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international center for living aquatic resources management

ICLARM

REPORT NO. II

Program Advisory Committee Meeting
Metro Manila; 7-11 March 1977



INTERNATIONAL CENTER FOR LIVING AQUATIC RESOURCES MANAGEMENT

The International Center for Living Aquatic Resources Management—ICLARM—is an international, non-profit, scientific center created to carry out research and stimulate discussion and the flow of information on fisheries and other living aquatic resources relevant to meeting the nutritive, economic and social needs in economically developing countries. Support for fishery research has generally been on an ad hoc basis, of a short-term nature, and uncoordinated, so that the necessary institutional structure for long-term organized and coordinated research has not been available. ICLARM has been formed in response to these pressing needs.

ICLARM carries out, stimulates and coordinates research, and related activities, on the critical problems in the areas of (1) aquaculture, (2) traditional fisheries, (3) resource development and management, (4) marine affairs and (5) education and training. One of its key functions is to provide information in a form (and language) that will be directly useful to those making decisions on fishery development. For the present, no ICLARM physical research infrastructure is planned. When laboratory or other facilities are needed, cooperative programs are developed with existing institutions in appropriate locations. Thus, ICLARM operations are labor-intensive rather than capital-intensive.

ICLARM is action-oriented. It is an operational organization and carries out its own programs or works in cooperation with other institutions. It is not a granting or funding entity.

Institutional linkages have been established with private foundations, other private institutions, governments, universities, regional agencies and international agencies.

ICLARM was incorporated as a "non-stock, philanthropic and non-profit corporation under the laws of the Republic of the Philippines" on 20 January 1977. Operational headquarters were established in Manila in March 1977. ICLARM policy is set by a Board of Trustees whose members are drawn from the international community and serve in their personal capacities. Present Board members include:

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Direction of ICLARM under the policies set by the Board is a responsibility of the Director General. Advice on programs is received by the Director General from a Program Advisory Committee composed of outstanding scientists, also drawn from the international community, who serve in their personal capacities.

The ICLARM core staff will consist of about twelve highly competent, internationally recruited scientists drawn from the areas of aquaculture, genetics, nutrition, civil engineering, fishery biology, population dynamics, economics, anthropology and international law. In addition, provision is made for interns, consultants, and visiting fellows, contributing to breadth of competence and flexibility. The core program and core staff are supported by private foundations and governments. In addition to core programs, special projects relevant to the ICLARM terms of reference are undertaken on behalf of governments, world and regional banks, and other regional and international agencies.

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REPORT OF THE FIRST MEETING
OF
THE ICLARM PROGRAM ADVISORY COMMITTEE
METRO MANILA, PHILIPPINES
7-11 MARCH 1977

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SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

The First Meeting of the ICLARM Program Advisory Committee was convened in Metro Manila, Philippines from 7 to 11 March 1977. The meeting was chaired by Professor Dr. Klaus Tiews (Federal Republic of Germany). Dr. Deb Menasveta (Thailand) acted as Reporteur, assisted by Drs. Ziad H. Shehadeh (Lebanon) and Colin E. Nash (United Kingdom).

I. GENERAL CONCLUSIONS

The Committee reviewed and discussed the rationale and purpose of ICLARM, as well as its program of work and mode of operation. The ICLARM terms of reference as stated in the Articles of Incorporation were endorsed. The justification for ICLARM is apparent and the need for the organization real and urgent. The lack of bureaucratic complexity in ICLARM's internal structure, and the organization's reliance on a highly competent and mobile professional staff, rather than on sophisticated physical facilities, enable ICLARM to pursue its program objectives in a variety of ways. These range from the stimulation of research and development to the actual planning, funding and implementation of long-term research and development programs. It can also move rapidly, capitalize on opportunities and pursue innovative programs which involve elements of risk. ICLARM, as an international, non-governmental agency, can address problems and issues of regional and/or international relevance. The Committee identified a number of programs and functions that ICLARM can carry out, without duplicating the efforts of other agencies.

ICLARM's program elements and the core program selected by the staff were reviewed by the Committee, which agreed that the staff had focused on major fishery problems that ICLARM could address appropriately. The program of work in the order of priority recommended by the ICLARM staff, amplified and amended by the Committee, was endorsed. It was urged that ICLARM include some short-term elements in its immediate program as well as long-term research.

The Committee agreed strongly with the staff that the success of ICLARM would depend to a considerable extent on the organization's ability to establish good lines of communication with governments in the region, as well as on the creation of demonstrably effective linkage with other technical agencies and institutions. In all of its activities, a fundamental consideration should be to stimulate, develop and

support local involvement. ICLARM should remain open and responsible to locally expressed needs and learn from these how it can best serve in the development and management of living aquatic resources.

II. PRINCIPAL PROGRAM ELEMENTS— RECOMMENDATIONS

A. AQUACULTURE

1. That ICLARM maintain its emphasis on developing countries in tropical and subtropical areas without restricting itself to a narrow geographic focus.
2. That ICLARM focus attention on the resolution of major technical problems impeding the more rapid development of aquaculture.
3. That ICLARM undertake research on brackishwater aquaculture and on controlled breeding of brackishwater/marine species, including research on the nutritional requirements of brood stock and juvenile stages.
4. That the breeding program be expanded to include freshwater species, particularly for stocking of lakes and reservoirs.
5. That ICLARM undertake work on the development and demonstration of complementary agriculture-aquaculture food production systems.
6. That ICLARM develop, collate and disseminate data on the economics of aquaculture.
7. That ICLARM study the areal extent and alternative uses of mangrove swamps, including their potential as sites for coastal aquaculture.
8. That ICLARM prepare production manuals incorporating relevant economic data as a first step in the study of the resource base available for the amplification of production from aquaculture.
9. That ICLARM carry out a pilot study of the socio-economic importance of aquaculture in rural communities of Java, Indonesia, as compared to other income generating activities.
10. That, as resources permit, ICLARM expand its aquaculture program to include (a) extension programs, (b) environmental problems, (c) marketing of products, (d) problems of land tenure, particularly in the

coastal zone, and (e) the position of aquaculture programs in government structure.

B. TRADITIONAL FISHERIES

11. That ICLARM undertake an evaluation of past development efforts in this field, identify the reasons for success or failure in each case as an aid in designing future development projects, and that such evaluations be made on a continuing basis.
12. That ICLARM identify long range problems and possibilities in improving the economic status of traditional fishermen, in one or more countries of Southeast Asia, using multidisciplinary teams with expertise in anthropology, economics and fisheries.
13. That ICLARM identify and stimulate the development of resources capable of supporting additional, or new, effort by traditional fisheries, as well as opportunities for reducing waste and adding value through improved handling, processing—particularly at the village level—and marketing.
14. That ICLARM carry out studies on the stock assessment of nearshore, multi-species fish stocks using available information and models, to provide rough estimates of specific resources.
15. That ICLARM collate and disseminate information available on conflicts between traditional and commercial fisheries, and add to it through its own studies.
16. That ICLARM consider the socio-economic problems of traditional fisheries within the framework of rural and regional development.

