

ICLARM  
*ANNUAL REPORT*  
1997

**International Center for Living Aquatic Resources Management**  
205 Salcedo St , Legaspi Village, Makati City, Metro Manila, Philippines  
MCPO Box 2631, 0718 Makati City, Philippines  
Tel (63 2) 812 8641, 840 3485  
Fax (63 2) 816 3183  
E mail ICLARM@cernet.com  
Visit our home page [http //www.cgiar.org/iclarm/](http://www.cgiar.org/iclarm/)

# ICLARM ANNUAL REPORT 1997

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Director Joanna Kane Potaka  
Editor/Writer Rita Kapadia  
Managing Editor Marie Sol Colocado  
Editorial Assistants Erlinda Gonzalez, Sheila Siar and Ma Graciela Balleras  
Graphic Designer Alan Siegfried Esquillon with assistance from Albert Contemprate  
Cover Designer Alan Siegfried Esquillon

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\* Available in French and Arabic translations upon request



International Center for Living Aquatic  
Resources Management

**Our Commitment** to improve the well being and livelihood of present and future generations of poor people in developing countries

**A Way to Achieve This** by undertaking, facilitating and disseminating scientific research to improve the production, management and conservation of aquatic resources such as fish

We believe this work will be most successful when undertaken in partnership with national government and nongovernment institutions and with the participation of the users of the research results

“Very early in its history ICLARM was telling the world something the governments did not want to hear  
Its messages about the pending collapse of economically important fisheries resources around the world  
have been given worldwide attention and the concern they deserved only in the past three years - after  
a number of key fisheries had indeed collapsed and had indeed threatened world food security ”

Dr Salvador Escudero III  
Philippine Secretary of Agriculture

## FUTURE HARVEST

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THE INTERNATIONAL CENTER FOR LIVING AQUATIC RESOURCES MANAGEMENT (ICLARM) supports Future Harvest, a public awareness campaign that builds understanding about the importance of agricultural issues and international agricultural research. Future Harvest links respected research institutions, influential public figures and leading agricultural scientists to underscore the wider social benefits of improved agriculture—peace, prosperity, environmental renewal, health and the alleviation of human suffering. Visit its web page at <http://www.futureharvest.org>

# Introduction



1997 was a milestone year for ICLARM as the Center celebrated its 20th anniversary. This caused us to reflect on the changes that have occurred in the world's aquatic resources between the time the Center was formed and today. ICLARM was created to find ways that fish could make a greater contribution to solving the world's food problems. Fishing harder was seen to be the answer to increasing production from wild stocks, and technology was seen to be the answer for improving production of cultured fish. The environment, biodiversity, climate, social and economic constraints, and other such factors were given little prominence.

Twenty years down the road, the developing countries in which ICLARM works produce a greater quantity of fish than the developed countries but the environmental sustainability of this production is in serious doubt. Fish supply has increased and aquaculture has made enormous gains, especially in carp and tilapia production. However, there have been major setbacks due to disease and environmental degradation which have prompted many sectors of the industry, regulators and scientists to find means to prevent similar occurrences in the future. At the same time, ICLARM and its partners have shown that from a base popula

tion with good genetic diversity, simple selective breeding can greatly improve the production efficiency of tropical fish. Also, in our aquaculture research in coastal zones and on farms, we have concentrated on creating new, environmentally friendly and affordable enterprise options such as giant clams and sea cucumbers as well as improved tilapia.

Since we were established, the United Nations Convention on the Law of the Sea (UNCLOS) and a host of global environmental, climate and social conventions and agreements have been signed and many ratified. These international legal instruments provide a framework for actions in response to growing pressures on resources and the environment generated by population growth, greater resource demands from more affluent peoples and persistent poverty and inequity in many countries. For fisheries resources and the many poor who still use and depend on them for food and livelihood, the outlook is mixed.

As fish has grown in popularity and many stocks have become overexploited, the price of fish has risen beyond the reach of many of the poor. Declining stocks also mean lower incomes for fishers, despite rising prices. National responsibility for fisheries management, as provided in UNCLOS, is gradually giving way in many countries to local and community based resource management. To build local capacity and skills takes time and so we have yet to see the benefits flow through to better resource management and healthier households. ICLARM's work has concentrated on understanding local and global changes in fisheries resources and aquatic ecosystems and on studying people centered approaches to improve resource management.

In 1997, our directions for the immediate future were embodied in our 1998-2000 Medium-term plan. This was developed during the latter half of 1996 and in early 1997 through a strongly consultative process involving over 400 of our many partners and poten-



tial partners, including our donors. The plan adds substance and direction to ICLARM's complex mandate which covers a range of research on aquatic resource systems and their users, aquatic biodiversity, culture technologies based on specific commodities, and economic and policy research linking fish with other sectors and with food security. We were pleased to get good approval ratings for this plan from the Consultative Group on International Agricultural Research (CGIAR) and its Technical Advisory Committee.

Related to the work program, we also took initial steps in 1997 to establish the framework for a Center-wide research impact assessment process. Impact assessment will be a major focus of our efforts in 1998, during which ICLARM will prepare its next strategic plan and will be subject to a full external and program review.

In 1997, ICLARM continued to enjoy good donor support and to attract new grants for specific projects. The budget for 1997 was \$11.898 million compared to \$10.44 million in 1996. Actual spending for 1997 was slightly lower than the budget. However, the net effects of fluctuations in the value of incoming and outgoing currencies meant that Center finances were stretched to cope with the planned work program. The strength of the US dollar against many other developed country currencies and the slide of many Asian currencies were the major factors. In addition, relatively high inflation rates prevailed in most countries in which ICLARM expends its budget.

Good progress was made on all fronts in setting up the new Research Center for Africa and West Asia at Abbassa in Egypt, following the acceptance in 1996 of the generous offer from the Government of Egypt. In late March, a very comprehensive host country agreement was signed between Dr. Y. Wally, representing the Government of the Arab Republic of Egypt, and ICLARM. This was passed through all stages of the legal parliamentary system and approved fully on 11 December 1997. Following recruitment of key senior staff for the facility in January and February 1997, an intensive upgrading program, funded by the Government of Japan, commenced and the first stage of the upgrade was formally opened on 25 May 1997 in conjunction with the Mid-term Meeting of the CGIAR held in Cairo. Over 300 Egyptian, CGIAR and partner dignitaries attended the opening.

Once again we regret to report that only modest progress was made during 1997 in securing an appropriate headquarters site for ICLARM in the Philippines. Negotiations continued with the Subic Bay Metropolitan Authority (SBMA) over possible sites there. By the end of the year, the SBMA and the Department of Agriculture (ICLARM's Philippine sponsor) were finalizing arrangements over the lease of a suitable site which could be made available for ICLARM's headquarters.

All ICLARM stations around the world continued active work in 1997. In the Solomon Islands, solid progress was made in expanding clam farming trials and developing further market opportunities for several types of clam products including shells, aquarium specimens and sashimi meat. Good progress was made in spawning and settling one species of sea cucumber and in defining the feasibility of a pearl oyster industry in the Solomon Islands.

Constraints to adoption of small scale aquaculture on farms in Malaŵi were considered and the longer term productivity changes in a number of adopting farms in southern Malaŵi analyzed

In Bangladesh, work expanded to include studies on deepwater rice fish systems, assessment of the impact of aquaculture adoption on household welfare and on the genetic improvement of carp. In 1997, a group of people from the Bangladesh government, non government organizations and other research partners visited the Philippines to study community-based resource management efforts

The two projects on coral reefs in the Caribbean enjoyed their first full year of operations in 1997 and started to show some interesting results on extensive migrations of some fish species out of and recruitment of juvenile fish into protected areas. These projects also yielded useful insights into the legal and institutional aspects of protected area management

A workshop was held in Denmark to bring together scientists, academicians and policymakers from around the world to focus on direction for future research on fisheries issues. Some key points of the consultation are presented in the Highlights section

In line with the focus that the CGIAR is placing on the scientific and property aspects of biotechnology, ICLARM developed a draft policy on intellectual property rights on aquatic genetic resources. It is now widely recognized as a critical issue that needs to be addressed globally

As ICLARM confidently looks to the future, we see immense challenges facing the management of living aquatic resources. We are ready to join our partners from different corners of the globe in facing these challenges and helping to improve the policies, human capacity, knowledge and technology which will be the essential parts of any solutions



A handwritten signature in black ink, appearing to read 'Kurt J Peters'.

**Kurt J Peters**

Board Chair



A handwritten signature in black ink, appearing to read 'Meryl J Williams'.

**Meryl J Williams**

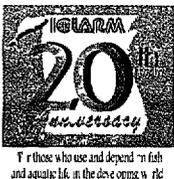
Director General

## 20 Years of ICLARM



### 20 Years On - More Relevant Than Ever

Very early in its history ICLARM was telling the world something the governments did not want to hear – that sustainable management of resources was not simply more efficient exploitation, as was noted by Philippine Secretary of Agriculture, Dr Salvador Escudero III, on the occasion of ICLARM's 20th anniversary celebrations. He went on to say that "It has taken ICLARM a little longer than other research institutions to be truly appreciated. Its messages about the pending collapse of economically important fisheries resources around the world have been given worldwide attention and the concern they deserved only in the past three years – after a number of key fisheries had indeed collapsed and had indeed threatened world food security. Today ICLARM's mission is more relevant than ever – more needed and more recognized."



The post World War II period witnessed rising concern with agricultural development as the growing populations of developing countries strained the existing capacities of their food production systems and general economies. By the early 1970s, the favorable impact of international agricultural programs, especially for rice, corn, beans and potatoes, focused the attention of the world on the effectiveness of the application of modern science to the

task of expanding food production. In keeping with its belief in the key role of science in the resolution of world problems and in line with its ongoing support of research in marine biology, the Rockefeller Foundation decided to support a research, training and action program in fisheries and aquaculture for the benefit of the developing countries.

In 1975 the Rockefeller Foundation helped set up ICLARM as an operational entity and a project of The Research Corporation of the University of Hawaii, with a grant under its "Conquest of Hunger" program. With two years of exploratory work on the elaboration of a preliminary program plan and definition of the structure and mode of operation, ICLARM was incorporated as an international research center in the Philippines in 1977, with headquarters in Manila.

In the two years between inception and incorporation in the Philippines, ICLARM staff travelled extensively to assess better the problems of the Pacific basin and to determine what programs could be inaugurated to assist people to utilize aquatic resources better to satisfy their nutritional needs. **The approach adopted was to work through cooperation with existing institutions rather than for ICLARM to establish its own research and training facilities.**

Over the first two decades ICLARM established its credentials as an independent, international, nongovernment organization engaged in assisting tropical developing countries to use the tools of science to improve their access to aquatic resources. In 1992 it became one of the 16 agricultural research centers of the CGIAR, in recognition of the high standards reached by its research and other programs. By 1997, its support had broadened to include 35 development assistance agencies and donor partners.

The original aim then was to look for ways to increase the production from artisanal fisheries and subsistence aquaculture for the benefit of low income people. Though this aim is still the centerpiece of ICLARM's *raison d'être*, its focus and methodology have evolved as the environment it is dealing with has changed. The name reflected the foresight of its founders. "At the time when fossil fuels were the only resources the world leaders were bent on preserving and managing, the (Rockefeller) Foundation was already drawing attention to the need to manage the earth's other resources, particularly its living aquatic resources. Unfortunately, management was almost the equivalent of exploitation. The new center was expected to aid in increasing the quantities and volumes of fish production."

**ICLARM soon pointed out that an ever increasing production of fisheries without management aimed at sustainability could not last. However, in saying this "it was ahead of its time" and had to go a long and torturous route to finally get global recognition of the relevance of its mission.**

In its early years ICLARM did most of its work in Asia and the Pacific, based on biology and technology, and in collaboration with selected partner institutions in the field of aquatic science. Over the 20 years of its existence its focus has both narrowed and widened, depending on which aspect you look at. It has prioritized three resource systems to concentrate on: coastal inshore systems, coral reefs, and farmponds and rice floodwaters.

This is based on the CGIAR's direction to ICLARM which was to focus on systems that had the highest production of fish, supported the greatest number of people, raised issues which science could address, and would be within the capacity of the national aquatic research agencies in developing countries to deal with

Its focus has widened in almost every other aspect

- to integrate relevant knowledge from disciplines such as demography, economics, sociology, environmental science, governance and more, in addition to biology and technology,
- to expand links with partners in many developed and developing countries as well as with the farming and fishing communities themselves,
- to work in other regions, i.e., Africa and the Caribbean,
- to a recognition of the global significance of its task,
- to a constant awareness of the impact of its work on ecosystems and the environment, and
- to keep the poor people who get their nutrition and earn their livelihood from fisheries at the top of the list of priorities

ICLARM started with three projects, namely, an assessment of the skipjack tuna stocks of the Southeastern Pacific, an evaluation of the small boats program in the Pacific Islands and a study of the feasibility of salmon production at the southern tip of South America. As ICLARM began to work with other world agencies, especially in the Asia Pacific region, it gradually grew to nine fully fledged programs, as described further in this report, with an extensive and growing network of partners engaged in development, conservation and management of living aquatic resources all over the world. These programs include research on biodiversity and genetics, breeding, integrated aquaculture agriculture, coastal stock enhancement, ecosystem dynamics, resource assessment, impact assessment, policy implications and dissemination of research and information.

The message at the end of 20 years of ICLARM is that proactive research and action must have an important place in the future management of aquatic resources. At one end of the spectrum is the view that the resources will not keep up with the needs of the expanding populations. At the other end is the view that this is unnecessarily alarmist and human ingenuity will always overcome the problem. Our message is to study the situation scientifically and propose action before a crisis occurs.



For those who use and depend on fish and aquatic life in the developing world.



## People and Ecology - The Focus of ICLARM's Work<sup>1</sup>

**J**ust over 20 years ago, a unique international research center was established and given a long but rather prophetic name – International Center for Living Aquatic Resources Management (ICLARM). The headquarters for the fledgling Center was set up in Manila, Philippines, and staffed with internationally recruited scientists, and locally recruited scientists and support staff.

As a Center studying living aquatic resources for use in the developing world, ICLARM naturally focused on fisheries and aquaculture in its early years. Before going on to describe how ICLARM came to live up to its name by turning “fisheries and aquaculture” into “living aquatic resources” research, I would like to reminisce about ICLARM’s past, especially its early years. Then I will compare the situation in our field of endeavor 20 years ago with the situation today to illustrate how we view ecology and development, including the role of women.

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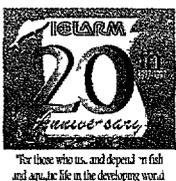
<sup>1</sup>An amended version of the article submitted as Ecology and Development: Aquatic Resource Research at ICLARM by Dr Meryl J Williams, Director General, ICLARM, to the Association of Women in Science (AWIS). Accepted for publication in AWIS Magazine 27 (2), 1998. Reprinted with kind permission from AWIS (e-mail: [awis@awis.org](mailto:awis@awis.org); home page: [www.awis.org](http://www.awis.org)).

We began as a project of the Rockefeller Foundation and a center for research into resource management. In 1974, Dr John Pino of the Rockefeller Foundation wrote a discussion document in which he said “The potential for increasing the productivity especially of near-coastal subsistence fisheries and fish ponds would appear to be considerable. While the world growth rate of fish production has been about 6 percent per year over the past 20 years, and production currently exceeds 70 million metric tons, these data refer to aquatic resources that for the most part are harvested by and for the benefit of ‘high-calorie’ nations. There is no evidence that production from coastal subsistence fishing has increased to any marked degree during the past 20 years. With respect to aquaculture, while several recent studies suggest that existing technology could, with selective mission oriented research efforts, improve pond management methods to result in sharply higher yields in some regions, increased yields from aquaculture production heretofore generally have been only sporadic. There is general agreement among specialists in the field as to research priorities among the technical problems that must be resolved in order to effect substantial improvement in aquatic protein production. It is therefore proposed that an International Center for Living Aquatic Resources Management (ICLARM) be established. The Pacific basin would be the most appropriate area for the center to focus on initially.”

We were created at a time when fishing harder was seen to be the answer to increasing production from wild stocks, while technology was the way to improve culture production. Fisheries specialists were the key.

Some comparisons between then and now – between the past and the present of ICLARM – can be informative.

- In the mid-1970s, world population was increasing at an alarming rate, but total populations were much smaller than at present. For example, the population of the Philippines was 42 million. Today it has grown to 70 million, although the rate of growth has started to slow. Most experts project that world population will not double over the next 50 years, but there is grave concern that the consumption rates of many resources, including fish, are rising fast and are becoming unsustainable. Can societies make the necessary changes fast enough and do we have enough knowledge and foresight to do it?
- World fish production is now more than 110 million metric tons per year. Most of the recent increase in fish harvest comes from aquaculture production, nearly all of which is in Asia.
- We have gone from the optimistic fisheries expansions of the late 1970s and early 1980s, when the oceans were going to feed the world and fish would provide the “poor person’s protein,” to the stressed ecosystems of today – where the limits of production are challenged and the very existence of many aquatic species is endangered.
- We have seen unimagined leaps in aquaculture production, such as with the culture of carp in China and of seaweed and tilapia in the Philippines, and some notable stumbles,



such as with the culture of shrimp and milkfish. A common question, however, is how to make aquaculture sustainable as well as bring it within the reach of all to benefit from it.

- We have seen fish prices rise, opposing the trend for other foods which have generally become more affordable while fish has become less so. Fish is now traded, on balance, from the developing to the developed countries.
- In the mid 1970s, biology and technology drove our aquatic science. ICLARM was one of the first research centers to start with multidisciplinary teams on its projects, combining economics and anthropology in its technical and policy research. Today, demography, sociology, economics, the environment, ecosystems, biodiversity, governance, computers and biotechnology drive our science. We strive for interdisciplinary approaches.
- In the mid 1970s, ICLARM's work was conducted in many different aquatic resource systems. After an exhaustive analysis in the 1990s, however, we decided to focus most of our work on three resource systems: coastal inshore systems and estuaries, coral reefs, and farmponds and rice floodwaters. These were chosen because they supported the greatest numbers of low income people, they produced or had the potential to produce the most fish, and they were likely to benefit from research results that could improve the use, management and conservation of their resources.
- In the mid 1970s, we sought out research partners and expertise in developed countries, in the few regional centers existing at the time, and in the very small and young national institutions. Our partners were almost exclusively engaged in aquatic science. Today, we are privileged to have a wide array of partners and potential partners, most from developing country institutions, that have grown in number, strength and quality over the last 20 years. But we go well beyond science and aquatic science in our partnerships – forging links with agricultural institutes such as the International Rice Research Institute (IRRI), one of our partners in CGIAR that we joined in 1992, with nongovernmental agencies, with the private sector, and with farmers and fishers groups.
- In the mid-1970s, we did most of our work in Asia and the Pacific. While we still do the majority of our work here, we have flourishing programs in Africa and the Caribbean and are establishing a reputation for developing global knowledge databases.
- Finally, when established in the mid-1970s, we had only a headquarters in downtown Makati. Today we also have research stations and full time staff in the Solomon Islands, Bangladesh, Malawi in Africa, Egypt and the Caribbean. We now have over 300 staff worldwide.

