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Possibilities for a Common Fisheries Development and Management Policy for the Organization of Eastern Caribbean States (O.E.C.S.)

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POSSIBILITIES FOR A COMMON FISHERIES DEVELOPMENT AND MANAGEMENT POLICY FOR THE ORGANIZATION OF EASTERN CARIBBEAN STATES (O.E.C.S.)

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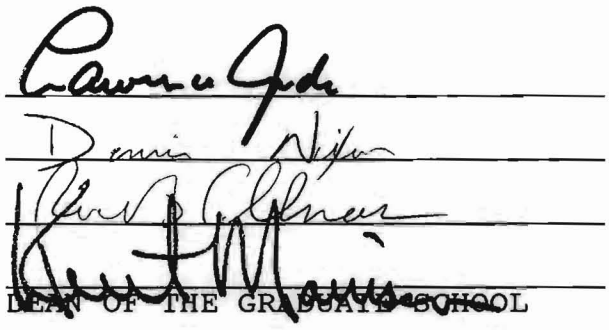

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ABSTRACT

The fisheries resources within the EEZs of countries in the Organization of Eastern Caribbean States is not being exploited at their maximum sustainable yield. Fisheries development has however been hampered by a history of these states, little or no sectoral development planning. If member states are to realize any increased socio-economic growth in the fisheries sector, it is imperative that a common fisheries management and development strategy be implemented by these states, in an effort to rationalize the use of scarce financial and technical resources. Such a strategy would involve the pursuance of common goals and objectives and the provision of the necessary technical and financial resources for the enhancement of the harvesting subsector and marketing and processing infrastructure. If the region is successful in implanting such a common strategy, Member States fishing industries can realize significant socio-economic growth and a greater contribution to the region's economy.

ACKNOWLEDGMENTS

The successful completion of this study would not have been possible without the invaluable guidance of my thesis research committee and the special encouragement of Professor Dennis Nixon and Professor Larry Juda. Their critical review of this study have contributed significantly to its successful completion. I am also grateful for the support of the staff at OECS fisheries unit who assisted in the initial typing of this thesis. Special thanks to administrative officer Mr. Alva Lynch for his support during the final stages of this exercise when I had to be out of the office regularly. I would also like to thank the fisheries and fisheries officials within the OECS for the valuable contribution and advice they have given to me during the research process. Most of all I feel great indebtedness to my wife, Debbie, for her constant encouragement and understanding without which I could not have completed this thesis. I would also like to thank my sons Jeiel and Samori for their silent inspiration. I am also very grateful to my Mom and Dad, Mr. and Mrs. Reginald Joseph for the sacrifices they have made toward my education and well being. Many thanks to Stafford and Caroleen for their hospitality.

TABLE OF CONTENTS

TABLE OF CONTENTS CONTINUED...

LIST OF FIGURES

LIST OF TABLES

CHAPTER I

INTRODUCTION TO THESIS RESEARCH

STATEMENT OF RESEARCH PROBLEM:

At the present time there is little coordination of fisheries development effort among the island states of the Organization of Eastern Caribbean States (O.E.C.S.). The present policies for fisheries development of member O.E.C.S. states remain somewhat ill-defined. Individual states are pursuing separate and in many case ad hoc programs that disregard the need for planning within the fishing industry. Discussions, however, are now taking place at the regional level for a coordinated approach to fisheries management and development. The rational exploitation of the fisheries resources of member countries might become possible in this region if Member States adopt a coordinated approach to the development and management of this sector.[1]

This study will seek to determine the most appropriate strategy for the development of the fisheries sector of the O.E.C.S. countries in light of the recent initiative of these states to harmonize their fisheries

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[1] Lestrard, S., "Organization of Eastern Caribbean States Involvement in Fisheries Development." Address delivered to the European Community/African, Caribbean and Pacific countries conference on Maritime Cooperation, Martinique, 1983, (unpublished).

legislation, the on-going discussion over the establishment of a technical-support unit within the organization secretariat, and the general provisions of the 1982 United Nations Law of the Sea Convention.

BACKGROUND:

The O.E.C.S. is comprised of a group of British Commonwealth Caribbean states in the Lesser Antilles region (Antigua-Barbuda, Dominica, Grenada, Montserrat, St. Christopher/Nevis, St. Lucia and St. Vincent and the Grenadines).[2]

Over a half-million people live in the countries of the O.E.C.S. region. This region has an annual protein production deficit of about 60 percent of the required amount (difference between requirements and domestic supply).[3] Optimal exploitation of the fisheries resources of member countries would significantly reduce this deficit and would have a positive impact on these countries' socio-economic development.[4]

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[2] O.E.C.S. Economic Affairs Secretariat, Report of Activities, 1984. Published by the Organization of Eastern Caribbean States Secretariat.

[3] Proceedings of the Third Technical Fisheries Seminar; CARICOM Secretariat, 1985.

[4] Gulf and Caribbean Fisheries Institute, 1982. Report of Proceedings.

The annual yield of the region's fisheries resources is about 35,000 mt. Most of it is caught by fishermen from the region, while distant water fishermen and fishermen from the neighboring French Antilles, Guadeloupe and Martinique illegally fish for a significant portion of the fisheries resources.[5]

There are ample reasons to believe that fish landings by local fishermen can be increased significantly above the present level with existing and/or improved technology. It is expected that increased productivity within the fishing industry will contribute significantly towards the overall socio-economic development of the region.[6]

The above assumptions rest upon the following information about the region:

1) The fisheries resources of the region are not fully exploited.

2) There is adequate manpower for expansion.

3) There is a need for alternative sources of foreign exchange.

4) There is a protein deficit in the region.

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[5] Joseph, Daven C., "A Guide to Fisheries Development in Antigua and Barbuda," 1984 (unpublished).

[6] FAO/OECS Workshop on the Harmonization and Coordination of Fisheries Regimes 1983-1984, Report of Proceedings.

5) There is need for economic diversification.

As discussed in the body of this study, the above cited considerations justify a new initiative for the development of the fisheries sector into a major industry in the region.

The ongoing fisheries development effort of the individual states has fallen short in generating real socio-economic growth. This sector is not carrying its share of responsibilities towards the economic and social development of the O.E.C.S. states. This sector has the potential of providing significant economic and social benefits to these people; such benefits can be achieved through careful and objective planning coupled with adequate developmental capital and firm political commitment.[7] What is required of the O.E.C.S. countries is an effective fisheries development plan that would allow for the optimal utilization of the fisheries resources. There is a need for simple yet adequate institution building which it is believed, could lead to the further development of the fisheries in meeting the needs and aspirations of the people of the region.

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[7] Proceedings of the Third Technical Fisheries Seminar of the Caribbean Community, CARICOM Secretariat, 1985.

Existing publications of the problems and constraints of fisheries development in the region identify a number of factors which have contributed to the lack of real growth within fisheries sector.[8]

1) Insufficient political commitment at the National level.

2) Inadequate investment capital available to the sector.

3) Need for greater competence in fisheries administration and management.

4) Need for adequate marketing and processing infrastructures.

5) The need to improve the efficiency of the harvesting sub-sector.

All of the above must be addressed if these states are to develop their fisheries sector successfully.

Individual states generally do not have the required inputs to pursue a successful unilateral process of fisheries development, hence it is believed that a multilateral approach could significantly improve the status of the fisheries sector. Further, regional cooperation could provide the necessary institutional framework that could alleviate or possibly eliminate the problems and constraints that affect their individual

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[8] Fisheries Development Project Reports, FAO/UNDP. Western Central Atlantic Commission, No. 236, 1988.

efforts of fisheries administration and management.[9]

Depending upon the level of cooperation achieved, both physical and manpower resources could be pooled for more rational management and use by Member States. However, although such cooperation might be advantageous, it can only become a reality with the necessary political and financial commitment of all states.

All the states of the O.E.C.S. region are signatories to the 1982 United Nations law of the Sea Convention; they are therefore, aware of their obligations under the emerging International Law of the Sea regime. These states have already extended their maritime jurisdictions as far as the rules of maritime boundaries delimitation would permit, creating EEZs. The implications of expanded maritime jurisdiction involve obligations toward the management, development and optimal utilization of the fisheries resources found within the newly extended area. Hence, these countries are expected to develop their capability for the management and utilization of these resources.[10]

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[9] "Fisheries Management and Fisheries Rights," FAO reports (FAP), No. 236, 1980.

[10] The United Nations Law of the Sea Convention, 1982, Art. 61&62.

Present national fisheries development efforts in the region cannot fulfill the developmental obligations of the O.E.C.S. countries. Hence this study has presented the best alternative approaches that need be considered by the states of the O.E.C.S. to develop their fisheries in a more coordinated and effective fashion.

This study explores available alternatives for fisheries development planning in the O.E.C.S region, that would seek to maximize benefits based upon the needs and aspirations of the people of the region in the context of a rational assessment of underutilized stocks and institutional constraints.

HYPOTHESIS:

A coordinated regional fisheries policy as opposed to unilateral effort is the most appropriate strategy for fisheries development in the O.E.C.S. region.

METHODOLOGY:

In pursuance of this study a review was carried out on the nature, abundance and distribution of the fisheries resources that are available to Member States; and the management initiatives which are appropriate to ensure their optimum utilization.

A historical review of fisheries development and management in the region has also been done to assess the process of fisheries management and development and to determine the factors which have inhibited the socio-economic growth of Member States' fishing industries.

An assessment was then undertaken on the economic potential of the fishing industries of OECS states and the possible rate of economic growth that could be achieved under an optimum management and development strategy.

The study then identified the present goals and objectives for fisheries development in the region and the sectoral, national and regional inputs that are necessary to achieve these goals.

A mechanism based upon national and regional involvement in the harvesting, marketing of the resources is developed coupled with a management and administrative framework that could implement this new strategy.

CHAPTER II

OCEANOGRAPHIC FEATURES AND FISH ABUNDANCE IN THE ORGANIZATION OF EASTERN CARIBBEAN STATES

I. INTRODUCTION

The nature and distribution of the fisheries resources in the OECS region constitutes one of the major factors requiring a co-operative approach by OECS States for the management of these resources. The oceanographic and physical features of the Caribbean Sea are responsible for the distribution of these resources throughout the region. Most of the islands share common shelf areas (Grenada and St. Vincent and the Grenadines to the south, Antigua/Barbuda and St. Kitts/Nevis to the north); hence, the close proximity of these islands results in the regular migration of some stocks from one State's exclusive economic zone (EEZ) to the other.[1]

This Chapter will analyze the nature and distribution of the major fisheries resources that are found within the OECS region; and the extent to which these resources might be transboundary during their natural life cycles. Quantitative estimations of the demersal and inshore pelagic species that are available for harvesting within

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[1] Mahon R. (ed), 1987. Report on the Expert Consultation on Shared Fisheries Resources of the Lesser Antilles Region. p. 8.

the national EEZ will also be provided. This estimation of stock sizes should only be considered as a preliminary initiative, to provide a relatively sensible premise upon which planning for the harvesting subsector of the industry can be based.

II. GEOGRAPHIC FEATURES OF THE OECS REGION

The islands of the OECS are: Antigua, Barbuda, Dominica, Grenada, Montserrat, St. Kitts/Nevis, St. Lucia, St. Vincent, and The British Virgin Islands. These are located between 12.5°north latitude/62°west longitude and 18.5°north latitude/64°west longitude (See map). These islands are part of an island chain that separate the semi-enclosed Caribbean Sea from the Central Atlantic Ocean. Their geographic location significantly influences water circulation occurring in the Caribbean Sea and the adjacent Atlantic Ocean.[2] The rate of water passage into and out of the Caribbean Sea coupled with the nature of local currents, is responsible for intermixing between the different water bodies entering the area. The availability of nutrients as a result of this intermixing is very important in supporting the fisheries resources of the area.[3]

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[2] Metcalf, W. G., 1978, "Water Exchange Between the Atlantic Ocean and the Caribbean Sea," FAO Fishery Report (200): 63-77.

[3] Ibid., p. 75.

The area of the Caribbean Sea that is of particular importance to this Study is that area between the south eastern most part of the Venezuelan basin, including the Aves ridge and the Grenadian basin. The Aves ridge, lying between the Venezuelan and Grenadian basin extends across the OECS in a north-south configuration.[4] The ridge is a 5km - 150km level expanse of sea floor, rising to depths of 1,000m - 2,000m.[5] The Aves plateau is bounded on the east by the east Aves escarpment and the Montserrat trough and on the west by the west Aves escarpment. The deep water that characterizes the Caribbean Sea off the coast of the OECS States is a result of the Aves plateau.[6] These predominantly deep features are interrupted by steep-sided ridges rising to shallow depths of 0 - 500m.[7] Because of the marked temperature gradient between the different layers of water in the Caribbean and permanent thermocline that is present, there is little intermixing taking place between the deep nutrient rich water and the surface water. The lack of vertical circulation of this

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[4] Molenari, L., et. al., 1951, "Surface Currents in the Caribbean Sea as Deduced from Lagrangian Observations." Journal of Geophysical Research (86), pp. 6537-42.

[5] Sverdaup, H.; Johnson, M.; Fleming, R.; The Oceans, Their Physical Chemistry and General Biology. 1942, Prentice Hall, Inc., p 640.

[6] Ibid., p. 640.

[7] Ibid., p. 640.

deep nutrient rich water prevents the upwelling of nutrients which could enhance biological productivity that is low in the waters of the Caribbean basin, around the island chain comprising the Lesser Antilles.[8]

Between the Lesser Antilles arc and the Aves ridge is the Grenada basin, representing the eastern most province of the Caribbean Sea. Within the northern third of this basin, off the coast of Dominica and St. Lucia are a series of broad ridges and troughs of moderate relief (200 - 1,000 m).[9] This interacting system significantly influences the flow of water from the Atlantic Ocean into the Caribbean Sea; and consequently the current pattern in the Eastern Caribbean region. The interchange of Atlantic water and deep water in this basin is further interrupted by the steep-sided ridges and the island system of the Eastern Caribbean.[10] As a result, the deep water of the Caribbean Sea is all at approximately the same temperature of about 4°C with little or no change throughout the year (the water temperature of the

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[8] Boyd, J. D. and T. H. Kinder. Current Meter Data From the South Eastern Caribbean Sea. 1980 NORDA Tech. Note (76).

[9] Ibid., p. 75.

[10] Forbes-Otega, G. Herrera, 1976: "Caribbean Sea Circulation and Water Mass Transport Near the Lesser Antilles." Bol. Institute. Oceanography. Oriente 15(1): pp. 83-96.

Atlantic at a depth of 5,250 ft).[11]

In the OECS region, as in other tropical areas, the sun's radiation is accumulated as heat in the surface waters of the sea. The level of interaction to supply energy, and abundance of the living resources to be found in a particular area. In the Caribbean Sea there is a marked temperature and nutrient stratification of surface and deep water. Surface water is extremely warm with few nutrients (average about 28°C) while deep water is rich in nutrients but is very cold (average 4°C). Very little upwelling activity has been recorded in the Exclusive Economic Zones of the OECS States. However, there is evidence of upwelling off the northeastern coast of Venezuela in close enough proximity to some of these States; created by a nutrient rich environment that is conducive to biological productivity.[12] These upwelling conditions probably influence the seasonal abundance of pelagic resources off Grenada and St. Vincent and the Grenadines (which are the closest states to the upwelling area). The Amazon River also increases the nutrient availability in the EEZ of the Southern OECS States at

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[11] Ibid., p. 84.

[12] Ibid., p. 95.

times of heavy discharge.[13]

III. CURRENT CIRCULATION PATTERNS IN THE EASTERN CARIBBEAN

The migratory pelagic resource represents a significant part of the fisheries resources of the OECS region and can be found in seasonal abundance through out the EEZ's of Member States. The composition of these resources include billfishes, dolphin fish (Coryphaena hippurus), several species of tuna, and flying fish.

The abundance of migratory pelagic resources is a direct result of the current patterns which enter the Caribbean Sea from the Atlantic Ocean. Three major currents have been identified and have been studied extensively in the Caribbean Sea.[14]

These current systems are:

(a) Caribbean current

(b) Guiana current

(c) North Equatorial current.

These major currents are influenced by the circulation of the western central Atlantic to the east

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[13] Borstad, G. (1989), The Influence of the Meandering Guiana Current and Arizona River Discharge on Surface Salinity Near Barbados. J. Har. Ris. 40 (2).

[14] Brucks J.T. 1971, "The Current East of the Windward Islands." FAO Fish. Rep./FAO Infopesca (71.3): 31-5.

and northeast of the OECS islands.[15]

Two of the major currents of this ocean (the Guiana current and the North Equatorial Current) flow past St. Lucia into the Eastern Caribbean and continue westward. As the north east trade winds propel the Guiana current in the Eastern Caribbean, it produces an upwelling of the deep water along the Latin American coast, especially on the eastern coast of Venezuela. This area is different from the remainder of the Eastern Caribbean where significant thermal stratification prevents vertical intermixing and reduce productivity values.[16]

There are some areas of the Lesser Antilles however, with varying current features. Once the water reaches inside the Caribbean it is organized around the three major current types mentioned above. Counter currents and eddies are developed between them creating complex current systems which vary from relative calmness to turbulence.[17] Eddies develop as the current passes through the island channel,

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[15] Kidd, R. and Sanders, F., 1979. "Surface Currents in the Caribbean Sea and Deduced for Satellite Tracked Drifting Bouys." Proceedings of the Gulf and Caribbean Fish Institute (32): 106-133.

[16] Brucks, J. T., 1971: "The Currents East of the Windward Islands," FAO Fish Report, FFR/71.2/30-35.

[17] Brucks, J. T., 1971: "The Currents East of the Windward Islands," FAO Fish. Report; FFR/71.2/30-35

one on each edge of the channel. One of these current systems is normally located immediately west of the southern Lesser Antilles near St. Vincent and the Grenadines and St. Lucia.[18] There is also an eddy which regularly forms north of Tobago east of Grenada; this area is where most flying fish are caught in the Lesser Antilles. This current system is believed to be of significant importance to the pelagic fisheries resources off the coasts of the Lesser Antilles.[19] The dynamics of this system are due to strong, year-round current flows.[20] These regularly occurring eddies which are associated with the current flow create water mixing, bringing nutrient rich water from the deep into the upper surface level, increasing primary production and the concentration of forage organisms. Ingham and Mahnken (1965) suggested that there might be a relationship between tuna sightings and primary production within these eddies.

Eddies that are described above are significant to primary production. They present a spiral trap for nutrients which are brought to the surface. Although the

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[18] Molenari, R. L., et. al., "Surface Currents in the Caribbean Sea as Deduced From Satellite Tracked Drifting Buoys," Proceedings of the Gulf and Caribbean Technical Institute, Vol. 32: 106-13.

[19] Ibid., p. 108.

[20] Ibid., p. 109.

anticyclonic nature of eddies limits their ability to bring nutrients from significant water depths, (this particular eddy brings nutrients from a maximum depth of 75m),[21] the spiral nature of eddies serve to localize nutrients within their domain hence, creating some stability in nutrient availability.[22] This enriched water is then trapped in the eddies west of St. Vincent and the Grenadines and St. Lucia, after which, zooplankton, followed by larger organisms are attracted if the eddies are sustained for at least thirty days.[23]

The direction and magnitude of its rotation suggest that is it formed by sudden changes in wind direction, caused by a jet stream between the passage south of St. Vincent and the Grenadines and St. Lucia. This jet stream formation is the result of the small size of the St. Vincent passage relative to that of St. Lucia.[24] These factors suggest that, the eddy should be present most of

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[21] Emery, A. R. Eddy Formation from an Oceanic Island: Ecological Effects. Caribbean. Journal. Science 12 (304): pp. 121-126.

[22] Metcalfe, W. G., "Water Exchange Between the Atlantic Ocean and the Caribbean Sea," 1978. FAO FIS/Rep (200): pp. 63-77.

[23] Emery, A. R. Ibid., p. 124.

[24] Molenari, R. L. "Surface Currents in the Caribbean Sea as Deduced From Satellite Tracked Drifting Bouys," Proc. Gulf and Caribbean Fisheries Institute (32): pp. 106-113.

the time in the area. This suggestion would support the possibilities that nutrient rich water exists off the western coast of St. Lucia and St. Vincent and the Grenadines in sufficient quantity to support moderate concentrations of foraging organisms which in turn attract moderate quantities of tuna and other migratory pelagic species in significant numbers to support small-scale pelagic fisheries.[25] The nature of this jet stream formation further suggests that an oppositely rotating eddy would be generated further north, close to Antigua/Barbuda, St. Kitts/Nevis and Montserrat with similar conditions that would attract a similar quantity of pelagic resources.[26]

IV. Nature and Abundance of the OECS Fisheries Resources Potential

The migratory pelagic resource populations can be found in varying abundance in the Caribbean Sea and other equatorial waters in which there are warm currents.[27] Migratory pelagic stocks are found in significant numbers from January through April, in the general area of the Caribbean basin and the Atlantic northeast of Brazil

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[25] Emery, A. R., Ibid., p. 126.

[26] Ibid., p. 128.

[27] Hunte, W. and Oxenford; "A Preliminary Investigation of the Dolphin (Corypluena hippurus) in the Western Central Atlantic," Fishery Bulletin, 34(2): 20-21.

to the Gulf of Mexico. During the months of May to September, an eastern aggregation moves in a northwesterly direction and eventually joins with a western aggregation.[28] These two aggregations of pelagic stocks form a continuity extending from off the outer banks of Cape Hatteras, North Carolina in the USA, through the extent of the Caribbean Sea. Although a precise boundary cannot be readily defined, the major spawning grounds of pelagic populations encompass an area between latitude 16°N and 16°S.[29] This means that pelagic species spawn in the EEZ of the OECS Member States as far north as Antigua and down south to Grenada. This spawning area spans a number of EEZs and represents one aspect of the transboundary nature of the pelagic resources as it passes through the Caribbean in its migratory circuit and underscore the need for regional co-operation for their management, conservation and exploitation.

The larva and juvenile pelagics are influenced by thermal stratification and are dependent to a significant extent on the direction and strength of the ocean currents. Yellowfin tuna and other species generally spawn on the local spawning grounds throughout the year and have given

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[28] Hunte W., Mahon, R., "How Important Are Migratory Patterns of Pelagic Fishes in the Caribbean," FAO Fishery Report/(278) supplemental: 165-175.

[29] Ibid., p. 167.

rise to secondary populations after the peak pelagic season. In the Lesser Antilles region the abundance of larva varies in relative occurrence. Larva of some species might be abundant on the Caribbean side of the island while on the Atlantic side the larva of other species might dominate. The final destination of larva is a function of the prevailing currents at that time. The larva of tunas and other pelagics are prevalent between November to April in the general area around 60°W longitude and 11°N latitude.[30] It is assumed this is the source of recruitment for the adult stocks found in the Lesser Antilles area. However, much ore evidence linking current flows with the larval population and the adult population is necessary in order to validate this assumption.

The movement of the adult populations of migratory pelagics is also related to current flow as well as water temperature, salinity, and other factors. But it will appear that the direction and strength of current flow is the most influential factor.[31] In the Lesser Antilles area the equatorial surface current that comprises the current system of the Eastern Caribbean Sea, displays important

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[30] Ibid., p. 167.

[31] Ibid., p. 169.

changes in both direction and strength throughout the course of the year. During the months of January through February when the current flows off the islands, there is a change in intensity due to relatively strong tradewinds and the reversal of the equatorial counter current; this is when pelagic populations, mainly tunas and swordfish are most available in the southern islands of the Lesser Antilles. As the current changes direction in March and flows to the north and northwest, pelagic populations become more abundant further north between St. Lucia, Martinique and Dominica.[32] Observations have shown that fish migratory patterns and their proximity to the islands differ according to the species. Yellowfin tuna has the most extensive range when compared to other species in the Lesser Antilles. They, as well as skipjack tuna and the dolphin fish, exhibit schooling behavior. The proximity of the blackfin tuna population to the islands is dependent also on the current flow. Where the current flows due north they are located relatively far off-shore but as the current changes direction and flows due south, blackfin tuna can be caught nearer to shore.[33]

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[32] Mahon, et. al., 1982. "Seasonality in the Commercial Marine Fisheries Off Barbados," Proceedings of the Gulf and Caribbean Fisheries Institute, 34: 28-29.

[33] Maylan, B. W. and Rivas, L. R., "The Blackfin Tuna (Thunnus atlanticus) as an Under Utilized Fishery Resource in the Tropical Western Atlantic Ocean. FAO Fishery Report (71.2) p. 163-72.

