiatives

Private-sector gestures toward environmental management include the tourist industry's concern to maintain an attractive natural environment, a proposal for an appropriately scaled tourism development, and the cattle industry's rehabilitation of degraded pastures. Ecotourism offers potential for environmental management. (2.21 - 2.22)

3. PLANNING FOR SUSTAINABLE DEVELOPMENT

A. Prioritizing Sustainability Issues

The imperative of economic development overshadows the concept of sustainability in Vanuatu, but steps toward conservation and environmental management are in train. Analysis of the several, interacting environmental issues suggests three general guidelines for environmental management in Vanuatu:

- control the rate of use or enhance the stock of renewable resources so that replenishment equals or exceeds withdrawal;
- modify agricultural and logging practices to enhance the environment and maintain resource quality; and
- intensify land use so that further expansion into forest and marginal land is slowed or stopped.
(3.1 - 3.7)

A national population policy is necessary to achieve sustainability goals. Resettlement could help to adjust uneven population densities -- but only temporarily. (3.8-3.9)

Preparation of the Vanuatu National Conservation Strategy will include wide consultation within Vanuatu about how the country can achieve its objectives for sustainable development. (3.10)

B. Constraints to Sustainable Use of Resources and Environment

Constraints to sustainable use of resources and environment include lack of information about some resources and the rate of their use, shortage of trained staff, lack of recurrent funding, short-term aid projects, low commodity prices, aspects of land tenure, commercial intrusions into the subsistence sector, ad hoc management decisions, and weaknesses in environmental enforcement, monitoring, planning, and legislation. (3.11 - 3.20)

C. Opportunities for Sustainable Development

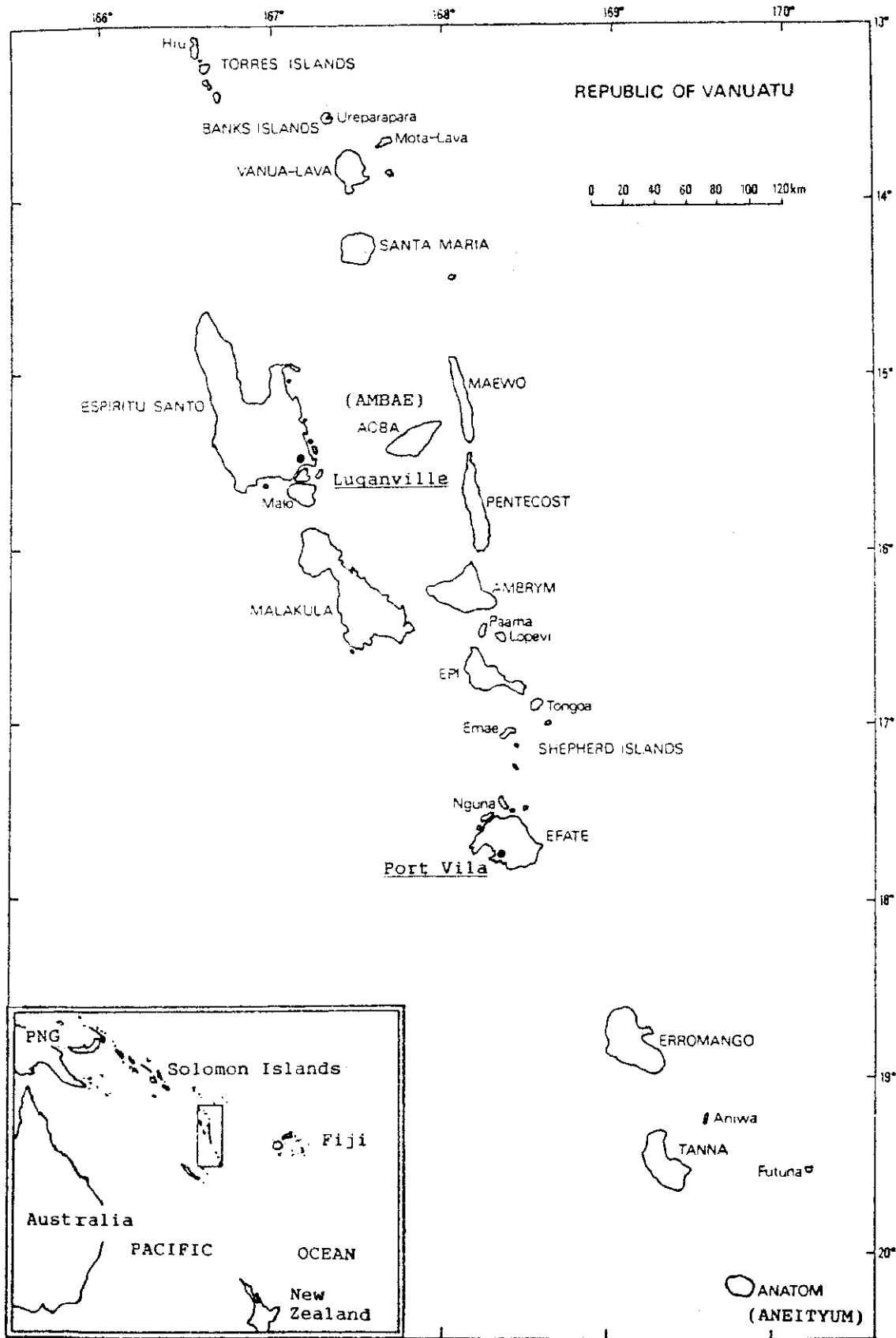
Opportunities for sustainable development include taking advantage of the present low levels of degradation and depletion, incorporating the tourist industry's environmental concerns into economic development and legislation,

strengthening the mechanism for environmental safeguards in land leases, investigating ways to lengthen the life span of aid-funded environmental projects, and making fuller use in environmental management of

- (1) the value assigned to custom and
- (2) the useful agricultural and agroforestry techniques known and practiced traditionally in the country.

The emphasis on conservation planning in local communities as part of the Vanuatu National Conservation Strategy should set a precedent for the integration of local-level planning with regional and national land-use planning for sustainable development. (3.21 - 3.26)

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Chapter 1

DEVELOPMENT TRENDS AND ENVIRONMENTAL CONSEQUENCES

A. Natural-Resource Endowment and Development

Geographical and Historical Setting

1.1. The total land area of the Republic of Vanuatu amounts to 12,190 square kilometres, divided among some 80 islands set in an EEZ of 710,000 square kilometres of the tropical southwest Pacific Ocean. Of the country's 142,944 inhabitants (1989 census), most are ni-Vanuatu (indigenous Melanesians). Eighty-two per cent of population are rural, living in small villages; the only two towns are Luganville, with 6983 people, on the island of Santo, and Port Vila, the capital, with 19,311 people, on the island of Efate.

1.2. The islands of Vanuatu are situated on the tectonically active edge of the Pacific plate, just to the east of the New Hebrides trench. Geologically young, the islands are mostly mountainous and volcanic, with some raised reef islands and a few low coral islands and reefs. Volcanoes are active on five islands; volcanic eruptions and the acid rains that sometimes accompany them pose threats to forests, settlements, and crops. Earthquakes are common, and recent fault movements have produced changes of shoreline elevations of up to two metres. Destructive tsunami, or tidal waves, occur occasionally.

1.3. Vanuatu's tropical climate is marked by mean annual temperatures ranging from lows of 20-23 degrees C to highs of 27-29 degrees C. Average annual rainfall declines from over 4000 mm in the north to less than 1500 mm in the south. On high islands, rainfall varies according to elevation and windward or leeward location in respect to the predominant southeast trade winds. The high sea-surface temperatures and normally low atmospheric pressure in the region surrounding Vanuatu are favourable to the formation of tropical cyclones, which strike Vanuatu's islands on the average of two times each season, bringing destructive winds, torrential rains, and storm surges. Cyclone Uma in 1987 was the strongest recent storm, causing an estimated \$40 million in damage, particularly to the infrastructure of the Port Vila area.

Particularly severe cyclones can be expected every few decades or less, and global warming may increase the storms' intensity or frequency or both. When the conditions of the El Nino Southern Oscillation (ENSO) prevail, the changed patterns of rainfall and atmospheric pressure that are part of ENSO may bring periods of drought to Vanuatu.

1.4. The first human settlement of Vanuatu occurred about 4000 years ago. The early settlers brought the southeast Asian crops of yams and taro, which remain important staple foods; they also introduced a variety of other crops, useful trees, and the domesticated pig. During the initial centuries of settlement, there is evidence of environmental degradation in the form of massive soil erosion on slopes, presumably the result of forest clearing and gardening by the early subsistence gardeners. The gardeners solved the problems brought by this degradation by developing soil-protecting orchards made up of many kinds of food- and material-producing trees together with elaborate systems of irrigated taro cultivation that enabled sustainable, high-yielding, food production.¹

1.5. Prior to the coming of Europeans, the indigenous inhabitants of Vanuatu came to have wide variations in culture and language. More than 100 separate indigenous languages are still spoken in Vanuatu, a distinct language on the average for every 1400 people, among the highest language densities in the world.² Into these islands of variety the first Spanish ships came in 1606 but left no permanent settlement. It was 162 years before another European ship appeared, led by the Frenchman Louis Antoine de Bougainville. This contact too left little mark, but the much more thorough explorations of the archipelago by James Cook shortly afterwards in 1774 were marred by killings on the island of Erromango. The islands were named the New Hebrides by Cook, who clearly mapped them and much of the rest of the Pacific, thus opening the region to entry by Europeans in ever greater numbers. It was not long before the period of European domination and resource exploitation began in the New Hebrides, first of the abundant sandalwood, then of the land for crop production.

¹ See Spriggs under AGRICULTURE in References section.

² Since the coming of Europeans, a common ni-Vanuatu language called Bislama has become the effective national language although many ni-Vanuatu also know English or French.

1.6. During the later 19th century, the location of the New Hebrides between the French sphere of influence in New Caledonia and the British sphere centred in Fiji led to colonial rivalry. As both British (or Australian) and French settlers, trading companies, and missionaries moved into the New Hebrides in increasing numbers, their demands to their respective colonial authorities for protection and official recognition of land claims grew, leading to a bizarre compromise: the formation in 1906 of a joint Anglo-French Condominium of the New Hebrides. This shaky joint administration with its competitive and wasteful duplication of services such as education and health survived for 74 years until 1980, when the New Hebrides became an independent country named Vanuatu.

1.7. The plantation-based economy that had begun in the 19th century expanded during the Condominium, based particularly on copra produced in the extensive coconut plantations established on most level coastal areas. Coffee, cocoa, and, decreasingly, cotton were also grown. Ni-Vanuatu participated initially only as plantation labourers, but gradually also entered small-scale copra production. Complaints by French planters about a shortage of reliable labour led the French arm of the administration to initiate the importation of Vietnamese as labourers in 1923.³ Production languished during the low prices of the world depression in the 1930s, and the joint administration had almost no funds for development of the colony. During World War II, the American military forces carried out massive construction of roads, wharves, airstrips, and buildings, creating the basis for much of the present-day infrastructure. After World War II, conditions gradually improved as both British and French administrations slowly strengthened their medical and educational services -- a beneficial contribution that also left the legacy of a dual system of services that later had to be co-ordinated and simplified by the independent government.

1.8. Improved health services led to an increase in population, which had suffered a decline during the 19th century. By 1950, population reached 55,500, about 37 per cent of today's population. The export economy continued to be dominated by copra, which accounted for 80 per cent of exports in 1965; minor contributors to the economy at that time were a tuna-fishing base on Santo and a manganese mine on Efate, neither of which are presently in operation. The

³ Most of the Vietnamese returned to their home country in the 1960s.

1970s were a decade of political preoccupations, with the greatest natural-resource issue having to do with the tension over the future of land ownership as the New Hebrides moved toward independence.

1.9. Following Independence in 1980, the new Government of Vanuatu was faced with the urgent task of replacing colonial structures and procedures with more appropriate institutions of its own. Starting with the very low level of development left behind by the colonialists, the Government saw that achieving economic development and self-reliance was to be a long-term task, based on diversifying, strengthening, and expanding the productive economic base. Aside from the income gained from Vanuatu's status as a finance centre and tax haven, economic development was focussed on the nation's natural resources, of which agricultural land was the most immediately available for development.

Agricultural Land

1.10. Vanuatu has an average population density of 12 persons per square km, demonstrating that the density is low compared with much of the world -- although it is slightly higher than the density of any other Melanesian country except Fiji. That 18 per cent of Vanuatu's population is concentrated in the two urban areas of Port Vila and Luganville reduces the average rural density to about 10 persons per square km. Turning to the statistic of density per unit of arable land would provide more useful information except that

- (1) the two most recent surveys of agricultural land⁴ on Vanuatu differ (partly because of varying definitions) as to how much arable land there is and how much is under cultivation, and
- (2) in a nation of eighty islands where there is no freehold land, each island must be treated as a separate unit.⁵

⁴ See Quantin (1982) for the ORSTOM study of agronomic potential and land use in Vanuatu. For the Agricultural Census of 1983/1984 see National Planning and Statistics Office (1986). Both listings are under AGRICULTURE.

⁵ Dahl (1988: 10-12, 15-16), under NATIONAL CONSERVATION STRATEGY, discusses these matters.

Aside from some small islands that have quite high densities but that are principally residential areas for people who have gardens and land on neighbouring larger islands, the islands with population densities that are of concern to rural planners as well as residents are Mere Lava (65 persons/km²), Paama (37 persons/km²), Tongoa (52 persons/km²), and Tanna (27 persons/km²) -- islands whose inhabitants do not have access to land by customary right on neighbouring less densely settled islands.⁶ These densities are low compared with parts of the world but are high within the Vanuatu framework, where both subsistence agriculture (largely shifting cultivation requiring long-term fallow) and commercial agriculture are land-extensive systems. It follows that land shortage is possible under these densities, and that the land in use can be subject to degradation if pressed under the present system of low agricultural inputs.

1.11 Many islands already require for food production all land that would be suitable for commercial agriculture. Any expansion of commercial agriculture on these islands will take land away from subsistence production, reduce self-sufficiency, and might increase malnutrition. Population pressure alone, even without the pressures of commercial agriculture, will encourage the agricultural use of marginal lands (erosion-prone, steeper slopes) that may result in damage to water supplies and sedimentation of valuable reefs. People on the land-short islands will need to find alternative sources of cash income.

1.12. On the other hand, there are large islands with very low densities, for example, Erromango with about 2 persons/km² and Santo with about 5 persons/km². To many people, the "dark bush" on such islands seems ripe for development, whether by formal project or by small-scale intrusion following logging. So long as such lands exist, there will be a tendency for further extension of agriculture or livestock onto newly cleared lands rather than the rehabilitation of degraded lands or the replanting of senile coconut plantations. However, the aid-funded Vanuatu Pasture Improvement Project has shown that rehabilitation of degraded pasture can be a more cost-effective choice than pioneering into bush. Cattle farmers are now becoming convinced of its comparative benefits (paragraph 2.14).

