

South Pacific Regional Environment Programme

Training Unit B1

PROBLEMS IN THE PACIFIC ISLANDS ENVIRONMENT

USE OF THIS UNIT

This unit describes the common environmental problems in the Pacific Islands (the area covered by the South Pacific Commission and the South Pacific Regional Environment Programme). It shows that most environmental problems are not just local, but are shared by countries throughout the region with similar environments. It aims to create a sensitivity to the many different kinds of environmental problems in the region.

The text can be provided as a reading assignment before a group discussion, or it can be described point by point by a teacher in one or more class sessions. The information can also be presented or reinforced with the accompanying slide programme that is organized to follow the text.

The presentation of the material should be followed up with a discussion relating each of the problems described to cases known to the participants, or to case studies where these are available. Many of the problems are treated in more detail in other units of this training programme.

This unit can also be used by itself to sensitize people to the environmental problems facing the region.

AUDIO-VISUAL SUPPORTS

The slide programme Problems in the Pacific Islands Environment accompanying this unit (see Annex) shows the environmental problems in the Pacific Islands described in the text. It can be used to illustrate a study of the material in the text, or to present the subject directly, using information from the text to supplement the script.

If this unit is being used by itself, the SPC film "Story of an Island: Managing Your Island Environment" can also be used to explain the origin of many Pacific Island problems.

EXERCISES

If this unit is not to be followed by others treating the problems in more detail, then one or more field trips could be organized to local sites illustrating as many of the environmental problems as possible. These might include:

- rubbish tip (garbage dump)
- waste treatment plant
- forest logging or replanting area
- site showing soil erosion
- water catchment, dam, well or water supply
- agricultural chemical storehouse
- park or natural area
- mine, quarry or dredge site
- factory with waste disposal problems.

It might also be possible to invite representatives of some of the government departments or companies concerned to come and speak to the group about some of these problems.

(Unit written by A. L. Dahl, based on Dahl (1984), *Ambio* 13(5-6):296-301)
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TEXT

PROBLEMS IN THE PACIFIC ISLANDS ENVIRONMENT

The Pacific is the water half of our planet, and the region usually referred to as the South Pacific is in the center of that vast expanse of ocean. The region covers about 29 million km², roughly equal to the area of Africa and almost seven times that of the Caribbean. The land, on the other hand, covers only 551,000 km² (88,760 km² if Papua New Guinea is excluded). There are 5 million inhabitants, of whom 3 million are in Papua New Guinea (1). The term South Pacific is not very accurate, as the region includes not only the islands of Polynesia and Melanesia extending from Pitcairn Island to Papua New Guinea, but the Micronesian islands which extend well north of the equator (see map).

The environmental priorities of the twenty-two countries and territories of the region concern the islands themselves and their immediate coastal areas, where the balance of population and resources is critical for the future. From the perspective of the island countries, the Pacific Ocean is still an unlimited resource relative to the present scale of their human impacts. The effects on the ocean of the great centers of population and industry on the Pacific rim are much more significant.

WIDESPREAD ENVIRONMENTAL PROBLEMS

There has been relatively little published scientific research on environmental problems in the region (2), mostly local studies or environmental assessments of development projects, although there has been some broader work in Melanesia (3,4). Fortunately, as part of the preparatory phase of the South Pacific Regional Environment Programme (SPREP), nearly all the countries and territories prepared country reports outlining their environmental problems and priorities, while experts were requested to review significant environmental topics (5). These were then summarized in a regional overview on the State of the Environment in the South Pacific (6). These documents and the information accumulated over the ten years that the South Pacific Commission has assisted with environmental problems at a regional level permit at least a qualitative description of the most pressing environmental concerns facing the region.

Domestic Waste

The most widespread environmental problem, affecting 90% of the countries, is the safe disposal of liquid domestic wastes, particularly human wastes and urban sewage. Few countries have adequate waste collection and treatment facilities even in the most developed urban areas, and those that exist are costly and seldom properly maintained. In spite of considerable efforts at rural sanitation, facilities in many rural areas are still rudimentary or entirely lacking. The result is serious water pollution both of fresh water supplies (rivers, groundwater and even rainwater catchments) and coastal waters around beaches, reefs and lagoons that are important for tourism, recreation and fishing. This pollution presents grave risks to human health, as

illustrated by the series of cholera epidemics affecting different countries in the region over the last few years.

It is only in the last decade that countries have begun to pay serious attention to this problem, but the investments required to collect and treat domestic wastes are such that progress is very slow.

Fisheries

The damage or destruction of productive coastal resources and fisheries is a nearly universal problem. Coral reefs are destroyed by construction or dredging, pollution, siltation and dynamiting or poisoning for fish. Mangroves are killed off by dredging or filling, or by changing essential patterns of water circulation and salinity. Seagrass beds are dredged or silted over. Unfortunately no quantitative studies of these effects have yet been made in the region. Modern boats and fishing techniques combined with increased fishing pressure have driven some coastal fisheries resources (such as giant clams, dugongs and sea turtles) to extinction in local areas, and left others seriously depleted. Ciguatera fish poisoning has increased with damaging activities in coral reef areas, further reducing useable fish resources. The result has been a steady reduction in the productive potential of coastal fisheries, one of the most important subsistence sources of protein, with a corresponding increase in imports of canned fish and other substitutes.

The establishment of 200 mile exclusive economic zones has brought most of the ocean area in the region under national jurisdictions. The principal concern in these zones at present is the management of the fisheries for highly migratory species, principally tuna, which can only be done on a regional basis.

Forest cover

Another major environmental concern for the future of the islands is the steady reduction in forest cover in every country of the region (except those that already have no forest left). Forests are logged for local use or export; shifting cultivation and clearing for agriculture are constant pressures on the forest resource; and frequent uncontrolled fires eat into the forest margins in some countries. This not only represents the loss of a significant productive resource, but contributes to many subsidiary problems such as water shortages, soil erosion, and loss of habitat for endangered species. While many countries have tree replanting programmes, these have rarely been more than marginally successful. Only Fiji has succeeded in creating significant forest plantations, but these have been on degraded grasslands rather than in recently cut forest areas.

Land Use and Land Tenure

On small islands with limited resources, efficient use must be made of all available land to meet the needs of the people for water, food, building materials and reasonable quality of life, and to maintain the functioning of natural systems on which all these depend. This requires comprehensive planning and careful allocation of land to the most appropriate use or combination of uses. Traditional systems of land and resource tenure have become a barrier to such approaches to environmental management in

Oceania. Land is a limited and precious commodity on an island. The Pacific Islander's attachment to his land goes far beyond western concepts of ownership, and includes mystical and spiritual dimensions rooted in island cultures. The systems of collective tenure were often effective before European contact in maintaining the fair allocation and wise management of scarce resources, but authority and control within the traditional land tenure system are rapidly breaking down. European systems of individual freehold ownership are no improvement in this respect. The resulting vacuum allows anarchic development, resource abuse and destruction without the possibility of imposing modern systems of zoning or control in the common interest. While some land is abused, other areas are neglected. However, tampering with land rights produces the same type of reaction as would interfering with religion. Restoring or building on customary systems of management may be the most acceptable and effective approach where it is still possible.

COMMON ENVIRONMENTAL CONCERNS

The above problems are the most widespread in their impacts within the Pacific Islands, and thus rank first in regional priority. Another group of concerns affect a majority of countries and territories in the region. They are frequently given high priority at a national level.

Soil Loss

The soil resource, the basis for agriculture, is inevitably limited in the island situation. The countries of the region are subject to the same problems of soil erosion and loss of fertility as most other parts of the world, but the problem is more acute because the resource is often so limited. Many island soils were poor to begin with, and irregular island topography, geological instability, heavy rainfall and larger areas of cleared land increase the susceptibility to erosion. Traditional agriculture generally involved lengthy fallows or the addition of humus, but these techniques are being abandoned with modernization and increasing pressure on the land. On Niue, for example, where soil fertility is particularly sensitive to poor agricultural practices, a comparison of two land surveys suggests that degraded lands increased from about 20% to 45% of the total island surface in the twenty-two years from 1949 to 1971.

Water Shortage

While heavy rains are characteristic of the region, they can be irregular from season to season and from year to year. Since most islands have little water storage capacity because of their porous rocks and many small watersheds, dry periods can result in serious water shortages which hamper development, and can create serious public health problems. Destruction of forest cover has caused many formerly perennial to stop flowing in the dry season. The shallow freshwater lens of atolls and coastal groundwater supplies of high islands can be irreversibly contaminated by saltwater if too much water is extracted from wells. Rainwater catchments are dependent on regular precipitation. On such islands, water is often the most limiting factor in development. Some islands in the Phoenix group had to be abandoned for lack of water after a decade of settlement.

Solid Waste Disposal

The smaller the island, the more difficult are its problems with solid waste disposal. The steady increase in imports from overseas has brought with it an accumulation of old car bodies and broken down heavy equipment, appliances, bottles, cans and plastic. Disposal sites are often in coastal swamps, or take land from other important uses. Collection and disposal of wastes are expensive on a small scale, so that wastes are either not collected, or the disposal sites are improperly managed, with resulting health and pollution problems.

Toxic Chemicals

There is widespread concern about the potential dangers of the toxic chemicals being imported into the Pacific Islands in increasing amounts. Most governments lack adequate legislation controlling toxic chemicals. Pesticides or herbicides may be imported in bulk and then repackaged without adequate labelling, resulting in accidental poisonings. Chemicals brought in on a trial basis, or given on aid, may simply sit in a warehouse until the containers deteriorate and the contents spill out or seep down into the groundwater. Products considered too dangerous elsewhere are still in widespread use (and misuse) with no public awareness of the risks involved. Pesticides have been widely used in campaigns to control mosquitos and other insect pests with no monitoring of possible environmental effects. In Tokelau, a warehouse containing barrels of Lindane was swept into the lagoon during a hurricane, killing a large area of reef. Drums of arsenic were recently spilled into the harbor in Vanuatu. Dieldrin has been used for fishing in the Cook Islands. Spraying equipment may simply be washed in the nearest stream, which may also serve as a village water supply. In Papua New Guinea, a large quantity of cyanide used in mining was spilled into the sea when a barge capsized. Accidents with toxic chemicals are that much more serious within the limited environment of small islands but few island doctors have experience in identifying poisoning by toxic chemicals, so most incidents probably go unreported. Monitoring for chemical residues in foods and the environment has hardly begun.

Oil pollution is only a very minor problem in the region at present. Oil spills have generally been restricted to small harbor accidents during fueling or transshipment, and to spillage of fuel oil from wrecks. Even small accidents like these could be serious if they affect critical habitats such as mangroves or major fishing areas on a small island, but most spills to date have either been on remote reefs or in the already disturbed environment of harbors. While there is a slight chance of accidents involving tankers delivering petroleum products to Pacific Island countries, the region is not on major shipping routes, and attempts to find oil within the region have not yet met with success. If a major accident does occur, the region is very poorly equipped to deal with it.

Endangered Species

The problem of the conservation of nature is particularly critical on islands where isolation has permitted the evolution of unique floras and faunas with large numbers of endemic species, while the small size of the populations increases their vulnerability. The demands of increasing human populations on limited land resources make it difficult to protect natural areas even where the land tenure situation would allow such action. Steady habitat destruction, and competition and predation by introduced species further increase the pressure on native species. The situation on many Pacific Islands is becoming critical as the area of undisturbed natural habitat diminishes. The result is a relatively large number of endangered (and extinct) species in a region where the scientific and financial resources available to deal with the problem are very limited. There are probably more endangered species per capita in the South Pacific than anywhere else in the world.

While a number of countries have made great efforts in setting aside more than one hundred protected areas (7), the needs far exceed the means. In addition, islands with limited land seldom can afford to create single purpose parks and reserves solely for nature conservation. Solutions need to be more flexible and adapted to island circumstances. The wildlife management areas of Papua New Guinea, which are created and managed by the traditional land owners, represent the kind of creative approach to conservation needed in the Pacific.