The evolution of ICLARM has responded to changes throughout the world that indicate the increasing importance, urgency, and complexity of our mission. The following four

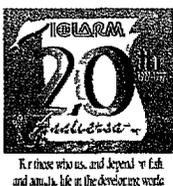
examples illustrate how ICLARM has come to put greater emphasis on understanding the ecology of aquatic resource systems as well as on the human dimensions that surround fisheries management

The first example is our work on assessment of complex tropical fisheries resources. From the start, we have been very active in developing methods for assessing sustainable yields from tropical fisheries that typically consist of numerous different species of fish and other life forms such as shrimp, squid and the small organisms that are the food for the fish. Our scientists pioneered techniques that were easy to use and found ways to substitute easy-to-collect data for more expensive, difficult-to-collect or unavailable data. For example, they developed models that used the length of fish as a proxy for age since, at the time, we did not have good methods for working out the age of tropical fish and usually did not know the age of the fish in the catch.

The various stock assessment methods were well documented. From the late 1970s, ICLARM began making the methods generally available by writing simple programs using programmable calculators and the new personal computers and by running training courses for our partners in the region. By the 1990s, our scientists had developed a large suite of methods for tropical fish stock assessment and our programmers worked with the Food and Agriculture Organization (FAO) to put these together with other programs in a large software package. This package, FAO ICLARM Stock Assessment Tools (FISAT), is now being used by fisheries scientists around the world and advice to fisheries managers on sustainable catch levels is often based on the analysis made through these programs.

However, as everyday observations and more detailed scientific evidence on fisheries showed that more and more fisheries were being overexploited, the limitations of the methods were also revealed. For example, our methods and those used in temperate fisheries tended to concentrate on individual fish stocks, such as individual species or particular categories like bottom dwelling fish or fish that swim in the water column. However, there are often unpredictable interactions among the different parts of the whole aquatic resource system. We realized that it made more sense to look at the whole community of aquatic life, including the small plankton and species not directly used by humans. Thus began our interest in developing models of whole fisheries ecosystems. Our software program, Ecopath, is being used today by scientists around the world to model whole ecosystems in locations ranging from small ricefields to the open oceans that support whales and tuna. It has been used to show that we humans are annually appropriating a large percentage of the global production of aquatic life, directly and indirectly, through the fish we harvest. It also shows that humans as predators have drastically changed the composition of life in all the waters of the world over the last 50 years. We truly have been "fishing down the food web" in most ecosystems.

To use these models, scientists require data that they either have to collect themselves or glean from existing scientific literature. However, many scientists in developing countries do not have access to much of this literature. Recognizing this, ICLARM began to develop



global databases of fish and coral reef information called FishBase and ReefBase, respectively. Both are available on CD ROM and contain virtual libraries of reference materials and data made accessible through relational databases. They are the result of extensive collaborations with hundreds of scientists and institutions around the world. Coupled with changes in policy approaches to managing fisheries and coastal resources, accurate stock assessment will lead to worldwide changes in the way fisheries resources will be studied and managed in the future, as the world urgently seeks solutions to the current dilemmas.

We are also learning more of the human dimensions of fisheries management through studies of the formal and informal institutions managing fisheries and coastal resources and through the development of training programs in integrated coastal management. The training programs are being designed in partnership with government and nongovernment agencies and are directed to meet the needs of the local communities and support scientific management of their natural resources.

My second example demonstrates how genetic improvements in fish will increase aquaculture productivity in much the same way as genetic enhancement has contributed to agriculture and animal husbandry over the last 100 years. The Genetic Improvement of Farmed Tilapias (GIFT) Project and its associated activities has demonstrated the results of producing faster growing and more robust tilapia. The project combined truly complementary skills among Philippine, Norwegian and ICLARM scientists. The work was conducted at the Freshwater Aquaculture Center of the Central Luzon State University with the Bureau of Fisheries and Aquatic Resources. The testing and study of the performance of the new breed in five Asian countries (China, Bangladesh, Philippines, Thailand and Vietnam) have shown that producing cheaper fish will benefit mainly the relatively poor producers and consumers that make up the middle two income quartiles of those countries. The research has also led to the formation of the GIFT International Foundation in the Philippines, which



*Tilapia breeding pond  
in Calauan Laguna*

has started marketing the improved fish to private and government-owned hatcheries. It also helps in imparting training in selective breeding methods to scientists in developing countries.

Having seen the potential benefits of selective breeding of the tropical Nile tilapia, we have just started a project to tackle improved breeding of carp in collaboration with institutions in the six most important carp producing countries of the world.

My third example involves the studies of giant clams in the Pacific Islands that have been undertaken by our Coastal Aquaculture Centre in the Solomon Islands. The clams are valuable and symbolic. They are used in a variety of ways: in traditional ornaments, as money, as food and as tropical aquarium pets. In the early phases the project included collaboration with several Philippine institutions, especially the Marine Science Institute (MSI) of the University of the Philippines. The loop has been closed over the years as we have sent specimens from the Pacific to the MSI. The Institute has used these and some Australian and Philippine specimens to establish broodstock and start the task of reintroducing the clams to the local ecosystems where they had been completely fished out. In the Pacific Islands, we have piloted small scale clam growing trials in coastal villages. We now believe that the restoration of clam populations in the wild will not be achievable without a viable farming industry because these animals start their life as small and rather fragile specimens, at the mercy of the many hungry fish and snails in the sea. Science can support such introductory cultures in partnership with fisheries communities. This development in coastal aquaculture is also promoting improved farming technologies for other valuable invertebrate species that are easier to grow, such as pearl oysters and sea cucumbers. It is also creating partnership opportunities for ICLARM to collaborate with different countries and with other development agencies in the Pacific, e.g., the Japan International Cooperation Agency, the South Pacific Commission and the Forum Fisheries Agency.

In my fourth example I would like to discuss our findings on the role of women in the development of aquatic resources. In carrying out our research we have long been concerned with the types of research outcomes that can help poor people the most. Prominent among the poor are women and children.

ICLARM has noted that gender-sensitive development research in fisheries must take into account the fact that men and women tend to undertake different tasks in fisheries, aquaculture, fish processing and marketing. The division of labor may not be fixed and absolute. For example, a general picture of the fisheries sector shows that men tend to build boats and catch fish whereas women make and mend nets, process and sell the catch. In aquaculture, men dig the ponds and stock them while women tend the ponds and feed the fish, men harvest the fish and women harvest and sell them.

Recent studies show that women are taking on more of the tasks typical of men in addition to their own tasks in all rural work, including fishing. Women's role in resource conservation is also central and needs to be supported by education programs. Frequently education programs exhibit a degree of mistargeting. More men than women receive training



in all areas of fisheries and aquaculture, even for tasks that women tend to dominate, such as fish processing. Minority ethnic groups are also rarely trained and limited literacy is often a barrier to training.

Therefore, we have selected a program that emphasizes new technologies for small scale and local needs through on farm and on station research, including participatory research with the farmers, new labor opportunities, especially for women and those of lower income groups, better access to information on existing technology, and the use of nontraditional extension agencies such as nongovernment organizations.

Our success in reaching women's groups varies from country to country. For example, in **Bangladesh, women represent 60% of the thousands of people we have worked with in study the pathways to adoption of small-scale aquaculture technologies.** In the Solomon Islands our village farmers are all men. When we investigated why we were not reaching the women in these villages, we found that the women were already burdened with many tasks on farms and at home and could not find any time for clam farming in their overloaded days. In southern Malawi in Africa, women own the family farms in a matrilineal society, and several of the fish farmers we work with are women.

At ICLARM we believe that the world, especially the developing world, faces many challenges and opportunities in sustainably managing living aquatic resources. Last year the world heralded the International Year of the Reef. In 1998 we hail the International Year of the Ocean. At last the marine resource systems of our planet are receiving some attention. These systems and their freshwater counterparts carry precious populations of animals and plants that are difficult to manage well. The pressures on these systems and their bounty have changed greatly since our Center was set up over 20 years ago and so has our approach to studying them. However, **we remain convinced that innovative and world class science, in combination with an awareness of the needs of the people involved, can make a big difference to the chances of success when it comes to the management of such valuable resources.**



*Women take on new practices in small scale pond aquaculture in Bangladesh*



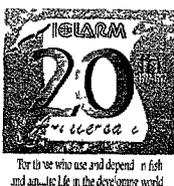
## A Tribute to ICLARM

Secretary Salvador Escudero III, Department of Agriculture, Philippines, officially opened ICLARM's 20<sup>th</sup> anniversary celebrations on 3 September 1997 at the Australia Center, in Manila, with a frank description of ICLARM's trials and successes in getting governments to recognize that aquatic resources were not limitless and needed management. His inspiring words are quoted below.

Ladies and gentlemen,

I am pleased to extend the congratulations of the Government of the Republic of the Philippines to the Trustees and Staff of the International Center for Living Aquatic Resources Management on the occasion of the Center's 20th anniversary.

Over twenty years ago, representatives of the Rockefeller Foundation travelled around the world looking for a home for what was then to become the latest in a series of international centers focused on solving the food problems of the world. The Rockefeller and Ford Foundations, with support from various international organizations and aid agencies, had, by that time, already established several other research centers which had made



a tremendous impact on world food production. Through these centers, located in developing countries around the world, the Green Revolution of the 1960s was launched. But, ladies and gentlemen, that is another story in itself to be told at another time or on another occasion.

The institution for which the Rockefeller Foundation was looking for a home was to be the first resource management center in the world. At a time when fossil fuels were the only resources that world leaders were bent on preserving and managing, the Foundation was already drawing attention to the need to manage the earth's other resources, particularly its living aquatic resources.

At that time, many in the Philippines thought that the bounty of its seas was limitless. Though I was not in government at that time, I think it reasonable for government leaders of the period to have thought that such a center would help the country improve the efficiency of its fish catches to feed a hungry growing population and to earn the foreign exchange needed to keep the economy afloat. Unfortunately, "management" was almost the equivalent of exploitation and efficient exploitation could not be bad for a country with what at that time appeared to be limitless resources. **Like earlier research centers, the new center was expected to aid in increasing the quantities and volumes of fish production.**

Eventually, however, the message trumpeted by this new center was not what many had expected. The scientists of this new center began talking about a pending collapse of fisheries resources not only in the Philippines but elsewhere in the developing world. But how could this be true? All data contradicted with the message — total volumes of fish catches continued to climb each year, the poor continued to trek to the shorelines to make a living from fishing, new technologies for more effective fish catching were being developed and international loans for building new fishing fleets were never easier to obtain.

**This center was telling the developing world something that the governments of the developing world did not want to hear.** If true, this message would complicate the food supply problems of countries like the Philippines who, for many years, wanted to believe that the seas and oceans could limitlessly continue to fill the gap between what agriculture could supply the country and what the growing population truly needed in terms not only of food but also in terms of sources of livelihood for its growing number of poor.

The same thing happened a few years into the existence of the center. In the late 70s and early 80s, the Philippines along with many other developing countries joined the prawn farming bandwagon. The fact that we were an archipelago with a total shoreline longer than that of many other countries and that most of the country had ideal prawn farming conditions was not lost on private entrepreneurs and development agencies. Prawn farming made many people rich in the Philippines. The government was leasing out large areas of shoreline and mangrove areas for conversion to prawn farms. Banks were lending out money for the development and working capital requirements of prawn farmers. Eventually, prawns became a significant export of the country, contributing significant amounts of foreign exchange at a time when the country needed it most.

Here again came ICLARM spreading the message that prawn farming, especially in the intensive manner that Filipino business people decided to go into it, was harmful to the environment and that the high prices paid worldwide for prawn exports could not be sustained. ICLARM had become the messenger of bad news related to fisheries and aquaculture.

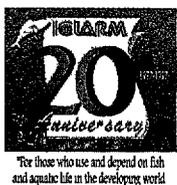
Eventually, the fish catch bubble and the prawn farming bubble burst and government planners and managers regretted not having listened to ICLARM and the scientists, international and Filipino, who had raised the warning flags long before we had any inkling that we actually had very fragile bubbles to take care of.

In a way, these two examples illustrate why, to a certain degree, it has taken ICLARM a little longer than other research institutions to be truly appreciated. As the first resource management center in the world, it was ahead of its time. It talked about sustainable development and resource management long before it became fashionable in international development circles. It was out of place in a world that had focused its attention on the development of technologies to increase crop yields and outputs with little regard to the impact of such intensive farming activities on our fragile ecosystems.

The delayed acceptance of the ICLARM message did not only happen in the Philippines. It also took the Center almost fifteen years to be accepted into the Consultative Group on International Agricultural Research (CGIAR). Its messages about the pending collapse of economically important fisheries resources around the world have been given the worldwide attention and concern they deserved only in the past three years — after a number of key fisheries had indeed collapsed and had indeed threatened world food security.

I am glad and proud to say that it has not been too late for the Philippines to appreciate the message of ICLARM and to work closely with the center in recent years to address many issues important not only to the Philippines but also to many other developing countries around the world. Among the areas that the Philippines has taken great pride in being a research center of ICLARM include:

- Coastal Resources Management and Community-based Management
- Establishment of Marine Parks and Other Marine Protected Areas
- Genetic Improvement of Farmed Tilapias
- Giant Clam Culture and Restocking the Wild
- Coral Reef Health
- Milkfish Economics



Congratulations again on your 20<sup>th</sup> anniversary. We look forward to many more years of fruitful collaboration.

## Celebrating with Our Partners



*Cutting the ribbon to officially open ICLARM's 20th anniversary celebrations are Mr Nicolous Coppel Charge d Affaires of the Australian Embassy, Dr Meryl Williams and Dr Kurt J Peters*

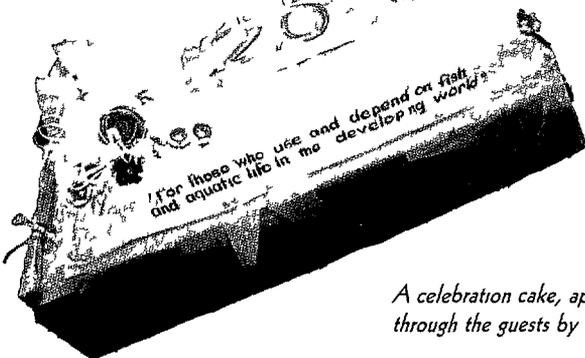
## PRESS RELEASE

In commemoration of the 20<sup>th</sup> anniversary of its incorporation in the Philippines the International Center for Living Aquatic Resources Management (ICLARM) held a month long exhibit at the gallery of the Australian Embassy during 3-30 September 1998

The exhibit was sponsored by the Australian Center for International Agricultural Research (ACIAR) the Australian Embassy in Manila the Royal Netherlands Embassy in Manila the Asian Development Bank and the United Nations Development Programme. It was the first showcase of ICLARM's work through multimedia and included computer models and related software. The display featured a Science Day with presentations of the research by ICLARM's scientists in Ambassadors Day with presentations highlighting ICLARM's past and future research projects and a Students Week for students and researchers. On display was a wide variety of scientific work ranging from genetics research to computer modeling and demonstration of worldwide databases. FishBase and ReefBase are live internet and various ICLARM public relations.

## Opening Night

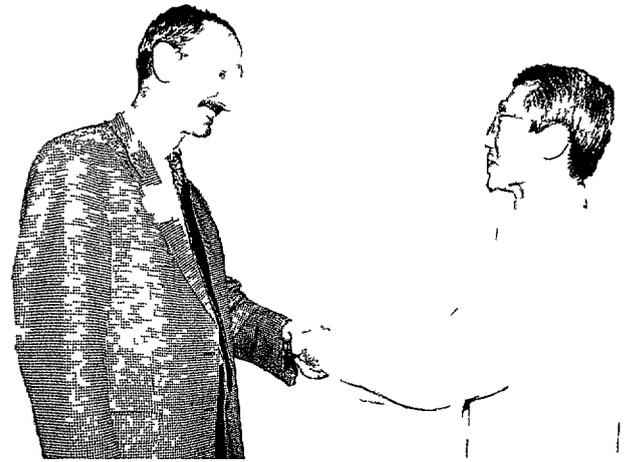
The exhibition of ICLARM's work was officially opened on 3 September 1997 at a cocktail reception at the Australia Center, Manila. Philippine Agriculture Secretary Dr Salvador Escudero III, the Charge d'Affaires of the Australian Embassy's Mr Nicolous Coppel and ICLARM Board Chair Dr Kurt J Peters officiated at the opening. In addressing the guests, Dr Escudero paid tribute to ICLARM's first 20 years of work. He reflected that the importance of ICLARM's work would have been more widely recognized much sooner were it not for the fact that the message the Center often had to deliver was not palatable to governments and fishers at the time, such as on the problems of overfishing and the unsustainability of some forms of shrimp farming. He noted that in the Philippines they were working closely with ICLARM to address fisheries issues important to many developing countries around the world.



*A celebration cake, appropriately wheeled through the guests by a scuba diver*

## Ambassadors' Day

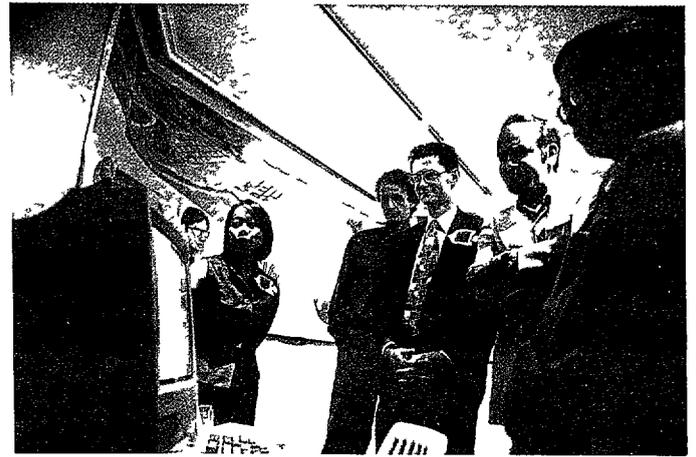
ICLARM held its first Ambassadors' Day to present its achievements during the two decades of its existence, its work in progress and the future directions of its research and development to current and prospective donors. Twelve embassies were represented at the special presentation. Nine ambassadors attended, some accompanied by their spouses. The program ended on an upbeat note with Ambassador Eric TJT Kwint of the Royal Netherlands Embassy speaking on behalf of the diplomatic corps. He called for their support to ICLARM so that it could continue its vital mission of carrying out research and disseminating information for the achievement of sustainable food security and resource conservation.



