

FORESTRY DEVELOPMENT IN WESTERN SAMOA

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ABSTRACT

Forests have two primary roles in the economy of Western Samoa: as a source of raw material for various domestic timber-based industries (mainly sawnwood and furniture) and for export; and as a stabiliser of vital watersheds — preventing soil erosion and increasing water yields for hydropower generation and sustained agricultural production at lower elevations.

Indiscriminate clearing and burning of forests on higher elevations have adversely affected the domestic timber supply as well as hydropower generation. These problems are very difficult to control, largely because of the nature of the local land tenure system whereby more than 80% of the total land area is held under customary ownership. The loss of forest through land clearing for agricultural crop farming is continuing at an accelerating rate and it is estimated that most of the potentially productive forest could be destroyed in the next 10 to 15 years.

To ensure a sustained supply of raw materials for the timber industry, a reforestation programme of fast-growing hardwood species was initiated in 1973 and was expanded in 1977 with Aid assistance from the government of New Zealand. Two other similar programmes now combine to establish about 900 ha of forest plantation per annum.

While the forest industries are still lagging behind copra and cocoa in terms of their contributions to the national economy, it is expected that, with proper management and marketing services, they will eventually gain momentum and become one of the country's major earners of foreign exchange.

INTRODUCTION

Western Samoa, which lies between latitudes 13° and 15° South, comprises a number of islands and islets. The main islands are Savaii (with an area of approximately 1 700 km²) and Upolu (approximately 1 170 km²), and the total land area is 2 935 km². The islands are geologically of recent origin and consist mainly of basalt.

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The climate is tropical oceanic and is influenced by the south-east trade winds which blow for much of the year. The rainfall increases with altitude and is markedly lower on the north and north-west coasts, where there is a dry season between July and October. Annual rainfall ranges from under 2 500 mm at the western end of each island to over 6 500 mm at high altitudes on Savaii.

Western Samoa's total population in 1979 was estimated at 154 000. It is very unevenly distributed, with population densities of 52 and 25/km² on South Upolu and Savaii, respectively. Employment is predominantly in agriculture and the principal crops are coconuts, taro, bananas, and cocoa which collectively occupy over 90% of the cultivated area. Since agriculture contributes well over 90% of Western Samoa's export earnings, prices of these export crops determine the standard of living for most Samoans.

FORESTRY SECTOR

Forest Policy

The primary forest policy document in Western Samoa is the Forest Act 1967 enacted:

"to consolidate, amend and extend the law relating to the conservation, protection, and development of the natural resources of the country, especially soil, water and forests and to enable effect to be given to the following principles and objectives.

- (a) To maintain and establish where necessary, areas of forests adequate to protect the climate, soil and water resources of the country.
- (b) As far as possible to provide on a sustained yield basis, the forest produce requirements of the people and the industry of the country and to encourage an export trade and,
- (c) To ensure the best use of all forest lands for the general benefit of the country".

To administer this Act, a Forestry Division was set up in 1967 in the Department of Agriculture and Forests under the control of a Chief Forest Officer assisted by other officers and employees.

The Forest Regulations 1969

These regulations give effect to the broader aims of the Forest Act by describing in some detail the procedures to be followed for certain activities. The bulk of the regulations are concerned with the collection and removal of forest produce, awarding wide

powers to the Chief Forest Officer to control the logging of all forests.

The Forest Policy was extended into more meaningful terms in the 3rd Five Year Development Plan (1974 - 79) where a review was made of the country's forest industries. Arising from these discussions and a simple evaluation of pilot trials, the plan set out a development plan for the reforestation of 1 000 acres (404 ha) per year.

THE INDIGENOUS FOREST RESOURCES

Forests cover more than 50% of the land area of Western Samoa but about one-third of them are on steep terrain where their function must be protective rather than productive. Production forests are located in west and south-west Savaii, in east and south Savaii, and in south Upolu. On the easier terrain of Upolu, forest land is being cleared at a rate exceeding 1 000 ha annually for agriculture and it has been estimated that within 10 to 15 years most of the potentially productive forest could be destroyed.

