

EXTENDED FISHERIES JURISDICTION AND THE DEVELOPMENT PROBLEMS OF
SMALL ISLAND COUNTRIES

by

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ABSTRACT

In 1981, the peoples of Micronesia will become independent of the United States. Like most small countries, Micronesians may well find that political independence is not accompanied by economic independence. The fishing industry offers one of the few opportunities for economic development. The thesis focuses specifically on the development of small-scale fisheries in Micronesia, and on the opportunities to lease the skipjack tuna resources within Micronesia's Exclusive Economic Zone (200-mile limit). Micronesia's situation is explained within the framework of the theory of economic dependency. Emphasis is given to assessing impacts of fishing and other industries on Micronesia's development problems. The thesis concludes that, although no single industry represents a solution to Micronesia's development problems, small-scale fisheries can be particularly responsive to the needs of the area, and should receive more attention in development planning.

Name and Title of Thesis Supervisor: Philip B. Herr, Associate Professor
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INTRODUCTION

Within the past ten years, two trends in world politics have come toward their separate conclusions. Both trends are of immense importance to the peoples of the world who inhabit the small island groups in Oceania, the Caribbean, the Indian Ocean, and other parts of the world. The first is the trend toward decolonization. This movement, which began in the years following World War II, now includes these small island groups. The second trend is the international effort to negotiate a new Law of the Sea. Although the negotiations still continue, one of the concepts is already accepted as customary law. Almost all of the nations of the world, including the small island groups, have declared a 200-mile limit, within which the coastal (or island) state has exclusive economic claim to the resources. This claim is of special importance in the exploitation of fishery resources by less developed countries.

This thesis is about the impact of these two trends on the islands of Micronesia, scheduled to achieve independence in 1981. The islands of Micronesia are among the world's last colonies, and they face some of the world's most formidable development problems. Virtually their only resource is fish, and the establishment of exclusive claim to their fishery resource is critical to development. Having claimed the resource, however, the ability to exploit it remains a problem.

The trend toward decolonization

Following World War II, there was increasing pressure put on the former colonial powers of the world to move toward decolonization. This process was accelerated in 1960, when the United Nations formed the Committee of Twenty-Four to oversee the process of decolonization. In the next decade, most of the former colonies of Africa and Asia became independent. In the 1970's, attention came to be focused on the small island groups which had been previously all but ignored in the discussions.

One of the key issues was whether such nations could ever be "independent" given their small size. The presence of small European nations such as Luxemburg, the Netherlands, and Andorra seemed to alleviate this issue. Throughout history, small nations such as Venice, Switzerland, and other nations have been important in world affairs. Some very small countries are also very prosperous. Monaco and Kuwait are examples of small, wealthy nations. In the face of these precedents, arguments against the independence of the small island territories have quieted. At present, 20 of the United Nations' 150 members are small island countries with a population of less than one million persons. Many of these countries also have a land area of less than 1000 square miles. There are an additional 40 political entities which are not members of the United Nations. Some, like the Republic of Nauru, are independent nations. Some, like the Cook Islands, have opted for a status of "free association" with a larger country. Under this arrangement, the larger nation is responsible for defense and for most foreign relations. The small country is independent in terms of internal matters

and may terminate the arrangement unilaterally. Other islands are associating themselves more formally with a metropole. For example, Guam and Puerto Rico have both chosen to enter a commonwealth arrangement with the United States. Finally, some places are moving toward independence. There are other political entities, such as the island of St. Helena, which are not included in the list of 40 above. These tiny places with populations of less than 1000 persons will probably remain territories of larger political jurisdictions.

For many of the island countries of the Third World, political independence has not been accompanied by economic independence. The Cook Islands, for example, depend on grants from the New Zealand government for 90 percent of its operating funds. It is not unusual for these small countries to spend more to import food than they earn in total exports. This pattern causes serious discussion of the inherent viability of such small, poor countries and of the reality of their "independence" in international politics. These questions have been raised in connection with the coming independence of the islands of Micronesia.

The Exclusive Economic Zone

One of the agreements that seems to have come out of the Law of the Sea negotiations is an acceptance of the principle of a 200-mile Exclusive Economic Zone (EEZ). The concept of the 200-mile limit was first used by Latin American nations to protect their fisheries. The Latin American nations, however, claimed that the 200-mile limit described their territorial sea. This meant that they had the right to

restrict ships passing through the zone. During the Law of the Sea negotiations, the African nations developed the idea of a 200-mile Exclusive Economic Zone as a compromise between the Latin American nations and the principal maritime nations. The less developed coastal states were concerned that the developed maritime nations (e.g., Japan, the United States, the Soviet Union) would exploit the fish stocks, using high technology not available to the poorer nations, before the coastal state could develop its own capacity to exploit these resources.

The Exclusive Economic Zone (EEZ) gives the coastal state both the opportunity to exploit the resources of its coastal waters, and the responsibility to manage those resources. Other nations have navigation rights, and may, within the regulations established by the coastal state, utilize the resources of the EEZ which the coastal state cannot harvest itself. There is still much to be determined. Can a coastal state refuse to permit the harvesting of its resources by other nations, even though it cannot fully utilize them itself? How shall foreign fishing fleets be phased out of an area where they have traditionally fished? Which nations shall have priority in harvesting the surplus yield (those resources which the coastal state cannot harvest)?

Despite the importance of the questions that remain, however, the agreement on the concept of the Exclusive Economic Zone is extremely important for fisheries. During the last few years, there have been dramatic changes in fishery technology which have threatened the existence of some important commercial fish stocks. Some fisheries had been clearly overfished, so that it was not profitable to engage in large-scale or medium-scale fishing in these areas. Thailand, for example, has reached the point that its trawlers must exert an increas-

ing effort for the same catch as a result of overfishing in Southeast Asian waters. (Gulland, 1977). The development of large factory ships, supplied by an accompanying fleet of trawlers, had enabled some nations (principally the Soviet Union and Japan) to virtually wipe out an established fishery in a short time. The establishment of the EEZ was intended especially to restrict the activities of these large-scale distant water fleets.

Although negotiations continue at the Law of the Sea conferences, it appears that the provisions relating to fisheries are essentially settled, and have been accepted by fishing nations as customary law. Almost all of the coastal states, including the United States and the Soviet Union, have declared a 200-mile limit for at least some purposes. There are boundary disputes in some parts of the world where fishing areas are claimed by more than one nation. With the exception of these disputed areas, however, the fishery resources of the coasts have been treated as belonging to the nation that claims the area (McKernan, 1977).

These international agreements offer some hope for economic development for small island nations with few resources and a population which is too small to defend its claim. As a result of the international agreements, many small countries are making relatively heavy investments in fisheries. Most are hoping to expand their fishing industry so that they can make full use of their fishery resource themselves. By examining the situation of Micronesia, and what it would take to develop a fishing industry there, it is hoped that some insight can be gained on the problems of these small countries, and the prospects which fishing provides of lessening their economic dependency on the former colonial administration.

Economic dependency

The concept of economic dependency provides a framework throughout the thesis in order to more clearly understand Micronesia's situation. Dependency theory has developed in the past ten or fifteen years, and describes how the underdevelopment of some nations occurs as a result of external political and economic forces. In this instance, the theory of dependency will be used to examine Micronesia's relationship with the expanding economies which have dominated it.

Of particular importance is an understanding of how Micronesia's colonial experiences have shaped the fishing industry. Despite the popular image of the tropical island paradise, Oceania has had a tragic history. The absence of a significant commercial fishery in Micronesia is a consequence of this history. Dependency theory will also be used to examine prospects for attracting investment capital to develop Micronesian fishing industries.

The thesis is organized into three sections. The first three chapters focus specifically on Micronesia. Chapter one describes Micronesia's colonial experience and the impact this had on its current economic situation and the state of its fishing industry. Chapter two discusses the major development problems facing Micronesia as it prepares for independence in 1981. Chapter three examines Micronesia's resources and possible strategies for development. The discussion concludes that the fishing industry offers significant opportunities for development.

The next three chapters focus on the fishing industry, and how

it might develop in Micronesia. Chapter four looks at the world market for fish products, problems of fishery management, and what these mean to Micronesian fisheries. Chapter five looks at the elements of a small-scale fishery in Micronesia, and how this might be developed. Chapter six discusses the agreements that Micronesia might make with foreign fishing fleets now using Micronesian fishery resources, and how such agreements could aid the development of a Micronesian fishing industry. Emphasis throughout this section is given to the development of small-scale fisheries.

The final chapter provides a summary and relates the fishing industry to the development problems which were presented earlier. The chapter concludes that while small-scale fisheries would not address all of Micronesia's problems, fishing would provide employment and would generate other economic activity. The chapter ends with some observations on the implications of these findings for other small island states.

CHAPTER I

BECOMING DEPENDENT: MICRONESIA'S COLONIAL EXPERIENCE

The Pacific Ocean comprises a third of the surface of the Earth. It is larger in area than all of the land areas of the world combined. In this vast expanse of water, there are islands which people discovered and settled thousands of years ago. This part of the world, appropriately called Oceania, is now the setting of the creation of the world's newest independent nations.

There are three geographical terms that divide the islands of the Pacific Ocean (see Figure 1): Melanesia, Micronesia, and Polynesia. Melanesia is the region just north of Australia in the western Pacific. It includes the larger (mela) islands of New Guinea, the Solomons, and the New Hebrides among others. Micronesia, also in the western Pacific, lies just to the north of the Equator. The islands are tiny (micro). Island groups within Micronesia include the Marianas, the Carolines, the Marshalls, the Gilberts, and Tuvalu (Ellis Islands). Polynesia is the region in the central Pacific. It includes many (poly) islands, such as Hawaii, Samoa, and Tahiti.

Many of the islands in these regions have recently become independent, or are now approaching independence. This thesis focuses on the people of the Trust Territory of the Pacific Islands in Micronesia. The Trust Territory includes the Marshall, Caroline and Northern Mariana Island groups. In 1981, the United States will end its administration of these islands. The thesis focuses particularly on the people of the

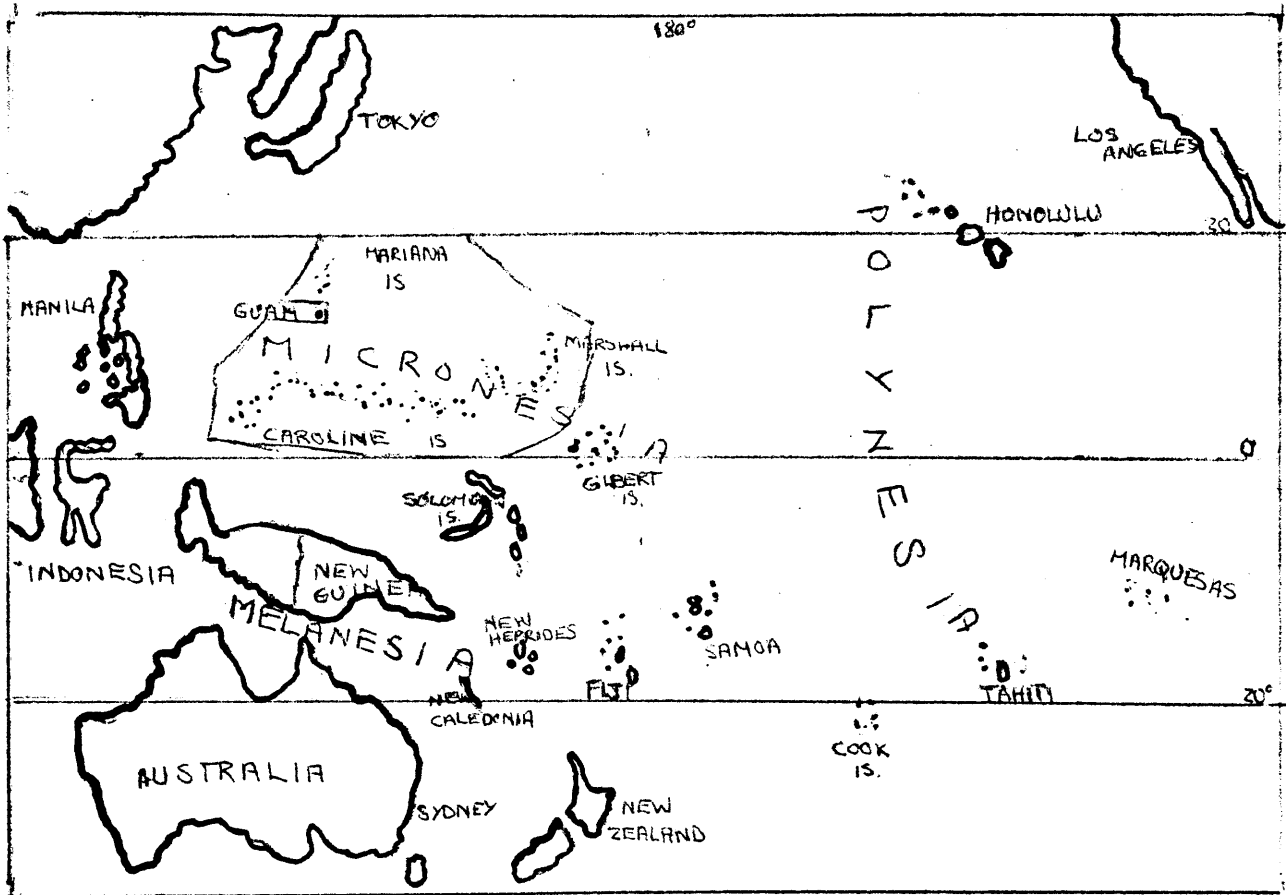


Figure 1. The Pacific Ocean

Carolines and the Marshalls since they have decided to chart a more independent political future.

As indicated earlier, the term "Micronesia" includes several island groups. For purposes of simplicity of usage in this thesis, however, "Micronesia" will refer only to the Carolines and the Marshalls. Unless there is a specific reference to the contrary, the other island groups in Micronesia (the Marianas, the Gilberts, and Tuvalu) are excluded. The Northern Marianas are part of the Trust Territory of the Pacific Islands. The island of Guam has had a separate political and administrative history since 1899, and is excluded from the discussion. The Gilberts and Tuvalu are excluded from the discussion for similar reasons.

The geography and distances involved in Micronesia are difficult for people from the Mainland to grasp. The island groups that comprise the Trust Territory form a semi-circle more than 3,000 miles in diameter. The tiny islands are sprinkled across an expanse of ocean which is as large as the continental United States. Of the more than 3 million square miles of land and water, only 700 square miles is land. It is as if about half of the state of Rhode Island were crumbled and sprinkled across the United States. It is further from Majuro, capital of the Marshalls, to Koror, capital of Palau, than it is from Richmond to Phoenix.

As one would imagine when such enormous distances are involved, there are differences in geography, language and culture between the islands. The diversity of language and culture, however, is even greater than one might expect. There are nine separate languages and several dialects spoken in the Trust Territory. There are at least six distinct cultures. There have been many studies of the peoples of Micronesia, and a detailed description here is not possible. Nevertheless, a brief sense of the differences between the districts may be useful (see Figure 2).

Marshalls. The Marshall Islands are comprised of a long chain of more than 1200 coral atolls. About 370 of the islands are inhabited by the population of 27,100 people (excluding Kwajelain Missile Base). The largest settlements are Majuro, the district center, and Ebeye, which houses the Marshallese who work on Kwajelain.

Ponape. Ponape is a series of 163 "complex" islands. It is the easternmost of the Caroline group. Ponape is the new capital of Micronesia. The population of 21,000 lives in scattered homes and clan settlements on 26 of the islands.

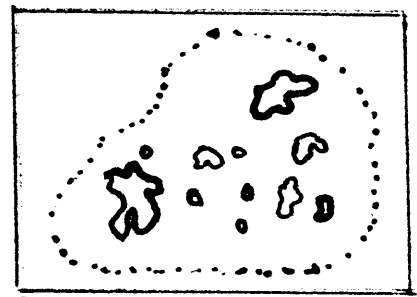
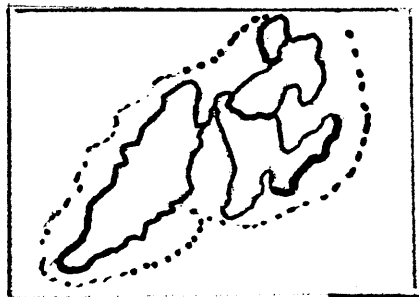
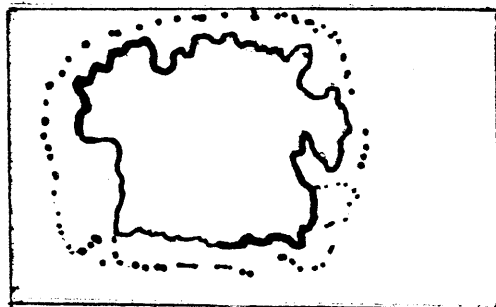
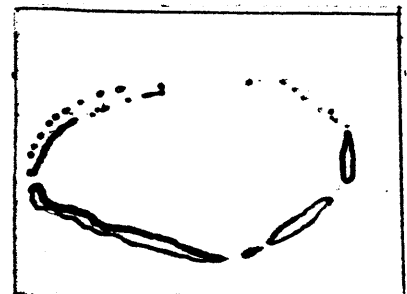
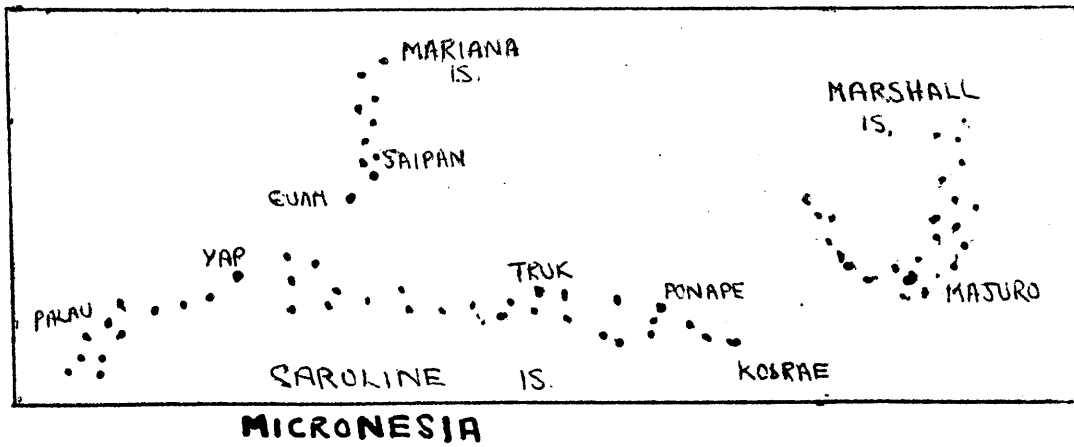


Figure 2. Micronesia and the District Centers

Kosrae. Kosrae (not illustrated) was separated from Ponape district in 1973 at the request of the people of Kosrae. The island of Kosrae is an old whaling port, and the population of 4500 live mostly in the district center. Kosrae consists of 5 "high" islands, only one of which is inhabited.