Sand and Gravel

One illustration of the limited nature of island resources is the difficulty on many islands in finding supplies of sand and gravel for construction purposes without creating serious environmental problems. Removal of sand from beaches leads to coastal erosion and the loss of beaches which are an important tourism and recreation resource. Dredging of coral and sand from coastal waters damages productive fisheries resources. Mining on land may affect the area available for agriculture, and leaves useless pits and quarries behind.

Human Habitat

There are also problems of the human habitat in the Pacific, particularly involving housing and sanitation. In a region where cyclonic storms are common, many houses are unable to resist hurricane force winds, or are in areas subject to flooding. The pressure of migration to urban areas has also resulted in overcrowding and makeshift construction with consequent health problems. Some cities now have at least partial sewage treatment, but the problems of urban pollution in general are far from solved.

SIGNIFICANT LOCALIZED PROBLEMS

A third group of environmental concerns are not as widespread as those above, affecting perhaps only a third of the countries in the region, but they are significant in the local areas affected.

Coastal Erosion

Islands are in a dynamic relationship with the sea, with material constantly being deposited on or carried away from shorelines. While the building of new land is usually considered desirable, coastal erosion is a serious local concern, particularly where it affects roads, buildings or scarce agricultural land. The expense of protective works to control erosion of shorelines is a continuing drain on those countries (particularly atolls) suffering from this problem.

Mining

Mining is the most significant economic activity for a number of island countries, and it is inevitably accompanied by serious environmental problems. These include the disposal of mine wastes, tailings and processing wastes, erosion problems and the pollution of rivers in mined areas, loss of natural habitat or of land with agricultural potential, and the abandonment of unusable wastelands once the mining has ended. While new mines today are generally subject to strict environmental controls, older mines and areas abandoned after earlier mining continue to present serious environmental problems. Some phosphate islands such as Ocean Island were mined to the point that their inhabitants had to be evacuated as the island could no longer support a human population.

Industrial Pollution

Industry is not widespread in the region, concentrating mostly on the processing of food or minerals for export. However, it frequently causes pollution and other problems in localities where it occurs. Wastes from fish and fruit processing plants, and dangerous air pollution from smelting operations are some examples of localized industrial pollution problems in the region. Fortunately the economic mainstay of some countries are non-polluting activities such as the sale of postage stamps. While some general air pollution (mostly from vehicles) is present in the larger urban areas, it is only of local significance and is usually dissipated in the great air masses of the Pacific basin.

Radioactivity

The problem of radioactivity in the Pacific Islands is a special case, and is given a high priority by governments at a political level. The region is perhaps the part of the world to have suffered the most from the nuclear activities of the great powers since the last war. The United States, the United Kingdom and France have all conducted many nuclear weapons tests in the Pacific Islands, with the latter still continuing to do so. Some island people were contaminated in fallout accidents, and a few islands still have residual levels of radioactivity from local fallout from these tests. The region was a principal battleground in the last world war, and nuclear activities are

seen as increasing the risk that it might again become one. Recent proposals to dump nuclear wastes in the Pacific have fuelled further fears of regional contamination. These activities are seen by the Pacific Islanders as the wealthy countries doing in other peoples' back yards what they dare not do at home, and are resented accordingly. A recent technical review minimized the dangers to the region from present nuclear activities (8), but this is more a moral and political issue than it is an environmental one.

SUSTAINABLE USE OF ISLAND RESOURCES

The above problems all contribute in one way or another to the most critical environmental issue facing the countries of the South Pacific: the sustainable use and management of limited island resources. Population growth per se is not always the most important factor; some islands have rapidly increasing population, while on others the population is actually declining through emigration. Nevertheless, human activities are leading everywhere to a gradual (or not so gradual) erosion in the resource base on which the islanders depend for survival. Since the limits to resources are much closer on islands, there is less room for error; an islander cannot just move on to somewhere else. Some Pacific countries are getting very close to their environmental limits. One island official confided to me that he expected his islands to reach the absolute limit of their agricultural resources within a decade. The soils were degrading rapidly, and it was culturally impossible to try to slow the increase in the population.

It is clear that the solution of these problems of the environment and of sustainable resource use will require management skills and a good scientific understanding of the island environment. Unfortunately, skilled people and scientific infrastructure are sorely lacking in the region. The few scientific institutions are staffed largely by expatriates. In the past there were traditional experts on resource management at the local level, but more than a hundred years of missionary activity, colonization, European education and modernization have largely destroyed this knowledge and the traditional management systems through which it was applied.

If the peoples of the region are to ensure for themselves a satisfactory environmental future, they must take measures to reverse the steady erosion in their resource base and to stabilize their populations within the carrying capacity of their islands, even if this means modifying what they see as deeply held cultural values. They must increase efforts to restore damaged resources, and to achieve comprehensive management of different resource uses and development activities, particularly in the critical coastal zone (which on islands may include most or all of their land area). This will be very difficult, as it requires questioning some of the development assumptions and goals inherited from former colonial masters or copied from elsewhere. It is clear from the above list of environmental concerns that the region requires unique forms of development adapted to the limitations of the environment, and drawing as much from the traditional societies that successfully lived within those limits for generations as from the modern world.

A comparison of the environmental concerns of the South Pacific with those of developed countries shows a profound difference of emphasis, at least in the short term. The pollution resulting from modern technological development is much less important than the need for sustainable management

of the natural resource base. The region is thus a potential model for the future, facing now what must become the long-term preoccupation of the whole world as resource degradation approaches the limits of the planet.

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- Revised from A. L. Dahl. 1984. Oceania's most pressing environmental concerns. *Ambio* 13(5-6): 296-301.

QUESTIONS

Which of these environmental problems are the most important in your country?

Why are they so important?

Which problems are not significant where you are?

Why not?

Which problems are caused primarily by local people?

Have some problems been imported from outside?

Can the government solve all these problems?

What can you do to solve environmental problems where you are?

ANNEX

Problems in the Pacific Islands Environment

SLIDE PROGRAMME

This slide programme shows the environmental problems in the Pacific Islands described in the text of training unit B1. It can be used to illustrate a study of the material in the text, or to present the subject directly, using information from the text to supplement the script which follows.

SLIDE	DESCRIPTION
1. Title	The Pacific Islands are tiny spots of land scattered in a very large ocean, and the environmental problems of the region reflect this.
2. Map of SPREP region	The 22 island countries and territories prepared country reports for the South Pacific Regional Environment Programme from which the following regional priorities and problems were identified.
3. Polluted creek	Water is an essential island resource, but it is easily polluted. This creek in New Caledonia is heavily contaminated by human wastes. Almost all the countries have water pollution problems like this.
4. Polluted water	This polluted water carries disease germs onto a beach where many tourists and children go swimming.
5. Reef with fish	The fish of coral reefs and other coastal waters, such as these at Tahaa in French Polynesia, are an important food for island people.
6. Seagrasses	It is the seagrasses, seaweeds and other plants on the reefs and in shallow waters that make food on which the fish and other animals depend. If something hurts the plants, the fish will have less food.
7. Large corals	The corals on the reef are like the trees in a forest, providing shelter and food for reef fish. Large corals may be many years old, like this one in the Solomon Islands. Killing the corals is like cutting down the trees in a forest.

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| 8. | Reef flat | Even on shallow reef flats many shellfish and other animals can be gleaned for food. |
| 9. | Trochus sales shed | The reef produces other things besides food. Many islanders collect <u>Trochus</u> shells which are sold to make buttons, as here on Ponape. |
| 10. | Algae making sand | The white sand of coral beaches comes from simple plants like this <u>Halimeda</u> in the Cook Islands, as well as shells and broken coral. If something hurts these plants, the beaches may eventually get smaller. |
| 11. | Scientist and coral | Coral reefs are of great scientific interest because they are so rich and productive in spite of the poorness of their environment. Here a scientist studies a coral on Guam. |
| 12. | Shallow coral reef | Coral reefs like this one in Samoa can be an important tourist attraction. |
| 13. | Divers in boat | People come from all over the world to see Pacific reefs, bringing valuable foreign exchange, but they will stop coming if the reefs are damaged or destroyed. |
| 14. | Polluted reef | If a lagoon or coral reef is badly polluted by sewage, the corals can be killed. |
| 15. | Polluted reef | Here in Kaneohe Bay, Hawaii, the wastes from a nearby town have made a seaweed grow very fast and smother all the corals. |
| 16. | Canneries | Other things can pollute the water, such as these cannery wastes and an oil spill in Pago Pago Harbour. |
| 17. | Starfish on coral | Man is not the only one to hurt coral. The crown-of-thorns starfish <u>Acanthaster</u> has also damaged many Pacific reefs by eating the coral. |
| 18. | Dynamited reef | One of the worst things for a reef is fishing with explosives or poisons, which kill everything on the reef and leave an unproductive wasteland behind. This dead and broken coral was caused by fishing with explosives on Truk. |
| 19. | Dredging | Dredging and construction can also be very damaging in shallow coastal waters, in part because the muddy water and sediment produced cut off light from the plants on the bottom and smother the corals. |

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| 20. | Mangroves | Mangroves like these in Palau are another productive coastal resource in many islands. They protect the shore from erosion and even help to build land by trapping the mud. |
| 21. | Mangrove roots | Mangrove leaves provide food, and their roots give shelter to baby fish and other animals, as they do here in the Solomon Islands. Mangroves are important nursery areas and food sources for many kinds of fish. |
| 22. | Mangrove from air | Unfortunately mangroves are often the first places to be dredged or filled in to make more land, destroying important fisheries resources. |
| 23. | Filling mangroves | One of the few mangrove areas in Samoa was filled in to make a hotel site. |
| 24. | City and mangroves | Mangroves may help to purify pollution from urban runoff, so their loss to a spreading city may also increase pollution problems. |
| 25. | Map of EEZ | The problem of managing coastal waters is now bigger than ever. With the declaration of 200 mile Exclusive Economic Zones, the countries of the South Pacific are now responsible for managing the resources of most of the ocean area in the region, including species like tuna and turtles that migrate widely from one country to another. |
| 26. | Forest | Every country in the region that still has forest left faces problems of the loss of that forest. The forest has long provided wood, food and medicines to island people, and it protects the soil and water. |
| 27. | Forest cutting | When the forest is cut, as here on Niue, the processes that build the soil are interrupted. |
| 28. | Cut forest from air | In the Solomon Islands, the logging machines so compacted the soil that the trees could no longer grow back in many places. |
| 29. | Reforestation trial | Governments have tried replanting the forest, as in this trial area in Western Samoa, but replanting is often difficult and expensive, and much more forest is cut than is replanted. |

30. Oil palm trial
The forest may be converted to other uses, as in this oil palm trial in the Solomon Islands, but it is important to ensure that enough forest remains to provide those things that only the forest can give to an island.
31. Invading raspberries
One problem in many island forests is their invasion or replacement by fast-growing introduced weeds that crowd out native plants and prevent young trees from growing, as this raspberry is doing on Tahiti.
32. Leucaena forest
Where the forest is destroyed, it is usually replaced by plants that are much less useful, as in this Leucaena forest on Saipan.
33. Farms from air
The land is one of the most limited and valuable island resources, and its use must be planned with care to meet island needs. These farms in Fiji produce sugar cane as a cash crop.
34. Mountains
On many high islands like Tahiti, much of the land is not suitable for development.
35. Coastal fringe
Most people live in the lowlands, usually along the coast as here on Rarotonga.
36. Garden in forest
The land produces the food people need to live. On Niue, taro is grown in the little pockets of soil between the rocks.
37. Pulaka pit
The soil is so poor on atolls that in Kiribati, soil is made in baskets in pits dug down to fresh water. On each island, people have found ways to use the land to meet their basic needs.
38. Road and forest
Traditional land use left some areas, like the Huvalu forest on Niue, protected in their natural state by taboos. Such areas were important to the balance of island resources, but most have disappeared today.
39. Custom houses
The old religion was often closely tied to the wise use of resources. In the Solomon Islands, the pagan priests put taboos on fishing areas to let the resources recover.
40. Shells
These shells used to make custom money are easily overfished in the shallow lagoons of Maleita, but the taboos protected them until recent times.