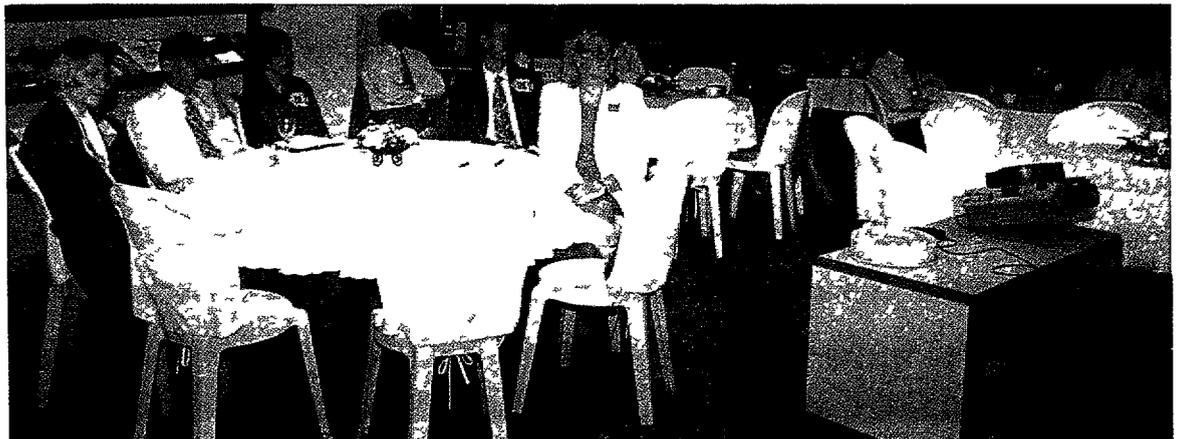
*Japanese Ambassador Hiroyuki Yushita being greeted by Dr Peter Gardiner of ICLARM*



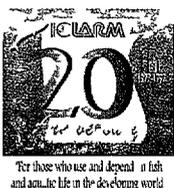
*Bangladeshi Ambassador Reazul Hossain being greeted by ICLARM Director General Dr Meryl Williams*



*(From right) Vietnamese Ambassador Nguyen Thac Dinh, Iranian Embassy Counselor Abul Fazl Tabatabaie, and Australian Ambassador Colin Virtue Bell watching the FishBase CD demonstration by ICLARM scientists Drs Michael Yakily and Deng Palomares*

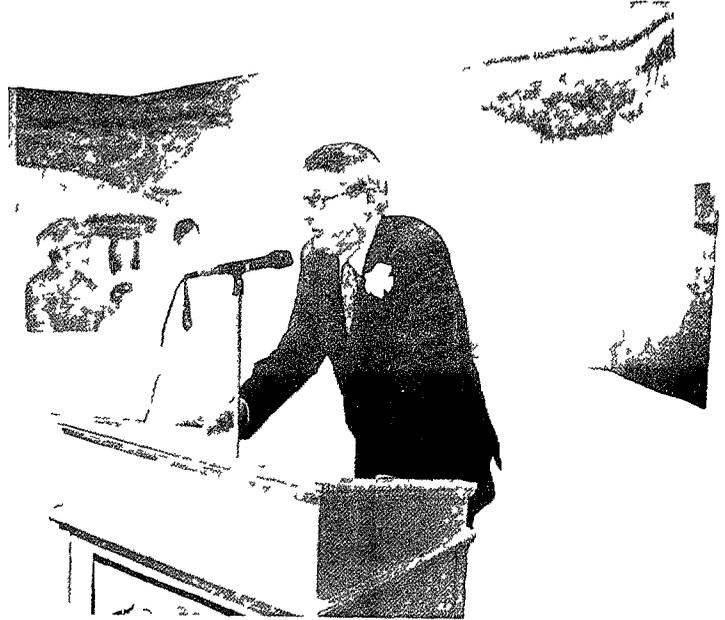


*(From left to right) Director General Dr Meryl Williams (ICLARM), Ambassador Bo Eriksson and Ms Annika Fransson Eriksson (Sweden), Ambassador Colin Virtue Bell (New Zealand), Charge d Affaires of the Australian Embassy Nicolous Coppel, Ambassadors Inga Magistad (Norway), Ambassador Eric TJT Kwint (The Netherlands), Dr Mark Prein (ICLARM), Ms Carleen Kwint (The Netherlands), Dr Madan Dey (ICLARM), Head of the Information Section of Indonesian Embassy Andreas Sitepu, Dr Michael Yakily (ICLARM), Embassy Counselor Abul Fazl Tabatabaie (Iran) and Ambassador Hiroyuki Yushita (Japan) listening intently to a presentation*





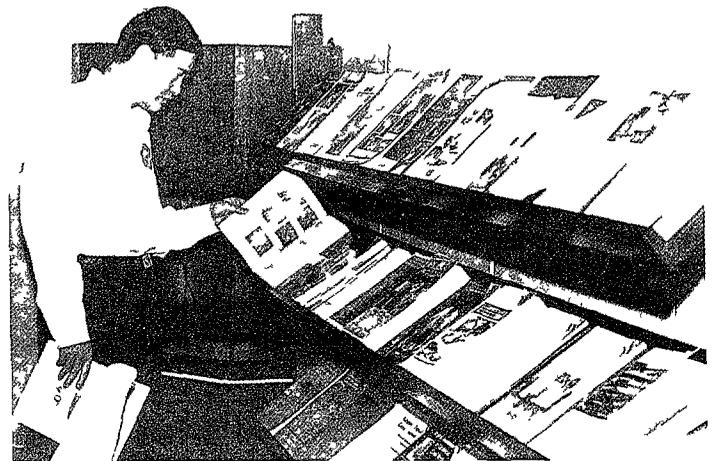
*European Union Ambassador Candido Rodriguez talking with Dr Meryl Williams and ICLARM scientist Dr Michael Vakily*



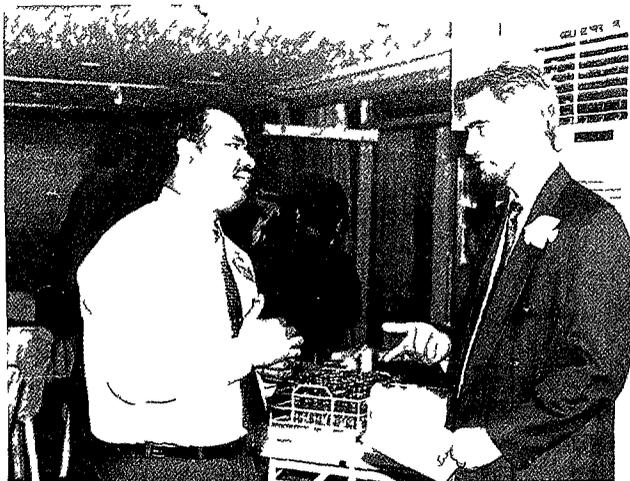
*Ambassador Eric TJT Kwint from the Royal Netherlands Embassy, one of the major sponsors of the exhibition*



*Ambassador Colin Virtue Bell of New Zealand having his name tag pinned by Library and Information Services Unit Manager Linda Temprosa*



*Chinese Ambassador Guan Dengming looking at ICLARM publications*



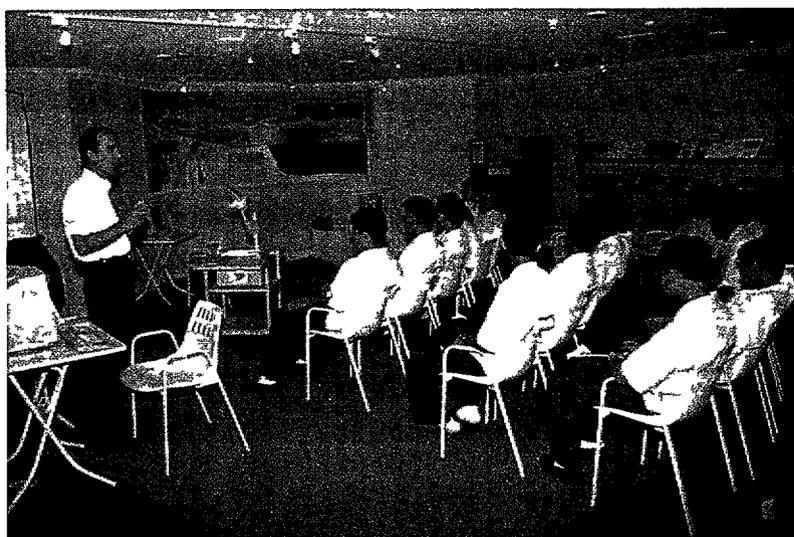
*Head of the Information Section of Indonesian Embassy Andreas Sitepu talking with ICLARM scientist Dr Mark Prein*

## Science Day

A Science Day was organized for selected guests. It featured presentations of ICLARM's research by the scientists. There were 20 guests from Philippine National Agricultural Research Systems (NARS) and the ICLARM Board of Trustees.



*Dr Meryl Williams reflecting on ICLARM's past and its implications for future fisheries science research with guests on Science Day*

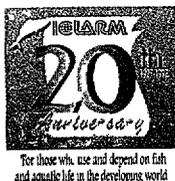


*Dr Villy Christensen making a presentation to students and teachers from Colegio de San Agustin on the importance of fisheries and the role of scientific research in their sustainable development*

## Students' Week

A Students' Week was promoted with tours and presentations for high school and university students and teachers, and some local organizations. Attendees were groups from Philippine Science High School, University of the East, Colegio de San Agustin, Philippine Fisheries Development Authority and the National Power Corporation.

## Reef Spectacular

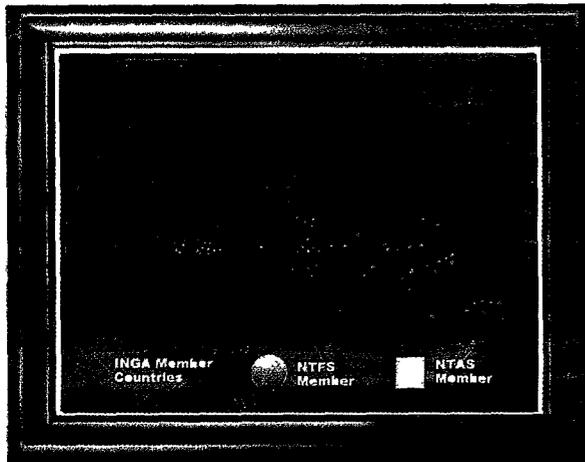


A special International Year of the Reef Day was organized for about 20 selected guests from NARS and the media. Activities included awarding of certificates to the first Aquanaut trainees, launching an underwater video on reefs, and discussions on reef conservation issues.

## On Display and Open to the Public

Outside of these special events, the display was open to the public and included

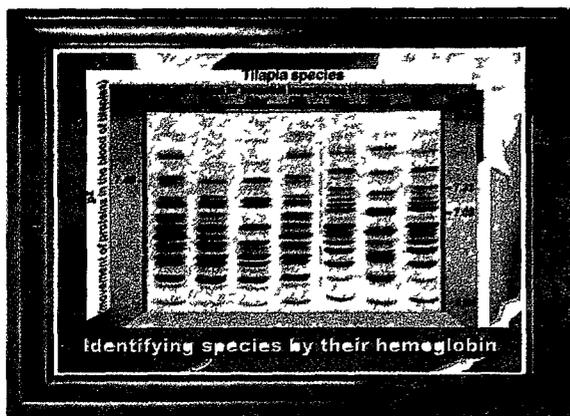
A high impact display of samples of a variety of ICLARM's research, cleverly achieved with dimmed lights, background ocean music and seven slide projectors. Seven lecterns displayed research stories and there was a flyer with more details on each one of them for visitors to take away. The stories included



### ● Strengthening of National Systems

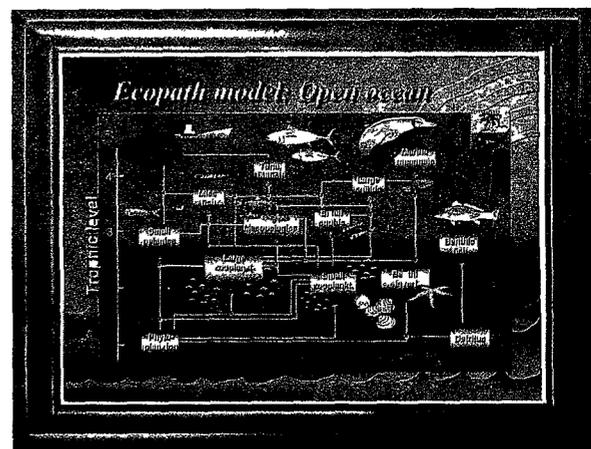
*As part of its strategy for developing and strengthening partnerships with national and international institutions for better management of living aquatic resources world wide, ICLARM currently coordinates two information networks, Network of Tropical Fisheries Scientists (NTFS) and Network of Tropical Aquaculture Scientists (NTAS), and a research network called International Network on Genetics in Aquaculture (INGA)*

*These networks serve as a vehicle by which aquaculture and fisheries scientists from developing countries, advanced scientific institutions and international organizations exchange information and undertake collaborative research projects in genetics, aquaculture and fisheries resources management*



### ● Saving Biodiversity

*ICLARM has developed a biochemical key for tilapia species identification appropriate for use by laboratories in developing countries. Shown in the slide is the characterization of tilapia species by their distinctive hemoglobin separated on a gel by a technique known as isoelectric focusing*



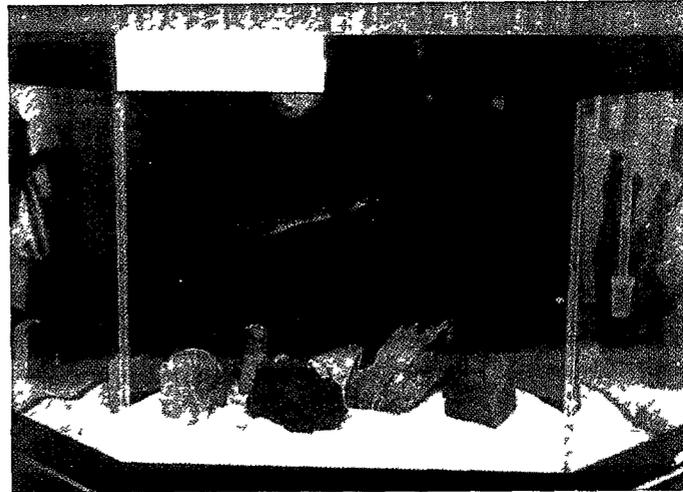
### ● Ecosystem Modeling

*Scientists at ICLARM have developed Ecopath models to describe how living resources interact through feeding and how fisheries impact ecosystems. Ecopath is one of the few methodologies for ecosystem analyses available to scientists working with tropical fisheries. The models can be used to study ecosystem reaction to fishing strategies*

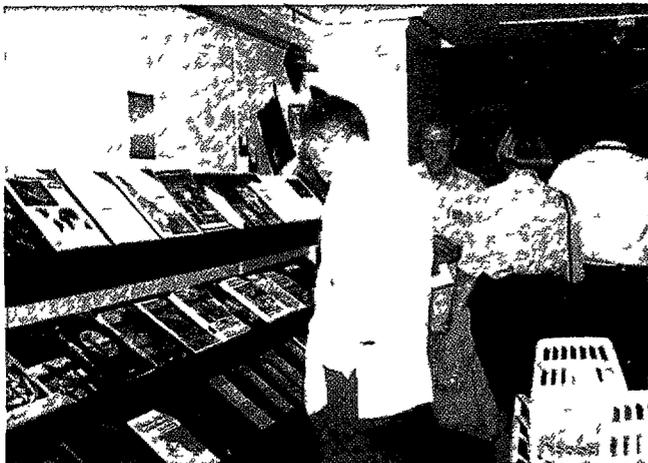




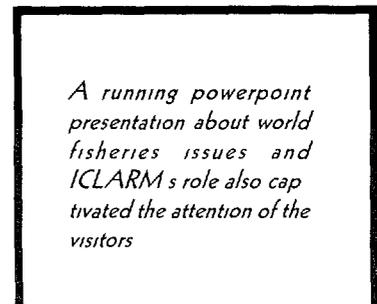
*Front display window was a big attention grabber with a live scuba diver posing with a friendly inflatable shark*



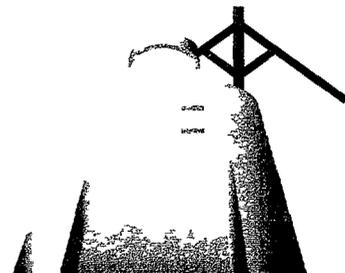
*A live super tilapia genetically bred by ICLARM, was on show. There was also a video of the story of how this tilapia was bred to attain a 60 percent better growth rate and a 50 percent better survival rate.*



*Some of ICLARM's successful publications on display*



*A running powerpoint presentation about world fisheries issues and ICLARM's role also captivated the attention of the visitors*



## Research Highlights



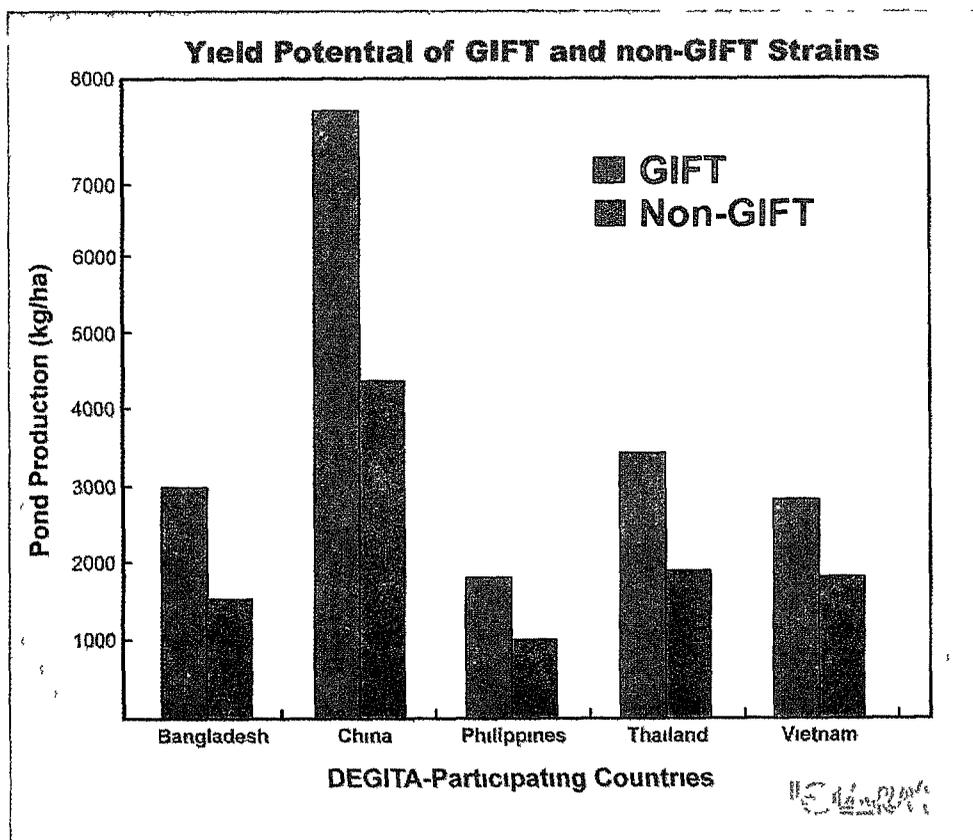
### Better Nutrition and Livelihood for Poor Farmers Through Aquaculture

A multi country effort to transfer the technology and evaluate the potential economic benefits of a new tilapia strain has shown some outstanding results. Development agencies and scientists have worked together with a long term vision which has resulted in a successful culture of fish with higher growth and survival rates, higher yields, lower production costs and high consumer acceptability with no adverse effect on other species. Its implications for small farmers, traders and poor consumers, both in terms of a greater availability of cheaper food and higher incomes, are quite significant.