C. RESOURCE DEVELOPMENT AND MANAGEMENT & D. MARINE AFFAIRS

17. That ICLARM concentrate its initiatives on providing information and advisory services on (a) the management of aquatic resources to concerned governments at the national level, (b) the exploitation of resources through shared access, and effective management of shared stocks, at the regional level, and (c) the provision of information needed for the management of migratory stocks that cut across several regions, at the international level.
18. That ICLARM pursue its program objectives by (a) strengthening the technical capabilities of developing coastal nations, (b) acting as a stimulator, working closely with national, regional, and international organizations and programs, (c) providing information and advisory services in advance of development planning and during development, and (d) preparing background reports to focus attention on, and clarify the perception of, specific problems.

19. That ICLARM play a fact-finding role and maintain a neutral position in areas of conflict.
20. That ICLARM study the future course of law of the sea matters and their effects on fisheries, with special reference to Southeast Asian and the Southwest Pacific.
21. That ICLARM bring the problems of pollution in a broad sense, including improper land use, to the attention of planners and developers, and assess the impact of pollution on fisheries.
22. That ICLARM collate and disseminate information on the ecological impact of selective fisheries and the management of multi-species stocks, and add to these through its own studies.

E. EDUCATION AND TRAINING

23. That ICLARM further the establishment and development, in one or more institutions of Southeast Asia, of fisheries curricula germane to local problems and circumstances.
24. That ICLARM sponsor special, country-specific seminars, involving local educators, fishery personnel and outside consultants to look into (a) the need for research personnel, (b) specialized versus general training, (c) the relationships between fishery curricula and problems encountered in the execution of national fishery programs and policies, and other related issues.
25. That ICLARM sponsor workshops, within the context of its programs, for the instruction of extension officers and vocational trainees.
26. That ICLARM prepare country-specific aquaculture manuals for use by extension officers.
27. That ICLARM initiate on-site training workshops in stock assessment, utilizing data on local stocks, as a continuing annual activity, based on special curricula, including simplified versions of manuals available from FAO.
28. That ICLARM sponsor special country seminars for updating fishery administrators on recent developments on marine affairs, fishery policies, technology and related matters, in the context of annual internal meetings of fishery personnel.

F. SPECIAL PROJECTS

29. That ICLARM undertake, from time to time, special projects that fall outside its principal program interests, where these projects have substantial potential benefits or where there is a lack of adequate develop-

ment initiatives and/or suitable mechanisms for their implementation.

30. That ICLARM should hereafter play a consultative, managerial role in the Southern Ocean Salmon Project, utilizing funds from outside its core budget, and/or assist in ensuring the technical viability of the project and the development of supporting linkages.
31. That ICLARM serve as a vehicle for the technical management of the Skipjack Survey and Assessment Project.

III. RELATED PROGRAMS

The Committee recognized that there are a number of programs and institutions in Southeast Asia with which ICLARM can interface, including the FAO/UNDP South China Sea Fisheries Development and Coordinating Programme, and the Department of Aquaculture of the Southeast Asian Fisheries Development Center. It agreed that there were no overlaps with the ICLARM program, but rather complementary interests which offered considerable opportunity for the establishment of linkages.

IV. STAFFING AND BUDGET

ICLARM will have a core staff of 12 professionals, with expertise in aquaculture, resource assessment, resource management, food technology, economics, anthropology, etc., who would be augmented by consultants, visiting fellows, post-doctorals and graduate students. This level of staffing is necessary to ensure the technical viability of the organization. Staff and program costs, as estimated by the ICLARM staff, indicate the need for an initial core program budget of

about US\$1.6 million, with special projects to be in addition to this amount.

V. OTHER MATTERS

ICLARM's ability to form cohesive and demonstrably effective institutional linkages will have considerable bearing on its support. Linkages are necessary to ensure adequate manpower and technical backstopping for ICLARM's long-term programs and serve to extend the drive that ICLARM can generate with its own funds. ICLARM's proposed institutional network for research on the controlled breeding of brackishwater species is an excellent beginning on the development of such linkages.

There is a continuing need to establish a flow of useful fishery information within and into the Southeast Asia region, including in the local languages of the region. The translation and distribution of information relevant to the local needs, available from within and outside the region, would be a useful function, as would be the publication of an informal newsletter dealing with various aspects of fishery development in the region.

ICLARM has decided not to construct its own special research facilities and to carry out its research programs through the facilities of existing institutions on a cooperative basis. This is a useful approach, but one which eventually should be re-evaluated on the basis of results obtained under this operational concept.

ICLARM's direct involvement in specific development projects, within the context of the Special Projects category, could constitute an important advisory resource to the development banks and similar agencies.

ICLARM PROGRAM ADVISORY COMMITTEE MEETING

7-11 MARCH 1977

I. INTRODUCTION

The First Meeting of the ICLARM Program Advisory Committee was convened at the Manila Intercontinental Hotel, Makati, Metro Manila, Philippines from 7 to 11 March 1977. The members of the Committee in attendance are listed in Annex I to this Report. Other participants are listed in Annex 2.

The Meeting was Chaired by Professor Dr. Klaus Tiews. Dr. Deb Menasveta acted as Rapporteur, assisted by Drs. Z. H. Shehadeh and C. E. Nash of the ICLARM staff. A discussion leader was appointed for each topic of the Agenda (see Annex 3).

Mr. J. C. Marr, Director General of ICLARM, opened the meeting and introduced ICLARM staff members. He gave a brief review of the ICLARM developments to date and emphasized the fact that the concept of the organization had evolved from that of a funding agency to an operational entity. Articles of Incorporation and Bylaws were adopted at the First Meeting of the Board of Trustees held in Manila on 3 November 1976. The Articles were registered by the Philippine Securities and Exchange Commission on 20 January 1977. President Marcos signed Presidential Decree 1105 on 7 March 1977 granting ICLARM the same privileges and immunities enjoyed by the International Rice Research Institute (IRRI). The Director General then turned the meeting over to the Chairman.

The Committee reviewed and adopted the Draft Agenda (Annex 3) and the Provisional Timetable (Annex 4) of the Meeting.

II. TERMS OF REFERENCE

The Committee noted the objectives and functions of ICLARM, and endorsed its terms of reference as stated in the Articles of Incorporation.