The dolphin fish has been the most widely studied of the pelagic stocks harvested in the OECS region and it is believed to be of two separate northwest and southeast stocks.[34] The southeast stock migrates through the islands of the OECS from Grenada in the southeast (Grenada has a peak pelagic season February/March) to the Virgin Islands (peak pelagic season April/May) in the northeast. This stock then moves northeast into the Atlantic. The northwest central Atlantic stock is identified near Puerto Rico between December and February, moving northwesternly passing the Bahamas in April/May and continuing to Florida, Georgia and North Carolina between May/July before moving southeasternly to Bermuda and eventually into the Atlantic. This stock is believed to complete its circuit by passing through the Virgin Islands and the northern OECS territory, giving these territories their second but smaller peak in November.[35]

The dolphin fish (Coryphaena hippurus linnaenus) is one of the most important species to the pelagic fishery of the region. It comprises about 27% of the annual landings of St. Lucia, 20% of Grenada's and 17% of St. Vincent

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[34] Oxenford, H. and Hunte, W., 1986, "A Preliminary Investigation of the Dolphin Coryphaena hippurus in the Western Central Atlantic," Fishery Bulletin 30 (2), pp. 20-21.

[35] Ibid., p. 21.

and the Grenadines.[36] This species, and the other pelagic stocks that are found in harvestable quantities in the region, reaches maximum availability between February to May as the southeast stock of the western central Atlantic migrates in a northwest

direction along the Lesser Antilles arc.[37] Over 75 percent of the total annual landing of the dolphin fish is caught within this period. Very little is known about stock abundance of this species as it migrates along the Lesser Antilles region. This is because the resource is not being adequately managed when it is within the OECS region, hence little or no information on landings or catch effort is available. Therefore, any management and development strategy for the OECS fishing industry must include as a prerequisite an adequate mechanism for the collection and analysis of fish landing statistics that would provide for the long term assessment of the resource.[38]

V. Coral Reef Ecosystems of the Eastern Caribbean

The islands within the OECS region are mainly of

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[36] Darroux, F., 1988, OECS Fisheries Unit Statistical Digest. (unpublished)

[37] Oxenford, H. and Hunte, W., 1986, "A Preliminary Investigation of the Dolphin Coryphaena hippurus in the Western Central Atlantic," Fishery Bulletin 30 (2), pp. 20-21.

[38] Ibid., p. 24.

volcanic origin.[39] Most of these islands were once active volcanoes that became inactive after millions of years. Some of these once volcanic islands subsided completely and active reef growth commenced giving rise to coral reef islands (Antigua/Barbuda, Anguilla), reef flats, and lagoons.[40]

In other instances where the volcanoes have not subsided completely, fringing reefs developed in the shallow waters. The continued growth of fringing reefs, combined with the build-up of sediment run-off from inland areas, raised these reef areas above sea level causing an increase in land area through accretion over a considerable period of time.[41] Many islands in the region are of this type with part of the island consisting of coral reef formation and the other part being volcanic in nature (eg. St. Lucia, St. Vincent and the Grenadines and Dominica).[42] There are three types of reef features associated with the islands of the Eastern Caribbean,

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[39] Mitchell et. al., 1983, "Development of the Marine Resources of the Eastern Caribbean: Leeward Island Case Study, p.9 Dalhousie Ocean Studies, University of Dalhousie, Nova Scotia.

[40] Ibid., p. 3.

[41] Ibid., p. 3.

[42] Ibid., p. 5.

these are fringing reef, patch reef and barrier reef.[43]

The growth of coral reefs depends upon the right salinity, temperature and turbidity conditions. Due to the close association between the land mass and the fringing reefs, there are times when run-off from the land mass may deposit too much sediment for the coral reefs in certain areas for these reefs to survive. It is therefore expected that the living coral populations in a fringing reef area would be relatively small especially in areas where land base substance are disposed. The greatest concentration of live reefs are towards the seaward side of the island shelf.

Barrier reefs can be formed as a result of a change in sea level relative to the land mass as the substratum that is supporting the fringing reef begins to subside. Most of the islands of the OECS have a series of barrier reef systems growing separated from the islands either by lagoons (eg. Barbuda) or in very shallow water reaching depth of only 75ft. Those islands with relatively larger island shelves have extensive enough barrier reef areas to attract enough reef species to accommodate a viable multi-species reef fishery.[44] The spiny lobster,

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[43] Ibid., p. 4.

[44] Munro, J., 1988, Caribbean Coral Reef Fishery Resources. ICLARM Study Review, (7): 276p.

snappers and groupers represent three of the most important reef species group.

To obtain a full understanding of the coral reef fisheries, the extreme diversity in the physiographic and ecological characteristics of the reef ecosystem must be known. One of these characteristics that is important to this study is the nature and pattern of recruitment to the reef fisheries. Coral reef ecosystems are characterized by two types of animal migration; adult animals which migrate to the reef for feeding and hiding purposes and migration during a particular stage of the animals' development.[45]

Surrounding seagrass beds and mangrove systems play a significant role in the population dynamics of the coral reef communities by providing nutrients and sanctuary to juveniles. Juvenile grunts and snappers and several other species of the reef fishes are recruited to the seagrass and mangrove ecosystems near to coral reef habitats. Most species of snappers during the early stages of their life history are more dependent on the mangrove and seagrass regions than other reef species.[46]

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[45] Ibid., p. 189.

[46] Ogden, J. C. and Zieman, J. C., 1977, "Ecological Aspects of Coral Reef-Sea Grass Beds Contacts in the Caribbean." Third International Coral Reef Symposium, Miami Rosenthal School of Marine and Atmospheric Science, Vol. 1: 377-382.

Spiny lobsters, after a pelagic lifestyle in their juvenile stage, settle among mangrove roots or seagrass beds. As these juveniles approach maturity, they move off to deeper habitats around reef patches, where they hide by day and emerge for feeding at night.

Demersal fish communities inhabiting reef areas in the Lesser Antilles region are similar to those populations in other reef areas of the western central Atlantic region.[47] The communities consist of over 300 species, however, only about 18 of these species are significant to the OECS fisheries, and can be grouped into two interdependent sub-units. These sub-units can be treated as separate management entities for the purpose of resource management. These comprise the shallow water reef species and deep water reef species respectively.[48]

The shallow water fishery is more diverse in species composition, comprising smaller species such as grunts, squirrel fishes, parrot fishes, groupers and snappers and is subjected to more intense fishing pressure due to its proximity to shore. The deep water reef fishery comprises larger species such as silk snapper, black fin

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[47] Munro, J., 1983, Caribbean Coral Reef Fishery Resources. ICLARM Study Review, (7): 271p.

[48] Ibid., p. 52.

snapper, vermilion snapper and larger groupers belonging. The fact that reef species have several similar biological characteristics, such as low growth rate and foraging habitats, they can be classified into one multi-species fishery for the purpose of research and management.[49] Reef fishes are sedentary in nature, maintaining residence in a singly reef patch, but some species migrate to adjacent seagrass beds for feeding and foraging. Population size of the multi-species reef fishery is limited by the amount of available reef habitat, the number and size of year classes recruited to the adult population and the quality of the adjacent seagrass beds and mudflats.[50]

VI. AN ESTIMATION OF THE FISHERIES RESOURCES OF THE OECS REGION

In order to establish an effective development and management plan for the OECS Fisheries, specific information is required about the nature and abundance of the fisheries resources. Knowledge of the nature of the stock, its abundance and availability to fishermen, is the "cornerstone" to any fisheries management and development

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[49] Ibid., p. 78.

[50] Ogden, J. C. and Zieman, J. C. Ecological Aspects of Coral Reef-Sea Grass Beds Contacts in the Caribbean. Third International Coral Reef Symposium, Miami Rosenthal School of Marine and Atmospheric Science, Vol. 1: 377-382.

effort which might be pursued in this region. The inadequacy and unreliability of catch/effort data on fish production in all the islands preclude any possibilities of projecting potential yield estimates, using methods that depend on accurate fish landing data. However, until the region develops its capability to determine absolute abundance, other indicators that can detect changes in species composition of fish catches and the size of fishes being caught can be employed to determine relative stock abundance.

Estimation of the fisheries resources of the OECS region is also hampered by the multi-species nature of the reef resources which is associated with complication of the inter-species dependence and the effect such variation will have on stock abundance. Magnifying this scenario is the fact that production of reef fish vary significantly from year to year as a result of the unstable nature of coral reef ecosystems.[51] For the purpose of this study, a fundamental technique has been applied to estimate the OECS demersal reef fisheries resources. The method used here is hardly adequate in arriving at a satisfactory estimate for management purposes, especially since all indications show that most of the demersal resources of the shelf are

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[51] Munro, J., 1983, Caribbean Coral Reef Fishery Resources. ICLARM Study Review, (7): p 89.

subjected to intense fishing pressure on a continued basis; hence the possibility of area specific over-fishing; and therefore, requires a management plan that is based on a fairly reliable model. However, the estimates obtained with this method can provide an effective guideline for any preliminary management and development strategy that might be adopted in the region in the absence of more reliable data. If the OECS is to implement adequate fisheries management and development plans, immediate efforts must be made to obtain adequate and reliable catch/effort information for all species that are commercially harvested within the region. This data collection prerequisite is necessary both for the shelf fisheries and the migratory pelagic fishery.

A. Harvestable Shelf Resources

The shelf areas of the islands of the OECS vary from islands to island and are directly related to the geologic features of the islands themselves rather than the size of their land masses.[52] Those islands of predominantly coral formation have a relatively larger shelf area than those whose geological structure is mainly of volcanic origin. Islands' shelf areas range from 3400km² in the case of Antigua/Barbuda to little or no shelf area in the case of

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[52] Mitchell et. al., 1983, "Development of the Marine Resources of the Eastern Caribbean: Leeward Island Case Study, p. 9 Dalhousie Ocean Studies, University of Dalhousie, Nova Scotia.

Dominica and Montserrat (Table 1).

The total shelf area of the OECS is approximately 9896km^2. This is more than four time the size of total land mass of this region. Yield estimates of the shelf resources vary widely depending upon the methods used to obtain them. For the purpose of this study the productivity of the shelf area is calculated using information for coralline shelf biomass for shelf areas around Jamaica (Munro, 1983,[53] the British Virgin Islands,[54] and Puerto Rico and the U.S. Virgin Islands.[55] These areas along with the rest of the Eastern Caribbean are comparable coral reef areas with similar species of coral reef living resources. Estimates of the biomass of the Puerto Rico shelf area were calculated at about 3.1 mt/km^2 of all commercial species. Munro estimated the biomass of the Jamaican shelf to be about 4.1 mt/km^2. Caddy estimated the total biomass for the BVI to be 3.32 mt/km^2 as is seen from Table II and Table III. Caddy stock assessment method for the BVI is an appropriate representative of the other Eastern Caribbean islands

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[53] Munro, J., 1983, Caribbean Coral Reef Fishery Resources. Iclarm Study Review, (7): p 174.

[54] Caddy, 1983.

[55] Juhl, et. al., 1971, "Status and Potential of the Fishery of the Caribbean," Proceedings of the Gulf and Caribbean Fisheries Institute. 23: pp. 175-183.

because of the proximity of the BVI and these other islands, the similarity in reef areas and similar species composition of the coral reef resources.

Caddy's approach is attractive since he was able to separate total biomass of all commercially important shelf species into four different categories on the basis of theproportion of each group in the British Virgin Islands catch. [Table II and Table III] Resource abundance and maximum sustainable yield is directly proportional to the natural mortality and the biomass of these stocks.

The maximum sustainable yield of each category for the OECS States is given in Table IV. This is based upon a total biomass of the shelf areas of the OECS region of 32854mt. The total potential yield of the combined OECS shelf area for the commercially exploited shelf species is about 8,211mt; of this reef species account for 4,208mt or 51 percent of the total; coastal pelagics (jacks, barracuda and hogfish) account for 2,821mt or 34.36% and spiny lobster accounts for 341mt or 4.2% (See Table IV). The distribution of potential yield from island to island varies considerably. Antigua/Barbuda with the largest shelf area has the largest potential yield for each group, followed by Grenada and St. Vincent and the Grenadines respectively.

Based on figures in Table I, IV, most of the island within the OECS have been exploiting their shelf resources at an intensive level for a number of years. Many of the fisheries of these islands are approaching their Maximum Sustainable Yields (MSY). The MSY for Antigua/Barbuda is estimated to be about 2,800 mt while the 1988 harvest averages approximately 2,000mt. The 2,000mt does not include the amount of shelf resources (e.g reef fish and coastal pelagic) that are taken illegally by fishermen of neighboring countries. The shelf resources might not be able to withstand a marked increase in fishing pressure.

Dominica and St. Lucia have a potential MSY of about 305mt and 433mt respectively, but statistics on fisheries production indicate that about 339mt and 443mt are being caught annually from the shelves of these islands. Grenada and St. Vincent on the other hand, harvest less than 30% of their potential MSY of their shelf resources, hence there might be some possibility for an increase in production. Another speculation is that catch per unit shelf area in Grenada and St. Vincent is due tooverfishing. Hence, in order to get an increase in unit production, severe cuts in fishing effort may be required. To substantiate this speculation a study should be carried out to determine the current level of exploitation and the optimum catch per effort that is permissible.

An overall assessment of the corralline reef fisheries of the OECS indicates that of a combined potential yield of 8,211mt approximately 4,692.3mt are harvested annually. There are some indications that there could be an increase in production at a local level for some of the OECS territories. However, because of the unreliability of yield estimates and fish production statistics, caution should be exercised in establishing a management plan that would involve an increase in the production of a fish from the reef resources.

B. Pelagic Resources - Potential

The oceanographic features of the Caribbean are directly responsible for the nature and abundance of the living marine resources in there region. The little or no intermixing between the deep, nutrient rich water and the nutrient deficient surface water in the Caribbean Sea prevents nutrients from reaching near the surface where the is enough solar energy to allow for primary production. The low level of primary production results in a correspondingly low abundance of surface feeders such as tuna and other pelagic species.

However, there is some intermixing of current systems which take place in localized areas within the

Eastern Caribbean off most of these islands. This allows nutrient rich water from up to 75m below the surface to mix with surface water. The spiral nature of these eddies localizes nutrients within these particular areas for a period of time of enough duration to allow the development of a food web within the eddy. Evidence from fishermen of St. Lucia and St. Vincent and the Grenadines, indicates areas where pelagic fish are most abundant, coincides with the perceived location of the eddies off their coasts. These fishermen are known to have been fishing these areas for several years with moderate degrees of seasonal success.

The production of migratory pelagic species in the OECS region could significantly increase fish production in this region. Information from all of the islands has indicated that the ocean pelagics have not been fully exploited and relatively large increases in production might be possible.

Virtually no effort is made by local fishermen to exploit the pelagic resources in Antigua/Barbuda's EEZ. Results of exploratory fishing indicate that some species of dolphin, tuna, king mackerel and flying-fish might be seasonally abundant in Antigua/Barbuda's EEZ. The maximum sustainable yield of these resources has been estimated to

be about 3,000 - 5,500 tons/year.[56] However, a more precise estimate of these resources is necessary before any significant fishery is developed based on this resource.

Dominica is located in the path where pelagic species such as tuna, flying fish and dolphin migrate. Like most of the OECS Member States, these species are of seasonal abundance and are significant in the catch of the local fishermen. The most productive areas are on the east coast of the island where the water is usually more turbulent. It is generally believed that fish production from this area could be increased with some improvement in the quality of the fishing fleet that operates in that area.

The Migratory pelagic fishery is not heavily exploited in Montserrat. There is evidence that this fishery could be increased significantly.[57] St. Kitts/Nevis also has not fully exploited the pelagic, although this fishery could support an increase in fish production.[58] It has been estimated that the fish production of St. Vincent and the Grenadines where pelagic

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[56] Western Central Atlantic Fishery Commission, 1980. Proposal for a regional fishery development project for the Lesser Antilles. Rome, FAO, WECAFC/80/18; 12.

[57] Ibid., p. 2.

[58] Ibid., p. 2

resources presently contribute 70 - 80% to the annual fish production, could be increased by a factor of three primarily through the harvesting of pelagic species.[59]

Presently more than 85% of the annual fish production of St. Lucia represents pelagic species. Expansion of catch might be possible from an increased fishing effort for pelagic stocks. But as in the case of the other islands, before any new initiative is made to increase harvesting of these species, a method for stock assessment based on catch/effort information must be developed and implemented. Stock assessment for most of these species can only be done on a more comprehensive regional scale using information from international organizations such as ICCAT.

The fact that the pelagic resources off many of these islands support a significant part of the regional fishing industries, necessitates an increase effort in the management of these resources on a regional basis. Member States should therefore cooperate to ensure that adequate management strategies which takes into consideration the shared nature of these resources are developed.

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[59] Ibid., p. 2.

VII. SUMMARY

The area of the Eastern Caribbean where the OECS is located constitutes an area with a very dynamic current system and a diversified geological structure. The islands in the south (Grenada, St. Vincent and the Grenadines, St. Lucia and Dominica) are primarily volcanic in origin with very steep and narrow island shelves. The islands in the north (Antigua/Barbuda, St. Kitts/Nevis, the British Virgin Islands) are more coralline in structure giving rise to a more extensive coralline island shelf with a variety of coral reef fisheries resources. This coralline feature is responsible for the predominance of the reef fishery in the northern islands. The dynamic current system and the inflow of water from the Atlantic through the southern islands, gives rise to the formation of eddies, capable oflocalizing nutrient flow for a sufficiently long period of time to extract migratory pelagic species in relatively significant quantities to support the dominating pelagic fisheries of the southern islands.

Except for some localized areas, around Grenada, St. Vincent, and Antigua, production of the coral reef fishery have not yet achieved their optimal yield; hence, with the implementation of an effective resource management plan coupled with a pragmatic development strategy Member States

in the OECS have an opportunity to increase the production of these resources.

The geographic nature of the OECS have provided strong evidence that a significant portion of the fisheries resources that are found in individual countries EEZs are shared with other countries within the Eastern Caribbean. This fact requires a degree of mutual consultation on the management and exploitation of these resources. This consultative approach was not given much attention prior to UNCLOS III, and the subsequent enactment of harmonized fisheries legislation by countries of the OECS, since there were no established base for what constitutes shared stocks.

It has now become more evident that almost all the fish stocks of the region are transboundary in nature, either during their plantonic stages of development or during their adult life history. As member states emerge from the euphoria of the immediate post-EEZ era, it is becoming apparent that although interested fisheries jurisdiction has opened up many economic opportunities for these states, at the same time it has placed a significant management burden on national fisheries administrations, which are at present, ill-equipped to provide these required management functions.

The transboundary nature of these stocks, will focus attention on the requirement for a regional management regime, that would ensure the continued integrity of fish stocks accruing in the region. A management region involving all states that are exploiting the same fish stocks is necessary to avoid the consequences of separate management authorities, managing parts of a common stock in adjacent EEZ's. Such consequences include the lack of ability to either attain the long term optional yield or the maximum recruitment level in the face of uncoordinated exploitation of these resources, particularly if resource harvesting strategies differ.

A common management strategy would involve the establishment of a single optimum yield for the shared stocks as the best stratagem. This objective could however be difficult to obtain if each country is required to remain within it's EEZ boundary during harvesting given that migratory fish stocks are seldom homogeneous in size and local abundance throughout their migratory circuit. Therefore, under these circumstances it is likely that some states might be obliged to exploit these resources at a size and fishing density that will preclude the attainment of the overall optimum yield throughout the stocks' migratory range. Overall optimum yield should therefore be

pursued within the context of a common fisheries zone, where fisheries from countries in the region can exploit these resources under an arrangement that will take into consideration the transboundary nature of these stocks. This would require economic and political cooperation between these states to allow for shared access within a common fishing zone.

involving public policy and administration and the growth of the harvesting sub-sector into a viable economic entity with private sector financing. The results of these strategies on the growth and development is also analyzed since it is apparent that present fisheries management and development planning in the OECS region is significantly influenced by those preceding stages of development of the fishing industries of the Member OECS States. This analysis will therefore provide the baseline data for which the development of a comprehensive regional fisheries policy will be pursued. Most studies of fisheries development and management in the region identified four issues which have impacted the fisheries development process over the past two decades.[1]

a) lack of specific development policy objectives due to inadequate political commitment;

b) over-capitalization of an unskilled harvesting sub-sector;

c) lack of adequate information on resource base;

d) pressure for increasing food production and employment; and

e) the common property nature of the fisheries resources.

These underlying issues are continuing to influence fisheries development planning in the region.

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[1] Caribbean Community Secretariat, 1982. Report of proceedings of first meeting of Caribbean Fisheries Officials. Kingston, Jamaica. (unpublished)

It is therefore imperative that these issues be analyzed so as to verify the relative levels of impacts that they have exerted and might continue to exert on the progress towards improved fisheries management and development initiatives within the OECS. An attempt will therefore be made to evaluate how the fishing industries in the region were managed and developed within the constraints associated with the underlying problems above. The analysis will consider the importance of the industry as a means of providing employment to Member OECS States work force and the contribution of the sector to the nutritional demands of the regional population during the developmental time frame. Capital input into the sector and the socio-economic benefits derived from the industry will also be discussed and evaluated. Finally, the inter-relationship of these factors and their combined impact on the present development and management processes of the regional fishing industries will be discussed in an effort to arrive at a suitable strategy to optimize the benefits that can be obtained from the industry both at the national and regional levels.

II. NATIONAL DEVELOPMENT POLICY

The concept of fisheries development planning began in the OECS region during the 1950's. Prior to this time,

public policy for the management and development of fisheries was non-existent.[2] The British Colonial governments which were then in charge of those States of the OECS created Fisheries Divisions as part of National Departments of Agriculture. These Divisions were staffed in most cases by a single Fisheries Officer who reported directly to the Directors of Agriculture. Today this structure still exists in the Federation of St. Kitts/Nevis.[3] The major objectives of fisheries administration were the supervision of various forms of welfare aid schemes and assistance programs targeted to functioning and potential artisanal fishermen.[4] It is therefore clear from the onset that during this period the intended function of the Fisheries Divisions, with their inadequate administrative personnel, did not include activities that would facilitate fisheries development planning. Consequently, in contrast to other Agricultural Divisions, within the Department of Agriculture, the Fisheries Divisions never functioned as management planning

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[2] Brown, W. H., 1967, "Marine Fisheries of the British West Indies," Report on field work carried out ONR contract. None-3652 (83), project number 388067. Berkeley, California, Department of Geography, University of California, p. 57.

[3] Richards, V.; Walters, H., 1989. Report of OECS Task Force on Institution Enforcement. (Origination structure of the fisheries division of St. Kitts/Nevis.)

[4] Brown, W. H., 1967, p. 105.

agencies, but mainly served as servicing agencies for government assistance programs to fishermen and fishing communities. Development of the fishing industry therefore undertook an ad hoc course with little consideration given to sound planning based on the nature of the resource base and the need for efficiency at the productive and marketing end of the sector. This initial approach is responsible for the nature of exploitation of Member States' fisheries resources whereby the industry is only providing subsistence employment and limited economic opportunities to the work-force that is involved in it.

The feeling of the Colonial administration was that before any program could be instituted in the fisheries sector, it was necessary to obtain a precise knowledge of the number of fishermen who were employed in the industry[5] (Ralph Camacho, Fisheries Officer - Antigua/Barbuda 1960 - 1976 Personal Comments). Censuses were undertaken in all the islands, including Antigua/Barbuda, Grenada, St. Lucia and St. Vincent and the Grenadines. These censuses provided basic information on the number of fishermen, their methods of fishing and the communities where most of the fishing operations were concentrated.[6]

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[5] Ralph Camacho (Fisheries Officer - Antigua/Barbuda 1960 -1976. Personal Comments)

[6] Brown, W. H., 1967, p. 189.

The basic data obtained from these surveys did not, however, provide an adequate basis for determining the bio-economic potential of the fisheries resources. Such data are of crucial importance in establishing an economic basis in determining the viability of a fisheries development strategy. For example, no consideration was given to the sustainability of the fisheries resource as harvesting pressure was increased. Neither was consideration given to the sector's economic viability and the infrastructural requirements for long term development and management planning. Hence, no provision was made for an administrative capability which could provide extension services that would facilitate an effective technical mechanism for the planning and management of fisheries development. The original strategy isolated and addressed only one of the principles governing fisheries development, with little or no consideration given to the more important (from a fisheries management and development point of view) bio-economic principles. Hence, without any preliminary assessment of the bio-economic potential of the fisheries resources the islands that are now within the OECS exploited their fisheries resources without any management and development plan and did not realize the need to provide the industry with technical man-power at the administrative level.

The basic prerequisite for sustained fisheries development was virtually overlooked from the onset resulting in some long term implications as these islands began to organize an administrative capability, that has capability of facilitating the development and management process. It is also apparent that the specific intention for the original fishing industry census was to provide data on the human resources utilization within the industry and the type of equipment that this relatively unskilled work-force was using to harvest fish.