41. Diver collecting shells Parts of the lagoon were made taboo for 5 or 6 years until the shells had grown to a good size for the fishermen to collect. Today, even though people have changed their religion, the same kind of wise management is still needed, and the knowledge on which it was based should not be forgotten.
42. Gardens on slope The land is not always used wisely and it is being damaged. When steep slopes like these in Pago Pago are cleared for gardens, the soil may wash away in heavy rains.
43. Burned slope Too many people set fire to the land in places like Papua New Guinea. The fire destroys the forest and the plants that protect the soil, and leaves the damaged soil naked to be washed away in the first rain. Things may grow well to begin with, but burned land quickly becomes poor.
44. Mountain road Construction, especially in steep areas, can also be very damaging to the land, as here on Tahiti.
45. Erosion Construction or mining can leave open sores on the land which erode more in every rain. The mud from such erosion also pollutes coastal waters.
46. Landslide Disturbing the land on steep slopes can lead to dangerous landslides. Some people were killed by a landslide near this one in American Samoa.
47. Cleared land Improper clearing can also damage land. A bulldozer may be fast, but it can also push all the good soil off the land or flatten the coastal ridge that protects the land from storms, as it has here in the Cook Islands.
48. Soil section On Niue, there is a good but very thin soil over the island limestone.
49. Disked field If modern farming methods like disking are used there, the coral rock is mixed with the soil and its fertility is damaged.
50. Fern scrub This has helped to create degraded wastelands covered with ferns on nearly half of the surface of Niue. Stopping the damage to valuable soil is an important island priority.

51. Water Water is another essential resource that is in short supply on many islands and needs to be protected or managed with care.
52. Atoll well On atolls such as here in Kiribati, the limited fresh-water lens underground is easily contaminated or made salty by overuse.
53. Rain catchment Many islands must depend on catching rainwater for their water supply, and there are frequent droughts when the rains fail to come.
54. Stream catchment Larger islands like Palau may have streams, but stream flow may stop if the forest is cut, or the stream may be polluted.
55. Vehicle dump All islands have problems getting rid of all those things they import and then no longer need. These old cars and trucks on Niue do not just rot away quickly like palm fronds or wooden canoes.
56. Rubbish dump The bottles, cans and broken things have to be put somewhere, taking up land or damaging resources like these mangroves in Ponape.
57. Rubbish dump, Tonga A poorly managed rubbish dump can be a health hazard, breeding rats and flies and spreading diseases.
58. Rubbish in water Rubbish can also lead to water pollution as in these Samoan mangroves.
59. Trash and view Thoughtless people leave their trash anywhere, even in the most beautiful places like this mountaintop in Tahiti.
60. Pesticides Many countries are now worried about the pesticides, poisons and other toxic chemicals now being brought into their small and fragile islands. There have been accidents all through the region where people have been poisoned or the environment damaged.
61. Oil pollution Oil pollution like this spill from a fueling dock in Pago Pago is not yet a serious problem except in some harbours.
62. Oiled cliff However, if a big accident occurs like this spill in California, an island could be badly damaged.

63. Oil on water Spilled oil covers the water, fouling or smothering the marine life along the coast.
64. Beach clean-up Can you imagine having to collect all the oiled sand on your beaches and trucking it away for burial?
65. Pines on coast Many islands have species of plants or animals that are found nowhere else in the world, like these columnar pines in New Caledonia. As islands are developed, many of these rare and valuable species are in danger of extinction. Some countries have made laws protecting them and established national parks and reserves where they can live in safety, but much more needs to be done.
66. Coral island Some islands also have very special places worth protecting. In the middle of this coral island in Palau, there is an unusual marine lake.
67. Jelly fish The lake is full of just a few kinds of plants and animals like the seaweed, mussels and jelly fish seen here.
68. Quarry Some islands are so limited in their resources that it is hard even to find sand and gravel for construction without damaging the land, beaches or coastal waters.
69. Traditional fales There are also environmental problems in the places people live. A traditional village such as this in Samoa may be beautiful, but it may no longer be adequate for a growing population and changing life-styles.
70. Houses However, new housing may be crowded, unhealthy, and less well adapted to the island environment. Such communities are also more vulnerable when there is a disaster.
71. Mined wasteland Other environmental problems can be very serious in local areas, such as this valley in Papua New Guinea dredged for gold about 50 years ago and still a wasteland.
72. Nauru from air Mining always involves some environmental effects. Here on Nauru the whole centre of the island is being mined for phosphate.

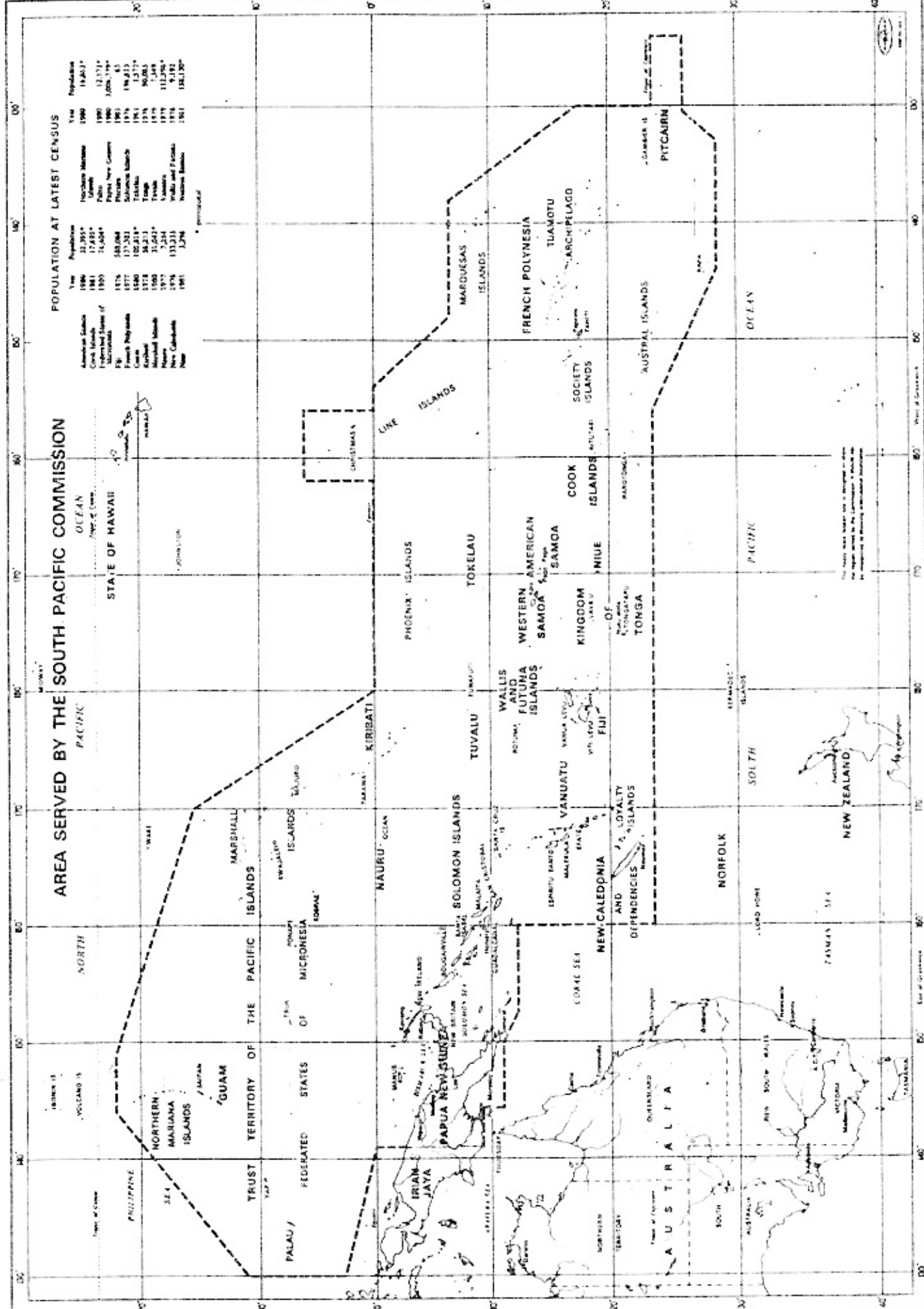
73. Phosphate mine The phosphate is dug out from pockets in the coral rock and is exported to make fertilizer.
74. Mined area Areas that have been mined are no longer good for anything, but for the people of Nauru the benefits from mining are worth the environmental cost. When the phosphate is exhausted in 15 or 20 years, there will not be much left of the island except barren rock in the middle and the coastal fringe.
75. Bougainville mine The copper mine on Bougainville in Papua New Guinea is another example of an important development project with serious local effects on the environment.
76. Mine The mine has made a giant hole in the ground. The trucks in the bottom have wheels 4 metres high and carry 170 tons of rock.
77. Tailings dump The rock that is not wanted is dumped down the Jaba River valley where the river carries it to the sea.
78. Jaba River People used to get fish from the river, but now the water is more like liquid mud and nothing can live in it. Here SPC trainees are measuring the pollution.
79. Industry There is a little industrial pollution in the region, mostly from fish and fruit canneries and industries like this nickel smelter in New Caledonia, but it is not as big a problem as in developed countries.
80. The end Outside of radioactivity, which is more a political issue than an immediate environmental threat, the above problems show that the big challenge to island peoples is learning to live wisely within the limits of what their resources can support for many years to come.

AREA SERVED BY THE SOUTH PACIFIC COMMISSION

POPULATION AT LATEST CENSUS

Year	Population	Year	Population
1946	32,354*	1960	19,603†
1951	17,452*	1955	12,571*
1955	14,264*	1960	12,025†
1957	13,321*	1965	12,571*
1958	12,218*	1970	19,635
1959	12,218*	1975	15,774
1960	12,218*	1976	16,263
1961	12,218*	1977	16,263
1962	12,218*	1978	16,263
1963	12,218*	1979	16,263
1964	12,218*	1980	16,263
1965	12,218*	1981	16,263
1966	12,218*	1982	16,263
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2006	12,218*	2022	16,263
2007	12,218*	2023	16,263
2008	12,218*	2024	16,263
2009	12,218*	2025	16,263
2010	12,218*	2026	16,263
2011	12,218*	2027	16,263
2012	12,218*	2028	16,263
2013	12,218*	2029	16,263
2014	12,218*	2030	16,263

* Includes Cook Islands, Niue, Tokelau, Samoa, Tonga, Tuvalu, Vanuatu, Wallis and Futuna, French Polynesia, and Pitcairn Islands.
† Includes Cook Islands, Niue, Tokelau, Samoa, Tonga, Tuvalu, Vanuatu, Wallis and Futuna, French Polynesia, and Pitcairn Islands.



The South Pacific Commission is a specialized agency of the United Nations. It was established in 1947 to assist the governments of the South Pacific Islands in their economic and social development.



South Pacific Regional Environment Programme

Training Unit B2

PROBLEMS IN THE LOCAL ENVIRONMENT

USE OF THIS UNIT

This unit should create an awareness of environmental problems in the local environment. As such it must be adapted to each local situation. The training leader should prepare in advance a list of the important environmental problems in the trainees' own areas. The topics in unit B1 can be used as a guide, but other problems should be added if they are locally important.

The group should explore local problems through a series of questions to be discussed by the group, as given in the text. As the trainees answer these questions, they should describe their local environmental problems from their own experience. It may be useful to list the problems mentioned on a blackboard or piece of paper, or to have the trainees write them down. Check to make certain that no important problems have been overlooked, by comparing with the list made up previously.

If the group is large, it can be broken up into small working groups for this exercise. The working groups would then report their lists of problems back to the whole group.

