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**Report on the
COASTAL ZONE MANAGEMENT
SEMINAR-WORKSHOP**

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RAPPORTEUR'S REPORT

I. Introduction

This is a report summarizing the results of a Coastal Zone Management Workshop sponsored by USAID Manila and held in the Philippines. Participants, who were largely representatives of Philippine government and development agencies, are listed in Appendix I.

As background for the workshop Dr. Ralph Edwards of USAID reviewed the history of AID's involvement in the Philippines and recent changes in the focus of AID assistance. Present and future programs are directed towards specific target groups, namely the rural poor including small farmers, farmers dependent upon rainfed agriculture, fishermen, landless laborers, and the urban poor. Because limited funding will be available for its work in the Philippines, AID will focus its development activities in Regions V (Bicol), VI, VII and VIII (Western, Central, and Eastern Visayas). Four major topics of emphasis are:

1. Reduction of fertility and mortality
2. Improving agricultural productivity
3. Developing alternative rural employment
4. Assistance with strengthening of local governments

Within the category of improving agricultural productivity one area of special emphasis is the coastal zones. An environmentally oriented approach will be followed to insure sustained utilization of resources available in the coastal zone.

An important element of the coastal zone resources is the fishery resources, and the municipal fishing communities dependent upon these resources were the principal subjects of this workshop.

Planning is progressing with a view to the next 20 years even though specific projects may not exceed 5 years in length. The Philippines is particularly dependent upon fisheries as a source for as much as 75% of the country's animal protein supply, and the traditional or municipal fishermen presently harvest 60% of this fish. With future population

levels as high as 200,000,000 people being predicted compared to the present population of 46,000,000 it is obvious that extreme pressure will be placed upon fishery resources of the country, many of which may already be overexploited.

Resource managers in many countries have not yet fully grasped the consequences of the fisheries dilemma now emerging in Southeast Asia. Official views often hold that abundant ^{under}overutilized stocks still exist while in fact few do and many are already overexploited. Official views commonly state that there are opportunities for increased employment in fishing while in fact the catches are already divided among too many fishermen resulting in very low individual incomes. Official views commonly are that more boats and fishing gear are needed while in fact a great excess of harvesting capacity already exists resulting in wasted fuel and resources. Perhaps most importantly, official plans call for rapidly increasing harvests of fish when this is probably not possible.

II. Purpose

Fortunately, among fishery managers in Southeast Asia and in the Philippines, a growing awareness exists of the nature and seriousness of this dilemma. The interest of USAID and fisheries officials in the Philippines in searching for solutions to the problem led to this workshop.

USAID interest in the problem as explained by Dr. Martin Billings, Workshop Organizer, can best be described in the context of a large "Rainfed Resources Development" program being proposed that will address resource management broadly and as an integral part of the rural development process. The broad purpose of this program is to identify, develop and institutionalize systems for sustainable utilization of the Philippines' rainfed resource base. A part of this resource base is the coastal zone, its fish populations and the people harvesting these fish. The municipal fishermen are of special interest to USAID because they are a major poverty group in the Philippines.

The purpose of this workshop was to encourage discussion of problems related to municipal fisheries among fisheries and development experts in

attendance in order to explore means for improving the welfare of the municipal fishing community. The workshop was designed to define and explore the problems and to propose possible approaches to alleviating them. The target was to formulate a consensus regarding realistic and practical approaches to the long-term management of the coastal zone resources as a whole and to the amelioration of the economic situation of coastal fishing communities specifically.

Assuming successful completion of the purpose and objectives of this workshop USAID proposes a number of relatively short term (3-4 years) project activities of a pilot nature to test alternatives for: (1) improvement and development of both the ecology and the productive resource base of these areas, (2) gaining local participation in this process, and (3) developing necessary institutional mechanisms at the local level to ensure effective action.

III. San Miguel Bay Case Study

A. Introduction

Under the leadership of Prof. A. Mines, University of the Philippines, a general discussion was presented of a case study conducted by the University of the Philippines and ICLARM in San Miguel Bay, Bicol Region. The municipal fishing communities in San Miguel Bay are representative in many ways of such communities in the Philippines and elsewhere in Southeast Asia, with implications for the need for management of fishery resources in the coastal zone.