Truk. Truk has the largest population (35,000), and one of the smallest land areas (45 square miles). Like Ponape, Truk is a group of "complex" islands. About 100 of the 290 islands are inhabited. Most of the population now lives in or near the district center of Moen.

Yap. Yap also consists of "complex" islands. Only 3 of Yap's 149 islands are inhabited, however. The people of Yap are the most traditional of the Micronesian cultures, and clan and kinship structures are reportedly stronger here than on other islands. About half of the population of 8500 lives in the district center of Colonia.

Palau. Palau district contains about 350 "high" islands, of which only one is inhabited. About half of the population of 13,500 lives in the district center of Koror. Palau is likely to separate from the rest of the Carolines when the Trusteeship terminates, although this may be influenced by the uncertain future of a proposed superport to be constructed in Palau. Much of Micronesia's fishing and copra industries is based in Palau, and the people of Palau have been prominent in political leadership of the Trust Territory.

Northern Marianas. The Northern Marianas (not illustrated) separated themselves from the rest of the Trust Territory in 1975. An expected merger with Guam was rejected by the Guamanians, and the 16,000 people

in the Northern Marianas will have a separate government. The Northern Marianas consist of 21 "high" islands, of which 6 are inhabited. Much of the population lives on Saipan, the largest island and the former capital of the Trust Territory.

There are several important aspects of the physical and cultural geography of Micronesia. First, the islands are isolated from each other and from the rest of the world. Transportation and communication systems are, therefore, especially important to any development plans. Second, the diversity of language and culture makes political and economic unity very difficult. Micronesians have thus far found it very difficult to maintain a united position in dealing with other nations. Third, the small population has made it difficult for Micronesians to cope with the very large countries which have dominated Oceania.

TABLE 1

POPULATION AND AREA OF THE DISTRICTS OF MICRONESIA

District	Number of Islands	Number of Inhabited Islands	Area of Dry Land (sq. mi.)	Pop. (1977)	Pop. per Sq. mile Dry Land
Marshalls	1225	369	69	27,096	391
Ponape	163	26	146	21,187	146
Kosrae	5	1	41	4,471	109
Truk	290	98	45	35,220	775
Yap	149	3	47	8,482	181
Palau	350	1	178	13,519	76
Total	2182	498	526	109,975	209

Upon termination of the Trusteeship, the people of the Trust Territory will become four separate political entities. The Northern Marianas will enter into a commonwealth arrangement with the United States. The Carolines will divide. The Palau islands will probably become a separate state. The remaining islands that comprise the Carolines (the present districts of Yap, Ponape, Truk, and Kosrae) will form a federated state. The Marshalls will also be a separate political entity. Each of these three separate states will enter into a "free association" with the United States. Under the "free association" arrangement, each state will control its internal affairs, but will rely on the United States for defense. Usually under a "free association" arrangement, the larger nation also conducts foreign relations for the smaller country. The people of Micronesia, however, have insisted on controlling their own foreign relations. The most recent agreement between Micronesia and the United States provides that "The peoples of Micronesia will have authority and responsibility for their foreign affairs including marine resources." (U.S. Dept. State Bulletin, 1978). The three island countries will continue to receive help from the United States government, although they will receive less per capita than the Northern Marianas gains in the Commonwealth arrangement.

Like most new countries, the peoples of Micronesia are particularly concerned with the need for economic development. Despite massive U.S. expenditures over the past thirty years, and decades of intensive investment by Japan in the years prior to World War II, Micronesia remains a poor country.

Perhaps the thing that seems strangest to the observer is the condition of Micronesia's marine sector. For generations, since before the

time of the Norman Conquest of Britain in 1066, the people of Micronesia have lived with the sea. In modern times, Micronesians have reenacted historic voyages in long canoes that took travelers from the Marshalls 3000 miles across open ocean to Saipan. Micronesian navigators using traditional navigation lore helped Native Hawaiians reenact the sailing from Hawaii to Tahiti (Lewis, 1974). For generations on their tiny islands, the people of Micronesia have relied on the sea for food. Yet, today, despite the continuation of this traditional knowledge of the sea, Micronesia has only a subsistence fishing industry, and has done little to harvest seaweed, coral, shells and other marine resources. Micronesians do not participate in international shipping as a commercial activity in any significant numbers. There is little to support a fishing industry - few boats, inadequate ports, and very limited fish processing capacity. Micronesians, in fact, spend more than 1.2 million dollars annually to import canned fish. Most of the canned fish has been caught in Micronesian waters by Japanese fishing vessels.

How has this occurred? Why is it that even now, despite recommendations from the United Nations and other international agencies, tourism receives more attention in development planning than fisheries and marine resources? In seeking to understand this puzzle, it may be useful to review Micronesia's colonial experience in light of theories of economic dependency. There are two basic schools of thought in approaching economic development: neo-classical and structuralist. The neo-classical approach has been to examine the various factors that have enabled the industrialized nations of the world to develop, and to emphasize ways in which these factors might be replicated in the less developed countries. Different theorists have focused on different factors. Some have empha-

the encouragement of entrepreneurs, some the transfer of technology, some the development of manufacturing capability. Whatever the factor emphasized, the underlying theory has been that once the critical elements are in place, the economy of the less developed country would develop. Dependency theory comes from the structuralist, or more radical, economic school of thought. According to this view, dependency and underdevelopment result not from missing factors, but from the basic structure of international economic relationships between the developed and less developed nations.

Much of the economic theory surrounding dependency and underdevelopment has come out of the experience of Latin America, especially the work of the Economic Commission for Latin America (ECLA). It has more recently been applied to Africa (Amin, 1976) and Oceania (Brookfield, 1972). Latin American economists sought to understand why their nations, which are rich in natural resources, have failed to develop and have tended to remain dependent on a few export products. Despite their resources and more than a century of political independence, Latin American nations failed to diversify their economies and develop. A decade of extensive foreign aid and investment in the 1960's brought growth, but generally failed to bring Latin nations to a stage of self-sustained growth. The economies continued to be heavily dependent on imports and exports. Problems such as extreme poverty, rural backwardness, and high unemployment persisted despite the increase in Gross National Product (GNP). These experiences caused some economists to reject the previous theories of economic development.

For some years, neo-classical economists believed that development occurred in stages, and that less developed countries of the world were

at a different, earlier stage of development than the industrialized countries. Walt Rostow's The Stages of Economic Growth (1960), is perhaps the best known work on this theory. Based on this perception, it was believed best to emphasize rapid economic growth, particularly through the introduction of heavy industry. The earnings from this sector would, it was thought, spill over into other sectors of the economy. Investments were made, through foreign capital, and growth did occur. By the late 1960's and early 1970's, however, it became clear that economic growth as measured by the GNP did not necessarily mean that the people of the country were benefitting from development. Indeed, some countries found that the economic growth through industrialization financed by foreign investors led to increased dependency on foreign countries and firms with little benefit to the population of the country.

The earlier works by Rostow and others had suggested three factors which were particularly important before a country could achieve what Rostow termed "self-sustained growth". These factors are (a) the rate of productive investment rises from about 5 percent of the national income to over 10 percent, (b) one or more substantial manufacturing sectors emerge to become the leading sectors in growth, and (c) the political and social framework is modified to exploit the impulses of the modern sector and thus give growth an ongoing character (Brookfield, 1975, p. 36-9).

The experience of the Latin American nations, however, suggested that new theories were needed to explain development and the failures of growth. During the 1960's, Latin American nations experienced considerable growth in GNP. Savings, considered crucial to producing capital necessary for investment, rose to 17.5 percent of national income - well over the

10 percent Rostow had considered necessary. Several manufacturing sectors developed, especially around Sao Paulo and Mexico City. Nevertheless, development did not take place as expected. Income inequality widened, unemployment remained very high, and the gap between the national income of most Latin countries and the developed world increased. Further, the region seemed to become more dependent on particular exports, and on imported goods from the developed world. Neo-classical theorists responded to this situation by examining other factors of development, or stressing the need to combine several factors in a "big push". Some Latin American scholars, however, began to develop a different approach. These theorists developed two principal theories to explain what had happened. These are (1) the idea that underdevelopment is something that occurs as a result of the relationship with developed economies, and (2) an examination of the structure of the dependent relationship between the developed and underdeveloped countries.

Some of the Latin American economists have focused particularly on the problem of continuing, even increasing, dependency on the developed world. Dos Santos (1970) describes this relationship as:

. . . a situation in which the economy of certain countries is conditioned by the development and expansion of another economy to which the former is subjected. The relation of interdependence between two or more economies, and between these and world trade, assumes the form of dependency when some countries (the dominant ones) can expand and be self-sustaining, while other countries (the dependent ones) can do this only as a reflection of that expansion, which can have either a positive or negative effect on their immediate development.

The dependent relationship occurs because the dominant country has been able to develop a monopolistic control of the market. This control enables the dominant country to set the terms of trade in its favor. The result is that the wealth is transferred from the dependent country

to the dominant country. Historically, this relationship has taken different forms, and Dos Santos classifies three types: (1) colonial dependence which involved monopoly control of land, mines, and labor. These monopoly controls enabled the colonial power to direct the economy of the colony to produce particular exports needed in the dominant country. (2) Financial-industrial dependence, which tended to have a similar result, but was achieved by monopoly control of capital for investment. Only those export products desired by the dominant country would receive investment capital. (3) Technological-industrial dependence, a "new dependency" which is based on investment by multinational corporations in the industries geared to the internal market of underdeveloped countries. Dos Santos believes that this represents a new form of dependency because the technology for production, the inputs for manufacturing, and the financing must all be imported. In order to pay for these imports, the nation must continue to rely on its principal exports.

In each form of dependency, two themes are common. First, the economy of the dependent country is restructured by the dominant economy into concentration on particular products for export. Other sectors of the economy do not receive investment. Second, traditional economic activities, such as handicrafts, are unable to compete with manufactured imports from the dominant economy and die out. This leads to increased dependence on imported goods from the dominant economy in order to meet basic needs, such as food and clothing. As more of the energy of the dependent country is turned to the production of the particular export, there is less available to produce other goods. As a result, the more the dependent

economy specializes in a particular export, the more it relies on a variety of imported goods. Thus, dependency involves reliance on external markets for export products and external suppliers for a variety of imports. Typically, the dependent economy has little or no influence over these forces of supply and demand.

Although Micronesia is not rich in resources and has never approximated the conditions for self-sustained growth described by Rostow, the theory of dependency is useful in understanding its current situation. Micronesia has been a colony of various countries for the past four hundred years. Each of these countries has, in a different way, transformed the economy of the region to serve its own needs. None of these countries had any interest in seeing Micronesia develop a fishing industry, and, therefore, made little effort to create such an industry. In understanding the current stagnation in Micronesian fisheries, it is similarly useful to understand that none of the metropolises which currently dominate Micronesia (Japan, the United States, and Australia) are particularly interested in Micronesian fisheries. Investors in all three countries can expect a higher profit on investments in tourism, and therefore, are more likely to invest in that industry.

A review of Micronesia's colonial experience may clarify the reasons for the arrested condition of Micronesia's fisheries. Since Guam and the Northern Marianas shared much of this history, they are included in the discussion. History is important to an understanding of Micronesia's current situation for three reasons. First, the structure of Micronesia's economy and the uses that have or have not been made of its resources reflect the priorities and needs of the governing powers. Second, other aspects of Micronesia's development problems are also primarily a reflec-

tion of the colonial experience. This will be addressed in detail in chapter two. Third, one is impressed by Micronesia's vulnerability to the larger nations and historic trends which passed through Oceania. This vulnerability is more impressive when one considers that, for the most part, Micronesia was not valued for itself as much as for its location in relation to the Asian mainland.

The Colonial Experience

If one were to locate a very old Micronesian - a person of ninety - it is entirely possible that the person would speak Spanish, German, Japanese and English in addition to the native language. In the last century, Micronesia has been ruled by four different foreign governments - each of which had a different reason for wanting the islands.

Spain: Ports and Converts

Micronesia's first contact with the West was when Magellan circumnavigated the globe in 1521. Actually, Magellan's voyage merely confirmed a claim that had been made already. The Treaty of Teresillas (1495) between Spain and Portugal gave Spain claim to the islands of the western central Pacific. Spain's primary interest in any of its colonies was gold. Finding none in Micronesia, the Spanish tried to assure themselves that the islands, particularly Guam, would be a safe watering and supply station for Spanish vessels trading between Manila and Acapulco (Leibowitz, 1978, p. 67). For this reason, the Spanish concentrated on converting the Micronesians to Catholicism by one means or another. The people of the Marianas were the most effected by this because of the importance of the island port of Guam.

The Spanish cleared all of the people from the Northern Marianas and resettled them on Guam where they were provided with religious instruction. When the Chamorros rebelled, the Spanish retaliated by killing all of the males over the age of six. Disease also took a heavy toll. Early Spanish missionaries estimated that the population of the Marianas was 70,000 when they first arrived. The census of 1710 showed 3,672 natives. This fell in 1756 to 1,600 natives (Nevin, 1977, p. 61). When first visited, the islands of Palau had a population of 50,000. Within a hundred years, the population was reduced to 3,000 (McKnight, 1978, p.22). Ancient foundations on the island of Yap indicate that there was a population of about 60,000 people prior to contact with the West. In 1970, the population had reached 4,000 after an earlier low.

The Spanish language remains strong in the culture and language of the Marianas and the Western Carolines. Most of the people are Catholic, and show heavy Spanish influence in names and culture. The people of the Eastern Carolines and the Marshalls, however, were more influenced by Protestant missionaries from the United States. The Spanish had little interest in these islands, and were generally unsuccessful in keeping out Protestant influences.

Germany: Copra

By the end of the nineteenth century, Spain was extremely weak and unable to control either expanding American or German influence in Micronesia (Brookfield, 1972, p. 62). Germany had entered the global race for colonies late, and was interested in developing a base in Oceania from which to conduct trade with the Asian mainland. Germany was also interested in developing the copra trade which was then spreading through-

out Oceania. German companies situated themselves in the Marshall Islands, which were the most suitable for copra production, and were conducting a profitable business by the late nineteenth century - with only occasional visits from the Spanish.

In 1899, when the United States defeated Spain in the Spanish-American War, and took over the Spanish Empire, Germany purchased Micronesia. The United States was not interested in any of the Micronesian islands except Guam, which was used as a Navy coaling station. Spain had offered to sell the remaining Micronesian islands for 4.5 million dollars, but President McKinley thought the price too high (Nufer, 1978, p. 12). Germany agreed to the price and purchased the islands at the Treaty of Paris in 1899.

Almost immediately after completing the purchase of the islands, the Germans consolidated the various commercial companies which had been operating in Oceania. German mining companies were also established. During the 20 years of German rule, all of Micronesia's mineral resources, except phosphate, were extracted and exported. The remaining phosphate resources were mined during the Japanese period. There are no known remaining mineral resources in Micronesia.

The rest of the islands were turned to the production of copra. No one was permitted to purchase land from the Micronesians except the German government. All purchases of land for the companies was made through the German government and then leased to the commercial operation. German trading companies were established, and the German companies in Micronesia and New Guinea hired Micronesians to work the copra plantations. There were experiments with other cash crops in both New Guinea

and Micronesia, and although these other crops did well, agriculture increasingly focused on copra production because it required little labor to cultivate. Neither the Micronesians nor the other peoples of Oceania were numerous enough or geographically concentrated enough to constitute an acceptable labor pool. Efforts to import labor from Asia, or convict labor from Europe, had been attempted earlier by the French and British in other parts of Oceania without success. The Germans learned from this experience and did not attempt similar measures (Brookfield, 1972, p. 50).

There are some recorded instances of uprisings during the German period. These revolts were suppressed and the leaders were executed (Nufer, 1978, p. 14). The Germans did establish schools for the Micronesians, and education was compulsory for children age seven to thirteen. Micronesians who remember this period indicate that emphasis was given to learning German and basic skills, such as reading or arithmetic. The Germans also collected taxes from Micronesians, and this was the principal strategy for encouraging the production of copra. Taxes could be paid in copra or in labor on the copra plantations of the German companies. Copra was also the only acceptable form of payment at the trading companies. Since the trading companies had a monopoly, the Micronesians had little choice but to engage in copra production. The Germans had little interest in Micronesian fisheries, however, and these remained at a subsistence level as they had under the Spanish.

Japan: Agriculture and Living Space

After the outbreak of World War I, Japan and Australia (which had

inherited British interests in Oceania) agreed to divide the German territories in Oceania at the Equator (Brookfield, 1972, p. 66). Japan, therefore, occupied the islands of Micronesia, except for Guam, which continued to belong to the United States. Japan was granted a League of Nations Mandate to administer the area. Under the terms of the Mandate, Japan was not to fortify the islands. There is still disagreement among historians as to whether Japan began to fortify the islands before the outbreak of World War II, but it is certainly true that Micronesia was a military stronghold of the Japanese during the Pacific War.

Prior to the outbreak of war, however, Japan invested a great deal in Micronesia. Japan continued to produce copra, but did not give this product the kind of exclusive emphasis which the Germans had. Already by the 1920's, Japan needed additional areas in which to grow food for her people. The development of Micronesia, therefore, concentrated on various agricultural products needed in Japan. These included sugar, fish, livestock and vegetables.