The questions can be modified to suit the local situation, and others can be added if necessary to bring out important local problems.

The SPC film "Story of an Island" can be used as an introduction to this unit if it has not already been shown to the group. It demonstrates the relationship between man's activities and changes in the island environment over time for a "typical" Pacific Island, and thus provides a good background for the questions raised in this unit.

If resources permit, photographs can be taken of local environmental problems, to be used as additional supporting audio-visual material for this unit. Alternatively, the group could itself assemble newspaper clippings, photographs, government reports and even reports made by the trainees themselves documenting local problems.

AUDIO-VISUAL SUPPORTS

The South Pacific Commission film "Story of an Island: Managing Your Island Environment" may be used at the beginning of the unit as basis for discussion of the questions. The script of this film is included as an annex to this unit.

EXERCISES

If time permits, individuals or small groups can visit or study particular problems identified in the group discussion and report back to the group. Tours or visits by the group to particular problem sites can also be arranged. Even a walk around a village with someone who can explain the different local environmental problems, such as a local health officer or doctor, agricultural extension officer or teacher, can be instructive.

REFERENCES AND SUPPLEMENTARY MATERIALS

The Country Reports prepared by each country in the region for the South Pacific Regional Environment Programme can be a useful source of information on local environmental problems.

South Pacific Regional Environment Programme. 1981-1982. Country Reports. South Pacific Commission, Noumea, New Caledonia.

1. American Samoa
2. Australia
3. Cook Islands
4. Fiji
5. French Polynesia
6. Guam
7. Kiribati
8. New Caledonia
9. Niue
10. Papua New Guinea
11. Pitcairn
12. Tokelau
13. Tonga
14. Trust Territory of the Pacific Islands
15. Vanuatu
16. Western Samoa
17. Solomon Islands
18. Tuvalu
19. Wallis and Futuna

(Unit written by A. L. Dahl)
[Revision 11/84]

TEXT

PROBLEMS IN THE LOCAL ENVIRONMENT

Look around you and see what problems you can identify in your own local environment.

WATER

Think about the water, for instance. Is there enough of it all the time? Is there less water now than there used to be, especially in dry periods?

Is it always fresh, or does it sometimes get salty?

Is it clean and pure, or do people (particularly small children) sometimes get sick if they drink it?

Where does it come from, and how might it get dirty through contact with people or animals?

Are there other kinds of pollution that might get into the water?

SOIL

The soil plants grow in is a basic resource on which we depend for much of our food. Do you have enough land to grow your food?

Does the soil "wear out" quickly so that you have to move your garden frequently while you let the soil "rest"?

How long do you have to wait before you can go back and garden in the same place?

Does the soil sometimes wash away in heavy rains?

Where does it go?

Do you do things to make your own soil or to make it better?

Is the soil as good now as it was when you were a child and your parents planted gardens?

Do you think the soil will be as good for your children as it has been for you?

FOREST

Is there still some forest around your village, or was it cut down long ago?

How far do you have to go to get wood for burning or building?

Do you still see the birds of the forest, or are they far away or gone altogether?

Can you still find the plants used as traditional medicines?

How much has this changed since the time of your parents or grandparents?

What does this mean for your children?

THE SEA

Most Pacific Island people live near the sea, and go fishing for some of their food. Are there coral reefs, a lagoon or mangroves or other important fishing spots near your village?

Is fishing important to you?

Is it easy to get enough fish to feed your family?

Have modern techniques made it easier to catch fish?

Has it become harder to find fish to catch?

Is there a problem of over-fishing in your area?

Do people fish with dynamite or poisons?

Have fishing areas been damaged by development, construction or pollution?

Is there a danger of being poisoned by fish (ciguatera), and is this problem getting worse?

Do you know as much about the fish as your parents or grandparents?

THE VILLAGE

Think about your village. What was it like before the Europeans came?

Are there many traditional houses left, or are they mostly made of new materials like corrugated iron or cement?

Is a new house as comfortable in the hot sun as a traditional house?

Is it as good to sleep in?

Is it as safe in a cyclone?

How clean is your village?

Do you see bottles and cans lying around?

Are there old abandoned cars or other junk?

Are there many flies or rats?

Where do people go to relieve themselves?

Is it easy to bathe or to wash the children in your village?

Do you sometimes have lots of sickness (epidemics) in your village?

Do you often have intestinal problems (diarrhoea) or runny stools?

Can you think of other signs that your village has environmental problems?

If your area is subject to cyclones (hurricanes or typhoons), what would happen to your village if it were hit by a cyclone?

Do you remember stories of what happened during famous storms in the past?

Are there other histories of natural disasters in your village?

What would happen today if a similar disaster occurred again?

Are there new dangers to people and the environment from things that modern development has brought?

Are large quantities of things that can burn or explode stored near where people live?

What poisons or toxic chemicals are now used in your area?

Could they create a danger through accident or misuse?

Film Script

STORY OF AN ISLAND: MANAGING YOUR ISLAND ENVIRONMENT

This 45 minute film produced and distributed by the South Pacific Commission was made in 1979 under the supervision of the SPC Regional Ecological Adviser, Dr. Arthur Lyon Dahl. It is available as a 16mm color film with optical sound, or on 3/4" or 1/2" video cassettes in English (PAL) or French (SECAM). A Papua New Guinea Pidgin version is also available. Copies are held in most countries of the region, or they may be purchased for the cost of the copy through the South Pacific Commission. Under certain circumstances copies may also be borrowed from the South Pacific Commission Library.

For further information, contact:

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Scene	Narration
INTRODUCTION	
Village discussion old man speaks	"You young people forget the past. Yet our traditions are important. We have always had food to eat, pure water, and many fish in the lagoon. Hard times were rare."
Young man speaks	"Yes, but the old ways are hard work. Today there are modern ways that are better."
Old man speaks	"Our island is small. How do we know that the new ways will not destroy what we have and leave nothing for our grandchildren?"
Group	Young and old, new and traditional; everywhere the discussion goes on.
Village scene	In the islands,
Girl with child	you have had to think about the future,
Man making food	because what you have is limited. You have always depended on the island environment for the basic things of life. We need food, water and shelter just like the animals that share the islands with us.
Dog	
Pig	The environment is everything around us.
Woman making mat	It is the plants that give us materials for building and shelter,
Girl in coconut	or for food and drink.
Children with soap	It is the water which keeps us clean.
Children walking	We depend on our environment for recreation,
Vegetation	and for the pleasure that comes from having beauty around us.
Pulling up boat	The land and the sea are both essential parts of our island environment.
Pilou	Our traditions, developed over generations, are tied to the land and sea that are our island.

Garden	Land is the most important thing a family has. Attachment to the land is very strong. You know how you feel about your land. It is your past and your future.
Motocultivator Market	Today things are changing. People have new needs, and development must try to meet those needs.
Bulldozer	But what kind of development?
Freeway	Not all kinds of development are good on an island.
people	It is you who know your island best, so you should decide how you want your island to develop.
THE ISLAND STORY	
Model island	This is the story of a typical small tropical island, perhaps like your own.
Model-details	This island has a mountain covered with forest, a small lagoon and reef, a low sandy area like an atoll, and
Model-stream	some small streams that empty into the lagoon.
Children in stream Island coastline	Your island may be like this, or it may be different in some ways, but, as you will see, this story will remind you of many things you have seen at home.
people on bridge Children	As you watch, think about your own island's future, and the kind of environment you want for yourself and your children.
Women in garden	Each part of the island environment is important to us in some way.
Garden with taro	The land and soil grow our basic food.
River	Water for drinking and washing comes from streams or wells, or sometimes from the rain itself.
Forest	The trees of the forest and the plants we grow provide traditional building materials and fuel for cooking.

B2 Local Environmental Problems

- B -

Boat and oar	The sea around us, and particularly the reef and lagoon, provide fish and other food to keep us healthy.
Market	These resources are also important for our economic development now and in the future.
Model-village	All the parts of the island environment affect each other, so changing one changes others as well.
Model-forest and stream	The forest makes good soil, and holds the rain to provide water.
Model-lagoon	What we do on land affects the sea around us.
Truck on road	Modern life also gives us tools that we never had before, things like trucks,
Bulldozer	bulldozers,
Motor boat	Motor boats,
Net	Nylon nets,
Chain saw	Chain saws, and
Spraying	Fertilizers and pesticides.
Subdivision	With these things, we can make big changes, and fast changes.
Bulldozer in forest	The effect of these new things on the environment of our island can be very different from the traditional ways of doing things, which took lots of time and hard work for even small changes like clearing land for a garden.
Clearing weeds and land	
ORIGINAL ISLAND	
Model-virgin island	Long ago, before anyone came to live on the island, it was covered by forest.
Model-forest	
Model-canoes arrive	When the first people arrived after a long canoe voyage, they found a good land.
Model-canoes on beach village	They settled and built a village.

TRADITIONAL ISLAND

Clearing bush	Clearing the forest with primitive tools was hard work so only small patches were cleared for family gardens.
Model-gardens	
Taro	The first harvest crop was good, but the next was not so good, and eventually the land was abandoned to go back to forest.
Abandoned garden	
Clearing weeds	A new garden was then cleared somewhere else.
Small garden	In many ways the old methods were good to the soil. Gardens were small and were protected from wind and drying out by the surrounding forest.
Planting taro	Often the ground and not cleared down to the bare soil, further protecting it.
Model-village and garden	Only a little of the forest was used for gardens at any one time.
Model-forest and village	The amount of forest stayed the same, and it continued to surround the village.
Model-garden	As new gardens were cleared,
Model-village and gardens	the forest would grow back in the old garden areas from the seeds of nearby trees.
Model - other gardens	Years later, when the area was cleared again, the soil was good once more.
Woman with baby	As more babies were born,
Model - more houses	more houses were built in the village
Children	The population grew, and
Model - larger village	so did the village. More land had to be cleared to grow more food.
Child	with each generation,
Crowd in market	there were more and more people.
Model - still larger village	The village grew even larger and the forest had less time to grow back in old gardens and to make the soil better.

Men walking to fields	The people had to go further from the village to find good land.
MODERN ISLAND	
Model - church and houses	With the coming of the Europeans and their new ways, more land was developed for agriculture and large plantations were established.
Model-plantations	
Model-bulldozer	Bulldozers and other machines made clearing land easier, but it cost money to use them.
Bulldozer	Sometimes there were problems with the new ways. Where the soil was shallow, the bulldozer could remove or destroy it.
Large field	The large cleared areas were more exposed to cyclone damage and drying out.
Eroded land	Once the soil was exposed on slopes, the rain could wash it away.
Applying fertilizer	Without forest to restore the soil, expensive fertilizers had to be used.
Insect damage	The new crops planted over large areas, had more insect pests and diseases requiring expensive and often dangerous pesticides.
Bulldozer	Land was also cleared for other uses.
Pasture	Some areas of forest were converted to pasture for cattle.
Model-subdivision	New housing areas were needed for the growing population. Houses, schools, churches, dispensaries, stores and businesses, even the streets had to be built, and all took up land.
Subdivision	That much less land was left to be used productively.
Model-sawmill	New industries to provide jobs also required land, and used up more island resources.
Sawmill	They attracted more people to the growing town.

Road construction	Roads were built so that new areas could be developed, but roads also use up land.
Model-airport construction	The need for better ties with the outside world required flat land for an airport. To make it, some of the reefs had to be filled in with sand and coral dredged from the lagoon. The dredging made the water cloudy, smothering the corals nearby. The fish went away.
Dredging	
Model-polluted water and island	The people now had many new things, but fewer resources were left to meet their basic needs.
FISHING	
Model-lagoon	The lagoon and coral reefs around most tropical islands have always been important to island people.
Lagoon	
Fish cooking	Fish provide much of the protein in island diets.
Ray, crab, clam	Traditionally, many different animals and plants were taken from the reef and lagoon for food.
Throwing net, setting net and beating, harpoon	Many fishing methods were used, taking some of each kind of fish, but not too many of any one kind.
Canoe Old fisherman	Fishermen knew the reef and the habits of the fish, and many rules and taboos helped to prevent overfishing.
Motor boat	Today, better boats and motors make it easier to go fishing.
Boat and net	and new methods and materials like nylon nets help to catch more fish.
Old man showing nets	But the new ways of fishing can also bring problems, leaving fewer fish to be caught another time. The old fiber or cotton nets and the new nylon net work in different ways. The old net blocked the fish, the new net snags the fish, catching more, but hurting others which later die.

