

# ECODEVELOPMENT URGED FOR CORAL REEF RESOURCES

by Dr. Bernard Salvat

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Coral reef resources, such as mother of pearl oyster, trochus shell, and trepang (*bêche de mer*), have been over-exploited by the Western trade export market during the 19th and 20th centuries. They have become seriously depleted because the old traditional ways have been superseded by modern life styles and new economic structures among the island populations of the South Pacific. In some parts of the South Pacific, even those resources which are used locally at subsistence level, such as turtles and lobsters, are depleted.

The term 'resource' implies the capacity for human use and exploitation. Elements of the coral reef environment which have never been exploited by man cannot be described as resources. The term, 'rational' means use or exploitation without threat to the ecosystems: the resources are maintained and collecting is possible from one year to the next.

There are 84 countries in the world that possess coral reefs, most of which are developing nations, with the exception of the states of Florida and Hawaii in USA and the Great Barrier Reef in Australia.

Coral reefs are one of the most productive ecosystems of our planet, a rich ecosystem, often situated in oceanic poverty. However, they are also complex and vulnerable, and unfortunately we have very little scientific knowledge of their structure and functioning.

## Traditional life style

Let me confine my discussion to the South Pacific archipelagoes, where coral reefs are well developed, since, as island nations far removed from continents, they are even more dependent on their marine and coastal resources. I would like to focus on the Pacific area also because this region is undergoing rapid and drastic political evolution and is at the cross-roads between the old traditional life style and that resulting from a modern economy. In addition to their own problems, these nations are also affected by the international energy crisis and the need for environmental protection.

The South Pacific region - Oceania - consists of



Polynesia, Micronesia and Melanesia, including Papua Guinea, an area of 30 million sq. km of which only 1 per cent is land. Of the five million inhabitants of this more than half live in Papua New Guinea. The region only two exports which exceed a million tons are nickel in New Caledonia and phosphates at Noumea.

Before their contacts with modern industrial civilization the islanders obtained most of their food supply from the sea - almost 90 per cent, in fact. Land resources were and subject to the catastrophes of typhoons and tsunamis. Their world, like their resources, was limited to the land reefs and the sea. They were able to keep their mode of life on a fairly even balance with the help of traditional customs aimed at preventing depletion of fish, turtle and sea urchin. For example, one traditional method of marine conservation was reef and lagoon tenure which was controlled by a group or clan. It was in their interest to harvest moderately and to ensure that the resources were not destroyed. They had their own system of rational use of resources, including closing fishing areas during spawning periods, allowing catch to escape, restricting fishing areas during bad weather and banning the slaughter of small turtle found on the reef.

Trade with the Western nations opened up these islands and export of some products of the coral reefs was developed with Europe.

## Pearl trade

Trade in pearl shells in the South Pacific has been going on for 170 years, and represents a classic case of exploitation of a limited resource. The market for these shells developed early in the 19th century for the manufacture of buttons. By 1827 the heaviest pillage was over and severely depleted stocks appeared in official reports by 1850. I estimate that exports of mother of pearl shells from 15 Polynesia atolls since 1802 totalled 100,000 tons. For biological and ecological reasons this species would need years or decades of non-collecting to recover its naturally abundant stocks.

It is the same story as regards the Cook Islands: 20 years ago this shell was still the main export here, but it was followed by a rapid decline, until by 1963 exports totalled only seven tons.

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Polynesia, Micronesia and Melanesia, including Papua New Guinea, an area of 30 million sq. km of which only two per cent is land. Of the five million inhabitants of this region more than half live in Papua New Guinea. The region has only two exports which exceed a million tons annually: nickel in New Caledonia and phosphates at Nouméa.

Before their contacts with modern industrial civilization, the islanders obtained most of their food supply from the sea — almost 90 per cent, in fact. Land resources were scarce, and subject to the catastrophes of typhoons and tsunamis. Their world, like their resources, was limited to the lagoons, reefs and the sea. They were able to keep their mode of life on a fairly even balance with the help of traditional customs aimed at preventing depletion of fish, turtle and sea birds.

For example, one traditional method of marine conservation was reef and lagoon tenure which was controlled by a chief, group or clan. It was in their interest to harvest in moderation and to ensure that the resources were not destroyed. They had their own system of rational use of resources, such as closing fishing areas during spawning periods, allowing excess catch to escape, restricting fishing areas during bad weather and banning the slaughter of small turtle found on the beach.

Trade with the Western nations opened up these islands and export of some products of the coral reefs was developed with Europe.

### Pearl trade

Trade in pearl shells in the South Pacific has been going on for 170 years, and represents a classic case of over-exploitation of a limited resource. The market for these shells developed early in the 19th century for the manufacture of buttons. By 1827 the heaviest pillage was over and signs of depleted stocks appeared in official reports by 1863. I estimate that exports of mother of pearl shells from French Polynesia atolls since 1802 totalled 100,000 tons. For biological and ecological reasons this species would need many years or decades of non-collecting to recover its natural and abundant stocks.

It is the same story as regards the Cook islands: twenty years ago this shell was still the main export here, but this was followed by a rapid decline, until by 1963 exports totalled only seven tons.

The principal market for trepang has always been Japan. Today Papua New Guinea, Solomon Island and the Philippines are the only exporters (about 500 tons annually) of this region. In some places production of trepang is expanding.