No foreigners were permitted in Micronesia. Land was taken by eminent domain. Micronesians were used as unskilled laborers in a variety of jobs, but few were given any training in skilled trades. The Japanese also prohibited Micronesians from participating in deep-sea fishing and confined Micronesian fishermen to subsistence reef fishing (Nufer, 1978, p. 15).

Japan also actively discouraged Micronesian-owned economic enterprises. Dwight Heine, a Marshallese, describes an attempt to form a "co-op" during the Japanese period:

We begin to form co-op [in the Marshalls], and they [the Japanese] know if we will be very effective, because we will ship our copra to Japan by passenger [ships], and then we'll order our own goods,

and that will kill their business, so they pass a law that no natives can have a business.

(Quoted in Nufer, 1978, p. 15)

Saipan in the Marianas was turned to sugar production, and by the late 1930's, 70 percent of the island was devoted to sugar. On an island of only 85 square miles, this left little land for the Micronesians. The Marshalls continued to be used primarily for copra production.

Japan saw Micronesia as additional living space for Japan, and many people emigrated from Japan, Okinawa, and other parts of the Japanese Empire. By 1945, the immigrants outnumbered the Micronesians 3 to 1. There were about 147,000 Orientals and about 45,000 Micronesians. Micronesians were at the bottom of the social order and few progressed beyond very low level jobs. One Saipanese remembered that "the highest position of the locals or indigenous that they have is about policeman. The rest is only their [the Japanese] store clerk or delivery boy;" (Nufer, 1978, p.16). David Ramarui, the current Director of Education for the Trust Territory, describes a four-class system of citizenship:

We thought that, and led, perhaps we were led to believe that they [the Japanese] were first-rate citizens, and, of course, the Okinawans, and the Koreans, and the Micronesians (in that order) at the bottom . . . Micronesians were fourth. . . In my observation, there were those [Okinawans and Koreans] in between us [the Japanese and Micronesians]. But, when it comes to schools, we have only two school systems. One system for the Japanese, Okinawans, and Koreans; the other was for the Micronesians.

(Quoted in Nufer, 1978, p. 18)

No Micronesians were permitted to own businesses. Schools were segregated. The major purpose of education was to teach Micronesians to speak Japanese. Few Micronesians were taught any skills. Okinawans and lower-class Japanese were imported for skilled work. Despite the harshness of the Japanese administration, however, some Micronesians look back on this

period with fondness as a time when there was work to do and when one knew both what the rules were and what would happen to you if you disobeyed them.

As World War II went against Japan, the battle came to Micronesia. Truk lagoon was the staging area for the Japanese Imperial Navy. Saipan was a major fortress for Japan and protected the route to the home islands. One of the fiercest battles of World War II was fought over Saipan. When the battle was over, the Japanese had fought to the last man and the Japanese civilians committed mass suicide rather than surrender. The battle had so denuded the island vegetation that the U.S. military seeded the island with fast-growing plants to prevent massive soil erosion.

The Micronesian population, which had recovered somewhat from the Spanish period and from disease, was further decimated by the war. On Truk, Ponape, and Yap, many starved to death because soldiers on both sides shot anything that moved. The Japanese, at one point, forbade the harvesting of coconut and breadfruit on pain of death. People starved to death within sight of food.

United States: Military Security

The United States succeeded in taking the Micronesian islands from Japan in 1944. With the formation of the United Nations, the United States was granted a United Nations Trusteeship over Micronesia. The Trusteeship included the Marshalls, the Carolines, and the Northern Marianas. The island of Guam, which had been captured by Japan during the war, was returned to its earlier status of an unincorporated territory of the United States. At American insistence, the Trust Territory was administered as a "strategic trust", the only such trusteeship in

the United Nations. As a strategic trust, the United States administration of the islands was supervised by the Security Council, where the United States had a veto, rather than by the Trusteeship Council. The importance of the Trust Territory to the United States is its strategic military location. The principal American military interest in Micronesia, however, was, and is, to deny the area to other nations, and to retain control of the islands for potential military needs if developments in Asia made this necessary (Nufer, 1978, p.21).

In governing the territory, the United States assumed that the Micronesians would wish eventually to become part of the United States. It was assumed that the ultimate goal of Micronesians would be to become a state. It came as something of a shock to American administrators in the 1960's, therefore, to learn that the Micronesians wished to become independent (Nevin, 1977, p.98).

American strategic military concerns dominated U.S. administration of the territory. From 1947 until 1951, the territory was governed by the United States Navy. No foreign trade was permitted. No companies, American or foreign, were permitted to operate in the territory. An offer by the Peter Paul Candy Company to set up a coconut desiccating plant in the Marshalls was rejected (Nufer, 1978, p. 23). No private shipping companies were permitted to operate in the territory, and the Navy provided transportation services. All "aliens", non-Micronesians, were repatriated. This removed all skilled laborers, and most of the unskilled labor force, from Micronesia. The Navy did provide health care, schools, and a variety of material goods.

In 1951, the U.S. administration was nominally transferred to the Interior Department. The Interior Department, however, was forced to

administer the territory from Honolulu, several thousand miles away, because the Navy would not permit civilians into the area without special permission. In 1953, the headquarters of the Trust Territory was moved to Guam, but the High Commissioner of the Trust Territory was not allowed to enter the Trust Territory without Navy permission until 1962.

The Interior Department's budget for the territory during this period was so low that equipment could not be replaced, and Micronesia earned the nickname "the Rust Territory." The reason for the Navy security was because (1) the United States was constructing Kwajelain Missile Base in the Marshalls, (2) two of the outer Marshall Islands, Bikini and Eniwietok, were used as testing sites for nuclear weapons, and (3) the CIA had a major training facility in Saipan where Chinese Nationalists were being trained (Heine, 1974; Leibowitz, 1976, p. 75).

Throughout this period, the Micronesians tended to return to subsistence farming and fishing, or to find work at the military bases and government offices. In the meantime, the U.S. military surveyed the land of the territory and indicated certain areas on which development was prohibited, because of potential future military needs. The lands so designated were substantial, especially when one considers that all land is at a premium in Micronesia. Land claimed by the United States constituted 68 percent of the land area of Palau, 4 percent of Yap, 17 percent of Truk, 66 percent of Ponape, 13 percent of the Marshalls, and 90 percent of the Northern Marianas (Leibowitz, 1978, p. 74). Although most of these lands remained unused, they could not be entered by the native population, in most instances, because the military did not remove

the unexploded ordinance from World War II battles in these areas. There are still areas of the Trust Territory which have not been cleared of unexploded ordinance.

In 1960, there was a dramatic change in the policies of the United States toward the development of Micronesia. The new Kennedy Administration had been embarrassed by the critical report of the 1960 United Nations Visiting Committee to the Trust Territory. For the first time, the UN Visiting Committee had included persons from former colonies. In line with the United Nations resolution of Decolonization, the UN Visiting Committees became much more critical of the administration of trusteeships than they had been in the past. The Kennedy Administration decided to try to turn the Trust Territory into a showplace of development. Accordingly, in 1962, the headquarters of the Trust Territory was moved into the Trust Territory - to the island of Saipan. The United States dramatically increased its budgetted appropriations for the Trust Territory from about 6 million dollars annually in the 1950's to 25 million dollars in 1967. This amounted to about \$600 per capita in a population which, for want of other economic activity, had returned to a barter economy. Most of the government funds were directed to education and health care, as were the nearly 900 Peace Corps volunteers who were annually stationed in the Trust Territory.

The ban on foreign investment continued, and the administration continued to discourage U.S. business from investing in the area. Not surprisingly, the territorial government became virtually the only employer. The government did not, however, organize productive activities, and the territory became increasingly dependent on imported goods. By 1970, the

UN Visiting Committee expressed serious concern that the Trust Territory was dependent on grants from the United States for 95 percent of its operating budget. Since the government was the only significant employer in the territory, these grants constituted 90 percent of the total earnings of the territory.

As a result of international pressures, and increasingly militant views of Micronesians, the United States has recently been working with Micronesians to increase economic production. Thus far, investments have concentrated on the development of a tourist industry.

The United States has not seemed to encourage the development of fisheries. A declaration of a 200-mile Exclusive Economic Zone by the Congress of Micronesia was initially vetoed by the High Commissioner. Micronesians were, for a time, prevented from observing the Law of the Sea negotiations, on the theory that it is unconstitutional for a "state" to engage in foreign relations. Fishery projects have been started but have never been part of a development plan, or received consistent emphasis. As a result, fishing practiced by Micronesians has remained largely at a subsistence level.

Implications of Micronesia's Colonial Experience

As indicated earlier, Micronesia's colonial experience has shaped the kinds of development problems which it faces. These problems will be discussed in more detail in the next chapter, but can be briefly described here. As a result of American policies and earlier colonial practices, Micronesians face serious obstacles to development. Economic development has lagged as a result of American military policies which

actively discouraged development. Outside investment was prohibited at a time when potential investment funds were available. Traditional fisheries and agriculture declined, partly because of the emphasis on copra production, partly because of the land policies of the administrators, and partly because of inadequate transportation and marketing arrangements. American policies have resulted in the Micronesian cash economy being extremely dependent on grants from the United States government. The physical infrastructure is only now being completed. This has increased the isolation of the islands from each other and from the other Oceanic states. The absence of good communication and transportation systems has increased tendencies to political fragmentation, and multiplied logistical problems of development. The educational system seems not to prepare Micronesians for the jobs that exist. The result is that labor must be imported despite high unemployment rates among Micronesians. Finally, the district centers are showing a variety of problems associated with rapid urbanization.

In addition to these more general consequences of Micronesia's colonial experience, there have also been specific impacts on Micronesia's fishing industry. These are discussed in more detail in subsequent chapters, but four aspects of the situation can be described briefly at this point. First, the prohibition of non-military vessels in the Trust Territory included marine research ships. As a result, very little is known about some of Micronesia's fishery resources. Second, the ban on foreign investment and the lack of encouragement of trade, means that potential markets for Micronesia's known fishery resources have not been fully developed. Third, the traditional claims to fishing rights in lagoons

have been clouded because fishing rights are often associated with land claims. As lagoons became common property, it became impossible to maintain good resource management practices. Finally, Micronesians have uncertain status at the Law of the Sea negotiations, and have been discouraged from participating as more than observers in international organizations. There have been disagreements between the Congress of Micronesia and the United States over the definition of the Exclusive Economic Zone, and this delayed the claim.

CHAPTER II

FACING INDEPENDENCE: MICRONESIA'S DEVELOPMENT PROBLEMS

Micronesia's experience as a colony of various countries has been tragic, and the problems that confront it as it moves toward independence reflect its historic experience. The role that fishing may play in the development of Micronesia, and its importance to Micronesia, can best be understood in the context of Micronesia's over-all development problems. Viewed in this context, it is easier to assess the relative importance of fisheries, and the kind of fishing industries to organize.

In many ways, development activities could not begin on a major scale in Micronesia until several important problems had been cleared up or moved toward resolution. The future political status of the Micronesians had to be resolved, and this now appears to be settled in the manner described earlier. The Micronesians have completed work on a new constitution, and this document has been accepted by the people. The last elections to the Congress of Micronesia were held under the terms of the new constitution. Each of the districts has also completed a constitutional convention, and there are working legislatures in each of the district centers. Thus, the political framework of Micronesia has been outlined.

There have also been important economic changes. Lands which had been taken by the military or by the Japanese have been returned or compensation paid. Unexploded ordinance has been removed from most of the inhabited islands. In 1974, the United States ended its prohibition

on foreign investment in the Trust Territory, and there have been applications from forty foreign firms, involving investments of more than 57 million dollars. Since 1973, the United States has undertaken an intensive capital improvement program to rebuild the infrastructure of roads, buildings, communication systems, power, water, and sewer systems that were destroyed in World War II.

The resolution of these issues makes it possible to begin to address some of the other pressing problems which Micronesia faces. The most important problems, which would influence the strategy employed in developing a fishing industry are presented in this chapter. These issues are: (1) dependence on grants from the United States government, (2) construction and maintenance of the physical infrastructure, (3) education and training of labor, and (4) rapid urbanization.

1. Economic dependence on grants from the United States government

In order to adequately prove that Micronesians were economically dependent on grants from the United States, it would be necessary to have more information on the barter economy than is available. It is not known how many Micronesians rely chiefly on subsistence agriculture, fisheries and handicrafts for their livelihood. It is reported that in the areas outside the district centers, the barter economy is dominant. Within the district centers it is not known how many persons rely on friends and relatives who have employment. Statistics indicate that about 17,000 people out of the population of about 110,000 are employed.

Within the cash economy, however, the territorial government is clearly the largest employer. Nearly 11,000 of the 17,000 employed Micronesians work for the government. They earned 32.3 million dollars

in 1977, which was more than 70 percent of the 44.5 million dollars earned by all Micronesians in that year.

It is not uncommon for new nations in Oceania to rely heavily on grants from the former colonial power. At present, however, grants from the United States government account for about 95 percent of the income of Micronesia.

TABLE 2
SOURCES OF INCOME TO MICRONESIA - 1977

Source	Amount (000's)
Direct U. S. Grants	\$82,500.
Federal Program Grants	31,700.
Sale of copra products	1,400.
Fisheries and marine products	3,000.
Direct tourism	2,200.
<hr/>	<hr/>
Total	\$120,800.

The dependence on American government grants is made clearer by examining import and export figures for 1977. The combined value of copra, fisheries and marine products, and tourism was 6.6 billion dollars. In this same period, Micronesians imported goods worth 44.3 million dollars. Processed food for household consumption accounted for 14 million dollars in imports - more than Micronesia's total exports.

This balance of trade represents a reversal of the economic situation during the Japanese administration. In 1938, Micronesians exported 12 million dollars of goods to Japan, and imported goods worth 7.6 million dollars. The difference between Micronesia's current situation and conditions in 1938 is in part a reflection of the decline in agriculture and fisheries during the American administration.

TABLE 3
CATEGORIES OF IMPORTED GOODS - 1977

Source	Amount (000's)
Food and beverages	\$20,221.
Industrial supplies	6,102.
Fuels and lubricants	5,109.
Capital goods, parts and accessories	711.
Transportation and equipment	3,512.
Other goods for consumers	7,759.
Other goods	808.
<hr/> Total	<hr/> \$44,222.

As Table 3 illustrates, food and beverages constitute the largest single item in the accounting of Micronesia's imports. Development of agriculture and fishing for domestic consumption as well as for export, is, therefore, especially important to Micronesia's economic situation. The fishing industry currently represents only 3 million dollars in exports for Micronesia. While a detailed discussion of the potential for the fishing industry is presented later in this thesis, it is nevertheless, useful to note that the estimate ranges from 10 to 15 million dollars annually. This is equivalent to the amount that Micronesians currently spend on food for household consumption.

Both the Trusteeship Council and the United Nations Committee of Twenty-Four on Decolonization have expressed great concern over the continuing dependence on grants from the United States. The Carolines and the Marshalls are now in the second year of a Five-Year Indicative Development Plan formulated with the help of a team of experts from the United Nations Development Program (UNDP). The plan is exclusively an economic plan, and does not address physical and social development issues.

The UNDP prepared plan emphasized improvement in agriculture and fisheries, so that Micronesia can be more self-sufficient in food, and development of Micronesia's tourist industry.

Since the completion of the plan, the Congress of Micronesia declared a 200-mile Exclusive Economic Zone. This declaration was vetoed by the United States because the boundaries defined in the declaration were based on the "archipelago theory". This means that Micronesians claimed that the ocean between island groups was part of their "territorial sea". As soon as the boundary dispute is settled, the Exclusive Economic Zone will be defined (Leibowitz, 1978). At present, the "archipelago theory" has been generally accepted in international law after intensive efforts by Indonesia, the Philippines, Fiji, and other island countries. Final definition of Micronesia's EEZ will depend on the political arrangements finalized between Palau, the Marshalls, and the Eastern Carolines. There is also some question as to what constitutes an "archipelago" in Micronesia. Specifically, there is a dispute as to whether Truk, Ponape, and Yap are separate archipelagos or part of the Carolines archipelago.

The current development policies seem to place heavy reliance on tourism, and fail to adequately address the problem of the extent to which Micronesians rely on imported food. Insufficient attention seems to be given to the role that agriculture and fisheries could play in improving this situation. The Marshalls and the Carolines are currently less able to produce food for the population. This is a problem which is typical of other Oceanic countries (Brookfield, 1972). People are leaving agriculture and fisheries and moving to the urban district centers. Arable land in the urban centers is being used for other purposes, and lagoons

are both polluted and overfished. This problem is aggravated by the use of dynamite and poisons to harvest reef fish.

The other major factor in Micronesian economic development is the growth of private investment - estimated at 57 million dollars in 1976. In 1974, the United States lifted its ban on any non-American investment in the territory. It is still too early to judge whether the rate of investment since the ban was lifted will level off or continue to increase. There is certainly the possibility, however, of considerable Japanese interest in the area, since Japan had invested heavily in Micronesia in the 1920's and 1930's. The UNDP team helped to set up a central clearinghouse in Micronesia which will review all the applications from potential investors. This should prove helpful in trying to target investment into geographic areas and industries which are most useful to Micronesia.

In summary, while the economic picture is, in many ways, still emerging, three areas of concern can be identified. First, Micronesians need to reduce their dependence on grants from the United States, and to maintain control over foreign investment from the United States, Japan, and other countries. Second, Micronesia needs to increase its ability to provide food for its people, so that imports can be reduced. Third, Micronesia needs to expand its exports through the development of tourism, fishing, and agriculture.

2. Construction and maintenance of the physical infrastructure

The geography of Micronesia presents special problems in constructing and maintaining an infrastructure. Islands are small and located at great distance from one another. Potable water is a major problem in

the coral atolls, especially in the Marshalls. Coral does not retain groundwater, and, therefore, the islands must depend on rainfall.