⁶ Figures from 1979 census. See Bedford (1989) under POPULATION

1.13. Vanuatu's present population densities are well below any theoretical upper limit to its carrying capacity. But carrying capacity is never an absolute number; it depends on management techniques and on definitions of what constitutes damage to land. What can be said is that land use in Vanuatu is undergoing fairly rapid change at present, particularly in the form of a transformation of forest to pasture, garden, small-holder coconuts, or scrub. Large-scale projects and commercial logging caused or are causing part of this transformation, but it may be that small-scale clearing on an unplanned basis is more significant. An aggregate land statistic shows the trend: if 41 per cent of Vanuatu is cultivable,⁷ then between 1979 and 1989 the cultivable land per rural household declined from 26 ha to 22 ha.

Use of Agricultural Land

1.14. In addition to the 1983-84 agricultural census and Quantin's ORSTOM survey published in 1982,⁸ several other sources provide information on one or another aspect of agriculture up to 1990. Much of the information in these sources will become outdated when the National Forest Resource Inventory is completed in 1992. This inventory will provide a database for natural-resources planning for the whole of Vanuatu, not just the forest areas. (See paragraph 2.11 for further discussion of the National Forest Resource Inventory.) Consequently, only the general pattern of land use as it is now or was in the recent past will be presented, together with brief comments on current or recent changes.

1.15 Plantations. The number of plantations operating in Vanuatu in 1991 is 185 (compared with 160 in 1983). The figure given in Table 1.1. for land in use in plantations represents only 56 per cent of the land actually held in plantation leases in 1983. The proportion in use will have risen because of efforts to rehabilitate land left untended following the exodus of European settlers near the time of Independence. In 1988, 69 per cent of plantations were on either Efate or Santo (including the closely adjacent small islands of Malo and Aore). This spatial concentration of plantations was lessened by the establishment of a Commonwealth Development Corporation (CDC) cocoa plantation on 3,500 ha of previously uncleared land on Malakula and the initial development of a CDC coffee plantation on Tanna in 1985. Nearly all land in use by plantations is used for

⁷ The estimate provided by both references is cited in Footnote 4.

⁸ See under AGRICULTURE in References section.

grazing cattle, whether or not tree crops are also grown. In 1988 coconuts were found on 84 per cent of plantations but only slightly more than half the plantations produced any copra -- in the aggregate 32 per cent of national production. Plantation production of cocoa amounted to 18 per cent of national production in 1987, but will rise as the CDC plantation comes on stream. In 1987, plantation coffee covered only 522 ha, an area now increasing because of the CDC plantation on Tanna. As Vanuatu entered its era of independence, all three of these major plantation tree crops were marked by the old age of their trees (for example, 64 per cent of the coconuts over 50 years of age), which has meant that increases in productivity per ha or total production could come from replanting and revitalization of land already in use rather than from clearing new plantation lands from forest.

TABLE 1.1. SUMMARY OF LAND IN USE IN HECTARES (1983-84)

Plantations	48,530
Smallholdings	76,220
Gardens	4,708
Garden Fallow	14,767
TOTAL	<u>144,225*</u>

* The figure of 144,225 ha, or 1440 square km, about 12 per cent of Vanuatu's total land, indicates that less than a quarter of the potential arable land of the country was in use when the 1983-84 census was taken. It can be assumed that the amount of land in use has now increased, although a 1988 survey provided an estimate of 45,154 ha of plantation land in use, a decline of 7 per cent from 1983.

(Source: National Planning and Statistics Office, 1986, under AGRICULTURE in References section)

1.16. Smallholder Cropping. Table 1.1. shows that smallholdings are important spatially in Vanuatu. They are also important economically in that most of the 22,740 households that make up the rural population depend on agriculture as a source of income as well as of food. Almost all smallholders own and continue to plant coconuts, the copra from which provides the main source of rural income. The smallholder section now accounts for over 70 per cent of national copra production. Coconuts also play a valuable role

in the subsistence economy, with an estimated 15 coconuts used per household per day for both human and animal food. About one-third of the cocoa grown is on smallholdings on Malakula, Santo, Ambae, and Pentecost. The Cocoa Development Project encourages the planting of improved varieties, and the Metenesel Cocoa Estate established on Malakula in 1983 now has about 500 ha under cocoa. Smallholders in the area are extending or initiating their own cocoa with planting material from the estate. A smallholder cash crop that has developed in Vanuatu since Independence is kava (Piper methysticum), a plant used to make a psychoactive drink that was important ritually in traditional Vanuatu and has now gained markets as a pharmaceutical export product and as a social drink sold in kava bars in Port Vila and Luganville. The 1989 Smallholder Survey shows 56 per cent of rural households to be kava growers, with an average of 314 plants per household, or about 3,873 ha under kava in 1989, an increase of 24 per cent since 1984. Pepper and coffee are also grown as cash crops by smallholders but in small amounts. A coffee development project has been established on the island of Tanna to raise Vanuatu's coffee production as well as its quality (by growing the arabica variety). This project combined with completion of an EC-funded coffee-processing plant on Tanna may raise production on that island back towards the 932 tonnes of coffee produced in 1939. Urbanization on Efate and Santo offer ever greater markets for locally produced fruits and vegetables from gardeners with access to the urban centres.

1.17. Smallholder Cattle. Smallholders' cattle herds increased by 7 per cent a year from 1985 to 1989. By 1989 the smallholder herd was estimated to be about 48,000 head, an average of 2 beasts per rural household. The distribution is uneven; smallholders on Santo accounted for 42 per cent of the smallholder cattle herd. There is a high level of bush slaughtering of smallholder cattle for local consumption, but a significant proportion of smallholder beasts move into the commercial stream. This is particularly true on Santo where 42 per cent of the cattle passing through the Santo abattoir came from smallholders in 1990 -- compared with about 18 per cent ten years ago.

1.18 Subsistence Gardens. Detailed information was collected on subsistence gardens during the 1983/1984 Agricultural Census. The average area of land per rural household under productive garden crops was estimated to be 0.22 ha per household, varying from 0.34 in the northern Banks and Torres Islands (the region with the least access to imported foods) to 0.14 ha per household in Efate (the region with the greatest access to imported food). The 1983/1984 survey noted that fallow periods were being shortened, with 19 per cent of gardens on land that had been used during the

previous 4 years, which is a short fallow period for a system of shifting cultivation. The staples crops are yam, taro, cassava (manioc, tapioca), sweet potato, and banana. Other important crops are "island cabbage" (Hibiscus manihot, an indigenous shrub producing edible, nutritious leaves), sugar cane, pineapple, corn, pawpaw (papaya), and a variety of European vegetables. Most households also keep chickens and pigs.⁹

1.19. Subsistence Agroforests. One form of subsistence production that is important in Vanuatu both nutritionally and environmentally but that is hardly ever included in official surveys or censuses are the household gardens and the groves of various trees -- they could also be called orchards or agroforests -- that surround villages. These groves provide shade, erosion protection, a variety of seasonally important foods, and materials for construction, cordage, gums, medicines, perfumes, and so forth. Trees grown include mango, coconut, breadfruit, Tahitian chesnut (Inocarpus fagifer, namambe in Bislama), banana, pawpaw, several species of citrus, oceanic lychee (Pometia pinnata, natau or nandao in Bislama), Malay apple, and several edible fig species native to Vanuatu. The exotic sweetsop and soursop, avocado, guava, tamarind, and a variety of other trees may also make their contributions to the beauty of the surroundings and the variety of the supplementary food supply. Similarly in urban areas, planted and preserved trees have great value, with mangoes, pawpaws, Terminalia catappa (Indian almond, natapoa in Bislama), breadfruit, and other species providing not only a sheltering cover of greenery to the town but also habitats for birds and seasonally varying foods to the town's men, women, and children. Even in environmentally focussed projects, scant attention is paid to the values of the traditional uses of trees.

Forests

1.20 The sandalwood trade was significant on Erromango during the last century. The valuable timber tree kauri (Agathis) was logged heavily during the colonial period. Nonetheless, 75 per cent of Vanuatu remains forested. Much of this forest is of little worth for timber because of frequent

⁹ Paragraphs 1.14 through 1.18 rely heavily on two documents from the National Planning and Statistics Office: (1) Report on the Agricultural Census 1983/1984 and (2) Report on the Smallholder Agricultural Survey 1989, both listed in the References section under AGRICULTURE.

damage by tropical cyclones, but valuable hardwoods remain in Vanuatu's forests, including some stands of Agathis. Several islands (especially Santo, Malekula, Efate, and Erromango) have been subject to logging operations in recent years. Between 1983 and 1989 there were log exports every year, with the smallest annual volume being 4,030 cubic metres (1983) and the largest being 27,184 cubic metres (1984). From 1990, the Vanuatu Government banned the export of unprocessed logs to encourage the development of local industry. Presently, 30 per cent of log production is exported as processed timber, with the remainder used in local construction. In the last few years there has been interest by foreign investors in the establishment of timber-processing industries, and significant investments have been made in veneer plants on both Efate and Santo. On the smaller-scale side of logging, an aid-funded programme has been initiated to supply village peoples with small portable sawmills so that they can meet their own needs for raw materials for construction and furniture. Once the Forest Resource Inventory is completed, the actual timber resource in terms of location, biomass, structure, and floristics will be much better known and more amenable to planning and monitoring at a national scale. Because selective felling rather than clear-cutting is practiced in Vanuatu, in theory a thinned-out forest remains after logging; in fact, damage to non-commercial species may be great, and the invasion of exotic weeds -- particularly the coarse vine Merremia -- make forest recovery slow or impossible. Moreover, tree-felling on Vanuatu often serves primarily for land clearing, in which case all or most trees are deliberately removed.

1.21. Forest plantations were first established in Vanuatu in 1975. About 40 species of local and exotic trees have been planted in trials for uses including timber, veneer, chips, fuelwood, and village forestry. Problems with soil deficiencies and cyclone damage have affected some of the plantations, as on Pentecost, where the project was abandoned because the trees died. Pilot projects are on-going to establish Industrial Forest Plantations on Erromango, Aneityum, and Santo. The commonest species planted has been Cordia alliodora; Pinus caribaea, Agathis macrophylla, and mahogany (Swietenia macrophylla) are also being planted. Replanting or enrichment planting of logged areas is practiced on a small scale, as with milktree (Antiaris toxicaria, an indigenous timber species) on Santo, but the rate of enrichment planting or of natural regeneration of logged natural forest is far less than the rate of felling.¹⁰

¹⁰ See Wood (1990) under FORESTRY and Second National Development Plan 1987 - 1991 under DEVELOPMENT in References section for further information.

Terrestrial Flora and Fauna

1.22. Compared with some Pacific biogeographic regions such as New Caledonia, Vanuatu's flora and fauna are not characterised by notably high levels of diversity or endemism -- that is, the flora and fauna are not unusually rich and, for Pacific archipelagoes, there are not remarkably high numbers of endemic species (types of plants or animals found only in Vanuatu and nowhere else in the world). This comparatively impoverished state results from the islands' geologic youth and the damage inflicted by frequent volcanic and cyclonic activity. Even so, because Vanuatu consists of isolated islands, a considerable range of endemic species have evolved in the country. Not all Vanuatu's endemic species are yet catalogued because the country's flora and fauna are still incompletely known scientifically.

1.23. In his study of ecosystems in the South Pacific, Dahl¹¹ lists 37 distinct biomes or ecosystems for Vanuatu. Nine types of forest and woodland cover the largest area of the country; scrub, grassland, and freshwater or marine ecosystems make up most of the remainder. About 1,000 higher plants have been recorded for Vanuatu. Of these, more than 150 species are endemic to the country, including the kauri Agathis macrophylla. There are at least 158 species of orchids in Vanuatu, including 7 endemics. More than a third of the 71 butterfly species are shared only with Solomon Islands and Papua New Guinea, and 5 are endemic to Vanuatu. The 76 species of land snails include 57 endemics. There are 4 endemic lizards among the 22 reptiles and amphibians. The 53 species of land birds include 7 endemics and many endemic subspecies. Some of the birds fall into the "rare" or "threatened" categories. There are 12 species of bats, one of which is endemic. About one-third of the insects are endemic. The best known invertebrate in Vanuatu would be the coconut crab (Birgus latro). While Vanuatu cannot claim the crab as an endemic, the country is one of the few in which the natural populations of the crab remain large enough to support harvesting. Its current availability as a source of income to some remote areas and its popularity as a gourmet dish in Port Vila restaurants threatens its continued existence as will be discussed further in paragraph 1.63.

¹¹ See Dahl (1980) and other entries in the References section under FLORA AND FAUNA for further details.

Marine-Life Resources

1.24. Vanuatu's coastline is fringed by coral reefs, seagrass beds, and mangrove forests. The country is fortunate to have a recent biological survey of coral reefs and sea grasses which provides inventories of the major groups of plants and animals and information on the condition of reefs and seagrasses throughout the country in March-April 1988.¹² Coral reefs and associated seagrass beds have traditionally provided a harvest of valuable protein for ni-Vanuatu villages but, to date, have been of little importance to the national economy, except for the value of reefs as a general attraction to tourists and as a site for dive-tourism. However, as a recent study notes:

the greatest financial value that fringing coral reefs and seagrass beds provide to Vanuatu may be that of protection and stabilization of coastlines on which they occur. In island nations, such as Vanuatu, the physical protection provided by these ecosystems can be of enormous importance, since the shoreline is very long compared to the total land area, and human populations are mainly concentrated in coastal areas. Degradation of the ecosystems could cause significant loss of land, or lead to costly engineering works to protect property and public utilities close to the shore.¹³

1.25 Vanuatu's coral reefs include many areas of exceptional aesthetic appeal, but neither the corals nor the shallow-water reef fishes are unique to Vanuatu, for they are generally the same as those found on Australia's Great Barrier Reef, and have probably dispersed to Vanuatu through the Solomon Islands. Surveys in the early 1980s indicated that annual catches in and around the reefs amounted to about 1,000 tonnes of fish and 1,400 tonnes (liveweight) of other organisms, mainly shellfish. Most of the catch is used for subsistence, but there is a trade in trochus and green snail shells and beche-de-mer for export. Since Independence the Village Fisheries Development Programme has sought to increase catches by means of training, boat-building, and the

¹² See Done and Navin (1990) under FLORA AND FAUNA in the References section. Further information is available under the same heading from Lal and Esrom (1990); Chambers, Bani, and Barker-Hudson (1989); Chambers and Esrom (1991); Dahl (1980); David (1985); and UNEP/IUCN (1988).

¹³ Done and Navin (1990: 2) under FLORA AND FAUNA

installation of fish aggregating devices (FADs). The 1988 survey found little evidence of significant human-induced disturbance of fish communities on the reefs -- although anecdotal evidence suggests that some areas are fished out. Some species of giant clams are moderately abundant on the reefs, but Tridacna gigas, which was once present, appears to be extinct, and Hippopus hippopus is rare or absent except on reefs far from human habitation, strongly suggesting overcollecting. Four species of marine turtle (loggerhead, green, hawksbill, and leatherback) are present and are exploited for eggs and meat.