Tilapia is becoming an important nutritional source for the poorer sections of society in Asia. Production of tilapia in Asia has been growing annually by over 12 percent. More significant is the fact that tilapia is widely farmed in ditches, ponds and cages by thousands of small farmers. For most it provides a very valuable supplementary source of income as well as nutrition. With the widespread dissemination of better culture techniques, the improved availability of fingerlings and the development of marketing channels, tilapia culture has become a profitable commercial activity. Tilapia has a very high degree of consumer acceptance in Asia and is now being introduced successfully into the markets of developed countries.

When selective breeding of Nile tilapia led to the development of a strain (GIFT genetic improvement of farmed tilapias) that significantly outperformed the most widely farmed tilapia strains in Asia, both in terms of growth and survival rates, it was a significant landmark for aquaculture development. This breakthrough was made possible by the long term vision and 10 years of support from the United Nations Development Programme (UNDP) as well as additional support from the Asian Development Bank (ADB) in the early stages.

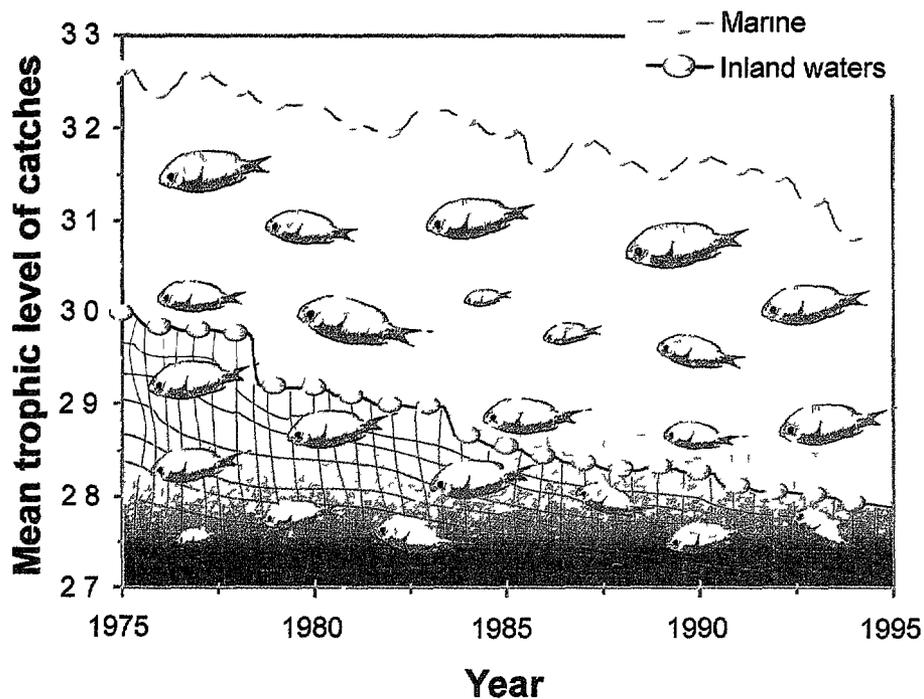
This potential improvement in the productivity and profitability of aquaculture through the scientific efforts of ICLARM and its partners could only be realized if it was tried and tested as widely as possible. The ADB then supported the next step, which was to disseminate the genetically improved tilapia species and evaluate its performance in Bangladesh, China, the Philippines, Thailand and Vietnam, collectively the biggest producers of tilapia species worldwide. In addition to testing whether this promise was achievable by the farmers themselves, the aim was to study the likely economic, social and environmental impact of culturing the new strain on a wide scale and under real life conditions. For this it was important to look at the consumption and production patterns, costs and profitability, marketing channels and the environmental consequences to assess the overall impact of adoption of the new tilapia strain.



The Dissemination and Evaluation of Genetically Improved Tilapia in Asia (DEGITA) study compared the performance of the GIFT strain with other locally popular strains in these five countries and came to some exciting conclusions. **The study found that the GIFT strain has a higher growth rate than local strains, the difference ranging from 18 percent in China to 66 percent in Bangladesh, without any increase in inputs.** This, combined with the somewhat better survival rate, indicates that the yield potential for a given farm area is anywhere between 54 to 97 percent higher, depending on local conditions in these countries. This implies lower per unit cost of production for the farmer – estimated at between 20 to 30 percent lower.

**What is perhaps more significant is the profile of the people engaged in raising tilapia and the main consumers of the fish, as these are the ones likely to benefit most from these improvements.** In all of these countries, tilapia is raised in ditches and ponds by many resource poor farmers. For example, in Bangladesh, the average size of a fish farm is only about 500 m<sup>2</sup>. It provides an important source of food and nutrition for the farmer's family and there is often a surplus for selling to others. Fish producers have a much higher consumption of fish than nonproducers in the poor rural communities. The sale of surplus production also provides extra income to the subsistence farmers. It requires little extra labor and can be managed by the household members themselves. Tilapia farming is also practiced for purely commercial purposes by medium scale farmers. For this group also the study indicates a potential increase in productivity and profitability by switching to the improved strain and therefore an increase in rural incomes.

**Any improvements in productivity and costs are expected to mean increased production and lower prices for the consumer.** Tilapia is consumed by the relatively poor consumers, so the adoption of the GIFT strain is expected to benefit them the most. ICLARM and its partners are justifiably proud of this achievement given their mission to improve the well being and livelihood of poor people in the developing world.



## As You Sow, So Shall You Reap

**E**xploitation of the ocean for fish and marine invertebrates, both wholesome and valuable products, ought to be a prosperous sector, given that capture fisheries in contrast to agriculture and aquaculture reap harvests that did not need to be sown” has been the conventional wisdom, as noted by the authors<sup>1</sup> of “Fishing down marine food webs” Fisheries scientists have, in fact, long disagreed with this view and have held that present patterns of exploitation of marine resources are unsustainable and the world cannot continue to reap what it has not sowed. We cannot continue to harvest the oceans faster than they can regenerate aquatic life.

Total estimated fish catches from natural stock worldwide have increased from around 74 million metric tons annually in 1984 to 84 million metric tons in 1994. So why are alarm bells going off about overfishing, depletion of world fish stocks, and the threat of a gradual loss of this important source of food even as more is required to feed the expanding populations? Are we indeed causing unalterable damage to aquatic ecosystems and destroying this valuable source of food?

<sup>1</sup>Daniel Pauly, Villy Christensen, Johanne Dalsgaard, Rainer Froese and Francisco Torres, Jr. *Science* 279: 860-863

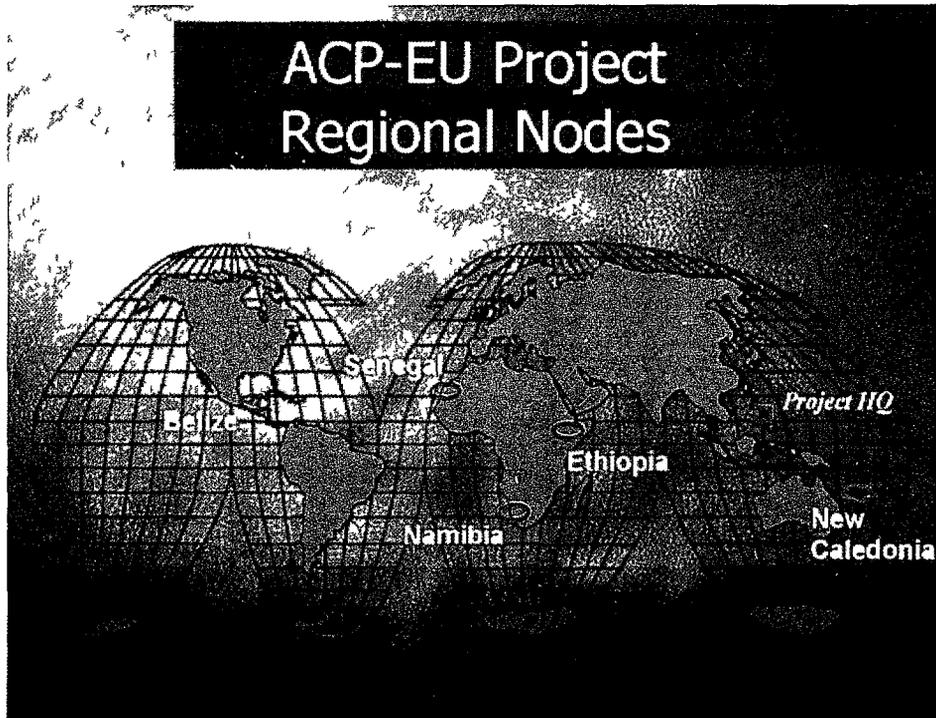
Researchers at ICLARM and the University of British Columbia have carefully documented and analyzed the pattern of world fish harvests since 1950 to show clearly that the wealth of the oceans is not limitless and human interaction with it is definitely causing changes that should be a serious cause for concern. They show that **humans are “fishing down the food web”, changing the marine ecosystem and reducing the amount of higher quality, more desirable food fish available from the oceans**

The feeding or trophic levels within the marine food web has been defined in the range from 1 for planktonic algae at the base of the food chain, to 4.6 for the highest level predator fish. The trophic level, or the position in the food chain, of each group of fish included in the Food and Agriculture Organization of the United Nations (FAO) statistics on global fish landings is defined within this range. When the actual fish catches between 1950 and 1994 were assigned trophic levels according to this definition, the researchers found that the average trophic level of the fish caught showed a declining trend. From an average level of 3.3 in the early 1950s, it has declined to 3.1 in 1994. On the assumption that the fish humans prefer to use are mainly in the 2.5 to 4.6 range, the data indicate a decline of nearly 10 percent of the usable range over the last four decades. **What this means is that though the total weight of fish caught has remained constant, the type of fish caught has deteriorated.** Are we using fish lower down the food chain because there are simply not enough of the top level species to catch? The answer is an unequivocal Yes.

When the analysis was extended to a study of specific fishing areas, it highlighted an even greater cause for concern. Although going down the food web is generally associated with a greater quantity of fish caught, there comes a point in the pattern of overexploitation where the fishery “collapses”, usually caused by a major shift in the ecosystem. Then even fishing lower down the food web results in a lower overall catch. Data from the north Atlantic fisheries, perhaps the longest and most intensively fished area in the world, support this hypothesis.

Fish biologists have been saying for some time that the current patterns of exploitation are unsustainable and stocks of larger and more valuable fish are being seriously depleted. **The study used scientific analysis and an ecosystem approach to provide support to the view that we are moving from long lived piscivorous bottom fish towards short-lived, low trophic level invertebrates and planktivorous pelagic fish.** Though fishing down food webs may initially result in larger catches, it eventually leads to a collapse of the fishery. It concludes that fisheries management should “emphasize the rebuilding of fish populations embedded within functional food webs.”

Given its mandate of improving the management of fisheries through scientific research, ICLARM has already been working on this aspect through its study of the impact of marine protected areas on regeneration of fish stocks and conservation of biodiversity.



## Empowering People to Manage Their Own Resources

**W**hile fish has been widely recognized as an important source of food and nutrition for the poor, it has become apparent that our natural fisheries resources have to be treated with care if fish is to continue to fulfill this role. The limits to fish supply have become so obvious that the need to conserve and manage the resource has become imperative. Many fisheries are facing severe problems, some even of crisis proportions, so it is important to anticipate future supply rather than to react to a crisis after it occurs. **The challenge is to get knowledge of the resource and the skills and tools to manage the resource effectively to all parts of the world so that people have the ability to manage their own fisheries.**

A large scale effort for training in fisheries management and research has been funded by the Commission of the European Communities (EU) for the 50 African, Caribbean and Pacific (ACP) countries that have a special relationship with the EU based on the Lome IV Convention. Its intention is to strengthen the capacity of scientists and scientific institutions in these countries to undertake their own research and to manage their fisheries in an efficient manner.

The approach adopted is to provide information, on the one hand, and modern tools, on the other, to selected key institutions in the countries that will be involved. Five regional nodes will be established, one each in New Caledonia, Namibia, Belize, Ethiopia and Senegal, to cover the ACP countries.

Better management of natural resources requires a knowledge of biodiversity and an understanding of the dynamics of the ecosystem. There is a vast amount of information on this subject that already exists but is not available to the people actually in charge of managing their fisheries in these countries. Data from the archives of several internationally renowned museums will be collected, compiled and made easily accessible. Three of these museums are the Museum National d'Histoire Naturelle, Paris, the Natural History Museum, London, and the Musee Royal de l'Afrique Centrale, Tervuren.

To use the vast and disparate information and data once they have been collated, it will be necessary to have the tools to analyze them. The second element to the approach then is **to provide fisheries scientists with modern concepts and the skills to use them to develop sound advice for fisheries managers**

and software specifically designed and developed for fisheries research and analysis of aquatic ecosystems and, at the same time, will be trained to use them.

In addition to coordinating the project, ICLARM has two of the best developed tools in the field to offer as a major input into this exercise. Its database on fish, FishBase, contains information on more than 20 000 fish species and is the major repository of global information on fish. It provides an excellent structure into which the information now being extracted from museum archives and other sources can be incorporated. The software for using this information as part of a model that takes into account the interrelationships between different parts of an ecosystem, ECOPATH, has also been developed by ICLARM with support from the Danish International Development Assistance (Danida). Scientists in the selected institutions will be trained to use the software, so that they can work with scientific methods which were previously available mainly to scientists in the developed countries.

**The end result of this initiative will be to create a network of regional and transregional cooperation using modern communication facilities, working with well documented and computerized national database on fish biodiversity, and using ecosystem models for analyzing the specific conditions and needs of each country.** These countries will develop their own data systems and will incorporate locally available information into the international databases such as FishBase. This partnership between the EU's plan to bring effective management of fisheries to locally based institutions and ICLARM's expertise in imparting the knowledge and skills will hopefully be the first of many such schemes of taking the task of development and management of aquatic resources to national and local institutions and communities in developing countries – ownership of a system being a key to its success.



## Fish for the Poor - Policies to Achieve This

**S**cientific research is one of the foundations for human progress. But when we begin to build the house, we need many other materials. ICLARM has been looking at how to incorporate its scientific research into the next stage, keeping clearly in mind that the final structure we want is a system which will help to make more fish available to poor people, now and in the future, through better management of fisheries.

In June 1997, Danida helped us bring together some of the key international players to discuss the future course of building up the structure. What directions should ICLARM and its partners be taking in pursuing its mandate?

In addition to scientists from ICLARM, the International Food Policy Research Institute (IFPRI), the Institute for Fisheries Management and Coastal Community Development, the Royal Veterinary Agricultural University (Denmark), FAO, 42 scientists, academicians and policymakers got together for the first time to focus on what could make a coherent and usable framework for fisheries research and development efforts over the next century. The workshop took some of its directions from lessons learned over the last century.

Fisheries science started as a study of marine biology. As the need for managing aquatic resources became apparent, it was recognized that it would also involve managing people, because people fished. Global initiatives like the UN Convention on the Law of the Sea were focused on national and international levels of management but did not provide all the answers. Further progress is being sought through strengthening the role of local institutions and community based management. **The new wisdom is that policy research could explain and provide insights into the missing link between people and resources and bring all these elements together to suggest what might be an effective course of action in the future.**

The Consultation in Denmark concluded that "Fish constitutes an important part of the staple diet and a major source of animal protein in many parts of the world. **Agricultural policy research often ignores the fisheries sector in studies of food and nutritional security of poor people in developing countries.** However, the aquatic systems of the globe have undergone a rapid transition over the past decades, as have the consumption of and trade patterns for fish in both developed and developing countries. These changes raise many relevant policy questions to which research can contribute valuable insights and suggest actions." Priority areas for research that were identified are succinctly stated in *A brief for fisheries policy research in developing countries* that came out of the deliberations. ICLARM has taken its direction from this and will focus its efforts on some of the critical issues that have emerged.

What exactly does sustainability and environmental protection mean in the context of increasing the supply of fish for the poor? To study this ICLARM will take the "total value" approach and look at the real opportunity costs and benefits of aquatic resources in all their alternative uses. How these resources are developed and used will have an effect on the environment and the resource base. Will the poor benefit or the rich, will this generation deprive the future one of a valuable resource? These will be the issues addressed by researchers in helping decisionmakers in choosing between different courses of action in the management of fisheries in developing countries.

**Specifically, ICLARM will collaborate with IFPRI and FAO to incorporate fish into the world food model as fish constitutes about 5 percent of the protein consumed by humans. This will help make fisheries an integral part of overall food policy for developing countries.** ICLARM will look at the demand, supply, marketing and employment in the fisheries sector to identify which management options will benefit the target groups the most. The highly productive ecosystem of the Mekong basin will be a special focus in the near future. With a total catchment area of 800 000 km<sup>2</sup> and providing food, water and economic sustenance to more than 50 million people living there, these wetlands need to be efficiently managed to maximize their economic gains in the long term.

**Fisheries science, sociology, ecology and economics will be brought together to generate action plans for better use of aquatic resources in the future.**



## Fish Travel Too - How Interdependent are Aquatic Systems?

**T**o what extent are reefs capable of self seeding progeny from their own populations? How important is the preservation of coral reefs in one area for the survival of marine species in other areas? Based on scientific evidence, answers to these questions are needed to convince different countries that they must work together in adopting management plans to conserve and maximize the use of these valuable aquatic resources. **National issues often become international concerns, as management plans of one country affect waters of another one**

The MacArthur Foundation's World Environment and Resources Program is bringing together scientists and institutions from several countries to study and demonstrate the extent to which the different coral reef systems and the species dependent on them are interconnected. Six countries, whose populations are heavily dependent on the resources of the South China Sea, will participate in the study. These are Indonesia, Malaysia, the Philippines, the Solomon Islands, Taiwan and Vietnam.

The oceans are a global resource. Overfishing, overexploitation, resource destruction and environmental degradation in any one part affects the health of the other parts of the marine aquatic system. Management of the system and its resources is, therefore, a multinational concern rather than a local or national issue. One of the most "fertile" marine resources is fast being destroyed. The IUCN - the World Conservation Union surveyed the world's coral reefs and concluded that they have been damaged or destroyed in 93 countries.

The South China Sea is an important center of marine biodiversity for the world's oceans and supports tens of thousands of aquatic species, which in turn provide food and livelihood to millions of economically disadvantaged people. Information on current circulation patterns and the amount of time fish and invertebrate larvae remain in the water column before settlement supports the hypothesis that there is a strong connection between different reef systems. **Aquatic organisms travel between these systems and, therefore, the preservation of coral reefs in one area has an impact on marine species in the other.**

Though considerable efforts are being put into the management of the area by various governments and research organizations, the effort needs to be much more collaborative. For this it is important that governments recognize the impact of activities in their areas of responsibility upon the others. This is where science has an important role to play.