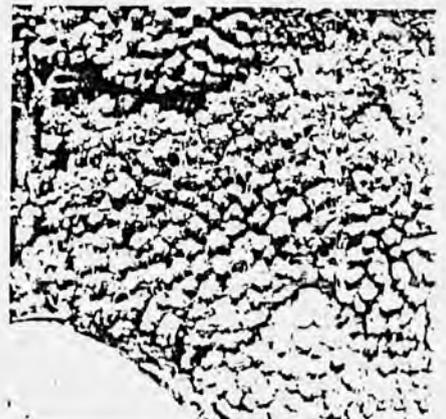
Although some coral reef resources are being exploited — mother of pearl oyster, trochus and others such as crustaceans, turtles and fish — the main export market. Recent estimates indicate that there is a potential for collecting of up to six million tons, or about ten per cent of all marine products. The potential exploitation of these resources is probably about ten per cent of this potential, even if all subsistence products included together with commercial products.

Among the main factors limiting large-scale exploitation are the localized nature of the production, the small size of different size, lack of sophisticated technology and inaccessibility of the resources (due to the geography of coral reefs), limited means of transport and products while awaiting transport and the cost of arranging transportation to markets.

Coral reef ecosystems are mainly confined to the fringes — the portions accessible to man — of the islands, since this zone is generally the nursery for many living in the entire ecosystem.

As for the future of the islands, with the current crisis, my feeling is that the islands will become more isolated due to rising energy costs which will reduce the islands' production, imports and exports to the continents. In such a situation, these islands, and their governments will be faced with the need for more economical self-sufficiency — a kind of survival on a very small scale. All resources will be valuable. In the past, those from lagoons and reefs were the most important in the South Pacific. The question is how to regulate these, how to replace old habits of exploitation and depletion of natural stocks, and how to solve only by research and further scientific

(Based on a paper presented at the Pacific Science Congress)





Asia, Micronesia and Melanesia, including Papua New Guinea, an area of 30 million sq. km of which only two per cent is land. Of the five million inhabitants of this region more than half live in Papua New Guinea. The region has two exports which exceed a million tons annually: tin in New Caledonia and phosphates at Noumea.

Before their contacts with modern industrial civilization, islanders obtained most of their food supply from the land, almost 90 per cent, in fact. Land resources were scarce, subject to the catastrophes of typhoons and tsunamis. The world, like their resources, was limited to the lagoons, reefs and the sea. They were able to keep their mode of life in a fairly even balance with the help of traditional customs at preventing depletion of fish, turtle and sea birds. In ample, one traditional method of marine conservation was reef and lagoon tenure which was controlled by a chief, or clan. It was in their interest to harvest in moderation to ensure that the resources were not destroyed. They had their own system of rational use of resources, such as fishing areas during spawning periods, allowing excess to escape, restricting fishing areas during bad weather and banning the slaughter of small turtle found on the beach. Trade with the Western nations opened up these islands and port of some products of the coral reefs was developed in the tropics.

#### Pearl trade

Trade in pearl shells in the South Pacific has been going on for 170 years, and represents a classic case of over-exploitation of a limited resource. The market for these shells opened early in the 19th century for the manufacture of buttons. By 1827 the heaviest pillage was over and signs of depletion of stocks appeared in official reports by 1863. It is estimated that exports of mother of pearl shells from French Polynesian atolls since 1802 totalled 100,000 tons. For biological and ecological reasons this species would need many decades of non-collecting to recover its natural and abundant stocks.

It is the same story as regards the Cook Islands: twenty years ago this shell was still the main export here, but this was followed by a rapid decline, until by 1953 exports totalled only 10 tons.

The principal market for trepang has always been China. Today Papua New Guinea, Solomon Islands and Fiji are the only exporters (about 500 tons annually) of the South Pacific region. In some places production of trepang is capable of expansion.

Although some coral reef resources have been over-exploited — mother of pearl oyster, trochus and trepang — others such as crustaceans, turtles and fish are not yet on the export market. Recent estimates indicate that coral reefs have a potential for collecting of up to six million tons of fish — about ten per cent of all marine products today. Present exploitation of these resources is probably less than five per cent of this potential, even if all subsistence production is included together with commercial production.

Among the main factors limiting large-scale exploitation are the localized nature of the production, diversity of fish of different size, lack of sophisticated technology, isolation and inaccessibility of the resources (due to the rough topography of coral reefs), limited means of preserving the products while awaiting transport and the difficulty of arranging transportation to markets.

Coral reef ecosystems are mainly damaged on the fringes — the portions accessible to man — which is catastrophic, since this zone is generally the nursery grounds for fish living in the entire ecosystem.

As for the future of the islands, with the growing energy crisis, my feeling is that the islands will become more and more isolated due to rising energy costs which will affect the islands' production, imports and exports to and from the continents. In such a situation, these islands, their population and their governments will be faced with the need to adopt a more economical self-sufficiency — a kind of ecodevelopment on a very small scale. All resources will be valuable, and, as in the past, those from lagoons and reefs will be the most important in the South Pacific. The question will be how to regulate these, how to replace old taboos and yet avoid over-exploitation and depletion of natural stocks. This will be solved only by research and further scientific knowledge.

*(Based on a paper presented at the Pacific Science Congress, Khabarovsk, 1979)*