1.26. Studies by ORSTOM and the South Pacific Commission in the late 1970s and early 1980s indicated that skipjack and yellowfin tuna are present seasonally in the oceanic waters of Vanuatu's EEZ in concentrations of tens of thousands of tonnes, comparable to those in the waters of other South Pacific countries that have developed pelagic fisheries. Until July 1986 Vanuatu benefitted economically from the operations of a fishing company on the island of Santo. The company landed and transhipped tuna caught by Taiwanese longliners throughout the southern waters of the South Pacific. Changing conditions of the market and of fishing techniques (the greater cost-effectiveness of purse seiners compared with longline fishing) led to a decline in the number of boats operating from Vanuatu until all vessels were transferred to a base in American Samoa. Subsequent attempts by the Vanuatu Government to interest distant-water fishing nations in the country's EEZ have resulted in Vanuatu acquiring a small percentage of the licensing fees under the multilateral fishing agreement between certain Pacific Islands and the U.S.A. Vanuatu also benefits from a bilateral fishing agreement with a Taiwanese fishing association.

1.27. Mangroves are not extensive along Vanuatu's shores, covering altogether only about 2,500 ha, or 0.2 per cent of the total land surface. Except on the island of Malakula, where there is a mangrove area of 1,975 ha, the salt-tolerant trees are found only in small clumps scattered along low-energy coastlines. None of the 12 or 13 species that make up Vanuatu's mangrove flora are endemic. The fauna associated with the mangrove forest is less well known, but 13 species of molluscs and 20 species of crustaceans have been collected from the mangrove habitat, and 42 species of fish have been identified as associated with mangroves. Mangroves are used for fuelwood in nearly villages. The mangrove crab, Scylla serrata, locally known as "busa" or "Caledonia crab", is also harvested. The supply of fish in local waters (and perhaps in deeper waters) depends to at least some extent upon the mangroves, which supply a nursery shelter and large amounts of nutrient detritus to the bottom of the food chain.

1.28. Two large marine-dwelling animals deserve special mention as part of Vanuatu's fauna: the dugong (Dugong dugong) and the estuarine crocodile (Crocodylus porosus).¹⁴ Both animals reach the easternmost extent of their range in Vanuatu and both are endangered or have become locally extinct over much of their total range although sizeable numbers of crocodile are present in northern Australia and Papua New Guinea. In Vanuatu, the crocodile has been reported in the past on several islands in the north of the country but now only from Vanua Lava in the Banks Islands, where the population is believed to have been greatly reduced by a cyclone in 1972 and may now be on the verge of local extinction. Their imminent demise is recognized as a loss of biodiversity from Vanuatu, but there are no plans to build up a breeding stock because the crocodiles are unpopular with the islanders, have no local economic value, and still exist in large numbers to the west in Australia and Papua New Guinea. A survey about the dugong was carried out in 1987 by means of a postal questionnaire and an aerial reconnaissance that covered the country from Tanna in the south to the Torres Islands in the north. The survey showed dugongs distributed throughout Vanuatu, always in seagrass habitats sheltered from the prevailing southeast tradewinds. Although only a few dugongs were found in any particular site and the animals are hunted in parts of Vanuatu, it is not believed that they are becoming rarer.

Mineral Resources

1.29. The only mining enterprise of significance in Vanuatu has been the manganese mine at Forari on the east coast of the island of Efate, where manganese was mined from the late 1950s to 1978, when the operation became uneconomical. At the height of the mining activity, the company village nearby housed about 1,000 people, and there was considerable infrastructure (conveyor belts, jetties, and such) in operation. At the present time there is no mining in the country, but there is active prospecting by two foreign companies on Malakula and Santo for gold, and the manganese mine at Forari may reopen, utilizing both onshore and offshore deposits. Small deposits of manganese are also present on Erromango. Potential for oil and gas exists in the sedimentary basins lying between Santo and Malakula on the west and Maewo and Pentecost on the east. Naturally occurring pozzolana (volcanic ash) is extensive on many islands and has been used as a cement substitute in construction materials. Large areas of raised coral limestone offer a potential

¹⁴ See Chambers, Bani, and Barker-Hudson (1989) and Chambers and Esrom (1991) under FLORA AND FAUNA in the References section.

source of lime for industrial and agricultural purposes. Until recently, sand, gravel, and coral have been removed without control.

Water Resources

1.30. The water supplies of both Port Vila and Luganville are drawn entirely from groundwater. How the rate of infiltration matches the withdrawal is not known. Luganville's supply is already contaminated with faecal material, and uncontrolled house building has begun in Port Vila's water catchment area. Water used in villages depends on several sources: small storage tank or drums, by bucket from streams or water holes, or from a piped supply. The Department of Geology, Mines and Rural Water Supply reports that about 75 per cent of Vanuatu's villages are now supplied with piped water. Supplying the remaining villages will be more difficult because they are mostly in isolated areas difficult of access.

Energy

1.31. Vanuatu is dependent on imports of petroleum products for energy in the modern sector. All electricity is produced from petrol- or diesel-powered generator sets except for a few minor solar PV installations. Wood remains the principal energy source in rural areas for cooking and copra drying. Geothermal generation of electricity is presently being evaluated at a site in northern Efate, and a Japanese-designed hydro-electricity plant is to be established on the Sarakata River near Luganville. Wind and waves have been considered as alternative sources of energy. Wind energy is not regarded as promising because of a high occurrence of light and variable winds as well the frequency of cyclones. A buoy to measure wave energy is now in place in the southeast swell off Efate; this source of energy, using recently developed Norwegian technology, is seen to have great potential. The comparatively high cost of electricity in Vanuatu now encourages the search for alternative sources.

Electricity Prices per Kilowatt Hour, 1990¹⁵

Vanuatu	\$0.21
Papua New Guinea	\$0.16
Fiji	\$0.14
USA	\$0.07

¹⁵ Turpin and Drake (1991) under ENERGY in References Section.

B. Economy

Background

1.32. Vanuatu's present-day economy derives from the country's scenic-island setting, its "offshore" location, and its colonial past. By the 1860s the initial stage of resource pillage by Europeans was over, having been based on sandalwood in the New Hebrides. For the next 40 years the most profitable "export" was a human cargo of plantation labourers. More than any other Melanesian people, New Hebrides Islanders were part of this "blackbirding" trade, with many thousands of labourers shipped from the New Hebrides to the growing plantation economies in Fiji, New Caledonia, and, most particularly, Queensland, which received a remarkable 40,000 New Hebrides Islanders between the 1860s and the beginning of the present century, when the labour trade was brought to a close. After a contract term or two, most labourers returned to the New Hebrides, where they or their descendants became engaged as labourers in the developing plantation economy established by French, British, and Australian settlers and trading companies.

1.33. The search for successful export crops -- an effort confounded by the varied suitabilities of local soil and climate, the demands of world trade, and the experiences of the planters -- included cotton, coffee, cacao, and coconuts in the New Hebrides. Coconuts, for copra, gained dominance, with some plantations, notably those that were company-owned, of considerable size and wealth; one on Malakula was 10,000 hectares. Slowly, during the first several decades of this century, islanders also entered the commercial economy directly for themselves by means of small-scale copra growing until, by 1965, they were producing about half of the copra for export, an independent activity of family or community that was preferable to working on European plantations. But from the beginnings of commercial cropping to the present day, subsistence production of traditional or introduced root crops has never been relinquished even among the increasing number of ni-Vanuatu who have taken to small-scale cash cropping and, more recently, to raising cattle. Perhaps paradoxically, the strength of the subsistence sector is well illustrated by the difference in income between those who live in one or the other of the two urban centres and the 82 per cent of the people who live in the rural areas. Per capita urban income is about 8.5 times higher than per capita rural income. There is also a wide divergence between ni-Vanuatu income and expatriate income, with the expatriate sector realising about 22 per cent of the national income but making up only 3 per cent of the total resident population.

Overview of the Economy¹⁶

1.34 Vanuatu's economy is dominated by services and agriculture (Table 1.2). Copra remains the most important agricultural export while cocoa and beef are gaining in significance. Economic development is constrained by dependence on a narrow range of agricultural exports, distance from markets, limitations in natural resources and skilled manpower, high cost of infrastructure, a very limited internal market, a small population dispersed widely over many islands, and a high frequency of natural disasters. Because of the economy's small size and the narrowness of its productive base, it is very vulnerable to outside forces, such as world commodity prices and downturns in the economies of the countries that are the major sources of tourist inflow. The trade balance remains in deficit, a condition that was aggravated in the mid-1980s by a large fall in the price of copra together with decreases in both copra production and tourist inflow because of cyclones in 1985 and 1987. A period of political unrest in the country in 1988 also brought a temporary decline in tourism, but the industry has since recovered.

1.35. At Independence, the new republic inherited the financial burden of an often duplicated system of government services left behind by the two colonial powers. The narrow and undeveloped economic base and the maintenance or expansion of essential services such as education imposed a difficult financial burden on the new country. Since Independence, the Government has sought to diversify, strengthen, and expand the productive base of the economy in order to achieve economic self-reliance. The Government sees self-reliance as a long term goal that will enable the economy to meet its import requirements from foreign exchange earnings, provide the larger portion of recurrent expenditure from domestic revenues, make some contribution toward the development budget, and meet manpower requirements from the domestic labour force. Real economic growth has averaged approximately two per cent per annum over the last seven years (with 1986 having negative growth), but the rising population has kept the per capita GDP the same. The per capita income for the ni-Vanuatu population in 1987 was estimated to be US\$418 at current prices.

¹⁶ For the sources used in this description of Vanuatu's economy, see ECONOMY in References section

Agriculture

1.36 The agriculture sector is dominated by subsistence activities, which account for something like 45 per cent of the total added value created by the sector. Next to subsistence agriculture, smallholder production of cash crops, especially copra, is the most important factor in agricultural production. Plantation copra production has declined in recent years because of the senility of trees and the low prices. Vanuatu is the only Pacific-island country to export beef, which has become the most important commodity in agricultural diversification. A major growth area in the agriculture sector has been the production of kava. Until recently this traditional beverage was grown for the domestic market, but a significant pharmaceutical and herbal export market is now starting to be exploited. For 1990, kava exports may exceed the coffee export in value.

TABLE 1.2. GROSS DOMESTIC PRODUCT BY KIND OF ECONOMIC ACTIVITY, 1987. (millions of 1990 US dollars)

Agriculture, Forestry, Fishing		31.1
Plantations	3.3	
Other commercial agriculture	2.0	
Small holdings	9.6	
Subsistence agriculture	12.0	
Forestry and logging	4.3	
Industry		15.4
Manufacturing	6.3	
Electricity	1.9	
Construction	7.2	
Services		88.8
Trade, restaurants, & hotels	46.3	
Transport, storage, & communications	10.0	
Finance centre	14.0	
Real estate, business services	7.0	
Government services	19.3	
Other community, social, & personal	1.2	
TOTAL		135.3

(Source: Turpin and Drake (1991) under ENERGY in References section)

Industry

1.37. Tables 1.2 and 1.3 show the industrial sector to be very small, although manufacturing (concentrated in food and beverage production and wood processing) almost doubled its contribution to GDP during the period 1983-89. The 125 small industries that exist in Port Vila and Luganville employ 1,300 people. There are plans for the possible development of a free-trade zone in what is now a rural part of Efate. The Government places a high priority on manufacturing so as to widen the present narrow base of domestic production and provide employment. Growth is limited by the small internal market, the relatively high cost of labour and energy (paragraph 1.31), and the small number of skilled workers. However, a brewery did open in 1990, and a recent agreement between the Vanuatu Government and Australian investors led to the establishment of a joint-venture garment-making factory in Port Vila, with 25 per cent equity from the Vanuatu National Provident Fund and 75 per cent from the Australian entrepreneurs. The company may employ as many as 100 workers, mainly women with sewing skills. Their products will have free entry to Australian and New Zealand markets under the trade agreement between those countries and South Pacific Island countries (SPARTECA) although the benefits from SPARTECA will be lessened when plans by Australia to cut tariffs on all imported textiles come into effect.

Services

1.38. The services sector accounts for two thirds of GDP. Tourism is gaining in importance as a generator of foreign exchange, with 35,043 visitor arrivals in the peak year of 1990, compared with 32,374 arrivals in 1983, the former peak year. Australia is now the major source of tourists, followed by New Zealand, but Japanese investors have bought properties for resort and golf course projects. Major expansions to some existing facilities are underway, and there are plans to open a Club Med in late 1992. A stable element in the dominant services sector has been offshore financial-sector services, which contribute 10 per cent to the nation's GDP and provide diversification. The finance centre in Port Vila developed from Vanuatu's tax-haven status, the country presently having no personal or company income taxes, no capital gains or profit taxes, and no exchange controls. Tax revenue comes largely from import duties, which makes for a high cost of living in urban areas, causing financial strain on poor ni-Vanuatu households.

TABLE 1.3. VANUATU EXPORTS, 1987 (1000s of 1990 US dollars)

Copra	7,400.8
Cocoa	2,133.5
Beef	2,597.1
Timber	2,146.3
Cow hides	261.0
Sandalwood	243.1
Trochus shell	135.3
Burgaus/green snail	95.5
Coffee	84.5
Artifacts	19.8
Vegetables	0.9
Other products	339.1
Other food products	12.9
Petroleum products(re-exports)	1,916.7
<hr/>	
TOTAL	17,386.5

(Source: Turpin and Drake (1991) under ENERGY in References section)

Trade and Aid

1.39. Imports into Vanuatu in 1987 amounted to US\$77,451,700, or four and a half times the exports shown in Table 1.3. Imports include the expected items of almost all the manufactured goods and machinery needed in the country, petroleum products, and substantial amounts of food and beverages. Exports (Table 1.3) are dominated by copra, cocoa, beef, and timber. For some years before 1986, when the fish factory closed, frozen fish was the second most important export item. The goal of export diversification is still far from being achieved although the value of the beef export is up 100 per cent in 1989-90 from its 1983 level (current prices), and new products such as kava and cow hides are now becoming significant in the export pattern. The severe trade deficit, which regularly occurs, is mainly balanced by net tourism earnings and foreign aid so that the country has a very small external debt. Aid accounts for 25 per cent of the GDP and 75 per cent of the trade balance.

C. DEMOGRAPHIC TRENDS¹⁷

1.40 The population of Vanuatu has been enumerated twice in official censuses: in 1979 and 1989. The New Hebrides was enumerated once, in 1967. By 1967, following a decline in population among ni-Vanuatu in the late 19th and early 20th centuries, the population had entered a stage of rapid growth. Between 1967 and 1979 the ni-Vanuatu population increased at an average rate of 3.2 per cent per annum from 72,243 to 104,371. The total population grew a little more slowly at 3.1 per cent per annum, reaching 111,251 in 1979. Some of the minor ethnic groups (Micronesian, Polynesian, other Melanesian, and the Vietnamese) declined slightly while the European, Chinese, and mixed-race group increased in size but more slowly than the ni-Vanuatu population. In the 1970s the ni-Vanuatu population was growing at a faster rate than it probably ever had in the past because of a high birth rate, a declining death rate, and -- unlike several Pacific Island countries -- the virtual absence of ni-Vanuatu migration to overseas destinations.

1.41. During the census period 1979-1989 the total growth rate slowed from 3.1 per cent to 2.4 per cent per year and the ni-Vanuatu rate slowed from 3.2 percent to 2.8 per cent per year, leading to a total population of 142,944 and a ni-Vanuatu population of 139,475.