In preparation for this discussion an audio-visual presentation^{1/} was made describing the problems of overfishing and competition as they affect the municipal fishermen. It was noted that the development approaches that were successful in the past, increasing fishing effort and improving gear, are not appropriate today in many situations and may even aggravate the problems. Commonly, management to

^{1/} This presentation "Philippine Municipal Fisheries: A Review of Resources, Technology and Socioeconomics" was prepared for the FIDC and ICLARM by the Department of Communications, Ateneo de Manila University.

bring about a reduction in effort is needed to maximize harvests and this poses a great many practical problems. Although the status quo is clearly not acceptable, there is a critical shortage of information on alternative development and management strategies. Improvement in marketing systems and methods of postharvest handling of the catch offer some short-term improvement in the incomes of municipal fishermen, but in the long term reduced fishing is clearly essential. Improved technology or additional loans to fishermen are not viable long-term solutions.

The solutions to this dilemma lie within the broader context of rural development. Movement of people from fishing occupations to others will be required to correct the overfishing problem and to increase incomes. Alternative forms of employment are not clearly visible in many locations, however, and this lack of opportunities has contributed to the steady increase in numbers of full-time and part-time fishermen.

In spite of their contribution municipal fishermen failed to gain the recognition and concern of government planners and policy makers prior to 1977, since the main focus of government programs was on large scale commercial fisheries which are capital intensive and potential sources of foreign exchange.

It was only in 1977 when the Integrated Fisheries Development Plan was formulated by the Fisheries Industry Development Council (FIDC) that municipal fishermen began to attract recognition and concern from government planners. Attempts to improve the economic condition of municipal fishermen included a variety of financing schemes (low interest loans), establishment of fishermen's associations and cooperatives in some villages, and extension services by personnel of the Bureau of Fisheries and Aquatic Resources (BFAR). Unfortunately, few positive responses were observed to all these efforts to improve the living and working conditions of this sector of the fishing industry.

In 1979 the Institute of Fisheries Development and Research (IFDR) of the College of Fisheries of the University of the Philippines and ICLARM decided to join hands in a concerted effort to conduct an in-depth analysis of the socio-economic conditions of the Philippine municipal fishermen. The study area selected was San Miguel Bay in the Bicol Region, one of the country's most productive fishing grounds. Aside from being an important fishing ground for shrimps, a variety of fish species like croakers, herrings, mullets, juvenile Spanish mackerels, anchovies, and crevalles are also caught in the Bay. Fishermen in the area are using many types of fishing gear, including stationary fish traps, gill nets, fish corrals, beach seines, lift nets, and trawls. Conflicts among fishermen in the Bay are common, especially among gill netters and trawl fishermen. In 1978 a workshop conducted by BFAR and the South China Sea Programme (SCSP) using secondary catch and effort data had concluded that San Miguel Bay is overfished.

The primary purpose of this research project envisioned by IFDR and ICLARM was to conduct an interdisciplinary study in San Miguel Bay to describe the problems of the municipal fishery and the fishing communities. It was recognized that biological, technological, economic and sociological factors all influence the well-being and incomes of municipal fishermen, and that, in order to fully understand the problems of these fishermen, the interrelationships of these factors must be known. Because an interdisciplinary approach had not been used before for municipal fisheries research in the Philippines, an underlying rationale for the project was to develop such an approach which could also be used in other areas.

The four distinct but complementary aspects or modules of the project are: Stock Assessment (Biology), headed by Dr. Daniel Pauly; Economics, led by Dr. Ian Smith; Sociology and Mobility, both headed by Dr. Conner Bailey. Work on improvement of post harvest technology was also conducted by the Department of Fish Processing Technology of the U.P. College of Fisheries, funded by the National Science Development Board (NSDB).

The Project which started data collecting in 1979 and ended in May 1981, was originally funded by ICLARM and IFDR, but soon funds were also contributed by the United Nations University (UNU) and the Philippine Council for Agricultural Resources Research (PCARR). It was envisioned that the results of this study could serve as a basis for government policy makers and planners to include the municipal fisheries of San Miguel Bay in the integrated area development plan which is being coordinated by the Bicol River Basin Development Program (BRBDP).