Considering the food production deficit of the region during this time, and the large sums of money spent on food imports, the initiation of any realistic fisheries development strategy should have taken into account policy considerations that would address the potential sustainable yield of the resource against the long term demand of fish and fish products as a source of protein to the regional population. Before harvesting targets are pursued a mechanism should be established to determine potential yields of the resources in the region. Such mechanism should be linked to existing catch/effort information and the ability of the National Fisheries Administration to pursue resource assessment programs.

Based on the availability of stocks, considerations should have also been given to sectoral objectives in the pursuance of national developmental goals. Such sectoral objectives should be based on the sustainability of the resource in order to avoid over-capitalization and the wastage of developmental resources that could be used more effectively in other areas of the national economy. Because previous developments did not take into consideration the above logical approach, initiatives for sustainable levels of growth in the sector was not begun. As a consequence of the above there is no existing historical data base that can provide clear guidelines for resource management as a basis for fisheries development. An adequate understanding of the biological processes in the ocean would allow us to ascertain the nature and distribution of the living resources that are available for exploitation; this is a major prerequisites in developing fisheries management and development strategies.[7]

The fact that very little attention was given to sustain fisheries development at the time when governments started to provide assistance to fishermen might be due to three significant socio-political realities at that time:

(a) Britain and most of the developed world at

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[7] Mackenzie, W. C., 1983, "An Introduction to the Economics of Fisheries Management. FAO Fisheries technical paper, No. 286, p. 12.

that time only exercised jurisdiction over resources within the three (3) mile territorial limit and regarded the resources beyond this boundary as global property hence no country could exercise control on their exploitation and management.

(b) The historical attitude of British Colonial government towards the development of their Caribbean colonies;

(c) The lack of perception on the economic feasibility of the fisheries sector in terms of its contribution to national economic growth.

During the 1960s very few countries attempted to ascertain jurisdictional rights over their fishing resources beyond the limit of their territorial seas except in the case of some Latin American countries. Distant water fishing nations were free to travel the world's ocean in pursuant of valuable fish stocks. Those nations with the ability to engage distant water fishing fleets were normally more successful in developing their fisheries sector. Apart from offshore fishing in the North Sea by Scottish fishermen, and its operations off Iceland. Britain was not considered to be a major fishing nation which operated long distance fleet; it was therefore apparent that Britain had little interest or competence in establishing an economically viable fishing industry in its Caribbean Colonies. Instead, the sector was viewed by the government as an alternative in providing subsistence employment to a growing unskilled labor force

that could no longer be absorbed by the fledging agricultural sector.

It is therefore apparent that Britain as a colonial power did not have any long term interest in the fisheries industries of its Caribbean colonies. It was only after the colonies were experiencing a significant unemployment problem, due to the decline of the sugar industry, that the fisheries sector was considered not as a complimentary economic entity but as an alternative depository for an increasing unskilled labor force that could no longer be accommodated in the agricultural sector. Attractive incentives such as low interest loans, duty and tax concessions were therefore offered to members of the work force who lived in coastal areas and wanted to become fishermen.[8]

During the late 1950s and 1960s little consideration was given to the sustainability of global fisheries resources. Global fishing effort, except for a number of distant water fishing fleets from Japan and the USSR, was relatively low and hence problems that are associated with overfishing were not generally addressed with high priority within the content of conservation and resource management.

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[8] Vidaeus, L., 1969, "Caribbean Fisheries Industries, 1960-1970, (A summary report of a series of counting studies), UNDP/FAO Caribbean Fisheries Development Project. SF/CAR/Registration 18 9M24.

The general view was that there was an abundance in global fisheries resources and the immediate objective should be geared towards increasing production.[9] Fisheries management and development issues such as over-fishing of individual stocks, economic efficiency of fishing operations and the need for efficient fisheries management and development institutions were not considered to be of major political importance. The general pattern of fishing was nomadic in nature, where operations were moved from heavily fished stocks showing signs of depletion to unexploitation or under exploited stocks.[10]

The lack of skilled man power and appropriate technology prevented fishermen from countries of the OECS from adopting the general global nomadic practice. The results were that fishermen continued to fish those areas that showed signs of over-exploitation with very little effort extended to non-traditional fishing areas.

III. IMPACT OF NATIONAL FISHERIES POLICIES ON DEVELOPMENT GROWTH

Relative rates of exploitation of a fishery can be

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[9] Copes, P., 1991, "The Impact of UNCHOS III on the Management of the World's Fisheries," Marine Policy, July, 1991. IPC Business Press, p. 220.

[10] Ibid., p. 220.

influenced by economic factors.[11] This is actually a case in point in the OECS region as far as the rate of exploitation of traditional fisheries resources are concerned. During the 1960s and 1970s fish prices were determined and established by the government administrations which were vigorously enforced. Subsequently, fishermen had little incentive to increase their catch because of the low price they received for the product. The catch per unit of effort remained fairly constant during the 1960s and 1970s in most Member States.[12] The rate of increase of the catch per unit of effort was larger in Antigua/Barbuda during the 1970's as the price control became ineffective because of the rapidly increasing demand for fish as the tourist industry expanded.[13] Antigua/Barbuda fishermen who have been operating larger vessels than fishermen from other OECS States, capitalized on the relaxation in the enforcement of the price control policy by increasing their fishing effort. They were able to sell a significant portion of their catch to hotel and restaurants receiving better prices than they were previously receiving from selling primarily to domestic consumers. Fishermen's income

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[11] Taylor, H., 1951, "Fisheries in St. Lucia, British West Indies (American consulate report No. 13, Grenada) Fisheries Report U.S. Fish and Wildlife Service (228).

[12] Table I, II.

[13] Table I, II.

increased significantly and many fishermen were able to purchase additional gear, hence increasing their individual fishing effort. There was a resultant increase in overall fish landings.

The factors responsible for increased fish landings in the 1970s were different than those that resulted in increased landings in the 1960's. In the 1960's the overall fishing effort increased through the entrants of new fishermen and vessels into the fisheries. During the 1970s the size of the fishing fleet remained fairly constant due to the increasing cost of equipment and vessels and the reduction in the level of assistance government was providing to the harvesting subsector. Catch, however, increased significantly due to an increase efforts of those fishermen already exploiting the fisheries.

Another factor which benefited fishermen significantly during the 1970's throughout the OECS is the World fuel crisis and the skyrocketing prices of imported staples (e.g., chicken, salted cod) normally competed with locally produced fish. Between 1972-1975, the price of imported chicken backs raised from EC$0.45/lb to EC$1.10/lb. The demand for fish increased as a

consequence resulting in an increase in the control price from EC$0.45/lb to EC$1.00/lb during this same period.

During the 1970s, fisheries' contribution to the GNP of Member States rose significantly. Fishermen's income also improved, enabling fishermen to enhance their standard of living.[14]

During the 1970s, the region experienced unprecedented levels of unemployment similar but more severe than that experienced during the first years of the 1960's. However, unlike the 1960s there were few financial opportunities in the form of low interest loans that would allow new entrants into the industry. The fishing industry experienced significant economic growth during this period, with little change in the number of fishermen and fishing vessels exploiting the resource. Although at that time the industry continued to provide a good potential source for employment, neither the public nor the private sector had the needed financial resources to finance potential fishermen to acquire new vessels and fishing gear. Therefore, the industry could not fulfill one of its original objectives of increasing employment within the sector itself. This presented a classical case of what can be termed "economic limited entry" in contrast to "economic free access" as was experienced during the

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[14] Table V and VI.

1960s when government assistance programs were operating liberally.

The fishing industry benefited significantly during the 1970s when the United Nations Food and Agriculture Organization established regional fishing bodies around the world. OECS States were placed within the Western Atlantic Fisheries Commission (WECAFC). These States benefited significantly from a number of WECAFC programs in the areas of gear and method improvements, training of fishermen and fisheries administrations and marine fisheries research.

In conclusion, the 1970s represented a good decade for the fishing industry in the region as the region experienced major improvement in many aspects of fisheries management and development. This period also marked the turning point for the pattern of fisheries development in the region as the industry assumed more significance in the national and regional socio-economic development effort.

During the second half of the 1970's the international order for the control and management of fisheries resources was changing significantly, under the emerging provisions of the 1982 UN Convention in the Law of the Sea, which would eventually give coastal states the

right to extend control over the fisheries resources adjacent to their coast out to 200 nautical miles. OECS States responded to this international initiative during the 1980s by establishing EEZ, and have benefited significantly from this new international ocean regime. The FAO through its EEZ program provided Member States with the initial assistance for them to develop and enact the relevant legislative mechanism that is necessary in pursuant of the opportunities and benefits that are possible from the fishing industries of these States under the new Law of the Sea provisions.

Member States strengthened their functional cooperation by establishing the Organization of Eastern Caribbean States in 1981. It was through this regional framework that Member governments approached the FAO for assistance to develop national legislation to reflect their new obligations and responsibilities of UNCLOS III as it applies to the exploitation of fisheries resources. The need for a regional approach towards achieving the expectations afforded by UNCLOS III became evident from the onset. This has presented the reason for a regional policy framework for fisheries management that is reflected in the harmonized fisheries legislation that is now in place in all Member OECS States.

IV. SUMMARY

The preceding discussion focused on the historical pattern of fisheries development and management for the past twenty-five (25) years. The discussions centered on the development strategy, its associated programs and the impact of those programs on the development of the industry. It was noted that the objectives of development and management did not realize the growth that the industry could have achieved because of the welfare nature of the approach to fisheries development in these islands.

Government incentive programs provided a vital stimulus to the industry but programs were not comprehensive enough to ensure sustained growth and development of the sector. The import duty and tax concessions that were given on fishing gear and fishing vessels significantly reduced the "start-up" and operational costs of fishermen, enabling more individuals to enter the fishery because of a more attractive investment program. The industry did not become more efficient by the introduction of these programs, instead the industry attracted more manpower than was needed for its efficient operation at that time. Therefore, although the catch of these islands actually increased from 3,120mt in 1960 to 7,421mt in 1975, the catch/effort unit of effort

did not reflect any significant increases since the effort to take this catch also increased correspondingly. Consequently, fishermen realized little growth in real income and little or no improvements in their standard of living relative to workers in other sectors of the national economies of the region.

The failure of the industry to realize any real growth of enough significance to improve the socio-economic well-being of those working in the sector is a direct result of conflicting objectives of the national development programs. Government development policies were based on objectives to increase employment opportunities in the sector while at the same time providing a cheap and efficient source of protein to the national population.

A National fisheries policies during this period encouraged new entrants into the industry by providing incentives for acquiring the means of production but only at a subsistence level. There were no real improvements in efficiency as more manpower and equipment were used than what was actually necessary to catch the amount of fish that were produced at the time. The result was a largely unskilled labor force within the sector that was provided with very little training opportunities to improve the fishing skills.

Between 1960 and 1975, the number of local fishermen operating in the OECS increased from 3500 to 9725. That is an increase by 6225 or about 200 percent. However due to the lack of a management and development plan that is geared towards the economic exploitation of the fisheries resources, the sector did not realize any significant economic growth.

In pursuing the other objective of making fish available as a cheap source of protein, it has become quite clear that the subsidies and incentives which governments provided were inadequate for this purpose if it was intended that fishermen should obtain adequate returns to their investments. Duty and tax concessions on imported gear and vessels were not enough to offset operational costs to the extent where the price control regulations that were imposed on fish products could generate enough revenue to make fishing operations profitable. The fact that most fishermen engaged in borrowing to finance the purchasing of fishing vessels and gear and was subsequently unable to repay their loans was as a direct result of the marginal returns to capital caused by the high cost of input relative to the revenue obtain from the sale of fish. The industry was therefore very unstable and fell short of its development potential.

Stability in the industry necessitated the need for increased revenue generation to enable fishermen to repay loans and offset operational cost such as, fuel, vessel maintenance, manpower and fishing gear and reinvestment in improved gear and methods.

Moreover, the policy did not provide a source of cheap animal protein in sufficient quantities to satisfy the local population demand because of the low productivity of the harvesting subsector. It also did not provide significant alternative employment opportunities in the fishing industries as were expected.

Fishermen should have been encouraged through incentives to explore and exploit other non-traditional fishing grounds. Instead, with their newly motorized vessels, increased manpower and fishing gear the traditional fishing grounds were subjected to an unprecedented increased in fishing effort. It was only during the 1970s, when the overall catch/vessel was decreasing, that efforts were made to institute management and development programs to address the accompanying problems. It is evidently necessary that any future planning for the industry must ensure that the process of development and management are properly synchronized

to ensure compatibility with one activity complimenting the other.

CHAPTER IV

ECONOMIC ANALYSIS OF THE OECS FISHING INDUSTRY

I. INTRODUCTION

The economic operation of the OECS Fisheries is characterized by a process which connects suppliers of inputs to fishing (The Harvesting Sector) on one hand and consumers of fish on the other hand. The economic operation of the fisheries could therefore be evaluated by an analysis of the cost of inputs by fishermen, the cost of the fishing operation itself and the sale of fish products to either middlemen or consumers and the level of employment that is generated within the sector.

The economic analysis of OECS fisheries must also take into consideration the open access nature of the fisheries resources; since the fisheries of the OECS can be considered as "open" in nature because OECS nationals have total freedom to enter or exit the industry as long as they have the economic means of acquiring the inputs. Because of this freedom and the limited nature of the living marine resources, there is a potential for the economic over-fishing of this resource.[1] Economic over-exploited fisheries are those fisheries where harvesting inputs

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[1] Christy, F. T., 1982, "Territorial use rights in Marine Fisheries" Definitions and Conditions. FAO Fisheries Technical Paper, No. 227, p. 2.

(labor and technology) are greater than the optimal requirements for taking that quantity of fish.[2] Uncontrolled investment in inputs will eventually reach the point where the value of inputs is equal or greater than the actual revenue derived from the sale of fish.[3]

In evaluating the economic operations of the OECS fisheries the goals and objectives of fisheries development during the periods that is being evaluated have been identified. The identification of these goals and objectives are important because of their apparent impact on the economic performance of the sector during the period when these objectives were pursued.

This evaluation covers the fisheries development period between 1965 - 1985. This twenty-year period is being addressed in two (2) ten-year periods because there are some significant differences of development patterns during these separate periods.

The economic evaluation of the fisheries is an important factor as it will provide an understanding of the functions of the fisheries system of the OECS. It will

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[2] Ibid., p. 3.

[3] MacKenzie, W. C., 1983. "An Introductions to the Economics of Fisheries Management. FAO Fisheries Technical Paper, No. 226, p. 9.

also provide the basis to assess the potential impact of new interventions such as management regulations and investment capital.[4]

II. ECONOMIC PERFORMANCE OF THE FISHING INDUSTRY 1965 - 1975

During the colonial period while the Fisheries Divisions were completing their censuses, a number of assistance programs geared primarily towards the harvesting sector were being instituted to enhance the development of the industry.[5] The major activities during the early stages of fisheries development in the region were geared towards providing the necessary incentives that could attract more individuals into the industry in an attempt to provide more employment opportunities. Towards this goal, the assistance programs that were developed and instituted during this period included:[6]

(a) low interest loan schemes in most islands intended to provide the necessary investment capital to fishermen;

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[4] Ibid., p. 11.

[5] Browne, W. H, Marine Fisheries of the British West Indies. Project 1967 NR 388067. Berkeley California, Department of Geography, University of California.

[6] Ibid., p. 25.

(b) duty and tax concessions on fishing vessel, motor and gear;

(c) slipway and mechanical workshop services for the maintenance and repair of fishing vessels;

(d) cold storage and ice-making facilities for fishermen to preserve their catch.

Based on the original assistance programs it would appear that the implicit objectives of the development strategy were to increase employment opportunities within the sector and at the same time provide a larger supply of local fish and fish products. Socio-economic improvement of fishermen could not have been adequately considered as a major policy objective since there were no provisions in the assistance program for increased marketability, which would have ensured a free market pricing system, based on the laws of supply and demand. Instead, all of the islands instituted controlled prices on fish which resulted in very negative consequences for the socio-economic growth of the industry, since it effectively marginalized fishermen's income, hence their ability to increase their production and make new investments.[7]

The objectives of increasing employment while

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[7] Price Control Statistical Records: Fisheries Divisions (St. Lucia, Antigua, St. Vincent and the Grenadines and Grenada).

producing fish as a cheap source of protein, resulted in the following developmental constraints:

(a) open access to limited resource with no restrictions placed on the number of fishermen participating in the fisheries at any given time;

(b) an artificial price control on locally produced fish. As a result the harvesting sector (fishermen) did not realize the growth that would have provided the foundation that is necessary for an economically feasible fisheries development strategy today;

(c) the labor force in the industry was under utilized as more effort (man-hours) was used in fisheries operations than was actually necessary.

In St. Lucia for example, a canoe that could be effectively operated by two persons, normally has three to four persons on board.[8]

Further analysis of available information indicates that in spite of the assistance programs that were made available to the fisheries sector of the OECS region, the sector did not realize any significant socio-economic growth. Fishing operations remained generally uneconomical which could be due to limited adaptive technology,

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[8] Matthews C, national report on fisheries for St. Lucia. FAO Fishery Report 278 Suppl. 45 - 48 pp 47.

unskilled man power and low prices for fish.[9] The industry, however, experienced an unprecedented increase in fishing effort due to the financial assistance that was made available.[10] The fishing industry was consequently characterized by its low rentability that only provided a subsistence occupation to most of the fishermen. No attempts were made to enhance the socio-economic viability of the fisheries sector. The Colonial Government, in seeking to find alternative employment for a growing but unskilled labor force was prepared to offer a number of incentives to attract people into fishing with very little consideration given to sustained economic growth of the sector.

A considerable amount of money was disbursed to fishermen and prospective fishermen in the form of low interest loans under various fisheries development loan schemes. In St. Lucia, the major focus of the program was to introduce new and larger fishing vessels to the fleet similar to those that were being operated by the

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[9] Browne, W. H. Marine Fisheries of the British West Indies. Report in field 1967 were carried out under ONR contract NONR - 3656 (83). Project No. 38806. Berkeley; California. Dept. Geography, University of California, 106p.

[10] Vidaeus, L. UNDP/FAO Caribbean Fishery development project. Barbados development Project. Barbados Report F/CAR/REG 15M 16M 4 16M6; 16M8.

neighboring Barbadian fishermen. Similar funding programswere also made available to fishermen of other OECS countries to motorize their existing canoes.[11] The canoe motorization program achieved a high level of success relative to the other assistance program for the introduction of larger craft to the fishing fleet. This might be the reason why the canoe type craft is still the most widely used fishing vessel in most of the members of the OECS.

The present nature of the fishing fleet indicates that the canoe echanization program was quite successful but the attempt to introduce new and larger vessels to the fishing fleet failed. The failure to successfully introduced larger vessels to the fishing fleet of St. Lucia, Dominica, St. Kitts/Nevis was apparently due to the inability of fishermen to operate these vessels since no adequate training was provided during the introduction of this program.[12]

Mechanization started in the late 1950s and early 1960s. This resulted in an increase fishing effort because actual fishing time increased as the time spent

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[11] Hess, E., 1961, "The Fisheries of the Caribbean Sea. Atlantic Ocean Fisheries, edited by D. Borgstrom and A. J. Heighway. London, Fishing News (books) LTD., pp. 212-32.

[12] Table VII.

going to and from fishing grounds decreased. Total amount output rose, production cost rose also but retail prices on fish was at a controlled price, e.g., in Antigua/Barbuda mechanization started in 1955 and landings increased three fold between 1954 - 1958.[13]

In Antigua/Barbuda, there was significant success in the fishing vessel improvement program. Not only were the existing vessels mechanized and upgraded but new and larger vessels were successfully introduced into the fishing fleet. During the period 1959 to 1967 about twenty new vessels, ranging in size from 20 to 45ft were introduced to the fishery with financial assistance from the fisheries loan schemes.[14] All of the other islands had schemes designed to attract new entrants into the industry. The success of the fishing vessel improvement program in Antigua/Barbuda was also experienced by Grenada. This success was due not to any formal training of fishermen but to the long history of boat building on these two islands and the excellent traditional navigation skills. Boats for the transportation of inter-island cargo were already being

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[13] Hess, E, 1961 pp. 225

[14] Brown, W.H. Marine fisheries of the British West Indies ONR contract NONR - 3656 (83) Project NR 388067 Berkeley, California, Dept. Geog. University of California.

built in Grenada and Antigua. These boats could also be adapted to fishing and became qualified to participate in the incentive programs available to the fishing industry.[15]

The loan schemes enabled fishermen to acquire new vessels powered with outboard motors which resulted in an increased effort and in many cases an increased catch. In spite of this effort, there was little improvement in the overall economic status of the fishing industries relative to other economic sectors. This is reflected in its declining percentage contribution to the national GDP.[16] New and better equipped fishing vessels meant that fishermen were saddled with greater overhead costs; eg. fuel, mechanical maintenance, loans repayment, etc. Hence they would have had to increase their catch and their revenue from sales at a high enough level to off-set these new expenses. This did not happen and most fishing operations tended to be uneconomical. (Appendix I and II).

Overall fish landings in the region did increase significantly between 1960 to 1965 (See Table 1). An explanation for this is that the growing number of

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[15] Antigua & Barbuda Fisheries Division, 1981. "The Fishing Industry Credit Program," 1965-1980.

[16] Table V and IV.

fishermen and the mechanization program facilitated an increased fish catch, but individual fishermen landings were not significantly higher. One typical example is that of Antigua/Barbuda: between 1959 and 1963 fish production increased more than two fold. However, the size of the fishing fleet and the number of fishermen also increased by over 100% hence the catch per fishermen did not change substantially.[17] Less dramatic but similar increases were registered for most of the islands in the OECS region; on a regional level between 1960 to 1965 the quantity of locally produced fish increased from 3,120mt to 4,437mt, representing an increase of more than 40% (Table V). During this same period capital investment in the industry doubled while the number of fishermen increased by about 40%. Antigua/Barbuda and Grenada contributed significantly to this overall total.[18]

The increased number of fishermen entering the fisheries placed tremendous pressure upon the fisheries resources that were being exploited, without any real economic growth being experienced in the sector at that time. This represented a classic case of misdirected capitalization intended to meet the objectives of

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[17] Table V and Table VI.

[18] Ibid.

increasing employment and fish production without any consideration in improving the socio-economic status of fishermen or maintaining an economically viable sector. The result was that the fisheries were characterized by an underemployed labor force of very low productive levels. The earnings of fishermen from the industry were not adequate to allow for reinvestment, hence when public assistance was significantly reduced during the 1970s the harvesting sector realized very little technological advancement and little or no economic growth. It can therefore be concluded that this early policy framework established the foundation which today gives the fishing industry in the region its subsistence character and its continued dependence on government subsidies.

The fishing industries of the region inherited a traditional development perspective, in which decision-making for the establishment of policies did not reflect an effective framework that would ensure the establishment of relevant objectives with sequential procedures for the attainment of these objectives; this is the main factor which is responsible for the poor performance of the sector during this period. The results are that the region's fishing industries have maintained a welfare characteristic within the national economic

framework of these island states and have not realized their potential contribution to socio-economic development. The industries' survival in their present individual characteristics depended upon massive government subsidies in the form of duty free concessions on such imports as fuel, gear and vessels; and the restoration of payments on government loans to fishermen.[19] Hence, the possible level of development and rate of growth have not been realized because of the absence of the necessary prerequisites such as a skilled labor force, non-conflicting development objectives and the removal of the price control.

III. CAPITAL INVESTMENT AND GOVERNMENT CONTROL ON FISH PRICES

During the 1960s and 1970s capital investment returned very marginal profitability to fishermen who ventured into the fishing industry. The level of returns on capital could not facilitate any economic sustainability within the sector because the revenue derived from fishing was just enough to provide operational cost and a small salary or subsistence to fishermen.[20] Many fishermen and fisheries administrators who were involved in the industry during this period concluded that the price

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[19] Caricom Secretarit, 1982. "Report of Proceedings of First Meeting of Caribbean Fisheries Officials" Kingston, Jamaica.

[20] Appendix I & II.

control measures that were imposed on locally produced fish, have only allowed fishermen to realize marginal returns to capital and suggested that this was a major contributor to the apparent lack of economic growth the industry experienced in the different states.[21]

A. Price Structure and Trade Margins

The performance and efficiency of the fish trade is heavily reflected in fish prices. In all the OECS territories, maximum prices of locally produced fresh fish are enforced by governments price control legislation.[22] As a result market forces are circumvented and the natural economic growth of the industry was subsequently retarded. The political belief at that time contended that price control on fish was necessary, since the industry was heavily subsidized at a public cost and also to provide a cheap source of protein to the population. However, evidence has shown that price control as operated in the region, offers no benefits to either the fishermen or the consumers in the long run since the low cost of fish prevented fishermen from repaying their loans or increased production through technological development

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[21] Challenger, B; Williams, C., 1988 (Editors), "Report of the First OECS WOrkshop on FIsheries Management and Development" OECS Fishery Report No. 1: p. 104.22 Ibid., p. 10.