There was general agreement on the need to discuss the rationale for the existence of ICLARM, as well as the mode of operation and the scope of activity of the organization. Accordingly, the terms of reference of the Committee were amended as follows:

- (1) To examine the rationale for the existence of ICLARM and its purpose, paying particular attention to the flexible nature of the organization and the catalytic role that it can play;
- (2) To identify major fishery problems within the context of ICLARM's principal program elements;

- (3) To comment on the initial ICLARM program elements, staffing pattern and other related matters.

III. PRINCIPAL PROGRAM ELEMENTS

A. AQUACULTURE

The Committee was advised that ICLARM's research and development programs in aquaculture would be focused on developing countries in tropical and subtropical areas. Priority would be given to brackishwater aquaculture, for which major technical inputs and trained manpower were needed, and for which vast areas of coastal land might be available. Within the context of brackishwater aquaculture, ICLARM would focus initially on the controlled breeding and mass propagation of brackishwater fish and shrimp, to ensure adequate and reliable supplies of seed stocks independent of natural sources.

The focus on freshwater aquaculture would emphasize and demonstrate possible linkages with agriculture that would permit compatible multiple use of resources (e.g., land, water, feed and fertilizer).

ICLARM would also mobilize information on production methods available in Southeast Asia by the translation and dissemination of husbandry manuals presently available only in the language of individual countries of the region. A similar effort would be made to collect and disseminate information on the economics of aquaculture systems to expedite development planning.

A general discussion on aquaculture and present activities in this field stressed the need to focus attention on basic research requirements, particularly solving major technical problems that could facilitate rapid expansion of aquaculture in developing countries. The Committee recognized that these research requirements were of long-term nature, and almost always beyond the means of developing countries. There was general agreement that ICLARM could provide a vehicle for the financial support and implementation of research programs of this nature.

In considering the geographical coverage of the ICLARM program, the Committee was of the opinion that, although the aquaculture industry was mostly concentrated in Southeast Asia, the need for development assistance might be more acute in other developing countries of Asia, such as Bangladesh and Pakistan, as well as in many countries of Africa. The Committee recommended that ICLARM should not

necessarily restrict itself to a narrow geographic focus. It was agreed, however, that ICLARM research and development activities in aquaculture be largely focused on developing countries of tropical and sub-tropical areas

The Committee recognized the increasing competition between agriculture and aquaculture for land and water resources, as well as animal feed and fertilizer. It endorsed ICLARM's emphasis on the development and implementation of integrated agriculture/aquaculture food production systems which would permit compatible multiple use of these resources.

The Committee recognized the acute prevailing need for data on the economics of aquaculture production systems. The lack of such data continued to be a major deterrent to the planning and financing of substantive aquaculture development programs. Providing such information to government agencies concerned with development and planning was approved as an element in the overall ICLARM program.

The Committee agreed that attention should be paid to the controlled stocking and intensive management of lakes and reservoirs.

The Committee then proceeded to review the program proposals prepared by the ICLARM staff:

1. *Controlled Breeding and Mass Propagation of Brackishwater Fish*

The Committee was informed that ICLARM intended to establish, help support, and oversee a coherent international research and production network aimed at resolving persistent problems hindering the mass production of juvenile stocks of brackishwater/marine food fish. The program would have the following broad objectives:

- (i) To ensure adequate and reliable seed supplies independent of natural sources, and to extend the period of seed availability.
- (ii) To develop suitable diets for broodstock, larvae and post-larval juveniles in captivity, and to bring about the total domestication of presently cultivated species (and promising new ones) to facilitate their widespread and intensive husbandry.
- (iii) To permit genetic improvement of cultivated species, specifically for characteristics desirable for culture.
- (iv) To collect, consolidate, publish and distribute information on the controlled production of seed stock to training centers, extension services and fish farmers.
- (v) To assist in enhancing the capabilities of selected institutions in some developing countries to undertake mission oriented research, and to provide a vehicle for training and transfer of technology.

Recognizing that the availability and cost of seed were becoming major production problems, the Committee strongly endorsed the project. It also endorsed the sharp focus on the limited subject matter, the network approach to implementation and the provision for a sustained research effort.

In discussing species selection, the Committee approved the initial, general focus on euryhaline species with established markets, such as mullets, milkfish, *Lates* sp., penaeid prawns, etc. It recommended, however, that the initial target species should be expanded to include freshwater fishes, particularly for lake and reservoir stocking. The point also was raised that it might be worthwhile to consider non-traditional cultivable species that could be bred and reared in captivity more easily. It was suggested that such species might be introduced from other regions. Specific mention was made of the introduction and rapidly increasing acceptability of *Tilapia nilotica* in Asia.

The Committee suggested the following modifications to the draft project proposal:

- (i) To emphasize research on the nutritional requirements of broodstock and young fish at various developmental stages,
- (ii) To define more clearly the specific functions of ICLARM in the implementation and supervision of the technical program, and administration of research funds.

2. *Assessment of the Resource Base Available for the Amplification of Production from Aquaculture in Southeast Asia*

The Committee reviewed the ICLARM proposal to undertake a series of special studies on individual aquaculture production systems for which reliable data on economics were available. The purpose of these studies was to define the resource base available for the development or expansion of aquaculture in individual countries, and evaluate the trade-offs with other sectors of the economy when scarce resources were allocated to aquaculture.

The results of the studies would provide baseline information needed for forming long-range aquaculture development policies. The studies would also identify production systems that were least likely to be uprooted by changes in the availability and cost of scarce resources, and would focus research and development efforts on identified, viable production systems.

The Committee recommended that the objectives be narrowed initially to the development of production manuals incorporating production costs, farm budgets, and other relevant economic data.

3. *A Study of the Area and Present Uses of Mangrove Swamps in Southeast Asia and the Feasibility of their Utilization for Aquaculture*

It was the opinion of ICLARM staff that the greatest potential for the expansion of aquaculture in many

countries of Southeast Asia rested in the coastal zone. It was also likely that the growing competition between freshwater pond-fish farming and agriculture, for land and water resources, would eventually curb the development and expansion of inland aquaculture.

The Committee was informed that ICLARM proposed a detailed quantitative assessment of the area of mangrove swamps, and of their present and potential uses. The project would provide information to plan for their management, and to establish the extent they can be utilized for brackishwater aquaculture within the context of multiple-use management schemes. It was anticipated that a synthesis of available information on the intrinsic ecological value of these swamps (particularly as nurseries for aquatic species of commercial importance) would assist in identifying additional studies needed to clarify this issue to permit realistic assessment of alternative uses of mangrove areas.

In reviewing the project, the Committee noted that the preparation of mangrove inventories by remote sensing was being planned for the Philippines and had been completed in Thailand. The Committee also noted that a regional program on mangrove ecosystem research and training had been formulated by the National Research Council of Thailand and was being reviewed by UNESCO. BIOTROP had expressed interest in such a program. In addition, Australia had initiated a long-term basic research program on the ecology of mangrove swamps near Cairns, Queensland.