B. Stock Assessment

San Miguel Bay is a shallow, sheltered estuary of 840 km² on the Pacific Coast of the Philippines where fishing operations are possible throughout the year. A single river, the Bicol River, contributes 97% of the freshwater inflow together with large quantities (0.6% in volume) of silt from deforested upland areas in the watershed. Siltation has reduced the average depth of the Bay by about 1.5 m since 1907 resulting in reduced physical and legal access to portions of the Bay and interfering with landing of the catch.

Catch statistics collected during the study were discussed by Dr. Daniel Pauly of ICLARM and were based on the following:

- samples of catch per trip categorized by gear and species groups for a period of more than one year
- estimation of annual numbers of trips for each type of gear based on actual counts, and
- estimation of total units of gear based on actual counts.

From these data total catch was estimated yielding the information presented below on two distinct fisheries operating in the Bay.

	<u>Municipal (non-trawl) fishery</u>	<u>Trawl fishery</u>
total annual catch	7000 tons	6500 tons
number of households owning gears	3000	30
number of persons employed	5000	500
major gears in use	gill nets	small trawler (<3mt.)
size of fish caught	larger	smaller

These catch statistics are three to four times higher than previously available estimates of total catch leading to the suggestion that total fishing catch has been seriously underestimated.

Detailed catch and effort data collected during the study are still being analyzed but are expected to yield information needed for a comprehensive understanding of the stocks and the impact of the fishery on these stocks. It is apparent at this time that the Bay is being overexploited. Catch per unit of effort and net income are lower than previously. Total catch may be holding steady but, if so, only as a result of the fishery shifting to the harvest of smaller fishes, and increasing fishing effort with additional associated costs.

C. Economics

Dr. Ian R. Smith of ICLARM presented the preliminary findings of the economics study of the San Miguel Bay fishery. The economics of production study focused on the costs and returns of the major municipal fishing gears operating in the Bay including gill netters, mini and baby trawls, push nets, stationary lift nets, filter nets and corrals. Data to measure the profitability of each of these gear types was gathered through a record keeping activity whereby daily costs and returns for 12 months were obtained from a sample of 65 fishing units in the communities of Castillo, Cabusao and Sabang, Calabanga.

Investment costs were presented to show the extreme range of investment levels (₱250 for a push net; ₱70,000 for a baby trawler) for gears that are grouped under the 'municipal' fisheries label. Extreme variations in profitability by gear type were also depicted. Generally speaking there was a positive correlation between profitability and investment levels. Push nets, gill netters, and lift nets all produced lower profits than could have been obtained by placing the investment capital in a savings account (the opportunity cost of capital). Filter nets, corrals, and especially trawlers all earned considerably higher profits than the opportunity costs of

capital. There is thus a clear dichotomy in the fishery with the most prevalent gear (gill nets) operating at the margin while a small number of trawlers capture half the total catch and almost all the pure profits. In the interest of equity, there is thus a clear need to address the questions of control of access and allocation of fishing rights within the municipal fishery.

Return to labor were determined by the sharing system in use for each gear type. While absolutely low (ranging from ₱150 to ₱530 per month), they were generally higher than returns obtained by labor in other nearby non-fishing activities. This finding supported the observation that there are very few alternative income generating activities to fishing, and therefore that levels of fishing effort are likely to remain high despite the low levels of income that fishing labor obtains.

D. Sociology

The basic task of the sociology module as presented by Dr. Conner Bailey was to provide a descriptive analysis of socio-economic conditions of the 44 fishing communities surrounding San Miguel Bay. Field work proceeded in 3 phases: an initial preliminary survey; a detailed socio-economic survey conducted in 22 communities with a sample of 641 fishermen; and one month of detailed investigation of a single community using participant observation as the primary research tool. We estimate 5,600 fishermen to be active in the Bay.

Initially the team examined (1) the physical and climatological characteristics of the fishery, (2) the seasonality of fishing activities, and (3) the effect of seasonality on marketing and processing of the catch. A wide range of gear are in use and individual fishermen often use a mix of gears over the course of a year.

Ownership patterns and systems of sharing the major gear types were also presented. Ownership of gear and craft is widely

distributed, except in the case of small and medium trawlers. Ownership of these relatively capital intensive trawlers is highly concentrated and the owners have been able to effect changes in the traditional, 50-50 division of net proceeds (after operating expenses are paid) which result in a higher proportion of the gross income accruing to the owners. While fishermen owners and non-owners using small-scale gear generally have comparable levels of income, the owners of trawlers receive markedly higher income than their crewmen. Less than 50 families own trawlers, and one family owns 25% of the total trawler fleet of 95. These trawlers employ some 500 fishermen and account for 47% of the total volume of catch from the Bay. The remaining 5,100 fishermen using gill nets, lift nets, fish corrals, and other small-scale gear land the remaining 53% of the catch.