The difficulties of constructing and maintaining transportation, power and other systems were compounded by the destruction of World War II. Unexploded ordinance still constitutes a hazard on some inhabited islands, and made much of the scarce land resources unusable for many years. Although most of the debris of war has now been cleaned up, however, the United States is only now rebuilding the roads, communication networks, docking and storage facilities and other facilities which were destroyed in the battles. With the Trusteeship agreement nearing an end, the United States is supporting a sizable capital improvement program. This program is tied to the needs of the tourist industry and to shipping needs. It emphasizes docks, storage areas, water and sewer systems, power plants, etc.

This rapid development of the infrastructure raises several issues. First, much of the labor has been done by foreign firms with imported, skilled labor. There has often "not been time" to hire and train Micronesians, who might then be able to repair and maintain the systems. Second, in the 1960's when a similar period of rapid construction was undertaken in the Trust Territory, major construction problems occurred. Buildings were constructed without plumbing or with bad wiring. It is important to prevent a similar experience, especially since an independent Micronesia would not have the income to correct the problems.

3. Education and training of the labor force

The growth and development achieved in Micronesia to date has not sufficiently benefitted Micronesians. Most of the higher paying jobs

were going to foreigners. Of 210 persons in Micronesia with an income greater than \$25,000 per annum, only one is Micronesian. Perhaps more significantly, expatriates constitute 21 percent of the wage earners in Micronesia, but earn 49 percent of the money. Further, Micronesians who do have jobs are largely dependent on the government for their income. More than 64 percent of the employed Micronesians worked for the territorial government, and government employees accounted for 73 percent of the wages earned by Micronesians.

The dominance of government jobs in the market open to Micronesians affected the expectations of young people. Some Micronesians had never seen an adult American who did "blue collar" work. People began to look down on those who work with their hands, and to admire people with desk jobs. There are few high-paying white-collar jobs, and few Micronesians who are skilled workers. Young Micronesians who graduated from school could not find work. Skilled workers had to be imported from Asia.

One major indication of the difficulty presented by the prevailing attitude of both government planners and young Micronesians is that of more than 1200 college students studying abroad in 1977, only 34 were studying agriculture and 11 were studying marine science. Government policies have emphasized training in management, law, medicine and other fields, but have not given priority to marine resources and agriculture.

4. Urbanization and growth

During the past twenty years there has been continued growth of the settlements which served as administrative capitals of the districts. Schools, hospitals, employment opportunities, contact with the outside world are all more available in the district centers than on the rural

islands. For most Micronesians, the district centers still offer the only opportunity to earn money with which to buy imported goods. Since foreign investment of any kind was prohibited in the Trust Territory until 1974, the territorial government provided the only real means of employment. Since 1974, foreign investment, migration, and the population growth of 4 percent per year combined to increase the population of the centers.

As is common in all developing countries of the world, including Oceania, people began to migrate to the district centers from the rural areas in search of jobs, education, and contact with something new. Most of the population in some island groups now live in the district centers. Truk, the most urbanized of the districts, has 80 percent of its population in the district center. Migration to the centers seems to be increasing as development occurs, and it is likely to speed up as the pace of development picks up.

The kind of urbanization occurring in Micronesia has both benefits and disadvantages. In many ways, the development of urban centers in the various districts is helpful to economic development, and to the modernization of the islands. Most economic activity requires a certain infrastructure of roads, power, communication, transportation, and a supply of labor to conduct its business. These things are available in urban areas. Since these things cannot yet be provided uniformly throughout the district, the center becomes the first place that such a framework for development can become established. As the urban area grows, as more activity locates in the center, it will become more economically attractive to other investors. Thus, the center gains momentum and continues to attract investment and economic activity. These effects of

urban growth, called agglomeration, are necessary if economic growth is to occur in any of the districts. For economic purposes only, economists have been unable to find a point at which a city becomes too large.

In a similar way, migration to the district centers helps to modernize the population of the entire district. As people go to the center, they learn about the outside world and gain skills associated with modern living. Most persons tend to keep in touch with friends and relatives in the rural areas, and their conversations with these persons spread new ideas. There are two examples of this modernizing influence of urban life. First, the establishment of the district legislatures in each of the centers has played an important part in the political education of the people. The district centers remain more highly politicized than the rural islands. Second, the location of high schools in the district centers brings young people to the centers from the rural islands. Those that return to the rural islands carry new ideas back with them. Those that remain in the centers are a link between the rural island and the new life. In both these respects - attracting investment and modernizing the population, the growth of the district centers is key to the development of the districts and of Micronesia.

Despite these advantages and the importance of urban growth to the development of Micronesia, however, there are certainly many problems associated with rapid urbanization about which the Congress of Micronesia has expressed concern. Conferences held recently in Guam and Fiji indicate that these concerns are also problems in other parts of Oceania. Four concerns seem to be paramount:

- a. In the islands of Micronesia, as perhaps nowhere else in the

world, rapid, unchecked urbanization could exceed the "carrying-capacity" of the land. Carrying-capacity is a relatively new notion. It means that the number of people, industries, pollution, and buildings may put more stress on the physical resources than can be supported without reducing the standard of living. For example, providing water to industry could reduce the water supply available for homes. In Micronesia, carrying-capacity would include such fundamental things as the amount of land available, and the supply of drinking water. It would also include things that are constructed, such as power supply, sewage system capacity, dock and storage capacity.

In the past, it appears that the islands supported a much larger population than the current levels. What is different now, however, is the demands made on the land by modern technology and living standards. Water shortages are already a factor on Majuro and Ebeye in the Marshalls, where rainfall provides the only source of drinking water. (Fiji and Samoa have also recently experienced droughts.) While it appears that there is no immediate crisis in any of the district centers, it is clear that there are limits to urban growth and development in Micronesia.

There are important questions that need to be answered. Is there sufficient land, water, materials, food, energy (power) to support the population and industry? At what level? Are there sufficient docking and storage facilities to bring in at reasonable cost what cannot be produced domestically? Since Micronesia intends to rely on tourism as a source of foreign exchange, it is also important to consider whether growth (population and industry) begins to make the environment less attractive.

Beyond the issue of attractiveness, some ecologists believe that

damage to the environment (pollution that kills the coral reef, salt water incursion into ground water) would be irreversible (Johannes, 1978). This would not only be an environmental tragedy, but also an economic disaster since investments in tourism and fisheries could be rendered worthless.

b. Growth is likely to create inequalities between districts, and between urban and rural areas. Although the growth of the district centers is critical to the development of the entire district, it does not follow that the growth of the center will necessarily benefit the outer islands. Indeed, many developing countries have discovered that growth of the major urban area is achieved at the expense of rural areas (Walton, 1975). Throughout Oceania, urbanization has been accompanied by rural depopulation, and a decrease in agricultural production (Yen, 1975). The same momentum which attracts investment and economic activity to the district centers from outside Micronesia, also attracts energy and investment from rural areas. This means that the difference between the centers and the outlying islands is likely to increase over time.

If this occurs, then more people would migrate to the centers from rural areas, in turn making the urban area more attractive and the rural islands poorer. For many years, some economists and urban specialists believed that over time, the growth of the major city would spill over to the rural areas, and that development would even out. These studies were largely based on the experience of developed countries (Williamson, 1965). Several decades of experience, however, indicate that this does not happen in developing countries. The inequalities

between regions tend to increase rather than decrease and rural areas remain impoverished. Even with major programs directed at redressing regional imbalance, many countries have been unable to reverse the inequality. In many developing countries, political leaders have decided that the political instability produced by regional disparity is among the worst effects of imbalance. The fragmenting effects of regional imbalance are evident in Micronesia. The most developed areas, the Northern Marianas, the Marshalls, and Palau wish to separate from the poorer districts.

c. In addition to the problems between the centers, and between the centers and rural islands, it is also true that the economic growth in any district center will not necessarily benefit Micronesians. Developing countries dealing with foreign investors often find that the investment does not necessarily improve things for the citizens. In a process which development specialists term dualism, two societies may emerge. The foreign investor and a few persons from the developing country may participate in the profits from the venture. If the investment involves capital-intensive production, however, it is likely that the jobs, the machinery, the management systems, and the patented processes for manufacture must all be imported. Those who do benefit from the investment are apt to spend their profits on luxury goods from abroad rather than in the developing country.

Pedro Sanchez, President of the University of Guam, has described a three-tiered society which he believes has emerged in the tourist dominated economies of Guam, Hawaii, and the Caribbean. At the top is a layer of government leaders and outside developers and financiers. In

the middle is a group of consumers. These persons are transients and tourists with no stake in the community. At the bottom are the workers or "natives", who are powerless and remain poor. Sanchez is concerned that Guam will become "another Hawaii" where the indigenous population finds itself on the bottom of the social and economic ladder (Sanchez, 1975).

d. The speed of modernization associated with rapid urbanization has produced problems of social disorganization - a major problem in Truk and Ponape. Although Micronesia's urban areas are tiny by world standards, urbanization has a dramatic personal impact on people. In absolute numbers, there is a very strong foreign influence in the district centers. In some areas, there are nearly as many expatriates as there are Micronesians. In periods of Micronesia's history, there have been more foreigners on the islands than there were Micronesians.

In addition to feeling, perhaps, outnumbered in one's own country, young Micronesians express a sense of alienation - of not being able to participate in the development of their country. Unemployment in the district centers is over twenty percent. Idleness and alienation have combined to create serious problems of alcoholism and violence among young people. This serious problem has been the subject of prolonged discussion in all of the district legislatures, and seems to be a problem throughout Oceania (Chandra, 1973).

Some sociologists and mental health experts have associated the problems of alcoholism and violence with the breakdown of social structures associated with traditional culture. Preventing conflicts between persons is a problem in any society, and is particularly difficult on a small, isolated island. With the breakdown of various social

castes and kinship systems, people have trouble preventing misunderstanding and resolving conflicts. This can lead to violence. Truk and Ponape are more densely populated areas, and, therefore, more prone to these problems.

In summary, Micronesia faces a series of development problems which are typical of other countries of the region, but which remain unresolved. In assessing Micronesia's options for development, and the potential for developing a fishing industry, the issues addressed in this chapter provide the context within which such an industry would have to operate.

CHAPTER III

CHOOSING A STRATEGY: MICRONESIA'S RESOURCES AND LIMITS

The problems discussed in the previous chapter provide a framework for discussion of the role which fishing might play in a development strategy for Micronesia. It is obvious that neither fishing, nor any other single industry, is likely, of itself, to resolve these problems. Nevertheless, it is the intent of this chapter to demonstrate that fisheries are an important part of Micronesia's resources, and further, that small-scale fisheries should receive more attention than they have in the past.

The chapters which follow will address the prospects for developing these fisheries. This chapter will (1) describe Micronesia's resources and (2) discuss some of the constraints imposed upon Micronesia by the fact that it is (a) a satellite economy, (b) a very small country, and (c) a collection of widely scattered islands with a heterogeneous population. Finally, the chapter addresses the relative advantages of small-scale fisheries in terms of these constraints, and Micronesia's development needs. The intent is not to suggest that fishing is the only activity which Micronesians should undertake, but only that it should receive more attention than has occurred to date.

Micronesia's Resources

Over the past thirty years, there have been several studies which

have surveyed Micronesia and assessed its resources for development. The most recent effort, by the United Nations Development Program, was completed in 1976. This was the first survey which produced a development plan.

All of the reports agree that Micronesia has a relatively limited choice of areas for investment. For the most part, the selection of one area for investment would not foreclose development of another sector, although there would be limitations in terms of available financing. At present, Micronesia is emphasizing the development of tourism in its planning. The UNDP program suggested that marine resources, agriculture, and tourism - in that order - be emphasized in development planning.

Marine resources

Fisheries. Fishing industries involve many things besides the fish itself. The industry requires gear, boats, processing, marketing and other activities which add to the local economy. These elements of the fishing industry are discussed in chapter five. The focus in this section is on the resource itself. Micronesia has three fishery resources: reef fish, near-shore fish, and skipjack tuna.

There are some fish in the reefs which have a potential market for export, although reef fish have traditionally been fished for local consumption. Statistics on the current harvest are somewhat unreliable because most of the fishing is for personal consumption. In 1977, local fishermen harvested 773 metric tons of reef fish and shellfish for cash. The catch was valued at \$700,000, and was estimated to be 25 percent of the total catch. If these figures are correct, the current catch is about

3,090 metric tons with an estimated value of 2.8 million dollars. This coincides with estimates by fishery experts regarding the potential for harvesting of reef and near-shore fish stocks. Johannes (1975, 1978) suggests that there is the potential for reef fish to produce 5 times the present catch. He estimated that the value would be 10 million dollars annually. Gulland(1971) estimated the potential yield in the Trust Territory (including the Northern Marianas) for both reef fish and near shore fisheries at 14,244 metric tons. Two cautions are necessary in considering these estimates, however. First, the near-shore resource is largely unexplored and unexploited. This means that the potential sustainable harvest is basically unknown. Second, the valuation given to the catch landed by local fishermen is approximately \$906 per metric ton. This is considerably above the world average of \$288 per metric ton, although below the average value of nations who harvest mostly lobster and other shellfish. It is possible, therefore, that the Micronesian fishermen were selling mostly shellfish and sea turtles. It is unlikely, however, that such a high value per metric ton would be sustained. It does seem likely, however, that Micronesia's catch can be increased from the present levels, and that exports can be increased beyond the 50 metric tons of reef fish exported in 1977.

The fishery which seems to be receiving the most attention at present in terms of investment is the tuna fishery. The skipjack tuna migrate through Micronesian waters, and these fish have been heavily exploited by Japanese and Soviet distant-water fishing vessels. In 1977, Japanese boats reported a catch of 73,760 metric tons of skipjack in Micronesian waters. The 12 vessels of the Micronesian tuna fleet had a catch of 6,990 metric tons. Further, the Micronesian fleet was manned by imported labor because

Micronesians were not interested in distant-water fishing.

Marine mineral resources. There are no known offshore petroleum resources in Micronesia. There may be manganese nodules in the district of Yap. At present, however, it is not clear whether the nodules are present in sufficient quantity or are of sufficient quality to justify the considerable expense of deep-sea mining.

Marine sciences. Some of the coral reefs in Micronesia are of particular scientific interest. During the Japanese administration of the islands, a marine research facility was located on Palau. This facility produced work of international interest (Johannes, 1978). There are indications that the coral reefs of Palau are unique in the world and contain species of fish found nowhere else. There is no scientific facility located in Micronesia at present, nor are there specific plans to establish such a facility. There has, however, been international interest in a proposed port facility to be constructed in Palau. Many marine scientists believe the port would seriously endanger the reefs (Johannes, 1978).

Agriculture

During the Japanese administration, the islands of Micronesia were exporters of various agricultural products. Now that the questions of land ownership have been largely resolved and the debris from World War II largely cleaned up, there is reason to believe that agriculture could be developed again. The chief problem seems to be in providing incentives for Micronesians to return to agricultural production. At present, the absence of transportation networks which would bring the products to

market, or of marketing plans which would help in selling the produce has discouraged agriculture (Nevin, 1977). As with fisheries, agriculture can potentially stimulate related economic activities if the transportation and marketing problems can be solved. For example, waste from fish processing could be converted to fish meal for animal feed or fertilizer. There is now a small fish meal plant in Micronesia, but other economic relationships with local industries have not been developed.

Agriculture could produce vegetables, livestock and fruit for local consumption and for export. In addition, to these products, there are two agricultural products which have a potential export market.

Copra. The copra industry of Micronesia was developed during the German administration, and Germany continues to be a principal market for Micronesian copra. In 1977, Micronesia produced about 17,500 metric tons of copra valued at 2.2 million dollars, and 18,000 metric tons of coconut oil valued at 4 million dollars. The price of copra on the world market, however, fluctuates a great deal from year to year, and the demand for copra seems to be declining (Nevin, 1977). The fluctuation in price has tended to discourage Micronesians from expanding production of copra (Yen, 1975).

Pepper. The pepper which grows on Ponape may develop a gourmet market. Interest has been shown in the pepper, and there are now efforts to expand production and marketing activities. The total production of pepper for export in 1977 was 3.4 metric tons valued at \$11,000.

The problem of rural depopulation discussed in the previous chapter, presents a barrier to further expansion of Micronesian agriculture.

The solution of this problem involves improvements in the quality of rural life as well as improvements in agriculture as an economic activity.

Handicrafts

Micronesia has a small handicrafts industry based on traditional decorative arts. None of these arts seems to have developed a special market. Exports of handicrafts have remained stable at about \$250,000 annually.

Tourism

Guam is one of the major tourist centers in the Pacific region, and Micronesia is interested in encouraging the tourists to continue from the Marianas to the other islands. Although there has been some increase in tourism from Guam to the nearby Northern Marianas, there has been little increase in tourism in the Carolines and the Marshalls. In 1976, the Northern Marianas received 52,000 visitors. The combined total for the Carolines and the Marshalls was 14,229 (Kosrae - 0, the Marshalls - 2919, Palau - 4902, Ponape - 1215, Truk - 3900, and Yap - 1293). It is likely that many visitors were counted more than once as they went from one district to another on the same trip.

The disinclination of visitors to travel to the Carolines and the Marshalls is attributed both to the extra travel time and to the absence of first-class hotel accommodations. The relatively higher number of visitors received by Palau and Truk reflects the appeal of these districts to divers. Palau, as mentioned earlier, has coral reefs which are considered to be unique in the world. Truk also has a special interest for

divers. During World War II, the United States bombed the Imperial Japanese Navy, which was headquartered in Truk lagoon. Many of the ships sunk in that attack are still in the lagoon, and are explored by divers.

Despite the initial difficulties in attracting tourists to Micronesia, however, tourism has been given a great deal of attention by territorial administrators. A plan of development was worked out with the Pacific Area Travel Association for the development of Micronesia as a tourist area. Thus far, Micronesians have been successful in retaining ownership of many of the hotels in the islands. This is mostly because foreign investment was prohibited until 1974, and only Micronesians could invest in tourism. Now that the prohibition on investment has been removed, Micronesians need to be concerned about maintaining control of the tourist industry. The experience of other countries suggests that tourism can have detrimental effects on a society if it is the dominant industry in the country.