The Committee recognized that many of these programs did not place adequate (if any) emphasis on aquaculture. It suggested that ICLARM might play a catalytic role in ensuring the incorporation of aquaculture and fisheries into existing or planned programs for the utilization and management of mangrove areas.

This might be accomplished by the preparation of a position paper on the feasibility of aquaculture development in mangrove swamps based on existing information.

The Committee endorsed the proposal as amended.

Two other projects, (4) *The Socio-economic Role of Aquaculture in Rural Communities* and (5) *Aquaculture Planning and Development in Egypt* were reviewed briefly. The Committee was advised that the first project (to be carried out in Java, Indonesia, in cooperation with the Agricultural Development Council) was a modest pilot study to compare the economic importance of aquaculture with other income generating activities of rural family units. The long-term objective of the study was to identify socially and economically acceptable approaches to increase the contribution of aquaculture to the incomes of rural families. The second project (which was in the planning phase) was aimed at increasing the contribution of aquaculture to animal protein

supplies in Egypt, where considerable potential existed for the rapid expansion of the industry. The anticipated role of ICLARM was that of catalytic agent and/or technical consultative body, working through interested bilateral and international aid agencies.

The Committee approved both projects as presented.

In summing up, the Committee endorsed the aquaculture project proposals in the order of priority recommended by the ICLARM staff. It suggested that, subject to the availability of resources, ICLARM consider expanding its aquaculture program in the future to include studies and/or projects in the following additional areas:

- (i) Integration of aquaculture and agriculture to ensure more efficient utilization of scarce resources,
- (ii) Extension programs to ensure transfer of availability technology and research results to fish farmers,
- (iii) Environmental problems related to the discharge of waste water from fish ponds and other aquaculture facilities.
- (iv) Marketing of aquaculture products,
- (v) Problems of land tenure, particularly in the coastal zone,
- (vi) Position of aquaculture in government agencies.

B. TRADITIONAL FISHERIES

The Committee discussed at length problems associated with improving the standard of living of traditional (artisanal) fishermen. It recognized that these problems were so complex that they had appeared, at times, to be completely intractable. Certainly there had been few successes in previous development projects which were aimed at this sector of the fishing community, and those were limited to increased production by improvements in fishing boats and gear, or improvements in fish handling, processing, and marketing.

Many projects had resulted in the deterioration of the economic condition of the majority of traditional fishermen and their dependents who, together, constitute the target group for development. These projects industrialized the fishery, introduced larger and more efficient boats and gear, and diverted both raw material and employment opportunities away from the traditional fisheries. Similar results were effected where the development objective was primarily to increase exports, since these could rarely be provided for through an artisanal fishery (with some notable exceptions, e.g., shrimp in Indonesia).

One reason for these negative effects was the confusion created by the dual need to increase food production from the sea (*ipso facto* total income) and to improve the welfare and employment opportunities

for traditional fishermen. While it was true that this group produced a significant proportion of the total fish landings for internal distribution and consumption (e.g., 50-60% in the Philippines), the ability to increase production significantly was limited by the stocks available, as well as by technological and marketing difficulties. It was believed that in most cases traditional fishermen were probably fishing close to the limit of sustainable yield. However, it was noted that information on the exploited stocks was limited, and this could be an important area of work for ICLARM.

Another problem of most (but not all) traditional fishermen was surplus of manpower. This resulted from population increase, but was also a consequence of landless laborers, and other individuals displaced from regular employment, moving into fishing at the artisanal level. Thus, while short-term limited benefits could be derived from projects which improved the productivity of traditional fishermen through better handling, processing, and marketing of the catch, in the long term the problems of this group might best be dealt with by socio-economic actions within the framework of rural or regional development.

A number of countries in Southeast Asia had launched programs to redirect surplus fishermen into other occupations through training programs (sometimes aimed at the children of fishermen) or through actual relocation. Fishermen were notoriously reluctant to change to other occupations, and it was not clear whether this was cultural or was due to lack of understanding of the offered alternatives. The agricultural alternatives seemed quite unattractive to fishermen, and a number of countries were looking at aquaculture, particularly brackishwater aquaculture, as a more appropriate occupation for displaced fishermen. The Committee suggested that the development and demonstration of practical linkages between coastal (brackishwater) aquaculture and traditional fisheries would be a logical extension of ICLARM's special interests in these two fields.

The Committee stressed the need to recognize that traditional fisheries existed and operated at different levels and in different modes. The situation was complex and by no means uniform throughout Southeast Asia and the Pacific Islands. In a number of areas there was conflict between the larger and more sophisticated fishing technology of the industrial fishery, and the traditional fisheries. This had been studied for situations in Japan, Malaysia, Indonesia, Philippines, and other countries. In Japan, a solution to the problems seemed to have been found. Where this had been achieved, the policies and results were worthy of review and circulation. It was expected that, in some countries, the extension of zones of economic jurisdiction (200 mile limit) would intensify the conflict between traditional inshore fishermen and industrial fishermen as the latter were forced out of the existing "distant water" fisheries.

The Committee agreed that the problems of traditional fisheries were complex and required more concentrated investigation than had hitherto been given to them. It was suggested that ICLARM might focus its efforts on the following projects:

(1) *Identification of Problems and Possibilities in the Long-Range Improvement of the Economic Status of Traditional Fishermen*

An analysis could be made by a team (or teams), including experts in anthropology, economics and fisheries, in one or more countries of Southeast Asia for which appropriate information was available.

(2) *Evaluation of Past Development Efforts*

An analysis could be made of past attempts to improve the status of traditional fishermen, and the reasons for success or failure identified in each case. A review also was needed of current development opportunities in traditional fisheries in Southeast Asia, as well as projections of likely success of new initiatives on the basis of previous experience. This program was suggested by the Committee to be a continuing ICLARM activity. Its results could be an invaluable aid to bilateral and other assistance agencies as well as governments of developing countries. It could also assist ICLARM to identify other program activities in this field.

(3) *Identification of New Development Opportunities*

Resources capable of supporting additional, or new effort by traditional fisheries should be identified and development stimulated.

(4) *Identification of Problems and Possibilities in Post-Harvest Technology*

These might be examined in the context of reducing waste and adding value and would include present and alternative methods of handling, processing (particularly at the village level), and marketing.

(5) *Assessment of Near-Shore, Multi-Species Fish Stocks*

It was noted that stock assessment methods in use were mostly applicable to temperate, single-species populations. However, it was felt that sufficient information or models were available to permit rough estimates of yields from multi-species stocks and to warrant practical field tests. In any case, there was an urgent need for assessment of specific resources.