**The Population Interdependencies in the South China Sea Ecosystem (PISCES) Project is a regional management effort designed to develop an awareness of the concept of reef biotic interconnectedness and to obtain and disseminate information on how fish stocks in one area are dependent on the others.** Selected reef species from six sites and adjacent areas will be studied to compare the genetic similarity of the species and to determine the range over which populations are interdependent. A model will be developed to quantify the relative exchange of organisms between reefs based on information on three fish species (*Heniochus acuminatus*, *Dascyllus trimaculatus* and *Thalassoma hardwickii*) and one invertebrate (*Linckia laevegata*).

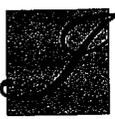
The research project, which is being facilitated by ICLARM, started in January 1997. The collaborating institutions (Environmental Study Center, Pattimura University, Indonesia, Universiti Malaysia Sabah, Malaysia, ICLARM Coastal Aquaculture Centre, Solomon Islands, Institute of Zoology Academia Sinica, Taiwan, Institute of Oceanography, Vietnam) are monitoring the sites regularly and collecting samples for analysis. A laboratory at ICLARM headquarters in the Philippines will screen samples from the six areas for genetic markers. Screening for isozyme markers and buffer systems for two of the four species was completed in 1997. A study of DNA markers will be spearheaded by the Institute of Zoology Academia Sinica in Taiwan. When all the specimens have been tested and the results analyzed, there will be a workshop to discuss the results and to develop methods of disseminating the information to the managers and policymakers responsible for preserving these resources.

## Work in 1997



### Partnerships in Research

"The need for strong national research systems, better utilization of scarce resources, quicker gains from strategic research and matching of complementary skills of agencies, underscores the importance of ICLARM working in partnership with national systems (government and nongovernment organizations), advanced scientific institutions, individual scientists, the private sector and farmers/fishers – *ICLARM policy on partnerships in research and related activities*

 ICLARM's partnerships with various individuals and institutions are continually being formed and strengthened through networking, as exemplified by our collaborative undertakings in research and other research related activities with over 300 partners worldwide for the past 20 years

During an international conference organized in Manila in February 1997 under the ICLARM coordinated International Network on Genetics in Aquaculture (INGA), participants from 13 countries in Asia and Africa unequivocally voiced the need for international networking for advancing the science of fish breeding and genetics. They approved a resolution which they called the "*Manila Resolution for Strengthening Partnerships to Advance the Science of Fish Breeding and Genetics and Development of National Fish*

*Breeding Programs*” (ICLARM Conf Proc 54) The resolution signifies the importance the member country NARS attach to cooperative partnerships

Our partners once again demonstrated that research issues of global and regional importance are better addressed through networking and sharing of benefits rather than working individually, through two regional projects during 1997 (i) Genetic Improvement of Carp Species in Asia, in which Bangladesh, China, India, Indonesia, Thailand and Vietnam are participating, and (ii) Characterization and Documentation of Tilapia Genetic Resources for Aquaculture in Africa, in which Côte d’Ivoire, Egypt, Ghana and Malawi are participating

Through networking, multidisciplinary research teams consisting of biologists and socioeconomists were formed to undertake projects in member countries ICLARM continues to assist partner institutions by providing advice/assistance Some examples are the development of plans and strategies for implementation of national fish breeding programs, as has been done for Indonesia and Vietnam, coordinating exchange of fish germplasm for research studies and initiation of breeding programs, organizing training programs for national scientists, and facilitating information exchange through regular communications among member countries and the publication of *Aquabyte*, *Fishbyte* and the *INGA* and *AFSSRN Newsletters* in *Naga*, the *ICLARM Quarterly*, in which network members publish their research results All these efforts result in fostering better relations among NARS and with ICLARM This is evident from the fact that partner countries are sharing fish germplasm through ICLARM and providing training in areas of their strengths to other NARS ICLARM has also assisted in linking NARS with centers of excellence in developed countries, e g , with the Norwegian Institute of Aquaculture (AKVAFORSK) in the area of genetics research

The information networks, Network of Tropical Aquaculture Scientists (NTAS) and the Network of Tropical Fisheries Scientists (NTFS), which have a membership of over 1 800 scientists from 130 countries, continue to attract new members, especially young scientists from developing countries



*The Chief Minister of Orissa State, India, inaugurates the Planning Workshop of the Regional Collaborative Project on Genetic Improvement of Carp Species in Asia*

## Program/Division Summaries

**1 Biodiversity and Genetic Resources Program (BGRP)** pursues strategic research on fish biodiversity and genetic resources and the development of genetic resources research methods in partnership with international, regional and national agencies and institutions, NGOs, scientists, farmers and fishers to facilitate understanding, use and conservation of biodiversity

### Major Accomplishments

- FishBase 97 released. It now contains information on 17 600 fishes drawn from 12 000 references
- A new project initiated for building up institutional capacity for the scientific management of fish biodiversity and conservation in 55 ACP countries
- Genetic studies begun on the black chinned tilapia in West Africa and the silver barb in Southeast Asia

**2 Germplasm Enhancement and Breeding Program (GEBP)** develops techniques for improving breeds of fish, disseminates these techniques and trains staff in their application

### Major Accomplishments

- Establishment of a foundation in the Philippines for the distribution of genetically improved farmed tilapias (GIFT)
- Dissemination and evaluation of the GIFT strain in Asia
- Initiation of a project on the genetic improvement of carp species in Asia

**3 Integrated Aquaculture-Agriculture Systems Program (IAASP)** aims to improve the productivity of smallholder farms through integration of fish farming and development of methods to assess the sustainability of integrated aquaculture agriculture systems

### Major Accomplishments

- Completion of RESTORE software package. RESTORE is a farm management tool designed to help farmers to optimize the use of farm resources
- Compilation of information on indicators for evaluating the performance of integrated agriculture aquaculture on small farms from a wide range of sources
- Completion of a dynamic simulation model of a Philippine rice fish farming system
- Development of ecoregion specific technologies through on farm, farmer participatory research in Bangladesh continued. Weed based carp polyculture practices successfully developed and tested for high rainfall, flood free, medium high land ecoregion, and prawn carp polyculture practices developed for the low saline coastal areas. Technical support to hatcheries provided

**4 Coastal Aquaculture and Stock Enhancement Program (CASEP)** develops and disseminates profitable village based methods for farming and restocking valuable fisheries species associated with coral reefs, such as giant clams, pearl oysters and sea cucumbers

### **Major Accomplishments**

- Distribution of 70 000 giant clam seed to coastal villagers in the Solomon Islands
- Designing and commissioning of a private hatchery for giant clams, including training of the operators in the larval rearing of giant clams
- Establishing a demonstration pearl farm for developing and disseminating information and technology for commercial farming of the blacklip pearl oyster
- Successful larval rearing of sea cucumbers
- Completion of project on improving the collection and growout of wild spat for the blacklip pearl oyster

**5 Aquatic Environments Program (AEP)** conducts research on ecosystem health and management to improve the conservation of aquatic habitats and the management of coastal zones

### **Major Accomplishments**

- Release of ReefBase 2.0 CD-ROM. It contains information on 7 000 coral reefs
- The ReefBase Aquanaut survey method developed the first batch of aquanauts trained for quick and efficient monitoring of reefs by volunteers
- Completion of the Training for the National Course on Integrated Coastal Management and preparation of the final draft of the "Training manual on integrated coastal management Philippines"
- Establishment of a laboratory for work on genetic markers (primarily isozyme analysis) for the PISCES Project

**6 Fisheries Resources Assessment and Management Program (FRAMP)** seeks better tools and approaches to assess and manage tropical fish stocks, including developing methods for acquiring data for aquatic resources management. Included in this program is a scientific assessment of the role of marine reserves in conservation of biodiversity

### **Major Accomplishments**

- Monitoring of the impact of marine protected areas in the British Virgin Islands and in Jamaica
- Establishing a marine conservation area at the Arnavon Islands, Solomon Islands
- Publication of workshop proceedings Status and Management of Coastal Fisheries in Asia (CP 53) and submission of a project proposal to ADB for carrying out follow up activities based on the outputs of the workshop
- Development of Ecopath with Ecosim. Ecosim, developed by Prof. Carl Walters of the University of British Columbia, Vancouver, Canada, and used for describing ecosystem dynamics, was incorporated in the Ecopath software. The new version of Ecopath makes it possible to simulate the impact of changes in fishing pressure on ecosystems

**7 Policy Research and Impact Assessment Program (PRIAP)** analyzes and evaluates the impact of new techniques, management practices and socioeconomic structures to improve policy decisions aimed at increasing the supply of fish for human consumption and the economic benefits from the fisheries sector

### **Major Accomplishments**

- Completion of several case studies on fisheries co management projects in Asia
- Collaborative development by IFPRI, FAO, NSC, ICLARM and representatives from many countries of future directions for fisheries research in developing countries at a workshop in Denmark
- Assessment of the bangus fry industry in five regions of the Philippines, a final technical report is being prepared with collaborators from SEAFDEC and BFAR
- Development of a conceptual framework on the bioeconomics of giant clam mariculture by ICLARM and the Department of Agricultural and Resource Economics, University of New England, Australia

**8 Information and Training Program (ITP)** disseminates ICLARM's scientific research results to encourage and accelerate their impact. In addition it promotes a wide range of fisheries research and management issues to create a worldwide awareness of global fisheries issues and the importance of the role of science.

### **Major Accomplishments**

- Provision of information and reference services to 2 138 clients
- Publishing of 31 documents, copyediting and clearance of 85 contributions
- Distribution of 17 700 copies of ICLARM publications
- Production and organization of numerous displays including the celebration of ICLARM's 20<sup>th</sup> anniversary and the opening of ICLARM's research site in Egypt
- Initiation of a listserver for translators and related positions in the CGIAR centers
- Detailed planning for updating and developing the ICLARM homepage
- Development of a strategic plan for the Program

**9 International Partnerships and Networks Program (IPNP)** strengthens and creates partnerships with national and international institutions and NGOs through research and information networks to improve management of living aquatic resources.

### **Major Accomplishments**

- Forging new partnerships with several regional and international agencies for research and training activities, namely, Network of Aquaculture Centres in Asia Pacific (NACA), IRRI, and International Service for National Agricultural Research (ISNAR)
- Initiation of the regional Project for Characterization and Documentation of Tilapia Genetic Resources in Côte d'Ivoire, Egypt, Ghana and Malawi
- Signing of a resolution by 13 member countries of INGA for strengthening partnerships to advance the science of fish breeding and genetics and to develop national breeding programs
- Completion of collaborative research on the Dissemination and Evaluation of Genetically Improved Tilapia in Asia (DEGITA)
- Publication of NTAS and NTFS newsletters (*Aquabyte* and *Fishbyte*, respectively) in Naga, the ICLARM Quarterly

**10 Systemwide Initiatives (SWI)** is the coordination of activities with other centers within CGIAR.

### **Major Accomplishments**

- Contribution to several of CGIAR's systemwide activities – provided the Chair of the Systemwide Genetic Resources Program (SGRP), provided outputs of co management research to the Systemwide Initiatives Property Rights and Collective Action (SP-PRCA), contributed to Systemwide Initiative on Water Management (SWIM) and the Gender Program

**11 External Relations Office (ERO)** aims to develop, maintain and enhance ICLARM's relationship with its donors

### **Major Accomplishments**

- Development and implementation of ICLARM's Proposal Development and Clearance Procedure
- Finalization and implementation of the guidelines for the planning, implementation and evaluation of projects
- Coordination of visits by several donors through the year
- Submission of monthly status reports on the Center's project development activities and tracking of submissions

**12 International Relations Office (IRO)** aims to develop, maintain and enhance ICLARM's relationships with its research partners. The activities of IRO are also closely linked with those of IPNP

### **Major Accomplishments**

- Forging of partnerships between Bangladesh, Vietnam, IRRI and ICLARM for research on increasing productivity of fish and rice in flooded ecosystems
- Initiation of the formation of Fisheries Subgroup of the Asia-Pacific Association of Agricultural Research Institutes (APAARI) to develop and enhance regional fisheries and aquaculture research
- Organization of workshop with Philippine institutions to identify priority research areas for collaboration
- Organization of annual meeting of ICLARM Philippine Biosafety Committee to discuss current developments in policies and issues regarding biodiversity and conservation

**13 Corporate Services Division (CSD)** provides operational and logistical support to the Center's units and programs. It also assists the Board of Trustees and Management in developing appropriate policies, procedures and guidelines to ensure transparency and consistency in the Center's operations. It is organized into four units: Human Resources, Finance and Management Information, Program and Administrative Services, and Computer Services

### **Major Accomplishments**

- Development of a new position and salary structure for nationally recruited staff (NRS)
- Conducting the first staff attitude survey at ICLARM
- Negotiating with government agencies to maximize ICLARM's privileges under the host country agreement

- Development of administrative procedures and guidelines to improve delivery of services, e.g., purchasing, transportation, communication, etc
- Setting up of in house travel facility to assist staff in their travel requirements
- Preparation of safety and security guidelines

**14 Office of the Deputy Director General - Africa and West Asia (ODDG-A and WA)** is a regional center focusing on research and training in aquaculture

**Major Accomplishments**

- Official opening of the Abbassa facility as ICLARM's A and WA regional office
- Signing of the host country agreement with the Government of Egypt
- Completion of the first phase of the renovation of the Abbassa facility
- Initiated a research program for the region

**15 Office of the Deputy Director General - Programs (ODDG-P)** oversees the planning, implementation, impact assessment and reporting of ICLARM's scientific programs

**Major Accomplishments**

- Finalization of ICLARM's Medium term Plan for 1998-2000
- In house review of ICLARM's scientific programs
- Convening of an internally commissioned external review of the Integrated Aquaculture Agriculture Systems Program

**16 Office of the Director General (ODG)** carries out the central executive management functions of ICLARM and is responsible for implementing Board policies and advising the Board on management and policy matters

**Major Accomplishments**

- Led the Executive Management Team in carrying out the business of the Center
- Represented ICLARM on top level CGIAR and other bodies

# Research Projects by Program<sup>1</sup>

| TITLE   | DURATION  | DONORS <sup>2</sup>                   | COLLABORATING INSTITUTIONS   |
|---|---|---------------------------------------|--|
| <b>Biodiversity and Genetic Resources Program</b>   |   |                                       |  |
| Strengthening Fisheries and Biodiversity Management in ACP Developing Countries with Further Development of a Biological Database on Fish (FishBase)  | Oct 1988 - Aug 1995<br>Sep 1995 - Nov 1996<br>Dec 1996 - Dec 2000 | EU<br>ICLARM unrestricted funds<br>EU | FAO AFS (American) International Game Fish Association<br>WCMC, Musee Royal de l'Afrique Centrale Tervuren<br>Museum National d'Histoire Naturelle Paris Zoologisches Institut und Zoologisches Museum University of Hamburg<br>Germany MRAG Imperial College England, EPOMEX<br>Universidad Autonoma de Campeche Mexico UBC<br>Canada the national programs of 55 countries in the ACP regions, other institutions and individual researchers |
| Fish Biodiversity in the Coastal Zone A Case Study on the Genetic Diversity (Process of Speciation), Conservation and Sustainable Use in Aquaculture and Fisheries of the Black chinned Tilapia ( <i>Sarotherodon melanotheron</i> ) in West African Coastal Lagoons and Watercourses | Jan 1997 - Dec 1999   | BMZ/GTZ                               | IAB Ghana Zoologisches Institut und Zoologisches Museum Germany  |
| Genetic Diversity of the Silver Barb <i>Puntius gononotus</i> (Bleeker), in Southeast Asia  | Oct 1997 - Sept 2000  | ODA                                   | University of Wales Swansea UK   |
| <b>Germplasm Enhancement and Breeding Program</b>   |   |                                       |  |
| Genetic Improvement of Farmed Tilapias Phase II   | Jan 1993 - Dec 1997   | UNDP/SEED                             | NFFTRC Philippines, BFAR FAC/CLSU, Institute of Aquaculture Research of Norway through NORAGRIC/NORAD  |
| Comparison of the Nutritional Energetics of Two Nile Tilapia Strains An Experimental GIFT Strain and the Widely Farmed Thai Chitlada Strain   | Apr 1995 - Apr 1997   | ODA (holdback funds)                  | AIT Thailand   |
| Prioritization of Carp Genetic Research   | Jun 1997 - May 2000   | ADB                                   | Bangladesh China India Indonesia Thailand and Vietnam (specific institutions to be identified)   |
| <b>Integrated Aquaculture Agriculture Systems Program</b>   |   |                                       |  |
| Integrated Resources Management Group and Development of RESTORE Software   | Ongoing since 1991  | ICLARM unrestricted funds             | IIRR ICLARM outreach teams and national collaborators in Bangladesh Malawi Vietnam and other countries   |
| Research for Development of Sustainable Aquaculture Practices   | Jun 1993 - Dec 1999   | USAID                                 | FRI Bangladesh various NGOs  |
| A Modeling Approach to the Determination of Ecological Sustainability in Integrated Agriculture Aquaculture Farming Systems   | May 1994 - May 1996   | Danida                                | RVAU, national institutions in the Philippines   |