[22] Ibid., p. 10.

which requires additional development capital.

In contrast to the control price of fresh fish, the major single imported fish product (salted cod) was retailing for an uncontrolled price between $0.65 cents - $0.80 cents.[23]

The control price on fresh fish varied considerably within the region, it became apparent that those islands where the price for fish was higher, the corresponding catch and the level of fisheries development was more significant. Considerations such as buying power, which is reflected in the GNP/Capita, ethnic composition and cultural background of the societies are factors that determine the demand level and the demand schedule for fish prices, and the resulting control price that is being instituted.[24]

During the latter half of the sixties, Dominica de-regulated the price of fish with an objective of increasing revenue to fishermen and providing them with

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[23] Kreuzer, R.; Oswald, E. O., 1978, "Report on Mission to Antigua, Barbados, Dominica and St. Lucia," FAO/WECA/C inter-regional project for the development of fisheries in the Western Central Atlantic, p. 1-18.

[24] Ministry of Agriculture, Fisheries & Lands, 1981, "Report of the Pricing Committee Antigua & Barbuda, p. 5.

an incentive to increase their production.[25] However, this objective did not materialize because:

(a) fishermen claimed that middlemen retained the greater portion of the increase revenue;

(b) limitation of the nearshore resources on Dominica's narrow island shelf;

(c) need for change in fishing practices.

Price control legislation can, and have had, an impeding effect on the marketing and distribution systems. The control price of fish provided an incentive for fishermen to retain as much as possible on the final value of the fish, consequently, the fisherman will tend to distribute the fish himself. This resulted in inefficient marketing and distribution system with a very limited capability to develop more lucrative marketing opportunities.[26]

Presently, effective control on fish prices in the current system has in all countries been difficult to implement. This is due to the significant increase in the demand for seafood in the region, and a shift in consumer's meat protein preference and the rapid growth in overnight

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[25] Kreuzer, R.; Oswald, E. O., 1978, "Report on Mission to Antigua, Barbados, Dominica and St. Lucia," FAO/WECA/C inter-regional project for the development of fisheries in the Western Central Atlantic, p. 6-16.

[26] Ibid., p. 12.

visitors within the tourism industry.[27] Control prices are still maintained by law, although consumers are willing to pay higher prices for their fish due to a shortage in supply and the high preference for seafood protein. The existence of legislative price control have held back the actual price that could be obtained by market forces, however, compared to the price levels that would develop in a free market environment, it is believed that the price control is maintained primarily for political reasons without any socio-economic rationale. As a result, St. Vincent and the Grenadines with opening of the new wholesale and retail market in Kingstown, have renounced price control legislation and have allowed market forces to set the price for locally produced seafood. Since the removal of the fixed price system fish landings have tripled at that market; however, it is uncertain the unregulated prices is the reason for this increased landings.

In Antigua/Barbuda for example, more than 0.2 million dollars were invested in additional boat and fishing gear with funds from low interest public loans between 1960-1965. In addition, there was also

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[27] Challenger, B; Williams, C., 1988 (Editors), "Report of the First OECS WOrkshop on FIsheries Management and Development" OECS Fishery Report No. 1, May 1988.

considerable capital investment from the private sector as total investment from fishermen themselves was about 0.6 million dollars.[28] However, the revenue from the catch for the entire fishing fleet over this period increased by only 0.1 million dollars.

Investigation into the reason for the low revenue growth for locally produced fish pointed to a number of commonalities among all the islands. These include:[29]

(a) Government price control for locally produced fish. All the islands had some form of price control regulation on locally produced fish, with an average ceiling price of $0.35/lb which was maintained until 1970. The price control measures that were imposed on fish were not in tandem with the policy objectives of maximizing productive employment and socio-economic growth within the sector. It can therefore be concluded that the artificial suppression of market prices produced low returns on investment capital while operational costs continued to increase. This was the primary factor for the stagnant economic growth and underemployment which characterized the fishing industries of the OECS region up until 1970.

(b) Excess fishing effort that was applied to the resources of the traditional fishing grounds were above the optimal level that could produce significant economic profitability for the fishermen. Hence, even though the overall landings increased significantly the catch/unit

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[28] Videaus, L., 1971, "Caribbean Fishing Industries 1960-1970. "A Cursory Report of a Series of Country Studies," UNDP/FAO Caribbean Fisheries Development Project. SF/CAR/REG. 189M24. p. 8-19.

[29] Ibid., p. 1-29.

effort declined while the price of fish remained constant. Therefore, the unit fishing operation recorded declining net revenue while the cost of operating newly mechanized vessels and equipment increased, constituting a case of economic over-fishing.

The failure of the initial program strategy to adequately address the economic potential of the fisheries of the OECS region, is responsible for the welfare nature ofthe industry today. The future development of the fisheries sector must therefore take into consideration those factors that would ensure sustained economic growth and a higher standard of living for participants in the industry. Among these factors would be the resource potential, the ability of fisheries to harvest these resources and the demand for fish both at the domestic and international levels. The available and potential markets should be analyzed to ensure that the optimum price for the fish are obtained.

IV. ANALYSIS OF OECS FISHING VESSEL OPERATIONS 1965-1970

The economic performance of any industry is determined by the ratio of the cost of production to the revenues obtained from the product. The fishing industries of the OECS are dependent on a number of factors, these include the availability of the harvestable resources, number of people employed in the industry, the number of

fishing vessels, the cost of their operation, the quantity of fish landed and the market availability and pricing schedule for fish and fish products.[30]

During the period between 1965 and 1970 there was an annual increase in the number of fishermen in the OECS. In 1965 the total number of fulltime and parttime fishermen from OECS countries were about 6,555, by 1970 the number of fishermen increased by about 50 percent of the 1965 figure amounting to approximately 9,922 fishermen.[31]

In terms of employment the industries in the region absorbed an average of about 4 percent of the total labor force in 1965. The percentage of the labor force employed in fisheries throughout the OECS region increased to about 7 percent by 1970. The increased manpower in the fisheries industries suggested that the objective of increasing the level of employment in this sector was realized.

In 1967 the number of OECS fishing vessels operating in the region was about 1,175. The credit

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[30] Mackenzie, W. C., 1983, "An Introduction to the Economics of Fisheries Management," FAO Fisheries Technical Paper, No. 226, p. 8.

[31] Table I, Table II.

programs provided by Governments enabled fishermen not only to motorize their vessels but also assisted in increasing the fishing fleet to about 1,816 by 1970. The fishing fleet improvement program was achieved at a cost of over EC8 million dollars which is equivalent to approximately US3.0 million dollars.[32]

During the period which is being discussed fishing effort was normally organized on a daily basis; vessels leave port at dawn and normally return at mid-afternoon. Each vessel averaged about 99 trips/year. Total landings of all OECS fishing vessels during 1965 was recorded at 4,437 mt and 1970 total production in the region increased to 6,200 mt, at values of $ 3.9 million (Eastern Caribbean) and 6.3 million dollars respectively. The ex-vessel control price of fish averaged about $0.45 in 1960 and $0.50 in 1970. [Table V and VI]

The total cost of production in 1965 and 1970 including depreciation of vessels, interest on capital outlay, insurance, fuel, maintenance and spare parts is calculated at about 6.6 million dollars and 9.8 million dollars respectively; this is based on the total number of vessels operating and the average cost per fishing

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[32] Table V and VI.

effort.[33]

The annual recurrent cost for the operation of a typical small size motorized fishing vessel in the region, after depreciation, loan servicing, insurance, fuel, labor, maintenance and gear replacement are taken into consideration is estimated to have been EC$5,395.[34]

The annual revenue obtained by the same operation during this period averaged about 5,148 Eastern Caribbean dollars. This indicates that the average fishing operation in the region operated at a loss during this period. However, this annual deficit may not have been apparent to vessel owners because most fishing vessels are usually owner operated, hence the owner's share as part of the crew's share is generally regarded as profit to the owner. Another interesting observation with regard to the operation of fishing vessels is that most vessel owners did not repay their loans which were issued by governments. Therefore, the cost of credit, insurance, depreciation and the credit itself are not observed by vessels owners, hence the reasons for their continued ability to operate. In Antigua/Barbuda for example more

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[33] Videaus, L., 1971, "Caribbean Fishing Industries 1960-1970. UNDP/FAO Caribbean Fisheries Development Project. SF/CAR/Registration 189M24. p. 8-19.

[34] Appendix I and II.

than .25 million dollars were depreciation expenses of vessel and gear, which would be reflected as principal repayment on the loans contributed to additional net revenue to the vessel owner.[35]

The economic operation deficiency of harvesting sub-sector of the industry had far reaching implications on the development of the industry. About $3M (Eastern Caribbean dollars) were issued in loans over the first eight years of the various credit programs operated by member governments, little or none of this amount has ever been repaid. All the other OECS countries experienced problems with the administration of the fisheries development loans funds. Virtually all these islands were forced to cancel their fisheries loan schemes due to the delinquency of fishermen in meeting their loan repayment schedules.[36]

Most fishermen argued that the low price on fish made it impossible for them to make enough money to meet their loan repayment obligations or to carry out needed repair and maintenance on their vessels. Fishermen contend that if they had repaid their loans they would not have

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[35] Ibid.

[36] Videaus, L., 1971, UNDP/FAO Caribbean Fisheries Development Project. SF/CAR/Registration 189M24. Caribbean Fishing Industries, 1960-1970.

any money to replace fishing gear or cover operational cost, and pointed their relatively low standard of living during this period which was about the lowest of the national labor force as a testament to this fact. The foregoing expenditure/revenue analysis has given some credibility to the fishermen's contentions as far as their net earnings are concerned. One former fisheries officer from the region said that all outstanding loans to fishermen should be written off because fishermen, unlike other producers of primary products, were forced to sell their fish at controlled prices with little or no free market opportunities to stimulate growth in the sector.[37]

V. ECONOMIC POTENTIAL OF THE OECS FISHING INDUSTRY

Although the fishing industry demonstrated little or no economic growth between 1960 to 1975 , there are some economic indicators that reflected the potential for the industry to become a viable sector within the overall framework of the regional economy. The contribution of fisheries to the region's gross national product is one such indicator. Between 1960 to 1965 fisheries contribution to the GNP recorded an increase of more than 9 percent to an average of about 1 percent of the GNP. Fish landings increased from 3120 mt to 4437 mt with a

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[37] Ralph Camacho: Chief Fisheries Officer, Antigua/Barbuda Personal Comments: 1960 - 1976.

corresponding increase in revenue from 1.59 million dollars to 3.9 million dollars.[38]

Following 1965, as the region experienced virtual stagnation in economic growth, the fishing industry performed relatively well compared to other sectors of the economy. While the agricultural and tourism sectors registered some decline in their contribution to the GNP; the fisheries sector percentage Fish landings increased from 4437 mt in 1965 to 6200 mt in 1970 contribution increased from 1.1 percent of GNP to 1.5 percent.[39] This represents an increased dollar value from 2.2 million dollars to 4.5 million dollars. This performance is attributed not only to the increased fish production over this period but also to an increase in the government control price of fish from an average of $0.45 per pound to a regional average of $0.50. Similar patterns of growth were also experienced up to 1984 when the average contribution to the GNP peaked at 3.04 percent and the average price for fish reached $1.75 per pound.[40]

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[38] Table V and Table VI.

[39] Table V and Table VI.

[40] Goodwin, M. et. al., 1985. Fisheries Sector Assessment for the OECS.(Island resource foundation).

Based on the above observation it is apparent that the fishing industries represents a viable sector within the general economic framework of the region, if due consideration is given to the resource potential of the EEZ and the determinant of the optimal fishing effort that should be applied to these living resources to ensure that stated objectives are achieved complete with the removal of the restrictive price control policy. To rationalize this economic potential, an effective development plan must be implemented to ensure that the determining factors of economic growth are effectively addressed to the benefit of those involved in the sector in particular and to the region in general.

Real development growth should not only be measured by the sector's contribution to Gross National Product (GNP). Gross National Product indicators alone do not reflect the performance of individual fishermen and hence the real socio-economic benefits which the sectoral participants actually obtain from the fisheries sector. (See Appendix III) A sector experiencing development growth usually realized increase in the number of persons employed within the sector, increase in income, improvements in the socio-economic status of sectoral employees and employers and an increase in capital

availability to the sector.[41] This list, although not exhaustive, is an indication of the sort of metamorphosis that would accompany growth and development. As seen from the above discussions, although the fisheries sector increased its contribution to the GNP, no real development growth was experienced since the sector lacked an environment which is conducive to growth.

There is, however, the recognition that with an effective developmental strategy real growth can be realized. The fact that there is some potential for sustained economic development of the sector necessitates the establishment of renewed policy guidelines that would lead to the harvesting of the economic development growth which is possible from the industry. For such developmental growth to be realized within the fisheries sector, the following activities must be implemented to stimulate the required investment capital:

(1) the removal of the price control on fish;

(2) controlled incentives to potential fishermen;

(3) development of infrastructure;

(4) training and adoption of appropriate technology;

(5) a fisheries administration that can pursue effective management and development strategies; and

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[41] Economic Policy Council (World Bank Report): Economic development policy guidelines Vol. III. Background Narrative. January 1979.

(6) regulated access to the resources.

The removal of price control would guarantee a fair price for fish and would allow fishing vessels to operate more effectively and economically efficiently, hence reducing the need for subsidies that the government provides to the industry at a cost that the government cannot presently afford. The market demands would establish acceptable price on fish and would provide added incentives for fishermen to explore new fishing grounds. Fisheries development throughout the sixties and early seventies was based on the maximization of man-power within the fisheries labor force and provision of cheap protein rather than economic efficiency and profitability of fishing operations. The importance of a net return to investment was not a primary consideration. The performance of the industry was therefore marginalized and could not facilitate sectoral growth, the result of which is an underdeveloped fisheries sector and a subsequent need for continuous governmental subsidies.

The impediments to the economic development of the fisheries industry of the OECS region must be addressed within a context that will recognize that fisheries sector growth must be realized within a national economic plan

taking other sectors of the economy into consideration that have the potential of attracting large amounts of capital resources. It is therefore necessary that the fisheries sector attack the basic problems, which are impeding its developmental growth within a structured development plan which is based on historic use rights and a limitation in the number of new entrants into the harvesting sub-sector. Addressing these developmental problems will necessitate a realistic evaluation of the resource base that is required to sustain economic development over a long term period. It is also very important to recognize the need for a disciplined approach to the problem since further ad hoc development will result in catastrophy over the long run.

VI. Summary

In order to address the potential of OECS fisheries, there are a number of factors which must be taken into consideration.

(a) sustainable yield of the fisheries resources;

(b) the operational cost of the harvesting sub-sector;

(c) the potential market value for the fish products; and

(d) social benefits that can be derived from the exploitation of the fishery.

therefore be reached between the level of fish production and the cost of producing this quantity so as to maintain viable economic fishing operations. If marginal cost of effort is more than the marginal revenue obtained by the industry, Member States will experience a net economic loss since the additional fish will be taken from a strict economic standpoint at a cost greater than their market value.

CHAPTER V

FISHERIES DEVELOPMENT PROSPECTS AND BENEFITS

I. INTRODUCTION

The prospect of sound fisheries management and development in the OECS region will depend largely on the goals and objectives that are pursued within a sectoral development plan, and the extent of the fisheries resources within the Exclusive Economic Zones.[1]

Given the current nature and abundance of the fisheries resources under these countries' jurisdiction and the potential for the enhancement of the regions' fishing fleet and land-base infrastructure, it is justifiable to conclude that fisheries development in the OECS has the potential for achieving a higher level of output with increased socio-economic benefits to Member States.[2] To achieve this high level of output a fisheries development plan with a clearly defined goal and objective must be developed and implemented.

At a workshop on Fisheries Development Planning

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[1] Mahon R., Fisheries Management Options for the Lesser Antilles Countries - 1990, FAO FIsheries Technical Paper, p. 22.

[2] Ibid., p. 26.

in St. Lucia, Member States participants agreed that management and development planning is a useful tool to assist Governments to arrange and develop the industry and that planning activities should be integrated within national and regional planning systems.[3]

All Member States have stated through policy declaration that their fisheries management and development objectives include:

(a) increased fish production;

(b) improved standard of living for fishermen;

(c) maximized employment opportunities in the fisheries sector; and

(d) increased fish export and providing substitutes for imported products.

While sectoral developmental objectives have not changed, over the years a number of other objectives have been added as Member OECS States place higher priorities on fisheries development as a viable attribute to national economic growth. The prospect of achieving these objectives of development, depends on the availability of the necessary inputs and an effective strategy for program implementation in the fishing industry. The prospect also depends upon the cooperation of fishermen and marketing and distribution agencies in the pursuance of these

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[3] Workshop on Fisheries Development planning in the WECAFC Region FAO fisheries Report No. 359 (FIPP/R359) p. 29.

sectoral management and development objectives.[4] It is also important that management and the development plan take into consideration those interacting factors that can influence the successful achievement of these sectoral objectives.

Among the factors that must be taken into consideration in the pursuance of fisheries management and development objectives within the OECS are:

(a) the nature and abundance of the available fisheries resources;

(b) the harvesting capabilities of the regions fishing fleet;

(c) marketing and processing potential at the national and regional levels;

(d) public administration and management mechanisms;

(e) availability of investment capital.

If the OECS as a region is to achieve its stated objectives with respect to its goals of fisheries management and development, there must be adequate understanding of the impact that the various factors will have, as these impacts will determine the possibilities of achieving the stated objectives.[5] The

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[4] Ibid., p. 10.

[5] Commonwealth Secretariat, Module in Fisheries Policy and Planning OECS/TP/Ref. 1.

understanding of these factors must then be fully considered in policy development and institutionalization. Recognition of the impact that these factors can have on development goals will facilitate the accomplishment of the stated objectives and will also determine the level of importance which the operation attributes such as revenues, production cost, technological development and cost to the public.[6]

This Chapter will examine the prospects and benefits for OECS States in achieving its management and development objectives. The factors that will influence the achievement of these objectives will be examined to ascertain their possible impacts and the adjustments that would be necessary to facilitate the development process.

Although the nature and abundance of the stock is paramount in setting fisheries development and management objectives, this factor alone cannot provide the justification for multiple objective management plans as those stated by OECS States. The economic and social factors that are associated with the development and management process must also be taken into consideration as they will determine the cooperation of fishermen and their

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6 Ibid., p. 5.

communities in complying with the management plans. The economic viability of the harvesting sub-sector is also an important prerequisite as this factor will provide the basis for attracting investment capital to improve the efficiency of the fishing fleet in the achievement of increased fish production.

All of the above social factors are important considerations in management planning in determining the mechanism that should be instituted to achieve increased production levels and employment opportunities.

Attainment of economic efficiency within the fisheries sector in the OECS is important, because of the scarce financial resources that are available to Member States and the declining ability of these States to continue to subsidize the industry. It is therefore important from the onset, that the value of the catch and the cost of input to achieve this catch be considered as the basis for any development and management plans. If the fishery is managed from an economic standpoint so that the maximum difference between the value and cost of the catch is pursued, then it would ensure that the industry does not utilize economic resources that could be used more

beneficially elsewhere in the economy.[7] Hence, optimizing the economic benefits from the fisheries resources is a primary consideration of management and development. The yield that is achieved at this level is also an acceptable level in terms of the sustainability of the resource, because it is normally obtained below the level of Maximum Sustainable Yield (MSY). However, the management of a fishery from a pure economic standpoint would conflict with other management objectives, such as the attainment of optimum employment opportunities, collective social benefits and community stability. It is therefore necessary to ascertain from the inception stages of development, that there is a balance compromised in establishing the expectation from the objectives. This can be addressed through careful rationalization of the factors which will impact the outcome of the developmental process.[8]

II. OBJECTIVES AND EXPECTATIONS OF FISHERIES DEVELOPMENT

The objectives and expectations of fisheries development must be geared towards the achievements of the fisheries development goals that are expressed in

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[7] FAO. 1983. FIRP/FIRM/R289: Report of Expert Consultation on the regulation of Fishing Effort.

[8] FAO. 1983. FIRP/R229; Report of the Working Party on the Principles of Fisheries Management in the New Ocean Regime.

national and regional economic development plans.[9] Proper identification and evaluation of sectoral objectives will ensure from the onset whether or not the sector can meet its obligations as far as its role in national and regional development is concerned. This initial identification and evaluation process is important because at this level, it can be determined whether or not the objectives that are required to achieve the development goals can be attained with existing resources and the additional inputs and outputs that might be required to achieve these objectives.

The goals established for fisheries development in the countries of the OECS can be summarized in a broad but pragmatic framework, which is the enhancement of the socio-economic contribution of fisheries to the economies of Member OECS States on a sustainable basis.[10]

The rationale for this goal is based on the potential contribution of the sea and how its resources are expected to make national and regional development as

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[9] Commonwealth Secretariat, 1990. Module in Fisheries Policy Planning, COM.SEC/OECS/TP/REF 1.

[10] Challenger B.; Williams C.; 1988 (eds) OECS Fishery Report of Proceedings of the First OECS Workshop on Fisheries Management and Development.

a result of extended jurisdiction over marine resources in accordance with the provision of UNCLOS III. The rationaleis also based on the fact that, Member States of the Organization are in the process of diversifying their economies in an effort to meet the challenges that are confronting their socio-economic growth process, due to the decline in production of traditional frontline industries, such as tourism and agriculture. These realities compounded by the growing expectation of higher standards of living for an increasingly demanding population.

For the fisheries sector to achieve its development potential, clearly defined and attainable sectoral objectives must be established and vigorously pursued. These objectives must take into consideration the potential yield that can be obtained from the resources, available technology, market opportunities and socio-economic conditions.[11] Given the above considerations and the established fisheries development goal in the region. The following objectives are appropriate for realizing this goal:

(a) increased fish production;

(b) improved standard of living for fishermen;

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[11] FAO, 1986; Strategy for Fisheries Management and Development

(c) maximize employment opportunities; and

(d) increase fish export and provide substitutes for imported seafood products.

It is apparent that the fisheries development process is expected to pursue more than one objective in order to achieve the development goal. It is therefore necessary that the comparative advantage of these objectives be indicated and clearly prioritized. Since the conditions and necessities for fisheries development in the region is not institutionalized, fisheries development planning is highly dynamic, hence, objectives that might be presently appropriate can become inappropriate during the development process. It is extremely important to carry out periodic evaluation of these objectives to ascertain their continued validity. The factors which will determine the attainment of these objectives should also be evaluated, as this evaluation will indicate at an early stage in the planning process whether or not the objectives can be achieved.[12]

The factors that will determine the attainment of the objectives are; the potential of the resource base to produce targeted production level; the nature of the fishing fleet; the availability of marketing and distribution systems and the fisheries management

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[12] OECS/TP/Ref/10: The Logical Framework - Modifications based on Experience.

mechanism which is adopted. The following analysis of the stated objective will evaluate the livelihood of their achievement base on these interacting factors.

A. Increased Fish Production

The estimated sustainable yield from the major fish stocks in the region was well established in Chapter 1. For the demersal reef species and the coastal pelagics an estimated sustainable yield based on the bio-mass and an estimated standing stock was determined to be approximately 8,211 mt.[13]

Currently annual fish production from these standing demersal and near shore pelagic stocks from the Antigua/Barbuda, Monterssat, St. Kitts and Nevis' EEZs is about 1,650 mt giving a sustainable yield of 3,648 mt. It is likely, therefore, that a further 750 mt of fish can be harvested within the sustainable level of these stocks providing for a Total Allowable Catch (TAC) at 65 percent of the Maximum Sustainable Yield (MSY).[14]

Increased production of fish can also be realized from the migratory pelagic stocks which are seasonally available in the EEZs of Member OECS States. Although

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[13] See Table IV.

[14] Ibid.

there is no precise estimation of the magnitude of these pelagic stocks, there are some fairly reliable estimates which provide a basis upon which production levels can be established. For example, the international convention for the Conservation of Atlantic Tuna estimated a maximum sustainable yield of 35,000 metric tons for yellowfin tunas occurring in the Western central Atlantic area. A review of the Marine resources of the Western central Atlantic was conducted in 1981 and concluded that the pelagic resources has the greatest potential for increased exploitation.[15]

The objective of increased production of fish in the OECS is further justified, by the fact that in Member States food production lags significantly behind population growth creating a high demand for imported food products. The high protein content and the ready availability of seafood presents a good alternative to reduce food import demand and increase food security in these countries.