(6) *Identification of Clear-Cut Conflict Areas Between Traditional and Commercial Fishes*

It was pointed out that conflicts over the use of a resource by the two groups sometimes resulted in damage to the stocks. ICLARM could render valuable service by collating information available on this subject and adding to it through its own studies. It was noted that studies had been conducted on this issue in

Japan, Indonesia, Malaysia and the Philippines, as well as in other countries.

C. RESOURCE DEVELOPMENT AND MANAGEMENT

D. MARINE AFFAIRS

Because of the many overlapping sub-topics within these two major program areas, the Committee considered them simultaneously. A general, preliminary discussion on the scope of possible programs preceded reference to specific ICLARM projects.

A number of problem areas, worthy of immediate attention, were identified. The problems of the management of the fishery resources of the South China Sea received special attention and were reviewed in the context of an ICLARM project proposal.

It was pointed out by ICLARM that the South China Sea could be thought of as a microcosm of the world's oceans with respect to fishery resources and management problems. It had at least one complication not shared with seas of higher latitude, namely the great proliferation of species. With the existing and coming extension of zones of economic jurisdiction to 200 miles, the South China Sea no longer would contain high-seas areas. Thus, it had the potential for total resource and fishery management. The overall goal was to suggest specific development and management objectives before uncontrolled, competitive exploitation became excessive and stocks were damaged.

It was recognized that management would be greatly facilitated by the availability of improved information in a number of areas. The Committee identified these to include:

- (i) Information on the resource base and its present status;
- (ii) Information on the natural variability in yields;
- (iii) Information on the migratory characteristics of important stocks;
- (iv) Information on the dynamics of multiple-species fisheries;
- (v) Identification of fish stocks available to artisanal fisheries; and
- (vi) Identification of the terms of, and obstacles to, intra-regional trade in fishery products.

These kinds of information are needed for a variety of purposes. The assessment of stocks and yields, including the understanding of multiple-species fisheries, is necessary to avoid over-harvest, as well as overcapitalization, of the resources. Knowledge of migratory behavior is necessary for the joint management of stocks shared by two or more states. In order to prevent undue hardships to artisanal fishermen, it is necessary to know the stocks that are important to them. Knowledge about intra-regional trade can be valuable in reaching international agreements.

It is clear, however, that little of this information is presently available and it is also clear that decisions cannot be postponed until more information is available. Thus, there are two tasks of critical importance that must be undertaken simultaneously. One is that of stimulating the effective production of desirable information as rapidly as possible. And the other is that of providing strategies for making the best decisions that can be made under the present conditions of uncertainty.

The Committee stressed the need to make use of all available, reliable data in the elaboration of development and management guidelines. This had not been done consistently in the past. As an example, it was pointed out that the Thai-German trawl survey in the Gulf of Thailand, and elsewhere, determined that catch and value decreased with distance offshore, but these findings often were not taken into account in subsequent planning and development efforts.

The Committee recognized that many difficult decisions still were ahead in aquatic resources management. Shortages of technical and financial resources added to the difficulties of management problems. The management of multi-species fisheries and the impact of selective fisheries on interrelated stocks provided added complications. The Committee pointed out that although adverse effects from selective fisheries had been noted in some countries, efforts aimed at the collation of such information so far had been inadequate. It was also suggested that experimental "cleansweep" fishing, in which all fish in a test area were subjected to similar fishing pressure, and other controlled tests, might provide useful information on the impact of selective fisheries and provide data for simulation models.

The Committee clearly recognized that some aspects of regional fisheries management are sensitive issues among governments. It felt that the role of ICLARM should be strictly limited with regard to these sensitive areas. ICLARM, as an international, technical, and non-governmental organization could be responsive to the requests of governments in facilitating discussions of the issues and in defining possible approaches to management problems and examining the implications.

In considering marine affairs, the Committee noted that development in matters concerning the Law of the Sea had been taking place fairly rapidly, and the full implications of these with respect to fisheries matters were not widely realized nor perhaps even fully explored.

The Committee was informed that ICLARM was planning an analysis of the probable future course of LOS matters and their effects on fisheries. The analysis would be general, but would also include matters of special interest in Southeast Asia. The study would be of value not only to ICLARM in the further elaboration of its activities in this field, but

also to governments in dealing with problems related to these matters.

The Committee noted that the Law of the Sea Conference had left several unresolved issues. Some key issues, of particular concern to Southeast Asia, were identified to include:

- (i) Border conflicts, particularly conflicts with islands and the ownership of islands. In the South China Sea these included the Spratleys, Macclesfield Bank and the Paracels. The base lines for determining extension of jurisdiction were not yet defined.
- (ii) The contents of the extended zones and the rights of coastal nations.
- (iii) Problems of geographically disadvantages states.

It was agreed that the resolutions of these problems was the responsibility of the relevant countries, and not ICLARM. ICLARM should keep abreast of developments with respect to all these issues, but should not be concerned with influencing events.

The Committee identified three general areas relating to resource management and marine affairs in which it recommended ICLARM should concentrate its activities, and to which it felt the organization could make positive contributions:

- (i) The national level—to provide information that will be helpful to coastal nations on the management of their fisheries; to provide aid in improving the competence of nations to manage their resources; and to respond to requests for analyses of alternative management proposals.
- (ii) The regional level—to stimulate discussion on, and to facilitate regional approaches to, the management of shared stocks.
- (iii) The international level—to analyze the problems of managing migratory species and, where requested, to provide advisory and facilitating services to the concerned countries.

The Committee was of the opinion that all these approaches were viable and would yield useful contributions. It stressed, however, that ICLARM should address the problems in close coordination with concerned policy makers and resource users.

The Committee suggested that ICLARM also could play a scholarly function in clarifying the role of fisheries and fishermen in public policy.

Noting that fishermen were rarely in a position to deal with industrial and other development projects which directly or indirectly threatened their livelihood, the Committee also recommended that ICLARM should bring the problems of pollution to the attention of planners and developers, and clarify the direct and indirect impact on fisheries of pollution, including the impact of specific pollutants and the improper use of land, including the coastal zone.

The Committee strongly recommended that ICLARM should pay particular and continuing attention to the problems of pollution in the context of all its programs.

In summing up the concurrent discussions on Resource Development and Management, and Marine Affairs, the Committee recognized that the field of study was vast and many problems had to be addressed and resolved before fixed nationalistic views emerged. There were a number of clearly defined areas in which ICLARM could concentrate its initiatives, and even play a leading role. The organization's success in these initiatives would depend on its ability to play a neutral role in the areas of conflict.

The Committee noted that ICLARM was an international organization, and that it should apply itself to problems of regional and/or inter-regional nature.