Tourism is expanding in both Oceania and the Caribbean. The experience of the West Indies indicates that tourism tends to produce few jobs for the indigenous population. Brookfield reports that about 70 percent of the tourist dollars brought into the West Indies went back to the tourists country of origin. The airplanes, staff, food, entertainment and other aspects of the tourist industry were imported along with the tourist. (Brookfield, 1972, p.134).

In Melanesia, where tourism began to expand in 1965, small local companies were soon absorbed by larger multi-national corporations based in the United States or Australia. In addition to returning little to the local economy, there have been detrimental effects

from the industry. Living costs and land values have increased sharply and tended to displace indigenous land owners. There is often a marked deterioration in race relations as a result of the rather brutal contrast between the wealth of the tourists and the poverty of the host country. Finally, there is a tendency for a parasitic population which exploits the vices of the tourists to develop. In all, tourism as an industry can destroy the social and physical environment which brought the tourists to the locale in the first place (Brookfield, 1972, p. 130-4).

The construction of large new hotels in Saipan in the Northern Marianas has also raised concerns about the physical impact of tourism. Immediately following the opening of the new hotel in 1973, Saipan experienced a shortage of fresh water, and a loss of water pressure throughout the system. Power shortages have also been a problem on the island since the opening of the hotel. While tourism remains an important resource for Micronesia, and one of the few possibilities for foreign exchange, there is considerable concern among leaders of Micronesia and among development specialists that tourism should not be the dominant industry if this can be avoided.

Minerals

There are no known mineral resources left in Micronesia. All commercially exploitable mineral resources were extracted during the German and Japanese colonial administrations.

U.S. Military

The people of Micronesia receive payment from the United States for the use of Kwajelain Missile Base in the Marshalls, and for damages

to Bikini and Eniwaitok Atolls, also in the Marshalls. These islands are uninhabitable as a result of nuclear testing.

These constitute the known commercial resources of Micronesia. Of these, fishing, agriculture and tourism are the most important at present. In 1981, when the pieces of Micronesia separate into independent political entities, the Eastern Carolines will face a bleak future. The only tuna processing plant is in Palau. The only copra-processing plants are in Palau and the Marshalls. Tourism is an important industry only in the Northern Marianas. In 1977, the Eastern Carolines shipped copra valued at \$803,200 to Palau, and had other exports valued at \$233,000. During this same period, the Eastern Carolines imported goods valued at 21 million dollars, of which 6 million dollars was for food for household consumption.

Of the resources described, fisheries and tourism seem to offer the best hope of increasing exports in the near term. Fisheries can also reduce imports. The impact of tourism on the economy and culture of developing countries has been described. The potential impacts of fishing will be addressed at a later point. At present, however, neither industry is developed. Before proceeding, it may, therefore, be useful to assess whether tourism or fisheries is likely to attract outside capital and assistance for the industry to develop.

Micronesia's Limits

In assessing the prospects for this kind of development, it is useful to examine three aspects of Micronesia's situation. First, it is a satellite economy. Second, it is a very small country(ies). Third, it consists of many scattered islands, inhabited by a heterogeneous popu-

lation.

Satellite Economy

In the description of dependency theory presented earlier, Dos Santos described three types of dependency. The first type is colonial dependence which involved monopoly trade arrangements and monopoly control of land, mines and labor. The operation of this type of dependency and its influence in Micronesia was described earlier. The second form of dependency, Dos Santos describes as "financial-industrial dependency". This has a similar result but is achieved by monopoly control of capital for investment, such that only those export products desired by the metropole receive investment capital. The third form, which Dos Santos calls "technological-industrial dependence" is based on investment by multinational corporations in the manufacturing sector of underdeveloped countries. Micronesia's small size and small internal market seem to make it unlikely that the third form of dependency would manifest itself here. The second form, however, "financial-industrial dependency" is useful to an understanding of why investments have been made in copra and tourism, but only limited investments have been made in fisheries.

Private capital for investment in Micronesia comes from either Tokyo, Honolulu, or Sydney. For the most part, Micronesian investment has been dominated by Honolulu (Brookfield, 1972, p. 128), but with the lifting of the ban on foreign investment Japanese interests will probably expand.

African economist Samir Amin(1976) explains that there is a distortion in the kind of investment which takes place on the "periphery" or in satellite economies. In the center, an investor would be likely

to invest either in an export product or in something designed for domestic consumption. In the periphery, however, where the source of investment is from the outside, investment is most likely to be in something needed by the center - that is, in the export sector. It is difficult to attract investment capital to projects which are designed primarily for local markets. Amin estimates that only 15 percent of the capital invested in underdeveloped countries has been directed toward products which are primarily for the home market.

In Oceania, Brookfield notes that the small size of the countries work a further hardship. Almost all of the banks in Oceania are branches of financial institutions which are based in Sydney, San Francisco, Tokyo, or Honolulu. These banks accumulate the savings of the population in the form of bank deposits, but a sizable portion of the deposits tend to be reinvested in the center rather than in the developing country. In Micronesia, banks reported deposits of 34 million dollars in 1976. Loans to local commercial customers were only 6 million dollars. Other funds were loaned for personal loans (7.5 million dollars), but the bulk of the funds held as deposits were invested in projects in other locations.

This means that other than government expenditures, the investment of capital in Micronesia is dominated by outside interests - either foreign investors or local banks which are branches of central banks. Brookfield estimates that in Melanesia, banks and other financial institutions receive more in savings than they invest in the region. That is, that Melanesians are exporting their capital to the center (Sydney in the case of Melanesia) and helping to finance the growth of the center (Brookfield, 1972, p.127). Demas reports the same pattern of financial investment in the Caribbean (Demas, 1965).

While there are other aspects of the satellite economy, the impact of investment capital is probably the most critical problem in the development of fisheries and agriculture to serve the domestic Micronesian market.

Economist B. F. Hoselitz described a continuum of economies from "dominant" to "satellite" economies:

The ideal case of a dominant pattern would be exhibited by a country with a fully closed economy, with no need to resort to foreign borrowing for purposes of capital accumulation, and without exports. At the other extreme, we would have a society which draws all of its capital for development from outside and which only develops those branches of production whose output is entirely exported. If we further stipulate that all or the bulk of capital imports go to one destination, we have a satellitic pattern of growth.

(Quoted in Brookfield, 1972, p. 127)

Brookfield describes the history of Oceania as the conversion of small closed economies into satellites.

Over the past several years, Third World countries have tried to gain more control over outside investment capital by regulating investors and foreign corporations. In connection with fishery resources, for example, Third World countries typically make many requirements of nations and companies wishing to fish within the Exclusive Economic Zone. These requirements are discussed in detail in chapter six. There is considerable disagreement among economists, however, as to whether the effort to control international capitalism through such regulations can succeed in reversing the drain of wealth and resources from the periphery to the center. Neo-classical economists believe that such investment is essential to Third World development, and that incentives and regulation can guide the investment to where it is most useful. Structuralists maintain that as long as the basic structure of the international economic

order remains unchanged, regulation will not stem the drain of resources to the periphery.

Special problems of very small countries

In trying to cope with the problems of underdevelopment and dependency, the larger nations of the Third World have tended to adopt strategies which try to develop a more balanced economy and to become more "self-reliant". This involves the development of industries which can supply products that would otherwise be imported, protection through trade arrangements for new industries that will compete with imported goods, regulation of foreign investments, and investment in agriculture and rural areas. The intent of these strategies is to make the economy of the country more closed - less influenced by external forces of supply and demand. Most of these strategies and economic models have been developed with large countries in mind. Small developing countries have special problems which limit the strategies available.

In all probability, no nation in the world can truly become self-reliant. For very small countries, however, such a goal is clearly impossible. Caribbean economist Demas (1965) describes some of the special problems which confront small developing economies.

1. Unlike continental economies, small countries have skewed resources. They are unlikely to have major mineral resources and agricultural resources and hydroelectric power, for example. This means that the small country must specialize in particular products. Micronesia has prospects in marine resources, fisheries, and tourism. There do not seem to be any resources or power sources, using existing technology, which could support a heavy industry.

2. Although resources are skewed, consumer demand will be varied. The people of Micronesia and Oceania like automobiles, variety in their diet, and other products of modern society. The small country is unable to provide these products itself, and must import them. The small economy is, therefore, of necessity, more dependent on imports than the continental economy. It may, however, be possible for a government to try to control imports so that people do not get used to a variety of consumer goods which their country cannot afford to continue to import. Some economists from small countries, for example, feel that the whole issue of the "viability" of very small countries actually revolves around what standards of living the small nation tries to adopt (Lewis, 1976).

3. At the time Demas wrote, manufacture was believed to be essential to development. Since then, there has been more recognition of the value of other sectors of the economy, such as agriculture and services. Nevertheless, it is generally agreed that the development of manufacturing is an important aspect of modernization. Small countries have particular difficulties developing such capability. Inputs to the manufacturing process must usually be imported. Manufacturing uses a great deal of power, which may be a scarce, imported resource. Economies of scale are almost impossible to achieve in a small economy, and the agglomeration effects of a large economy will also be lost. Interindustry transactions will almost certainly be international transactions. For the most part, Micronesia seems to have few prospects for manufacturing, other than the possibility of an assembly plant for motorbikes sold in the region. The industrial processes which do exist are related to agriculture and fishing (copra dessication, tuna processing).

4. Large economies rely on domestic demand for various goods to stimulate the economy and sustain economic growth. In very small countries, the domestic market is very small and rarely (Demas believes never) provides sufficient impetus to support a modern economy. Even in small countries with a high per capita income, the aggregate national income will usually be too small to produce sufficient demand for growth to be self-sustaining. In countries like Micronesia, where the population is both small and poor, domestic demand is most unlikely to provide enough stimulation for development.

5. In both imports and exports, the small country is usually too small to have significant impact on the world markets. It is, therefore, a "price taker" in both imports and exports, and will have little or no control over the external forces which shape supply and demand. There are, of course, some small countries, such as Kuwait, whose principal resource is a scarce resource. Most of the small island countries of Oceania and the Caribbean, however, lack these kind of resources. They are, therefore, in a weak negotiating position with international firms and investors.

The dilemma of small developing countries is, therefore, that they remain open economies, dependent on imports and exports. Further, the small country specializing in a particular commodity will be interacting with large, vertically integrated corporations which are important both as suppliers and purchasers. For example, Trinidad and Tobago deal with the major oil corporations as suppliers of equipment and technology to extract the petroleum and refine it; as shippers of the exported goods; and as purchasers of the petroleum products. In a similar way, Micronesia is dealing with large corporations both in tourism and

fisheries. The international tourist industry tends to be dominated by large corporations which own the airlines, hotels, and travel agencies. Continental Airlines, for example, owns a major share of Air Micronesia and owns and operates the Saipan Continental, the largest hotel in the Trust Territory. The Van Campe Company, an international fishing concern, is the owner and operator of several tuna boats, supplies and repairs those owned by Micronesians, owns and operates the tuna cannery in Palau, and markets the product.

Demas recommends a different strategy for small, open economies. If possible, a small country might specialize in a commodity or service for which there is a particular demand, or in which it has a monopoly. Examples include the banking services of the Swiss, or "flags of convenience" in shipping offered by Liberia and Panama. Whether or not this is possible, it is important to substitute local products for imports where this can be done. Demas suggests, for example, that some construction materials, such as bricks, might be domestically produced despite the lack of economies of scale. High transportation costs per unit on imported bricks make local production a possibility. Increasing agricultural production and reducing food imports is also important. Finally, and most importantly, Demas believes that it is essential to small countries to develop economic communities of a regional nature to help one another.

Scattered islands and a heterogeneous population

The options open to Micronesia seem to be somewhat further limited because of the geography and cultural diversity of the islands. Demas assumes that very small countries at least have the advantage of homogeneity and low internal transportation costs. Micronesia does not have this

advantage. It is further from the Marshall Islands to Palau than it is from Richmond to Las Vegas.

In Micronesia there are only two modes of transportation between districts - air and ship. There is passenger and air freight service between the district centers twice weekly. There are also ships which serve the outer islands. The field ships get to each inhabited outer island about once every 6 weeks. In addition, there is freight service between the district centers. The frequency of this service depends on demand. Most travel between the district centers and the outer islands is done by individual traditional boats (Lewis, 1974).

The problems of transportation are compounded by cultural and language differences. In many ways, it is true to say that Micronesians have little in common except the same succession of foreign conquerors. There are strong feelings of emergent nationalism in each of the districts, and this leads toward fragmentation. This political fragmentation makes it difficult to develop economic relationships based on a regional view.

In consequence, it is difficult to think of an internal Micronesian market. Economic activities tend to be isolated, like the islands on which they are located, and there is often little direct spillover of economic activity from the district center to the outer islands, or from one district to another.

Clearly, Micronesia's options for development strategies are limited. Under the circumstances, all types of resources should be developed. In the past, small-scale fisheries have received less attention than other resources. There are several reasons why fisheries, and especially small-scale fisheries deserve more emphasis in development planning.

1. Micronesia has fishery resources, although it has few other

resources. There seem to be enough fishery resources to provide for domestic demand and for export.

2. There is a stable international and domestic demand for fish. This will be discussed in more detail in the following chapters. The stability of demand for fish makes this product more attractive than the existing agricultural exports of copra and pepper.

3. Fishing can be done in a variety of ways - either through labor intensive methods or capital-intensive methods of harvest. While the most efficient method varies with the nature of the species being harvested, there is leeway. This means that fishing can provide jobs.

4. Experience in other countries suggests that fishing stimulates other economic activities. The small size of the district centers means that the multipliers would be very small, but some demand resulting in local employment is possible.

5. Fishing could be conducted in each of the district centers separately, without requiring a great deal of transportation of goods between them. Thus, the scattered nature of the islands would not represent an overwhelming problem.

6. Fishing is essentially an urban activity because the fish needs to be processed and marketed quickly after harvesting. While this means that fishing would not have any immediate benefit to the outer islands, it does mean that, unlike agricultural products, the problem of rural depopulation would not have to be solved prior to the development of a fishing industry.

7. Finally, although fishing for local consumption would probably not attract investment capital from private sources, it is possible that export-oriented fisheries could attract investment capital. While these

investments could themselves be the source of difficulties later, Micronesia will almost certainly need capital investment when the Trusteeship agreement terminates in 1981.

In summary, the fishing industry would seem to offer very good opportunities as a major part of Micronesia's development planning. The following chapters examine the fishing industry, and the requirements for a Micronesian fishery in more detail.

CHAPTER IV

THE INTERNATIONAL FISHING INDUSTRY

Fishing seems to be an appropriate industry for Micronesians to emphasize in development planning. There are, however, many kinds of fisheries, and many approaches to the development of a fishing industry. The next three chapters will examine: (1) the international market for fish and what this means for Micronesian fishery development, (2) the elements of a small-scale fishing industry in Micronesia, and (3) possible points of negotiation in leasing or renting Micronesia's skipjack tuna resources to foreign fishing vessels. This chapter concerns the first problem - the international market for fish products and what this means to Micronesia. This will be approached first by looking at world demand for fishery products, next at problems of resource management or supply, and finally at the implications of the situation for Micronesian fishery development.

Demand for Fishery Products

One of the things that makes fishing an attractive area for development is that there is a stable and growing demand for fish both within Micronesia and on a world-wide basis. Details of the Micronesian demand for fish have not been studied, but we do know that Micronesians have increased their consumption of imported canned fish dramatically. In 1950, Micronesians imported \$40,500. worth of fish. In 1971, this had increased to \$1,292,000. of imported fish. Even with inflation this is

a significant increase. This pattern has also developed in Fiji, Western Samoa, and other countries in Oceania. Fiji currently imports ten pounds of canned fish per capita, at an annual cost of more than one million dollars (Johannes, 1975).

On a world-wide basis, demand for fish is also increasing. This reflects the growing world demand for food. Fish is an important part of the world food supply, because it is high quality protein. Economist Frederick Bell estimates that about 9 percent of the world supply of protein for human consumption is provided by fish. This is calculated by estimating that directly edible fish and shellfish supply 5.4 percent of world protein. People also consume fish indirectly because fish meal is used as animal feed. This indirect consumption accounts for another 1 percent of world protein. Adjusting for the quality of the protein, fish constitutes about 9 percent of the world supply of protein for humans. (Bell, 1978, p. 22).

Studies of the structure of demand for fish products show that the key factors in demand are the price of the fish, the size of the population, and the average per capita income. The price elasticity and income elasticity vary with the species of fish and the particular country. In general, however, a large country with a high average income will consume more fish, providing that the price remains competitive with other foods. Bell calculated the major consuming nations in twelve categories of fish products: groundfish, tuna, salmon, halibut, sardines/herring, shrimp, lobster, crabs, clams, scallops, oysters, and fish meal. In all categories, the United States, Japan, and the Soviet Union were among the major consuming nations. The United States is one of the four major consumers in every category except sardines.

Japan is one of the four major consumers in every category except lobsters.

In tuna, the category most important to Micronesia, the United States and Japan rank first and second - together accounting for 59 percent of world consumption. Thus, the two nations with which Micronesia has the closest ties are also the principal world markets for Micronesia's single most important fishery resource. This has both advantages in terms of developing marketing arrangements, and disadvantages, in terms of the dependency relationships described earlier.

Since fish is a highly perishable product, there are also important differences in the demand for fish processed in different ways. There are seven main ways of processing fish to prevent spoilage before marketing. These are: sun-drying, icing, freezing, reduction to fish meal, canning, smoking, and salting (Cushing, 1975, p. 5). The process which is best depends on the species of fish and the destination. The United States imports a great deal of canned fish and frozen fish, but imports little smoked fish. Japan, on the other hand, consumes more dried fish than many other countries do. Some fish, like anchovies, herring, and krill must be processed very rapidly, and are often converted to fish meal at sea on factory ships.