Member States are experiencing annual increases in food import as their population and subsequent demand for protein increases.[16] Faced with a widening food

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[15] Stevenson, D. K., A review of the marine resources of the Western central Atlantic Fisheries Commission (WECAFC) region. FAO Fisheries Technical Paper, (211): 132p.

[16] OECS/EAS Secretariat: OECS Statistical Digest, 1988.

production deficit and declining foreign exchange it is important that the region develop its capabilities to produce increased quantities of those food commodities it is capable of producing and to substitute for some imported products. Fish and other seafood products presents a major potential for the reduction of the food importation bill and the protein production/deficit of Member OECS States.

Yield estimates were calculated for the fisheries resources within the EEZ of Member OECS States.[17] Yet the percentage biomass method which is used can only provide estimates on resource abundance as a proportion of total biomass and cannot provide any quantitative analysis of the species composition of the resource base. In order to establish a more realistic sustainable yield estimates, a more reliable stock assessment methods base on catch effort information must be developed and implemented before the resource is subjected to increased production in the OECS region.

This is important because when there is no reliable information on the nature and abundance of the resource to be harvested within a fisheries development plan, at least two negative consequences are likely to occur: fisheries development planning will be limited to guess work and

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[17] Table I, Table II, Table III and Table IV.

management plans will not normally be effective in achieving the desired goals.

As noted in Chapter 1, the fisheries resources within the EEZ of Member OECS States are relatively limited in nature. Therefore to sustain any increase in production a proper management regime based on compatible objectives it is necessary to prevent the over-exploitation of the resource base. If a proper management regime based on monitoring and control is not adopted and the level of harvesting is increased, the likely result will be a reduction in fisheries income and over-exploitation of the fisheries resources. Within the industry itself, there would be serious implications for gainful employment opportunities and the standard of living for most fishermen. There is, therefore, a need to recognize the limitations of the fisheries resources in establishing the fisheries management and development objectives which are geared towards increasing production.[18]

However, in most of these countries, fisheries exploitation is less than 50 percent of the sustainable

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[18] Mackenzie W.C. An Introduction to the Economies of Fisheries Management. FAO. FIPP/T226.

yield estimates which is calculated in this study.[19] It istherefore possible, that the resource can sustain moderate increase in exploitation of up to 75 percent of this sustainable yield estimate. This would allow for a margin of error of up to 25 percent and maintain productions within the biological and socio-economic yield levels of the production curve.

Currently the region is exploiting less than 40 percent of the maximum sustainable yield of its demersal resources.[20] An increase in production of 2,000 mt would put exploitation levels to about 62 percent of the estimated sustainable yield. A production target ofabout 5,150 mt is therefore possible from the demersal and coastal pelagic resources based on a sustainable yield of 8,211 mt and a harvesting target (Total Allowable Catch TAC) of 70 percent of the MSY (Maximum Sustainable Yield).

To increase demersal and coastal pelagics production by 2,000 mt would require significant improvement and restructuring of the demersal fishing fleet currently operating in Member States. The fishing fleet of Antigua, St. Christopher/Nevis and Montserrat is almost exclusively targeting these resources, and constitute approximately 90 percent of total fishing effort in these Member

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[19] See Table IV.

States.[20] On the other hand, the pelagic resources dominate the fisheries of the Windward Islands, the fishingfleet comprises mainly of vessels targeting the seasonal migratory and coastal pelagic resources between November to July and the demersal resources between July to November.[21]

Approximately 75 percent of the fishing effort of St. Lucia, St. Vincent and Grenada is geared towards pelagic fishing and 23 percent towards the demersal reef species.[22]

Grenada and St. Vincent and the Grenadines share a common shelf area and together have a yield potential for demersals and nearshore pelagics of about 4,000 mt. The current harvesting levels of these resources based on 1989 estimates are approximately 1,500 mt or about 30 percent of their potential yield.[23] Therefore it can be concluded that production from these resources can be doubled to 3,000 mt without risking the sustainability of the nature and abundance of the resource.

Given the present technology and manpower skills

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[20] Table IV.

[21] Atapattu, A. R., Institutional credit for small scale fisheries in countries of the OECS, 1989.

[22] Atapattu A. R. Institutional Credit for Small Scale Fishermen in the Countries of the OECS, 1989.

[23] Appendix III.

that are available in the region, it is not possible for the region to increase production of its demersal resources to these expected levels without improving existing technology.[24] There is, therefore, a need to enhance the efficiency of the present fleet through a technology and manpower improvement program to improve the economic viability of fish harvesting operation.

While technological improvement alone could increase the catch/unit effort of the demersal fleet in the Leeward Island to meet the production goal, the actual fleet size targeting the reef species in the Windward Islands will require some expansion, if the target of 1,500 tons from the Windward zone is to be realized. The current catch/unit effort for the Leeward Islands demersal fleet is about 600 lbs.[25] A unit/effort is referred to as one boat, operated by an average of three (3) persons spending about 12 hours at sea hauling 60 traps.

Most of the vessels in the Leeward Islands fleet could improve their production rate by acquiring the necessary technology that would speedup the time spent locating and hauling their fish traps and other detached

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[24] Atapattu A. R. Institutional Credit for Small Scale Fishermen in the Countries of the OECS, 1989.

[25] Based on 1989 Catch Estimates and the number of fishermen and vessels in operation (See Table)

fishing gears such as long lines. A considerable number of these vessels are not equipped with fish finders and hydraulic haulers making the process of setting and returning fish traps a very time consuming undertaking.[26]

The most abundant stocks of fish within Member States' EEZ are the migratory oceanic pelagics which are relatively abundant on a seasonal basis. The fishing industry of St. Vincent and the Grenadines, St. Lucia, Dominica and Grenada depends almost exclusively on the exploitation of pelagic stocks such as dolphin, flying fish, wahoo and tunas.[27]

The significant aspect of the biology of these oceanic pelagics is that they are widely distributed throughout the Western Atlantic and are only seasonally available for exploitation in the OECS.[28] These stocks are available in significant quantities and represents the most important stocks upon which increased production can be realized. However, the lack of adequate knowledge of the nature and abundance of these resources predicates the need for a controlled introduction of larger vessels and

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[26] Atapattu A. R. Institutional Credit for Small Scale Fishermen in the Countries of the OECS, 1989.

[27] Mahon R. Fisheries Management Options for the Lesser Antilles Countries. FAO/FTP/313.

[28] Ibid., p. 32.

careful monitoring of the stocks' response to increasing fishing pressure.[29]

Based on yield estimates from the International Commission for the Conservation of Atlantic Tunas, the maximum sustainable yield for the Western Atlantic yellowfin tuna is approximately 35,000 mt; of this amount, Venezuela vessels harvest about 30,000 tons from waters throughout the Western Atlantic region.[30] Schools from this yellowfin stock have been located in the Lesser Antilles areas in large spawning aggregations. It is therefore possible for the OECS to claim a right to these resources as they migrate through Member States EEZ. An annual production target of 3000 metric tons of this resource is also possible, given that more than twenty-five percent (25%) of the annual yellowfin production of Venezuela is believed to be taken illegally in waters under OECS Member States' jurisdiction. Member countries of the OECS could institute the relevant mechanisms to ensure that they can benefit from the harvesting of these resources. An international agreement among countries within the Western Atlantic region, complete with the establishment of a Total Allowable Catch (TAC) and catch quotas for

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[29] Ibid., p. 36.

[30] Mahon, R., 1991, "Potential for increasing fish landings in the OECS region," Paper presented at the OECS/Commonwealth training program on fisheries management and development. Antigua, 1991.

those states bordering the western Atlantic, could provide the necessary management mechanism, that will insure that OECS states benefit from these resources.

Based on the foregoing analysis and establishing a TAC of 60 percent of the maximum sustainability yield of the regions fisheries resources, it is possible for the states of the region to increase fishing production to 18,000 mt from the estimated 1989 total production of 6500 mt.

The estimated 1989 pelagic fish landings for the region was 4,500 tons.[31] Although there are no estimates of the abundance of these resources it is widely believed by the scientific and harvesting experts that current production levels are about 20 percent of the maximum sustainable yield of these resources which is believed to be about 20,000 mt.[32]

The combined sustainable yield of demersal and pelagic resources, based on the foregoing estimates is about 29,000 mt. It should be noted, however, that

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[31] Appendix IV.

[32] Challenger, B. and Williams, C. (Editors). 1988. "The first OECS workshop on fisheries management and development," St. Vincent and the Grenadines, 1987. OECS fisheries report No. 1, p. 63-66.

because yield estimates have been circulated using circumstantial methods, a TAC should be declared within a guaranteed safety limit of the estimated yield. For the purpose of this analysis a TAC is calculated at 60 percent of the Maximum Sustainable Yield (MSY) or 18,000 mt.

A further 11,000 mt is therefore available for exploitation and will provide the resource base for fisheries development and management in the region. It must be noted however, that more than 75 percent of the TAC comprises the migratory pelagics. Therefore, any fisheries development and management goals that are based on these pelagic resources must be carried out on a cooperative regional basis to ensure their proper management and utilization as is required under international law.[33]

B. Maximized Employment

Maximizing employment in the fishing industry should be pursued within the contexts of productive efficiency of the harvesting sector work force, and the overall size and composition of the fishing fleet and the marketing and processing potential available to the industry. This is referred

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[33] Third United Nations Law of the Sea Convention, 1983, Article 61 and 62.

to as the operational capacity of the fishery and should be match against the potential yield of the resource to determine developmental growth.

It has been established in Chapter III that there is insufficient fish production in the OECS to meet the fisheries development goals that have been established in the region. As a result, the region imports more than 40 percent of its current seafood consumption. Although employment levels (number of fishermen) in the industry have been maintained constant over the past ten (10) years, at an average of three (3) personnel/vessel over the last five (5) years, indications are that many of those small vessels in the Windward Islands are over-manned and could be more efficiently operated with two (2) personnel with some improvement in harvesting technology.[34] This suggest the necessary prerequisite to enhance the economic efficiency of the traditional fishing fleet of the region.

The present number of fishermen in the OECS is 11,000 operating about 3,118 vessels at an average of 3.5 fishermen per vessel. Of this amount, it is believed that over 60 percent is underemployed; and that the number of fishermen could be reduced to 8,000 and maintain the

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[34] Walters, H. D. Chief Fisheries Officer St. Lucia (Personal Comments).

same production of 6,500 mt.[35] A limited number of this class of fishermen could be re-trained and equipped with vessels and gear to target the demersal resources in pursuance of the exploitation target. While the remaining excess could be re-deployed into the migratory pelagic fishery. This strategy would ensure the exploitation of the demersal resources exclusively by the traditional fishermen, while the development of the pelagic fleet would depend on new entrants into the fishery.

Increased employment in the sector could however be realized form increased exploitation of the oceanic pelagic resources by the introduction **of new vessels** to a new off shore fleet and through ancillary services such as processing, marketing, vessel and gear repair an maintenance, the region could increase employment opportunities.

The new entrants that would be required for the harvesting sub-sector level would require specialized skills in the operation of large fishing vessels equipped with state of the art appropriate technology, to harvest the oceanic pelagic resources. As previously indicated the TAC for these resources, established at 60 percent of the maximum sustainable yield of 20,000 mt is about 12,000

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[35] See Table IV, iii.

mt, while the current production level is 4,500 mt. There is therefore available an amount of 7,500 mt from the pelagic resources which will require additional vessels and manpower for its exploitation. Based on catch records of American swordfishing vessels operating in the Lesser Antilles, a vessel operated by four (4) fishermen spending two (2) weeks fishing can harvest up to 5 mt of fish per trip. Given a pelagic fishing season of seven (7) months per year such a vessel could complete about ten (10) trips with a total production of 50 mt during the seven (7) month season. It would require a fleet of 175 similar vessels fishing throughout the season to harvest a total allowable catch of 12,000 mt of pelagic resources. This level of fleet expansion would require a total crew of approximately 1,050 fishermen at a rate of six (6) fishermen per vessel.

It can therefore be concluded that the level of employment in the fisheries sector can be increased significantly; with the possibility of about 10 percent increase in the number of fishermen and similar increases in the marketing, processing and other sectoral services. By increasing the economic efficiency of Member States' fishing fleets, the harvesting sector would realize higher net revenue and corresponding increased income to fishermen allowing for a higher standard of living.

C. Increased Fish Export

There is a significant external demand for a number of fish species that are available in the OECS' exclusive economic zones. Among these are several species of snappers, the spiny lobster, the swordfish, the dolphin fish and the yellowfin tuna.[36] The region exports about 1,478 mt of fresh fish, this includes an assortment of demersal reef species, the spiny lobster and an unspecified amount of pelagic species.[37] In order to provide for import substitution products the export oriented markets should concentrate on the export of high valued species such as the spiny lobster, red snapper, swordfish and the yellowfin tuna. Other species such as flying fish, dolphin and kingfish should only be exported when Member States domestic demands are satisfied. Secondary processing of underutilized species which occur in large quantities should be undertaken as value added to the industry.

Illegal foreign fishing in the OECS region for pelagic resource is about 3,000 mt. By legitimizing illegal foreign fishing into joint venture operations, the

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[36] Charles D. (ed): Survey of the Demand of the North American and British markets for OECS produced seafood, 1990.

[37] Table VIII and Table IX.

region can turn around its deficit into a trade surplus within one fishing season. To do this would require the exploitation of at least 750 tons of swordfish and yellowfin tuna for an export oriented market based on domestic production and assuming a stable export price of EC$8.00/lb. To achieve this production target, the region would have to invest in a new fishing fleet of twelve (12) vessels capable of harvesting these under utilized resources.

The technology to effectively harvest the under utilized swordfish and yellowfin tuna resources is not readily available in the region. There are however at least five (5) such vessels scattered throughout the region that are engaged in limited exploitation of these resources. However, these vessels themselves are not manned by sufficiently trained personnel, proficient in the operations of longlining and fish quality assurance. As a result catches from these vessels are well below the catch rate and quality standards of similar foreign vessels operating in the region. These vessels will need upgrading in technology and trained personnel to produce swordfish and tuna in sufficient quantities and adequate quantities to penetrate the export market. It can therefore be concluded that in a relatively short period these states can become net exporters of seafood and still maintain the

capability to produce an increasing quantity of fish for their own domestic markets.

Because of the variable nature of fisheries resources they are subject to unpredictable cycles of fluctuating abundance. Fluctuations in stock abundance can also be induced by the harvesting sub-sector itself. Consequently, the stabilization of pelagic catches at 1,200 mt is a critical objective in attaining fisheries development goals in the OECS.

III. DEVELOPMENT POTENTIAL OF THE FISHERIES SECTOR

Based upon the objectives and expectations of fisheries development in the OECS, it is possible to assess and evaluate the developmental possibilities for Member States' fisheries sector. It has been established that there are favorable possibilities for the fisheries sector to achieve its stated objectives on the basis of the available resource based, the availability of human resources and the demand for fish products both in the national and regional market place.

However, there are other prerequisites that must be available within the sector to provide the means of attaining these developmental objectives. Such prerequisites include increasing fishing effort, the

establishment of land based infrastructure and the enhancement of quality and presentation of the product.

The idea of economic growth and development as it was articulated for many years in the fisheries sector, fell short of fulfilling the developmental aspirations for fisheries in the region.[38] There has emerged an awareness that the national development effort require concerted planning in achieving desired goals.[39] The planning process will eliminate the uncertainties associated with technological transfer and the marketing of fish products. Developing countries such as those of the OECS are at distinct disadvantage as it relates

technology and market intelligence.[40] The planning process must therefore carefully rationalize the realities of the national effort based upon the following considerations:[41]

(a) the stage of maturity of the fisheries sector;

(b) the problems of appropriate technology;

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[38] Economic Development Policy Guidelines Vol II: Background Narrative: By the Economic Policy Council. World Bank Report January, 1979, 386p.

[39] Ibid., p. 64.

[40] Ibid., p. 102.

[41] MacKenzie, W. C., 1983, "An Introduction to the Economics of Fisheries Management. FAO FIsheries Technical Paper, No. 226, p. 2.

(c) the level of appropriate skills; and

(d) the existing institutional framework.

A. The National Development Effort

To achieve the production output targets that were established in the previous chapter, the exploitation strategy should take into consideration the size and composition of the required fleet and the capital that is required to commission this fleet. Because of the unavailability of sufficient financial resources for the required fleet enhancement program, a gradual increase in the national fleet aimed at obtaining its full complement within five years. To facilitate the fishing fleet enhancement program, governments within the OECS should provide innovative incentive programs to attract capital into the sector. Incentive programs could include, guaranteed loan schemes administered by commercial banks, technical assistance for training of crew, limited user rights to the resources and adequate land based infrastructure for marketing and processing.

During the first half of this five (5) year period, Member States should vigorously pursue joint venture fishing enterprises to harvest and market those species which are targeted for export. Foreign joint venture partners could provide part of the capital that is required

to harvest and market these products. The national fishing effort could then concentrate on the exploitation of the demersal and other pelagic resources that is required for domestic consumption.

B. Foreign Investment Capital

Foreign investment in fisheries can be contrasted to foreign investment in the tourist industry. However, there are a few fundamental differences in the two sectors that suggest different approaches when dealing with foreign capital investment.

Firstly, the fisheries resources, unlike the tourism resources are not confined to the territory of any individual State in the OECS. Most of these resources are known to be shared among these States as they move from between national EEZs.[42] Therefore there is a definite need for a cooperative approach by Member OECS States towards the management of the fisheries resources.

Another factor that should be considered when establishing policies for foreign investment in the fishing industry is the ability of OECS nationals to afford the type of investment that can effectively meet

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[42] Mahon R. (ed): Report of the Expert Consultation on Shared Fisheries Resources of the Lesser Antilles region, 1987, 190p.

the developmental needs of the sector. If it can be ascertained that OECS nationals are willing and able to provide the necessary investment capital that is required to achieve the sectoral development objectives, then priority should be given to their investment interest over non-regional concerns. One of the impediments to this strategy might be the inability of OECS nationals to acquire and operate the required fisheries technology, hence the cost-benefits of prior training of nationals should be identified, since this is crucial for the success of local fishing enterprises. The necessity for Member States to ensure that regional capital is encouraged for investment in the sector, lies within the premise that the fisheries resources represent a lucrative area for investment in the region with significant levels of return to investment capital. The peoples of the region should therefore be given the opportunities to realize the benefits from their fisheries resources and this goal should be a major policy direction within the region.

If the harvesting and marketing of species such as the swordfish and the yellowfin tuna are carefully managed and developed, the rate of return on capital investment can be considerably significant and comparable to investment in other sectors like tourism andmanufacturing.

Another factor which OECS Member States should take into consideration in pursuance of its development objectives is the requirement to establish effective trading mechanisms for OECS produced fish and fish products. Although the Law of the Sea Convention did not make specific reference to this issue, there is an emerging trend among from coastal States to link foreign investment in the fishing industry with access to the market of the foreign partner.[43] As far as Member States of the OECS are concerned, the extent of such a link could vary from the provision of regular information on the available conditions for access to that market, to a binding commitment for importing given quantities of fish and fishery products produced by countries of the OECS. The present practice of some OECS States is to negotiate foreign investment directly with private interests instead of with the State on behalf of that interest. This strategy is very limited in scope and could reduce the possibility of negotiating access to markets and other trade benefits that can only be given by the flag State itself. However, Member States could (especially with respect to the United States and the EEC) negotiate market access for their fish and fish products under other conventions or trade packs such as the Caribbean Basin

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[43] Fisheries Agreements between some African Countries *Nigeria & Sinegal) and Japan.

Initiative (CBI) and the LOME Convention.[44]

The European Community (EC) has concluded bilateral access agreements with some African, Caribbean and Pacific countries which does not include any arrangement on fish trade. For example, the Commonwealth of Dominica has concluded a fisheries agreement with the European Community on behalf of the fisherman in the French Departments of Martinique and Guadalupe. However under the 1984 Lome Convention (that was concluded between the EEC and ACP States), provisions are made for these States to gain access for their fish and fish products to EC markets.[45]

The Lome Convention provides access for products that originate in ACP countries into the Community free of custom duties and other charges. (Article 130 (1) of the 1984 Lome Convention). As far as fisheries and fish products are concerned, the following products are considered as "wholly obtained" in an ACP State:

(a) products obtained by fishing within the EEZ of an ACP State by third countries.

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[44] The LOME convention and the Caribbean basin initiative are trade cooperation agreements between Caribbean States and the European Community and between Caribbean States and the United States of America respectively.

[45] Churchill, R. R., 1987, EEC Fisheries Law. Fisheries Law and Legislation European Economic Community Countries.

(b) fish and fish products that are harvested from ACP countries by that country's vessels;

(c) products made aboard factory ships of ACP States, exclusively from products referred to in sub-paragraph (b); and

(d) goods that are produced exclusively from the products specified above.

(Ref. Article 2 of Protocol 1 to the Convention)

The above provisions eliminate fish and fish products that are caught in areas of ACP jurisdiction by vessels that are not owned by ACP States. For OECS States, this would eliminate products that are caught by foreign vessels which might be operating in the region under joint venture arrangements. This policy of the EEC presents serious implications for OECS access to the EEC market for its high valued tuna and billfish resources which will be the main target species are as far as increasing production is concerned. OECS States should seek a more acceptable arrangement for its seafood entering in European Community Markets, to avoid the resulting implications of exclusion from this potentially important market. In exercising their sovereign rights over the fisheries resources in their EEZs, all catch that is taken in Member States' waters and landed in their ports for processing or transhipment should be considered as originating from that State irrespective of the technology and manpower used to exploit these resources. In support

of this argument an analogy could be drawn to the petroleum industry of most developing countries that depends on foreign technology and skilled manpower for its harvesting and yet there is no doubt to the country of origin of petroleum resources.

C. Foreign Fishing Effort

Illegal foreign fishing activities continue to be the most significant challenge facing Member States fishing industries. Over the last three years there has been a steady increase in the number of foreign fishing vessels operating illegally in the OECS region. Most of these vessels target the swordfish and tuna resources between November to April each year. Although most of the foreign fishing vessels are from the United States, an increasing number of Asian and Venezuelan fishing vessels are sighted operating in the region.[46]

In 1986 over forty-three American fishing vessels operated illegally in the Lesser Antilles throughout the pelagic fishing season.[47] These vessels caught over two million pounds of swordfish in the Lesser Antilles, during that 1986 fishing season; at a retail value of 16 million

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[46] Mahon, R., (Editor), Report of the expert consultation on shared fisheries resources in the Lesser Antilles region, 1987. FAO Fishery Report, No. 415, p. 82.

[47] Ibid., p. 89.

dollars. The number of vessels operating in the Lesser Antilles increased by more than 40 percent for the 1987/88 fishing season, landing a total catch of 2.8 millions pounds of swordfish and yellowfin tuna valued at 28 million dollars. Although the final landings for the 1988/89 season are not available, preliminary estimates projected that about sixty-five from the United States operated in the region with landings that are expected to exceed two million pounds. Although there are no figures available for Taiwanese, Korean, Japanese or Venezuelan vessels operating in the OECS region, evidence obtained aboard three Venezuelan and a Korean vessel arrested in St. Vincent and the Grenadines and the British Virgin Islands respectively, indicates that these vessels fish heavily for all pelagic species and might be catching larger quantities of fish than the U.S swordfishing fleet that operates in the OECS.[48] In 1988, three Venezuelan vessels were arrested in St. Vincent and the Grenadines for illegally fishing in that country's EEZ. After only three days of fishing, the total catch for these vessels were over 250,000 pounds of mixed tuna species, with a local retail value of 750,000 dollars and an export market value of US 1 million dollars.[49]

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[48] Data obtained from ICATT 1989 report on status of billfish and tuna catches in the Caribbean region.

[49] Morris, K., Chief fisheries officer St. Vincent and Grenadines. Situation report on the detainment of three Venezuelan vessels arrested in St. Vincent & EEZ. 1988.

The level of illegal fishing in the Member States' EEZ is expected to increase over the next few years, because of inadequate surveillance and enforcement. The United States has closed its 200 miles fishing zone to foreign fishing in 1976 and Canada's fisheries development policy is heavily oriented towards domestic utilization of its fisheries resources. Therefore, foreign fishing fleet which have been expelled from the north Atlantic and Pacific Ocean will fish in the EEZ of developing countries, where surveillance and enforcement are less rigid, rather than chancing arrest in the U.S. and Canada's forbidden fishing zones.

