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Oceania's Most Pressing Environmental Concerns

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Oceania's Most Pressing Env

The islands and coastal waters of Oceania are unique eco-systems. The characteristics which set them apart, however, also make them vulnerable to a wide range of environmental threats. This article provides an overview of the various regional and localized problems in the South Pacific and outlines the principles for sustained use of island resources.

Only in the last decade have countries 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, 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 salini-

There has been relatively little published scientific research on environmental problems in Oceania (1), other than local studies or environmental assessments of development projects, although some broader work has been done in Melanesia (2, 3). Fortunately, as part of the preparatory phase of the South Pacific Regional Environment Program (SPREP), nearly all the countries and territories in the Region prepared country reports outlining their environmental problems and priorities, while experts were requested to review significant environmental topics (4). These were then summarized in a regional overview on the State of the Environment in the South Pacific (5). These documents and the information accumulated during ten years of South Pacific Commission assistance with regional environmental problems permit at least a qualitative description of the most pressing environmental concerns facing the Region.

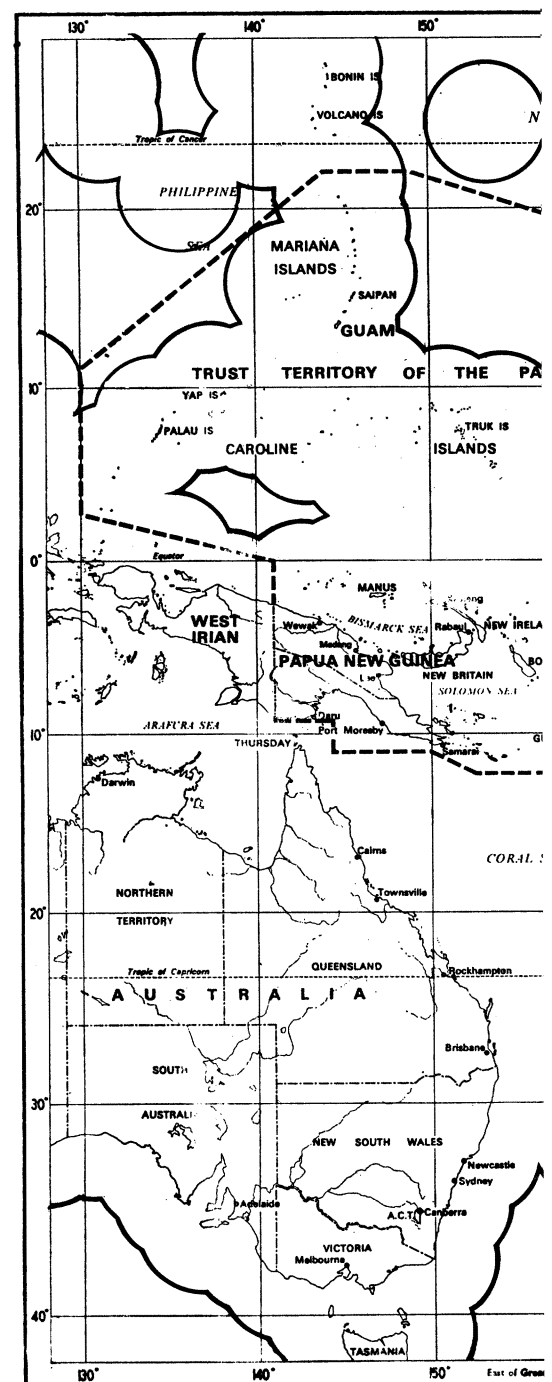
WIDESPREAD PROBLEMS

Domestic Waste

The most widespread environmental problem, affecting 90 percent 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 nonexistent. The result is serious water pollution both of freshwater 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.



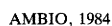
Dredging construction material from a lagoon on Tahiti (French Polynesia) pollutes adjacent waters and reduces the productive area of marine habitat. This is a problem that affects wide areas of the South Pacific. Photo: A Dahl.



BY
ARTHUR LYON DAHL

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.

Figure 1. The approximate area falling within the declared 200 mile Exclusive Economic Zones (EEZs) in the South Pacific region. (Note: some country names are out of date).





Loss of tree cover is an accelerating problem in the South Pacific. Countries like Samoa and New Caledonia are already approaching the limits of their harvestable timber resources. In other cases, as shown here, timber cleared for agricultural purposes is simply left to rot on the ground.