Diver and speared fish	In many places, it is getting harder and harder to find fish to catch. Too many fish were taken in the past, and sometimes damaging methods were used like dynamiting and poisoning, or the area may have been polluted.
Model-polluted lagoon	Pollution can poison the fish or kill off their food. A polluted lagoon may produce less than a clean one, and things from it could make us sick.
Diver - no fish	Now there are no fish.
FOREST DEVELOPMENT	
Model-forest	The forest has always provided many things in the islands such as foods, and wood for houses, canoes and firewood.
Cutting tree	
Collecting plant Treating child	Island people have often collected plants in the forest for many uses, such as medicines for those who are sick.
Model-sawmill	Today, modern forestry projects are an example of the ways island resources can be used for economic development.
Cutting trees	The best trees are chosen and cut. A hundred years or more of growth is harvested in a few minutes.
Bulldozer hauling	The logs are hauled out of the forest to the logging roads.
Model-bulldozer	With modern equipment, almost everything in the forest can be cut and removed.
Logs being cut up	The logs are then cut up to be carried by truck to the port or mill.
Cut over area Workers	Very large areas of forest can be cleared in a short time, providing money and jobs.
Sawmill	A sawmill to cut the logs into boards for local use and export can be a further development project.
Forest being logged	Without help, most island forest grows back very slowly, so once the trees are cut, an important resource and its many benefits are lost.

B2 Local Environmental Problems

- 13 -

Model-rain	It is the forest that catches the rain, protecting the soil from being washed away,
Stream	and holding the water to keep the streams and springs flowing.
Girl washing pot	We cannot live without water.
Women in river	We need water for washing,
Child drinking	and clean water is important to good health.

THE ISLAND TODAY

Model-modern island and village	Many islands today are at about this point in the story. European buildings and ways of living are replacing traditional ways in the village.
Model-bulldozer	New ways are replacing old in agriculture. Good land is hard to find, and there is less forest.
Model-lagoon	Fish are hard to find near the village now. The good fishing places are far away, and some of the best fish are hard to find anywhere.
Fisherman and boat	
Children	The population is growing rapidly, and there are lots of children to feed, educate and find work for.
Women washing	The stream near the village is polluted now. It is not safe to drink from, so water must be piped from far away.
Market	The old ways of sharing and working together are being replaced by jobs and a money economy. Some people have much more; some have less than before.

ISLAND FUTURE DEGRADATION

Model-modern island	The problems with island environment may not seem big, but an island is a small place.
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Model-closeups	Let us see what can happen if development on the island continues as before without regard for the environment or the future. Today, there is still a lot of forest on the island, but as time goes by,
Model-advanced logging	the logging project continues until all accessible trees are cut. When the trees are gone, so are the jobs and money that they made possible.
Model-cleared island	Clearing for agriculture extends even up the very steep slopes, and right to the edged the streams.
Model-fire	Fires are carelessly lit and burn off more of the forest. Degraded or productive land is just abandoned.
Model-heavy rain	In the next heavy raining there is nothing to protect the soil. It washes off the land into the streams.
Model - muddy stream Muddy streams	
Flooded river and house	There is flooding in the valleys.
Model - streams and lagoon	And the good island soil washes out into the lagoon. It pollutes the water and smothers and kills the corals and other life on which fish depend.
Model - polluted lagoon	Oil and wastes from industry and the village pollute the lagoon even more.
Model - degraded island	After the rains, the streams dry up. The native birds and plants are nearly gone. There is no forest left to hold water for the dry periods, or to shelter wildlife.
Model - destroyed forest	
Model - degraded island	Without soil, forests, water or fish, what are the island people going to eat? How are they going to live? What is left on which to base their future?
Dirty house Child	

ISLAND FUTURE - SUSTAINED

Model - modern island

Fortunately, this is not the only possible island future. Let us go back to the island as it is today, and see how these environmental problems can be avoided.

Farmer

Farmers can take good care of the soil, whether in traditional or modern agriculture.

Small garden

The types of crops can be mixed to reduce pest damage, and trees can be planted as windbrakes and to keep the soil from washing away.

Terraced farm

On slopes, terracing can hold the soil and stop erosion.

Mulch

Applying mulch and compost can make the soil better help control weeds and hold moisture, just like the forest did before.

Motor cultivator

Small machines can often be more useful than large ones in village agriculture.

Raking

This used to be degraded land. With care, it has been restored to productivity.

Watering

There is no reason why this garden should not be able to produce indefinitely.

Planting tree seeds

When trees are cut down in the forest, seeds can be taken and planted.

Nursery

In several days the seeds sprout.

Transplanting

The tiny trees are put in their own bags, pots or cans, and grown in the nursery until they are big enough to transplant to the forest.

Nursery

Planted forest

With care, the little trees will grow into a new productive forest.

- Model - sustained island
Forests and gardens need land, and on an island there is little land. What land there is must be used wisely to meet all the needs of the people.
- Model - agriculture
The best land should be reserved for agriculture, with controls to protect the soil.
- Model - reforestation
Poorer areas can be used for forest, pasture, or village and industrial sites. The forest should be protected or new trees planted on streambanks and mountain slopes to maintain island water supplies.
- Model - lagoon
Development on the shore should not hurt the reef or lagoon.
- Model - forest area
Some parts of the island can be set aside as national parks, reserves and scenic sites. Then there will always be some native forest birds and wildlife, places where children can learn about their island heritage.
- Parrot
They can see how their island was made.
- Scouts
Drawing
Scout group
They can learn the names of the plants and animals
- Scouts walking
In parks, children and adults, local people and tourists can appreciate the beauty of the island. They can experience and understand their island environment.
- Boy and scouts in park
- Lagoon reserve
Fishing reserves and other control measures can help overfished areas to recover.
- Fisherman stopping youth
The most destructive new techniques can be banned,
- Fence marking reserved area
and access limited if necessary to the number of fishermen the area can support.

- Father and children . Of course the population must be kept within the limits of what the island can provide a living for.
- Model - sustained use The result can be an island with balanced development which can sustain its people indefinitely, an island with resources to provide all their essential needs, and an environment allowing a good quality of life on into the future.
- Sunset
- CONCLUSION
- Village discussion In most islands it is people like you who control the land and how it is used, who farm and fish and use or clear the forest. It is you who must decide your island's future.
- old man speaks "We know the land and reef, the ways of the fish in the lagoon, the uses of each plant and tree in the forest, and the times to plant and harvest."
- young man speaks "In school we learn how things are done in other places. There are new tools and machines that can help us to develop."
- old man speaks "There was wisdom in the ways of the past and the old taboos and rules. They helped us to protect our environment for hundreds of years."
- young man speaks "There is also wisdom in modern science and technology. It is easier today to produce more and to make money. Development can bring jobs and the comforts of modern life."
- old man speaks "But development without regard for the past and the future can bring many problems. See what has happened in other countries. We cannot afford to make the same mistakes on a small island."
- young man speaks "Together we can find the best of both old and new ways. We can avoid new ways that may hurt our island."
- old man speaks "Then we can choose kinds of development that are good for our own island and our own culture. We can have our own way of life that meets our needs and fits our island environment, a life that will bring happiness and assure a good future for our children and our children's children."

South Pacific Regional Environment Programme

Training Unit B3

PROBLEMS IN THE WORLD ENVIRONMENT

USE OF THIS UNIT

The text of this unit summarizes some of the most important world environmental problems. Everyone today should know something about these problems, even if there seems to be no way that any individual, especially in the developing world, can do anything about them.

The simplest way to use this unit is to read the text with the group, or to pass it around so that each one can read in turn, and then to discuss each paragraph, perhaps with the help of the questions provided.

If time permits going into more detail and there is a library available, these subjects have been widely written about in newspapers, magazines and books. The trainees could be assigned individually or in small groups to look for more information on one of the problems and to report back to the group.

International organizations concerned with these problems may also be able to provide information, and perhaps even audio-visual materials, so there has been no attempt to duplicate this material in this training programme.

REFERENCES AND SUPPLEMENTARY MATERIALS

It is not possible to list all the possible references on world environmental problems, but your library or school system might be able to supply some pertinent references available locally.

For a description by country of conservation problems and some endangered species in the region, see: Regional Ecosystems Survey of the South Pacific Area by Arthur L. Dahl (1980), South Pacific Commission Technical Paper No. 179.

(Unit written by A. L. Dahl)
[11/84]

TEXT

PROBLEMS IN THE WORLD ENVIRONMENT

Limits

People who live on small islands know that their island environment is limited. They see those limits every day. They know that if they are not careful they can use up all of a resource, such as fresh water or a favorite kind of fish, and have nothing left. They know that, if they dirty or poison their island, they cannot easily get away from it.

This world on which we live is also like an island in the great ocean that is space. On a larger scale it has the same kinds of limits as a small island in the ocean. Before, we could not easily see those limits, and man did not think much about them. But now men have gone into space and have taken pictures of their world island.

New Technology

With modern science and technology, man has learned to make bigger and bigger changes in the world. When he had only stone axes, he could not cut down many trees, but now with modern machines he can easily cut down whole forests. We do everything on a much bigger scale than ever before. In the past, the world seemed too big for men to have any effect on it. There were important changes, but they generally occurred so slowly that it took generations to notice them. In any one man's lifetime, the world stayed much the same as he had always known it. Today we can change the face of the planet. We make gardens out of deserts in some places, and deserts out of gardens in others. We catch so many fish in the oceans that the populations collapse. We move mountains (if there are minerals worth mining inside). We can probably cut all the major areas of tropical forest in the lifetime of our children. If we are foolhardy enough to use the nuclear weapons we have made in large numbers, we could even exterminate all life on the planet.

We have such power at our disposal that we can now change the world environment, but we do not yet have enough knowledge to do so wisely. So we continue doing what we have been doing, hoping that the changes we bring about will not be too disastrous. It is a risky way to prepare for the future.

Population

The basis of many of the problems in the world environment is the growing world population. There are far more people than there ever have been before, and our numbers have already doubled twice in this century. No one knows how many people can comfortably live on our planet. Some experts think we already have too many; others expect we can always develop new resources when they are needed. Part of the problem is that the numbers of people are growing much too rapidly in many countries for us to keep up with the need for new houses, new schools, new jobs and more food. The increasing numbers of poor people in many developing countries are often forced to strip the forests of their trees for fuel, clear and farm the land until it is exhausted or has eroded away, pollute their water, and strip every living

thing from the expanding deserts in their desperate attempt to survive. Even so, millions die from starvation and disease.

Consumption and Pollution

The poor are not the only ones to cause environmental problems. The rich consume far more than their share of the world's resources, often very wastefully. They are primarily responsible for the rapid exhaustion of many of the world's non-renewable resources (minerals and fossil fuels like oil), producing at the same time most of the global pollution. The developed nations are now wallowing in their own filth, so to speak. The gases from automobiles, industrial smokestacks and generating plants produce acid rain that is killing forests and sterilizing lakes over large areas of Europe and North America. Industrial chemicals and wastes carelessly dumped or buried years ago are now poisoning neighborhoods and water supplies. Some modern chemicals break down slowly or not at all; they are becoming long-term contaminants of the whole planet. Others may be rising up into the atmosphere where they may destroy the protective ozone layer that keeps us from being burned by the sun. Pesticides may spread and go on killing long after their initial use. Scientists are only now discovering that some materials and chemicals in common use cause cancer or deformed babies. Developing countries are increasingly suffering the same kinds of problems, and their resources for protection and control are much more limited.