Drift net fishing will also become more popular in the Eastern Caribbean region now that there are plans for its total ban and because of the relatively low cost of drift net fishing operation and the banning of this fishing gear by the foreign fisheries agency of the South Pacific. Vessels using this method are able to operate in waters of relatively lower fish population than the traditional fishing banks of the north Atlantic and Pacific Oceans.

At its Fifteenth Meeting, the OECS Heads of Authority endorsed recommendations for an OECS strategy for

foreign fishing access, and a surveillance, monitoring and surveillance mechanism. However, no Member State has issued any foreign fishing licenses under this program. While Member States maintained the status quo and not issuing foreign fishing licenses, there has been increased illegal foreign fishing activities in the region. Increased illegal fishing activities are occurring even though Member States have increased their fisheries surveillance and enforcement capabilities.

Further improvements are expected in surveillance and enforcement as Member States have declared common surveillance zones to maximize their surveillance resources given the high cost of surveillance activities.[50] However, increased surveillance and enforcement activities alone will not bring illegal foreign fishing under control. The surveillance and enforcement program must be complimented with a foreign fishing access strategy granting limited fishing licenses to the under utilized pelagic species within a joint venture framework. This dual strategy will provide a number of benefits which include:

(a) Transfer of technology to fisheries in the region;

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[50] Report of Proceedings of the Sixteenth Meeting of the OECS Authority, November, 1989.

(b) Increase the amount of fish available to local markets;

(c) Provide the organization with more accurate information on the nature and abundance of the highly migratory pelagic species found seasonally in the region; and

(d) Strengthen the surveillance and enforcement effort.

IV. FISHERIES MANAGEMENT AND UNCLOS III

Prior to 1982, coastal States had legal claim to ocean space of up to three miles from their coast. This three mile zone was then known as the territorial sea where the coastal State exercised complete sovereignty over all political and economic activities including resource exploitation and management. During this period distant water fishing enterprises were free to exploit lucrative fishing grounds outside this narrow territorial limit. Developing coastal States, unable to acquire the technology that was required for the large-scale exploitation and marketing of fishery resources could not participate in the economic returns of these resources and were obliged to watch developed countries industrial fishing enterprises taking the lion's share of the world fishery resources.

In the Eastern Caribbean and Western Central Atlantic area large scale exploitation of the fisheries resources was carried out by Japanese, United States and

Taiwanese vessels. Local fishermen with their limited vessels and equipments concentrated their efforts near shore, exploiting the reef fisheries, inshore pelagics such as sardine, jacks, robin and limited quantities of large pelagics such as tunas, dolphin and kingfish. Domestic production was therefore very low and could not sustain the economic life of those fishermen involved and the development of marketing and processing business enterprises. Fishermen fished on a day to day basis, leaving port very early in the morning and returning mid-afternoon to market their fish to consumers. Fish had to be marketed the same day of capture to avoid spoilage due to inadequate cold storage facilities. In most cases, fishermen after spending the better part of the day at sea in open vessels, exposed to the glaring heat of the sun still have to retail their catch either from the side of their wharfed vessels or in the public meat market. This severely reduced the quality and presentation of the final product and has significantly contributed to the marginalization of consumer demand as many consumers were reluctant to purchase fish under these conditions and developed preference for other meat protein.

V. SUMMARY

The prospect for sound fisheries management and development in the OECS region is dependent on the goals

and objectives which have been identified within the sectoral development plan.

The goals that are established in the OECS for fisheries management and development can be achieved if Member States pursue the objectives that are required. In pursuance of these objectives, due considerations must be given to the nature and abundance of the resources and the necessary inputs and outputs that are required such as financial resources for capital investment, training and technology transfer and adequate infrastructure and extension services.

The previous Chapters of this Study have explained the past and present fisheries management and development process and identified a number of constraints which are believed to be responsible for the current under-development state of the fishing industry of countries of the OECS. In the past, these constraints were inadequately addressed within a narrow sectoral development framework, they have therefore remained as obstacles to the development and management process of the industry. It is, therefore, necessary to implement a fisheries management and development plan for countries of the OECS that would pursue the goals and objectives that are established for the fisheries sectoral growth. This development and management plan must take into consideration those factors which inhibited developmental growth in the past and the necessary inputs that are required to ensure the sector obtain the capability of achieving the stated objectives. Consideration is also required for the level of cooperation which is attainable between these states, to rationalize the use and provisions of the required inputs.

This chapter will review the state of functional cooperation within the Organization of Eastern Caribbean States, its present structure, and its regional

Britain prior to full independence.[2] The objectives of WISA were to administer a number of services and functions common to all the Associated States. The move towards full independence by these island States resulted in a need for the reappraisal of the WISA machinery to examine its functional capabilities. It was concluded that a more formal and effective organization with a legal personality was necessary if the level of cooperation among these States was to be improved.[3]

In May of 1979, the Member States accepted a resolution in support of retaining and improving the arrangements for joint action. Among other things, this resolution pointed to the need for the establishment of a modified machinery for the achievement of joint economic and social development strategies. This resulted into the formation of the Organization of Eastern Caribbean States in 1981.[4]

Since the formation of the OECS, there has been a rising profile of Member countries within the region and

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[2] Compton, A. Director of Administration and Functional Cooperation, (OECS Central Secretariat). Integrated Evolution to the OECS; OECS Tenth Anniversary Commemorated Magazine. pps 11-72, 1991.

[3] Treaty Establishing the Organization of Eastern Caribbean States 1980.

[4] Compton, A. Ibid., pp. 11.

the international Community. This have given recognition toMember States as a distinct regional grouping both in regional and international affairs through the OECS, Member States are involved in a number of cooperative activities such as, health, education, fisheries, legislative issues, environmental management and agricultural diversification.[5]

The decade of the 1990s in presenting new challenges to the OECS in terms of maintaining stability in economic growth and social development. These challenges are enhanced by events that were not anticipated during the early life of the OECS. Among these global events are the changes in Eastern Europe, the emerging single market of Western Europe in 1992, and the lowering of the cost of export products from developing countries. The European single market will have the most detrimental impact on Member States economies as the United Kingdom represents a major market for OECS commodities such as banana and sugar. The banana industries are major sources of foreign exchange and employment for the Windward Islands, while sugar provides St. Kitts with much needed employment and foreign exchange. The preferential

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[5] Lewis, V. Director General (OECS Central Secretariat). Looking back on the First Decade. Interview in OECS Tenth Anniversary Commemorative Magazine, 1991.

treatment that Member States products traditionally received in the United Kingdom and other European Community markets are now uncertain and Member States must prepare themselves to adjust to this reality by engaging in industrial diversification into activities that can trade competitively on the world market in lieu of dissipated preferential access to traditional markets.

Towards this end, the OECS countries are in pursuant of an economic diversification strategy to meet the developmental challenges that are anticipated in the near future. This has resulted in an expansion in the functions and activities of the regional organization and the subsequent restructuring of national development plans through a harmonized regional strategy.[6]

It is a general feeling in the region among the political directorate, that as the world experiences significant political and economic changes and as the various groupings in the world reorganize themselves in economic blocs, that the countries within the OECS will have to adjust to these new developments.[7] Such adjustment would involve changes within the institutions and political

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[6] Ibid.

[7] Commemorative Magazine: OECS Tenth Anniversary. pp 7-10, 1991.

management structures by which the cooperative relationship of these countries are conducted. There are diversion of views among Member States concerning the nature of the institutional adjustments that are required to meet the challenges of socio-economic development within a changing global environment. Some Members favor an immediate movement towards political unification, while others favor the strengthening of the socio-economic integration process within a similar progressive framework as that adopted by the European Community.[8] Nonetheless, it seems likely that the functional co-operation process will continue to be deepened while the debate continues on the question of potential unification among these States. This is evident in the fact that while the issue of political unification is being pursued, Member States have agreed to establish a single market by 1993 in which goods, people and capital could move freely within a regional framework.

The transboundary nature of the fisheries resources, the requirement for large investment capital to harvest and market these resources, together with the need for regional cooperation for the management of shared fish stocks, presents the fishing industry as a viable case to ascertain the extent to which Member States of the Organization can

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[8] Address of the Prime Minister of Antigua/Barbuda at the Opening Ceremony of the Fifteenth Meeting of the Authority, St. John's Antigua.

cooperate to ensure collective benefits by deepening the regional cooperative arrangements.

III. THE REGIONAL ORGANIZATIONS PRESENT FUNCTION AND ADMINISTRATIVE CAPABILITIES

The present structure of the Organization of Eastern Caribbean States consists of an Authority of Heads of Government which meets twice yearly to discuss issues arising from the various ministerial committees and an administrative Secretariat to carry out the activities of the Organization.[9] The business of the Organization is conducted within the framework of two Secretariats, the Central Secretariat, Located in St. Lucia and the Economic Affairs Secretariat located in Antigua/Barbuda.

The organizational structure of both Secretariats expanded significantly between 1981 and 1991 as Member States strengthen functional cooperation and establish a number of specialized agencies to pursue specific cooperative programs. These agencies include the East Caribbean Drug Services, the EastCaribbean Investment Promotion Service, the Natural Resource Management Unit, the East Caribbean Export Development Agency, the OECS Sports Desk, the Agricultural Diversification Coordinating Unit and the OECS FIsheries Unit.

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[9] Figure III.

The structure and function of both Secretariats are divided functionally between economic and policy analysis and the administration of specialized cooperative agencies. Another responsibility of the Secretariat is the evaluation of the effect of national policies on the regional cooperative effort and joint external diplomatic representation.[10]

The Organization is also engaged in annual review of socio-economic activities in Member States and offer technical and information services towards the national development effort including assistance for the preparation of national project for submission for external funding and critical data and information for use in developmental planning.

The activities and performance of these Secretariats are reviewed during the bi-annual meetings of the Authority, with intersessionary reviews conducted by ministerial and administrative committees.

IV. POTENTIAL FOR REGIONAL DEVELOPMENT AND MANAGEMENT PLANNING IN THE FISHERIES SECTOR

Cooperation in fisheries development in this region has been traced to the colonial era. During the time of British rule, these States had similar legislation

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[10] Ibid.

and pursued a common fisheries development strategy. Fisheries development programs during colonial rule had very little impact on the growth of the industry. This is manifested in the fact that although the fishing industries in the region were engaged in similar developmental programs through the colonial era, there was little improvement in the growth of the sector in these states.

Regionalism in fisheries is of paramount importance because of the very nature of the resources that are being utilized. The United States has adopted a regional fisheries management system involving eight regional councils. While each state is responsible for fisheries management and development within the three mile limit, regional Fisheries Management Councils are responsible for fisheries management and administration within the United States exclusive economic zone.[11] Such regional arrangements, it is believed, will be more effective in the management of shared stocks which traverse the waters throughout the region and are fished by all fishermen.

The 1982 United Nation's convention on the Law of

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[11] Ryan A. The Caribbean Sea. Proceedings of the Symposium on Marine Regionalism. URI, 1979, pp. 65. .

the Sea contains a series of articles relating to regionalism for fisheries management and development. These articles establish the basis framework for exploration, exploitation, conservation and management of living marine resources of the EEZ. Not only are the rights and obligations of coastal states pointed out but the need for regional cooperation was also emphasized. Article 63 of the Convention addresses the case for cooperation in the management and development of fisheries stocks. Joint management is especially important where a stock or stocks of similar species are found within the EEZ of two or more coastal states within the same region. The distances between the islands of the OECS are less than one hundred miles in most cases, hence it is highly possible that some of these islands utilized a common stock of associated species, especially those islands with a significant pelagic fishery.

Article 63 states:

> 1. Where the same stock or stocks of associated species occur within the EEZ's of two or more coastal states, these states shall seek, either directly or through appropriate sub-regional organizations, to agree upon the measures necessary to coordinate and ensure the conservation and development of such stocks without prejudice to the other provisions of this part.
>
> 2. Where the same stock or stocks of associated species occur both within the EEZ and in any area beyond and adjacent to the zone, the

> coastal state and the states fishing for such stock in the adjacent area shall seek, either directly or through appropriate sub-regional or regional organizations, to agree upon the measures necessary for the conservation of these stocks in the adjacent area.

Within the OECS Harmonized Fisheries Legislation which has been implemented by all Member States has provided the nerve center for fisheries management and development in the region. In keeping with Member States objectives for closer cooperation in matters relating to the sea and its resources, Member States negotiated and activated an impressive set of Harmonized Fisheries Legislation.[12]

Several aspect of fisheries management are harmonized to allow for common approaches to fisheries management and development issues in the region. At the same time the Harmonized Legislation has provided some degree of flexibility to Member States to pursue specific management and development initiatives within the general spirit of effective resource management.[13]

The Fisheries Act of all Member States addresses the question of regional cooperation in fisheries. For

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[12] FAO. Harmonized Fisheries Regulations for the OECS Region; TCP/RLA/6765 (A) 1988.

[13] FAO. Report on OECS Workshop on the Harmonization of Fisheries Regimes, 1983.

example, section six of the Antigua and Barbuda 1983 Fisheries Act provide for that: "The Minister may enter into arrangement or agreements with other countries of the region or with any competent regional organization."

The Agreements and arrangements referred to are for the purpose of joint action on certain issues of fisheries management and development as they relate to:

(a) licensing of foreign fishing vessels;

(b) joint surveillance, enforcement and compliance control measures;

(c) joint fisheries research projects and management plans;

(d) harmonization of systems for the collection of statistics and the carrying out of procedures in the assessment of the state of the fisheries resources;

(e) the establishment and operation of joint regional bodies;

(f) such other cooperative measures including the promotion of the welfare of fisheries and the insurance of fishing vessels at sea.

The hypothesis that is established for successful fisheries development in the OECS is already being tested in the OECS region by a number of fisheries management and development activities that are being jointly pursued by countries of the OECS. Their ongoing programs are expected to lead to a comprehensive goal of a common policy for fisheries management and development.

In November, 1984, countries of the OECS agreed to implement harmonized fisheries legislation in each Member States that would provide the legal framework for joint program and activities for fisheries in each individual Member States to undertake certain measures which, "...can promote the management and development of fisheries, so as to ensure the optimum utilization of the fisheries resources...," in the fishery zones and exclusive economic zones of countries of the OECS. Such measures would include arrangements with other countries in the region or with any competent regional organization. (Appendix IV)

In recognition of the urgent need to develop the fisheries sector in member countries, and the failure of the unilateral fisheries development effort of individual states, the member governments of the OECS agreed to establish a regional fisheries unit within the OECS secretariat. The member governments mandated the secretariat to seek international funding and technical assistance to establish the regional fisheries unit. In 1985 the secretariat was successful in obtaining the assistance of the government of Canada through its International Center for Ocean Development (ICOO) for financial, technical and advisory support over a four year period. The unit was initially funded jointly by ICOO and

the OOCS, with ICOD providing a grant of $1.2M, Eastern Caribbean dollars in support of this initiative.[14] The objectives of the unit are to assist the countries of the OECS in the development and management of their living marine resources. The unit is charged with the provision of assistance to governments, to the benefit of all those engaged in the fisheries sector.

The establishment of the OECS fisheries unit is of considerable significance in the achievement of a common fisheries management and development policy, since it can provide the necessary institutional capability for the implementation and monitoring of programs and activities within a common policy framework.

A common fisheries policy must recognize that there must be proper overall management of the fisheries resources, which are transboundary in nature and are exploited by fishermen from all member countries of the organization. The unit, therefore, was mandated from its inception to:

> (a) Coordinate and facilitate regional fisheries within the framework of a regional management and development plan, that recognizes the development objectives of member status;

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[14] OECS/ICOD: 1985. Memorandum of Understanding for Establishment of the OECS Fisheries Unit.

(b) The monitoring, control and surveillance of member states fisheries resources to prevent illegal fishing activities;

(c) The development of a strategy for granting access to foreign fishing vessels.

It is obvious that during negotiations of UNCLOS III, it was generally believed that regional cooperation is necessary in carrying out the perceived global mandate of rationale fisheries development. Throughout negotiations of UNCLOS III the philosophy of regionalism had an impact on all areas of negotiations. Regions usually form `power blocs' during these negotiations as long as such arrangements would provide individual benefits to them.[15] Hence it is not surprising that several sections of the convention call for action at a regional level in preference to unilateral national action.

Member States of OECS are expected to cooperate on a regional basis as far as the management of resources that are being harvested by more than one state of the region is concerned.[16] The Convention encourages the establishment of regional fisheries organizations for the management of

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[15] Clingan T. Jr. UNCLOS III and the future for regional arrangement; Symposium of Marine Regionalism, Marine Affairs Program U.R.I. pp. 15. 1979.

[16] United Nations, the Law of the Sea, United Nations Convention on the Law of the Sea, New York, 1983; Art. 6.

fish stocks which migrate from one EEZ in the region to the other. Since more than one state might have interest in a particular stock the need for cooperative management is imperative.

In many parts of the 1982 UN Law of the Sea Convention, reference is made to regional cooperation. In some cases such cooperation is mandated as in the case of the regional transfer of marine science and technology, and dispute settlement issues. Part XII of the 1982 Law of the Sea Convention places great importance on regional cooperation: Article 195 states among other things that; "States shall cooperate on a global basis and, as appropriate on a regional basis, directly or through competent international organizations, in formulating and elaborating international rules, standards and recommendations. Practices and procedures consistent with this convention, for the protection and preservation of the marine environment, taking into account characteristic regional features."

This article provides for the widest sphere of regional cooperation with the assistance of international organizations who possess the necessary manpower in the specific area of cooperation. It can be concluded that the success of the provisions of the 1982 convention depend

greatly on cooperation at the global and in particular the regional levels. The OECS is an area where such cooperation is necessary and some initiative to this end is being pursued by these states; however, there is great potential for closer cooperation in pursuance of fisheries development and management.

To achieve fisheries development objectives, there is a need for adequate public administration to assume the responsibility of developing, implementing, monitoring fisheries management and development and the provision of extension services. There must therefore be a public administration mechanisms staffed by skilled human resources for fisheries planning. Such mechanisms should take into consideration the transboundary nature of the resources and the need for regional decision making to ensure efficient management practice. The administrative mechanism can be more efficiently developed in the region through the pooling of technical and financial resources to provide common fisheries services to Member States.

Provision of reliable and timely statistical information is paramount in pursuance of the fisheries development objectives because discussions which are necessary for the planning, implementation and monitoring processes must be based on credible data and information.

Towards this end, a national capability to collect data and information is required to facilitate a comprehensive regional data and information management system that must be established. This regional data and information management system would provide data processing and interprtation services for each country within the regional framework, and the necessary management information for the creation and the implementation of development and management decisions.

The significant financial resources and skilled manpower that are required to conduct stock assessment, creates a necessity for Member States of the OECS to better rationalize the use of these scarce resources. This would eliminate the likelihood of costly duplication of effort and provide a more credible basis of accessing those resources that are shared between these States. The regional data and information service could then provide the data and information that would be required for the stock assessment process. This would facilitate the establishment of a total allowable catch on a regional basis, which is more acceptable than national total allowable catch for a regionally shared resource and would in turn gives greater credibility to the regional fisheries mechanism.

A technical service network is required on a regional basis to provide the industry with solutions towards the enhancement of harvesting, marketing, processing, material supply and technology innovations. If these aspects are carefully addressed, OECS countries would be able to better exploit their fisheries resources, improve employment opportunities and increase the contribution of the sector to national economies.[17]

The economic viability of the fishing industry must always be the primary goal of development and management. This is important because it has been proven that the provision of subsidies to the industry during the 1960s and 1970s only provided short-term economic growth but resulted in the over-capitalization of an unskilled labor force and diminishing returns to investment capital.[18] This is the major reason which retarded the growth and development of Member States' fishing industries and could further adversely affect this process. It is therefore important to establish and utilize the social values of fisheries in providing food, employment and economic profit, hence the need to protect and consume the resources by the establishment of an efficient fishing fleet, processing and marketing facilities, to ensure the longterm economic

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[17] Figure I.

[18] See Appendix I and II.

viability and sustainability of the industry. An investment promotion and credit facility within a regional investment framework could attract the regional investment capital to allow for intra-economic development activities through the pooling of private sector resources from all Member States.

The achievement of the fisheries management and development objectives in the OECS will depend upon the legal framework and institutional structure that are established to facilitate these objectives. These structures and framework will provide the basis for the monitoring and control of sectoral activities and also measuring the effect that non-sectoral activities can have on the successful implementation of the development and management strategy. This is of particular importance to resolving management conflicts between artisanal fishermen and large scale fishermen from different Member States and to minimize conflict between other users of the EEZ and fishermen themselves.

The potential for a regional fisheries development and management strategy must be examined within the context of the goals established for the fishing industry of each Member State, the stated objectives in pursuance of these goals and the outputs and inputs that are required to

attain these objectives. There are a number of justifications for a common fisheries management and development strategy in the OECS. Among these justifications are:

(a) that most of the fish stocks available to Member States are transboundary in nature and are shared by countries of the OECS.

(b) There is a common need in the region for the development of trained human resources to address all aspects of the industry. The national fisheries divisions are not equipped to provide the necessary administrative and extension services that are critical to the achievement of the sectoral objectives. A regional training program could attract significant international assistance especially for the development of a regional training capability involving the institutionalization of training activities within the region. By providing training opportunities on a regional basis Member States are in a better position to utilize the scarce technical manpower that is available through short-term attachments within national fisheries divisions.

(c) Surveillance and enforcement is absolutely critical for the protection of the fisheries resources within Member States EEZ. The high cost of surveillance activities has rendered this activity almost impossible to Member States. Although Member States are presently engaged in an extensive regional surveillance program, it is largely dependent upon international donor assistance and require major structural adjustment to ensure its continuity. The level of illegal foreign fishing in Member States' EEZ must be curtailed, since such a practice can have a detrimental effect on the realization of OECS fisheries development objectives.

V. MECHANISM FOR A REGIONAL FISHERIES MANAGEMENT AND DEVELOPMENT ADMINISTRATION STRATEGY

It has already been established, that in order to achieve the stated goals and objectives, the region must embark on a strategy that would significantly increase the contribution of the fisheries sector to the Gross Domestic Product of OECS countries and at the same time increase the earnings of workers in the sector. This would require an increase of about fifty percent in fish landings over a satisfactory time period and an increase in the number and technical capabilities of the labor force within the harvesting, processing and marketing sub-sectors.

An export oriented capability would also be necessary to provide marketing opportunities for high valued fish products that can be sold in international markets. Member States will also have to improve domestic and regional marketing infrastructure so that locally produced seafood can be more readily available to local consumers. To reduce the region's food import requirements, this domestic and regional marketing infrastructure should be complemented by a processing capability to produce salted, smoked, dried and canned seafood.

Increasing production levels would require an improvement in the current fishing fleet to achieve a

higher level of catch per unit of effort. Cautious increase in the exploitation of the demersal resources and an extensive development and management program for the pelagic resources should be vigorously pursued. This would require the provision of training to existing and prospective fishermen to provide them with the necessary skills to operate new and improve technology and the injection of capital investment into the harvesting, processing and marketing sub-sectors.

Providing adequate skilled personnel to the industry will prove to be one of the most urgent factors that will have to be addressed. The requirement for highly skilled personnel will become apparent in all areas of the industry especially for harvesting, marketing and public administration. Activities relating to harvesting, marketing and public administration must therefore be pursued on a regional basis within a legislative framework that would provide for intra-regional joint venture enterprises for the harvesting, marketing and processing of seafood; and a regional capability to carry out common administrative functions.

At the same time the region should establish a fisheries training school affiliated to the University of the West Indies (UWI) and in association with at other

international fisheries schools to provide the required trained personnel to the fisheries sector. The fisheries training school would provide training in such areas as fishing vessel construction and maintenance; fishing gear design, construction and repair; fishing vessel management and operations; seamanship; seafood processing technology and quality assurance, fisheries management and development and aquaculture development. Training must also be made available in fisheries administration, extension services, and data and information management.

Based on the above requirements it is important from the onset that clearly defined roles for the national and regional administration unit be established. A functional model that have rationalizes the administrative requirements for the fisheries management and development strategy is proposed.[18] This model has illustrated those functions that are expected to be administered at the national level, the role of regional administration and the interaction between the national and regional management units.

VI. LEGAL FRAMEWORK AND SURVEILLANCE AND ENFORCEMENT

The allocation of competence between the regional Secretariat and Member States in relation to the management

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[18] Figure III.

and development strategy will depend on Member States' willingness to relinquish to the regional fisheries unit their national authority over a number of management and development activities.

To determine how authority should be allocated within the regional management and development strategy, reference must be made to those activities that can be more adequately pursued on a regional basis, within the context of the legal authority that can be assumed by the regional fisheries unit under existing legislation and the availability of financial resources for the implementation of regional activities.