The importance of the fisherman's family in terms of income and their role in decisions affecting investment in fishing units was documented. Women and children are active in both processing and marketing of the catch and the income from fishing itself typically is handed over to the wife, who controls the family finances. Thus, women play a pivotal role in the economy of fishing communities.

E. Mobility

This research was conducted in close cooperation with the sociology module, drawing on data from that module plus personal observations in the field and secondary sources (e.g. data from the 1980 census), and was designed to assess the extent and attitudes toward geographic and occupational mobility.

A majority of the fishermen respondents indicated willingness to change occupations even if this required a move to another place (e.g. a different municipality or different province).

Local opportunities for economically viable alternatives to fishing are distinctly limited, however. Only 10% of the respondents presently engaged in agriculture, mostly in a limited fashion.

Lack of access to land is a major constraint. Also, a large surplus of labor in the Bicol agricultural sector limits the possibility that future developments in agriculture will lead to absorption of labor from fisheries. Local cottage industries and manufacturing sectors are also weak, as is reflected in a high rate of out-migration from the Bicol region. Fishing communities also contribute to this out-migration, but absolute numbers of fishermen operating in the Bay is still increasing.

Some potential exists for supplementing incomes of fishermen, e.g. through animal husbandry, but this is not likely to result in reducing the level of fishing effort from a fishery that's already overexploited. If national goals and priorities call for increasing employment and/or improving income, it may be necessary to consider some limits on operations of trawlers within San Miguel Bay.

IV. Workgroup Sessions

A. Introduction

The workshop had focused, up to this point, on descriptions of the problems and on a case study designed to improve understanding of the problems of the municipal fishing communities. The participants were then assigned to one of three workgroups to explore possibilities for workable solutions to the dilemma of the coastal fishing communities. These groups addressed the problem from three viewpoints: (1) political-legal, (2) socio-economic and (3) technical. The broad experience of workshop participants in dealing with these problems was utilized to gain insight, develop new ideas and discuss both successful and unsuccessful approaches to the problems made in the past. The workgroups were challenged to come up with viable plans and ideas. A basic question posed to the workgroups was "Can we manage coastal fisheries in Southeast Asian countries given existing conditions, and if so, how can this be done?"

B. Political-Legal Workgroup

This group identified the principal management goal of municipal fisheries to be increased production to feed the increasing population. This goal was defined to incorporate the concept of maximum sustainable yield in a manner that encourages wide distribution of benefits from increased fisheries production. It was recognized that maximum production may result in a reduction in employment in the sector, therefore an intermediate, socially acceptable course of action was recommended that would strive toward both optimum employment and optimum yield for given resources and socio-economic circumstances. The resource managers would have to define an appropriate mix of these two goals for each individual situation. It was warned that, given our inadequate knowledge of the resource base in most instances and the danger of causing irreversible damage to fish stocks or to the environment, it may be prudent to underutilize resources at present.

The discussion of problems led to recognition that decisions on management of municipal fisheries are not based on biological information but on political grounds. An example cited was the banning of trawling in Manila Bay. An observation was made that there are too many government agencies involved in fisheries management in the Philippines. At present 16 to 18 groups have some involvement and three play major roles (Bureau of Fisheries and Aquatic Resources, Fishing Industry Development Council and Philippine Fish Marketing Authority).

The conflicts and competition between commercial and municipal fishermen is a special problem of increasing intensity. Large trawlers harvesting valuable shrimp and less valuable "trash fish" including juveniles of valuable species compete directly with municipal fishermen. Existing regulation of fishing in coastal areas in the Asian region is varied and complex. For example, Hong Kong and Japan have strict regulations. The Philippines

liberally grants licenses and awards concessions, for example, to milkfish fry fishermen and corral fishermen. There is loose registration of bancas and motorized vessels used in the Philippines. Questions were raised regarding the need for regulation or limitations on boat construction.