Forest resource surveys which have been conducted during the past decade show that the volume of economically accessible wood on Upolu ranges from 600 000 to 1 500 000 m³ of which some 100 000 to 300 000 m³ are of sawntimber sizes. On the less densely populated island of Savaii, the accessible volume is substantially higher (3 to 7 million m³, of which 1 to 3 million m³ is of sawntimber volume) and the rate of land clearance is slower.

The forest types are typical of the South Pacific islands. At lower altitudes, *Pometia pinnata* forest is widespread, with *Planchonella terricellensis* dominant on south-facing slopes. On the northern slopes of Savaii and in a few locations in Upolu, *Calophyllum samoensis* (a species used in the construction of dugout canoes) is dominant. A transition zone of *Syzygium* forest at altitudes up to 60 m leads to Amoora-dominated forest.

Most of the forest below about 150 m in altitude has now been cleared and relatively little of the rich and valuable *Pometia* forest remains. Tables 1 and 2 give summaries of the forest resources.

FOREST ESTABLISHMENT

To supplement the diminishing forest resource, a reforestation programme was started on government land in western Savaii in 1973. Another similar programme was initiated on southern Upolu in 1978.

TABLE 1: FOREST AREAS (ha)

	<i>Savaii</i>	<i>Upolu</i>	<i>Total</i>
Land area	171 012	114 737	285 749
Productive forest	79 028	24 657	105 684
Non-productive forest	25 344	25 263	50 607
Total forest area	104 372	49 920	156 291
Forest as % of land areas	61	43	54

TABLE 2: VOLUME IN MILLIONS OF CUBIC METERS

<i>Region</i>	<i>Timber</i>	<i>Chipwood</i>	<i>Fuelwood</i>	<i>Total</i>
West Savaii	0.84 - 0.89	0.96 - 2.25	0.69 - 0.17	2.53 - 4.54
East Savaii	0.15 - 0.46	0.37 - 1.24	0.16 - 1.07	0.68 - 2.77
Upolu	0.08 - 0.30	0.28 - 0.74	0.13 - 0.41	0.49 - 1.45

(Source: "The Forest Resource of Western Samoa," P. F. Olsen and Co, Rotorua, N.Z., 1977).

In 1976, the Savaii project was expanded considerably with assistance from the New Zealand Bilateral Aid Programme (NZBAP) which provided professional staff, heavy machinery and plant, staff quarters, equipment and tools, and assistance in the training of local personnel. In 1977, an annual target of 404 ha of new plantations was set for this project and with the Upolu project, some 536 ha of fast-growing low-density hardwood (e.g., *Eucalyptus deglupta* and *Anthocephalus chinensis*) and furniture wood (teak and mahogany) plantations were created on government land each year.

In 1980, an agreement was signed between the Asian Development Bank, and the governments of New Zealand and Western Samoa to expand forestry development in Upolu and eastern Savaii. As a result, the planting target for the Upolu project was increased from 122 to 235 ha/yr with a set target of 260 ha/yr for eastern Savaii.

The ABD/NZ/WSG project also made provision for the purchase of timber extraction equipment and transport to produce 12 500 m³ annually (at capacity) from communally owned forest areas which are being cleared for planting of agricultural crops on Upolu: the construction of 10 km of all-weather roads and 21 km of formed tracks on Upolu, and 21 km of formed tracks on Savaii, provision of workshop and maintenance equipment for the training of Samoans in various forestry skills.

A summary of planting achievements for the various projects is given in Table 3.

TABLE 3: AREA PLANTED BY PROJECT (ha)

Year	Upolu	Project area		Total
		W. Savaii	E. Savaii	
1970	—	112	—	112
1977	—	358	—	358
1978	92	561	—	653
1979	200	432	—	632
1980	92	426	—	520
1981	120	343	—	463
1982	98	436	12	546
Total	602	2670	12	3284

THE INDUSTRIAL SECTOR

Two sawmills of significant size have been the main users of the forest resources since 1972. Samoa Forest Products Limited (SFP), with 98% government shareholding, operates on the bigger island of Savaii and has an annual capacity of 24,600 m³(s) (10 million bd ft.) New Samoa Industries (NSIL) is a much smaller company, with 50% being owned by the government through SFP shares.