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 which are already deforested), with countries like Samoa and New Caledonia approaching the limits of their harvestable timber resources. 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 areas with a dry season such as in Papua New Guinea and New Caledonia. This not only means 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 programs, 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 in order to meet the needs of the people for water, food, building materials and reasonable quality of life, and to maintain the functioning of the natural systems on which these all depend. This requires comprehensive planning and careful allocation of land for the most appropriate use or combination of uses. Conventional systems of land and resource tenure have been 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 indigenous 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, resulting in 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 affects a majority of countries and territories in the Region. They are frequently given high priority at the national level.

Soil Loss

The soil resource, the basis for agriculture, is inevitably limited on islands. 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 are poor to begin with, and irregular island topography, geological instability, heavy rainfall and larger areas of cleared land increase their susceptibility to erosion. Traditional agriculture generally involved lengthy fallows or the addition of humus, but these techniques are being abandoned with modernization and in-

creasing 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 percent of the total island surface in the twenty-two years from 1949 to 1971.

Water Shortage

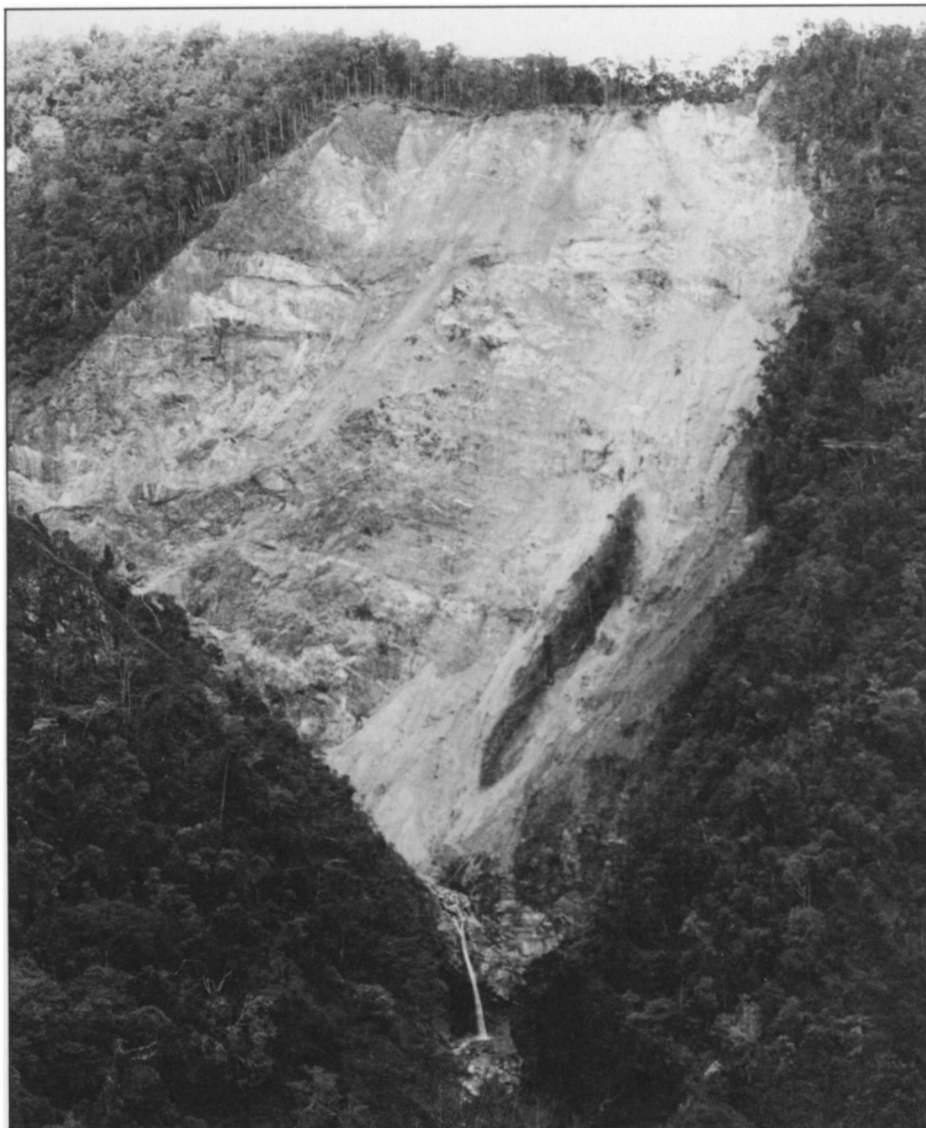
While heavy rains are characteristic of the Region, they can be irregular from season to season and from year to year. Since most islands have little water storage capacity because of their porous rocks and many small watersheds, dry periods can result in acute water shortages which hamper development and can create serious public health problems. Destruction of forest cover has caused many formerly perennial rivers to stop flowing in the dry season. The shallow freshwater lenses of atolls and the 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, for example, 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 often ruin 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, resulting in health and pollution problems.