The Committee also recognized that, in certain areas, there was frequently the opportunity to take advantage of existing knowledge and data to elaborate development and management strategies, without resorting to costly field programs.

In the context of the South China Sea, there was a sense of agreement that catch possibly could be increased, or at least kept from diminishing, through rational regional management of fishery resources. National and regional efforts aimed at achieving this and should be continued and strengthened. Many good results had been achieved already, and there were many data (for example, data on multi-species fisheries) and could be put to effective use for this purpose.

Finally, the Committee recommended that, in pursuing its programs in Resource Development and Management, and Marine Affairs, ICLARM should:

- (i) Maintain a policy which emphasizes local involvement;
- (ii) Establish linkages with policy makers and resource users and maintain these linkages through its planned information services;
- (iii) Avoid involvement in other than a neutral role in all issues of conflict between nations;
- (iv) Conduct its studies and prepare reports to focus attention on, and clarify the perception of, specific problems;
- (v) Prepare background reports of broad applicability within regions;
- (vi) Stimulate research and discussion by convening special meetings;
- (vii) Cooperate fully with other projects or programs when possible; and
- (viii) Respond readily to requests for assistance and advice.

E. EDUCATION AND TRAINING

The committee noted, during introductory discussions, that most of the education in fisheries, and

indeed in the newer field of resource management in general, had arisen in the economically developed countries of North America and northern Europe. For a number of reasons this type of education was not appropriate (i.e., completely relevant) to the economically developing countries. Students who were sent abroad were frequently trained in circumstances out of context with their own countries, and on problems with little or no relevance or application to their needs at home. It was therefore desirable to develop for use on a wider basis in the developing countries curricula of fisheries and resource development and management that were germane to their problems and circumstances. ICLARM would render valuable service by furthering the development of undergraduate and graduate curricula in these subject areas and establishing such curricula in one or more institutions in Southeast Asia.

A discussion of fishery education and training in Southeast Asia by the Committee revealed the need for an assessment of manpower requirements in the region to provide the basis for better planning, and to develop appropriate curricula and training material suited to the desired level of expertise.

While direct involvement by ICLARM in university level education was not a prime mission of the organization, ICLARM should, as a management and development center, provide its services where appropriate to assist in the development and upgrading of university education in fisheries and related topics.

The Committee recognized the urgent need for substantial numbers of extension officers and vocational trainees. There was general agreement that local workshops, or 'training centers,' were the best vehicles for instruction at this level and that ICLARM should consider sponsoring such workshops within the context of its programs.

With regard to curricula development, the Committee urged ICLARM to pursue this objective by sponsoring special, country-specific seminars, involving local educators, fishery personnel and outside consultants. Some topics suggested for these seminars included:

- (i) evaluation of the need for research personnel,
- (ii) specialized versus general training, and
- (iii) the relationships between fishery curricula and problems encountered in the execution of national fishery policies.

The Committee unanimously stressed the need for specialized training in stock assessment, and strongly urged ICLARM to initiate training workshops in this field. It was recommended that this program be implemented as a continuing, annual, on-site training activity in Southeast Asia, utilizing data on local fish stocks. It was pointed out that such workshops were currently conducted in Australia, and it might be possible for ICLARM to mobilize the experts involved for similar training centers in Southeast Asia. It was

also recommended that ICLARM consider the preparation of special curricula for these training centers, including simplified versions of training manuals available from FAO.

The Committee pointed out the need for special training seminars aimed at updating fishery administrators in recent developments in fishery policies, technology and other related matters. It was suggested that ICLARM should take advantage of the annual internal meetings of fishery personnel on a country level for this purpose. Subject matter should be restricted to the principal elements of the ICLARM program.

The preparation of fish husbandry manuals, proposed by the ICLARM staff, was approved by the Committee with the recommendation that such manuals should be country-specific rather than general. It was also recommended that these manuals should be aimed at extension officers and prepared locally with support from ICLARM.

F. SPECIAL PROJECTS

The Committee was informed that, as elaborated in the Program Development Statement, ICLARM would from time to time undertake special projects which fell outside its long term principal program interests. These special projects would be undertaken because of:

- (i) potential benefits in terms of aquatic food production,
- (ii) potential economic benefits, and
- (iii) the lack of adequate development initiatives and/or suitable mechanisms for their implementation.

ICLARM's role in these projects would be a catalytic one, providing planning and technical advice, seed money, and links to suitable institutions and funding agencies. When appropriate, ICLARM would also provide consultative managerial services during the implementation phase.

The Committee endorsed this program element and was of the opinion that ICLARM's flexibility and non-bureaucratic structure would permit the organization to move quickly when substantial special projects were identified. The Committee reviewed at length two such projects in which ICLARM had already become involved:

1. *Southern Ocean Salmon Project*

The project proposed to establish certain salmonid stocks in South America, below latitude 45°S, in the hope that such migratory stocks, once established, would utilize some of the krill resources of the southern ocean. The salmon would be harvested upon return to their natal streams. If successful, the project would provide additional quantities to the net supply of protein foodstuffs produced in the region and

would create social and economic benefits. Where these benefits would eventually rest was an appropriate question, and perhaps the most intriguing aspect of the proposal would be to devise mechanisms whereby the benefits would not simply go into increasing the well-known gap between the haves and the have-nots. One unique aspect of project was the opportunity for the early development of a regional body for the management of the anticipated fishery.

To date, ICLARM had fielded two missions to Chile, biologically the most suited country for launching the salmon. The organization had discussed the project with the appropriate Government agencies, selected a tentative site for the proposed salmon hatchery, and assisted the Government in the preparation of a technical project document for funding purposes. The work was carried out in collaboration with the Oceanic Institute (Hawaii) and was funded by ICLARM, the Rockefeller Foundation and the Tinker Foundation.

Discussions were in progress between the appropriate government agencies in Chile; the Inter-American Development Bank and ICLARM, concerning the organization and funding of the project. The Antarctic Treaty States were being kept informed of the project.

In summing up, the Committee endorsed the project as an exciting and worthwhile effort. It strongly recommended that ICLARM should:

- (i) Hereafter play a consultative, managerial role utilizing funds from outside sources (i.e., without drawing on its core budget),
- (ii) Play a catalytic role aimed at ensuring the technical viability of the program and the development of supporting linkages, and
- (iii) Make a special effort, when its role in project implementation is clarified, to place the project on the agenda of forthcoming meetings of the Antarctic Treaty states, in order to ensure early discussions on the future management of the anticipated fishery.

2. Skipjack Survey and Assessment Project

The high-seas fishery resources of the Southwest Pacific are some of the few resources available to the island nations of that region. One of the least developed is the skipjack tuna. The proposed project would lead to information on the magnitude of the skipjack tuna resource, stock identity, movements and growth rates, and provide information on baitfish resources. All of these were essential to the rational development and management of the resource.