A set of ideas were advanced regarding management schemes required to achieve the goal increased production. These ideas are listed below:

1. Increasing involvement of the private sector.
2. A role for donor agencies in effecting changes in the present management procedures, as has been useful in at least one recent instance.
3. Testing of different management schemes in different areas of the Philippines, each being tailored to specific situations.
4. Integration of aquaculture and agriculture into the activities of fishing communities.
5. Insurance for aquaculture.
6. Involvement of fishing communities in protecting and managing fishery resources.
7. Involvement of educational institutions in the resource conservation and management program.
8. Development of broad educational programs related to municipal fisheries that are directed at all educational levels.
9. Increasing understanding of the political elements of fishery management decisions among students in fisheries schools.

In summary, this group called for a more 'pragmatic formula' for dealing with the coastal fishermen's dilemma that would address both the need for employment and the need for increased production.

C. Socio-Economic Workgroup

This workgroup conducted discussions of the following four major topics:

- (1) Definition and characterization of small-scale municipal fishermen,
- (2) Area planning and possible points of intervention,
- (3) Organizations, and
- (4) Alternative activities for increasing income.

In defining the target group, the small-scale fishermen, the following set of characteristics were agreed upon that distinguish them from commercial fishermen:

- lower income
- little or no ability to influence prices
- poor access to capital and information, especially information on prices
- lack of organization
- less costly and less sophisticated vessels and gear
- do little or no processing of the catch
- have few employment and/or investment options

The point was made that in Development Academy of the Philippines (DAP)-assisted fishermen's associations, the association members themselves vote to decide which fishermen in the community are eligible for benefits of the association, thus in effect defining who the fishermen are.

Implicit in this discussion was the feeling that the present legal definition of municipal fishermen used in the Philippines is inadequate to properly define the target groups. Nevertheless, no working alternative was suggested.

On the subject of planning, discussion was centered around two alternatives, first centralized planning involving nationwide program implementation, and secondly, decentralized area-specific approaches such as that being followed in the new Integrated Fisheries Development Plan. The group agreed the latter was more

appropriate because of area-specific differences in problems and potential solutions. Only through area-specific approaches can problems and constraints be adequately evaluated. For example, in some exceptional areas of the country the potential still exists for upgrading municipal fishermen to commercial fishermen to harvest underutilized offshore fishery resources. In many other areas, however, this potential does not exist.

Depending upon the status of the existing local fishery and the fishery resources there are several identifiable points of intervention:

- improvement in basic shore support and infrastructure
- improvement in boats and gear
- initiation of group activities
- improvement in marketing and processing
- aquaculture
- alternative income-generating activities

Selection of the appropriate intervention point is highly dependent upon the level of exploitation of the fish stocks and upon an accurate assessment of the status of the stocks. For any of the above intervention points the role of community organizations of fishermen is deemed to be critical to assure their contribution to planning and management. A decentralized approach to management was concluded to be most appropriate.

Alternative fishermen's organizations discussed were cooperatives, associations and corporations. Joint ventures between municipalities and fishermen's groups were mentioned but not discussed. The group was divided on opinions regarding the role of cooperatives in the Philippines. Supporters suggested that special training of local coop leaders and strong long-term support from the Government would be needed to insure success. Others felt that coops have not been very successful in most countries (South Korea and Japan are considered exceptions).

Local experience of DAP with fishermen's associations was reviewed. Most of these have functioned in acquisition of commercial vessels through loans to a group. Failures have often been related to undue haste in implementing the associations. The key ingredient in success has been the leadership and the more highly structured Moslem communities in the Southern Philippines have the best record of successful associations.

Experience with one fishermen's corporation in Mindanao was recounted by one of the group. This corporation functions primarily in marketing of tuna. Community and social services may be an additional role of the corporation and plans exist to acquire centralized refrigeration equipment.

Regardless of the specific organizational form, two key elements for success were recognized, (1) economic motivation must be provided to participants (i.e. potential economic benefits from activities such as credit, marketing, or control of access must be demonstrated), and (2) the organization must address local problems with local leadership and with participation of local fishermen working toward solution of shared problems. In addition, information dissemination and education in support of organizational development are essential. Their importance is illustrated by the successful conservation/management programs of Silliman University and of DAP. As cooperation in many circumstances in the Philippines has been short-lived, speculation was offered as to whether past difficulties in organizing fishermen in the Philippines was related to the prevailing attitudes regarding the relative roles of family, community and government in solving social problems.