1.42. Although the rate of ni-Vanuatu population growth has declined since 1979, the current rate is still very high compared with other developing countries; it is surpassed in Melanesia only by Solomon Islands, which has a growth rate of 3.5 per cent per year. The fall in Vanuatu's total population growth rate over the 1979-1989 period was caused in part by the departure of expatriates around the time of Independence rather than because of a significant decline in ni-Vanuatu total fertility rate. Vanuatu's population is widely scattered (over 67 islands in 1979), and population densities vary markedly from island to island. During the 1979-1989 period, population increased in all the inhabited areas except Paama and the Shepherds, whose population decline is

¹⁷ The analysis of the 1979 census has been published. See Bedford (1989) under POPULATION in References section. The report on the 1989 census is not yet published but the figures are available from the National Planning and Statistics Office, Republic of Vanuatu.

clearly associated with out-migration to Port Vila and Luganville. Paama and the Shepherds are small areas and are also the two Local Government Council regions with the highest population densities in 1979 -- 37.1 persons/ km² on Paama and 51.7 persons/km² in the Shepherds. There are also migrants to Port Vila and Luganville from all the other Local Government Council regions, but in these regions local rates of growth surpassed out-migration.

TABLE 1.4. VANUATU POPULATION, 1979-1989

	1967-1979		1979-1989	
	per cent growth/yr	1979 size	per cent growth/yr	1989 size
Total population	3.1	111,251	2.4	142,944
Ni-Vanuatu population	3.2	104,371	2.8	139,475

Source: Statistics Office, Government of Vanuatu

1.43. Because of the rural-urban drift, the ni-Vanuatu urban growth rate was 7.5 per cent per annum during the 1979-1989 period, which is more than 3 times the rural growth rate of 2.1 per cent per annum during the same period. Port Vila's ni-Vanuatu population grew at the phenomenal rate of 10.8 per cent per annum during the 1986-1989 period. Because of the prevalence of migration to urban areas, the population pyramid of the urban population is irregular, with a bulge for age groups between 15-39 years, especially amongst males. This structure represents the migration of young adults to Port Vila and Luganville. As would be expected, the total Vanuatu population is youthful, with 44 per cent of the population in the 0-14 age group in 1989, which gives a high dependency rate and a built-in potential for continued rapid population growth. If Port Vila's population continues to grow at the same average rate that it grew over the 1979-1989 period, its population will double in 9 years. At that rate, by 1997, Port Vila would have a resident ni-Vanuatu population of 32,000. In the face of the implications of such

growth-rate figures, Government is enquiring about future needs for urban housing, educational and health facilities, water supply, and employment. Consideration is being given to the social impacts to be expected from high rural-urban drift that will include a growing number of younger migrants.

1.44. Vanuatu has had no formal population policy, and the emphasis has been on the positive effects of increasing population. As remarked in 1984 in The Mid-Term Review of Vanuatu's First National Development Plan with regard to the country's first Development Plan (1982-1986):

The general impression conveyed in the Plan and in statements by some prominent community leaders and politicians in Vanuatu in recent years is that much of the country is sparsely populated, that it had a much larger population in the past, and that it would be desirable to have more ni-Vanuatu in the future. The prevailing view about fertility in Vanuatu seems to be pro-natalist. Large families are considered desirable and a high birth rate is seen to be a sign of a healthy growing population.¹⁸

However, it is increasingly recognized that too large a population or too speedy a growth can become severe burdens. With this in mind, the following objectives were adopted for the 1987-1991 period of the Second National Development Plan:

- to create an awareness in both the Government and the private sector of the influences and effects of population changes on overall social and economic development;
- to institutionalise an appropriate system for monitoring the demographic characteristics of the population within Government;
- to prepare a plan of action which will ensure an equitable distribution of the country's opportunities and resources among the urban and rural populations.

Preparations now underway for the Third National Development Plan (1992-1996) will include a review of current population

¹⁸ Page 334, National Planning and Statistics Office (1984), The Mid-Term Review of Vanuatu's First National Development Plan. Republic of Vanuatu.

trends and characteristics with a view to establishing a comprehensive national population policy. To further this goal an advisory committee on population policy was formed within the Government in December 1990.

D. NATURAL-RESOURCE AND ENVIRONMENTAL ISSUES

1.45. Views as to the state of Vanuatu's environment range from the "untouched paradise" of tourism promotion to deep worries about irremediable pollution of urban water supplies or the imminently harmful effects of rapid population growth on resources of land and sea. Leading political figures, public servants, scientists, tourists, businessmen, teachers, and others commonly express the opinion that because there is little industrial enterprise in Vanuatu, because there are no mines in operation, because the aggregate population density is low by world standards, because forest still remains the dominant land cover, and because the ni-Vanuatu feel a deep affinity with their land, the country has been spared serious environmental degradation and resource depletion. But knowledgeable observers almost always follow their optimistic view with an amendment to the effect that things may be changing for the worse, that minor environmental problems are evident, that some environmentally deleterious processes are perceptible, or that certain natural features of the environment were previously bigger, better, or more abundant. These comments indicate that Vanuatu's environment and natural resources are moving towards thresholds beyond which may lie pronounced or irremediable degradation and depletion. Thus, while Vanuatu may be in the fortunate position of having "the opportunity to take preventive action rather than remedial action in ensuring that the development process does not cause serious deterioration to the environment"¹⁹, there is also an urgent need to remove or lessen environmental threats to sustainable development.

1.46. Like almost any set of environmental issues, Vanuatu's issues are cross-cutting, inter-influencing, and have unknown ultimate effects; they cannot be easily prioritised. They are ordered here, very roughly, in terms of either the number of people or the extent of national territory likely to be affected.

¹⁹ Page 145, A. Garae and J. Whittall, "Development and the Environment", in Chambers and Bani (1988) under DEVELOPMENT/DEVELOPMENT AND ENVIRONMENT in References section

Land Tenure

1.47. Because a system of land tenure is not a physical process, it cannot of itself be a direct cause of environmental problems. What tenure does is determine not only access to land, which is prerequisite to most development projects, but also authority over land, which is prerequisite to environmental management. In Vanuatu, the significance of tenure goes still further, for a person's relationship to land is fundamental in ni-Vanuatu cultures. There can be almost no discussion of land use or environmental management in Vanuatu without land tenure coming onto the stage. When the Republic of Vanuatu gained Independence in 1980, articles in the new Constitution provided that all land belongs to indigenous custom (customary, traditional) owners, except land that Government acquires in the public interest. In 1982, the introduction of the Alienated Land Act sought to regularise the situation with regard to pre-Independence alienated land that had come to be owned either by ni-Vanuatu or by the Government. Provisions were introduced to allow persons other than custom owners to apply for the status of "alienator" to enable them to negotiate leases with the custom owners. Further legislation has required that all leases be surveyed and registered. Unlike the situation with "native land" in Fiji, unleased custom land in Vanuatu is not yet surveyed or registered. Island Courts have been established to deal with disputes, but lack of trained staff has led to a large backlog of cases. The significance of this situation is spelled out in Second National Development Plan, when it notes: "Disputes over the ownership of custom land, rather than land availability, are the largest single obstacle to the development of the rural areas of Vanuatu."

1.48. Custom land ownership will have no simple or single influence on the future of environmental management in Vanuatu. The issue of tenure will, however, arise in each situation and always be significant. Custom land ownership is sometimes viewed as an obstacle to sustainable development because, for instance, long negotiations are necessary to acquire land for protected habitat areas or other conservationist or necessary public purposes. The system also gives custom owners the inalienable right to do as they wish with their land -- for instance, to damage it irrevocably. It is true that environmental safeguards can be inserted into leases, with more or less success (paragraph 2.5), but most land is not under lease. Notwithstanding, accomodation to custom land ownership -- which is a basic aspect of local cohesion, social structure, and culture -- offers a challenging opportunity to integrate the rights of the local custodians of land with planning assessments as to a sustainable balance of production and protection.

Population Pressure/Population Increase.

1.49. This topic has already been discussed (paragraphs 1.10-1.13, 1.18, and 1.40-1.44) but requires brief reiteration as it relates one way or another to every one of the environmental issues discussed below. Even on the islands with a very low population density, an increase in the number of humans will affect the environment -- not always harmfully and often well within the framework of sustainable development. But limits to growth remain, as is shown by the migration to town from the most crowded rural areas (paragraph 1.42-1.43) and the informal, unplanned settlement of people from the crowded Shepherds onto newly logged areas in rural Efate, which has a quite low population density.

Ocean and Reef Resources.

1.50. Within Vanuatu's national territory, the sea surface covers an area almost 60 times larger than the land surface. The sea is also important culturally and economically although the people of Vanuatu did not traditionally make as heavy a use of marine resources as did some Pacific Islanders. Besides containing the country's fishery resource, the sea is home to the coral reefs that fringe all the islands. Subsistence fishing, which remains important, is mostly done close inshore by wading and surface diving. Most fisheries experts believe the subsistence fish resource is not overfished except in localized areas around the two urban centres and a few large coastal villages. For instance, a chief on the island of Tanna is reported to have banned fishing along a sizeable stretch of beach for a year because he believed fish populations had diminished. Commercial fishing was not encouraged by the Anglo-French colonial government but began to develop in 1981 with the formation of the Fisheries Department. Strong encouragement came from the aid-funded Village Fisheries Development Programme, which initially set up 25 projects, each with a fully equipped boat and small freezer supplied on the basis of a 50 per cent grant, 40 per cent loan, and 10 per cent local cash contribution. These projects concentrated on the fishing of a snapper on the outer-reef slopes at depths of 80 to 400 metres. The initial success of this programme led to what was probably too rapid an expansion, and many of the small fishing projects failed. The problems, which had to do with inadequacy of economic returns, training, and motivation, are being dealt with, and the Programme is now running well in Santo. The present catch is probably well below the maximum sustainable yield, as estimated on the basis of ORSTOM research.

1.51. Vanuatu's EEZ contains a tuna resource of albacore, skipjack, and yellowfin. Presently, 35-40 Taiwanese long-lining boats are fishing albacore under a bilateral arrangement. Vanuatu is also part of the Forum Fisheries Agency (FFA) 16-nation multilateral agreement with the USA government, but that country's purse-seining ships generally operate farther to the north where the yellowfin and skipjack have a longer residence time than they do on their migrations through Vanuatu's waters. Efforts by the Fisheries Department to obtain information, for stock-assessment purposes, on the Taiwanese catch of albacore have not been successful. There are presently no limits set on the Taiwanese catch. Government is seeking to interest investors in re-opening the fishing base on Santo that closed in 1986 (paragraph 1.26).

1.52. Because coral reefs are damaged by siltation, pollution, fresh water, and overuse, they are increasingly at risk as Vanuatu's population increases; as urban areas grow, bringing eutrophication of adjacent waters and siltation from dredging and construction; as logging continues, resulting in sedimentation from erosion; and as cattle pastures extend over more of the land, probably increasing the surface runoff during high-intensity storms. Reef degradation is reported in localized areas, as around Port Vila, where the reefs are a tourist attraction. Deterioration is not all human-induced; cyclones play an important recurrent role in reef degradation. Outbreaks of the coral-eating crown-of-thorns starfish (Acanthaster planci) have also caused damage; these outbreaks may be partly natural but may also be partly the result of increased nitrate levels in the water and the removal of the triton shell, a predator of the starfish.

Sea-Level Rise.

1.53. The possibility of sea-level rise as a result of climatic warming is a significant regional issue in the Pacific but is not widely perceived or understood in Vanuatu as a threat. However, it is clear that a rise of 20 cm or slightly more within the next 40 years (a conservative median estimate) could directly affect the low islands in the Banks and Shepherd groups. Beyond the direct effect on low islands is the likelihood that climatic warming will also increase the severity and frequency of tropical cyclones, which means that there will be more storm surges starting at a somewhat higher level, resulting in an increased possibility of destruction to the low-lying built-up areas of Port Vila, Luganville, and the many shoreline villages. Tsunami that began at a sea level 20 cm higher than the present level

would also be more damaging, and salt water intrusions into ground water reserves would increase. (Vanuatu does take part in the regional programme to monitor sea-level changes, and a sea-level measuring device has been set up.)

Soil Erosion.

1.54. No quantitative measurements are available, but erosion as a form of land degradation is reported by agricultural and forestry officers. Erosion occurs where subsistence shifting cultivation is under population pressure (for example, Paama and North Pentecost), where there is an irresponsible use of fire, where loggers do not leave buffer strips of forest near streams, and along logging roads and skid tracks. Generally, erosion is insignificant in smallholder pastures except in a few areas where cattle have been overstocked on excessively steep slopes with no conservationist management (improved grasses or contour strips of perennial vegetation). Plantation pastures are generally on flat land or quite moderate slopes and do not suffer from much erosion. Gold-prospecting operations, where bulldozers have cleared perpendicularly to the contours, have left occasional erosion scars. In years to come, in this land of steep terrain and heavy rainfall, continued removal or thinning of the natural vegetation cover and extension of agriculture and other activities will inevitably accelerate the natural erosion and land slipping associated with cyclones and earthquakes. At present, there is no soil conservation officer or unit, so that responsibility for erosion is spread incidentally over several agencies.

Loss of Forests.

1.55. Beginning with sandalwood exploitation in the last century, commercial logging has been going on in Vanuatu for over 150 years. Aneityum and Erromango have had extensive logging of kauri forests, and there are several sporadic logging operations sporadically now on Efate, Santo, and other islands -- enterprises that provide employment for about 200 people. The Department of Forestry estimates that sufficient exploitable timber exists to meet domestic demand for at least 20 years, by which time the forest plantations will relieve the pressure on natural forests. The suggestion that harvesting of local timbers will end in 20 years does not mean that all natural forest will have been removed. Much of the 75 per cent of the land presently under forest cover is too steep or is too difficult of access or contains too little timber of value to be harvestable. Where logging does occur, conservation practices are often poor, streams are not protected by buffer strips, and roading is not properly placed. Logging companies operate under controls laid down by the Department of Forestry and in agreement with custom land

owners, but many of the loggers and none of the villagers are trained in conservationist techniques, and the Department lacks staff for adequate policing.

1.56. More loss of forest may result from clearing for pasture and gardens than from logging, especially as most logging is selective so at least some trees are left standing, although often damaged. The regenerative capacity of the natural vegetation is sufficient to provide a protective cover quickly over bare areas although the new cover may not always be forest. It is reported that kauri regeneration has been good on Erromango; but on some islands, natural re-vegetation following logging contains few trees. Many logged areas that would regenerate if left undisturbed are taken over by local people for pastures or gardens, especially where logging roads have provided easy access. In the plantation sector, about 1,300 ha of forest are cleared per year for improved pasture whereas about 1,700 ha of existing pasture are resown with superior species, and significant areas of gross weed infestation are controlled. Approximately 20,000 ha of uncleared land within existing plantation leases are likely to be developed for improved pasture within the next 15 years, but almost none of the vegetation cover on this land is primary rainforest. Rather, the cover is dominated by regrowth species common on disturbed sites (e.g., Hibiscus tiliaceus -- burao in Bislama -- Merremia, and Kleinhovia hospita -- namatal in Bislama). The smallholder sector is developing about 400 ha of pasture per year with proportionally more forest clearing compared with rehabilitation than occurs in the plantation sector. If copra prices remain low or decline further, smallholders may respond by increasing their area of improved pasture, thus accelerating the rate of forest loss. One strategy to lessen this possibility is to re-establish coconut with a wider spacing between the trees than is the present practice, thus decreasing shade on the ground and increasing the production of pasture or crops other than coconuts.