<sup>1</sup> See list of acronyms on p. 90

<sup>2</sup> Programs receive funding from ICLARM's unrestricted funds

Research Projects continued

| TITLE  | DURATION                                | DONORS <sup>2</sup>  | COLLABORATING INSTITUTIONS  |
|--|---|--|---|
| Development of Sustainability Indicators for Integrated Agriculture Aquaculture Farming Systems  | Oct 1994 Dec 1998                       | BMZ/GTZ  | University of Kassel (GHK) Germany national institutions in the Philippines and Vietnam   |
| Aquaculture Research and Development for Smallholder Farms in Southern Africa  | Ongoing since Jan 1996                  | ICLARM unrestricted funds  | Malawi Fisheries Department Malawi Ministry of Agriculture and Livestock Development University of Malawi MAGFAD  |
| Upland Integrated Aquaculture Agriculture Systems in Forest Buffer Zone Management   | Jul 1996 Jun 1997 extended to Dec 1997  | Philippines/Germany CFPQ BMZ/GTZ                                 | CFPQ DENR PO of Baguio Village and Don Maranon Perez Philippines  |
| Research Programme on Increasing and Sustaining the Productivity of Fish and Rice in the Flood Prone Ecosystems of South and Southeast Asia (Bangladesh and Vietnam) | Apr 1997 Mar 2000                       | IFAD Ford Foundation   | FRI BRRI Proshika Bangladesh Research Institute for Aquaculture No I and No II Vietnam Agricultural Science Institute Cantho University IRRI  |
| <b>Coastal Aquaculture and Stock Enhancement Program</b>   |   |  |   |
| Biotechnical Systems for Cultivation of Giant Clams  | Since 1987 this phase Jul 1995 Dec 1999 | ACIAR EU FAO South Pacific Aquaculture Development Program ESCAP | MAF Solomon Islands JCU   |
| Development of Small Scale Village Farms for Blacklip Pearl Oysters in Solomon Islands Using Wild Spat   | Nov 1995 Nov 1997                       | ACIAR  | MAF Solomon Islands JCU Cook Islands Ministry of Marine Resources US Peace Corps  |
| Development of Methods for the Mass Rearing of Tropical Sea Cucumbers to Enhance Wild Stocks   | Since 1993 this phase Jan 1995 Dec 1999 | ACIAR  | MAF Solomon Islands Advisory Panel from ASI s in Australia coordinated by ACIAR   |
| <b>Aquatic Environments Program</b>  |   |  |   |
| ReefBase A Global Database on Coral Reefs and Their Resources  | Jan 1997 Dec 1997                       | SIDA   | WCMC URI GCRMN, WRI NCAR NASA Johnson Space Center  |
| Population Interdependencies in the South China Sea Ecosystems   | Jan 1997 Jun 1999                       | MacArthur Foundation   | University of Malaysia Sabah Malaysia Institute of Zoology Academia Sinica Taipei Department of Marine Living Resources Institute of Oceanography Vietnam Environmental Study Center Pattimura University Indonesia |
| Development of a Broad based Coastal Management Training Program in the Philippines  | Jan 1997 Dec 1997                       | Rockefeller Brothers Fund through Haribon Foundation             | Haribon Foundation PCAMRD DENR BFAR IIRR  |
| <b>Fisheries Resources Assessment and Management Program</b>   |   |  |   |
| Caribbean Marine Protected Areas Project The Role of Marine Protected Areas in Fisheries Management and Biodiversity Conservation in Coral Reef Ecosystems           | Jan 1996 Dec 1999                       | ADB (Jamaica component) UK ODA (BVI component)                   | Center for Marine Sciences University of the West Indies Jamaica Conservation and Fisheries Department BVI  |

<sup>2</sup> Programs receive funding from ICLARM's unrestricted funds

Research Projects continued

| TITLE   | DURATION           | DONORS <sup>2</sup>              | COLLABORATING INSTITUTIONS  |
|---|--------------------|----------------------------------|---|
| Testing the Use of Marine Protected Areas to Manage Fisheries for Tropical Coral Reef Invertebrates Arnavon Islands | Oct 1994 Feb 1999  | ACIAR                            | GBRMPA, MAF, Ministry of Forests Environment and Conservation, Solomon Islands, TNC   |
| Tropical Fish Stock Assessment  | Ongoing since 1979 | ICLARM unrestricted funds        | Predominantly in house studies with informal linkages with various research institutions  |
| Modeling of Multispecies Fisheries  | Feb 1990 Jan 1998  | Danida ICLARM unrestricted funds | NSC, Fisheries Centre UBC   |
| Regional Technical Assistance on the Sustainable Exploitation of Tropical Coastal Fish Stocks in Asia               | Feb 1996 May 1997  | ADB                              | Fisheries agencies in various DMC of ADB namely Bangladesh Indonesia Malaysia, Philippines, Sri Lanka, Thailand and Vietnam   |
| <b>Policy Research and Impact Assessment Program</b>  |                    |                                  |   |
| Fisheries Co Management Project   | Apr 1994 Dec 1998  | Danida                           | NSC, Vietnam Ministry of Fisheries, National Center for Social Sciences CTU, Thailand DOF, Kasetsart University, PSU, Malaysia Universiti Pertanian Malaysia, Indonesia RIMF, DGF, Indonesian Fisheries Socionomic Research Network, Philippines SEAFDEC/AQD, UP College of Public Administration, DENR, Southeast Asian Ministers of Education Organization SEARCA, TDC, UPV, Mozambique IDPPE, Zimbabwe Center for Applied Social Sciences University of Zimbabwe Lake Kariba Fisheries Research Institute, Malawi Fisheries Department, Chancellor College, West Africa Program for Integrated Development of Artisanal Fisheries, Zambia DOF, South Africa University of Cape Town, Sea Fisheries Research Institute, Caribbean CARICOM FRAMP |
| Valuation of Reef Systems   | Dec 1997 Dec 1998  | ICLARM unrestricted funds        | UP and others to be identified  |
| Policy Research on User Based Management The Case of Inland Openwater Fisheries of Bangladesh                       | Jul 1995 Jun 1998  | Ford Foundation                  | DOF Bangladesh, Caritas Proshika Manobik Unnayan Kendra, BRAC, Banchte Shekha, CRED   |
| Legal and Institutional Analysis of Coastal Resources Co Management   | Oct 1996 Sep 1998  | SIDA                             | DENR Philippines Continental Shelf Committee, Vietnam Bangladesh Environmental Lawyers Association, Office of the State Minister for Environment, Indonesia, PSU Thailand, Wetlands International, Cambodia   |
| Evaluation of the Performance of Fisheries Co Management Institutions   | Nov 1996 Oct 1998  | Ford Foundation                  | Yayasan Hualopu Universiti Pattimura Indonesia  |
| Institutional Capacity Building for Community Based Fisheries Management in Bangladesh                              | Jan 1997 Dec 1999  | Ford Foundation                  | DOF Bangladesh Caritas Proshika Manobik Unnayan Kendra BRAC Banchte Shekha CRED TDC   |
| Impact of Giant Clam Productivity Enhancement Research  | Oct 1997 Sep 1998  | ICLARM unrestricted funds        | DARE UNE  |
| Socioeconomic Impact of Fish Culture Extension on the Farming Systems of Bangladesh                                 | Jul 1996 Jun 1998  | IFAD                             | DOF Bangladesh  |
| Socioeconomic Component of the Project Support Strengthening the Institutional Capacity for Sustainable Aquaculture | Sep 1994 Dec 1997  | FCRI/HAKI Hungary                | Faculty of Fisheries, CTU AFSSRN SEAFDEC/AQD  |

<sup>2</sup> Programs receive funding from ICLARM's unrestricted funds

Research Projects continued

| TITLE  | DURATION               | DONORS <sup>2</sup>              | COLLABORATING INSTITUTIONS   |
|--|------------------------|----------------------------------|--|
| <b>Development in the Southern Part of Vietnam</b>   |                        |                                  |  |
| Bangus Fry Resource Assessment Project   | Mar 1996 - Dec 1998    | BFAR PCAMRD                      | BFAR PCAMRD SEAFDEC  |
| Socioeconomic and Policy Analysis of Freshwater Capture Fisheries of Cambodia Training Data Analysis and Report Presentation | Oct 1996 - May 1998    | MRC                              | DOF Cambodia MRC   |
| International Consultation on Fisheries Policy Research in Developing Countries Issues, Priorities and Needs                 | Jan 1997 - Dec 1998    | Danida                           | IFPRI IFM NSC Royal Veterinary and Agricultural University (RVAU) Denmark  |
| Database for the Assessment of Developing Country Fisheries  | Ongoing since Jul 1997 | ICLARM unrestricted funds        | FAO INFOFISH NACA and others to be identified  |
| <b>International Partnerships and Networks Program</b>   |                        |                                  |  |
| Network of Tropical Fisheries Scientists   | Ongoing since Apr 1982 | FAO ICLARM unrestricted funds    | FAO/DANIDA Training Course in Tropical Stock Assessment  |
| Network of Tropical Aquaculture Scientists   | Ongoing since Jul 1987 | ICLARM unrestricted funds        | —  |
| Asian Fisheries Social Science Research Network  | Ongoing since 1983     | ICLARM unrestricted funds        | AFS (Asian) Indonesia Faculty of Economics Universitas Diponegoro CRIFI RIMF Malaysia Faculty of Economics and Administration UM Natural Resource Economics Department Universiti Pertanian Malaysia Philippines BFAR FAC/CLSU SEAFDEC/AQD Department of Agricultural Economics College of Economics and Management UPLB Faculty of Arts and Sciences in the Visayas Thailand Fisheries Economics Research Sub division DOF DARE Faculty of Economics and Business Administration Kasetsart University Coastal Resources Institute PSU Vietnam MOF CTU |
| International Network on Genetics in Aquaculture   | Ongoing since Aug 1993 | Norway ICLARM unrestricted funds | FRI Bangladesh Department of Aquaculture Shanghai Fisheries University China Fish Research Center Cote d'Ivoire National Aquaculture Research Center Egypt Ministry of Agriculture Fisheries and Forestry Fiji IAB Ghana Central Institute for Freshwater Aquaculture India Central Research Institute for Fisheries Indonesia University of Malawi Fisheries Department UM Malaysia AKVAFORSK Norway BFAR FAC/CLSU Philippines NAGRI Thailand Research Institute for Aquaculture No. 1 and No. 2 Vietnam  |
| Dissemination and Evaluation of Genetically Improved Tilapia Species in Asia   | Jun 1994 - Jun 1997    | ADB                              | FRI Bangladesh Shanghai Fisheries University China BFAR Philippines NAGRI Thailand Research Institute for Aquaculture No. 1 and No. 2 Vietnam  |
| International Partnerships   | Ongoing since 1996     | ICLARM unrestricted funds        | Regional and national research institutions  |

<sup>2</sup> Programs receive funding from ICLARM's unrestricted funds

## Published Works

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- Ahmed, M. Fish for the poor under a rising global demand and changing fishery regime  
Naga, ICLARM Q (Suppl ) July/December 4-7
- Ahmed, M and R A V Santos, Editors. International Consultation on Fisheries Policy  
Research in Developing Countries. Issues, Priorities and Needs. Naga, ICLARM  
Q (Suppl ) July/December 3
- Ahmed, M , C Delgado and S Sverdrup-Jensen. A brief for fisheries policy research in  
developing countries. 16 p
- Ahmed, M , R A V Santos, M C Balgos, C M V Casal, L R Garces and M L  
Tungala. Toward guidelines on running multi-country, multi-site projects. ICLARM  
Conf Proc 55, 13 p
- Barut, N C , M D Santos and L R Garces. Overview of Philippine marine fisheries, p  
62-71. *In* G Silvestre and D Pauly (eds ) Status and management of tropical  
coastal fisheries in Asia. ICLARM Conf Proc 53
- Brummett, R E. ICLARM's approach to integrated resource management in Africa, p  
33-35. *In* J H Annala (ed ) Fisheries and aquaculture research planning needs for  
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- Fisheries Co Management News. Issues 5 and 6. January and August
- Froese, R and D Pauly, Editors. FishBase 97. concepts, design and data sources. Two  
CD-ROM and one user's manual. 256 p
- Gayanilo, FC , Jr , G Silvestre and D Pauly. User's guide to BRUN, a decision sup-  
port system and teaching tool for managing the coastal resources of Brunei Darussalam.  
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- Gayanilo, FC , Jr , T Strømme and D Pauly. Toward a generic trawl survey database  
management system, p 116-132. *In* G Silvestre and D Pauly (eds ) Status and  
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- Gupta, M V , M M Dey, R Dunham and G Bimbao. Proceedings of the collaborative  
research and training on genetic improvement of carp species in Asia. ICLARM  
Work Doc 1<sup>1</sup>
- ICLARM 1997 Operational Plan. 150 p
- ICLARM Annual Report 1996. 94 p
- ICLARM ReefBase 2.0 (brochure)
- ICLARM The ReefBase aquanaut survey method (brochure)

<sup>1</sup>ICLARM's Working Document series consists of unpublished documents that are considered significantly important to be formally recorded and available outside ICLARM and the organizations of the other authors. These documents have not been through a full editorial and review process.

- International Network on Genetics in Aquaculture Manila Resolution strengthening partnerships to advance the science of fish breeding and genetics and development of national fish breeding programs ICLARM Conf Proc 54, 12 p
- Lightfoot, C , S Feldman and M Zainul Abedin Foyers ruraux, ecosystèmes agricoles et gestion des ressources rurales ICLARM Educ Ser 12, 80 p (Catherine Lhomme Binudin, translator)
- McManus, J W Ecological community structure analysis applications in fisheries management, p 133 142 /n G Silvestre and D Pauly (eds ) Status and management of tropical coastal fisheries in Asia ICLARM Conf Proc 53
- McManus, J W The world's coral reefs hope for the future (brochure) 6 p
- McManus, J W and M C Ablan, Editors ReefBase a global database of coral reefs and their resources 194 p
- McManus, J W , M C A Ablan, S G Vergara, L A B Meñez, B M Vallejo, K PK Reyes, M L G Gorospe and L Halmarick The ReefBase aquanaut survey manual Educ Ser 18, 61 p
- Munro, J L ICLARM's research on coral reef resources systems, p 13 14 /n J H Annala (ed ) Fisheries and aquaculture planning needs for Africa and West Asia ICLARM Conf Proc 50
- Naga, the ICLARM Quarterly April June 1997 Vol 20, No 2 78 p
- Naga, the ICLARM Quarterly January March 1997 Vol 20, No 1 72 p
- Newsplash, the monthly staff newsletter of ICLARM January December 1997 Vol 5, Nos 1 11
- Palomares, M L D , L R Garces, Q P Sia, II and M J M Vega Diet composition and daily ration estimates of selected trawl caught fishes in San Miguel Bay Naga, ICLARM Q 20(2) 35 40
- Pauly, D and FC Gayanilo, Jr Yield per recruit analyses, p 112 120 /n R Froese and D Pauly (eds ) FishBase 97 concepts, design and data sources
- Pauly, D , FC Gayanilo, Jr and G Silvestre A low level geographic information system for coastal zone management, with applications to Brunei Darussalam Part I The concept and its design elements Naga, ICLARM Q 20(2) 41 45
- Pauly, D , J Moreau and FC Gayanilo, Jr Auximetric analyses, p 105 109 /n R Froese and D Pauly (eds ) FishBase 97 concepts, design and data sources
- Prein, M Partnership between national aquatic research systems (NARS) and ICLARM in Africa, p 65 68 /n J Annala (ed ) Fisheries and aquaculture research planning needs for Africa and West Asia ICLARM Conf Proc 50
- Pullin, R S V International concerns on fish biodiversity and genetic resources management, p 1 2 /n R S V Pullin, C M V Casal, E K Abban and T M Falk (eds ) Characterization of Ghanaian tilapia genetic resources for use in fisheries and aquaculture ICLARM Conf Proc 52

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- ReefBase a global database of coral reefs and their resources Ver 2 0 CD ROM
- Renwranz, L, T M Falk, O Hallas and W Villwock On the species-specific composition of molecules from muscle and blood of specimens of the tilapia group, p 6-11 /n R S V Pullin, C M V Casal, E K Abban and T M Falk (eds) Characterization of Ghanaian tilapia genetic resources for use in fisheries and aquaculture ICLARM Conf Proc 52
- Silvestre, G and D Pauly, Editors Status and management of tropical coastal fisheries in Asia ICLARM Conf Proc 53, 208 p
- Silvestre, G and D Pauly Management of tropical coastal fisheries in Asia an overview of key challenges and opportunities, p 8-25 /n G Silvestre and D Pauly (eds) Status and management of tropical coastal fisheries in Asia ICLARM Conf Proc 53
- Silvestre, G and D Pauly Synopsis and recommendations of the ADB/ICLARM Workshop on Tropical Coastal Fish Stocks in Asia, p 1-7 /n G Silvestre and D Pauly (eds) Status and management of tropical coastal fisheries in Asia ICLARM Conf Proc 53
- Vakily, J M, R Froese, M L D Palomares and D Pauly A European Union project to strengthen fisheries and biodiversity management in African, Caribbean and Pacific (ACP) countries Naga, ICLARM Q 20(1) 4-7

## Published Outside ICLARM

### Refereed

- Ahmed, M, A D Capistrano and M Hossain Experience of partnership models for the co-management of Bangladesh fisheries Fish Manage Ecol 2(3) 233-248
- Balgos, M C Artificial reefs in the Philippines a policy analysis, p 1987-1990 /n H A Lessios and I G Macintyre (eds) Proceedings of the Eighth International Coral Reef Symposium Smithsonian Tropical Research Institute, Balboa, Panama
- Bell, J D, A M Hart, T P Foyle, M Gervis and I Lane Can aquaculture help restore and sustain production of giant clams?, p 509-513 /n D A Hancock, D C Smith, A Grant and J P Beumer (eds) Developing and sustaining world fisheries resources the state of science and management CSIRO Publishing, Victoria, Australia
- Bell, J D, I Lane, M Gervis, S Soule and H Tafea Village-based farming of the giant clam, *Tridacna gigas* (L), for the aquarium market initial trials in Solomon Islands

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- Brummett, R E Production of *Tilapia rendalli* in weedy ponds receiving no external inputs  
Malaŵi J Sci Technol 3:37-48
- Capistrano, A D, M Hossain and M Ahmed Poverty alleviation, empowerment and sustainable resource use: experiments in inland fisheries management in Bangladesh, p 141-162 /in F Smith (ed) Environmental sustainability: practical global implications St Lucie Press, Boca Raton, Florida
- Coronado, G U and J W McManus Mapper: a mapping tool for database systems with coral reef applications, p 1561-1564 /in H A Lessios and I G Macintyre (eds) Proceedings of the Eighth International Coral Reef Symposium Smithsonian Tropical Research Institute, Balboa, Panama
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- Eakin, C M, J W McManus, M D Spalding and S C Jameson Coral reef status around the world: where are we and where do we go from here?, p 277-282 /in H A Lessios and I G Macintyre (eds) Proceedings of the Eighth International Coral Reef Symposium Smithsonian Tropical Research Institute, Balboa, Panama
- Foyle, T P, J D Bell, M Gervis and I Lane Survival and growth of juvenile fluted giant clams, *Tridacna squamosa*, in large scale village grow-out trials in the Solomon Islands Aquaculture 148:85-104
- Froese, R An algorithm for identifying misspellings and synonyms in lists of scientific names of fishes Cybium 21(3) 265-280
- Froese, R FishBase: a database with key information on coral reef fishes, p 1545-1548 /in H A Lessios and I G Macintyre (eds) Proceedings of the Eighth International Coral Reef Symposium Smithsonian Tropical Research Institute, Balboa, Panama
- Gorospe, M L and R B Pollnac The tabao of Atulayan: communal use of private property in the Philippines, p 13-26 /in R B Pollnac and J J Poggie (eds) Fish aggregating devices in developing countries: problems and perspectives International Center for Marine Resource Development, Kingston, Rhode Island
- Grice, A M and J D Bell Enhanced growth of the giant clam *Tridacna derasa* (Roding 1798) can be maintained by reducing the frequency of ammonium supplements J Shellfish Res 16(2) 523-525
- Lincoln Smith, M P, J D Bell and B D Mapstone Testing the use of a marine protected area to restore and manage invertebrate fisheries at the Arnavon Islands, Solomon Islands: choice of methods and preliminary results, p 1937-1942 /in H A Lessios and I G Macintyre (eds) Proceedings of the Eighth International Coral Reef Symposium Smithsonian Tropical Research Institute, Balboa, Panama
- McManus, J W Tropical marine fisheries and the future of coral reefs: a brief review with emphasis on Southeast Asia, p 129-134 /in H A Lessios and I G Macintyre (eds) Proceedings of the Eighth International Coral Reef Sympo

