


SOUTH PACIFIC REGIONAL ENVIRONMENT PROGRAMME

COUNTRY REPORT

T U V A L U

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SOUTH PACIFIC REGIONAL ENVIRONMENT PROGRAMMETUVALU COUNTRY REPORTINTRODUCTION

Tuvalu consists of nine coral islands, rarely reaching more than 4 metres in highest elevation, with a total land area of 2,511 hectares. Funafuti, Nanumea, Nui, Nukufetau and Nukulaelae are atolls, generally with narrow strips of land on the east and reef with scattered islets on the west. Nanumanga, Niulakita and Niutao are reef islands consisting of single islets with brackish internal lakes. Vaitupu is intermediate in type, with a large but virtually land-locked central lagoon.

Hurricanes have played a major role in land formation by throwing up rubble from the reef, and major hurricanes have been recorded in 1891, 1958 and 1972.

Tuvalu, the former Ellice Islands, became independent in 1978. The 1979 census recorded a population of 7,349, of whom 70% are in the subsistence sector of the economy. An additional 1,381 Tuvaluans were temporarily abroad.

Because of their small size and coral origin, the islands have very limited resources, and are more sensitive to environmental problems. The major export is postage stamps, earning four times as much as copra, which is the only natural resource export at present. Therefore, despite efforts at self-sufficiency, Tuvalu is still dependent on foreign aid.

POLICY AND IMPLEMENTATIONPolicy

The major statement of government policy is the Second Development Plan 1980-1983, which emphasizes basic infrastructure, rural development, agriculture and fisheries.

The chapter on Conservation and Environmental Improvement states the aims of the government as follows :

"The government recognizes that the eco-system on the isolated coral atolls that make up Tuvalu is very finely balanced and that a stable environment is vital to the life styles of the people.

"The primary aim of conservation is to : -
- protect the environment from pollution and unnecessary exploitation beyond the immediate needs of the people.

"In some respects, this aim may conflict with other objectives for developing the country's natural resources and the government will be watchful and ensure that the overall natural resource balance remains in a state of equilibrium.

"The conservation policy is designed to preserve the wildlife and the natural resources of the country, particularly where they are important to the subsistence needs of the outer islands, so that future generations will be able to enjoy the same benefits of the environment as people of today."

Legislation

While there is no environmental legislation as such in Tuvalu, there are ample provisions in other legislation to cover most areas of environmental concern. These include :

- Penal Code (fishing with explosives, polluting water, negligence with poisons)
- Local Government (wide powers to make local regulations)
- Mineral Development (prevention of mining pollution, rehabilitation)
- Foreshore and Land Reclamation (regulating sand and coral removal and reclamation)
- Pharmacy and Poisons (power to control import, sale and use of listed poisons)
- Quarantine (controlling import of noxious insects, pests and diseases)
- Public Health (power to make regulations; regulations concerning waste disposal, water supply pollution, and mosquito control)
- Pure Food (foods with poisonous or injurious ingredients)
- Plants (permit required to import plants)
- Water Supply (pollution of water supplies; power to declare water reserves)
- Petroleum (power to regulate import, handling and storage, and to prevent discharge into coastal waters)
- Importation of Animals (permit required to import animals)
- Fisheries (prohibits fishing with explosives and poisons; power to make regulations)
- Wildlife Conservation (protects most seabirds; power to make wildlife sanctuaries)
- Prohibited Areas (power to declare prohibited areas)

- Harbours (controls vessels carrying dangerous materials; prohibits discharge of sewage or oil into harbours without permission)
- Oil Pollution (applies international conventions on civil liability and compensation)
- Nuclear Installations (liability for injury from radioactive materials transported in territorial limits)

There is no legislation providing for the protection of plants, historic or archaeological sites, or features controlling erosion or providing shelter from hurricanes (such as rubble ridges, coastal vegetation and windbrakes), controlling the importation of marine life, or calling for environmental assessments of development projects other than mining. While the power to make regulations is adequate, the regulations themselves are often weak or entirely lacking. For instance, there are no regulations concerning pesticides, water supply protection, and petroleum pollution outside of harbours. The implementation and enforcement of legislation is often poor, frequently because the expertise and awareness of problems is lacking, or because the legislative provisions were developed elsewhere and are inappropriate to conditions in Tuvalu.