In 1982, a veneer plant was attached to the SFP sawmill and has just started operating. All produce will be exported to Australia but it is most likely that the manufacture of plywood in Samoa could be realised in the near future.

Domestic markets absorb much of the locally produced sawnwood. All other industrial wood products, such as panel boards, newsprint, and paper products are imported and will continue to be imported as the local market is too small to warrant local production.

The construction industry's demand for sawnwood varies, but it is estimated that a wooden house built to European standards in Samoa uses 5 to 10 m³ of sawnwood. A large quantity of sawnwood is used for framing, cladding and inside paneling. The demand for sawnwood by the local people is to upgrade and extend traditional fale (houses) progressively with exterior and, later, internal cladding.

Domestic sawnwood consumption is running at 0.08 to 0.10 m³ per capita per annum. Sawnwood is also used for construction, furniture, manufacture, as shooks for taro and banana cases, in vehicle bodies and other miscellaneous items. Because of import restrictions on sawnwood, the domestic market is forced to rely solely on local production.

The average annual intake of wood of a small furniture shop is 50 to 55 m³, and for a large furniture factory it is 270 to 280 m³. Demand for sawnwood for furniture is expected to rise with the increase in population and *per capita* income.

The two sawnwood producers supply a captive market. Samoa Forest Products supplies all major retailers, while NSIL sells all produce at mill gate. The retail mark-up varies between 25 and 35% and only standard sizes are normally available. Compared with an ex-mill price of about US\$140/m³ the retail price of imported *Pinus radiata* kiln dried, gauged and treated, was US\$308/m³. (ADB Report No. SAM, 12 April 1980).

PROJECTED FUTURE SAWNWOOD CONSUMPTION

ADB in 1980 projected the sawnwood consumption in Samoa to the year 2001 based on two different sets of assumptions (see tables 3 and 4). In the first case, the 1978 sawnwood consumption was projected based on a population growth of 2% per annum. This projection foresees sawnwood consumption rising from 18 000 to 28 000 m³/yr at an annual average increase of 2%. In the second case, sawnwood consumption was projected based on a 2% GNP *per capita* and a 2% growth in population. The second estimate shows that annual consumption would rise from 18 000 to 65 000 m³/yr, an average annual increase of about 6.5%. Average annual increase in sawnwood consumption is most likely to be 2.0 to 6.5%.

TABLE 3: DOMESTIC SALES, EXPORTS, IMPORTS AND APPARENT CONSUMPTION OF SAWNWOOD

Year	Domestic* Sales (a) m ³	Export (b) m ³	Import (c) m ³	Apparent† Consumption (a - c) m ³	Population	Apparent Consumption per 1000 Population in m ³
1971	9 303	5 400	3 516	12 819	146 627	87.42
1972	9 609	8 104	4 106	13 715	147 653	92.88
1973	14 042	9 490	1 380	15 422	149 815	102.94
1974	15 691	8 083	901	16 592	149 198	111.20
1975	9 175	2 985	1 441	10 616	150 774	70.41
1976	12 225	1 744	1 445	13 670	151 983	89.94
1977	10 837	3 591	1 521	12 358	152 672	80.94
1978	15 637	4 353	2 473	18 110	153 679	117.84

*Domestic production is higher than domestic sales.

†This does not include round logs, posts and coconut stems being used in villages. The Forestry Division estimates these uses at about 3 000 m³ annually.

TABLE 4: SAWNWOOD CONSUMPTION PROJECTIONS (m³)

<i>Year</i>	<i>A*</i>	<i>B†</i>
1978	18 110	18 110
1981	19 898	22 274
1986	21 951	28 636
1991	24 291	36 477
1996	26 225	45 388
2001	27 784	65 060

*Based on population growth of 2% at the consumption level of 1978.

†Based on 2% GNP *per capita* and 2% population growth.

Source: ADB Report No. SAM: April 12 1980.