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- McManus, J W and M C Ablan ReefBase a global database of coral reefs and their resources, p 1541-1544 *In* H A Lessios and I G Macintyre (eds) Proceedings of the Eighth International Coral Reef Symposium Smithsonian Tropical Research Institute, Balboa, Panama
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- Ruddle, K and M Prein Assessing the potential nutritional and household economic benefits of developing integrated farming systems, p 111-121 *In* J A Mathias, A T Charles and H Baotong (eds) Integrated fish farming Proceedings of a Workshop on Integrated Fish Farming held in Wuxi, Jiangsu Province, People's Republic of China, 11-15 October 1994 CRC Press, Boca Raton 420 p
- Sunderlin, W D and M L Gorospe Fishers' organizations and modes of co management the case of San Miguel Bay, Philippines *Hum Org* 56(3) 333-343

- Vallejo, B Survey and review of the Philippine marine aquarium fish industry, p 1981-1984 /in H A Lessios and I G Macintyre (eds ) Proceedings of the Eighth International Coral Reef Symposium Smithsonian Tropical Research Institute, Balboa, Panama
- Walters, C , V Christensen and D Pauly Structuring dynamic models of exploited ecosystems from trophic mass-balance assessments Rev Fish Biol Fish 7(2) 139-172
- Williams, M J Aquaculture and sustainable food security in the developing world, p 15-51 /in J E Bardach (ed ) Sustainable aquaculture Wiley, New York

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- Ablan, M C Corals in danger Agriscope 11(5) 11-14
- Bell, J D , I Lane and A Hart Culture, handling and air transport of giant clams from the South Pacific, p 60-66 /in B Paust and J B Peters (eds ) Marketing and shipping live aquatic products Northeast Region Agricultural Engineering Services, New York
- Brummett, R E Farming fish to save water (Letter to the editor) Bioscience 47(7) 402
- Brummett, R E Production of *Tilapia rendalli* fingerlings under Malawian smallholder conditions, p 273-286 /in K Fitzsimmons (ed ) Tilapia aquaculture proceedings from the Fourth International Symposium on Tilapia in Aquaculture, 9-12 November 1997 NRAES 106
- Chikafumbwa, F K J Fish culture in rainfed pools in Malawi SADC Nat Resour 8 2
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- Christensen, V and R Mahon Researchable issues relevant for management of large marine ecosystems, with special reference to the Caribbean, p 79-100 /in ACP-EU Fisheries research initiative Proceedings of the Third Dialogue Meeting, Caribbean and Pacific and the European Union, Belize City, 5-10 December 1996 ACP-EU Fish Res Rep 3
- Dalsgaard, J P T Tracking nutrient flows in a multi enterprise farming system with a mass balance model (ECOPATH), p 325-343 /in R A Morris (ed ) Managing soil fertility for intensive vegetable production systems in Asia Proceedings of an International Conference, 4-10 November 1997, Taiwan AVRDC Publ No 97-469, 346 p
- Dalsgaard, J P T and V Christensen Flow modeling with ECOPATH providing insights on the ecological state of agroecosystems, p 203-212 /in P S Teng, M J Kropff, H F M ten Berg, J B Dent, F B Lansigan and H H van Laar (eds ) Applications of systems approaches at the farm and regional level Kluwer Academic Publishers, Dordrecht
- Gayaniño, F C Jr and D Pauly FAO ICLARM Fish Stock Assessment (FISAT) refer

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- Jarre-Teichmann, A and V Christensen Comparative modeling of trophic flows in four large upwelling ecosystems global vs local effects, p 423 443 /in M H Durand, P Cury, R Mendelsohn, C Roy, A Bakun and D Pauly (eds) Global vs local changes in upwelling ecosystems Proceedings of the First CEOS Symposium, 5-9 September 1994, Monterey, California
- Kesner, K N ReefBase accessing global data on coral reefs Asian Diver 5(5) 35-36
- Lavapie-Gonzales, F, S R Ganaden and FC Gayanilo, Jr Some population parameters of commercially-important fishes in the Philippines Bureau of Fisheries and Aquatic Resources 114 p
- Prein, M, C Lightfoot and R S V Pullin ICLARM's approach to the integration of aquaculture into sustainable farming systems, p 117 125 /in Proceedings of the Regional Study and Workshop on Aquaculture Sustainability and the Environment Network of Aquaculture Centers in Asia, Bangkok (In press)
- Pullin, R S V, M L Palomares, C V Casal, M M Dey and D Pauly Environmental impacts of tilapias, p 554 570 /in K Fitzsimmons (ed) Tilapia aquaculture proceedings from the Fourth International Symposium on Tilapia in Aquaculture NRAES 106
- Tripathi, S D and D Mazumder Low cost sustainable aquaculture system, p 152 154 /in BARRA, CARE and IIRR, Small-scale aquaculture in Bangladesh an information kit Bangladesh Rural Reconstruction Association, Dhaka
- Tripathi, S D, M A Mazid and D Mazumder On farm seed production of a small indigenous species, *Cirrhinus reba* (Ham), for aquaculture and biodiversity conservation, p 79 84 /in R A Felts, K Ahmed and M Akhteruzzaman (eds) Proceedings of the National Workshop on Small Indigenous Fish Species Culture in Bangladesh, Rajshahi, Bangladesh BARRA, CARE and IIRR 156 p

## Papers Presented

- Ahmed, M Policy issues deriving from the scope, determinants of growth and changing structure of supply of fish and fishery products in developing countries International Consultation on Fisheries Policy Research in Developing Countries Issues, Priorities and Needs Hirtshals, Denmark, 2-6 June
- Ahmed, M Toward a methodology for estimating family and rice fields production - the use of household survey, monitoring and complementary tools Fisheries Methodology for Estimating Family/Rice Field Fishery Production and Related Parameters Workshop Phnom Penh, Cambodia, 4 7 March
- Albert, J, R Froese, R Bauchot and H Ito Diversity of brain size in fishes preliminary analysis of a database including 1174 species in 45 orders Fifth Indo Pacific Fisheries Conference Noumea, New Caledonia, 3 8 November
- Battaglione, S and J Bell The potential of the tropical sea cucumber, *Holothura scabra*, for

- stock enhancement First International Symposium on Stock Enhancement and Sea Ranching Bergen, Norway, 8-11 September
- Bell, J Restocking of giant clams: progress, problems and potential First International Symposium on Stock Enhancement and Sea Ranching Bergen, Norway, 8-11 September
- Bimbao, M P and M Prein Sustainability indicators for integrated aquaculture agriculture farming systems ICLARM's preliminary experiences with Philippine farmers National Workshop on the Development of Sustainable Indicators Case Presentation and Analyses SEARCA, Laguna, Philippines, 16-17 December
- Binohlan, C and R Froese FishBase: a call for collaboration (poster) Fifth Indo Pacific Fisheries Conference Noumea, New Caledonia, 3-8 November
- Brummett, R E Farmer scientist research partnerships in IAA development Roundtable on Ecological Agriculture Environmental Capacity Enhancement Project Siavonga, Zambia, 28 May - 4 June
- Brummett, R E Farmer scientist research partnerships in Malawi aquaculture development Fourth International Symposium on Tilapia in Aquaculture Florida, USA, 9-12 November
- Brummett, R E Price setting in Southern Malawi fish markets Malawi National Fisheries Research Symposium Boadzulu, Malawi, 20-22 January
- Brummett, R E Production of *Tilapia rendalli* fingerlings under Malawi smallholder conditions Fourth International Symposium on Tilapia in Aquaculture Florida, USA, 9-12 November
- Brummett, R E Sustainable aquaculture in sub-Saharan Africa Aquaculture Association of Southern Africa Congress Stellenbosch, RSA, 15-18 September
- Capuli, E and R Froese Status of the freshwater fishes of the Philippines Fifth Indo Pacific Fisheries Conference Noumea, New Caledonia, 3-8 November
- Casal, C M V, D Bartley, R Froese, P Sa a and M L D Palomares Documenting the status of freshwater fish introductions in Oceania Fifth Indo Pacific Fisheries Conference Noumea, New Caledonia, 3-8 November
- Chikafumbwa, F Community management of Thamandas Malawi National Fisheries Research Symposium Boadzulu, Malawi, 20-22 January
- Chikafumbwa, F IAA development in Malawi Roundtable on Ecological Aquaculture Environmental Capacity Enhancement Project Siavonga, Zambia, 28 May - 4 June
- Chikafumbwa, F ICLARM's approach to IAA in Malawi UNDP Sustainable Livelihood and Food Security Programme Workshop Lilongwe, Malawi, 20-22 August
- Chikafumbwa, F Impact and adoption of IAA in Sakata Malawi National Fisheries Research Symposium Boadzulu, Malawi, 20-22 January
- Chikafumbwa, F, K Katambalika and R E Brummett Production of tilapia (*Oreochromis mossambicus*) in community rainfed reservoirs in Malawi Fourth International Symposium on Tilapia in Aquaculture Florida, USA, 9-12 November

- Froese, R A format and a procedure for a checklist of the fishes of the South China Sea (CLOFSCS) International Workshop on Biodiversity Assessment and Inventories of Key Organisms in the South China Sea Singapore, 3-10 May
- Froese, R and C V Garilao An annotated checklist of elasmobranchs of the South China Sea International Seminar and Workshop on Shark and Ray Biodiversity, Conservation and Management Sabah, Malaysia, 7-10 July
- Froese, R , E Capuli and M C Rañola Taxonomic information management in the 21st century how to deal with changes in scientific names Ninth International Congress of European Ichthyologists (CEI 9) Trieste, Italy, 24-30 August
- Froese, R , N Bailly, G U Coronado, P Pruvost, R Reyes and J C Hureau A new procedure to clean up fish collection databases Fifth Indo-Pacific Fisheries Conference Noumea, New Caledonia, 3 8 November
- Garces, L and R A Valmonte-Santos The impact of wastewater and the environment the case of Manila Bay Philippine International Wastewater Congress Manila, Philippines, 2 3 September
- Harkes, I Measuring success of co management and community-based coastal resource management Asian Regional Workshop on Fisheries Co management Phuket, Thailand, 21 23 October
- Katon, B M Honda Bay, Palawan, Philippines a co management pilot site Asian Regional Workshop on Fisheries Co management Phuket, Thailand, 21 23 October
- Katon, B M Mangrove rehabilitation and coastal resource management of Cogtong Bay a case study of co management in the Philippines Asian Regional Workshop on Fisheries Co-management Phuket, Thailand, 21 23 October
- Katon, B M The Marine Conservation Project of San Salvador a case study of fisheries co-management in the Philippines Asian Regional Workshop on Fisheries Co-management Phuket, Thailand, 21 23 October
- McManus, J Coral reefs of the world Launching of the International Year of the Reef Philippines 1997 (IYOR 97) Quezon City, Philippines, 10 April
- McManus, J Global coral reef assessment volunteers, professionals and ReefBase Symposium on Marine Conservation Biology British Columbia, Canada, 5 9 June
- McManus, J ReefBase, coral reef health and quality of life ICLARM 20th anniversary, Australian Embassy Makati City, Philippines, 24 September
- McManus, J ReefBase status and plans World Bank Conference on Coral Reefs 1997 Washington, DC, USA, 9-11 October
- McManus, J Status of the world's coral reefs Save Our Seas, Clean Oceans Conference Hawaii, USA, 11-16 June
- Muñoz, J C , L R Garces, C R Pagdilaog, L S Papa and V Palaganas Coastal resource management in the Philippines an overview of past and present initiatives Regional

Workshop on Integrated Management of the Coastal Zone Makati City, Philippines,  
26-27 June

Nozawa, C M C , S G Vergara and M Acedera Development of a cadre of ICM practitioners  
Ecotone VI, Regional Seminar for Southeast and East Asia Beihai, China, 18-21  
March

Palomares, M L D Common names, indigenous knowledge and databases a call for collaboration  
(poster) Fifth Indo Pacific Fisheries Conference Noumea, New Caledonia, 3-8  
November

Palomares, M L D and C M V Casal A database approach to illustrate genetic trends in  
fishes First International Meeting on Population Genetics and Aquaculture in Africa  
Abidjan, Côte d'Ivoire, 1-4 April

Palomares, M L D and R Froese FishBase as a tool for studying fish biodiversity (poster)  
Ninth International Congress of European Ichthyologists (CEI 9) Trieste, Italy, 24-30  
August

Palomares, M L D , C V Garilao and D Pauly Indigenous knowledge in FishBase a case study  
on the common names of Philippine fishes Fifth Indo Pacific Fisheries Conference Noumea,  
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Pomeroy, R S Evaluation of community based coastal resource management projects and programs  
in the Philippines Asian Regional Workshop on Fisheries Co management Phuket,  
Thailand, 21-23 October

Pomeroy, R S Institutional analysis IDRC Workshop on Community based Natural Resource  
Management Hue, Vietnam, 3-21 May

Pomeroy, R S Institutional analysis Workshop on Participatory Methods for Community based  
Coastal Resource Management IIRR, Cavite, Philippines, 5-7 August

Pomeroy, R S Socioeconomic analysis of integrated farming systems households Development  
of Aquaculture Extension in the Mekong Delta Workshop Cantho University, Cantho,  
Vietnam, 3-5 April

Pomeroy, R S Some points on running multi country, multi site projects Toward Guidelines on  
Running Multi country, Multi site Projects ICLARM, Makati City, Philippines, 18  
January

Pomeroy, R S The institutional analysis framework of co management Asian Regional Workshop  
on Fisheries Co management Phuket, Thailand, 21-23 October

Pomeroy, R S The Marine Conservation Project of San Salvador a case study of fisheries co  
management in the Philippines Workshop on Property Rights, Collective Action and  
Technology Adoption, System wide Initiative on Property Rights and Collective Ac  
tion ICARDA, Aleppo, Syria, 22-25 November (Paper written by B M Katon,  
R S Pomeroy and A Salamanca)

Prein, M ICLARM's approach to aquaculture research for developing countries rationale and  
outline of the IAASP and potential topics for collaboration Annual Meeting of the

- Pond Dynamics/Aquaculture CRSP Washington, DC, USA, 17-19 February
- Prein, M Living aquatic resources within irrigation schemes and their relevance to farmers' needs and water use SWIM Workshop, IIMI Colombo, Sri Lanka, 10-14 February
- Pullin, R S V Alien species in aquaculture Conference on Introductions of Alien Crayfish in Europe How to Make the Best of a Bad Situation? Florence, Italy, 24-27 September
- Pullin, R S V Aquatic biodiversity issues and partnerships National Workshop on Agenda Setting for Biodiversity Research in the Philippines SEARCA, Laguna, Philippines, 2-4 July
- Pullin, R S V Genetic resources for aquaculture ownership and access First International Meeting on Population Genetics and Aquaculture in Africa Abidjan, Côte d'Ivoire, 1-4 April
- Tiongco, M M Towards self-sufficiency or self reliance the Philippines' future strategy for strengthening food security Thirteenth Federation of Crop Science Society of the Philippines Annual Scientific Conference Baguio City, Philippines, 26-28 May
- Williams, M J Address to Auburn University staff on ICLARM's programs Alabama, USA, 20 October
- Williams, M J Local and global impacts on coral reefs Fifth Taiwan Coral Reef Society Conference Taipei, Taiwan, 18-19 April
- Williams, M J The role of fisheries and aquaculture in the future supply of animal protein Food for the Future? Second International Symposium on Sustainable Aquaculture Oslo, Norway, 2-5 November
- Williams, M J and L R Garces Better water management means better aquatic life management With Rivers to the Sea Seventh Stockholm Water Symposium/Third EMECS Conference Stockholm, Sweden, 11-14 August
- Williams, M J Application of genetics to aquaculture some ICLARM experiences CSIRO Marine Laboratories, Cleveland, Australia, 30 January (Paper largely prepared by A E Eknath)
- Williams, M J Aquaculture planning for the future - managing the risks and opportunities in the global market international keynote address Sixth International Aquaculture Exchange Tasmania, Australia, 25-28 July
- Williams, M J Factoring in fish Keystone Center Conference on Critical Variables and Long Term Projections for Sustainable Food Security Virginia, USA, 10-13 March
- Williams, M J Factoring in fish some policy research issues ICLARM IFPRI-IFM Fisheries Policy Research Workshop Hirtshals, Denmark, 3-6 June
- Williams, M J Investigating the impact of GIFT tilapia ICLARM presentation CGIAR International Centers' Week Washington, DC, USA, 27-31 October

## Training

Ablan, C - Training on GIFT (30 participants) ICLARM, Nueva Ecija, Philippines, 30-31 July

Ahmed, M - Supervised a three week training (27 January - 14 February) for a Vietnamese social scientist on social science research methodologies and database management and analysis

Balgos, M - UN Train-Sea Coast Coordination Conference New York, USA, 24-26 April Discussed the implementation of the Train Sea Coast network and the progress of the course development units in training development

Fisheries Co Management Project In collaboration with VCOP II, hosted the visit/study tour in ICLARM of five research partners from the Ministry of Fisheries in Vietnam, Fisheries University in Nha Trang and Khanh Hoa Provincial Fisheries Office on 6-27 June

Fisheries Co Management Project Hosted the study tour in ICLARM of four research partners from the Faculty of Fisheries, Cantho University, Vietnam on 28 April - 5 May This activity is part of the HAKI Project

Gorospe, M IOC UNEP IUCN GCRMN Social, Economic and Cultural Methods Workshop (19 participants) Bolinao, Pangasinan, 24-30 August The goal of the workshop was to produce a draft, basic level manual on rapid assessment methodology to gather social, cultural and economic data on coral reefs

ICLARM Malawi (National Aquaculture Center) Extension agents were trained in RESTORE data collection and resource mapping One lab technician received on the job training in computer usage, water quality analysis, inventory and stock keeping Two lab technicians received ICLARM sponsored training in soil analysis in the ICRAF laboratory at Makoko experiment station The Fisheries Department (FD) librarian received on the job training and also participated in an ICLARM FD joint financed training program in library management at the University of Malawi (UM) Eight students from UM worked with ICLARM to conduct their fourth year research projects Four of these were involved in the design of a commercial fish diet and four in the study of pond foodwebs Training in principles of pond management and IAA was conducted for extension agents during a short course sponsored by GTZ (MAGFAD) at Bunda College of Agriculture

LISU staff - Advice and practical training on the library and information system for Bijoy Bhusan Debnath from ICLARM Bangladesh office, 6-7 October

Lopez, L Served as facilitator/resource person for the PhanSUP (Phil HIV Support Program) Training/Seminar on Participatory Rural Appraisal on HIV held at Cebu City, Philippines, 4-6 December

McManus, J Save Our Seas, Clean Oceans Conference Hawaii, USA, 11-16 June Held discussions with key government officials and coral reef scientists, creation of a resolution on coral reef conservation

McManus, J Symposium on Marine Conservation Biology British Columbia, Canada,

5-9 June Presented and explained the global coral reef situation to conservation biologists and other participants Information exchange on coastal resource management