In 1975, the most recent year for which detailed fishery statistics are available, the Yearbook of Fishery Statistics (FAO, 1976) reports that the world catch was disposed of in the following way:

DISPOSITION OF THE WORLD CATCH - 1975

Disposition	Amount (millions of metric tons)	Percentage of world catch
Human Consumption		
Fresh	20.7	29.7
Freezing	12.7	18.2
Curing	8.1	11.6
Canning	7.2	10.3
Subtotal	<u>48.7</u>	<u>69.9</u>
Other Uses		
Reduction	20.0	28.7
Miscellaneous	1.0	1.4
Subtotal	<u>21.0</u>	<u>30.1</u>
World Total	69.7	100.0

In general, fish destined for a distant market usually require processing utilizing higher technology. An added problem for less developed countries is that processing tends to be specialized for particular fish. In tropical waters, many fish swim together, and it is difficult for fishers to get a particular kind of fish in sufficient quantity. While there are multi-purpose processing plants, these tend to require more flexible technology and management skills which less developed countries do not presently have the capacity to use (Liston and Smith, 1974).

In summary, the demand for fish products is increasing world-wide, and reflects the structure of demand for all foods. The United States and Japan are among the world's major consumers of fish and would be the most likely markets for fish exports from Micronesia, especially

of tuna. The market selected would influence which form of processing should be used.

Supply of Fish

There is general agreement among fishery experts that world fish stocks are becoming depleted. Between 1950 and 1970, several nations invested heavily in fisheries. As a result of these investments, the world catch increased from 21 million metric tons to 70 million metric tons - an average increase of 12 percent per year. Since 1970, despite increased fishing effort, the world fish catch has remained constant or decreased (Bell, 1978, p. 2). Most experts agree that the world fish catch for species currently harvested is not likely to expand and may decrease (O'Rourke, 1977; FAO, 1977).

There are several reasons for this development. First, following World War II, many developed nations were in desperate need to produce food and earn foreign exchange credits. Fishing was an industry pursued by several European nations and Japan. Agricultural failures in the Soviet Union led to an increase in Soviet fishing activity. In 1963, Peru began an emphasis on the fish meal industry, and within ten years, became the world's leading fishing nation. Other developing countries expanded their fisheries, and fishing became an important industry in Thailand, Malaysia, South Korea, China, Mexico, Chile and the Philippines.

Since the fishery resources of the sea were free to all and belonged to no one, there was no incentive for any nation to conserve the fish stocks. It became advantageous for each individual or fishing nation to maximize its own catch. The best way to increase the catch was to develop larger, more efficient vessels. The Soviet and Japanese fishing

industries developed large distant-water vessels capable of processing the fish at sea. Other nations developed similar vessels. Most fishery experts agree that the world fishing fleet is currently over-capitalized (Anderson, 1975; Gulland, 1977; Bell, 1978). This means that there are too many vessels for the supply of fish.

Large vessels require a large harvest to meet expenses. Since the price of fish continues to increase, it has become economically advantageous to individuals to harvest beyond the sustainable yield - that is, beyond the ability of the fish to biologically replace itself. Once the fish stock has gone below the sustainable yield, it takes more effort to harvest the same amount of fish. Since the stock is being depleted, it will take an increasing effort for fewer fish.

Data gathered on the menhaden fishery of the Gulf of Mexico illustrate the impact of over-fishing on supply and on average and marginal costs.

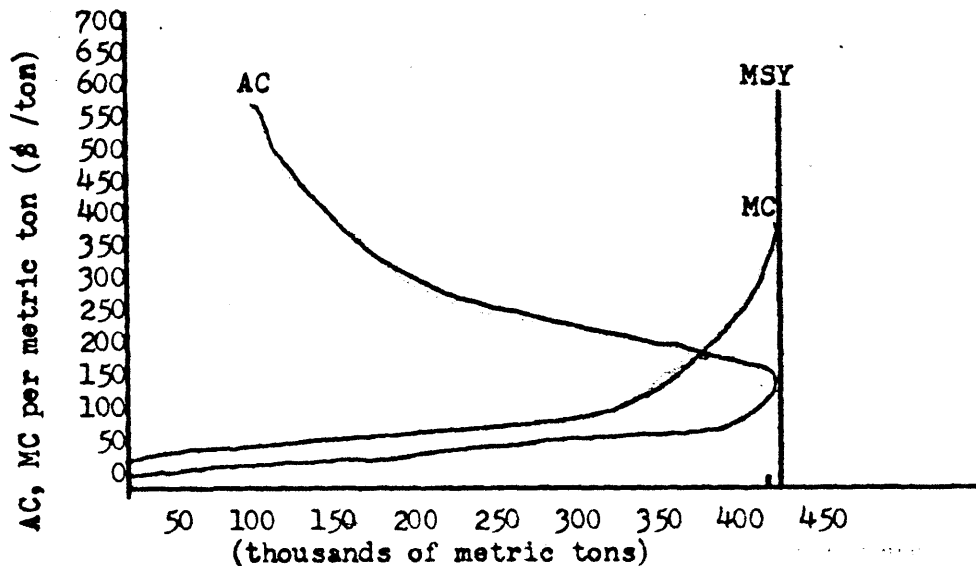


Figure 3 - The Effect of Overfishing - the Menhaden Fishery of the Gulf of Mexico (Bell, 1978)

Up until the Maximum Sustainable Yield (MSY), the increase in fishing

effort produces an increase in harvest. When the MSY is reached, the fishery begins to be depleted, and marginal cost increases sharply. At this point, the increase in fishing effort yields a decrease in the harvest.

For the most part, the same countries which are major consumers of fish products are also the largest harvesters of fish. The largest harvesting nations, listed in order of the value of their catch, are:

TABLE 5

MAJOR FISHING NATIONS OF THE WORLD, 1973

Nation	Amount of catch
1. China(Taiwan and PRC)	7,574,000 metric tons
2. Soviet Union	8,619,000 " "
3. Japan	10,701,900 " "
4. United States	2,669,900 " "
5. Philippines	1,248,500 " "
6. France	796,800 " "
7. India	1,958,000 " "
8. South Korea	1,654,600 " "
9. United Kingdom	1,144,400 " "
10. South Viet Nam	713,500 " "
11. Thailand	1,692,300 " "
12. Norway	2,974,500 " "
13. Spain	1,570,400 " "
14. Italy	389,700 " "
15. Canada	1,151,600 " "

(Source: Bell, 1978, from FAO statistics for 1973)

In the face of expansion of distant-water fishing fleets, and the inability of regional and international organizations to control the situation, pressure for 200-mile limits increased. In claiming these zones, developing countries hoped to accomplish two things. First, they wished to protect small-scale fisheries which were unable to com-

pete with the large foreign vessels. Second, they wanted to receive payment for the use of their fishery resources by foreign fishing fleets. Since 64 percent of the world fishery resources are within the Exclusive Economic Zones claimed by less developed countries who will now charge for them, economists hope that the stocks will be better managed (Bell, 1975).

Management of Fisheries

Expansion of any fishery is not without risk at a time when the world fish stocks are being depleted. Thailand, one of the less developed countries which relies on fish for export earnings, is an instructive example. Thailand made a heavy investment in middle-sized trawlers and purse seiners. The development of this fleet represented a substantial investment of development funds and management resources. Between 1964 and 1971, Thailand's catch increased 54 percent (Tussing, 1974). Thailand is currently the seventh largest fishing nation in the world by volume of fish landed.

In recent years, however, the expansion of fishing by Thailand, by its neighboring states, and by the distant-water fleets of the Soviet Union and Japan resulted in over-fishing. Thailand's fleet must now exert more effort for the same amount of fish. With Malaysia and other nations in the region also investing in expanded fisheries, Thailand faces a problem of management of the fish stocks within its EEZ, and may experience a decrease in the volume of its catch over the near term, despite restrictions on the Soviet vessels which had heavily fished the area.

The conservation and management of fisheries is a new and complex

undertaking. In order to conserve the stocks, it is first necessary to determine how many fish there are, and how the present rate of harvest is affecting the fishery. Simpson (1978) describes some of the research tasks associated with these calculations. Fishery management requires the ability to collect statistics about the fish harvest and stocks, to identify both commercial and underutilized species, and to evaluate the state of each stock. It is also important to understand how the species interrelate, and how the harvesting of one species affects others. This information would help a nation to determine the sustainable yield for each species. Unfortunately, this kind of information is very difficult to obtain, and reliable statistics do not exist in most parts of the world (including many developed countries). In addition to research on fish stocks which Simpson described, it is also important to understand the situation of the people who fish. Fishery management does not really regulate the fish. It is the people who are "managed". It is, therefore, important to understand how and why people fish, and what alternative sources of income they may have.

Once a nation has done the best it can to collect the information it would determine the best yield that should be harvested. Conservation measures, if appropriate, might include limited entry into fishing (either the individual or the vessel), limiting the amount of fish that a given person can harvest (catch quotas), taxing vessels so as to discourage entry, declaring seasons or limiting areas where fishing can be done, and other measures. Catch quotas (either on the person, the vessel, or the fishery) are the most common form of fishery management. Whichever method is selected, it will be important to monitor the effectiveness of the program and to evaluate its successes and

failures (Christy, 1973). Such efforts are very complicated and expensive, and few countries have the capacity to carry out the necessary research and management tasks. The FAO and other international agencies provide assistance, but have generally not had the resources to help all the countries which requested assistance.

One of the most important conservation measures is the elimination of waste in harvesting fish. In tropical waters many species of fish swim together. When the net is brought in, it is unlikely for any single species to constitute more than 20 percent of the catch. Some of the fish will be locally marketable, and others will be considered "trash fish" and discarded even if they are edible. The determining factor for the fisher will be the local market values of the fish. The "trash fish" will be discarded although they are dead once in the net. Wastage of underutilized species through dumping may amount to 80 percent of the fish harvested. Inadequate storage facilities aboard ship and inefficient marketing practices will create additional waste due to spoilage (Liston and Smith, 1974).

Supply, Demand and Management in Micronesia

Micronesia's fishery resources, as described in the previous chapter are (a) reef fish and shellfish, (b) near-shore fisheries which are largely unexplored and unexploited, and (c) skipjack tuna.

Reef and near-shore fish and shellfish. Reef fishing is done primarily for subsistence in both district centers and the outer islands. The concentration of population in the district centers has led to over-fishing in these lagoons. The problem of over-fishing has been complicated by the use of destructive practices such as dynamite fishing

and the use of poisons to catch reef fish. Both practices are illegal, but continue nevertheless. The problem is not confined to Micronesia. Prime Minister Tupuola Efi of Western Samoa describes the impact of these practices on the reefs of Samoa:

Until quite recently, Pacific man lived in almost idyllic harmony with his environment. Indeed, it could be said that his culture, if not his existence, was founded on a carefully cultivated relationship with nature.

The first quarter of the Moon Atu-a-pupola was one of the signals for bonito fishing. The moonless night popo-loloa-lensina was the call for lobster fishing. When the flower of the aloalo or gatae bloomed, it was the season of the lo'tailo. The red-lipped mullet of Pu'apu'a appeared in between the first and second rise of the palolo va-i-palolo.

Today it is a different story. Fish inside the reef, which once were the mainstay of our protein diet, are becoming increasingly scarce. Ava niu kini and dynamite are largely responsible. I have experienced the trauma of witnessing the deathly white and softened coral and sea plants a day after the laying of ava niu kini. There is an eeriness which bespeaks mutilation, profanity and even death.

As fish become scarce, the ava niu kini and dynamite . . . [seem to the fishermen] even more necessary to ensure a respectable catch. That catch does not suffice, use of dynamite notwithstanding and in 1976, Western Samoa will import slightly over US \$1 million of canned fish. This represents approximately five million one-pound cans of fish, or approximately 32 one-pound cans for every man, woman and child living in Western Samoa.

This importation of canned fish includes the entirely wasted cost of approximately US \$150,000. for cans, and the untold environmental pollution that five million empty cans cause.

The traditional containers - that is, baskets woven from palm leaves, banana and breadfruit leaves - are easily disposable. Empty cans are not. But whereas this type of pollution is readily visible to us it is not the worst pollution problem. What is not easily disposable is not as bad as what is not dissoluble.

(Quoted in Bardach, 1977, pp.18-19)

By tradition, fishery rights in the lagoons and reefs belonged to certain kinship groups. A family or clan had tenure in a particular part of the lagoon and depended on it for food. This encouraged conservation measures. Increasingly, lagoon and reef fish are becoming common property, and there is no incentive to practice conservation. Johannes (1975) indicates that there is a clear likelihood of overexploitation

of the reef fisheries in urban areas, although he believes that with careful management, the reef fisheries could be very productive.

The way that fishing is done varies from district to district (Alkire, 1977). In Palau, reef fishing is done primarily by the men using spears and nets. In Truk, the women do the fishing in the reefs and use hand nets. According to tradition, however, only the men of Truk are permitted to fish from canoes. In the Carolines (other than Truk and Palau), men are the primary reef fishers and use traps, weirs, nets, spears, hooks and lines. Where there are no coral reefs, the Carolinians troll for bointo. In most parts of Micronesia, it is impossible to use trawling gear because the coral bottom is too uneven and rips the net. It is also impossible to use gill nets. Sharks eat the fish caught in the gill nets before they can be harvested.

In general, harvesting methods are oriented toward catching individual fish (hand nets, spears, hook and line). There are hundreds of varieties of fish, and it is difficult to get the kind of fish one wants without fishing specifically for that fish.

Although there have been experiments in mariculture, there has not yet been a successful application of closed reef mariculture in Micronesia. At present, too little is known about the life cycle of the fish, about their relationships to each other, about the ecology of a coral reef, and about the age and present population of the fish. In this connection, some marine biologists have indicated that researchers should give more attention to recording the traditional knowledge of Micronesians. This traditional knowledge is being lost, and anthropologists have tended not to record the information. At present there is no good base data on the reef fisheries of Oceania (Johannes, 1975).

Skipjack tuna. The skipjack tuna is a migratory species which travels through Micronesian waters as well as through the waters of other nations of the southwestern Pacific. Less than half of the skipjack tuna harvested is within the 200-mile limit of any nation. Nevertheless, the skipjack is an important resource for Micronesia. In 1975, the Japanese fleet harvested nearly 74,000 metric tons of skipjack in Micronesian waters. Most of the skipjack were harvested in the waters of the Marshall Islands. The vessels of other nations were also fishing in Micronesian waters, but their catch statistics are not available.

Micronesia has been attempting to develop a Micronesian skipjack fishery. There are now 12 tuna boats in the fleet. Two are Japanese built purse seiners which were received as partial payment for "war damages". The other ten are "pole and line" vessels. Pole and line has been less productive than seining because bait fish spoil before they can be used. The purse seiners are generally more efficient. Most of the funds for fishery research, however, have been focused on the bait fish problem (U.S. Dept. of State, 1978).

The tuna fishery, whether pole and line or purse seiner, uses distant-water vessels, and, therefore, requires sophisticated equipment for navigation and for harvesting and preservation at sea. This equipment must be imported, and Micronesia lacks repair facilities.

The only tuna processing plant is located in Palau. Seven thousand six hundred eleven (7,611) metric tons were landed in Palau in 1977. The plant in Palau does two kinds of processing. Tuna destined for the United States is frozen and shipped to American Samoa for canning. Tuna from Micronesia would be subject to import duties. Tuna from American Samoa is not. Tuna destined for the Japanese market is dried and processed

as arabushi. Waste from the arabushi and other processing is converted to fish meal for livestock and poultry feed. Current efforts are being made to build arabushi processing facilities in Truk and Ponape.

Although skipjack tuna is subject to large fluctuations in population and migration patterns, it does not seem to be in any immediate danger of over-fishing. Bell estimates that the skipjack will not reach the Maximum Sustainable Yield until the year 2000. The sizable fluctuations in harvest, however, would be important to Micronesia.

In summary, there is a growing world demand for fishery products, and supply in some fisheries is decreasing. Micronesia's fishery resources near shore and within the lagoons are not fully exploited, although the reef fish in the district centers are overfished. It is likely that well-managed small-scale fisheries could produce fish for export as well as for domestic needs. Micronesia's skipjack tuna resource could be leased to foreign fishing industries and harvested in part by Micronesian vessels.

CHAPTER V

DEVELOPING A SMALL-SCALE FISHERY IN MICRONESIA

The thrust of the previous chapters has been to suggest that Micronesia's development planners should seriously consider giving more emphasis to the development of small-scale fisheries harvesting reef fish and near-shore fish stocks. In recent years, after a long period of neglect, more attention has been given to small-scale fisheries in many developing countries. The countries of Indonesia, Malaysia, Thailand, and the Philippines have been among the most active Asian countries (Lockwood and Ruddle, 1977). There have also been efforts to help small-scale fishermen in Latin America and Africa (Lawson, 1977). These experiences provide a framework on how to approach the question of developing small-scale fisheries in Micronesia.

It is beyond the scope of this thesis to provide a detailed plan for the development of such an industry, but it is possible to briefly describe the most important elements of developing small-scale fisheries. This chapter addresses five broad categories in which action would be necessary. First, it is important to have adequate planning and management so that the fishery can be approached as a total system. Second, it is important to organize the people involved in fishing into cooperatives or associations. Third, it is important to provide adequate financing on terms that are appropriate to the small-scale fishery. Fourth, it is necessary to encourage and support the development of local industries related to the harvesting and marketing of the fish. Finally, the needs

of the fishery need to be considered in the allocation and planning of transportation systems, water supply, land use, and other resources.

Planning and managing the fishery as a total system

One of the complaints most often made about the American administration of the Trust Territory has been the absence of a concerted, consistent approach to economic development. There have been fishery projects, but they have tended to be isolated and unrelated to other activities. As a result, the benefits have been short-lived. A fishing industry is a total system, and the physical, economic, and social elements must be integrated. Given Micronesia's situation, it is also important, wherever possible, to look for opportunities to stimulate other local enterprises, and to avoid imports when this is possible. An FAO conference on fishing ports and markets (1970) identified some of the elements that should be considered in the planning and management of a fishery. Some of these factors are:

Assessment of the fish stocks. What species are marketable and for what market? How should they be processed to be acceptable to that market? Can these species be harvested in sufficient quantity to justify this particular process? The key here is that both species and quantity are important in determining the appropriate market and process.

Method of harvest. Given the volume and the species to be harvested, what is the most appropriate method of harvest? This would include design and manufacture of gear, boats, and other supplies. It would also be important to determine how expensive the gear and boat would be both in the initial purchase and in maintenance costs. Cost will determine whether

local people could afford to use it given the price they are likely to receive for the fish.