ICLARM had acted as the instigator by providing seed money to the South Pacific Commission. The Commission had used the funds to retain the services of a fishery biologist for one year to elaborate the project and to arouse interest in its support. Interest had been expressed so far by Australia, New Zealand,

U.K. and the U.S.A. There also was possibility of future interest on the part of France and Japan.

During discussions, it was explained to the Committee that, although ICLARM had in fact been in existence for over two years, it had gone through an extensive evolution in concept. Initially ICLARM was devised as a kind of "money funnel", which would obtain funds from various sources and apply them to innovative and potentially beneficial programs through existing institutions and bodies. This was the concept in effect when ICLARM became involved in the skipjack project. Subsequently it had become apparent that, without having access to substantial sums of money, it was not feasible to function as a funnel and that the only practical course for ICLARM to follow was to act as an operational organization. It was noted that there were other arguments in favor of being an operational body as well. It was the view of the ICLARM staff that if ICLARM was to continue with the skipjack project, it should act, as in the case of the salmon project, in a managerial capacity.

The main technical criticism of the project by the Committee was that returns from tagged skipjack were notoriously low. However, it was indicated that tag returns from small fish provided more information than those from large fish, and this would compensate for the low returns. Another weakness was that the project did not include Tasmania or the Celebes, and it was suggested that these should be incorporated at a later date.

It was noted that the key to project implementation was the skipjack fishing vessel requested from Japan, but which had not been supplied as yet.

The Committee suggested that ICLARM's management of the project might help to overcome Japan's current reluctance to participate as it was not a member of the SPC. The suggestion was also made that ICLARM might play a facilitating role in the establishment of a permanent management body for the skipjack resource. Accordingly, the Committee endorsed ICLARM as a vehicle for the technical management of the project.

In concluding discussions on ICLARM's research programs, the Committee recommended the addition of a program element on marine pollution and/or conflicts in the use of the coastal zone. It was felt that these topics were consistent with the terms of reference of ICLARM as set forth in its Articles of Incorporation.

IV. RELATED PROGRAMS

Noting that there were a number of programs and institutions in Southeast Asia with which ICLARM could interface, the Committee invited Mr. A. G. Woodland, Programme Leader of the South China Sea Fisheries Development and Coordinating Programme (SCSP) and Dr. Q. F. Miravite, Executive Director of the SEAFDEC Aquaculture

Department, to present brief reviews of their organizations and program activities.

1. *The South China Sea Fisheries Development and Coordinating Programme (SCSP)*

The Committee was informed that the SCSP was a regional program funded by UNDP during its initial phase, and at present jointly by the UNDP and CIDA. The program was executed by FAO. Member countries included Hong Kong, Indonesia, Kampuchea, Malaysia, Philippines, Singapore, Thailand and Vietnam. The first phase of the program, consisting of fact finding and problem area identification, was completed in 1973. Phase II of the program had been in operation for 2-1/2 years and had utilized its entire 5-year budget of US\$5.3 million.

Formerly, the main aim of the program was to increase fish production through aquaculture and pelagic fishery resources. Phase III of the program, which had been approved by the program's Consultative Committee, placed increased emphasis on artisanal fisheries development. Long term activities, including assessment and management of marine fishery resources, and fishery statistics were to be continued. In implementing the artisanal fisheries development program, pilot projects were to be set up in the member countries of the SCSP. Training of extension workers was an important element in these pilot projects, and coastal aquaculture was to be developed as a complementary activity to artisanal fishing. The Program also intended to develop economical types of craft and gear, for harvesting certain stocks of pelagic fish such as skipjack.

The Phase III program has a duration of 5 years and a budget of \$10 million. The program was to commence in July 1977 and would probably be funded by CIDA (90%) and UNDP (10%).

2. *The Southeast Asian Fisheries Development Center (SEAFDEC) Aquaculture Department*

Dr. Miravite informed the Committee that, as an outcome of the recommendations of the Second Ministerial Conference for the Economic Development of Southeast Asia in 1966, the Southeast Asian Fisheries Development Center was established in 1968 under an Agreement signed by representatives of the Governments of Japan, Malaysia, Philippines, Singapore, Thailand and Vietnam. The membership of the Center was open for other Southeast Asian nations namely, Union of Burma, Indonesia, Kampuchea and Laos, and invitations had been extended to Australia and New Zealand.

The Center maintained a small Secretariat and a Training Department in Samutprakarn, Thailand. According to the Agreement, the Chief of one of the Departments of the Center was concurrently elected by the Council of the Center as the Center's Secretary General. The Training Department set up in 1968 was hosted by the Government of Thailand and had

carried out training of operators for the primary sector of the fishing industry. The annual budget of the Training Department amounted to US\$500,000.

The Marine Fisheries Research Department, hosted by the Government of Singapore, currently undertook research on the fishery resources of the South China Sea and Andaman Sea, fishery oceanography and the monitoring of the commercial fishing grounds, as well as training of research personnel from member countries. The Marine Fisheries Research Department was located in Changi Point, Singapore. The annual budget of the Research Department was US\$300,000.

The Aquaculture Department was hosted by the Government of the Republic of the Philippines. The Department, established in 1973, had expanded rapidly in its physical facilities and established research and training programs in aquaculture. The Department was currently implementing the following programs:

- (i) Controlled breeding and rearing of *Penaeus monodon*
- (ii) Domestication of milkfish (*Chanos chanos*)
- (iii) Experimental breeding of *Macrobrachium rosenbergii*
- (iv) Mussel culture
- (v) Freshwater aquaculture and ecosystem research
- (vi) Seafarming experiments and bioscreening of certain marine species suitable for cultivation

A film depicting the facilities and programs of the Department was shown to the Committee.

The operational budget of the Aquaculture Department for 1977 was estimated at US\$13 million. In concluding his presentation, Dr. Miravite indicated his Department was in need of trained research scientists, and offered its research facilities to ICLARM staff.

At the conclusion of the SCSP and SEAFDEC program reviews, the Committee agreed that there were no overlaps with the ICLARM program, but rather complementary interests which offered considerable opportunity for the establishment of linkages.

V. STAFFING AND BUDGET

The Committee was informed that ICLARM would retain a core staff of about 12 professionals who would be involved in the major ICLARM program areas reviewed and endorsed earlier. The staff would be drawn from several disciplines (aquaculture, economics, anthropology, resource assessment, food technology, resource management, etc.) and loosely organized according to the table of organization presented to the Committee. The core staff would be augmented by *ad hoc* consultants, visiting fellows, post-doctorals and graduate students.