Tuvalu is a party to the International Convention on Civil Liability for Oil Pollution Damage (1969) and the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (1971). The government is in favour of better international control of oceanic fisheries, and would like to see the region declared a nuclear-free zone in which all nuclear waste dumping would be prohibited. It would be useful to have advice on other international conventions to which Tuvalu might appropriately become a party.

Planning

Economic development planning is the responsibility of the Planning Office in the Ministry of Finance, and the Planning Committee. Island Councils also plan their own Island Development Programmes. There is little experience in, or information for, the environmental aspects of planning. A physical development plan exists for Funafuti and has just been updated, but continuing advice will be needed for effective physical planning. A land resources survey is to be made shortly. Outside assistance would be needed for the environmental assessment of any major development projects.

Administration

Environmental responsibilities are divided between the Ministries of Social Services (health and education), Commerce and Natural Resources (agriculture, fisheries, conservation) and Works and Local Government (construction, water supplies, local government).

A local committee was created in 1980 for the South Pacific Regional Environment Programme, and it has reviewed priority areas and projects of concern. This committee will continue as the Environment Committee to co-ordinate government actions concerning the environment, to review development plans and projects, to examine significant cases of pollution and resource degradation, and to co-ordinate Tuvalu participation in the South Pacific Regional Environment Programme. The Environment Committee has recommended to Government that application for projects which are likely to have an environmental impact should be submitted to the Environmental Committee for its comment before submission for final approval.

Much responsibility for environmental management must rest at the local level with the Island Councils. These Councils have broad authority on their islands, but presently lack the management skills, expertise and financial resources to exercise their responsibility effectively.

ASSESSMENT

Major Environmental Problems

The only urban area is on Funafuti, the national capital, where the land area for urban expansion is very limited. All water comes from rainwater catchment, and is subject both to contamination and to shortage in time of drought. Many houses still lack latrines or septic tanks. Disposal of solid wastes, particularly cans, bottles and plastics, is a major problem. Almost all food for the urban population must be imported. The severe hurricane of 1972 nearly destroyed the town, and the risk is always present.

In the rural areas, the extremely poor soils make soil management and improvement a major problem. The groundwater, important for agriculture and on some islands for human consumption, is limited and subject to salinization. There is also evidence of significant pollution of the groundwater by human and animal wastes, which may be made worse by the latrines being installed under the rural sanitation project. While there is at present little use of pesticides and herbicides, the pressures for their use are increasing and their effects on the atoll environment are unknown.

In the coastal environment, nearly all the islands are trying to control problems of coastal erosion with gabion seawall construction, but there is little understanding of the currents and coastal process involved. Information necessary for the management of marine resources is almost totally lacking, but genuine efforts are being made to rectify this inadequacy, and perhaps Vaitupu, as well as of giant clams and turtles. Information necessary for the management of marine resources is almost totally lacking.

Research and Monitoring

There are ongoing programmes of agricultural research by both resident staff and visiting consultants, and there is some capability for environmental health monitoring, but in a small country like Tuvalu the research capacity will always be very limited.

More research and monitoring are needed, particularly on coastal fisheries resources, wildlife (seabirds) used for food, coastal geomorphology, soil nutrients, and pollution of groundwater and water supplies.

While the government should develop some simple routine monitoring programmes, major assessments or surveys will need to be provided by outside aid. The results of the Royal Society expeditions in 1896-98 can provide useful baseline information for geomorphological monitoring on Funafuti.

MANAGEMENT

Status of Resources

SOILS. As on all atolls, the soils are limited in both quantity and quality, with imbalances from the very high calcium content and alkalinity that increase with cultivation. The fertility depends largely on the organic content and is thus easily lost if poorly managed. Traditional agriculture is concentrated in pulaka (swamp taro) pits excavated to groundwater level and enriched with added organic matter.