1.57. The lack of adequate information about the characteristics of the forests and the actual volume and quality of timber will be remedied when the Vanuatu National Forest Resource Survey is completed, and the Forest Resource Information System (FRIS) comes into operation. FRIS also contains information about non-forest resources and will greatly enhance the capability for agricultural land-use planning as well as for forestry management. (paragraph 2.11).

Loss of Biological Diversity.

1.58. Should loss of forest and degradation of reefs become widespread, an inevitable loss of plant and animal species, some of which will be rare endemics, will follow. Such habitat loss and depletion of species is not a public issue in Vanuatu except for the threats, from exploitation, to certain commercially valuable species such as the trochus shell and the coconut crab (paragraphs 1.61 and 1.63). Paine, in a report by the World Conservation Monitoring Centre, summed up the situation in 1989:

The current protected areas system covers an insignificant proportion of the total land area and fails to provide effective protection for all but some marine ecosystems. There is no adequate legislative provision for protected areas and this may well reflect the strong customary land tenure system. It is currently impractical for the government to acquire land for protected areas as this might involve expensive compensation to traditional land holders. Leasing or joint management of protected areas may be more effective. Although Vanuatu is in many respects in the enviable position of having largely intact natural resources, a number of priority actions must be addressed.²⁰

Efforts to establish the kauri reserve on Erromango and the shearwater bird sanctuary on Laika Island in the Shepherds group may initiate a trend towards more protected areas. Incomplete knowledge about non-forest, as well as forest, plants and animals increases the difficulties of setting up a protected areas system in Vanuatu.

Deteriorating Garden Fallow and Soil Exhaustion.

1.59. Shortened fallows impoverish soils, increase soil bulk density, and lessen the content of organic matter. Given the growing population, logic suggests that fallows are becoming shorter. Anecdotal evidence supports the logic, with people remembering fallow vegetation on gardens cleared in their youth to have been mature or well-developed secondary forest whereas now it is only a scrubby young pioneer cover. Estimates by the Statistics Office of agricultural land use as a percentage of the availability of moderate to good agricultural land in 1986 resulted in a national figure of 31 per cent, a figure that reflects the

²⁰ See Paine (1989) under FLORA AND FAUNA/BIOLOGICAL DIVERSITY/PROTECTED AREAS in References section

large areas of unused land on islands such as Erromango. In the most crowded rural areas, the figures rose to 118 per cent (Shepherds) and 224 per cent (Paama), indicating inadequate fallow for shifting cultivation as well as the use of marginal lands.

Weed Infestation and Pasture Degradation.

1.60. Extensive areas of abandoned or overgrazed pastures became heavily infested with several different kinds of noxious weeds and may also have suffered soil degradation. With adjacent forest land nearby, the temptation has often been for further clearing rather than rehabilitation of degraded pastures. The Vanuatu Pasture Improvement Project is presently acting to counter this process (paragraph 2.14). The inter-island movement of heavy machinery, particularly for road-building, is believed to have led to the spread of many new weeds over the past 10 years -- an unwelcome result of development that could be prevented by pressure cleaning the machinery before inter-island barging.

Trochus shells.

1.61. Trochus shells are collected widely in Vanuatu for sale to three button-processing factories, which are jointly owned by foreign and local investors. The harvest of trochus shells in some of the remote areas of the country, such as Gaua in the Banks Islands, provides local communities and families with one of their few ways of earning much needed cash. This good example of local resource development and in-country processing also illustrates a quandary of sustainable development. Some parts of Government see the expansion of the trochus-shell industry only as an economic opportunity; marine-resource experts see the trochus shell as a limited resource, requiring management, based on accurate assessment of the resource, if it is to be exploited on a sustainable basis. There are regulations as to the minimum size of shell that should be collected, but on occasion undersize shells can be sold. The power of money is also reported to have broken down local custom rules, tabu, against diving for trochus on reefs other than your own (custom ownership extending across the shoreline from land to the outer edge of the fringing reef). Custom chiefs have tried in vain to limit

the months open for trochus collection, but the need for money overrides the word of a chief.²¹

Mangroves.

1.62. Mangroves -- and by extension their immediately associated animals, such as the valuable Caledonia crab, and their contribution to fisheries -- come under attack both from major tourism developments and from village fuelwood collection. Some mangroves have been removed for purposes of tourist development, but other proposed removals have been stopped or decreased by actions of the Environment Section of the Ministry of Home Affairs. As the major area of mangrove forest is distant from the urban areas, it is probably village activities that are most damaging. As with terrestrial forests, the situation with regard to mangroves will be much better known following the completion of the National Forest Resource Survey. Presently, there is no systematic management of the resource so that any actions to conserve the mangrove resource are ad hoc.

Coconut crabs.

1.63. Several pieces of evidence show that coconut crab stocks are declining. Once widespread throughout Vanuatu, the crab is now restricted to the Santo-Malo and Banks-Torres regions, especially the Torres. Most of the crabs now sent to Port Vila restaurants have been harvested by Torres Islanders, whose small, remote islands have few other sources of income. That they are overexploiting the resource is evident because the crabs now being shipped are smaller than those of two years ago, a sure sign that the stocks are declining. The crab is vulnerable to over-exploitation as it is a slow-growing animal, requiring 12-15 years to reach the legal minimum size of 9 cm. The Fisheries Department has attempted to control the trade but has lacked adequate legislation, which is now being drawn up. Studies into farming/reseeding the crab have also been attempted.

Water Pollution.

1.64. Water supply to the majority of villages is thought to be fairly pure, given the generally low population density and the spread of piped water. As mentioned, the subsurface supply to Luganville is contaminated, and building activities on the infiltration zone to Port Vila's subsurface supply are not under adequate control (paragraph 1.30). The water

²¹ See Eagland (1991) under FLORA AND FAUNA/BIOLOGICAL DIVERSITY/PROTECTED AREAS in References section

pollution issue that attracts most attention is the contamination of Port Vila Harbour and adjacent Erakor Lagoons, between which lies the town of Port Vila on a narrow ridge. Ad hoc surveys of pollution in these waters have been going on since at least 1980; recent worry has arisen because contamination of the near-shore waters was said to threaten the development of Port Vila as a Japanese tourist destination. One source of contamination in the Harbour is defecation from anchored yachts. A much larger and less manageable source results from the absence of a reticulated sewage system in Port Vila, which now has around 20,000 inhabitants. The hospital and one large hotel have treatment plants, but most properties have only a septic system that discharges the overflow through a soakway into the porous limestones that lie under the town. The harbour is a considerably enclosed body of water, and the two lagoons are connected to the sea by a narrow channel and to each other by another channel so that the inner lagoon has very restricted flushing. A causeway across the narrow channel has further reduced flushing and increased the residence time of water in the inner lagoon. Clarity/turbidity measurements in the waters of the lagoons and harbour indicate nutrient loading from septic overflows and a decline in water quality over the past decade. Coliform contamination indicates the possible presence of pathological bacteria or viruses. Several areas of the harbour and lagoons show levels of contamination above many of the health standards (for example, 350 faecal coliforms per 100ml). Of particular concern are high levels of contamination in areas used for shellfish collection. In view of the rapid growth of Port Vila on lands draining into the lagoons and harbour, it is probable that water quality will continue to deteriorate if there is continued reliance on septic systems. Even if the country's financial capability would allow an expensive sewage system to be installed as soon as possible, continuing inputs from septic systems moving through the limestone will continue to add to the pollution load for several years.²²

Urbanisation.

1.65. Paragraph 1.43 gives details on the rapid growth of Vila and Luganville. As just described, near-shore water quality and water supply is under threat in both towns. Aside from the difficulties of providing social services and housing in the face of rapid growth and the health problems from contaminated shellfish and near-shore polluted waters, an environmental problem arising from urbanisation is

²² See Abbott (1991) under WATER POLLUTION in References section

disposal of rubbish (paragraphs 1.66 and 1.67). Rapid urbanisation also brings to Vanuatu problems such as social breakdown, crime, loss of kin ties to home islands, rapid cultural change, disease, and malnutrition.

Environmental Aspects of Human Health.

1.66. Human-induced environmental changes that affect human health include not only the pollution and sanitation issues mentioned above but also, for instance, the discarded tins, old tyres, and rubbish that provide breeding sites for the mosquitoes that carry dengue fever, which strikes Port Vila in recurrent epidemics. Another example would be the improper siting of pit latrines in villages and squatter settlements -- an issue now subject to a Health Department campaign to educate people to avoid polluting their water supply with human waste. Deteriorating soils in gardens will lead to a concentration on crops such as cassava (manioc) at the expense of a variety of other foods. In turn, this change means a deterioration in diet, which could be still further worsened by the loss of the agroforests, which also greatly enhance diet (paragraph 1.19).

Waste Disposal

1.67 Locally within Port Vila, the need to find a new location for the rubbish tip is an environmental issue that attracts much attention -- just as it does in many of the world's cities. The present Port Vila tip is within the urban area at a place called Fres Wota; the tip is now saturated and its presence conflicts with the continued development of a low-cost housing project in the vicinity. Like the previous tip, which is farther downslope, water draining through the tip may flow into a little bay at the north end of the Harbour where local residents bathe and collect shellfish. A location for a new tip has been found to the southeast of the town. Technically excellent, the new location will provide a long term solution to the rubbish problem if a land dispute over the site can be resolved. Waste disposal is also a problem in Luganville and is becoming a concern throughout the rest of the country as non-biodegradable rubbish accumulates.

Chapter 2

RESPONSES TO ENVIRONMENT/DEVELOPMENT ISSUES

A. Government Policies and Legislation

Policies

2.1. The 1980 Constitution of the Republic of Vanuatu contains an obligation with regard to what would now be termed sustainable development. Two of the 7 National Development Objectives stated in the Second National Development Plan (1987-1991) refine and expand that obligation. Article 7(d) of the Constitution states:

Every person has the following fundamental duties to himself and his descendants and to others:

(d) to protect Vanuatu and to safeguard the national wealth, resources and environment in the interests of the present generation and of future generations.

The National Development Objectives relevant to the environment are to:

-- increase productive utilisation of the country's natural resource base as a means of generating viable and sustained economic growth; and

-- ensure that Vanuatu's unique environmental and cultural heritage is not damaged in the process of economic development and change.

Chapter 33 of the Second National Development Plan spells out these objectives and their implementation further, particularly as they relate to the responsibility for environment and conservation charged to the then Environment Unit of the Ministry of Lands, Energy and Rural Water Supply.

33.04 The basic objective in this area is to plan for the development of the country's natural resources without this being accompanied by undue degradation and depletion of the natural environment.

33.05 To accomplish this, the following objectives have been established:

- increase study and knowledge of the natural environment and its wildlife resources;
- study and recommend procedures for the rational and wise development of the natural resources and wildlife;
- initiate relevant legislation as necessary;
- increase the awareness of conservation and environment issues in Government and other agencies;
- train ni-Vanuatu personnel to take over the Environment Unit; and
- provide technical expertise to Government and other agencies as required.

The objectives of sectoral departments such as Agriculture and Forestry also include commitments to conservation and long-term management for the benefit of future generations. Fisheries objectives do not contain such direct conservationist expressions but there is discussion of maximum sustained yields of certain fish types in the chapter on fisheries in the Second Development Plan.

2.2. The stated objectives in the Second Development Plan together with the environmental-management activities that have been implemented during the period of the plan (1987-1991), demonstrate that progress has been made in the decade since 1981, when a United Nations Development Advisory Team consultant wrote:

Vanuatu's constitutional obligation to develop natural resources wisely, with the interest of future generations in mind, has yet to be expressed in detailed resource management and environmental protection policy and programmes.¹

¹ Baines (1981) under DEVELOPMENT/DEVELOPMENT AND ENVIRONMENT in References section

Further policy direction can be expected to arise from the considerations of a Constitutional Review Committee that is now meeting.

2.3. With regard to international conventions, Vanuatu became a party to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in 1988 and ratified the Convention in 1989. The International Trade (Flora and Fauna) Act No. 56 was gazetted in 1990. Vanuatu is not yet a party to any of the international conventions or programmes directly promoting the conservation of natural areas such as:

- the Convention for the Protection of Natural Resources and Environment of the South Pacific (the SPREP Convention),
- the Convention on the Conservation of Nature in the South Pacific (the Apia Convention),
- the World Heritage Convention,
- UNESCO Man and the Biosphere Programme, or
- the Convention on Wetlands of International Importance Especially as Waterfowl Habitat (the RAMSAR Convention).

Legislation

2.4. Laws and regulations directed at various environmental issues are now being considered or drafted in Vanuatu, and there is concern at all levels of administration to develop comprehensive environmental legislation with "bite". But it will be some time before an integrated package of environmental laws is in place. Concomitant with the development of the legislation is the need for an expansion of funding and staff to ensure policing and enforcement of environmental regulations that are established. Current environmentalist work in the Attorney General's Office is focussed on water-resources management. When completed, perhaps by the end of 1991, the Water Resources Act will be the first attempt at a comprehensive coverage of the water resource in the country and will tie together the work of many departments. This legislation will give the Department of Geology, Mines and Rural Water Supply the power to limit building in the infiltration zone for Port Vila's groundwater aquifer (paragraphs 1.30 and 1.64). A shortage of legal draftsmen slows progress in the further development of environmental legislation in the Attorney General's Office.

Sectoral departments are working on legislation or regulations related to several important environmental/conservationist issues. Fisheries is drawing up legislation to control the harvesting and sales of coconut crabs. Provisions are under consideration for the general protection of flora and fauna and the establishment of habitat protection (the present law is described as "embryonic"). Forestry seeks laws to tighten logging regulations to prevent the possibility of logging operations beginning before formal approval has been given. Pesticide imports by a private company presently need approval from the Department of Agriculture, Livestock and Horticulture (DALH). Pesticides are not considered to be a serious problem in Vanuatu now, but the DALH has requested laws to control pesticides -- the present control having been described as "singularly underdeveloped". It is also known that some workers in the plantation sector do not use protective clothing when applying pesticides. The DALH has programmes or extension packages that attempt to address this potentially harmful practice, but some projects have neglected the danger in the past.