The present legislative framework of the Organization of Eastern Caribbean States, preclude the Secretariat from the authority to enact legislative procedures. On the other hand through decisions taken at the Authority level, supported by the provisions of harmonized national legislation, the secretariat can be provided with the necessary competence to implement and enforce actions within the framework of national legislative procedures.

As far as enforcement of jurisdiction is concerned, authority to arrest has been vested in regional authorized

officers through the establishment of common fisheries zones for the purpose of intra-OECS access and monitoring, surveillance and control.[19] The process involved a decision of the Authority to declare common fisheries zones and assent to a treaty through the national parliamentary process. The effect is a more rational deployment of scarce surveillance and enforcement resources that is coordinated at the regional Secretariat. Some questions, however, as to whether for example an arrest in a Member State's EEZ can be made by authorized officers from another Member State. This problem can only be solved by the establishment of an OECS court of justice which will provide the necessary legal authority to the regional Secretariat and provide a forum for the administration of justice for offenses committed within the common fisheries zone. In the absence of this arrangement, officers working for the Secretariat possess no powers of arrest unless carried out under the Authority of the Member State of which the officer is a national. In the interim period however, the Secretariat can obtain limited legal authority through the treaty provisions among Member States.

Through an agreement at the Authority level the

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[19] Report of the Eighteenth Meeting of the OECS Authority, Castries, St. Lucia, 1991, pp 40.

organization Secretariat has the authority to establish a regional mechanism for negotiating access to Member States' fisheries resources and to develop information in support of access negotiations.[20] In pursuance of access negotiations the authority has endorsed a foreign access fee structure and requested the secretariat to commission a negotiating team to facilitate access negotiations. The Organization's Secretariat is also mandated to develop and implement a regional register of foreign fishing vessels whereby foreign fishing vessels operating in the region can be registered.[21]

Jurisdiction over surveillance and monitoring however, should be shared between the regional administrative authority and national authority to enhance and optimized the use of surveillance expertise and resources. The OECS heads of government established at its Twelfth Meeting in 1987, the role of national and regional administration in the monitoring, control and surveillance program. A mechanism for financing this surveillance program has also been established and funds for its operations are expected to be derived from infringement fines and national contributions.

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[20] Report of the meeting of the Decisions of the Twelfth Meeting of the Authority, November 24, 1987.

[21] Appendix VI, (Fee structure for foreign fishing access).

It can therefore be concluded that a regional strategy for negotiating foreign fishing access and for the surveillance and monitoring of fisheries operations would include clearly defined roles for the national and regional administrations as is provided by various decisions of the Authority. However, the effectiveness of this surveillance strategy has not been realized because the financial and technical input that is required at the national level is not forthcoming. A stronger legislation process including a compliance mechanism is required to be effective at the national level to these far reaching regional cooperative decisions.

To achieve the level of management and development growth in accordance with the established objectives there must be a fisheries management and development system that is capable of generating the necessary output that are required to achieve the objectives of the management and development plan. Such a system should be designed to ensure maximum efficiency in the use of human and financial resources that are required to administered the resource management, extension services and capital investment requirements of Member States' fishing industries.

To ensure the optimum management of the fisheries

resources Member States will need to improve their data collection capabilities to ensure the collection of accurate information with regard to the socio-economic activities of the fisheries sector. Such information is critical for decision making purposes and the quality of this information will determine the effectiveness of projects and programs that are implemented. Skilled personnel are also required to process and manage statistical and other industry related data to provide management information on yield estimates, total allowable catch and market intelligence. Such information is also required during the evaluation process to measure the progress that is being made with respect to the objectives that are established for the management and development of the fisheries sector.

The requirements for the management and development of the fisheries dictate significant involvement of the public sector to initiate pilot programs in the pioneering of new activities, such as; harvesting technology (fishing vessels, gear and equipment), promotion of quality assurance standards; seamanship; fish processing and marketing; and ancillary services such as insurance; fishing vessel and gear repairs and maintenance and institutional credit programs. Public involvement is required in the pilot stages of program related activities

to provide the necessary technical services to the industry.

The human and financial resources available to Member States' fisheries sector is highly inadequate in meeting their resource management requirements. It would not be financially or technically prudent for each Member State to develop its own comprehensive resource management capability without given consideration to the sharing of some of the functional activities among Member States of the OECS within a regional resource management mechanism. Such activities like stock assessment, data management, and the development of stock specific management plans can be pursued more efficiently on a regional basis and constitute some of the fundamental activities that can be more effectively pursued on a regional basis. Member States in turn could concentrate their national administrative effort on efficient collection of socio-economic data, preliminary data processing for ad hoc decision making and the provision of fisheries extension services to the harvesting, processing and marketing sub-sectors.

To achieve a common fisheries management and development framework, a rational management and development structure is required. It is necessary that

such a structure take into consideration the limited financial resources available for fisheries management and development activities and the level of socio-economic growth that is possible within the sector given the nature and abundance of the resource.

Although Member States are currently pursuing joint programs through the OECS fisheries unit, these programs by themselves have not constituted a common fisheries policy since individual state practice has shown that Member States can deviate from the regional programs in pursuance of national development programs. This is evident in the fact that although states have agreed to negotiate access to their EEZ on a regional basis, a number of them have entered into bilateral agreements with third countries without the involvement of the regional organization, even though they have all agreed to such an approach.[23] The problem is that there are no binding commitments among Member States to ensure that decisions taken at the regional level are strictly enforced.

Another case in point is the regional surveillance program upon which Member States have agreed to commit adequate financial resources to undertake at least two

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[23] Grenada and St. Lucia initiated unilateral access negotiations with foreign fishing interests in 1988.

hours of aerial surveillance per month in support of this regional surveillance program. Only a few Member States have actually budgeted for these activities and although they have admitted the importance of this program there is little or no financial support for its implementation.

It would appear however that Member countries of the OECS have realized the benefits that are possible from the implementation of a common fisheries management and development strategy on a regional basis. This is evident in the mandates that have been given to the fisheries unit to pursue such regional activities as resource assessment and management, monitoring surveillance and control, a regional fishing vessel insurance program, joint internal marketing, joint international representation and the dedication of a common fisheries zone to maximum fisheries production.

However, in spite of these good intentions, the implementation of these programs can only be effective if regional and national authority are clearly defined along the administrative framework suggested in Figure II, and the delegation of functions to the regional fisheries unit as suggested in Figure II. These organizational structures must be supported by significant financial commitment as Member States can no longer depend on significant financial

assistance from external sources. Member States must pay for the services offered by the regional fisheries unit or be faced with penalties which should include the suspension of services to that state from the regional fisheries unit. Such an agreement will serve to assess the commitment of these states to the optimum development of their fisheries resources, which can only be achieved through a common fisheries management and development policy within the OECS region.

CHAPTER VII

SUMMARY AND CONCLUSION

SUMMARY

The area of the Eastern Caribbean where the OECS is located constitutes an area with a very dynamic current system and a diversified geological structure; the islands in the south (Grenada, St. Vincent and the Grenadines, St. Lucia and Dominica) are primarily volcanic in origin with very steep and narrow island shelves. The islands in the north (Antigua/Barbuda, St. Kitts/Nevis, the British Virgin Island) are more coralline in structure giving rise to a more extensive coralline island shelf with a variety of coral reef fisheries resources. This coralline feature is responsible for the predominance of the reef fishery in the northern islands. The dynamic current system and the inflow of water from the Atlantic through the southern islands, gives rise to the formation of eddies, capable of localizing nutrient flow for a sufficiently long period of time to extract migratory pelagic species in relatively significant quantities to support the dominating pelagic fisheries of the southern island.

Except for some localized areas, production of both the coral reef fishery and the pelagic reef fishery have

not yet achieved their optimal yield; hence, with the implementation of an effective resource management plan coupled with a pragmatic development strategy Member States in the OECS have an opportunity to increase the production of these resources.

The geographic nature of the OECS has provided strong evidence that a significant portion of the fisheries resources that are found in individual countries' EEZs are shared with other countries within the Eastern Caribbean. This fact requires a degree of mutual consultation on the management and exploitation of these resources. This consultative approach was not given much attention prior to UNCLOS III, and the subsequent enactment of harmonized fisheries legislation by countries of the OECS. This is because there were no established basic for what constitutes shared stocks.

It has now been established that almost all the fish stocks of the region are transboundary in nature, either during their planktonic stages of development or during their adult life history. As Member States emerge from the euphoria of the immediate post-EEZ era, it is becoming apparent that extended fisheries jurisdiction has opened up many economic opportunities for these states, and at the same time significant management responsibilities on

national fisheries administrations, whom are at present ill-equipped administratively to meet these organizations obligations.

The transboundary nature of these stocks, has focused attention on the requirement for a regional management regime, that would ensure the continued integrity of fish stocks in the region. A management regime involving all OECS states is necessary to avoid the consequences of separate management authorities, managing parts of a common stock in adjacent EEZs, and a re-enactment of the tragedy of the commons.

A common management strategy would involve the establishment of a single optimum yield for the shared stocks and the declaration of a total allowable catch (TAC). The exploitation of this (TAC) should then be pursued within the context of a common fisheries zone, where fishermen from countries in the region can exploit these resources under an arrangement that will take into consideration the transboundary nature of these stocks. This would require economic and political cooperation between these states to allow for shared access within a common fishing zone.

During the 1960s and 1970s, the fishing industries

did not realize the growth that could have been achieved. This is because of the approach to fisheries development that was adopted in these states. Although government incentive programs provided a vital stimulus to the industry, these programs were not comprehensive enough to ensure sustained growth and development of the sector. The industry did not realize any significant growth as a result of the introduction of these programs, instead the industry attracted more manpower than was needed for its efficient operation at that time. Therefore, although fish landings from these islands actually increased from 3,120 mt in 1960 to 7,142 mt in 1975, the catch unit of effort did not reflect any significant increase since the effort to take this catch also increased correspondingly. Consequently, fishermen realized little growth in real income and little or no improvements in their standard of living relative to workers in other sectors of the national economies of the region.

Between 1960 and 1975, the number of local fishermen operating in the OECS increased from 3,500 to 9,725. That is an increase by 6,225 or about 300 percent. However due to the lack of a management and development plan geared toward the economic exploitation of the fisheries resources, the sector did not realize any significant economic growth.

It has become quite clear that the subsidies and incentives which governments provided were inadequate for this purpose if it was intended that fishermen should obtain adequate returns to their investments. Duty and tax concessions on imported gear and vessels were not enough to offset operational costs to the extent where the price control regulations that were imposed on fish products could generate enough revenue to make fishing operations profitable. The fact that most fishermen engaged in borrowing to finance fishing vessels and gear and were unable to repay their debt was as a direct result of the marginal returns to capital, caused by the high cost of input relative to the revenue obtain from the sale of fish. The industry was therefore very unstable and fell short of it development potential. Stability in the industry necessitated increased revenue generation to enable fishermen to repay loans and offset operational costs.

Fishermen should have been encouraged through incentives to explore and exploit other non-traditional fishing grounds. Instead, with their newly motorized vessels, increased manpower and fishing gear, the traditional fishing grounds were subjected to an unprecedented increase in fishing effort. It was only during the 1970s, when the overall catch/vessel was

decreasing, that efforts were made to institute management and development programs to address the accompanying problems. It is evidently necessary that any future planning for the industry must ensure that the process of development and management are properly synchronized to ensure compatibility with one activity complementing the other.

Proper use of a fish stock requires that the resources be utilized to maximize its net value to those that are involved in its production. If the overall national economies in the region are operating properly, the net value of the fish produced could be maximized within such an economic climate.

In pursuance of increasing levels of exploitation, due consideration should be given to improving the efficiencies of the present fleet before considering increasing the size of the fleet itself. It should be noted however, that improvement in efficiency will have an accompanying cost factor since it would require new and more efficient equipment and facilities onboard existing vessels and in some cases, the replacement of vessels and a reduction in labor requirements. Hence, to achieve economic viability of the fishery, an increased cost in production must be offset by an increase in fish landing at

a level which would not have a negative impact on the fishery resources. A balance must therefore be reached between the level of fish production and the cost of producing this quantity, so as to maintain viable fishing operations.

CONCLUSION

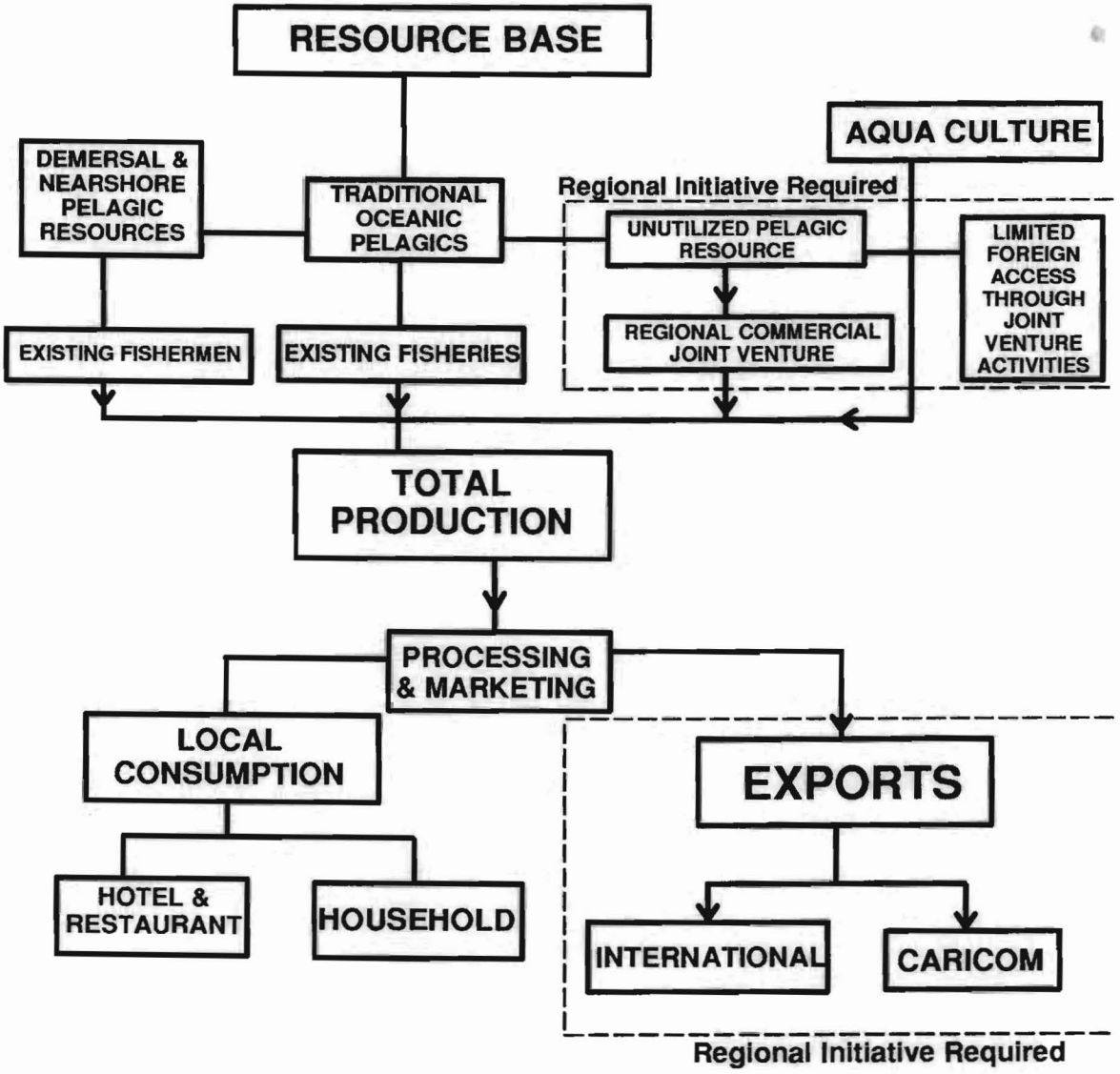
If Member States are to realize any increased socio-economic growth in the fisheries sector, it is imperative that they implement a common fisheries development and management strategy. This is necessary because individual states do not have the technical or financial resources to pursue a unilateral process of fisheries development as is evident in the failure of their fisheries development effort prior to the establishment of exclusive economic zones.

The advent of UNCLOS III and the subsequent institution of harmonized fisheries by legislation in Member States have provided Member States with the legal basis for the pursuance of this common strategy. This legal framework has also provided the impetus for the establishment of the regional fisheries unit which is currently administering a number of management and development programs on behalf of Member countries of the OECS. Such regional cooperation could eliminate the

problems and constraints that are affecting individual country efforts through the pooling of scarce financial and technical resources. However, the establishment of a regional institutional framework, complemented with a regional management and development program, cannot by themselves constitute a basis for a common policy for fisheries management and development in the OECS region. To achieve a successful regional development and management policy Member States must be prepared to provide the necessary finances for the operation of the regional program and be prepared to relinquish some national authority to the regional administration to give effect to a common policy.

FIGURE I

OECS PROPOSED SEAFOOD PRODUCTION & MARKETING MODEL



The exploitation processing and marketing of underutilized species must be undertaken under a regional development program invoking regional commercial joint venture operators and limited foreign access through joint venture and li censing programs. There must be a management capability within the regional administrative mechanism to accommodate investment promotions, negotiate licensing and access agreements, provide external market information, promotion of seafood products and the implementation and monitoring of resource management plans.