The Committee endorsed the level of staffing as necessary to ensure the professional and technical viability of ICLARM, and recognized the need for an initial core program budget of about \$1.6 million, with special projects to be in addition to this amount.

VI. OTHER MATTERS (Linkages, Information Services, Facilities, Development Projects)

Noting the positive results of institutional linkages developed by the International Agricultural Research Institutes, UNICEF and other international organizations, the Committee endorsed the development of linkages in principle.

It was suggested that the ability of ICLARM to attract funds from international agencies might very well depend on its ability to form cohesive and demonstrably effective institutional linkages. Linkages with university systems were also recommended as a means of ensuring manpower and technical backstopping for ICLARM's long-term programs. Linkages with other action-oriented organizations would also help extend the drive that ICLARM could generate with its own funds.

The Committee recognized that linkages grow and mature slowly, and that the ICLARM staff would have to exercise their judgment in establishing the type of linkages needed to further program goals and attract funding. The ICLARM aquaculture proposal for the establishment of a research network on controlled breeding of brackishwater fishes was cited as an excellent beginning.

In the context of the proposed Information Services, the Committee gave its strong and repeated endorsement to the concept of delivering information to users in usable form. It was pointed out that ICLARM could provide valuable service by translating useful information published in local languages of Southeast Asia and disseminating this throughout the region. Information applicable to Southeast Asia could also be introduced from other regions through translation services. ICLARM could, therefore, establish a selective flow of useful information within and into the region. The Committee recommended that translation be carried out through local contracts.

The Committee strongly endorsed the publication of an informal newsletter dealing with various aspects of fishery development in the region. It was recommended that the newsletter be written in relatively simple style, contain brief articles, have a large mailing list and be circulated frequently. The newsletter would be useful in itself, and at the same time would give ICLARM rapid and wide visibility.

The need for specialized information services at this stage, such as a technical referral center, was discussed and the matter shelved for the time being. The Committee was informed that IDRC was planning to field a mission to look into the need for establishing an aquaculture information service in the region.

This need to establish a full-scale fishery library at ICLARM headquarters was debated. The Committee recommended that, for the time being, ICLARM should establish a library relevant to its core program only, and should interface with existing libraries for any other needs it may have.

There was discussion of the proposed ICLARM technical journal and, while there was reservation expressed about starting a quarterly journal of substantial size, the Committee recognized the need for a mechanism to establish visibility in the academic community. The Committee endorsed the publication of a technical series as a more viable alternative.

ICLARM's intention not to construct its own special research facilities was approved by the Committee, with the proviso that this decision should be re-evaluated on the basis of results obtained without such facilities.

ICLARM's direct involvement in development projects was endorsed by the Committee on two levels, namely

- (i) development activity in the context of ICLARM's Special Projects category, and
- (ii) as an advisory resource to development banks and similar agencies.

VII. SUMMARY

The Program Advisory Committee reviewed the core program selected by the staff. A few projects were revised and some new suggestions were offered. But on the whole, the Committee is of the opinion that the staff have identified and focused on major fishery problems that ICLARM could address appropriately. The Committee, therefore, accepted and endorsed the program of work as amended.

At the beginning of the session the Committee deemed it appropriate to examine the special need and rationale for ICLARM and added this to its terms of reference. In the course of discussion of the proposed research program, the Committee came to the conclusion that the rationale and justification of ICLARM were apparent, and the need for the organization very real and urgent.

The Committee was pleased to find that ICLARM was not a "brick and mortar" organization, but rather one that relies heavily on a highly competent and experienced staff. Its lack of bureaucratic complexity will permit it to more rapidly capitalize on opportunities and take calculated risks that other agencies cannot take.

The Committee's deliberations identified a variety of functions that ICLARM could carry out, ranging from catalysis to the implementation of long-term research and development programs, as well as a broad and urgent role in fishery development.

The Committee also recognized the intrinsic difficulties facing ICLARM, particularly competition for funds, and stressed that the organization must

quickly establish a track record without sacrificing its long-term programs and goals.

The Committee emphasized the need for ICLARM to establish appropriate communications, in a variety of forms, with the host government and other gov-

ernments in the region, as well as regional and international organizations, and to remain sensitive to communications.

The Committee is relying upon, and confident of the ability of the staff to make ICLARM succeed.

VIII. ANNEXES

ANNEX 1

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ANNEX 2

OTHER PARTICIPANTS

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Reinhart, Johanna M., Assistant Editor,
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Woodland, A. G.*, Programme Leader,
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*Invited to present reviews of their respective programs.

ANNEX 3

AGENDA

Chairman : K. Tiews
Rapporteur: D. Menasveta, assisted by
Z. Shehadeh and C. Nash

Discussion Leaders:

- | | |
|--|---------------------------|
| I. TERMS OF REFERENCE | L. Sprague |
| II. PRINCIPAL PROGRAM ELEMENTS | |
| A. Aquaculture | R. Juliano |
| B. Traditional Fisheries | J. Liston |
| C. Resource Development and Management | J. Crutchfield |
| D. Marine Affairs | F. Christy, Jr. |
| E. Education and Training | S. Sumardi & E. Gomez |
| F. Special Projects | G. Murphy |
| III. RELATED PROGRAMS (South China Sea Programme, SEAFDEC) | A. Woodland & Q. Miravite |
| IV. STAFFING AND BUDGET | P. Roedel |
| A. Core Staff | |
| B. Consultants | |
| C. Visiting fellows, post-doctorals, graduate students | |
| D. Budget | |
| V. OTHER MATTERS | P. Larkin |
| A. Linkages | |
| B. Information Services | |
| C. Facilities | |
| D. Development Projects | |
| VI. SUMMARY | J. Storer |

ANNEX 4
TIMETABLE

Monday 7 March

0900 — 1200	PAC Meeting; Agenda Items I, II A	— “Where else” Room
1200 — 1400	Lunch — Free	
1400 — 1800	PAC Meeting; Agenda Item IIA	— “Where else” Room
1830 — 2030	ICLARM Reception	— Forbes Room

Tuesday 8 March

0900 — 1200	PAC Meeting; Agenda Items II B & C	— “Where else” Room
1200 — 1400	Lunch — Free	
1400 — 1800	PAC Meeting; Agenda Items II C & D	— “Where else” Room

Wednesday 9 March

0800 — 1200	PAC Meeting; Agenda Items II E & F, III	— “Where else” Room
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Thursday 10 March

Field trip to Batangas Fisheries Biological Station, Philippine Bureau of Fisheries and Aquatic Resources, arranged by Department of Natural Resources

Friday 11 March

AM	Free	
1400 — 1800	PAC Meeting; Adoption of Report	— “Where else” Room
1830 — 2030	Marr Reception	— LPL Towers, Apt 7B Legaspi Street Makati