Alternative activities for producing income were assumed essential in situations where fish stocks are fully exploited. Possibilities were discussed and elements of studies to explore their feasibility were proposed. Small scale processing (e.g. drying) of fish products and mariculture where investment requirements are low were suggested as possibilities. The marketing risks,

capital costs and low labor requirements of most mariculture were discussed as elements limiting this alternative. Shellfish farming is one of the more attractive mariculture alternatives because of low capital costs and high labor requirements.

Feasibility studies to determine site specific opportunities for employment generation were proposed. These feasibility studies should include:

- biological site surveys
- pilot testing to include technical and economic evaluation of new activities
- evaluation of market potential of products
- studies of training requirements
- assessment of risks.

In conclusion, this group was unable to come to firm grips with the issue of control of fishing effort through management programs, although licensing schemes and awarding of concessions were mentioned. An example of concessions for fishing rights is the allocation of milkfish fry fishing rights. This concession is effective in maximizing municipal income but not necessarily in maximizing employment or income of fry gatherers. There was a consensus that some kind of local participation in management, planning and decision-making is necessary, although the precise mode of organization could not be defined. Certainly the time frame under which such organizations may evolve will be long.

D. Technical Workgroup

This workgroup focused primarily on assessment of exploited stocks to determine the impact of fishing, this being a major gap in knowledge and an essential basis for understanding and solving problems. Available information on stocks in Regions V, VI and VIII was discussed. The South China Sea Program has good general information on tuna stocks in the Indo-Pacific Region while BFAR has collected information on several other commercial species over wide areas of the Philippines. The UP College of

Fisheries has limited its studies to trawlable demersal species in Ticao Pass, Burias Pass and the Samar Sea. Because existing data are not readily accessible centralized files or indices of available data would be most helpful, and it was suggested that an academic institution could best handle this task. However, because much of the existing data is of a descriptive rather than an analytical nature, and because recording and reporting methods have not always been good, some of the existing data have little value for definitive stock assessment work.

Stock assessment priorities as related to the municipal fishermen are: first, for demersal, trawlable stocks; second, for reef stocks; and third, for small and medium sized pelagic fishes abundant in nearshore areas. Relevant data needed to determine status of exploited stocks is primarily catch per unit of effort over a period of many years. These data are almost entirely lacking at present. The methodology to conduct stock assessment analysis exists and has been described in FAO publications as well as elsewhere. Furthermore, innovative new methods of stock assessment such as the methods based upon length-frequency data are well suited for use in the Philippines.

One immediate recommendation made by this group was that a center of fisheries academic excellence be established to educate students in methods for gathering, handling and analyzing data for stock assessment. It was a general consensus and the group's recommendation that the planned University of the Philippines Visayas (UPV) in Iloilo be this center of academic excellence serving both the Philippines and the Southeast Asian region.

The needs for collection of fishery statistics were reviewed and it was concluded that BFAR personnel should receive training on this subject. With proper training and minimal supervision BFAR field personnel should be able to collect necessary data for appropriate analytical studies.

It was recommended that fisheries research should go beyond the descriptive stage and should have a management orientation.

Results should be presented to non-technical persons and politicians as well as to scientists. Fisheries scientists should also prepare recommendations for the fishery managers including alternative courses of action and anticipated consequences of various alternatives. It was also proposed that another project of the type conducted by IFDR and ICLARM in San Miguel Bay be conducted in a location with different types of fisheries. Participants expressed the opinion that a comprehensive study over a 1-year period, if properly executed, could generate conclusive data that would enable planners to make recommendations on a course of action.

On a broader scale, the need was identified for quantitative studies of component ecosystems believed to influence fishery production, for example, mangroves or coral reefs.

On the basis of our understanding of the dilemma of the municipal fishermen as documented through the San Miguel Bay and other studies, the group agreed that action such as limiting access to fishing grounds, restricting fishing rights, imposing catch quotas or diversifying income generating alternatives are needed. These changes entail basic social and economic innovations that require information and education campaigns to implement. A major change envisioned is a gradual shift from dealing with fishery resources as open-access, common property to allocation of property ownership or use rights to groups, municipalities or individuals. The group felt this concept would not be entirely alien to municipal fishermen since it is presently encompassed in the use of private fish traps, payaos, fish corrals, stationary lift nets and some shellfish farming in public waters. It was also stated that local leaders will be in the best position to manage and to allocate use of fishery resources in given areas. It was also noted that given the above assumptions municipal fishermen will naturally move toward habitat modification and aquaculture as alternatives or supplements to the traditional capture of wild fish. Property rights are an integral part of such steps to improve production.