Changing Climate

The human race has now developed to the point that its activities can affect the whole world system. We have burned so much fossil fuel and cut down so much forest that we have caused carbon dioxide gas (produced by burning or decaying organic matter) to build up in the atmosphere in ever larger quantities. One property of this gas in the air is that it traps heat from the sun much as a window or corrugated iron roof does. Many scientists believe the world will warm up as a result, and this could change world weather patterns, causing droughts in some areas and unusual rains or floods in others. This would be catastrophic for agriculture and for many other human and natural activities. It could also cause a partial melting of polar ice which would make the level of the oceans rise. It would not take much of a rise in sea level for some Pacific Islands to disappear.

Declining Productivity

Another worrying trend in the world environment is the continuing destruction of the natural ecosystems and primary productivity of the planet. Primary productivity is the process by which plants trap energy from the sun and turn it into food and materials. Almost all life depends directly or indirectly on this food for survival. Even the energy in our oil and coal was first trapped by plants ages ago. The amount of primary productivity thus determines how much life (and how many people) can survive on this planet. Yet man is busily cutting down the forests, poisoning the oceans, and misusing land so that the deserts spread. More and more land is stripped, degraded and abandoned. The resources that are lost are those that could be renewed indefinitely if properly cared for. More and more kinds of plants and animals are becoming extinct; they can never be brought back, and the world is that much poorer for their loss.

Exhaustion of Resources

At the same time, the resources that are the basis of most modern industry are not renewable. Most minerals occur only in limited quantities on the planet, at least in forms or concentrations that can be mined economically. We are rapidly exhausting the richest and most accessible ores of these minerals (copper, aluminum, iron, nickel, phosphate, etc.). The same thing is happening with the fossil fuels (oil, coal, natural gas) which provide most of our energy. As the costs of the raw materials go up, industries become less and less economic. Some materials are expected to run out in a few decades. This will force painful changes in industrial societies with great social and economic consequences.

Interactions

Looked at all together, the trends in the world situation are frightening. The numbers of people are increasing just as the productivity of the planet is declining and many important resources are running out. Pollution is spreading and the weather could become more unstable. The result is that there is less and less to support more and more. These trends cannot continue for ever. At some point the "crunch" has got to come.

It is clear that the world society cannot go on indefinitely as it has without paying attention to world limits. If we do not change voluntarily, the changes will be forced upon us, and there will probably be great suffering in the process. The longer we wait to act, the harder the change will be. Unfortunately, no one can agree as to how we should change, or in what direction, at what speed, and who should bear the costs. These problems are as much political and moral as technological, and are beyond the scope of this unit, although every concerned person should think about them.

QUESTIONS

Limits

What are some of the limits to the island environment?

How is the world similar to an island?

What are some of the limits to the world environment?

New Technology

How has new technology made it easier to clear land?

What has technology done to help agriculture?

What are some new fishing technologies?

How have new technologies in communications and transportation changed life in the islands?

In what ways has technology made it possible to change the world environment?

Population

How many people were there in the world in 1900?

How many are there today?

How many are there projected to be at the end of this century?

What was the population of your country or island in 1900, and today?

Is the population of your island increasing, stable or decreasing?

What is the reason for this change?

If this trend continues, what will your island be like in 20 or 50 years time?

What environmental problems are caused by large numbers of poor people?

Consumption and Pollution

Why do the rich developed countries use more than their proportional share of the world's resources?

What are some of the environmental problems of materially developed countries?

What materials that you use did not exist a hundred years ago?

Where do these materials go, and what happens to them, when you have finished using them?

Changing Climate

What has man done that might change the climate?

What would happen on your island if the climate changed?

What would happen to your island if the sea level rose 50 cm (20 in.)?

Declining Productivity

How much forest is left on your island?

How much land is used for agriculture?

How much land is degraded or not useful for anything?

How much of your island has changed from forest to agricultural land or from agricultural land to degraded land in the last 100 years?

Have the reefs or coastal waters of your island been degraded or become less productive?

What would your island be like if almost all the land became degraded?

What would happen to the world if almost all the land became degraded?

Are there any parts of your island that have become more productive?

Do you know of plants or animals on your island that are now very rare or that have disappeared (become extinct)?

Have some kinds of forest or natural areas disappeared completely?

Exhaustion of Resources

Is there any mining in your country?

How long is the mining expected to continue?

Is the mine doing as well as when it first started, or is the quality of the ore declining?

What will happen when there is nothing left to mine?

What happens to the price of something if many people need it and it becomes harder to find?

How are materials like copper or oil (and oil-based products like plastic) used in your country?

Imagine what would happen if the world ran out of something important like oil or copper?

What kinds of resources will never run out if they are taken care of?

Interactions

What happens when there are more people but less food?

If it was no longer possible to import food to your island, what would be the result?

What would happen on your island if oil runs out and there is much less or much more expensive transportation?

How would you feel if someone somewhere else poisoned your air or land?

Is there a relationship between environmental problems and war or peace in the world?

South Pacific Regional Environment Programme

Training Unit B4

RELEVANCE OF ENVIRONMENT
TO IMMEDIATE PRACTICAL CONCERNS

USE OF THIS UNIT

Many people see interest in the environment or ecology as something far away from the practical concerns of daily life, and therefore a luxury that we cannot afford. This unit gives some of the reasons why everyone must be concerned about the environment. Trainees learning environmental management must not only feel the importance of this work themselves, but also be able to convince others of its relevance. The approaches in this unit may help with this.

Each section of the text should be read and discussed within the group. The participants should be encouraged to think about and express their own feelings on each subject. This should help them to understand their own motivation and make it easier for them to share it with others. Where the number of participants is large, small discussion groups of 5 to 9 people can be formed to give everyone a chance to express themselves.

The group should be encouraged to think of other arguments for the importance of environmental concern and environmental management, perhaps related to immediate local problems.

EXERCISES

After the general discussion of the topic, role-playing exercises can help the participants to understand these points while giving them confidence in their ability to express themselves.

The group is divided into pairs. One person is the sceptic who sees no reason to be interested in the environment and does not want to be bothered by it; the other is the environmental manager who must convince him of the importance of some environmental action. Each pair plays out these roles in front of the group. The pairs can also switch roles if they wish and if time permits. A few minutes should be sufficient to let each pair develop their arguments and counter-arguments.

The specifics of the case are not important to the lesson, but they may be either assigned by the group leader or chosen by the participants if this makes it easier to imagine the roles. Some examples are:

The farmer who is clearing a steep hillside subject to erosion, to whom it must be explained that the soil will wash away and his effort will be lost;

The fisherman going out to fish with dynamite, who does not care if there is no reef left for fishing tomorrow;

The cattle raiser burning off the pasture to clear the weeds, without realising the long-term damage to the soil;

The hunter going out to shoot an endangered species of bird;

The farm worker washing out his pesticide spraying equipment in a stream used by other villages for drinking water; etc.

Such role-playing is usually fun for the participants, and can often bring out new arguments and explanations for the importance of environmental management.

(Unit written by A. L. Dahl)
[Revision 11/8/84]

TEXT

RELEVANCE OF ENVIRONMENT TO IMMEDIATE PRACTICAL CONCERNS

Many people ask why they should do something about the environment. They may see it as a foreign idea brought in from outside, as something idealistic and impractical, as something that interferes with their life and makes things harder for them, or as something that was not needed in the past, so why should it be now, etc. The following are some of the reasons why the environment is of immediate practical concern to everyone.

We are part of the environment

The environment is everything around you, and you are part of it, not separate from it. You depend on it for your most immediate needs: breathing, eating, drinking, and disposing of your wastes. We often take these things for granted and do not even think about them until something goes wrong. Imagine how you would feel if the air around you was no longer fit to breathe - suppose it was full of dense smoke, for instance. If you did not improve your environment very quickly or move rapidly to another environment, you would die. In some big cities, the air is hardly fit to breathe; many people get sick from it, and some even die. Suppose the environment refused to accept your wastes, so that they would neither decompose nor wash away. You would quickly find yourself in an unpleasant situation.

The above are only the most basic human or animal needs. The quality of our living environment is important in many other ways. The environment is where we live and work. It can be agreeable - even beautiful - satisfying all of our needs, or it can be depressing and constraining, so that we dream of escaping from it. How do you feel about your own environment: where you live? where you work? If you could choose your ideal environment, what would it be like?

We are all responsible for the environment

The place where you live and work today did not suddenly start to exist at your birth. You inherited it from your ancestors, and each of them left their mark on it. Try to imagine what it was like before any man came here. How much has it been changed by man's activities? Who cleared the land, built the houses and roads, planted the coconut palms and other useful trees? You may know who did some of these things, or it may have been so long ago that no one remembers. Nevertheless, what you have today was passed on to you by those who came before you. If they did their work well and improved the environment, you are richer for it. If they neglected the environment and did not care about the future effects of their actions, you are now suffering the consequences.

There is a famous story of an old man who was out in his garden planting fruit trees. Someone asked him why he was planting the trees, when he was so old that he would certainly not live to eat the fruits from them.

The old man replied that when he was young, he had enjoyed the fruits of trees planted by those who lived before him. Now he wanted to ensure that those who came after him could benefit as he had.

In the same way, you will pass on the environment to your children and grandchildren. Will they thank you for your foresightedness, or curse you for your selfishness? Your environment is an inheritance in your care and custody for a time. It is up to you to exercise your responsibility with wisdom.

Man and nature

Before man, the environment resulted entirely from natural processes. As civilizations have developed, man has increased his powers to change or direct nature. Some changes have been beneficial, others have upset natural balances or degraded natural resources. Sometimes an accumulation of many small actions can have a big effect. Suppose each person who visited a beach took one bucket of sand away with him to put in his garden or make cement. Taking one bucket of sand from a beach does not seem to make any difference; the waves and tides smooth the hole and the beach seems as before. But many bucketfuls of sand will eventually remove all the sand on the beach, and it will slowly but surely disappear. Many beaches throughout the Pacific have suffered this fate.

The same kind of cumulative change can come from cutting down trees, burning a bit of bush, letting a little bit of land erode, dynamiting a coral patch, or some other small destructive action. The result over time is a big change in something very important, and usually very limited, especially on a small island.

Nature does have some power of recovery from our actions. If you cut a tree or break a coral, another can grow in its place. The balance depends on how often we cut a tree and how long they take to grow back. Back when men cut trees with stone axes, it was hard to cut down more than could grow. Now that we have chain saws and bulldozers, we can clear a whole forest in less time than it takes a tree to grow. If we want to keep some important resources like trees, we have to control our development of them to what nature (sometimes with our help) can replace.

Environmental awareness as a key to success

Taking care of the environment is not just something we do for our children (important as that may be), it can also contribute to our own success. For example, suppose you are planting a garden. You have to work hard to clear the land, prepare the soil, plant, tend and harvest. If the harvest is not good, your effort is wasted (and you and your family may go hungry). Many things in the environment can make your garden fail if you do not respect them. A storm or cyclone may bring wind or flooding. Erosion can wash away the soil and plants. The soil may be too poor in nutrients, or these may be quickly lost. The crop may be invaded by pests, diseases or weeds. If you plant at the wrong time, or if there is a drought, the crop may fail. You may choose the wrong varieties or the wrong conditions.

The more you know about the environment, including both the potentials and the risks, the better your chances of developing the potential and of lessening or eliminating the risks. The same thing can be true of most other activities such as building a house, fishing, and even many businesses or development projects.

Traditional cultures had this environmental awareness; it was necessary for survival. Agriculture was often governed by complex practices and elaborate beliefs. Many of these developed over centuries of trial and error as the best way to ensure success. A community that could not ensure success did not live. Traditional farmers do not like to change their way of doing things, because for them any change to something unknown increases the risk of failure.