WATER. Rainwater is the principal source for human consumption on the wetter islands, and there are projects at present to increase the storage capacity for times of drought. However, the roof catchments and tanks need better maintenance to avoid contamination, and a regular programme of monitoring and cleaning when necessary should be instituted. A brief study in 1978 identified slight pollution by fecal coliform bacteria (an indicator of fecal contamination) in every cistern examined on Funafuti, with significant pollution in several government hotel, hospital and town council cisterns. Those at Falepepe and south of Falepepe failed even to pass international standards for swimming and bathing water. A few houses and churches have asbestos cement roofs which have been shown to produce asbestos contamination in drinking water. The health risk from this is unknown, although asbestos fibres are known to cause cancer. A simple precautionary measure such as painting these roofs might be in order.

The groundwater resources are poorly known and should be surveyed. Some wells and pulaka pits have become too brackish for use. Studies on Vaitupu by the University of the South Pacific have shown significant contamination of the groundwater by intestinal (coliform) bacteria, and the same problem may be widespread on other islands where the siting of latrines and wells has not been made with this in mind. A complete survey of the problem is needed, and important water catchment areas may well require special protection.

CROPS. An agricultural development survey was made in 1976 and a research programme started in 1978, but the possibilities for atoll agriculture are limited, with coconuts, pulaka, taro, breadfruit and bananas remaining the principal crops. Some efforts are being made at import substitution and increased diversity for better nutrition. There is a coconut replanting programme, but even the present crop is not completely harvested for copra. One problem with improving agriculture is the excessive fragmentation of land ownership.

ANIMALS. Pigs and chickens are the main domestic food animals. Goats have been introduced on a small scale with careful controls. Most other attempted introductions have failed. The lack of local feed is a major limitation. There may be some export potential in coconut crabs which should be investigated, but the resource should be carefully managed. There are strict animal and plant quarantine regulations in force.

FORESTS. While there are no true forests, there is a problem with the building pole and firewood supply from the bush, especially on Funafuti, reducing the protective value of coastal vegetation. Some plantings may be needed for this purpose.

MANGROVES. Mangroves occur around most inland lagoons and cover 40 hectares (about 1.6% of land area). Because of their inland location, their role in fisheries ecology is unknown, but the possibility of a link through underground connections with the sea should not be excluded. There are some uses for mangrove wood. Some reclamation of mangrove areas may be attempted, particularly on Funafuti.

REEFS AND LAGOONS. The islands of Tuvalu appear to be rather young, with changing land areas and lagoons still filling with sediment. The impact of occasional cyclones would keep the coral reefs in a state of change and regeneration. The studies by the Royal Society suggested that there was a high rate of sand production by algae and foraminifera in the Funafuti lagoon, which should allow some localized removal of sand away from coastal areas for fill or construction without significant effect. The channel blasting projects in the outer islands are essential to provide safe transportation, but they should be monitored in case there is an associated increase in fish poisoning or coastal erosion. There is great concern about erosion of land areas, with consequent sea wall construction, but it is quite normal for reef islands to shrink, grow, or change shape, and the forces involved may be beyond the control of any reasonable coastal engineering projects. Only a detailed study of geomorphology, waves, currents, and coastal processes can show where erosion controls may have a reasonable chance of success or where they may just be a waste of money.

FISHERIES. A preliminary fisheries survey was undertaken in 1976. The offshore tuna and skipjack resources are significant, and projects are under way for Tuvaluan participation in their harvest, although the local supply of baitfish may be a problem. There is little information on lagoon and reef fisheries. Beche-de-mer was successfully harvested at Funafuti, but the fishermen lacked motivation to continue. There are recent signs of overfishing on Funafuti and the resources on Vaitupu are also limited, but elsewhere the resource seems adequate for the demand. Giant clams and sea turtles are also declining from over-exploitation, and their harvest should be controlled, as both are very slow-growing and therefore slow to respond to management measures. The changes in fishing impact from new technologies such as outboard motors are so recent in Tuvalu that their effect is not yet noticeable. New management controls and fisheries extension work will be needed as the impact spreads. Some consideration has been given to aquaculture, particularly for baitfish, but the porous structure of the islands would make pond construction difficult. There is a ciguatera problem in some localized areas, and red tides toxic to fish have been reported in some lagoons.