Toxic Chemicals

There is widespread concern about the potential dangers of the increasing amounts of toxic chemicals being imported into the Pacific Islands. 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 in aid programs, 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. 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. Accidents with toxic chemicals are more serious on small islands where few



Soil loss and erosion are serious problems on many South Pacific islands. On Papua New Guinea, landslides are endemic even on forested slopes (shown here). In cleared areas, the erosion of denuded hillsides can be catastrophic. Photo: Seddon.



The problem of solid waste disposal on small islands is a common environmental concern throughout the Region. Here, a waste dump in a mangrove swamp on Tonga is a breeding ground for diseases. Photo: A Dahl.

island doctors have experience in identifying poisoning by toxic chemicals; 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 trans-shipment, 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 flora and fauna 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 problems are very limited. There are roughly 7 times more endangered bird species *per capita* in the South Pacific than in the Caribbean, 50 times more than in South America, and a hundred times more than in North America or Africa.

While a number of countries have made great efforts in setting aside more than one hundred protected areas totalling approximately 800 km² (6), this is only 0.15 percent of the land area, and the needs far exceed the means. In addition, small islands seldom can afford to create parks and reserves for the sole purpose of 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 important resources for tourism

and recreation. 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 interact dynamically 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 so intensively that they could no longer support a human population and their inhabitants had to be evacuated.

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 some localities. 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. While some general air pollution (mostly from vehicles) is present in larger



The effects of mining on local ecosystems is often pronounced, as shown here at the Bougainville Copper Mine in Papua New Guinea. Photo: A Dahl.

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 political priority by governments. The Region has perhaps 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 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 fueled further fears of regional contamination. A recent technical review minimized the dan-

gers to the Region from present nuclear activities (7), although the importance of this issue is more moral and political than environmental.

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 populations while on others the population is actually declining through emigration. Nevertheless, human activities are leading to an erosion in the resource base on which the islanders depend for survival. Since resources are more limited on islands, there is less room for error; an islander cannot just move on to the "frontier". Some Pacific countries such as Wallis and Futuna, Nauru and cer-



Workers measure pollution levels (especially from heavy metals) in the silt-laden Jaba River downstream from the Bougainville Copper Mine. Photo: A Dahl.

tain atolls are getting very close to their environmental limits. In some cases the rapid degradation of soil coupled with the cultural difficulty of family planning measures is an immediate threat to agricultural resources.

It is clear that the solution to 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 planet as resource degradation approaches its global limits.

References and Notes

1. *Environmental Issues in the South Pacific: a Preliminary Bibliography*, University of the South Pacific Library, Pacific Information Center, and South Pacific Regional Environment Program, Suva, Fiji (1983).
2. H C Brookfield, Ed., *Population-environment Relations in Tropical Islands: the Case of Eastern Fiji*, MAB Technical Notes 13, Unesco, Paris (1980).
3. J H Winslow, Ed., *The Melanesian Environment*, Australian National University Press, Canberra (1977).
4. South Pacific Regional Environment Program, *Country Reports 1980-1981*, Numbers 1-19, and *Topic Reviews*, Numbers 1-13, South Pacific Commission, Noumea, New Caledonia (1981, 1982).
5. A L Dahl and I Baumgart, *The State of the Environment in the South Pacific*, Report of the Conference on the Human Environment in the South Pacific, Rarotonga, Cook Islands, 8-11 March 1982, pp 47-71, South Pacific Commission, Noumea, New Caledonia (1982); reprinted as UNEP Regional Seas Reports and Studies No. 31 (1983).
6. A L Dahl, *Regional Ecosystems Survey of the South Pacific Area*, South Pacific Commission Technical Paper No. 179, Noumea, New Caledonia (1980).
7. South Pacific Regional Environment Program, *Report of the Technical Group on Radioactivity in the South Pacific Region*, South Pacific Commission, Noumea, New Caledonia (1983).

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