Environment and health

Our health and that of our families depends in large measure on how we take care of the environment. Many sicknesses are spread through the environment, through the water we drink or the food we eat. There are many ways that nature can destroy the germs that cause these sicknesses, if we know how to use or help these natural processes. If we do not pay attention to good sanitation, and instead spread our germs around, it is much easier for everyone to get sick.

Some sicknesses are also spread by mosquitos or rats. If we let junk and dirt collect, then there are many more places for rats and mosquitos to breed, and the diseases they carry will spread more easily. A clean environment is also a healthy environment.

Today there are many useful products like pesticides and chemicals that are also dangerous poisons if they are misused and get into the environment. Many industrial waste products are also highly toxic or cause cancer or other sicknesses. In developed countries where these products are most common, many deaths and illnesses can be traced to environmental causes. As these products become more common in the islands, they may cause new health problems if they are not used and disposed of with great care.

For all these reasons, the care with which we manage our environment is essential to the health and wellbeing of ourselves and our families. What is more immediate and practical than good health?

South Pacific Regional Environment Programme

Training Unit B5

OVERVIEW OF TRADITIONAL ENVIRONMENTAL MANAGEMENT

USE OF THIS UNIT

People with origins in non-Western cultures such as those of the Pacific Islands often have a rich heritage of traditional knowledge of the environment and of methods for managing environmental resources. However Western education has generally eroded their interest and confidence in this heritage. This unit aims to create an awareness of the existence and breadth of this knowledge with many important applications to today's problems. The subject is treated in more detail in section E of this training programme, Traditional Environmental Management.

The heart of this unit is a list of different kinds of traditional environmental knowledge found in most cultures in the Pacific region. The training leader should go over the text of the unit so that he or she can present the topic to the group. The group should then go through the list, while the participants describe and discuss examples from their own experience. The questions that follow the text can help to direct this discussion.

The personal examples brought out in the discussion should give the participants an awareness of the environmental knowledge they already possess. They will thus be able to see the continuity between this knowledge and the training programme.

If this unit is used separately from the training programme, it can be supported or followed up with materials from section E.

(Unit written by A. L. Dahl)

[Revision 11/9/84]

TEXT

OVERVIEW OF TRADITIONAL ENVIRONMENTAL MANAGEMENT

The original inhabitants of most countries lived close to the land and the sea and depended on them for survival. They observed nature closely, and over generations came to understand many things about the natural world and how it worked. Most villages had their wise old men and women to whom others would turn for advice and who would decide when and where to plant or fish. Many traditional practices were developed where necessary to ensure adequate food for the people and to protect resources from overuse. In general these systems worked well until the arrival of the Europeans brought new techniques and new economic pressures. The old knowledge and values were often discredited as sorcery or superstition, and children went off to school instead of learning from their elders. Much of this practical knowledge has been lost as old people have died without passing it on to the next generation. Often only fragments are still remembered, or have been recorded by outside observers. Yet much of this information would be useful to the wise management of resources today. It is important to try to save what is left of this traditional knowledge and the value system of respect for nature on which it was based, so that it can be reinterpreted in the light of modern scientific understanding, and reapplied as necessary to manage resources better.

Traditional knowledge of the environment covered a wide range of subjects, often in great detail related to specific local circumstances. Such knowledge can be much more useful than general scientific knowledge based on observations made elsewhere. The following list gives some of the kinds of traditional knowledge that are important to environmental management.

Agriculture

The many different varieties of crop plants and their utilization.

The best places, conditions and times for planting, caring for and harvesting crops.

Food storage techniques.

Control of crop sicknesses, insects and other pests.

Management of agricultural land, both seasonally and from year to year; planting sequences or rotations; periods of fallow to allow the land to recover; techniques for soil improvement.

Control of erosion and wind damage.

Identification or classification of soils.

Water management and irrigation, including complex systems of aqueducts and irrigated terraces.

Controls on land use and access to land.

Fishing

Fishing methods and materials.

Knowledge of fish species, their behavior, migration, and reproduction.

Best fishing locations, times and techniques for each species.

Controls on fishing: limited access to fishing areas, taboo areas or seasons, catch restrictions.

Changes in fishing resources, effects of overfishing, "how things used to be".

Animals and Hunting

Behavior of species and hunting or trapping methods.

Controls or limitations on hunting: taboo areas, special times for hunting, restrictions to special occasions or special ranks.

Plants and the Forest

Useful trees and the qualities and uses of their woods.

Techniques for cutting and hauling trees from the forest.

Edible plants and plant parts (nuts, leaves, bark, roots, etc.).

Medicinal plants and their uses.

Genetic resources, varieties or special features of plants, loss of varieties.

Changes in the forest, loss of forest cover (where the forest used to be).

General

Traditional names for and classifications of species and communities.

Calendars related to the weather, to celestial bodies (solar and lunar cycles, appearance or movement of stars), or to association with natural events such as the flowering or fruiting of trees or the migration of birds.

Weather patterns and prediction, cycles of rain and drought, changes in climate.

Natural catastrophes, cyclones, tsunamis, floods; signs and warnings; effects and areas affected.

Changes in the environment, past extent of the forest and agricultural areas, former locations and populations of villages.

Environmental knowledge: who possessed it, how it was used and transmitted.

Every culture possessed a body of knowledge like the above that was added to and passed on from generation to generation, in much the same way that scientific knowledge is used in western societies. However the intellectual and cultural context was different, with the knowledge being closely associated with traditional religions or magic, often held in secret and passed on within the family. Within its context it had as much value as modern science, and in some areas it was well in advance of present scientific understanding. Those who had such knowledge were the equivalent of scientific experts, and through their help traditional peoples were able to live successfully in what were often difficult and limited environments. Modern societies are far from achieving a similar equilibrium with their resources, and have much to learn from those who succeeded before them.

QUESTIONS .

Can you think of examples of each kind of traditional knowledge from your own experience?

Do you know of other people in your family or village who have such knowledge?

Is the knowledge the same or are there differences from family to family and village to village?

Can you think of other kinds of knowledge to add to the list?

South Pacific Regional Environment Programme

Training Unit B6

THE SOUTH PACIFIC REGIONAL ENVIRONMENT PROGRAMME

USE OF THIS UNIT

This unit describes the origins and activities of the South Pacific Regional Environment Programme, through which the island countries of the South Pacific work together to solve their environmental problems, and which produced these training materials.

The text of the unit can be given as a reading assignment, or it can be studied by the leader and then presented to the group.

The group should then read together and discuss in detail the South Pacific Declaration on Natural Resources and the Environment adopted by the governments of the region at the Rarotonga Conference in 1982 (see Annex 1). This declaration is a regional statement of policy on the environment now being implemented by SPREP.

AUDIO-VISUAL SUPPORTS

The slide-tape programme South Pacific Regional Environment Programme can be used to supplement this unit, or even to replace the text if this is more appropriate to the group concerned.

SUPPLEMENTARY MATERIALS

The documents produced by SPREP could be made available for the group to look at, and to read whatever interests them. The report of the Rarotonga Conference, the Country Reports, and the Topic Reviews would be of particular interest in this context (see the list of references). These documents are available in all South Pacific Commission deposit libraries. Some may also be obtained from SPREP by writing:

South Pacific Regional Environment Programme
B. P. D5
NOUMEA CEDEX
New Caledonia

TEXT

THE SOUTH PACIFIC REGIONAL ENVIRONMENT PROGRAMME

Introduction

The South Pacific Regional Environment Programme, often referred to as SPREP, regroups 22 island countries and territories to deal with their common environmental problems. It is a joint programme of the South Pacific Bureau for Economic Co-operation (SPEC), the South Pacific Commission (SPC), the United Nations Environment Programme (UNEP) and the UN Economic and Social Commission for Asia and the Pacific (ESCAP), with a secretariat based at SPC and financial support from UNEP as part of its Regional Seas Programme.

Each of the 10 Regional Seas Programmes encouraged by UNEP to deal with the environmental problems of major ocean areas has its own distinctive characteristics. The South Pacific Regional Environment Programme is unique in its origins and orientation, as is appropriate to a region consisting entirely of island states with well established regional organizations and traditions of co-operation. The earliest regional intergovernmental organization, the South Pacific Commission, is nearly as old as the United Nations, having been founded in 1947. The traditional island cultures have developed over generations within the constraints of their environment, and where resources were limited they generally evolved management strategies and controls.

The term "South Pacific" is not strictly accurate, as the region includes not only all the tropical South Pacific Islands of Melanesia and Polynesia from Papua New Guinea to Pitcairn, but also extends northward through the islands of Micronesia, most of which lie north of the equator (see map). The region covers about 29 million km², almost seven times that of the Caribbean, which makes it by far the largest Regional Seas programme in area. The land area, on the other hand, is only 551,000 km², of which Papua New Guinea makes up 84%. There are roughly 3 million inhabitants in Papua New Guinea, and 2 million in the other 21 countries of the region, ranging from over 600,000 in Fiji to less than a hundred on Pitcairn. Population densities (persons/km²) range from 6 or 7 in Papua New Guinea and New Caledonia to 348 on Nauru. The GNP per capita of US\$ 1,775 (in 1978) is considerably below that of the Caribbean (SPC, 1982).

Origins

SPREP evolved out of a decade of regional environmental interest and activity. As far back as 1970, the South Pacific Commission proposed recruiting an ecologist on its staff, and this was supported by a resolution from the Regional Symposium on Conservation of Nature - Reefs and Lagoons, held in Noumea, New Caledonia in 1971 under the joint sponsorship of SPC and the International Union for Conservation of Nature and Natural Resources (IUCN), which identified many environmental problems of regional concern. The governments of the region approved the post and a special project on conservation of nature in 1973, and Dr. Arthur Dahl was recruited as Regional Ecological Adviser in 1974. A wide variety of activities in environment and

conservation were included in the SPC work programme until replaced by SPREP in 1980.

The idea for a regional environmental programme in the South Pacific originated from discussions between SPC and UNEP. UNEP also suggested a "mini-Stockholm" conference on the environment for the Pacific, and this idea was supported by ESCAP. At the request of governments, the development of this programme became a joint activity between SPC and SPEC, the secretariat for the South Pacific Forum, in 1976. After a series of preparatory technical meetings of government experts, and the agreement of UNEP to provide initial funding, the South Pacific Regional Environment Programme was launched in January 1980.

South Pacific Regional Environment Programme

The first phase of the programme was designed to help the countries and territories of the region to identify their own environmental problems and priorities. Each government was requested to submit a country report to the programme (SPREP, 1981a; 1982a), and a number of experts were requested to prepare reviews on topics of regional interest (SPREP, 1981b). The process produced a "Stockholm-like" increase in governmental awareness of the significance of environmental concerns to their immediate interests. On the basis of this information, the SPREP secretariat was able to outline the state of the environment in the South Pacific (Dahl and Baumgart, 1982). It was clear that the South Pacific was no longer the carefree paradise of the tourist posters, nor was it yet the polluted Mediterranean. There was an obvious need for preventive measures before the environmental decline went too far.

The country reports showed that 60% of the countries had significant problems of soil erosion, more than half were concerned about the environmental impacts of the extraction of construction materials like sand and gravel, and 30% had major mining activity. Water shortages and water pollution also affected 60% of the countries. Loss of forest areas concerned 70%, and two thirds had problems of endangered species and nature conservation. More than half faced conflicts of land use and land tenure, given the limited land area available on many islands. In the coastal zone, reclamation and coastal erosion were each a problem in a third of the countries, overfishing and mangrove management were difficulties in over half, and three quarters suffered from significant pollution in coral reef areas. Waste disposal was a nearly universal problem; more than 90% had difficulties disposing of liquid wastes without creating pollution, and 60% could not find satisfactory means for getting rid of their solid wastes. Toxic chemicals such as pesticides, to which small islands are particularly vulnerable, were another worry for a majority of the region. Radioactivity was a special case, since the long continuing use of islands in the region for nuclear weapons tests and the proposals for ocean dumping of nuclear wastes have made this a major political issue. Finally, more than 60% of the governments were concerned about their population growth relative to the carrying capacity of their islands.