CONSERVATION. While most seabirds are protected by law, they are an important traditional food source and have not been endangered by subsistence use. The considerable increase in shotguns and airguns may result in over-exploitation and lead to loss of an important resource. Revised legislation should be introduced allowing Island Councils to make regulations for the limited take of common species. Wildlife sanctuaries may need to be declared to protect local seabird and turtle breeding areas. Further studies of wildlife are needed to allow their proper management.

ENDANGERED SPECIES. Because green turtles may take decades to reach reproductive maturity, they are very slow to show signs of overfishing, and the recent decline is worrying. Better protection of turtle breeding areas is needed, and all the rarer species, at least, should be totally protected. Some of the rarer land birds and seabirds also may be endangered if not protected. An inventory of the flora and fauna would show if there are other species at risk.

LOCAL ENERGY SOURCES. The present oil installation on Funafuti is substandard and should be provided with better protection against pollution. There is also a pollution risk from old American fuel dumps on some islets of Funafuti, and perhaps from some recent shipwrecks. The fuel should be salvaged if possible for local use. Solar and wind energy may well have local applications. There is good potential for charcoal production from coconut wastes and overage trees, and for the use of coconut oil as a replacement fuel for diesel on the outer islands.

MINERALS. There are no known mineral resources other than some small amounts of phosphate. Sand and aggregate for construction are generally taken from beach or coastal areas, thus contributing to coastal erosion. New sources of these materials are needed, and a study is planned to determine the best locations. Research on coastal dynamics would show where sand and rubble are lost to deep water and therefore could be taken without risk.

HUMAN RESOURCES. Most of the population of Tuvalu lives at a subsistence level where the basic quality of life is reasonably high. There are some deficiencies in the diet made worse by the increasing adoption of imported foodstuffs. Sanitation in some rural areas is inadequate as shown by the occurrence of environmentally-transmitted diseases such as hepatitis and amoebiasis, but there are health education and sanitation improvement projects under way. Employment opportunities are very limited, but even where there are opportunities for cash incomes, the motivation for regular work is often lacking. The practice of paying wages or incentive payments even for community self-help projects has eroded the traditional spirit of communal work and raised the cost of rural development projects.

INFRASTRUCTURE. Transportation and communications are major problems for Tuvalu, both internally and with other countries, that greatly limit the possibilities for development. With one ship and one seaplane providing inter-island service, any mechanical failure or interruption of service for maintenance can leave the outer islands totally isolated. Electricity is presently provided only to the urban area on Funafuti.

Major Development Trends

HUMAN SETTLEMENTS. Although the government is trying to discourage urban concentration, the growth of the government centre on Funafuti will probably continue, producing increasing density and a housing shortage. Building regulations are required to ensure that housing meets minimum health standards and hurricane safety criteria. The present coral concrete technology seems deficient, and expert advice should be sought to improve it before further major buildings are constructed. In the areas of highest density, the sewage disposal problem could become acute. The present septic tank designs should be reviewed for their appropriateness to local conditions, and contingency plans should be made in any new construction to facilitate their connection to an eventual collective treatment system.

In rural communities, the water supply and latrine projects need to pay particular attention to siting to avoid creating new health problems and to minimize the contamination of groundwater. Some septic tank systems may be needed where pollution is a problem.

INDUSTRIAL DEVELOPMENT. The resources of Tuvalu are too limited and the islands too remote to permit any significant industrial development. There are plans to develop a commercial tuna fishery, but the possibilities for onshore support facilities for this are uncertain.

AGRICULTURE. There is a coconut replanting scheme to improve copra yields, and some efforts at diversification of crops, but there seems to be little potential for agricultural exports outside of copra. The major goal is therefore increased import substitution.

FISHERIES and AQUACULTURE. There are plans to increase the local fishery, with the appointment of an extension officer and the construction of a fish processing centre and market. The disposal of wastes from this facility will need careful attention. A Tuvaluan vessel will join in the commercial offshore fishery, but it will operate out of Fiji at least initially.