Landing facilities and/or port facilities. Given the information on harvesting method and the size of the fleet, what kind of landing facilities and/or port facilities would be needed by the fleet? A key factor here is the connection between the landing place and the facilities for processing, packing, and transporting the fish to market. It is best if the fish can be directly off-loaded from the boat into the processing facility or packing area. If the boats must land elsewhere, and the fish unloaded and transported to the processing facility or packing area, there will be added expense and spoilage. The expense would be greater in Micronesia than in many places because trucks tend to rust quickly in the tropical climate, and fuel is an expensive, imported item.

Ecological impacts. Since the small-scale fisheries to be expanded are reef fisheries, it will also be important to look at ecological impacts on the fish stock in preparing a landing place or port facility. It seems likely that the existing port facilities in Micronesia would be able to serve the fishery without expansion at this time. Expansion of processing facilities could, however, strain power or water supplies on some of the islands where these factors are in short supply.

Financing. Even though the system described is very small-scale, the financing of the operation, particularly during the early years, is very important. It is unlikely that any planning could foresee all of the problems that might arise. Fish is a perishable product, and a gap in the system between the fishing boat and the market could mean that

the product spoils , with no income to the fishers. Financing should, therefore, contain leeway for unexpected difficulties. This will be addressed later in more detail.

The key to approaching the fishery is to follow the fish all the way from the water to the market and ensure that each link has been considered. It is best to develop the entire system as a whole, and gradually expand operations as this becomes feasible. Developing countries which have invested heavily in one part of the system - improved boats, a better market area - but neglected to develop the entire system have generally been unsuccessful. For example, investments have sometimes been made in boats and gear without solving the problem of transportation to a major market. More fish are harvested, but cannot be sold. The larger boat and new gear become merely added expenses to the fisher.

Organizing people involved in fishing

The importance of cooperatives or associations. Expanding small-scale fisheries and attempting to introduce improvements has not always been successful. In the past, the practice has often been to introduce technical improvements, such as nylon nets or outboard motors, without looking at the over-all context of the traditional fishery. In many instances, this has resulted in the innovation not "taking". Lawson(1977) describes an African effort to replace fish dealers who government planners thought were exploiting the traditional fishers. The fishers immediately went out on strike in support of the dealers, whose role in developing markets and providing capital to purchase boats and equipment was critical to their survival. Liston and Smith (1974) describe an effort to intro-

duce outboard motors in Latin America. After the motors were introduced, it was discovered that the fishers would remove the motors and store them on the boat on one person after they had left the shore. It seems that the motors had been introduced without considering the design of the fishing boats. When the boats were loaded with fish, they became unstable and capsized. Without the outboard motors, the boats were perfectly stable. Not wishing to offend the people who were trying to help them, the locals pretended to use the motors.

In some cases, however, the introduction of technical improvements to a small-scale fishery has had more disastrous results. Bardach (1977) describes the tragic introduction of nylon nets into a fishery along the northeastern coast of Brazil. Prior to the introduction of the nylon net, there was a reasonable balance between the people, the environment, and the fishery. Property claims and social patterns formed a kind of "limited entry" which had controlled the amount of fish harvested.

The innovators intended that the traditional fishing captains should buy the nets. Yet nearly all of these fishermen rejected the innovation, not out of conservatism, but because they could not meet the long repayment schedules set by the government. Consequently, the nylon nets fell into the hands of wealthy middlemen (factory bosses, plantation owners, and local merchants) who could afford to speculate in fishing. Small-scale fishermen cannot do so; they have to minimize their risks. In consequence, a highly competitive nylon net fishing enclave grew up in the midst of the traditional community.

There arose a tremendous amount of cut-throat competition between the rich-few and the many-poor; equipment was destroyed and some fishermen were killed. The intensification of fishing also severely depleted the native fish stock, and economic warfare crippled the industry in general. Pressured by the effects of over-fishing, traditional captains were increasingly lured into high-risk strategies with their equipment against the better financed nylon net specialists. The overall result was that the traditional fishermen lost and were forced to shift their base of operations to the mangrove swamp itself which they had previously recognized as the reservoir whence their resources

flowed. This translocation led to serious environmental damage in the mangrove swamps and to flooding and destruction of property.

Micronesia's traditional fisheries have had difficulty surviving as a result of its tragic history. The decline in traditional fisheries has meant that some of the traditional knowledge is being lost. To a large extent, traditional fisheries in Micronesia operate only in the outer islands, where the population is declining. Within the district centers, the lagoons are already endangered by the dissolution of traditional ownership of certain reef areas and the practices of dynamite and poison fishing described earlier.

Clearly, if reef fishing is to be expanded to the point where it can support domestic needs for fish and perhaps provide some exports products, many problems must be solved. Two are primary. First, technological innovations must be introduced carefully and targeted specifically to the local fishery. Second, destructive practices, such as the use of dynamite and poison, must be halted. Making these practices illegal has not solved the problem.

There seems to be almost universal agreement among those working in the problems of small-scale fisheries, that the best approach is to work with fishing associations or cooperatives. Micronesians have been oriented toward fishing cooperatives, but have received little support and help from the government in their efforts (Nevin, 1977, p. 196). Despite this lack of support there are 73 active cooperatives for various purposes in Micronesia. Wherever they have been introduced the cooperative form of organization seems to work well in Micronesia. One of the most successful cooperatives is the agriculture and fishing cooperative at the Ponape Agriculture and Trade School. The success of this effort sug-

gests that similar student organizations might be possible at other schools.

The cooperative or association makes it easier for government agencies and others to communicate with the people who fish. Organizing the fishery into these groups (many of which form naturally) and then working closely with the association before, during, and after the introduction of a technical innovation is critical. The use of fishing associations has been particularly important in development efforts in Malaysia (Sabri, 1977).

In addition to improving communication, fishing cooperatives can be very useful in conservation and management of the resource, and in ending destructive fishing practices. Research on fishery cooperatives in various parts of the world indicates that when the cooperative (or association or clan) owns a particular fishing area, they tend to behave in ways which conserve the resource. Johannes (1975) believes that cooperatives in Micronesia could replace the role that was traditionally played by family or clan ownership of particular reef and near-shore areas.

Research on the effect of these kinds of divisions of fishing areas indicates that such behavior has the result of conserving the fish even if this is not the motivation. It is becoming more common for countries to recognize the value of the association and to grant fishing rights to cooperatives and associations. For example, both Japan and Korea already divide up coastal fishing areas and assign rights in those areas to particular cooperatives or individuals.

Since the notion of rights to particular fishing areas is part

of traditional Micronesian cultures, it seems reasonable to believe that such a division might be accepted. The formation of the cooperatives and the assignment of the areas would, of course, be a very difficult political task in Micronesia because the land claims have only recently been settled.

Organizing the cooperatives. Although cooperative arrangements tend to form naturally in Micronesia, encouragement is necessary if the fishery is to be expanded in a systematic way. There are two things which might be done. First, the district legislatures in Micronesia could address the question of how best to organize cooperatives and assign fishing rights. The district level is suggested because the organization of cooperatives should reflect local culture and geography. These would be best understood at the local level. If district legislatures were unable to resolve the question, then the national government could provide assistance as appropriate.

Cooperatives might be formed around traditional kinship groups if this is acceptable. It is likely that the use of kinship as a tie would be more common in rural areas than in the district centers where people have other things in common as well as kinship. Pollnac (1977), in a study of Panamanian fishing cooperatives found that kinship as a basis of cooperative membership was more common in rural areas than in urban. Nevertheless, kinship is often important in the fishing industry. In many parts of the world, kinship groups generally have more stable crew relationships, and encounter less difficulty in sharing their capital equipment (Pollnac, 1977).

Second, efforts could begin to make fishing a more attractive occupation and to introduce young people to cooperative fishing arrangements. There is a supply of unemployed persons in the district centers, and most of these persons have a high school education. The main problem, however, is to interest them in fishing as a career. There is a strong belief in Micronesia that educated persons do not work with their hands. When an American vocational education specialist offered a class in lagoon fishing, only 5 students showed up out of a possible 700. Conversations with some of the agricultural students at the school in Ponape indicate that most do not intend to become farmers or fishers. They expect to teach or work for the government. This attitude may be one of the most difficult obstacles in the path of developing a fishing industry. It is difficult to say whether the general acceptance of cooperatives, and the absence of other employment opportunities will overcome this attitude.

It is possible, however, that organizing cooperatives in the high schools will at least help to combat the view that fishing is beneath an educated person. Students could learn about the management of cooperatives, about the fishing industry, and would also earn money. By making participation in such work a part of education, the school system would provide recognition of fishing as a useful and important career. More effort should also be made to encourage students interested in the marine sciences.

Financing the fishery

Financing the development of lagoon fisheries is also a problem. It is likely that small-scale fisheries would not attract outside private investment capital for the reasons discussed earlier. There is evidence,

however, that people engaged in fishing have a high propensity to reinvest their profits in boats and gear, so that earnings from fishing would tend to be reinvested in the industry. Pollnac (1977) found this pattern in Panama, and Roemer (1970) found a similar pattern in Peru. In the beginning, however, financing would probably have to come from the government's development funds. It is also possible that small-scale fisheries might benefit from rent of the skipjack resource to the international foreign fishing fleet.

Whatever the source, it is important that there be sufficient financing to carry the fishery through difficult times. If there is a gap which keeps the fish from reaching the market in good condition, fishers receive no income for their effort and expense. Little is known about the near-shore resources, and it is likely to take some time before a stable fishing enterprise can be established. It may be necessary to assume, for example, that the fishery would not be self-supporting for a year or more. For this reason, the district and national governments should probably consider a phased program which begins with a few cooperatives in one or two districts and expands gradually, as the total system is developed.

Insurance should be considered as part of the over-all financing package. Boats and equipment can easily be lost to the difficult coral reefs, or destroyed by a typhoon. Without insurance, such a loss could end a cooperative.

Encouraging and supporting related industries

One of the reasons why fishing has been emphasized by several developing countries is that other enterprises tend to grow up around the

industry. More than most industries, fishing stimulates other local activities. In his study of the Peruvian anchovetta fishery, Roemer (1970) was able to identify several industries which grew up to support fisheries. While there are considerable differences between the Peruvian fish meal industry and small-scale fishing in Micronesia, Roemer's work suggests areas where there may be a potential for local business to develop. Some of the areas are related to the harvesting of fish (boats, engines, gear, fuel) and some to the marketing of fish products (refrigeration, processing, transportation).

Boats. Peru experienced a boom in boat-building following the growth of the fish meal industry. Most of the new boats were locally constructed by semi-skilled workers using locally available material. Within a year or two, there was consolidation in the boat building industry and fewer firms operated using more sophisticated equipment. In large part, however, this remained a local enterprise in towns and cities associated with the fishery. This was true of boat construction and boat repair.

It seems reasonable to expect that much of the boat building activity to support a small-scale fishery could be done locally in Micronesia. This would be particularly true if the boats were constructed of wood. Ponape and Palau have forestry resources. There is a boatyard which has just been started in Yap district. There are also small fiberglass boat-building operations in Majuro (Marshalls) and Truk. While fiberglass would be an imported item, the labor could be done locally. The fishing industry could be important in providing support to these new enterprises.

Engines. The kinds of engines which are employed in small boats are similar in design to automobile engines and should be able to be serviced locally. The engines themselves, however, would be imported. Some experts recommend that people be encouraged to use the same kind of engine so that parts can be more easily stocked. If this is done, it may also be possible to make special arrangements with the manufacturer on the servicing and financing of the engines.

Gear and nets. Without more information on the nature of the fishery resource, it is impossible to speculate on the possibility of local enterprises making or repairing gear for the fishermen. In Peru, nylon was imported and made into nets by Peruvian manufacturing firms which developed in support of the fishery.

Fuel. Fuel for boats, processing equipment, and other needs would be a major imported item.

Refrigeration. Tropical fish spoil very quickly without refrigeration of some sort. If they are iced or chilled, however, they are more durable than fish from colder waters. There are several possible strategies to protect the fish from spoilage. Sometimes, small-scale boats carry their own ice. Unless there is refrigeration equipment on board, however, this may not be feasible.

Another method, developed in the Philippines, uses a separate boat which collects the fish from the smaller boats at sea, refrigerates them, and brings them back to shore (Bardach, 1977). Ice-making and repair of refrigeration machinery provides another potential service associated with the fishery. The machinery itself, however, and the power

to run it would be imported items.

Processing the fish. The type of facility most suited to Micronesia depends entirely on the species of fish to be marketed, the volume of the harvest, and the market for the fish. In any event, however, it is likely that a fish processing facility would provide jobs. It is also likely that the processing would require services connected with refrigeration, packing, packing materials, transportation, and storage. Depending on the sophistication of the processing required, the cooperatives themselves or the government might be able to provide much of the processing.

Transportation. Unless the cooperative is operating in the district center and the fish are to be sold there, transportation is a critical element in the development of the fishery. Micronesia presently relies on Air Micronesia for most air freight services, and on private shipping firms for other freight transportation. Shipping service is presently too irregular to serve an export market, and Air Micronesia's combined freight and passenger service probably could not transport fish in bulk. Transportation services must, therefore, be developed in conjunction with the potential market. Similarly, transportation services between the district centers and the rural islands would need to be developed before fishing could represent a viable part of the rural development needs.

Allocating land, power, water and other resources

Land is at a premium in Micronesia, especially in the district centers. Potable water is in short supply in some districts. Power is expensive and relies on imported fuel. While land is not yet a limiting factor, except perhaps on Truk, growth of the urban centers

will put stress on lands available to the fishing industry. Where water is a problem, fishing and tourism may be in competition for available supplies. This could also be true of processing. In Peru, the fish processing facilities were sometimes shut down due to power shortages. When this effected the refrigeration equipment, it was a serious problem. To the extent that fish processing and related enterprises locate in the district centers, and stimulate growth in the centers, fisheries will face increasing competition from other potential users of shore lands, water supplies, and available power.

This brief review of the elements necessary to support and expand small-scale fisheries underscores the need for systematic, consistent government support if the industry is to develop. The discussion also indicates the various ways in which small-scale fisheries could stimulate other economic activities. The small-scale fisheries will, however, make little use of the 200-mile Exclusive Economic Zone - at least in the near term. The following chapter examines this more distant resource, and the relationships to the small-scale fisheries.

CHAPTER VI

LEASING THE SKIPJACK TUNA RESOURCE

As the previous chapter indicates, there are a variety of tasks which will be involved in developing small-scale fisheries in Micronesia. Some of these tasks can be done by the Micronesians themselves, others require expertise that is not available in Micronesia. There are four tasks, in particular, which seem to require outside assistance. These are: (1) conducting marine research in the coral reefs and near-shore areas to identify potentially marketable fish and estimate the size of the yield from that species, (2) developing export markets for these fish, (3) selecting and developing appropriate processing technology for the resource and the market, and (4) assessing the feasibility of various harvesting methods, including traditional fishing techniques. Micronesia has three potential sources for this help: the United States, international organizations, and nations using the skipjack tuna resource. The kind of assistance which the United States can provide is one of the items under discussion at the political status negotiations. This chapter focuses on the other two sources of assistance: international organizations engaged in work with fisheries, and agreements that might be worked out with nations using the skipjack resource.

International organizations

Although there are several international organizations which are

concerned with the oceans, the organization most concerned with fisheries is the Food and Agriculture Organization of the United Nations, particularly through its Committee on Fisheries and its regional committees (Kingham and McRae, 1979). The FAO collects statistics, provides technical assistance, and encourages the sharing of information about fisheries. Over the past several years, the FAO formed regional commissions throughout the world to gather statistics and promote cooperation in development and management of fisheries (Miles, 1977). The changes in the Law of the Sea represented by the acceptance of the Exclusive Economic Zone, and the growing problems of over-fishing means that these regional organizations will have to reassess their role. Micronesia is part of the Indo-Pacific Fisheries Council (IPFC). The area covered by this agency is not entirely clear, but includes at least the South China Sea, the Andaman Malacca area, and Micronesia. This council will probably be the focus for international management efforts of the skipjack tuna fishery, if the resource becomes over-fished.

While the role of the Indo-Pacific Fisheries Council, and similar organizations remains to be resolved, one can speculate about the kind of activities that would be most useful to Micronesia.

1. Continuing to gather statistics on the fisheries and fish stocks.

There are not good statistics on Micronesia's reef fish and near-shore fisheries, and the IPFC and the FAO should be helpful to Micronesia in setting up a data system to collect this information. These agencies would also be an important source of information on the skipjack tuna.

2. Providing technical assistance. It will be very important to Micronesia to have a "neutral" organization to advise it about the kind of arrangements that might be made with the foreign fishing fleets, or

marketing arrangements related to the exploitation of the reef and near-shore fisheries.

3. Developing fishery management plans for the skipjack tuna. It is unlikely that there are other species of fish in Micronesia that cross international boundaries.

4. Developing markets for underutilized species. The FAO and the IPFC may be helpful in identifying potential markets for Micronesian fish. This would provide an alternative to sole reliance on the United States or Japan. Regional commissions have generally not been involved in the development of markets previously, but this activity could be performed.

The major problem for Micronesia in working with the international organizations, is that these agencies have limited staff resources, and Micronesia is a small place. It is difficult to say whether the Micronesians would be able to receive the kind of intensive help they need from FAO, or whether Micronesia will need to rely on help from the United States. In any event, the international agencies provide at least a backstop and a source of "neutral" opinion on some issues.

There are other sources of assistance which might be available to Micronesia. These include the South Pacific Commission, the East-West Center at the University of Hawaii, the United Nations Development Program, and other agencies. In the past, the United States has discouraged international organizations from working with Micronesians. It is only within the past five years that Micronesians have started to participate as observers in international organizations. For this reason, Micronesian leaders are still in the process of developing working relationships with international agencies and representatives of nations with similar problems.