The preparatory phase of SPREP concluded with the Conference on the Human Environment in the South Pacific, held in Rarotonga, Cook Islands, in March 1982, at which ministers and other high level delegates from nearly all participating countries adopted a South Pacific Declaration on Natural Resources and the Environment (Annex 1), and an Action Plan for Managing the Natural Resources and Environment of the South Pacific Region (SPREP, 1982b).

It is significant that every single country and territory in the region participated actively in the preparatory phase of SPREP, showing the widespread support for the aims of the programme. Some countries even established environmental committees or bodies to implement their environmental priorities identified for SPREP.

Immediate priorities

The Action Plan adopted at the Rarotonga Conference identified a wide range of areas of environmental need, but certain priorities were also expressed. The programme therefore launched immediate activities in several of the priority areas. A technical group of international experts was organized to prepare a review of radioactivity in the South Pacific, so that the technical questions could be distinguished from the political and moral issues on this difficult subject (SPC/SPEC/ESCAP/UNEP, 1983). A similar review was commissioned on the disposal of hazardous wastes in the Pacific Ocean. It was clear that the regional policies on this subject could only be implemented through international and regional legal agreements. SPREP therefore encouraged countries to become party to the London Dumping Convention, and organized a series of meetings to draft a Convention for the Protection and Development of the Natural Resources and Environment of the Pacific Region and associated protocols.

Given the lack of baseline data on pollution by toxic chemicals such as pesticides and herbicides, and the reported extent of pollution by urban drainage and other liquid wastes, SPREP began consultations with regional universities and research organizations on the creation of a network of sub-regional pollution monitoring centres with analytical laboratories. The discussions also extended to research and training needs and the possible co-ordination of approaches, particularly with respect to the marine and coastal environments.

A major effort is being made in the area of environmental information and public awareness, including the preparation of a directory of research centres, a bibliography of environmental literature, and environmental radio broadcasts. The importance of preserving what remains of traditional environmental knowledge and management practices for their possible usefulness in solving current problems is also being emphasized. Approaches for training village leaders to better manage their own land and resources are being developed, since in the decentralized structure of the Pacific much responsibility for resource management will always rest at the local level. The programme also made provision for direct assistance to countries with specific problems.

Distinct features of SPREP

As mentioned above, the region of the South Pacific Regional Environment Programme is distinctive in consisting of tiny islands in a vast area of sea without nearby continental margins. Most of the 22 participating countries and territories (American Samoa, Cook Islands, Federated States of Micronesia, Fiji, French Polynesia, Guam, Kiribati, Marshall Islands, Nauru, New Caledonia, Niue, Northern Mariana Islands, Palau, Papua New Guinea, Pitcairn Island, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu, Wallis and Futuna, and Western Samoa) are micro-states struggling with problems of small size, isolation and lack of resources. Five developed countries with territories or former territorial interests in the region (Australia, France, New Zealand, United Kingdom and United States) also support the programme.

SPREP originated in the desire of governments for regional activities to protect the Pacific environment from deterioration. It reflects the region's own needs and priorities, although UNEP assistance and encouragement helped to bring it to fruition. It is based in strong regional organizations with a long history of regional co-operation in many fields. It has a unique structure, with a Co-ordinating Group representing the four co-operating organizations (SPEC, SPC, ESCAP and UNEP) which reports to the two major intergovernmental meetings in the region, the South Pacific Forum and the South Pacific Conference. The SPREP secretariat is located at the South Pacific Commission headquarters in Noumea, New Caledonia, and is currently headed by Dr. Jeremy Carew-Reid, SPREP Regional Co-ordinator. SPREP is thus a combined effort of the major intergovernmental organizations with environmental interests in the region, and is directly responsive to the wishes of governments as laid down in the Action Plan and as reviewed at their annual meetings.

SPREP covers all of the South Pacific environment, terrestrial as well as marine. On an island it would be artificial and unrealistic to separate the two. It gives special emphasis to the small island environment. SPREP also tries to be sensitive to the special geographic, economic, social and cultural dimensions of the region. It is trying to strengthen the ability to respond to environmental problems in a region where there is a relative lack of scientific and technical capabilities, and where the possibilities for independent national action in support of a regional plan are limited. Regional co-operation is thus essential to resolve pressing environmental problems. Finally, SPREP recognizes that education, public awareness and training are essential to involve every Pacific Islander in the protection and improvement of his local environment. This training programme is a result of that recognition.

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- ANNEX 1: South Pacific Declaration on Natural Resources and the Environment (Rarotonga, 1982)
- MAP: Area served by the South Pacific Commission and the South Pacific Regional Environment Programme

ANNEX 1

SOUTH PACIFIC DECLARATION ON NATURAL RESOURCES
AND THE ENVIRONMENT

This Conference :

Having regard to the Declaration of the UN Conference on the Human Environment adopted in Stockholm in 1972 and the desirability for a regional declaration within the South Pacific framework;

Noting the World Conservation Strategy;

Recognizing that the environment of the South Pacific Region has features such as tropical rain forests and small island/lagoon/reef ecosystems which require special care in responsible management;

Taking into account the traditions and cultures of the Pacific people which incorporate wise management, born of their long history of living successfully in the region, as expressed in accepted customs and rules of conduct;

Seeking to ensure that resource development for the benefit of the people shall be in harmony with the maintenance of the unique environmental quality of the region and the evolving principles of sustained resource management, particularly in view of increasing population densities;

Building on the established processes of regional co-operation based on independence, consultation and consensus;

Declares that :

1. The resources of land, sea and air which are the basis of life and cultures for South Pacific peoples must be controlled with responsibility, and safeguarded for the benefit of present and future generations, through sustained resource management.
2. Integrated environmental, economic, social and resource planning and management is essential to ensure sustainable rational use of the land and sea resources of the region, and the greatest enhancement of human well-being.
3. An effective programme of public information, education and training is necessary to promote basic environmental understanding by the people, as well as the skills necessary for effective environmental assessment and management.

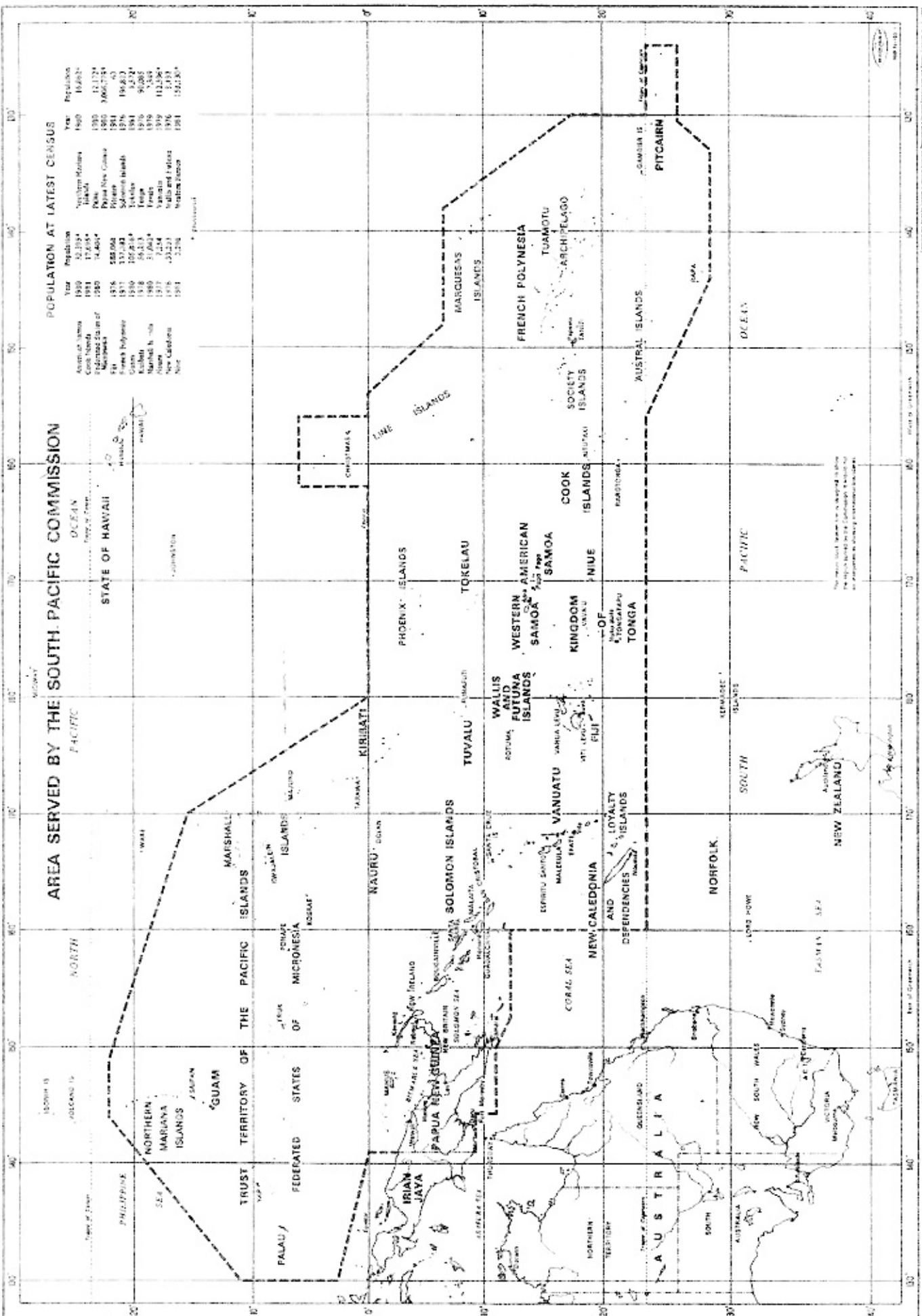
4. Appropriate and enforceable legal instruments and institutional arrangements are a necessary basis for effective integration of environmental concern with the whole development process.
5. A system of specially-designated areas such as national parks and reserves is essential for the protection of traditional use of resources, and should be included in resource use planning.
6. The economic utilization of resources, particularly forests and fisheries, should be based upon reliable information to ensure sustainable production without over-exploitation or damage to the environment and affected peoples.
7. Management of the growth and distribution of population should be encouraged to ensure adequate management of natural resources and to maintain adequate standards of human well-being.
8. The rate and nature of discharges of non-nuclear wastes shall not exceed the capacity of the environment to absorb them without harm to the environment and to the people who live from it.
9. The storage and release of nuclear wastes in the Pacific regional environment shall be prevented.
10. The testing of nuclear devices against the wishes of the majority of the people in the region will not be permitted.
11. The vulnerability of much of the region to environmental and economic damage from natural and man-made disasters requires the development of national and regional contingency plans and prevention programmes.
12. Regional co-operation should be further developed as an effective means of helping the countries and territories of the South Pacific to maintain and improve their shared environment and to enhance their capacity to provide a present and future resource base to support the needs and maintain the quality of life of the people.
13. Traditional conservation practices and technology and traditional systems of land and reef tenure adaptable for modern resource management shall be encouraged. Traditional environmental knowledge will be sought and considered when assessing the expected effects of development projects.
14. Involvement and participation of directly affected people in the management of their resources, including the decision-making process, should be encouraged.

AREA SERVED BY THE SOUTH PACIFIC COMMISSION

POPULATION AT LATEST CENSUS

Year	Population
1939	50,139*
1941	57,455*
1950	74,401*
1958	100,000*
1960	110,000*
1962	121,774
1965	146,754
1968	166,754

Year	Population
1978	535,000
1980	577,000
1985	625,000
1990	675,000
1995	725,000
2000	775,000
2005	825,000
2010	875,000
2015	925,000
2020	975,000
2025	1,025,000
2030	1,075,000
2035	1,125,000
2040	1,175,000
2045	1,225,000
2050	1,275,000



* Population figures for the Hawaiian Islands are based on the 1950 Census. The population figures for the other islands are based on the 1960 Census.