2.5. A significant contribution to the further development of environment law in Vanuatu is the recent publication of a thorough description and evaluation of existing environmental law.² This 140-page study points out the gaps and inadequacies of the present laws and makes firm recommendations for improvement. The study reveals that a substantial body of law with environmental implications already exists, both in sectoral legislation and in general law. In several fields of activity, the environmental management now exercised rests on informal negotiations, goodwill, or administrative controls rather than being based upon or reinforced by legal requirements. This means that the practice and effectiveness of environmental management is at the mercy of any change of personnel or policy. Outstanding in this regard is the absence of any formal legal requirement for environmental impact assessment (EIA). In practice, however, EIA is required for projects valued at more than 20 million vatu (about US\$180,000) and considered to be environmentally sensitive by the Rural Land Development Committee. Guidelines prepared by the Environment Section set out the conditions for preparing Environmental Impact Statements (EIS). If the EIS, which is to be prepared at the expense of the developer by an assessor acceptable to the Government, recommends that the project not proceed, the negotiator's certificate necessary to obtain a lease will

² See Forster (1991) under ENVIRONMENTAL LEGISLATION in the References section

probably not be issued. But the procedure, in which practice could be said to be ahead of principle, is informal and can be put aside at the wish of higher authority. Along similar lines, the present functions of the Physical Planning Section and the Environment Section are purely advisory. Co-operative goodwill among departments has meant that advice is sought and accepted, but Forster's evaluation of environmental law in Vanuatu notes that it might be of value to amend the Physical Planning Act so as to provide the Physical Planning Section with "a more formidable weapon to its enforcement armoury". Forster also recommends that the requirement for EIA for certain classes of development should be placed upon a statutory footing. The use of environmental-protection covenants in leases is another legal mechanism worthy of mention. Conservation-related covenants are frequently inserted in leases under the Land Leases Act. The Department of Lands, when it negotiates the lease on behalf of the custom owners, often includes a conservation covenant not only to protect the custom owners but also in the public interest. In principle, if the covenant is breached, the lease may be forfeited but only if the custom owners complain or bring an action. Forster recommends an amendment to the Land Leases Act to enable the responsible Ministry to bring action in cases where the custom owners do not complain. He argues that vesting this authority in Government to enforce compliance with the covenants might be almost as productive of good environmental management as any other single legislative change.

B. INSTITUTIONAL DEVELOPMENTS

2.6. Several departmental initiatives to develop more effective environmental controls by legislative means have been covered in paragraphs 2.4 and 2.5. The Forestry Department has developed a code for logging practices; information about the code is disseminated by means of discussions in village workshops. Another development in logging is the Forestry Department's revision of the agreement form between custom owners and logging companies. The revised agreement contains a list of options that give landowners a sense of choice and that suggest that control of environmentally potent decisions lies with the landowners. For instance, the agreement requires that owners specify which species may be cut and also provides for the specific exclusion from cutting of whatever fruit trees and food trees the owners list on the agreement.

2.7. The most specifically environmental of recent institutional developments in the Government was the formation of the Environmental Unit in September 1986. The Unit was recognized as the only agency with cross-sectoral responsibility for environment and conservation. Initially located in the Ministry of Lands, the Environment Unit was shifted recently to the Ministry of Home Affairs and became a section in the Department of Physical Planning and the Environment. Initially the staff consisted of an advisor and one ni-Vanuatu graduate. A second graduate joined in 1988, and two additional staff are expected to be added within the next year. The Section has been gaining ground since its beginning, and its projects are now given high priority. Other institutional changes have been the elevation of Forestry to departmental status; previously Forestry was a section within the Department of Agriculture. An inter-departmental committee, the National Advisory Committee on Environment (NACE), was formed in 1987 to integrate environmental initiatives across sectoral lines and to review EIA. However, NACE has not been effectively coordinated into the activities of the National Planning Office. It is now being re-activated and charged with co-ordinating and reviewing the preparation and eventual implementation of the National Conservation Strategy. Because the members of the Committee, which is chaired by the Principal Environmental Officer of the Environment Section, include directors of departments, the Committee's voice is that of the highest level of the Public Service.

2.8. The most far reaching environmental activity being carried out by the Environment Section is the preparation of the National Conservation Strategy. The prospectus for the Strategy was published in 1988.³ As noted in paragraph 2.7, the National Advisory Committee on Environment is responsible for the overview of ongoing work on the Strategy and its subsequent implementation. The development of the Strategy involves extensive local consultation and places great emphasis on public education and participation.

C. SPECIFIC PROGRAMMES AND PROJECTS

2.9. The current major programme of the Environment Section is work preparatory to drafting Vanuatu's National Conservation Strategy (paragraph 2.8). Other projects of the

³ Dahl (1988) under NATIONAL CONSERVATION STRATEGY in References section

Section that have been recently completed or are in progress include:

- preparation and introduction of Environmental Impact Statement guidelines (paragraph 2.5),
- freshwater resources surveys,
- marine resources surveys,
- crocodile survey,⁴
- dugong survey,⁵
- heritage site survey,
- identification and establishment of protected areas, based on the information gained from the environmental surveys, with the objective of establishing within the country a network of protected areas that adequately represent the country's range of landscapes, marine, terrestrial, and freshwater resources,
- development of environmental education (paragraph 2.10), and
- an environmental conference, which was held in September 1987 and brought together government and private-sector representatives to discuss shared environmental concerns.⁶

2.10. A Radio Vanuatu programme entitled "Aelan Blong Yumi" (Our Islands) has been a successful initiative in environmental education by the Environment Section. Originally a fortnightly programme, it is now broadcasted weekly (and re-broadcasted once). Topics include descriptions of the survey work carried out (crocodiles, dugongs, bats), the development of protected areas, sea-level change, and other topics of current interest. Response has been good. The

⁴ See Chambers and Esrom (1991) under FLORA AND FAUNA in the References section

⁵ See Chambers and Bani (1989) under FLORA AND FAUNA in the References section

⁶ Chambers and Bani (1988) under DEVELOPMENT/DEVELOPMENT AND ENVIRONMENT in References section

Environment Section has also developed an "Environment Week" and organized seminars and village workshops on environmental topics.

2.11. A particularly important project for the long-term future of environmental management in Vanuatu is the National Forest Resource Inventory, an aid-funded project that is being carried out by the Forestry Department with technical assistance from the Queensland (Australia) Forest Service and the Division of Tropical Crops and Pastures of the Australian Commonwealth Scientific and Industrial Research Organisation (CSIRO). Ongoing discussions between Forestry, Agriculture, Lands, the Environment Section, and other interested agencies determine the input to this inventory to assure its optimal use when completed. The project has been running since mid-1989 and is expected to be complete near the end of 1992. The end product will be a Forest Resource Information System (FRIS) that will include non-forest uses and serve as a useful tool for determining sustainable forest use as well as in planning for conservation (for example, water-catchment management), population growth, and land capability for agriculture. The FRIS database will be fundamental to the implementation of the National Conservation Strategy.

2.12. A significant first step for the future of a network of protected zones in Vanuatu is the establishment of the Erromango Kauri Reserve, an area of approximately 3,000 ha of undisturbed kauri (Agathis macrophylla) forest on the southwestern side of the island of Erromango. Negotiations with the custom landowners over lease arrangements are almost completed; payment will include rent for the lease as well as compensation for the timber value. Custom landowners will be able to continue to use the forest for traditional uses such as hunting, but logging and road construction will be restricted. In the Shepherds group, negotiations with landowners are proceeding in the effort to create a sea bird sanctuary on Laika, a small island offshore from the larger island of Tongoa. Laika is reportedly the nesting site for large numbers of the shearwater Puffinus pacificus. As Tongoa villagers collect the shearwater chicks for meat and for sale, they will receive compensation -- paid in cash or in the form of village development projects -- as part of the arrangement to establish the sanctuary and to limit or discontinue exploitation as required to maintain the shearwater population. The full development of this sanctuary will require external funding.

2.13. Volume II of the Second National Development Plan 1987-1991 contains almost 300 pages, most of them listing

programmes and projects, many of which have environmental implications. These range from projects to use larvivorous fish as a method of biological control against the prevalence of malaria to investigations of the feasibility and cost of a reticulated sewage system for Port Vila in order to lessen near-shore water pollution (paragraph 1.64). As it is impractical to attempt a summary of this long list of projects, only two more projects will be briefly described, both of them relating to serious issues of land degradation.

2.14. Vanuatu Pasture Improvement Project (VIP). This Australian-aided project seeks to improve commercial beef production by:

- disseminating proven pasture and grazing management technology to estate, ni-Vanuatu plantation, and smallholder producers;
- supporting agricultural training institutions with materials, lectures, and field experience relating to pasture improvement; and
- improving the expertise of Extension staff and agricultural teachers in relation to pasture improvement and animal production and management.

Beyond the economic benefits of increasing Vanuatu's beef production (evident in the 1990 production figures), the long-term ecological value of this project is its concentration on rehabilitation of degraded pasture rather than expansion of area under pasture. Many plantation lands were invaded by noxious weeds when expatriate owners departed near the time of Independence. These lands are now being reclaimed and improved by weed control, legume sowing, and training in sustained pasture management. Some 3,000 ha of pasture have been improved over each of the past 5 years. Some herbicides are used in weed control, but manual and mechanical clearing are also important. Fertilizers are not used; rather, areas of poor soils, such as those with a phosphorus deficiency, are managed by selection of appropriate species. The project depends to some extent on imported seeds of improved legumes, but these can also be disseminated by cuttings. Farmers with significant areas of degraded pastures are said to accept that investment in rehabilitation gives superior returns to pioneering into newly cleared areas. Trials so far show no evidence of declining yields if a fairly high level of legumes is maintained. This project appears to offer a sustainable

intensification of land use, which means an increase in production without an extension of pasture into forest or marginal lands.

2.15 Sustainable Systems of Food Cropping. On the subsistence side of agriculture, an aid-funded project located within the Department of Agriculture, Livestock and Horticulture (DALH) also has a focus on agricultural intensification. Giving recognition to the environmental problems and declining yields that accompany shortening fallows when the population density of shifting cultivators increases, this project -- entitled "Development of Sustainable Systems of Food Cropping for the Volcanic Islands of Melanesia" -- has the primary goal of developing agroforestry-based subsistence production systems that are ecologically and economically sustainable. It is intended to conduct trials on Efate and N. Pentecost (an area of high population density in Vanuatu) with techniques such as alley cropping, the taungya system, and improved fallows, all of which could act to counteract the land degradation associated with shortening fallows. A related DALH-affiliated project seeks to implement soil conservation measures on gardenized steepplands in N. Pentecost.

D. TRAINING, EDUCATION, NGOs, AND PUBLIC AWARENESS

2.16. Ni-Vanuatu who work professionally as educationalists or environmentalist believe that the typical rural or urban person in Vanuatu lacks a full understanding of many environmental problems. Or, a problem may be perceived but not the chain of causes that lead to it. Because individual awareness is low, the forthcoming National Conservation Strategy will focus strongly on training and education (paragraph 2.8). There will be a particular effort to educate people to achieve sustainable development by planning for themselves, having gained an understanding of the problems that development can bring to water, soil, forests, and other productive parts of their environment. Efforts towards this sort of education have already been making headway in Vanuatu over the past several years. Naturally, when the country became independent in 1980, the main initial concern was to encourage development, to go ahead free of colonial controls or inertia. Despite the principles in the Constitution, environmental protection had a low priority. But the growth of international environmental consciousness during the past

decade, the increasing concern of funding agencies with environmental safeguards, and the recognition by some that Vanuatu has environmental problems are acting to stimulate environmental concern and action within the country.

2.17. The formation of the Environmental Health Section within the Health Department and of the Environment Section within (now) the Ministry of Home Affairs brought Government agencies that spoke in an environmental voice. The Environmental Health Section advises on sanitation and other environmental issues; the two municipalities also have Environmental Health Officers, who encourage people to be sure that rubbish gets to the tip and that house boundaries and surroundings are kept clean and free of mosquito-breeding sites. The Environmental Section's radio programme "Aelan blong Yumi" ("Our Islands") is now a weekly rather than a fortnightly programme. Radio is the major means of spreading information and education away from the urban centres -- and probably even within them, where the only local newspaper is a weekly available only to the literate part of the population.. Environmental officers visiting local centres find that the environmentalist messages coming from different directions and agencies are raising awareness. People are beginning to exercise more caution before inviting investors to take up a 75-year lease, wondering if their children will have enough land or other resources. An "Aelan blong Yumi" radio programme on the coconut crab brought responses showing that the fact that it takes a crab 15 years to mature was making people think about the future of the resource. Other programmes have discussed the flying fox (fruit-eating bats), dugongs, and the crocodiles in the Banks Islands

2.18 Pamphlets on environmental topics are provided at all school levels. The first four years of secondary school have good environmental materials, some of it produced locally and dealing with local environmental conditions and problems. Until recently, the final years of anglophone secondary school had a curriculum tied to the British final examinations. But the curriculum is to be revised to have more local relevance; it is hoped that some of the information available in government departments can be integrated into the new curriculum. Environmental materials used at the primary level are also to be redone. At a more technical level, officers from the Environmental Section lecture to the "young farmers" training course and speak on topics such as "Consequences of Using Pesticides". The Forestry Department is involved in training local loggers in good practices. The aid-funded Vanuatu Pasture Improvement Project offers field days and demonstrations as well as short courses on pasture improvement, pasture rehabilitation, and

weed control; these are attended by ni-Vanuatu smallholders, agricultural extension staff, young farmer trainees, and plantation managers and foremen.

2.19. Several NGOs carry out environmental activities in Vanuatu. A drama group visits villages, schools, and meetings, giving performances on environmental issues such as logging, drift-net fishing, and over-fishing, providing a clear and excitingly presented message. The Foundation for the Peoples of the South Pacific (FPSP) have an office in Vanuatu and work on small self-help schemes using local labour. In conjunction with technical support from the Department of Forestry, the FPSP is initiating in Vanuatu the "Walkabout Sawmill" scheme that has been operating in Papua New Guinea as a way to encourage small-scale, environmentally benign logging to meet local timber needs. The Vanuatu National Council of Women is an NGO that began with Independence with the goal of giving women a collective voice in the country. It has a network from village groups to area councils to island councils to the national executive. The Council provides leadership training to women and works on rural-development issues, including health, financial independence, domestic violence, and re-valuation of women's labour. Last year the Council operated a successful women's national festival; it has also hired 5 community workers to integrate local groups with the national group. Although the focus of this NGO is not primarily environmental, its networking system carries environmentalist information. For instance, issues of the Council's newsletter "Nius Blong Ol Women" have included a story on women's concern over logging damage to freshwater sources on Malakula and a note on the National Conservation Strategy. The journal Naika, published by the Vanuatu Natural Science Society, carries many articles on environmental issues.

2.20. Summing up, some, not all, ni-Vanuatu are becoming more environmentally concerned. Awareness is being built up through all the means mentioned above as well as through knowledge of problems elsewhere, for example, the situation surrounding the Bougainville mine in Papua New Guinea. "Environment" and "conservation" were new words to the ni-Vanuatu when Independence came. Initially they seemed something alien. Through local education and discussion, many people now see that the concepts are not new, only the words. The concepts are inherent in much traditional practice such as the tabu system of resource control that protected spawning fish and crabs and helped to maintain sustainable stocks. Events such as the "Grassroots Seminar" during Environment Week in June 1991 bring people into Port Vila from the outer regions and stimulate further understanding of

environmental degradation and of the mixture of modern and traditional methods that can be used to prevent or to lessen deterioration.

