"REPORT"

## 1. NATURAL ENVIRONMENT AND FISHERIES IN CARIBBEAN SEA

### (1) Oceanic Conditions -

The equatorial current which runs into the Caribbean Sea, passing by Antilles Small Islands, flows into the Gulf of Maxico, changing its direction to the west with the influence of the North-West Trade Wind.

In the coastal area, seasonal counter current is observed along with this current which runs off-shore.

The annual average temperature of the surface of the sea does not reach 30°C.

The salinity of the surface of the sea shows 36 o/oo off-shore and 35 o/oo in the coastal area.

Area whose depth of water ranges from 10 to 100 meters is extremely small, except Gulf of Almirante, Gulf of Chiriqui and that of San Blas Islands area.

The water area whose depth is more than 100 meters is the continental cliff and continues to the ocean depth.

In the most part of water shallower than 100 meters, coral reefs are distributed, and among these coral reefs, there exist bottoms of white sand, black sand and mud.

Moderate or strong breeze with the maximum wind force from 4 to 6 (Beau - Fort Scale) blows from December to April.

### (2) Feature of Fishery Resources -

In the shallow water, pink snapper, red snapper, grouper, jacks and other species of fish inhabit and those are captured by canoe-type fishing.

Moreover, predatory fish such as shark, spanish mackerel, etc., can be seen in this area.

As for the species of crustacea, lobsters which inhabit in the rocky area is well known and those are captured by diving.

On the other hand, as far as we know, hakes, Norway lobsters. and small shrimps inhabit in the water deeper than 100 meters.

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These species are promising in view of commercialization however, its quantity seems to be small.

Present Condition of Fisheries:

Fisheries depending on the above-mentioned resources is now in its primitive stage, as shown only by utilization of canoes and small-motor-equipped boat. These conditions largely due to the natural, environmental and less developed transportation system.

In the coastal area composed of coral reefs, shore reefs, and platform surrounded by islands, small scale fishing such as skin diving, hand line, casting net, long line, gill net, and beach seine fishing are conducted.

The vast majority of the captured fish, except lobsters which are sent by plane alive is locally consummed.

Most of the fishermen are farmers and very few people are specialized in fisheries.

2. COMMENTS ON THE IMPLEMENTATION OF THE EXPLORATORY FISHING IN CARIBBEAN SEA

(1) Backgrounds -

As is mentioned in part 1, there seems to be many obstacles for the quick development of modern fisheries in Caribbean Sea of the Republic of Panama.

It is a fact that, however, some characteristic fishery resources are recognized in the shallower waters on this coast, and are somewhat distinctive from those of Pacific Coast.

Also, some unexploited new fishing grounds are expected to be found in deeper waters.

Furthermore, in the water of 200 miles, some tuna resources have been recognized through temporal commercial fishing.

The size of these fishery resources does not seem to be big enough to the development of the large-scale modern industries.

But none of these resources has been fully exploited or investigated and remains as virgin stocks, therefore, a considerable size of fishery could be developed under careful management.

The possibility of the development of fisheries will be classified in the following three forms:

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(1) Coastal fisheries by use of small boats including canoes in shallow waters and reef areas.

(2) Trawl fishery and fisheries for pelagic and mid layer species by the use of off-shore-type vessels in the deeper waters.

(3) Long line and trolling fisheries for tunas in the 200 miles area.

However, it seems to be very important to point out followings in the course of the development of Fisheries. Namely, in the shallow waters, considering the problems of collection and transportation of fish, the development program of the fishery on this coast should be planned and enforced slowly and steadily. Fishing operations should be conducted in the scale of which corresponds to the size of resources.

Even if taking into considerations the above-mentioned matters, it is essential to execute the following resources survey for the real development of the fisheries of this country.

(2) Contents of Survey -

A. Survey in deeper waters

a. Objective: Localization of the fishing ground in the waters deeper than 100 meters and collection of data for promotion of middle and large scale fisheries, using the unexploited resources.

b. Practical Object: Investigating the unexploited fishery resources and clarifying the possibility of exploitation of these stocks (such as hake, Norway lobster, shrimps, etc.) by trawl, gill net, bottom long line and pot.

c. Method: Survey and simulated commercial fishing in deep-water with fish finder and fishing, using all the possible gears.

B. Survey of Pelagic Resources from 100 meters deep to 200 miles limit

a. Objective: Study on the distribution of pelagic resources and on the possibility of its exploitation in the off-shore area.

b. Practical Object: Clarifying the distribution of tunas, bonitos and others.

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c. Method: Fish finders for experimental and simulated commercial fishing using long line, trolling, lamps and all possible gears.

(3) Implementation of Survey -

For the implementation of the above-mentioned surveys and simulated commercial fishing, followings should be secured.

A. Survey boat and its equipment

a. Equipment:

Deeper water surveys -

Survey equipment capable of trawling as deep as 600 meters.

Fish finder capable of tracing from the depth of 0 to 450 meters.

Fish finder capable of tracing from the depth of 0 to 1,000 meters.

Survey for pelagic species -

Long line, trolling gear, etc.

Hydrografic survey -

Apparatus necessary for the fishing ground observation.

b. Size of Survey Boat:

Considering the safety of the fishing operation, it is necessary to use the off-shore type vessel.

B. Personnel

Three (3) experts and some crew members necessary for the survey.

C. Period of Cooperation

Two (2) years.

D. Bases for the survey boat

Port facilities in Colon and Almirante.

# 参　考　文　献


1) 国際協力事業団，＂ホンデュラス共和国水産資源陸上調査報告書＂，1980

2) M. Giudicelli, "Results of exploration and simulated commercial trawling and shark longlining operation in Panama". F.A.O., Rome 1978.

3) Ministerio de comercio e industria. "Estadistica pesquera, 1969 A 1978" 1978."

4) Ministerio de comercio e industria direccion general de recursos marinos. "Lista ictiofauna Panamea." (unpublished).

5) Fcervigón & W. Fisher" Infopesca-catalogo de especies marinas de interés económico actual o potencial para-America Latina-." Programa de las naciones unidas para el desarrollo organizacion de las naciones unidas para la agricultura y la alimentacion." 1979.

6) 水産庁調査研究部。＂調査船照洋丸報告書－東部太平洋・西部太西洋＂。1966～1971。

7) 在パナマ大使館＂パナマ便覧＂。1978

8) マルセル・ギウディセリ，＂R/Vカノプス号によるカリブ海沿岸エビの調査及び仮りに行なわれた商業漁業＂。1971.

9) Tohn P. Wise and William W. Fox, JR." The Japanese atlantic long line fishery, 1965 and the status of the yellowfin tuna and albacore stocks.", United States Fish and Wildlife Service Special Scientific Report ... Fisheries No. 582, 1969.

10) Fisheries Agency of Japan." The Fisheris Pockt Book", Isana Shobo, Tokyo, 1959.

11) 阿部友三郎＂海水の科学＂NHKブックス231　東京放送出版協会。