Management Approaches

Because of its small size, Tuvalu has not developed integrated planning outside of the Development Plan, and most decisions have been made on an ad hoc basis. A town plan exists for Funafuti and this has just been revised. There has been no planning other than building regulations to reduce the effect of disasters.

The government is a party to two international conventions concerning oil pollution, and would be interested in participating in a regional oil spill contingency plan.

With respect to population policy, there are family planning activities, but it has been difficult to keep them staffed effectively.

REQUIREMENTS FOR NATIONAL ACTION

New Actions

With the establishment of the Environment Committee on a continuing basis, there is no further need for governmental structures concerning environment at present. What is required in government is greater awareness of environmental problems, better training, and more planning expertise. A major effort is needed to train island councils and island executive officers, so that they will be more effective in handling environmental matters at the local level.

Public education programmes are needed on the issues raised in this report. As part of this, a museum should eventually be created, with both educational exhibits and reference collections. It should be incorporated in the plans for the new library and archives. Better school programmes in environmental education are also required, and are now being prepared.

Water is one of the most vulnerable resources in Tuvalu. A more complete survey of groundwater resources is needed, and the extent of pollution in both groundwater and rainwater catchments should be studied urgently because of the health risks involved. Measures will probably be required to protect major water catchment areas from contamination, including the better siting or relocation of latrines, and possibly the use of septic tanks and collectors or drains in vulnerable areas. The expansion of rainwater systems should be continued, with regular maintenance, monitoring for pollution, and cleaning where necessary. The use of asbestos roofs with such systems should be avoided, or the roofs treated to prevent asbestos contamination of the water.

A soil management and improvement programme should be developed, looking both at ways of adding more organic matter to the soil, and the impact of fertilizer applications. A study is needed of the costs and risks of land clearing with either mechanical methods and chemicals (herbicides), to determine if the latter are too hazardous for atoll use.

Since the land on atolls is formed from the sea, it is essential to understand the coastal processes involved in the construction and erosion of land areas. Where erosion can be controlled, better techniques for seawall construction are needed. Better planning is needed for hurricane protection. This should include identifying vulnerable areas, maintaining or reinforcing natural defenses such as hurricane banks, coastal vegetation and windbrakes and siting buildings in the most protected areas where possible. If it is necessary to build housing on the seaward side of the runway on Funafuti (where a 15m wave smashed buildings and swept people away in 1972), then a suitable hurricane warning system should be developed, and buildings identified where people could shelter in more protected areas. Plans also should be prepared for the rehabilitation of crops and trees after a hurricane, including the identification of sources of adequate planting material in all the islands.

Since any removal of material from the islands increases the risk of erosion, a study is planned to locate alternative sources of sand and aggregate for building and reclamation. If enough material is available, it should be possible to reclaim the large borrow pits left by World War II construction activities. If the lagoon sand is too poor in quality for use in concrete, alternative sources will be difficult to find, but any extensive use of hurricane bank material will increase the risk of storm damage inland.

The present rubbish disposal practices on Funafuti are both unsightly and a health hazard, and must be improved. Rubbish should be dumped at a single site, crushed and covered with sand. The old borrow pit farthest from the town centre is an excellent site for a sanitary landfill, and a small hydraulic dredge could easily bring sand from the lagoon to both cover the rubbish and gradually reclaim the pit. Eventually, some limited recycling might be practical, particularly the composting of organic materials and paper for soil improvement, and the salvaging of aluminum cans for scrap as part of a possible regional project.

A decline in coastal fisheries productivity from over-harvesting would have a serious effect on the local diet where opportunities for substitution are limited. Some attention could also be paid to the incidence of ciguatera fish poisoning and other marine pests and hazards where they are locally important, and to possible impacts of pollution from any planned uses of agricultural chemicals.

The expanding use of shotguns and airguns to shoot seabirds for food could lead to very rapid over-exploitation and destruction of an important traditional food source. The bird populations need to be studied to determine the sustainable harvest, and new regulations introduced including stricter gun controls if necessary, to provide for effective management of the resource.