V. General Discussion

A number of points were raised in open discussion following which two large discussion groups were formed, one to address local management options and a second to discuss regional or national management possibilities.

A. Open Discussion

The need for reducing the amount of fishing was generally acknowledged, and as a consequence the inevitable reduction in employment opportunities in the fishing industry.

The research at Silliman University in providing sanctuaries was mentioned and it was noted they have had a positive effect on local reef fisheries catches.

The importance of reducing the common property nature of fisheries through gradual allocation of property rights was widely accepted. Mechanisms for legal changes are needed, and new concepts must be introduced to change accepted procedures and patterns. An operational strategy should be developed for this process of change. Additional research was called for to provide a basis for change and to predict effects of proposed changes.

Cautions were voiced regarding placing too much emphasis on aquaculture as a solution to the coastal fishermen's dilemma. Capital costs, costs of feed and other inputs, limited resources and research needs all will limit the attractiveness of aquaculture and the rate of increase in aquacultural production. Present world production from aquaculture is 8 to 9 mmt per year or about 15% of the 57 mmt total fishery harvest used for human consumption. One participant suggested that the world's total production from aquaculture would never likely exceed 30 mmt while others felt that there is no upper "limit" to aquacultural production as there is no "limit" to any other form of animal husbandry. In the Philippines 10% of total fish production comes from aquaculture. FIDC has anticipated 20% of the fish production in the Philippines will be derived from aquaculture by 1990.

Participants from BFAR observed that while many ideas are proposed, e.g. limiting entry, high license fees, and mechanisms for enforcement that do not require police action, the solid scientific advice based on hard data is lacking. Research is needed to develop a rationale for action followed by a broad educational program to persuade the public and resource managers at all levels of a logical course of action.

The ingredient most seriously lacking to carry out this approach is trained personnel. A strong university-level training program in modern methods of tropical stock assessment and fisheries economics should be given high priority.

B. Local Management Options

This group discussion was oriented toward suggestions of workable arrangements at the community level. What can the local community do in fisheries management? Is the municipal government a good vehicle for action or are fishermen's groups a better vehicle?

It was noted that municipal governments already have appropriate power but they may have trouble focusing on the fishermen's problems because of other interests. Barangay captains and local police could be trained to assist with management; however, at present these people often play negative roles, for example in selling dynamite to fishermen. Barangay captains do have considerable power and function between individuals and the municipal government. At present town councils can issue fishing ordinances only with approval of the Minister of Natural Resources.

DAP is assisting associations and exploring the idea of public enterprise-area based corporations, for example in fisheries. Investment would come both from the local government and from the beneficiaries. Participants and buyers might be shareholders. These community corporations would enact mini-ordinances to protect the interests of the community. This form of organization would promote self-interest and self-management, but would require advice from technical institutions. Such a corporation would require

assistance in management until management skills are developed. Existing fishermen's associations could form corporations once fishermen are convinced of the potential benefits and corporations could join to form federations.

Aquaculture and mariculture may provide good incentives for local organization. The most attractive forms of mariculture are oyster, mussel and seaweed farming because they require no land and only small capital investments. Pilot projects have shown that the technology for oyster, mussel or seaweed farming is not complicated and can easily be learned. The biggest danger with these commodities is that production will increase more rapidly than market demand. The best approach is apparently slow expansion of production with marketing assistance. A FIDC plan exists that has explored the potential of mariculture. It concludes that the potential is great and that shellfish culture may grow five-fold within 4 years.

Two DAP-assisted associations are involved with mariculture. Municipalities have granted permits to establish sites and one of the associations has organized its own security system to protect its investment. Since many profitable small businesses become even more profitable on a larger scale, the threat of take-over by larger firms is always present.

Considerable discussion took place concerning how to work with barangays and other local politicians. DAP experience at the local level has been that the local hierarchy cannot be ignored. After working in the community in educational and training processes DAP has left final decisions up to local people. Considerable first hand experience gained by DAP in dealing with and forming local organizations was shared with the group.