FIGURE II

PROPOSED FISHERIES MANAGEMENT and DEVELOPMENT ADMINISTRATIVE and FUNCTIONAL MECHANISM

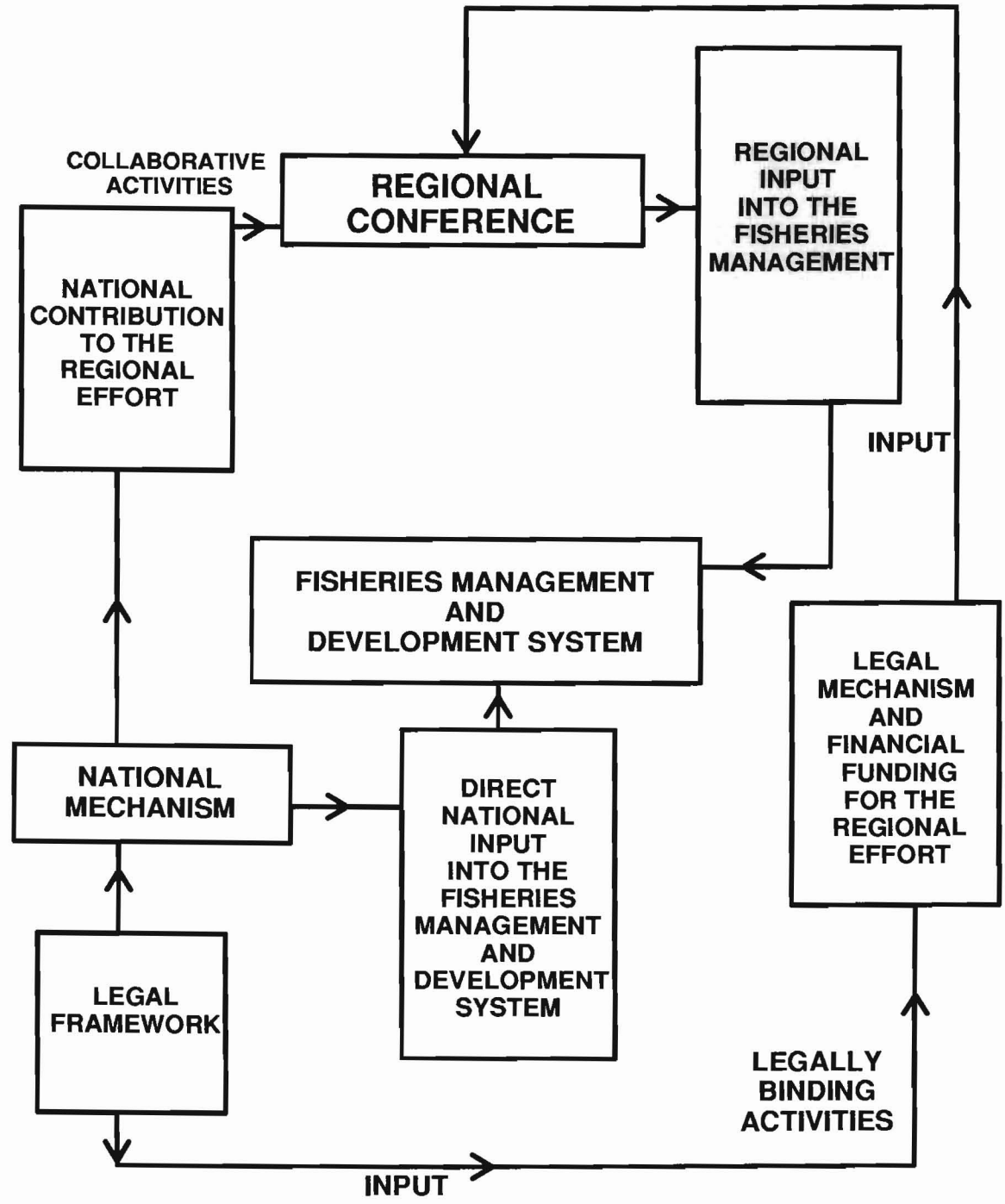


Figure III

ELEMENTS OF A REGIONAL ADMINISTRATIVE MECHANISM FOR FISHERIES

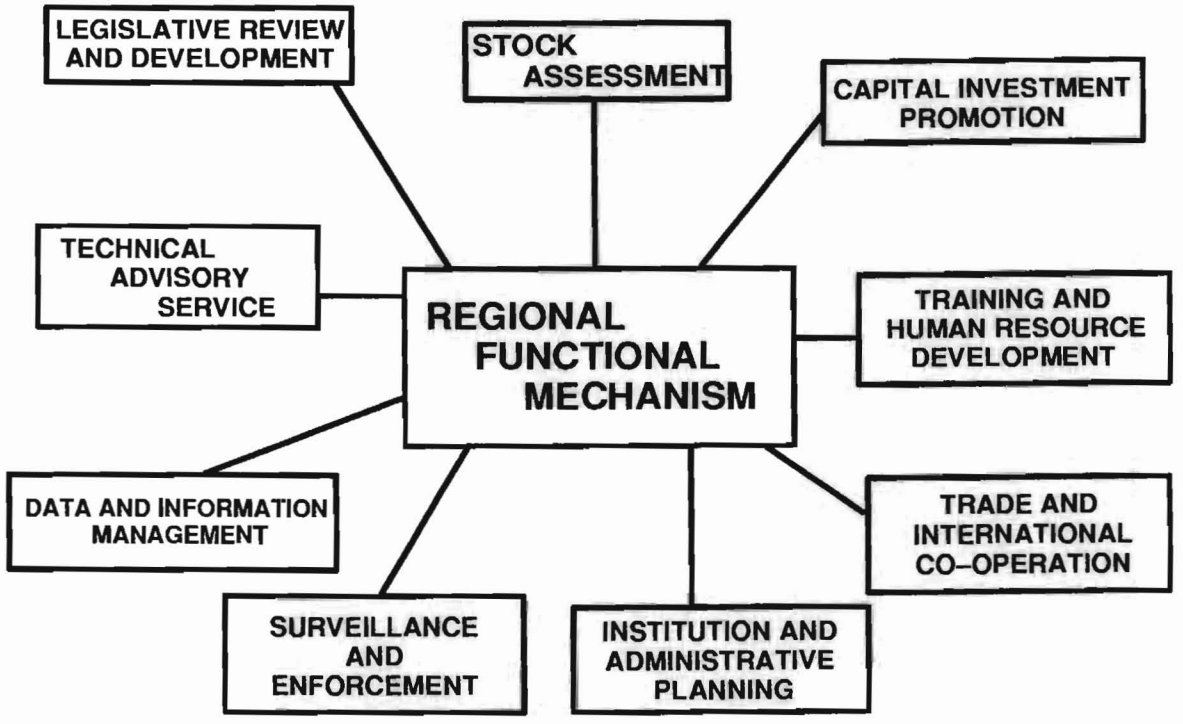


FIGURE IV

MODEL FOR FISHERIES SECTOR MANAGEMENT and DEVELOPMENT ACTIVITIES

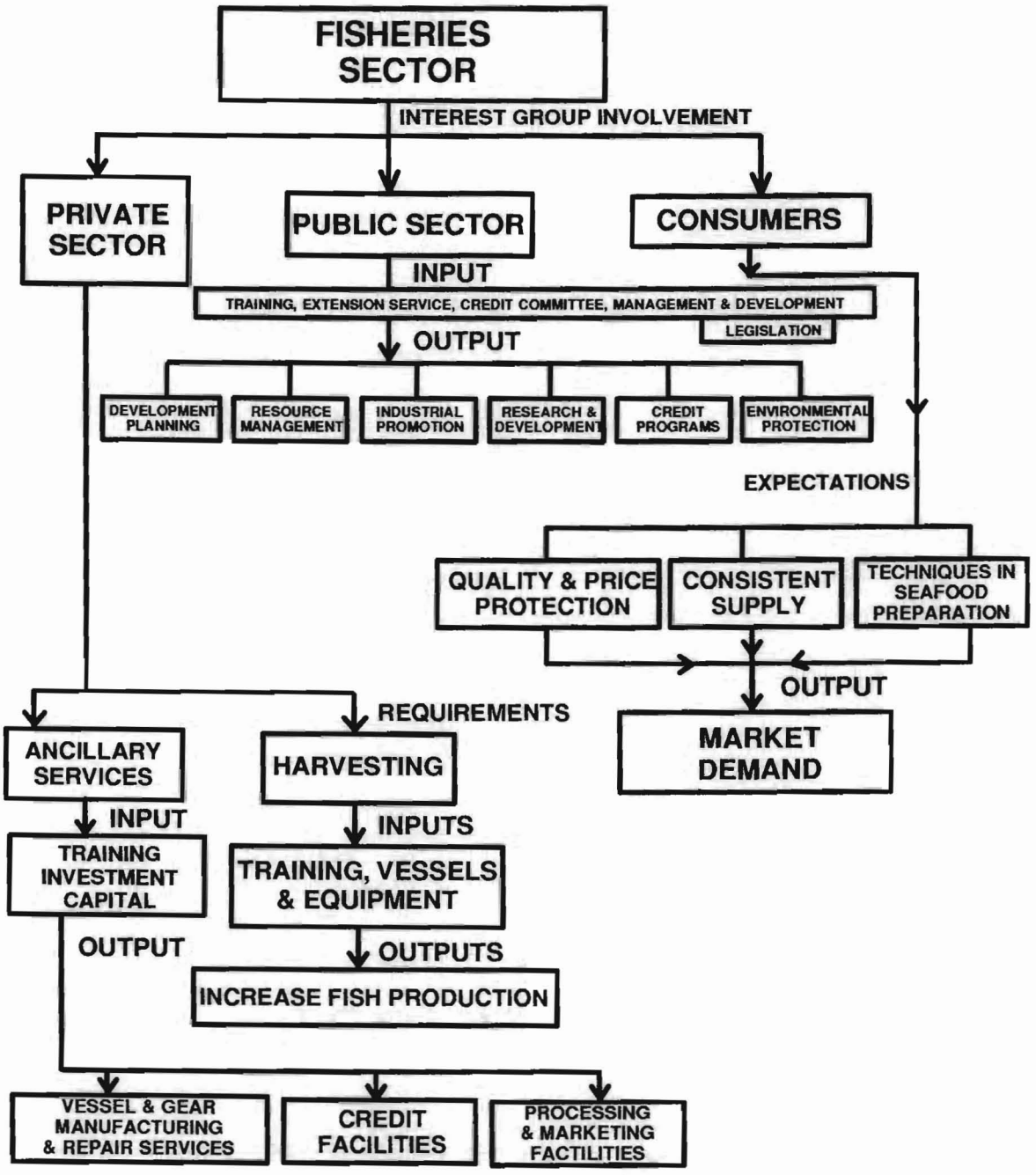


FIGURE V

ORGANISATION OF EASTERN CARIBBEAN STATES
ORGANISATIONAL CHART

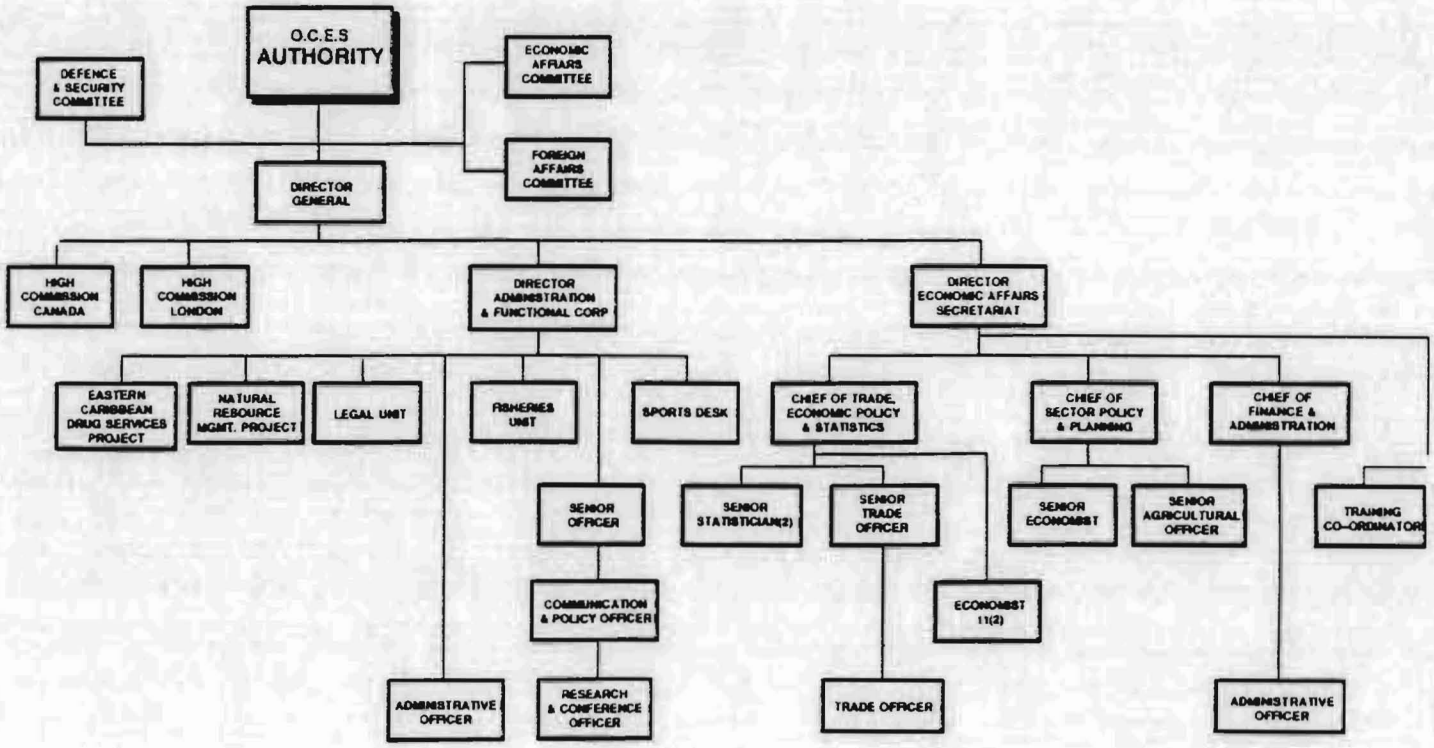


TABLE I

SHELF AND LAND AREAS FOR OECS STATES

By Countries

Country	SHELF AREA	REEF AREAS 1/3 SHELF AREA	LAND AREA
Antigua/Barbuda	3,400 km2	1,122 km2	441 km2
Dominica	368 km2	119 km2	777 km2
Grenada	3,100 km2	1,023 km2	344 km2
Montserrat	108 km2	36 km2	98 km2
St. Kitts/Nevis	595 km2	196 km2	616 km2
St. Lucia	522 km2	172 km2	261 km2
St. Vincent & the Grenadines	1,800 km2	594 km2	388 km2
TOTAL	9,896 km2	3,262 km2	2,925 km2

SOURCE: Information derived from the FISHERIES SECTOR ASSESSMENT. Island Resources Foundation, 1985. (Goodwin et. al.).

TABLE II

TOTAL ESTIMATES OF BIOMASS FOR COMMERCIALLY EXPLOITED SHELF RESOURCES OF THE OECS

TYPE	QUANTITY	TOTAL PERCENTAGES OF BIOMASS
REEF FISH	16,018	54
COSTAL PELAGIC	11,278	34
LOBSTERS	1,362	4
OTHERS	3,264,	10
TOTAL	32,822	100

SOURCE: MUNRO, J., 1983: CARIBBEAN CORAL REEF FISHERIES. Goodwin et. al. 1980, Fisheries Sector Assessment for the Eastern Caribbean.

TABLE III

ESTIMATE OF BIOMASS FOR COMMERCIALLY EXPLOITED SPECIES ON SHELF

By Countries

Country	Reef Fish 1.17 mt/km2	Coastal Pelagic 1.14 mt/km2	Lobsters 0.14 mt/km2	Others 0.33 mt/km2	Total 3.32 mt/km2
Antigua/Barbuda	5,814	3,876	476	1,122	11,288
Dominica	629	420	52	121	1,222
Grenada	5,301	3,534	434	1,023	10,292
Montserrat	185	123	15	36	359
St. Kitts/Nevis	1,018	678	60	196	1,952
St. Lucia	893	595	73	172	1,733
St. Vincent & the Grenadines	3,078	2,052	252	594	5,976
TOTAL	16,018	11,278	1,362	3,264	32,822

SOURCE: MUNRO, J., 1983: CARIBBEAN CORAL REEF FISHERIES. Goodwin et. al. 1980, Fisheries Sector Assessment for the Eastern Caribbean.

TABLE IV

M.S.Y. OF SHELF RESOURCES

BASED ON THE FORMULA BELOW

Y = .5 MB M = .5 B = BIOMASS

Y = MSY
M = NATURAL MORTALITY
B = BIOMASS

Country	Reef Fish	Coastal Pelagic	Lobsters	Others	Total
Antigua/Barbuda	1,454	969	119	281	2,822
Dominica	157	105	13	30	305
Grenada	1,325	884	109	256	2,573
Montserrat	46	31	4	9	90
St. Kitts/Nevis	285	170	15	49	494
St. Lucia	233	149	18	43	433
St. Vincent & the Grenadines	770	513	63	149	1,494
TOTAL	4,208	2,821	341	817	8,211

SOURCE: MUNRO, J., 1983: CARIBBEAN CORAL REEF FISHERIES. Goodwin et. al. 1980, Fisheries Sector Assessment for the Eastern Caribbean.

TABLE V

FISH PRODUCTION VALUES
IN THE OECS
1960 - 1970

(EASTERN CARIBBEAN DOLLARS)

Country	1960			1965			1970		
	Size of Catch	Value $M	% GNP	Size of Catch	Value $M	% GNP	Size of Catch	Value $M	% GNP
Antigua/Barbuda	620 mt	0.34	1.2	837 mt	0.75	1.70	800 mt	0.80	0.07
Dominica (1959)	500 mt	0.35	1.4	600 mt	0.54	1.60	600 mt	0.60	1.20
Grenada	500 mt	0.13	1.1	900 mt	0.81	0.46	1,500 mt	1.50	2.50
Montserrat	100 mt	0.06	1.1	100 mt (1968)	0.09	1.70	100 mt	0.01	0.07
St. Kitts/Nevis	300 mt	0.19	1.1	500 mt	0.45	1.00	650 mt	0.65	1.40
St. Lucia	600 mt	0.30	0.8	700 mt	0.63	1.10	1,700 mt	1.70	2.50
St. Vincent & the Grenadines	500 mt	0.22	1.1	800 mt	0.72	0.90	850 mt	0.85	1.30
TOTAL	3,120 mt	1.59	1.1	4,437 mt	3.99	1.20	6,200 mt	6.11	1.50

SOURCE: FAO STATISTICAL DIGEST,
1960–65; 1965–70, 1970–75

TABLE VI

FISH PRODUCTION VALUES
IN THE OECS
1975 - 1985

(EASTERN CARIBBEAN DOLLARS)

Country	1975			1980			1985		
	Size of Catch	Value $M	% GNP	Size of Catch	Value $M	% GNP	Size of Catch	Value $M	% GNP
Antigua/Barbuda	1,601 mt	3.75	3.1	1,247 mt (1981)	5.5 *	3.8	1,200 mt	8.0	5.1
Dominica (1959)	1,002 mt	2.30	3.9	1,445 mt	3.4	3.7	945 mt	4.2	4.1
Grenada	1,700 mt	3.80	4.5	1,753 mt	3.9	2.6	1.801 mt	5.0	3.1
Montserrat	70 mt	0.10	0.5	120 mt	0.5	1.2	120 mt	0.7	1.4
St. Kitts/Nevis	500 mt	0.72	0.9	1,050 mt	4.1	4.3	970 mt	4.3	3.9
St. Lucia	2,000 mt	6.20	5.7	1,400 mt	5.3	1.5	1.204 mt	6.6	2.0
St. Vincent & the Grenadines	549 mt	0.90	1.4	1,047 mt	2.4	1.8	1,047 mt	3.0	1.9
TOTAL	7,421 mt	17.80	2.9	8,062 mt	25.1	2.9	7,287 mt	31.8	3.04

*Includes 1.4m from lobster sales.
1981 lobster production = 127.2 mt @ $5/lb

SOURCE: FAO STATISTICAL DIGEST YEAR BOOK
Fisheries Sector Assessment for the ***OECS***
(Island Resources Foundation, 1985)
World Bank Report
Statistical Year Book, 1978.

TABLE VII

NUMBER OF VESSELS IN THE NATIONAL FISHING FLEET (1967)

GROUPS	TOTAL OF BOATS	DEGREE OF MECHANIZATION	FISHERMEN INVOLVED
ANTIGUA/BARBUDA	225	75	650
ST. KITTS/NEVIS	100	35	700
MONTSERRAT	50	90	200
ST. LUCIA	300	45	1,500
ST. VINCENT	400	17	1,800
GRENADA	450	27	1,100
DOMINICA	250	60	1,200
TOTAL	1,775	349	7,150

This table represents the number of boats and fishermen (part time and full time). The figures are approximate and in some cases not better than qualified guesses, as boat registries are either not available or kept up to date.

Source: Vedeaus, L. 1971, UNDP/FAO Caribbean Fishery Development Project. Barbados Report F/CARREG. 15M.

TABLE VIII

COMPARATIVE ANALYSIS OF FISH AND SHELLFISH

EXPORT FOR *OECS* COUNTRIES IN KILOGRAMS

YEAR	GRENADA	ST. VINCENT	ST. LUCIA	ST. KITTS/NEVIS	ANTIGUA
1980	56,469	N/A	2,365	89,559	856,100
1981	90,687	N/A	470	88,745	539,000
1982	145,566	N/A	N/A	50,640	447,900
1983	233,870	N/A	171	79,746	199,700
1984	471,100	85,938	N/A	126,932	710,100
1985	797,060	69,126	3,493	13,219	549,117
1986	1,278,730	104,738	68,293	105,426	N/A
1987	1,062,960	146,409	42,813	160,399	870,880
1988	877,397	163,828	11,364	N/A	332,314
ANNUAL AVERAGE	557,092	102,007	18,363	89,333	563,138

Average annual export for the region 1.3 million kilogram or 1,478 mt.

SOURCE: *ORGANIZATION OF EASTERN CARIBBEAN STATES FISHERIES STATISTICAL REVIEW* (***OECS*** Fisheries Unit, 1989).

TABLE IX

FISH TRADE AVERAGE VALUES

(Import and Export 1984 – 1990)
Eastern Caribbean million dollars.

COUNTRY	IMPORT	EXPORT	DEFICIT (–) SURPLUS (+)
Antigua/Barbuda	4.0	3.3	– 0.7
St. Kitts	1.6	0.5	–1.1
St. Lucia	4.0	0.5	– 3.5
St. Vincent and the Grenadines	1.7	0.7	– 1.0
Grenada	2.5	2.7	+ 0.2
TOTAL	13.8	7.7	– 6.1

The ***OECS*** region is running a deficit of 6.1 million dollars in its seafood trade.

Source: Organization of Eastern Caribbean States Fisheries Statistics Review (OECS Fisheries Unit 1989).

APPENDIX I

1965–1970 Capital Outlay
for Fishing with a Typical Motorized Canoe in the OECS

1. Capital Expenditures

24 ft. Canoe	EC$	600.00
20 h,.p. Outboard Motor		1,280.00
Gear (net, pots, line)		480.00
TOTAL	EC$	2.360.00

2. Gross revenue

(11,440 lbs/year @ .45¢/lb)	EC$	5,148.00

3. Recurrent Cost

(a) Depreciation			
Boat Over (5 years)	EC$	120.00	
Motor Over (2 years)	EC$	600.00	
	EC$		720.00
(b) Interest on Loan (motor 3%)	EC$		39.00
(c) Insurance	EC$		150.00
(d) Fuel			
99 trips (14 gallons/trip @.80¢)	EC$		1,109.00

4. Maintenance and Spare Parts

(a) Upkeep of Hull	EC$	100.00	
(b) Engine parts and maintenance	EC$	200.00	
(c) Gear replacement	EC$	440.00	
	EC$		740.00

5. Labor

(60 % of gross revenue)		EC$	2,637.00		
TOTAL		EC$	5.395.00	EC$	5.148.00

APPENDIX II

CAPITAL OUTLAY FOR A FISHING VESSEL OPERATING IN ANTIGUA/BARBUDA 1970-1975

CAPITAL OUTLAY	Total	Hull	Engine
32 ft. sloop; 40 h.p. diesel	13,500.00,	9,000.00	4,500.00
40 ft. sloop; 100 h.p. diesel	19,000.00	13.000.00	6,000.00

With an economic lifetime of about 10 years, annual depreciation of hull and engine would be EC $1,350.00 for small boats and about EC $2,000.00 for the bigger boats.

ANNUAL OPERATION COST

Depreciation hull and engine	1,500.00	
Interest on capital outlay 3%	400.00	
Insurance 4% on hull and engine	550.00	
FIXED COST		2,450.00
Fuel Consumption (13 gals. per trip, 150 trips/.50 gal.)	950.00	
Lubricating Oil	100.00	
Ice at .2/lb. (300 trips)	900.00	
Maintenance on hull and engine	700.00	
Replacement of gear (40 fresh pots every six months @ $30)	600.00	
Miscellaneous	300.00	
VARIABLE COST		3,550.00
TOTAL OPERATIONAL COST		6,000.00

Variable cost are usually shared amongst the crew; the owner of the vessel has to cover fixed cost from his earnings.

Operational expense to be covered by the owner is about 56% or $3,350.00 of which 70% are fixed costs.

APPENDIX III

Regional cooperation in Fisheries Management.

6.—(1) The Minister may enter into arrangements or agreements with other countries in the region or with any competent regional organization, providing for:

(a) the harmonization of systems for the collecting of statistics, and the carrying out of surveys and procedures for assessing the state of the fisheries resources;

(b) the harmonization of licensing procedures and conditions in respect of foreign fishing vessels;

(c) schemes for the issuance of fishing licences in respect of foreign fishing vessels by a competent regional organization on behalf of the Minister and the recognition of regional licences issued by such organization, subject to such conditions as may be specified in the agreement or arrangement and to such additional conditions as the Minister may specify from time to time;

(d) the taking of joint or harmonized enforcement measures in respect of foreign fishing vessels contravening fisheries laws in the region;

(e) the establishment and operation of joint or regional fisheries management bodies where appropriate;

(f) where appropriate, the establishment of a regional register of fishing vessels;

(g) such other co-operative measures as appropriate including measures for promoting the welfare of fishermen and the insurance of fishing vessels and gear.

(2) For the purpose of giving effect to any arrangement or agreement entered into under this section, the Minister may by Order published in the *Gazette:*

(a) authorize any competent regional organization designated in the Order to issue fishing licences in respect of foreign fishing vessels on behalf of the Minister, within the limits set out in the Order;

(b) exempt from the requirements of Section 8 any foreign fishing vessel or class of foreign fishing vessels holding a valid regional fishing licence issued by a competent regional organization designated in the Order; and

(c) prescribe the conditions to be observed by foreign fishing vessels exempted under paragraph (b) while fishing or navigating in the fishery waters.

(3) Any Order made under subsection (2) shall be subject to negative resolution of the Parliament.

Fisheries access agreements.

7.—(1) The Minister may enter into access agreements with other states and with associations representing foreign fishing vessel owners or charterers, providing for the allocation of fishing rights to vessels from these states or associations.

(2) The fishing rights allocated under agreements entered into under this section shall not exceed the total resources or amount of fishing allowed to the appropriate category of foreign fishing vessels under the fisheries plan.

(3) Any agreement entered into under this section shall include a provision establishing the responsibility of the foreign state or association to take necessary measures to ensure compliance by its vessels with the terms and conditions of the agreement and with the laws relating to fishing in the fishery waters.

(4) For the purposes of this section and Section 8 the term "state" shall include any regional organization to which the power to negotiate access agreements has been delegated by the member countries.

APPENDIX IV
REPORT OF THE WORKING GROUP
ON HARMONIZED MINIMUM CONDITIONS FOR FOREIGN ACCESS
TO THE EEZ'S OF THE OECS STATES

1. Access will be granted to the pelagic resource specifically, swordfish, yellowfin and big-eye tuna with a permissible by=catch consisting of other pelagics such as dolphin, kingfish (wahoo) and other species of tuna.
2. Foreign vessels licensed in an OECS Member State or common EEZ of the OECS States must first be registered in the regional register at the OECS Fisheries Unit. The OECS Fisheries Unit will provide the foreign vessel with a certificate of registration (COR). Each vessel should provide an annual fishing plan including quantity of gear, anticipated date of arrival and departure from the EEZ, and ports of landing.
3. Access will be granted to foreign vessels to fish only outside of 20 miles off the coast of each or any Member States of the OECS.
4. It will be a condition of the license that every fishing vessel will be in good standing in the Regional Register (R.R.).
5. Each licensed vessel shall be required as a condition of the license to have an observer on board at all times while the vessel is operating in the fishing access area. This observer shall be from an OECS

Member State.

6. No fish shall be transferred from one foreign fishing vessel to another foreign vessel while in the fishing access area. Vessels deemed to circumventing this requirement by temporarily existing the EEZ may face license suspension.

7. In the pelagic fishery, any other species apart from the swordfish, yellowfin tuna and big-eye tuna species will be considered as by-catch.

8. It will be a requirement that the by-catch be kept onboard in good condition (i.e the flesh should be firm, there should be no offensive odor, the eyes should be clear.) The by-catch should be disposed of at a price specified in the fee structure.

9. The license shall be carried onboard the vessel while the vessel is fishing or transporting fish in the EEZ. This license must be produced to any authorized officer upon request.

10. At all times, when a foreign fishing vessel is in an unauthorized fishing area, within the EEZ, the year of the vessel shall be stowed in such manner as not to be available for fishing.

11. Specific information on the position where the licensed foreign fishing vessel intends to operate while in the EEZ should be provided to the Chief Fisheries Officer or his designee at least forty= eight (48) hours before the vessel begins each

fishing trip to the EEZ licensing area. Failure to provide such notification may result to license suspension.

12. Vessel must inform the State of entry into the EEZ forty-eight (48) hours prior to arrival and departure.

13. It will be the responsibility of a foreign fishing vessel or its agent to obtain the license and place onboard prior to commencing fishing operations.

14. The vessel must submit an authorized trip report form revealing the weight, species mix of its catch, and fishing effort (position and length of line, number of hooks, time and duration of set, and coordinates of each set) to the Chief Fisheries Officer or his designee, for any fishing trip within the licensed area, and permit the catch to be inspected on arrival in port. The trip report must be duly signed by a Captain and handed over to the Chief Fisheries Officer or his designee within two (2) hours upon arrival in port. The vessel will not be permitted to leave port for another trip unless the trip report is approved by the Chief Fisheries Officer or his designee. And weight sheets must be submitted by the licensed party upon off-loading of the catch within two (2) weeks of off-loading. For vessels to land in non-member OECS ports, this information should be

postmarked to the Chief Fisheries Officer within one (1) calendar day of landing. Failure to submit the report in the manner specified may result in license cancellation. A copy of the approved trip report should be submitted to the OECS FIsheries Unit within six (6) days of its approval.

15. The Captain and each member of crew of the licensed foreign fishing vessel shall inevitably comply with all terms and conditions of the license. Such conditions shall specify that an authorized officer of the Member OECS state may request the vessel move to a specified location, stop to facilitate boarding and inspection of the vessel, gear, equipment, fish and fish products or any records pertaining to operation of the EEZ, in compliance with the Fisheries Act of that state.

16. All licensed vessels shall have their international radio call sign posted in white on a black background or black on a white background on the horizontal plans of the superstructure on both sides of the vessel and on the vertical plane of these vessels in a manner clearly visible from the air. While the vessel is in the EEZ all parts of these markings shall be clear, distinct and uncovered. Each call number and letter must be a minimum of sixteen (16) inches in height, four (4) inches in diameter, and two (2) inches apart.

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