There is no market for fuelwood in the village, since villagers can draw their supplies from agricultural areas and various land clearing schemes at no cost. In the Apia urban area 25 kg bundles of fuelwood are sold in the market at WS\$1.00 per bundle (equivalent to about U.S. \$47.00/m³). Some off-cuts from NSIL are sold for fuelwood or other miscellaneous uses for about U.S. \$6.00/m³.

In 1979, the Forestry Division prepared a plan for forestry for the period 1980-84, and it has been incorporated into the Fourth Five-year National Development Plan (DP4). The principles and objectives required under the Forest Act 1967 were stressed resulting in considerable expansion of the reforestation programme.

The main increase in production envisaged as a result of expanded reforestation programmes is to provide for additional sawnwood to meet the rising domestic demand and fuelwood for wood-fired power stations.

In view of the government's commitment to self-sufficiency in sawnwood and electricity generation through wood-fired power stations, forestry development which aims at the creation of substantial areas of forests and as utilisation of timber from land being clearfelled for agriculture is highly desirable.

FORESTRY DEVELOPMENT RISKS AND PROBLEMS

At present there are three major risks involved in the development of large areas of forest plantations.

(1) *The Timely Availability of Land for Reforestation*

The continuity of supply of raw materials and thus the viability of the timber industry depends solely on the availability of adequate areas of land (government and customary land) for reforestation. This, however, creates several difficult problems. First, the

government owns less than 20% of the land area and is therefore not in a position to provide adequate land for forestry. Secondly, customary lands are not properly surveyed and village land boundaries are therefore not demarcated. Land negotiations take several months, if not years, and court decisions to resolve boundary disputes are not uncommon. It is evident that unless more customary land is made available for forestry development, the future of the industry will be severely jeopardised.

(2) *Natural Disasters*

Although it is not a major concern at present, the threat of an outbreak of natural disasters (*e.g.*, hurricanes, fire, pests and diseases) is very much a force to be reckoned with. Forest plantations are relatively young in age (the oldest stands being about 10 to 12 years) and evidence of any major threats are minimal.

(3) *Expected Timber Yields from Reforested Areas*

It is possible that expected timber yields will not be realised owing to various factors that affect tree growth. However, the species selected for reforestation have been tested under local conditions, and recent estimates show that they are capable of attaining high sawtimber volume yield. (Yields of 90 to 110 m³/ha of sawtimber are predicted on a ten-years' rotation for *Eucalyptus deglupta* and *Anthocephalus chinensis*).

SOCIO-ECONOMIC BENEFITS OF FORESTRY DEVELOPMENT

The primary goal of Western Samoa's national forest policy is to maintain and establish, where necessary, areas of forests to protect the climate, soil and water resources of the country and as far as possible to provide, on a sustained yield basis, the forest produce requirements of the people.

Forestry development will substantially contribute to improvement in land use. Given the dominance of customary land ownership a clear demonstration of systematic extraction and reforestation on marginal lands will go a long way to rationalising customary land use at higher elevations.

The primary benefit to the economy from the timber industry and reforestation programmes has been the increased and sustained production from the nation's forest and marginal lands, although substantial increases in replanting are needed to ensure continuity of wood supplies in the medium and long term.

Forestry and related industries are massive employers of labour, and to that extent, forestry development has a considerable role in alleviating the unemployment problem in Western Samoa. Migration to urban centres has been controlled in areas of forestry concentration. Improved standard of living, particularly in Western Savaii where the sawmilling industry and reforestation programme are centred, has been quite evident during the past 5 years. Communication links have been improved and employment opportunities are plentiful with labour shortages now being experienced at times.

Apart from meeting the increasing local demand for sawtimber, and the supply of fuelwood (for home-cooking and for wood-fired power plants) as by-product of timber extraction operations, forestry development will have a salutary affect on the balance of payment situation of the country as it could result in a substantial reduction in imports of diesel fuel.

Forestry development has a considerable role to play in the development of the national economy, particularly in the rural areas. Government has realised this and has rightly given high support for forestry programmes. With fast growing forest plantations now being developed, it is expected that full benefits will begin to flow into the economy in the next 10 to 12 years.