E. PRIVATE-SECTOR INITIATIVES

2.21. The private sector does not now express much explicit response to Vanuatu's environmental problems because most of the private sector is not particularly affected economically. On the other hand, few parts of the private sector show gross disregard of environmental proprieties. Much of what damage is done is more a matter of ignorance on the part of the private sector or of absence of control by appropriate authorities. For instance, the view from the Forestry Department is that most loggers will follow reasonably good practices so long as they know or are trained to know what those practices are. The few "cowboys" are an exception. That graziers choose to rehabilitate degraded old pastures rather than to clear forest for new pasture lands is another example, even if the choice is based on economics rather than environmental concern (paragraph 2.14).

2.22. Ecotourism may provide the most direct example of private-sector environmentalism. Two small tourism ventures in Vanuatu offer "adventure travel" and visits to "remote, unspoilt areas". It is to the advantage of these operators to keep the natural surroundings unspoilt. On a larger scale, an unspoilt environment also benefits the big hotels and the nation's tourism industry in general, as evidenced by the fear that pollution of Port Vila's nearshore waters might deter Japanese tourism (paragraph 1.64). A more active approach to sustainable development is offered by a proposal from a tourism operator to set up several small tourist bungalows or lodges around the country on a scale appropriate to the local environment and society. These establishments would be owned and operated by local people but would be part of a centralized umbrella organisation that would provide bulk-purchased supplies and ensure a certain level of amenity and efficiency in the operation of the tourist facilities.

Chapter 3

PLANNING FOR SUSTAINABLE DEVELOPMENT

A. Prioritizing Sustainability Issues

3.1. Vanuatu's national development objectives (paragraph 2.1) contain the same internal contradiction that some thinkers have found in the term "sustainable development". "Development" implies growth, an increase in the utilisation of natural resources for economic production; "sustainability" implies limits, the physical impossibility of indefinite growth. The forced marriage of the contradictory concepts took place because there is an imperative for economic growth and also an imperative to recognize ecological limits. Without an unforeseeably radical transformation in attitudes towards both economic development and nature, the marriage will continue but can only be seen as a difficult experiment in which advances will be small and in which continual attention must be given to correcting behaviour and actions that cause environmental degradation or resource depletion. Conceptual relief from the contradiction found in "sustainable development" can come by defining "development" as improvement rather than growth, quality rather than quantity. This way of thinking about development implies the ability to convert a constant level of resources into an increasing amount of human satisfaction. To achieve this sort of sustainable resource conversion requires careful and protective management of resources and the environment. In Vanuatu, the imperative of economic development overshadows the concept of sustainability but initial steps are being taken to institutionalize environmental management into development planning. The process has proceeded about as quickly as it could, given the scarcity of trained personnel and the many other jobs that faced the Government at the time of Independence. Vanuatu has clear policy statements regarding the protection and healthy maintenance of the country's environmental heritage. The legal apparatus to implement the policy is slowly being expanded and refined to make it more adequate to the task. Awareness that the country faces environmental issues is growing even though ameliorative actions are often lacking

3.2. Any attempt to prioritize the issues faces the predicament that the environment and human impacts upon it cannot be divided into separate compartments. The pressures that arise from human needs, increasing population density,

TABLE 3.1. FORMS OF NATURAL-RESOURCE DEPLETION & DEGRADATION IN VANUATU SET AGAINST GENERAL REMEDIAL ACTIONS

	K	C	P	I	S	R	R/R
OCEAN/ REEF RESOURCE	x	x				x	
SOIL EROSION		x	x	x			
LOSS OF NATURAL FORESTS		x	x	x	x	x	x
LOSS OF BIO- DIVERSITY	x	x		x		x	
GDN. FALLOW & SOIL EX- HAUSTION		x	x	x			
WEEDS & PASTURE DEGRAD.		x	x	x			x
TROCHUS DEPLETION	x	x				x	x
MANGROVE DEGRADATION		x				x	
COCONUT CRAB DEPLETION	x	x				x	x
WATER POLLUTION			x				

- K: Knowledge about resource characteristics still needed
 C: Control of rate of use required
 P: Practices need modification to avoid damage
 I: Intensification of land use would relieve pressure
 S: Substitute another resource
 R: Reserves needed over part of range of resource
 R/R: Rehabilitate/Replant/Restock

and efforts to achieve economic growth manifest themselves in the environment as a great variety of activities that affect in direct and indirect ways the many components of the environment. In Vanuatu, logging affects bird species, endemic orchids, and reef fish as well as trees. Tourism increases the eutrophication of the reefs, whose beauty helps attract the tourists. The development of better transport threatens the survival of coconut crabs. Encouraging local industry depletes the stock of trochus shells. Individuals seeking to improve their economic situation bring too rapid urbanization. In this situation, where should environmental management begin? What are the most urgent priorities? Where should the country's limited capability for response be directed? Rather than trying to pick specific responses that best answer these questions, analysis more usefully points to a few general guidelines that fit the Vanuatu situation.

3.3. In Table 3.1 the prevalence of the need for remedial actions in the column labelled C (Control of rate of use required) suggests that Vanuatu is using several renewable resources at a non-sustainable rate, with harvests in excess of sustainable yield so that the future availability or quality of the resource is reduced. In the case of forest loss there is also the externality of sedimentation and possibly a deleterious change in hydrological conditions. Other inferences that can be drawn from Table 3.1 are that:

- the extensive subsistence agriculture widely practiced in Vanuatu is not sustainable;
- in several instances there is a lack of knowledge or information about the level of consumption of biological resources that can be maintained without reducing future yield;
- biological reserves, protected areas, or sanctuaries are in short supply;
- the policy of rehabilitation and replanting that is already partially in place with regard to pastures and forests needs to be extended to the restocking of other renewable resources; and
- the on-going loss of forest requires a wide range of responses.

The arbitrary remedial actions listed in Table 3.1. suggest three general guidelines for environmental management in Vanuatu:

- control the rate of use or enhance the stock of renewable resources so that replenishment equals or exceeds withdrawal;
- modify agricultural and logging practices to enhance the environment and maintain resource quality; and
- intensify land use so that further expansion into forest and marginal land is slowed or stopped.

3.4. Controlling the rate of use. In several parts of the country, people can be seen to be making resource withdrawals from the environmental bank at too fast a rate. Natural resources such as forest, soil fertility, pure water, or coconut crabs are being spent faster than they are being replaced. This depletion of natural capital is beginning to hurt, especially as there is an ever larger population joining the withdrawal queue. Putting limits on the amount withdrawn seems the answer except that people need the cash gained from selling trochus shells or the food grown in tired or eroding soil. This situation requires that policy and planning seek alternative ways of making a living for people now causing depletion or degradation; or that more sources be found to pay compensation for voluntary slowdowns in rates of resource use; or that there be greater acceptance of a lower immediate return in order to achieve sustainable development over a longer time. Expanding the presently very small system of protected areas and biological reserves is an important part of controlling the rate of use of renewable resources. Replanting and restocking depleted renewable resources are also required.

3.5. Modifying practices. Some modifications are simple and are being put into use -- for example, leaving buffer strips along streams during logging, building roads on contours, planting rows of trees along contours, alley cropping (planting food crops between rows of nitrogen-fixing trees), and so forth. Other modifications are more difficult to establish and require more elaborate planning, for example, transforming short-fallow shifting cultivation into more intensive kinds of agriculture.

3.6. Intensifying land use. Most students of shifting cultivation agree that the system gives good returns per unit of labour and is a sustainable kind of agriculture so long as population densities remain low. Rising numbers of people mean an inexorable decline in quality of fallow, soil fertility, and crop yields per hectare, linked with an increase in soil compaction, rainfall runoff, and soil erosion on slopes. Frequently, the variety and quality of the food produced also decreases. Many of these problems can be

alleviated by agricultural intensification, which means changing to a system that requires more input per unit of land but a reduced need for fallowing. In subsistence agriculture, the increased input is labour for tasks such as tillage, mulching, and weed control; in industrialized agriculture, the increased input means the use of more fuel, machinery, and agricultural chemicals. Intensive agriculture requires less land than does shifting cultivation to produce an equivalent amount of food. In turn, the consequence of needing less agricultural land (to produce an equivalent amount of crop) is that more land can be left in forest reserves, protected watersheds, wildlife sanctuaries, and so forth. The process of intensification is being effectively applied to pasture in Vanuatu (paragraph 2.14), and there is a project underway to intensify subsistence agriculture (paragrph 2.15). The flaw in intensification is that it requires more inputs -- more labour, more imports of chemicals or pesticides or seeds, more fuel, more machinery, pumps, whatever, depending on the kind of agriculture adopted. Policy and planning, therefore, need to determine how to make the inputs as benign, cheap, and agreeable as possible. The hard truth, however, is that intensification "costs" human beings more than extensive, forest-fallow agriculture because in the latter system the forest is doing much of the work of soil enrichment and weed suppression. This is not to say that intensive agriculture may not give an economic advantage, as has been shown to be the case with pasture improvement in Vanuatu, where data show that unfertilized, improved grass/legume pastures have sustained production over a 15-year period.

3.7. These 3 guidelines (paragraphs 3.4, 3.5, and 3.6) would all facilitate sustainability and could also serve the purposes of development -- for example, maintaining richly diverse forests and reefs provides a basis for nature tourism. There remain 2 other policy matters that are significant for planning for sustainable development in Vanuatu: aggregate population growth and the uneven distribution of population density.

3.8. Population growth and population policy. Table 3.2 presents one of the many negative sustainability implications that Vanuatu's rapid population growth poses for the planner and policy maker: the surprising speed with which rapid population growth can exceed the carrying capacity* of a territory. An appreciation of this issue of the changing

"Carrying capacity" -- the number of persons that a particular area can carry permanently without damage to the land or its resources.

balance between land and people as well as many other population-related environmental, social, and economic issues has led Government to initiate preparatory planning for a national population policy (paragraph 1.44). A similar conclusion regarding the necessity for government intervention in population matters has been reached in seven Asian countries, as presented in the Asian Development Bank study Economic Policies for Sustainable Development¹

It is the unanimous finding of the seven country reports that the hoped for demographic transition to lower population growth rates, which are more consistent with sustainability goals, will not occur without active and explicit government support.

TABLE 3.2. CHANGING BALANCE BETWEEN LAND AREA AND VANUATU'S GROWING POPULATION

	1991	+25	+50	+75 years
Persons
Units of Land

If the ni-Vanuatu population growth rate of 2.8 per cent per year does not decrease, population size will double in about 25 years and be 8 times larger in 75 years. Because the area of land remains constant, the balance between people and land area changes radically during periods of rapid population growth, with each unit of land being required to support ever more persons. Carrying capacity can be increased by intensification and other means but not indefinitely. Continued rapid population growth will inevitably exceed carrying capacity.

¹ See Asian Development Bank (1990) under DEVELOPMENT/ DEVELOPMENT AND ENVIRONMENT in References section

3.9. Uneven population density. No country has a perfectly even distribution of population, but in a country of many islands, sharp differences in population density are especially obvious. On some of Vanuatu's islands, land is short; on others, the population density is extremely low (paragraphs 1.10, 1.42). The options for sustainable development are very different from one to the other of these situations. Resettlement is a way to even out the variation in density, leading to an improvement in development possibilities in both high- and low-density areas. Given the land-tenure arrangements in Vanuatu and the deep feelings about land, resettlement needs to be a slow and cautious process. But aside from urbanization, movements of people already take place. Some are informal such as settlements in logged areas on Efate by people from the Shepherds group; others have been officially organised to provide land for people displaced by volcanic destruction; and there are some movements from crowded to less crowded areas that are based on traditional kin networks. Government-sponsored resettlement could serve to prevent the densely settled parts of Vanuatu from being further impoverished, both economically and environmentally, although resettlement cannot be seen as a component of sustainable development since it offers only temporary relief from population pressures.

3.10. Before considering constraints to and opportunities for sustainable development, it should be reiterated that this UNCED Report is only an initial contribution toward thinking about sustainability issues in the country. The Environment Section's ongoing project to prepare the Vanuatu National Conservation Strategy is intended to spell out, by means of wide consultation within the Vanuatu community, how the country is going to meet its objectives for sustainable development.

B. Constraints to Sustainable Use of Resources and Environment

3.11. History, economy, and geography. Because Vanuatu is a small, little-developed, oceanic-island country in the tropics, the nation suffers from a familiar cluster of constraints to development, whether that development is sustainable or not. Vanuatu is also a very young, recently colonial country engaged in putting together the structures necessary for administration and for the implementation of services and controls. It is still building up a body of people with higher education to carry out administrative and technical work. And it is a country made up of many islands, some of which are economically and administratively remote from the centres.

3.12. Lack of information on biological resources and the rate of their use/lack of land-use planning. Uncertainty about the severity or imminence of threats to several biological resources makes management planning difficult. Previous proposals for detailed land-use planning and mapping lost momentum so that decisions as to where to best place agricultural projects lack precise information about land capability and limitations. The on-going surveys by the Environment Section (paragraph 2.9), other Government departments, and ORSTOM are helping to remedy the lack of information. The implementation of the Forest Resource Information System (paragraph 2.11) will make possible detailed mapping and planning for a variety of economic and conservationist purposes.

3.13. Shortages of staff and recurrent funding. Without exception, the sectoral departments dealing with natural resources believe themselves to be understaffed and, therefore, lacking in capability to gain adequate information, to monitor resource use, and to exercise control over that use, even if the laws and sanctions for such control were in place. As an example, the Department of Forestry in seeking to remedy the shortage of technically qualified staff successfully sought aid for the overseas training of a dozen ni-Vanuatu as potential foresters. But funds are lacking to employ the trainees when they graduate. As noted (paragraph 2.7), the Environment Section is growing in terms of staff and is successful in gaining funds for environmental projects or for attending international conferences but lacks funds for equipment and for travel within Vanuatu for purposes of monitoring, collecting information, and educating people in conservation.

3.14. Short-term aid projects. Aid is short-term, sustainability is long-term. Many aid projects now have environmental concerns built into them, but however beneficial this may be, the externally funded projects require Government staff time to negotiate, set up, manage, review, report on, and so forth; then the projects come to an end. During a project's life span, good may be achieved; but the day-to-day environmental management, planning, and monitoring required for long-term sustainability of environment and resources may have to be neglected. In turn, the benefits achieved by the aid project may be neglected when the funds for that project run out. Within its limited means, the Government of Vanuatu seeks to counteract this situation, as in its commitment to assimilate four ni-Vanuatu specialists in pasture/animal production into the Department of Agriculture, Livestock and Horticulture in order to maintain the work initiated by the aid-funded Vanuatu Pasture Improvement Project (paragraph 2.14).

3.15. Low commodity prices. Low or fluctuating commodity prices have been the bane of producers of tropical products for at least 400 years, making economic development difficult. Low prices also can inhibit sustainable development, as in Vanuatu today when very low copra prices force people in remoter islands to turn from their economic mainstay of coconut trees, which are already established, to other resources such as trochus shells and coconut crabs. Fluctuating or low commodity prices also encourage the continuing search for new, more successful products and needed economic diversification, all of which means new development projects, which may require more land clearing.