Agreements with foreign fishing nations

Although the Law of the Sea has not been completed, there have been over a hundred bilateral agreements made between fishing nations and coastal nations based on the language of the Informal Composite Negotiating Text. The provisions on fisheries have essentially been agreed to, and are being implemented in fact. Carroz and Savini (1979) analyzed these agreements, and their work suggests the kind of terms which Micronesia might try to make with the foreign fishing fleets using the skipjack tuna resource. It would be advantageous if Micronesia could maintain some political and economic unity so that the islands cooperated rather than competed with one another in the negotiations. The political unity of Micronesia would, of course, also effect the boundaries of the EEZ.

Despite Micronesia's efforts to expand the tuna fishery, it is clear that Micronesian vessels cannot harvest the tuna by themselves. It, therefore, seems appropriate to lease the resource to other nations and get the revenue from the skipjack that migrate through Micronesian waters. In discussing the terms that Micronesia might offer, it is important to remember that more than half of the skipjack is harvested outside the EEZ claim of any nation. Therefore, it would be possible for fishing nations to avoid Micronesian waters if the requirements were too onerous.

The bilateral agreements worked out thus far contain a variety of requirements which are imposed on the vessel owner and the flag state. In most cases, the agreements provide a framework for cooperation between the coastal state and the flag state regarding the fishery, and establish the terms and conditions under which the resource can be harvested. More

specific laws and requirements within this framework can be negotiated annually,

Carroz and Savini (1979) describe four areas of agreement: (1) the general terms and conditions of access to the resource, (2) specific requirements which are the responsibility of the vessel owner, (3) specific requirements or agreements worked out with the flag state, and (4) enforcement provisions.

General terms and conditions of access. These general terms specify how many vessels from the flag state will be permitted to fish the area. In some cases, the vessels are named in the agreement. More often, the agreement specifies the number and size of the vessels which will be permitted in the EEZ. The terms and conditions usually also describe policy considerations underlying the agreement. For example, it is common to state that there is a need to protect small-scale fisheries operating near the shore.

Specific requirements of the vessel owner. The agreements usually contain conservation measures, such as the limitations on the catch, areas where fishing is prohibited, and other requirements. The agreements also provide for the fee to be paid to the coastal state. This fee may be based on the size of the vessel, on the catch, or on the number of boats. It is also common for developing countries to require that a certain portion of the catch be landed at the processing plants of the coastal state, and to require that the vessel owner agree to train and/or hire a certain number of local fishermen.

Specific requirements of the flag state. There is a variety of

requirements in the agreements negotiated thus far. Sometimes, the flag state agrees to provide grants-in-aid or low-interest loans to the coastal state. Other requirements involve the conduct of marine research and the training of marine scientists from the coastal state. The European Economic Community has agreed to help coastal states market their fish products in EEC countries.

Enforcement. Enforcement is a problem for less developed countries which lack a navy. While there are provisions relating to enforcement in all of the agreements, it is generally believed that the enforcement of the agreement essentially depends on the good faith of the vessel owner and flag state.

These existing bilateral agreements suggest that Micronesia should be able to negotiate with Japan and other fishing nations and receive assistance in the development of its fisheries. As indicated earlier, Japan and the United States seem to be the most likely markets for Micronesian fish. Japan is the most active in fishing the skipjack tuna, but the interest of the EEC countries represents a useful alternative if Japan or the United States is not responsive to Micronesian needs.

Given the kind of agreements worked out by other countries, it would seem entirely reasonable for Micronesia to ask Japan to provide assistance in examining the reef and near shore fishery resources and to help identify species that could be exported to Japan. Further, Japan could assist in marketing arrangements and transportation systems associated with these species. Such agreements could be imposed in addition to payment of fees for the harvest of skipjack. Similar arrangements might be worked out with another flag state.

What is suggested here is that one fishery resource (the skipjack tuna) pay for the development of another fishery resource (small-scale fisheries). Given Micronesia's unemployment problems and the potential importance of small-scale fisheries in over-all development planning, it seems appropriate to emphasize this aspect of the fishing industry rather than further emphasis on developing Micronesian skipjack fisheries at this time. Such an emphasis would not, however, preclude later expansion of the Micronesian skipjack fishery when the small-scale fisheries are established.

CHAPTER VII

FISHING AND DEVELOPMENT IN MICRONESIA - SOME CONCLUSIONS

The previous chapters have described some of the development problems of Micronesia, and some of the aspects of developing a fishing industry. The purpose of this chapter is to summarize the material, to assess the potential impact of a fishing industry on Micronesia's development problems, and to suggest what these conclusions might mean to other small island countries. Several themes have underlain the discussion thus far.

1. Micronesia is extremely vulnerable to external influences. Throughout its history, it has been the satellite of one major power or another. Each of these powers have reshaped its economic structure to its own needs. Micronesia's current opportunity to plot a more independent future is the result of another external force - the movement toward decolonization. Looking to the future, Micronesia will continue to be strongly influenced by its relationships with the economies which dominate the region, although the form of the dependency will change.

2. Micronesia faces many of the kinds of development problems typical of other developing countries in Oceania and other parts of the Third World. It is important that, in deciding what industries to try to develop, Micronesians keep the context of the over-all situation in mind. Different kinds of industries and development strategies would have different kinds of impacts on these problems.

3. Micronesia has limited resources. Only marine resources, agriculture and tourism offer viable prospects for development. While all should be developed, there is a question of what the best mix would be. Presently, tourism is receiving the most attention in development plans. Fishing has many advantages as an industry for development, and would seem to be appropriate to Micronesia's situation.

4. At present, most of Micronesia's efforts in fisheries have been directed toward developing a tuna fishery. More attention should be given to the development of small-scale fisheries. Small-scale fisheries could be used to provide fresh fish for local consumption, a form of import substitution, and possibly to produce export products. The development of such fisheries would not preclude the continuation of the existing tuna fishery, or preclude the development of tourism and agriculture. Expanding efforts to develop small-scale fisheries might, however, mean that further expansion of the skipjack tuna fleet would be delayed. There are several reasons why small-scale fisheries offer an interesting alternative.

The international tuna fishing industry is highly competitive and involves primarily large, capital-intensive boats from the world's principal fishing nations. This large industry relies on some economies of scale which it is unlikely that Micronesia's industry would be able to utilize. Further, the kinds of equipment necessary to this fishery require sophisticated repair facilities which Micronesia could probably not develop. The manufacture of parts and equipment would have to be

done outside Micronesia and imported. Finally, Micronesians seem less interested in distant-water fishing. The existing purse seining boats have had to be manned by imported labor at a time when Micronesia needs to find jobs.

The experience of other developing countries with the use of large-scale capital intensive industry as a way of generating growth, indicates that such industries tend to promote dualisms within a society, and generate few jobs for the bulk of the population. A larger number of smaller boats is a more labor-intensive industry and would tend to create more jobs for Micronesians than would the tuna fishery. Jobs would be generated not only in fishing, but also in fishing related supply, marketing, and processing enterprises. The larger-scale tuna fishery would be more oriented outside Micronesia and more import dependent than would the smaller-scale fishery.

Within the physical, economic and social context of Micronesia, it would seem to make sense to have several smaller-scale industries rather than fewer larger-scale industries. Since it is likely that Micronesia could never support a manufacturing sector, it is better not to depend on an industry which would rely on imported manufactured goods. It would be better to have smaller boats with less sophisticated equipment that could be repaired and serviced locally.

Earlier, it was suggested that the fishing industry offered Micronesia the most appropriate resource for a development strategy. Preliminary analysis suggested that fisheries would be more responsive to the development needs of Micronesia than would tourism or agriculture. Further, it has been suggested that small-scale fisheries are more responsive than further investment in tuna fishing at this time.

It is now appropriate, having sketched out some of these elements of a Micronesian fishery, to return to the question of the development problems of Micronesia, and speculate as to the impact of small-scale fisheries. The description of Micronesia's problems in the second chapter listed four separate categories of problems: (1) economic dependency on grants from the United States, (2) inability to maintain the expensive infrastructure now being constructed in Micronesia, (3) problems of unemployment, and the need for education and training in the fields where there are jobs, (4) problems associated with rapid growth and urbanization. Obviously, fishing does not offer the solution to any of these problems, let alone to all of Micronesia's development needs, but the argument has been made that small-scale fisheries would be more responsive to these problems than the other development options.

Economic Dependence

Fishing does permit the exploitation of one of Micronesia's few resources, and one of the few which exists in all of the regions of Micronesia. The expansion of small-scale fisheries would produce some products for export, although the exact yield is not known because the stocks have not been assessed. Perhaps more importantly, however, small scale fisheries could immediately provide local fresh fish and reduce imports for food for human consumption.

Unlike the requirements for the skipjack tuna fishery, small-scale fishermen could utilize locally made boats, fishing gear, and repair facilities. If rent is exacted from the foreign fishing fleet, for the skipjack fishery, Micronesia would still have the benefit of that resource. In the absence of good information on the fish stocks in the lagoons, it is impossible to estimate the impact of the fishing

industry on the problem of economic dependency. It is certainly not likely that fisheries could come close to the 114 million dollars or more in grants which Micronesia now receives from the United States. It is, therefore, likely that either the Micronesians will have to dramatically lower their standard of living, or they will continue to be dependent on grants from the United States.

Physical Infrastructure

The success of any fishery for export depends on the transportation network which can bring the fish to market before it spoils. Fishing also relies on sufficient power to run processing facilities and provide refrigeration. The fishing boats require some kind of port facility or landing area. It seems likely that the infrastructure now being constructed will be adequate to serve a small-scale fishery, and, perhaps, with a little expansion, can also serve a larger fishery for export.

To the extent that the fishing industry requires persons who are able to repair equipment used in fishing, and, to the extent that this skill can also be used in repairing the transportation and other facilities, fisheries might be seen as supportive of creating the ability to maintain the infrastructure. As users of the facilities, fishermen may also contribute to repair of transportation and power systems. In general, however, it does not seem that fishing would make any direct contributions to the construction and maintenance of the infrastructure.

Education and Training

Of the development alternatives, fishing offers the most employment opportunities for Micronesians in a variety of job levels and using

a variety of skills. In addition to jobs in fishing, there are also many jobs associated with processing of fish, with repair and maintenance of gear, boats, and engines; and with marketing and transportation. Since small-scale fisheries are particularly adaptive to the cooperative structure, it is likely that most of these jobs would go to Micronesians. Fishery management and conservation needs might also create interest in and demand for persons trained in these fields. The fishing industry, and particularly small-scale fisheries, are, therefore, very responsive to Micronesia's need for employment.

Urbanization and Growth

Under the heading of urbanization and growth, four problems were addressed in chapter two. These are: (a) the prospect that uncontrolled growth might exceed the carrying-capacity of the district centers, (b) the tendency of growth to result in imbalances between districts and between urban and rural areas, (c) the tendency for growth to result in dualism within a society so that a few people benefit from development, but most are unaffected by growth in economic activity, and (d) problems of social disorganization, particularly those associated with alcoholism and violence among youth. What impact might fisheries have on these problems?

Urban growth and the problem of carrying-capacity. The development of small-scale fisheries would probably begin in the islands now occupied by the district centers, because of the necessary connection between fisheries and transportation to market. There would appear to be two effects on urban growth caused by the development of such an industry. First, to the extent that fishing did generate jobs in the centers, it

would encourage more migration from the rural islands to the district centers, thus, increasing urbanization. Further, the development of processing facilities and related industries would put pressure on the carrying-capacity of the islands.

At the same time, however, the granting of fishing rights to certain areas of the lagoons to particular cooperatives would tend to retard development in certain areas. For example, fishermen who depended on the reef for their living might resist development of mangrove swamps which they knew to be nursery areas for the fish. Further, some fisheries require extensive shorefront, and fishermen who depended on this land would resist development of the area. To the extent that such dynamics operated, it would seem that the effect of expanding small-scale fisheries might be to concentrate urban growth in a particular part of the island, leaving other parts of the island relatively undeveloped. This, in fact, has been one of the reported effects of coastal conservation programs in the United States. Urban growth has tended to become more concentrated as conservation efforts restrict growth in other areas.

Concentrating growth rather than letting it spread out a lower density on the islands might, in fact, increase the carrying-capacity of the island. Some areas would be free for water catchment and vegetation, for example. Power and water systems are more easily constructed if populations are more concentrated than when they are dispersed.

Inequalities between districts. Since small-scale fishing could be conducted in each of the districts, it is not likely that the fishing industry would have an impact on the issue of regional inequalities. It is possible, however, that the existence of a fishing industry and associ-

ated jobs would encourage people to remain in an otherwise backward area. For example, if a fishing industry developed in Kosrae, it might reduce the incentive for people to migrate from Kosrae to Palau or the Marshalls. If fishery resources turn out to be unevenly distributed between districts, this could also affect migration of persons and regional inequities.

Urban-rural disparities. While artisanal fisheries are often described as part of a total rural development strategy, in the context of Micronesia, where the "urban area" is not more than 20,000 people, fishing is "urban". Fishers must get their fish to market quickly. The rural islands presently do not have good transportation to either the district centers or potential export markets. Until the transportation problem is solved, fishing could not be made a part of a program to improve the quality of rural island life. In fact, by providing jobs in the centers, fishing could aggravate the problem of rural depopulation. If the problem of transportation is solved, then small-scale fisheries could also be developed in the outer islands.

Dualisms. As indicated earlier, small-scale fisheries in Micronesia would seem to be most appropriately organized around cooperatives. This form of organization, when combined with the tendency of fishing to generate related enterprises, has less tendency toward dualisms than most activities. This does not imply that small-scale fisheries, or cooperatives, would, of themselves, eliminate the dualisms in Micronesian society. It is difficult to say what the effect might be, and there could be a variance in the impacts on different districts. In one area, fishing cooperatives might have very positive impacts on the entire society in alleviating

inequities. In another district, cooperatives might be organized around traditional social castes, and the assignment of fishing areas could be inequitable - deepening the dualisms in the society. In general, however, the cooperative form of organization and the fishing industry both seem to tend toward egalitarian structures.

Social disorganization. To the extent that the problems of youth violence and alcoholism are related to unemployment, and to the extent that the development of small-scale fisheries provides employment, there can be positive effect on the problem of youth. Similarly, it may be possible that cooperative arrangements could replace the missing social structure which some experts believe is the cause of alienation. Care should be taken, however, to think about who would be included, and who would be excluded, in various cooperative arrangements. If the most troubled youth are excluded by age or other factors, from participating in the cooperative organization, the problems could actually be aggravated. In any event, the link between small-scale fisheries and problems of social disorganization will vary with the district and the manner in which the cooperatives are put together. The impact of fisheries on problems of social disorganization is, therefore, unknown.

In summary, the development of small-scale fisheries would seem to have positive effects on some problems (economic dependency, employment), to have unknown effects on others (social disorganization, physical infrastructure, dualisms), and ambivalent effects on others (regional inequities, carrying-capacity). The development of small-scale fisheries has no obvious negative effects on any of the Micronesian problems.

Some next steps

There are some immediate steps which could be taken to begin the process of development of small-scale fisheries. The first, and most important, would be to recognize the importance of this activity and the role that it can play in Micronesian development plans. There are other issues to address. The first two would be handled at the level of the district legislatures.

1. The cooperative is the foundation of establishing small-scale fisheries. The form of organization could easily vary from district to district in order to respond to the culture and situation of the people. The district legislatures should also begin to address the question of providing grants to fishing areas to cooperatives. This is essential if reef fish are to be conserved, and the destructive practices of poison and dynamite fishing stopped. Each legislature should develop a process by which the reef areas will be divided, and how they will be assigned.

2. While there need not be any major conflicts between fishing and other industries, such as tourism, some issues will need to be resolved in connection with siting of facilities, use of power and potable water, and recreational boating and fishing. This is essentially a land use problem, and concerns the question of carrying-capacity. District planners and administrators should address the question of land use in connection with the suggested assignment of fishing areas to cooperatives. The demands of the fisheries, and of projected development in the area should be compared.

3. Investment capital for development of the fisheries will come from public sources and from revenue from the skipjack tuna, since it is unlikely that small-scale fisheries will attract outside investment capital. Consideration should be given early to what kinds of agreements Micronesians would like to negotiate with the foreign skipjack tuna fleet. In 1981, when the Trusteeship agreement terminates, Micronesians will be conducting these important negotiations. It would be most helpful if Micronesians participate with American diplomats negotiating the fishing agreements over the next two years. Such participation would both provide training for the Micronesians, and help to assure that Micronesian interests were not overlooked in the broader context of Japanese-American concerns.

Implications for other small island countries

Although the islands of Micronesia are smaller, more scattered, and inhabited by a more heterogeneous population than other small island countries, much of the discussion seems applicable to most such nations. The impact and character of the colonial experience in Micronesia are similar to those of other Oceanic and Caribbean nations, and to larger Third World nations as well. The kinds of development problems that the Micronesians face are likewise similar to other small, island countries. Finally, the basic structure and the tasks associated with developing small-scale fisheries are generally valid for many countries.

The uniqueness of Micronesia seems to be primarily in the degree of its dependency, its heterogeneity, its distances. Transportation is more of an issue for Micronesia than for many countries. Communica-

tion across distance and culture is more difficult for Micronesians than for many small countries. The vulnerability to external influences is greater for Micronesia's tiny population than for most other countries. Despite the issue of degree, however, the issues themselves are common.

With respect to small countries, there are two issues not previously emphasized, which seem to emerge from this study of Micronesia's situation. First, it seems to be particularly difficult for small countries to maintain a united or cooperative relationship with one another, despite the seemingly obvious advantages of such cooperation. Even in dealing with a small-scale fishing industry, there would be advantages for Micronesians if the boat-building, and perhaps some processing facilities could be specialized, yet remain within the national economy. Political and economic fragmentation of the districts could make such arrangements very difficult. The problem of fragmentation is common in small countries (Lewis, 1976). There are many explanations, but perhaps the most useful is to recognize that the pull of the center on the satellite is stronger than the attraction between two satellites. This means that cooperative efforts must be developed in the face of strong, consistent forces of dissolution.

Second, more optimistically, small-scale fisheries seem to offer a viable means of development in small, scattered island groups. The lesson here is that in spite of the monumental problems that one confronts, it is important not to overlook the value of a small-scale response. While small-scale fisheries are not a solution, they do seem to offer a possible starting point.

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