The regulations concerning the import, storage and use of dangerous chemicals and products such as oil, pesticides and herbicides are inadequate or entirely lacking. Given the sensitivity of the small atoll environment to pollution accidents from such materials, there needs to be a careful review as to what chemicals should be permitted into the country, and how they should be stored and used. Some means is also needed to dispose of unwanted agricultural chemicals received under earlier aid programmes.

Requirements

EDUCATION : The school curriculum needs to be revised and expanded to include more appropriate environmental material. Top priority is being given to environmental science as a theme in the primary school curriculum, and a workshop is being held to implement this. The young people of Tuvalu need to become aware of the environmental processes that have created and now maintain the islands and their resources, and to develop the moral attitudes of respect and appreciation for their natural and human heritage that must underlie good resource management. There is a need for posters, pamphlets and charts that can be used for classroom instruction.

A great effort is needed to educate the public in environmental matters, since the management of most natural resources in Tuvalu depends on the daily actions of many individuals.

PERSONNEL. Tuvalu lacks both manpower and experience in technical environmental matters. There is some local public health expertise in the Medical Department, and some expatriate research personnel in agriculture and fisheries in addition to local officers. Since there is little possibility of an expanded public service in this area, the best approach for the government would be to depend on outside assistance for extensive surveys or highly technical advice, and to improve the background and capabilities of existing staff with in-service training and short courses.

There is a need for information programmes to explain environmental issues to government leaders and policy-makers, and for further training of teachers and planners.

A major lack in Tuvalu is of environmentally-knowledgeable leaders and staffs at the local government level. The island councils and island executive officers have broad responsibilities in agriculture, forestry, fisheries, erosion control, public health, planning and education at the local level, but very little training or experience in these areas. Programmes need to be developed to give them the understanding necessary to handle routine environmental management and monitoring on their own islands. This may require upgrading the posts of island executive officer.

FACILITIES and EQUIPMENT : The hospital laboratory and the health inspector have limited facilities for some pollution analyses, but the capacity for water supply surveillance needs to be upgraded, particularly with portable equipment which can be used on the outer islands. Beyond that, Tuvalu will need to depend for some time to come on outside researchers and laboratories such as the University of the South Pacific and the Atoll Research Unit on Tarawa.

OUTSIDE EXPERTISE : Tuvalu will require outside expertise for help with environmental problems in the following areas :

- water pollution and groundwater management
- soil analyses and management
- coastal processes, coastal engineering and erosion control
- marine resources management
- oil and pesticide pollution prevention

INFORMATION : Most scientific information on Tuvalu is incomplete and quite out of date. Funafuti was well studied geologically by the Royal Society in 1896-98, but the maps are not available locally. Studies of agriculture and fisheries were made in 1976, but they provide little specific information for resource management. A land resources survey is planned shortly.

Since atolls share many common features throughout the central Pacific there needs to be more information exchange between different countries, and a regional information exchange to do this would be useful. It is important that environmental information be available in forms understandable by the existing non-specialist manpower in government, and also be used as a basis for public information materials.

As more information is collected on soils, groundwater, coastal processes, fisheries resources, etc., it needs to be compiled on maps or in other forms that can be easily used by national and local governments for planning purposes.

PRIORITIES FOR SPREP

The government of Tuvalu attaches great importance to the following types of activities and requests that they be given priority for inclusion in the South Pacific Regional Environment Programme :

- adult education on the management of natural resources and the environment, with special emphasis on people in local government;
 - assistance with studies of coastal processes, including erosion control and safe sources of coral material for construction;
 - assistance with occasional pollution surveys, such as groundwater pollution;
 - advice on the selection, use, handling and storage of dangerous or toxic chemicals such as pesticides and herbicides, and assistance with the disposal of unwanted toxic chemicals;
 - regional co-operation on methods of recycling or disposal of solid wastes;
 - assistance in monitoring and managing coastal fisheries, especially in areas where there is heavy subsistence fishing.
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