3.16. Long-term leases of custom land. Vanuatu's system of custom land tenure can function as a constraint to or an opportunity for sustainable development (paragraphs 1.47-1.48). An issue related to land tenure that needs particular attention is the arrangement for 75-year leases. Since the total change in the land-ownership system at the time of Independence, many 75-year leases have been signed, which means that land-use decisions are now locked in for 75 years before they can be reconsidered. Arthur Dahl discusses this situation in his Prospectus for the National Conservation Strategy.

One worrying feature concerning the 75 year lease system is that few land owners are planning for their own land requirements 75 years into the future. At present rates of growth, a family of 10 will have 90 members in 75 years time, a village of 100 will need land then to meet the needs of nearly 1,000 inhabitants. How many people are reserving land for these requirements? If these factors are not considered now, pressures will inevitably build up that will bring fundamental changes to the culture and lifestyle of the people and make self-sufficiency as a national goal increasingly difficult.²

3.17. Pressures on the subsistence resource base. It is appropriate in a discussion of sustainable development to ask: "Sustainable for whom?" It has been noted that 75-year leases subtract land from the subsistence base, even if the leased land is put into sustainable pasture or tree crops. It may be that within the village context, small-scale commercial exploitation of land and sea resources -- which might be theoretically sustainable -- is taking resources from subsistence requirements. Are food gardens being displaced by cash crops? Are over-ambitious fisheries schemes

² Page 16, Dahl (1988) under NATIONAL CONSERVATION STRATEGY in References section

diverting protein supplies from subsistence to commercial purposes? A recommendation was made near the time of Independence to establish "subsistence reserves", to be set out in consultation with custom resource owners and sector officers, but the concept was not carried further.³ Because copra was an early commercial product and still occupies the top place among Vanuatu's exports despite its low price, its production has a certain economic "sacredness" in Vanuatu. It is stipulated that coconut trees be planted at 9-metre intervals, a spacing that gives maximum production of coconuts but too heavy shading for optimum production of lower crops or pasture. Because much of the best coastal agricultural land has been planted under coconut trees, this spacing greatly constrains production of other crops and cattle. An increase to an 11-metre spacing would increase light transmission through the trees from 40 per cent to 65 per cent and make possible the growth of new pasture grasses and legumes and an increased production of other crops. Although the system of increased spacing would lessen copra production, it would give a greater total production of a mix of crops or of crops and cattle. During periods of low prices for copra, the larger spacing might also produce a greater aggregate value.

3.18. "Looseness" between environmental/physical planning and project development. It was noted in paragraph 2.5 that requirements for EIA have no statutory basis. A similar lack of rigour, a kind of looseness, characterizes much of what happens to environmental management and physical planning in relation to development in Vanuatu. This can be seen as an inevitable part of the transition between colonial administration and the development of a full set of laws and implementing procedures appropriate to an independent country. But as the tightening process takes place, environmental misfortunes can slip through the holes of missing laws and loose procedures. Or laws that are in place can be overridden by ad hoc decisions. The purely advisory function of the Physical Planning Section and the Environmental Section means that decision making lies with authorities who have no technical expertise in either field. Review procedures are needed to intercept imminent environmental problems and to ensure that economic planning and development are more firmly coupled to environmental management. For instance, the lack of firm physical-planning control over the shoreline zone means that investment in coastal tourism development is not yet subject to adequate assessment.

³ Page 22 in Baines (1981) under DEVELOPMENT/DEVELOPMENT AND ENVIRONMENT in References section

3.19. Weaknesses in enforcement and monitoring. Even if the legal requirements for environmental control are present, enforcement on the ground may be weak because of the lack of trained manpower or because economic considerations take precedence. Monitoring of environmental change is also weak. The useful wildlife surveys carried out by the Environment Section depended on external funding. The measurement of pollution in the Port Vila lagoons and harbour can only be an on-and-off procedure because it depends on irregular external funding.

3.20. Incomplete legislation. A thorough review of environmental law has been carried out recently and the serious gaps noted (paragraphs 2.4-2.5). Legislation is needed in areas such as control of pesticides and toxic chemicals, soil conservation and erosion control, protected areas, coastal zone management, sites of special scenic value, protection of custom sites, and liability for damage to subsistence resources.⁴

C. Opportunities for Sustainable Development

3.21. One of the most significant opportunities that Vanuatu has for the achievement of sustainable development is to make a deliberate decision to maintain the country's present fortunate position of having only low levels of degradation and depletion. It will, however, be all too easy to allow deteriorating processes to drift beyond irremediable thresholds -- hence the urgency for seizing the precious opportunity of being able to "anticipate and prevent" rather than being faced with the necessity to "react and cure".

3.22. Tourism offers promising opportunities for combining economic development with nature conservation and environmental protection. Not only does tourism provide a strong economic motive to maintain reefs and water quality (paragraph 1.64), tourism can be linked into schemes to compensate local people for setting up protected areas on reefs or for terrestrial plants and animals. Dive tourism and ecotourism, or nature tourism, can provide local employment and economic growth that is directly tied to environmental protection. The Tourism Council of the South

⁴ Page 11, Esrom (1990) under DEVELOPMENT/DEVELOPMENT AND ENVIRONMENT in References section

Pacific⁵ has suggested that there is good potential for developing tourism by promoting natural features. Such a tourism industry depends on a well protected environment as well as on good marketing, backing from the government, and the training of local people in the skills necessary to operate tourist enterprises. If managed carefully and in full consultation with local people, nature tourism offers an opportunity to encourage environmental protection while being only minimally disruptive of local cultures. The present set of attractions that draw tourists to Vanuatu includes natural features, but these are not the main focus of the country's tourism image and are unlikely to become as significant as they may in Solomon Islands or Papua New Guinea. Nonetheless, given the comparative importance of the tourism industry in Vanuatu, an expansion of nature tourism could be a useful component of sustainable development.

3.23. That land cannot be purchased provides the opportunity to insert environmental safeguards into negotiator's certificates and leases (paragraph 2.5). To take full advantage of this opportunity, the implementation of legal procedures will need to be combined with education of the custom land owners as to the ultimate value of protecting their land. The leasing system also provides for cancellation of leases where the particular farming operation is under-performing in terms of land capability. Carrying out these environmental-protection and economic-assessment procedures will require a strengthening of both monitoring and enforcement capability.

3.24. The time is mostly past when lending or aid institutions urge environmentally questionable projects onto recipient countries for economic reasons. Most agencies have internalized environmental concerns into their projects. But short-term projects often prove unsustainable in the longer term. When external funding ends, local support and monitoring may have to be concluded, which leads to frustrating discontinuities of information and control (paragraph 3.14). Changes in granting procedures that allowed for longer project time spans could be helpful in maintaining sustainability. Beyond this sort of adjustment, a more fundamental change of outlook is required. Sustainable development, if it is to be successfully implemented and institutionalized, cannot be based solely on a set of project "packages". Sustainable development will be an evolutionary process, requiring constant adaptation to changing human and

⁵ See Tourism Council of the South Pacific (1988) under Tourism and Nature Conservation in References section

environmental conditions. It needs to be viewed as an ongoing process, not as a set of discrete projects. To keep it in place will require incremental policymaking and planning.

3.25. Because ni-Vanuatu and the Vanuatu Government place great emphasis on custom belief and practice, there are opportunities for encouraging the further use and protection of traditional systems of sustainable agriculture and agroforestry and for promoting the integration of traditional knowledge into sustainable resource management. A mechanism already exists for such action in the Vanuatu Cultural Centre (with 29 fieldworkers based in their own culture and language areas) and the Malvatumauri (the system of chiefs, from the village to the national level). The National Council of Chiefs strongly supports use of traditional methods and values and urges that primary school dropouts should be encouraged to stay in rural areas and learn traditional ways rather than seeking urban employment. This promotion of traditional ways could be more closely linked with re-introductions of traditional and sustainable methods of agriculture, such as irrigated taro cultivation (paragraph 1.4), which also ties into suggestions for promoting agricultural intensification (paragraph 3.6).⁶ The further development of productive and protective agroforestry systems can also be promoted as a traditional practice (paragraph 1.19) rather than as a newly discovered introduced technology.

3.26. The Vanuatu system of custom land ownership is sometimes seen as an environmental issue (paragraphs 1.47-1.48) because the custom owners are empowered to manage their land as they wish, which can include bad management, neglect, or the granting of harmful exploitation rights. However, this strong local jurisdiction, which is an incontrovertibly respected part of ni-Vanuatu culture, is also an opportunity if local people are imbued with principles of management for sustainable development. Large developments and projects on leased land can be relatively easily made subject to environmental controls (paragraph 3.23). The countless smaller activities of villagers and smallholders, which combine to cause the larger part of the country's land degradation, will change only on the basis of changed local imperatives, beliefs, and knowledge. One way to work toward the goal of locally based sustainable development is to encourage local communities to work out their own land-use management policy by providing technical information on

⁶ It should be added that intensifying taro production on a sustainable basis as far as soil fertility goes may run into problems of disease and insect infestation.

resource-development options and consequences, workshops as a focus for discussion, and secretarial aid to produce required documentation. The essence of this approach is contained in the Prospectus to the National Conservation Strategy, where it is recommended that the Strategy be formulated with an emphasis on public education and participation, and local-level conservation planning.⁷

3.27. The conjunction of the preparation of the Vanuatu National Conservation Strategy with the development of the Forest Resource Information System (paragraph 2.11) provides the opportunity to establish a method of assessment and planning at all levels, extending from the individual land custodian and village community through project, island, and region, to nation. Essential to the method will be extensive communication within the country, including: wide dissemination of information about land limitations and capabilities; advice about degradational hazards and their controls; and discussion about physically, biologically, and economically sustainable alternatives to currently destructive forms of land use and resource exploitation. Vanuatu already possesses several building blocks that could support sustainable development. The country's task in preparing the National Conservation Strategy is to work the building blocks into a mutually reinforcing structure, out of which can come the effective and creative decisions necessary to avoid further environmental abuse and to achieve sustainability.

⁷ See Dahl (1988) under NATIONAL CONSERVATION STRATEGY in References section

Chapter 4

PROCEDURAL MATTERS

A. Report Preparation

4.1. As part of the South Pacific's preparations for UNCED, SPREP coordinated technical assistance to 15 Pacific Island Developing Countries (PIDCs) for the purpose of preparing their National Reports for UNCED. For Vanuatu, this technical assistance was provided by Dr William C. Clarke, who made two visits to the country (17 April to 15 May 1991 and 21 July to 4 August 1991). Dr Clarke's in-country work was coordinated by Mr Ernest Bani, Principal Environment Officer, Environment Section, Ministry of Home Affairs, Republic of Vanuatu.

4.2. During the first part of his initial visit, Dr Clarke reviewed relevant documents and consulted, in the company of Mr Bani, with a wide range of Government officials, members of NGOs, and others (listed in paragraph 4.3). Dr Clarke then compiled the first draft of the Report, which was reviewed by the Vanuatu UNCED Task Force at a meeting held on 14 May 1991 in Port Vila under the chairmanship of Mr Bani. On the basis of oral comments made at the meeting and written comments submitted to Mr Bani after the meeting, Dr Clarke produced a second draft of the Report, which was reviewed by the Task Force at a meeting held on 26 July 1991. At that meeting, the Task Force recommended that, following the inclusion of emendments suggested during the meeting, the Report be submitted to the Vanuatu National Development Committee for endorsement.

B. Role and Composition of the National Task Force

4.3. The persons listed in this paragraph were consulted by Mr Bani and Dr Clarke during the preparation of the UNCED National Report for Vanuatu. Names of persons who attended the first Task Force Review meeting (14 May) are marked with an asterisk (*). Those who attended the second Task Force meeting (26 July) are marked with a cross (+).

Environment Section, Ministry of Home Affairs

- * +Mr Ernest Bani, Principal Environment Officer
- Mr David Esrom, Senior Marine Conservation Officer
- * +Ms Jenny Whyte, National Conservation Strategy Coordinator
- +Mr Charles Vatu, Assistant Environment Officer

Department of Agriculture, Livestock and Horticulture

- *Mr Philip Dovo, Director
- Mr Fred Iakam, Acting Director
- Dr I.S. Webb, USP-Ireta Research Fellow
- * +Mr David Macfarlane, Vanuatu Pasture Improvement Project

Attorney General's Office

- Mr Silas C. Hakwa, Attorney General
- Mr Hamlison Bulu, Legal Officer
- +Mr Jack Iamlae, Legal Officer

Fisheries Department

- * +Mr Wycliff Z. Bakeo, Director

Department of Forestry

- *Mr Aru Mathias, Forest Utilization Officer
- *Mr David Wood, Acting Director

Department of Geology, Mines and Rural Water Supply

- * +Mr Cedric Mortimer, Director

Department of Health

- *Dr Roy Fey, Principal Medical Officer, Rural Services
- +Mr Gideon Mael, Health Planner

Department of Industry

- Mr Japin Tari, Director
- Mr Eric Oude Vrielink, Chief Technical Advisor (UNIDO)

National Planning and Statistics Office

Mr Garvan McCann, Natural Resources Planner
Dr Gerald Haberkorn, Principal Planning Officer
Mr Michael Grey, Development Budget & Systems Adviser
+Mr Edgell Tari, Assistant Planner, Infrastructure

Department of Physical Planning and the Environment

* +Mr David Blaikie, Physical Planning Advisor, Physical
Planning Section

Statistics Office

*Mr Lennox Vuti, Principal Statistician

South Pacific Regional Environment Programme (SPREP)

*Mr Gerald Miles, Project Officer/UNCED

Commonwealth Scientific and Industrial Research Organisation
(CSIRO)

Mr John McAlpine, Coordinator, Forest Resource Information
System

Office de la Recherche Scientifique et Technique d'Outre-Mer
(ORSTOM)

+Dr Gilbert David, Fisheries Officer

Vanuatu National Council of Women

*Ms Jacquie Adams

Vanuatu Agricultural and Resource Management Services

Mr Jeremy Challacombe, Agricultural and Natural Resources
Consultant

Frank King Tours

+Mr Frank King, Tour operator

Malapoa College

*Mr Martin Horrocks, Teacher, and Editor of Naika (Journal of the Vanuatu Natural Science Society)

C. The Role of Nongovernmental Organizations (NGOs)

4.4. Several NGOs are involved in environmental activities in Vanuatu (paragraph 2.19). Members of two of these organisations were consulted during preparation of the UNCED National Report; the two persons consulted also attended the first meeting of the Task Force. One of these NGOs is the Vanuatu National Council of Women, a non-political, non-religious organization that has developed a wide network amongst women at all levels in the country and is concerned to provide a voice that speaks on behalf of improving women's lives. The other organization is the Vanuatu Natural Science Society, which brings together people interested in understanding and protecting Vanuatu's natural history. The Society publishes Naika, a journal that often contains articles on problems of resource depletion and environmental degradation.

D. Level of Government Endorsement

4.5. The present UNCED Report has been considered at two meetings of the Vanuatu UNCED Task Force. At its second meeting (26 July 1991), the Task Force recommended that the Report, which has been twice emended on the basis of Task Force comments, be submitted to the National Development Committee for endorsement.

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