The many failures of fishermen to organize lead to questions regarding local capacity for management, the danger of imposing outsiders values, and the presence of local power groups that might inhibit new organizations. Such organization is a political process,

probably requiring backing by the government to be successful. The question "what is feasible in local management?" has not been satisfactorily answered. While fishermen are eager to organize to attain short-term perceived needs, more than a short-term approach is needed. Rather a long-term commitment to a cause is needed to achieve successful organization. Development of successful cooperative organizations in Japan took about 50 years, for example.

It is important that planners be aware of both the "gainers" and the "losers" in any development scheme. For example large-scale commercial fishermen may lose as small-scale municipal fishermen benefit. The losses resulting from proposed changes in terms of employment, income, and products should be evaluated before making changes.

If, in fact, production can be expanded through mariculture or other means, marketing is the biggest unknown. Studies of marketing are required in addition to postharvest handling and preservation methods that will enhance the value of fishery products.

Use of schools and churches as well as other local organizations in resource conservation education was suggested.

A role for the private sector was envisioned in mariculture technology transfer. This means for demonstration of new methodology has been most effective in the Philippines. The advantages and disadvantages of contract farming were discussed. Good potential for benefits from marketing must be weighed against the loss of power by fishermen.

C. Regional Management Options

This group found it had difficulty defining "regions" adequately, but used major administrative regions of the Philippines (e.g. the Western Visayas, Region VI) for purposes of this discussion. It was clear the regions should be defined on the basis of their resources and a categorization and identification of resource types may be the first logical step. Characteristics of an appropriate

vehicle for regional development was a major point of consideration. Such an authority would need entity in law, decision-making machinery and an enforcement capability. It is clear the authority would be required to explore 'new' approaches beyond those presently used and special power might be required for this purpose. Maximum participation of the private sector including both fishermen and aquaculturists is of paramount importance.

It was agreed that present handling of fishery resources as open-access common property resources was not acceptable on a long-term basis. The problem of allocation of property (or fishing use) rights is entirely unresolved and requires additional study, and possibly experimentation. In this context it is important to look seriously at what can realistically be expected in terms of fisheries and aquacultural production increases. Present BFAR plans call for annual increases of 5.5% to 6.0%.

Training needs in a variety of areas continue to be apparent. Local training and education is not the least of these needs and this local education should be oriented toward replacement of central government functions by local government. Stress was also placed on education of decision makers in the basics of fishery management strategy.

In consideration of possible organizational structures for development, several important points were noted. First was the concept of "bottom-up" participation in any project. Second was the need for groups or associations of some type to provide a basis for community action. The organization of a World Bank project was mentioned that includes: (1) management by a subsidiary corporation which owns vessels and leases them to fishermen, (2) marketing by a commercial group, and (3) heavy private sector involvement. The possible role of a central technical advisory body to provide advice to a number of regional decision-making bodies was suggested. It was concluded that new laws governing public enterprises were likely to be needed.

VI. Conclusions

A summary statement was presented by Martin Billings of USAID noting main themes of the workshop. USAID is committed to assisting with the problems of the small-scale fishermen and the related problems of management of common property fishery resources. The access to these resources or the allocation of property rights is a complex subject with political overtones that will require gradual changes over the long-term. Opportunities for participation in this process by bilateral donors appear limited. Nevertheless, the concept of localized management of fishery resources was agreed to be an important goal.

The main theme arising repeatedly during the workshop is the need for education at all levels to increase perception of problems and to increase capabilities for solution of them. A large portion of this educational process must be completed prior to taking major steps toward localized management of fishery resources.

Additional research and preliminary studies are required to define:

- (1) the status of exploited fishery stocks
- (2) the economics of various possible local management options
- (3) the social consequences and benefits of various local management options

- (4) the employment alternatives related to coastal zone resources.

These preliminary studies should focus particularly on local organizational structures with "bottom-up" power distributions, and with 10-year or longer frameworks for completion and need not be restricted by present legal regulations.

Preliminary studies should then be followed by implementation of some pilot local management systems. Fishermen and fishing communities could, at this time, be involved with management at several levels and in several ways to determine, on the basis of 5 to 10 year trials, the best alternatives for local management of Philippine coastal resources. These pilot trials would encompass all aspects of coastal resource management including aquaculture and resource-related employment opportunities.

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Appendix I. List of Participants

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