Oficial, R T, M Bimbao, T Lopez and L Orenca Under the framework of a collaborative research activity with CFPQ/GTZ/DENR and ICLARM's Project on Sustainability Indicators for Integrated Aquaculture Systems (BMZ/GTZ), three one-day training workshops were held with 41 Philippine farmers on low external input IAA technology Two one day impact and planning workshops were also conducted to present the results of farm production and economic data and to discuss plans for the next cropping season

Pauly D, R Froese, M L Palomares, J M Vakily and J Falcon Served as resource persons providing lectures and assistance during the Training Course on Fisheries and Biodiversity Management in ACP countries Noumea, New Caledonia, 20-31 October Thirteen participants from Fiji, Kiribati, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu attended the training course, representing fisheries administrations, academic institutions and organizations with a mandate for environmentally oriented work in the Pacific region

Prein, M, T Lopez and FF Villanueva Conducted the First RESTORE Training Course with the Department of Agriculture/Office of Agriculture Research (OARD) of Thailand, in Chiangmai There were 31 participants from all eight OARD offices

Research and Development of Sustainable Aquaculture Technologies in Bangladesh Project (USAID) - Organized the following training programs

Tripathi, S D Low cost, Environment Friendly, Sustainable Aquaculture Practices Eighteen sessions, one day For NGO extension workers and farmers Organized by ICLARM, in collaboration with BFRI and NGOs

Integrated Agriculture aquaculture One session, one day For NGO extension workers (39) and farmers (456) Held a number of times in different places

Quality Fish Seed Production Two training workshops Representatives from 23 government agencies and from 12 NGOs and 55 private hatchery managers/owners participated Organized jointly by ICLARM and BFRI

Fisheries Co-Management Project - In collaboration with Tambuyog Development Center (TDC) conducted a Training Course on Community based Fisheries Management in Quezon City, Philippines, 9-25 November There were 25 participants from government and nongovernment organizations involved in inland fisheries management in Bangladesh

Vergara, S Global Coral Reef Monitoring Network (GCRMN) South Asia Regional Planning Workshop (51 participants) Hikkaduwa Marine Sanctuary, Sri Lanka, 30 November 4 December Presented ReefBase and coordinated the setting up of a South Asian regional database on coral reefs using ReefBase The output of the workshop was the training of a programmer from the region on the ReefBase database in ICLARM Future outputs include the training of other users in the region and the incorporation of their respective country's databases into ReefBase

Vergara, S, M Balgos and L Garces - Eighth National Course on Integrated Coastal Management (20 participants) Laguna, Philippines, 3-14 November

Vergara, S , M Balgos and L Garces Seventh National Course on Integrated Coastal Management (22 participants) Iloilo, Philippines, 2-12 June

Vergara, S , M Balgos and L Garces Sixth National Course on Integrated Coastal Management (24 participants) La Union, Philippines, 24 February - 7 March

## Advisory Services

Ablan, C EO 247 Limiting access to biological and genetic resources (50 participants) PAWB-DENR, Quezon City, Philippines, 13 December This meeting was aimed to produce a procedural strategy for the implementation of EO 247

Ahmed, M Provided assistance to Mekong River Commission (MRC) Project on the Management of Fisheries in Reservoirs in the Mekong Basin He visited the Research Institute of Aquaculture No. 3 in Vietnam on 31 March - 7 April to advise on the design and implementation of baseline survey on rural reservoirs in Vietnam

Brummett, R Designated by FD as an Aquaculture Research Advisor to the Government of Malaŵi In this capacity, ICLARM has been active in maintaining contacts with aquaculture related activities and initiatives around the country and region to provide relevant input to the decisionmaking process The establishment of a Steering Committee for the ICLARM-Malaŵi office provides another avenue for information exchange with government

Farmers in Quirino were assisted through liaising them with accredited fish hatcheries and providing them with technical advice on stocking fingerlings and fish management techniques Around 8 580 fingerlings of common, grass, silver and bighead carps were stocked in farmers' ponds

Garces, L - Creation of a task force on the assessment of all municipal fisheries researches (10 participants) BFAR, Quezon City, Philippines, 27 February

Garces, L Multisectoral Consultation Meeting (20 participants) NEDA, Philippines, 6 May Creation of sustainability indicators for fisheries sector in the Philippines

Garces, L National Steering Committee Meeting of the Coastal Zone Environmental and Resource Management Project (20 participants) Quezon City, Philippines, 12 September Identification of suitable sites for marine sanctuaries in the Lingayen Gulf (case study) using GIS Remote Sensing

Garces, L Third Technical Working Group Meeting of the Coastal Resources Management Project Policy Component (20 participants) DENR, Philippines, 3 September Source book on coastal resources management policies in the Philippines

Gayanilo, F C , Jr Evaluation of the Danida-funded Project Assessment of Living Marine Resources of Vietnam, Hai Phong, Vietnam, 28 April - 9 May

Jhocson, N Provided technical advice on computerized library management and information services using UNESCO's CDS/ISIS system software package for the Philippine Institute for Development Studies Library, 29 January

Lopez, L Part of the editorial team of the Philippine Participatory Learning and Action Network (PhilPLAN) Newsletter, October 1997, Vol. 1, No. 1

- McManus, J - Advisory Committee on Protection of the Seas Meeting (100 participants) Washington, DC, USA, 12 May - 2 June Created a resolution on the protection of the seas
- Munro, J - Part of a group which is providing informal assistance to WWF's Marine Advisory Group in connection with WWF's initiative on marine protected areas
- Pomeroy, R Assisted in the preparation of the Annual Meeting of the Asian Fisheries Social Science Research Network in Phuket, Thailand, 20-24 October
- Pullin, R S V Chaired SGRP's Inter-Center Working Group on Genetic Resources, also participated in the International Centers' Week 1997 as part of the delegation from SGRP
- Pullin, R S V Member of IUCN's Commission on Ecosystem Management
- Pullin, R S V Participated in the Eighth Global Diversity Forum, Montreal, Canada, 29-31 August
- Pullin, R S V - Participated in the Third Meeting of the Convention on Biological Diversity's Subsidiary Body for Scientific, Technical and Technological Advice, Montreal, Canada, 15 September
- Torell, M - Participated in the review of the Inventory and Management of Wetlands in the Lower Mekong Basin (Phase II) Project under the Environment Unit of MRC in Thailand and Cambodia, 30 April - 2 May
- Vergara, S and L Meñez Technical Working Group of the President Commission on Sustainable Management of Sulu and Celebes Seas Quezon City, Philippines, 8 September Created a draft proposal on how to monitor the Sulu and Celebes Seas, with the possible adaption of the Aquanaut (ICLARM) as the survey method to be used
- Watson, M - Actively involved in ReefCheck, a regional initiative related to GCRMN
- Williams, M J - Elected First Vice-chair, FAO Advisory Committee on Fisheries Research FAO, Rome, 25-28 November
- Williams, M J Invited member, MacArthur Foundation Committee, to advise on new Population, Consumption, Environment Program September 1997

### **Workshops/Conferences/Seminars Conducted**

- African Regional Workshop on Fisheries Co-Management (M Ahmed and M Torell) Mangochi, Malawi, 18-20 March
- Aquanaut System Launching (ReefBase staff) Manila, Philippines, 30 September
- Asian Regional Workshop on Fisheries Co Management (R S Pomeroy, B M Katon, E Genio and I Harkes) Phuket, Thailand, 21-23 October
- Conference on Coral Reefs (J McManus and S Vergara) Washington, DC, USA, 9-11 October

- Eighth Steering Committee Meeting of the Fisheries Co Management Research Project (M J Williams, PR Gardiner, M Ahmed, R S Pomeroy and B M Katon) Manila, Philippines, 17-18 October
- Final Workshop for the DEGITA Project (M M Dey, G Bimbao and M V Gupta) Manila, Philippines, 18-19 February
- First International Symposium on Stock Enhancement and Sea Ranching (J Bell and S Battaglene) Bergen, Norway, 8-11 September
- First Training Course for Aquanaut Master Instructors (ReefBase staff) Batangas, Philippines, 12-14 March
- First Training Course on Fisheries and Biodiversity Management in ACP Countries (D Pauly, R Froese, M L Palomares, J M Vakily, J Falcon, E Capuli and C Binohlan) Noumea, New Caledonia, 20-31 October
- Fisheries Co Management Workshop (M Ahmed, M Torell) Mangochi, Malawi, 18-20 March
- Gulf and Caribbean Fisheries Institute, Fiftieth Annual Meeting (J L Munro) Yucatan, Mexico, 9-14 November
- Increasing and Sustaining the Productivity of Fish and Rice in the Flood prone Ecosystems of South and Southeast Asia (M M Dey and M Prein) Hanoi, Vietnam, 20-21 May
- Increasing and Sustaining the Productivity of Fish and Rice in the Flood prone Ecosystems of South and Southeast Asia (M M Dey and M Prein) Ho Chi Minh, Vietnam, 21-22 August
- Increasing and Sustaining the Productivity of Fish and Rice in the Flood prone Ecosystems of South and Southeast Asia (M M Dey, M Prein, S D Tripathi and P Thomson) Dhaka, Bangladesh, 2-5 June
- Increasing and Sustaining the Productivity of Fish and Rice in the Flood prone Ecosystems of South and Southeast Asia (R S Pomeroy) Vietnam, June
- INGA Planning Meeting (M V Gupta, M Dey and N Macawaris) Manila, Philippines, 20-21 February
- International Consultation on Fisheries Policy Research in Developing Countries: Issues, Priorities and Needs (M Ahmed, M Torell, M J Williams, PR Gardiner, E Borteidoku Aryeteey and S Garcia) North Sea Centre, Hirtshals, Denmark, 2-6 June
- IOC UNEP IUCN GCRMN's Social, Economic and Cultural Methods Workshop (M Gorospe) Bolinao, Philippines, 24-30 August
- Meeting of the Asian Fisheries Social Science Research Network Phuket, Thailand, 24 October
- Multivariate Ecological Analysis (lecture series) (J McManus) Makati City, Philippines, July-August
- National Workshop on Policy for Sustainable Inland Fisheries Management (P Thompson)

- Dhaka, Bangladesh, 22-24 March
- Planning Workshop for Genetic Improvement of Carp Species in Asia (R Dunham, M Gupta, P Gardiner, M Dey and A Eknath) Central Institute of Freshwater Aquaculture, Bhubaneswar, India, 26-29 July
- Planning Workshop on Characterization and Documentation of Tilapia Genetic Resources in Africa (M Gupta) Mangochi, Malaŵi, 22-25 September
- Planning Workshop on the Genetic Improvement of Carp Species in Asia (M Gupta and M Dey) Bhubaneswar, India, 26-29 July
- Population Interdependencies in the South China Sea Ecosystems (PISCES) Workshop (C Ablan) Manila, Philippines, 16-17 April
- Presentation of Projects within the CASEP to the ACIAR Board (J Bell) Manila, Philippines, 14 April
- Progress on the Aquaculture of Giant Clams and Sea Cucumbers at CAC (J Bell) SEAFDEC, Iloilo, Philippines, 15 April
- Regulating Access to Biological and Genetic Resources in the Philippines (C Ablan) Manila, Philippines, 20 August
- SACCAR Stakeholders Meeting (M V Gupta) Gaborone, Botswana, 10-14 March
- Second International Symposium on Sustainable Aquaculture (M Gupta) Oslo, Norway, 2-5 November
- Second Meeting of the Advisory Panel to the ACIAR Sea Cucumber Project (S Battaglione) Sydney, Australia, 4 September
- Second Training Course for Aquanaut Master Instructors (ReefBase staff) Batangas, Philippines, 21-23 July
- Seventh Meeting of the CGIAR's Inter-Center Working Group on Genetic Resources, Systemwide Genetic Resources Program (R S V Pullin) Puncak, Indonesia, 27 January-1 February
- Species 2000 Project Management Team Meeting (R Froese) Amsterdam, The Netherlands, 27-30 January
- Species 2000 Project Management Team Meeting (R Froese and C Rañola) Taipei, Taiwan, 14-15 November
- Species 2000 Project Management Team Meeting (R Froese) Missouri, USA, 6-10 May
- Strengthening of Fisheries and Biodiversity Management in ACP Countries Project, First Steering Committee Meeting (R S V Pullin, R Froese, J M Vakily, M V Gupta, M L D Palomares, C M V Casal, G Pablico, E Capuli, C Binohlan, A Torres, C Garilao, A Laborte, J Falcon, P Sa-a, R Reyes, T Cruz and G Coronado) ICLARM, Manila, Philippines, 3-5 June
- SWIM, Subproject on Multiple Use of Irrigation Water, Watershed and Water Use Efficiency ICLARM and IIMI, Colombo, Sri Lanka, 10-14 February

- Third Technical Coordination Meeting of the South Pacific Aquaculture Development Project (J Bell and J Battaglione) Nadi, Fiji, 20-22 November
- Toward Guidelines on Running Multi-country, Multi-site Projects (M Ahmed, R S Pomeroy, M Torell, B Katon, E Genio, R A V Santos, M M Tiongco, J M Gacutan and M L Tungala) Manila, Philippines, 18 January
- Workshop on a Framework for Future Training in Marine and Coastal Protected Area Management (J McManus and L Garces) Manila, Philippines, 3-7 November
- Workshop on Bangus Fry Resource Assessment Project with SEAFDEC, BFAR Staff and DA-Regional Coordinators (M Ahmed, F Torres, Jr, J M Gacutan, M M Tiongco and R A V Santos) Manila, Philippines, 3-4 February
- Workshop on Community-based Fisheries Management (R S Pomeroy and P Thompson) Dhaka, Bangladesh, 13-14 August
- Workshop on Social, Economic and Cultural Methods for Coral Reef Assessment (M Ahmed, R S Pomeroy, M J Williams and R A V Santos) Pangasinan, Philippines, 24-30 August
- Workshop on the Participatory Design of the Honda Bay Co-management Pilot Project (B Katon and L R Garces) Palawan, Philippines, 12-13 February
- WRI-ICLARM Reefs at Risk International Workshop (ReefBase staff) Makati City, Philippines, 24-25 September

## Selected Media Coverage

### Print Media

- ACIAR Newsletter* **ACIAR on World Wide Web** (30) 15
- ACIAR Newsletter* **Australia upholds international centres** | Bevege (30) 5
- ACIAR Newsletter* **Pearls for the picking** (30) 7
- Akhbar Al Yaoum (Daily News)* **Inauguration of ICLARM** 31 May
- Al Ahram (The News)* **ICLARM Abbassa inauguration** 27 May
- Al Wafd* **ICLARM inaugurates international aquatic resources center** 24 May
- Al Wafd* **ICLARM inauguration** 30 May
- Aquaculture* **Book reviews FishBase 96 concepts, design and data sources** TW Rowell 154(1) 87-91
- Aquaculture News* **Aquaculture systems research** G Haylor (23) 18-20

- Aquaculture News* Transgenic fish and aquaculture J Beardmore (23) 23-24
- Aquanews* The GIFT of tilapia 12(1) 8
- ATSAF Circular* ICLARM, Bericht über die Teilnahme am Board Meeting vom 20 01 bis 25 01 97 in Manila/Philippinen V Hilge 49 25-26
- Beche-de-mer Information Bulletin* Successful production of juvenile sandfish *Holothura scabra* by ICLARM in the Solomon Islands (9) 3 4
- BusinessWorld* Mangrove areas shrinking at steady rate - FMB data A F Cusi, III 12 February 11
- BusinessWorld* Profit from farming prawns W A de Lange, Jr 2 June 23
- Cairo Times* Research partnerships to protect the environment, transform agriculture and combat poverty May (Special Suppl ) 1
- Cairo Times* The work of the CGIAR centers May (Special Suppl ) 2-5
- Catch and Culture* Fourth Annual Meeting of the MRC Programme for Fisheries Management and Development Cooperation 3(1) 10-11
- CG Gender Lens* Profile Meryl J Williams - reflections and observations of a director general M J Williams 2(1) 8
- CGIAR News* The International Year of the Reef 4(2) 5-6
- Entwicklung und Laendlicher Raum* Building a global information network for agricultural and rural research, the SINGER system M C Perry and P O'Nolan 31(2) 19-23
- Environmental Biology of Fishes* Continuing problems with gray literature F Lacanilao 49(1) 1-5
- Environmental Biology of Fishes* Development of a global fish database S S Crawford 50(2) 231-234
- Evening Paper* Isabela's townsfolk to satisfy own fish requirements 10-12 January 6
- Far Eastern Economic Review* Fishing for trouble T Saywell 160(11) 50-52
- Fauna and Flora News* Freshwater fishes and microchiroptera (7) 3
- FFA News Digest* Arnavon marine conservation area (2) 11-12
- Fish Farming International* 4th International Symposium on Tilapia in Aquaculture (ISTA IV) 24(3) 41
- Fish Farming International* Disney World venue for tilapia 24(1) 5
- Fish Farming International* Sustainable farming speakers announced 24(8) 45
- Fishing Chimes* Dr S D Tripathi, new project leader of ICLARM's Bangladesh project 6(11) 39
- Fishing Chimes* The Fourth Indian Fisheries Forum, 24-28 November 1996, Kochi, Kerala R Jayaraman 16(10) 26-30
- Fishing Chimes* ICLARM marks 19th year 16(11) 24

- Fishing Chimes* **India recognizes GEBP leader** 16(11) 27
- Fishing Chimes* **Species 2000 Federation founded** 16(11) 24
- Fishing Chimes* **Super tilapia** 16(11) 24
- Fisheries Education and Training Information Bulletin* **A new ICLARM project** (7) 16
- Fisheries Newsletter* **Bangladesh Fisheries Research Institute Current status and future strategy for dissemination of Genetically Improved Farmed Tilapia in Bangladesh** 5(1/2) 6
- Fisheries Newsletter* **Bangladesh Fisheries Research Institute Training Workshop on Quality Fish Seed Production** 5(1/2) 7
- FishBytes* **ECOPATH Training Course in Mexico** D Pauly 3(1) 1
- Ford Foundation Report* **Bangladesh's troubled waters, finding a better way to manage precious resource** D Capistrano and J Stockhouse 28(1) 30 33
- ICES/CIEM Information* **"Scuttlebutt" from in and around ICES** (30) 15
- INFOFISH International* **1997 is International Year of the Reef** (1) 7
- INFOFISH International* **Sea cucumber breeding project** (5) 37
- Intercoast Network* **Monitoring and evaluating coral reef management** R B Pollnac (29) 5,6,18
- International Agricultural Development* **Research spending under continued pressure** 17(4) 4
- International Agricultural Development* **Year of the Reef** 17(1) 2
- Journal of Fish Biology* **FishBase 96 concepts, design and data sources and CD-ROM** R J Wootton 50(3) 684 685
- Malaya* **Island of Samar** A Alcalá 10 October 18
- Malaya* **Marine reserves as biology laboratories** A Alcalá 3 January 6
- Manila Bulletin* **Agricultural projects get Australian assistance** S A Baysa 21 May 14
- Manila Bulletin* **Iloilo fish broodstock hatchery** 25 July B 19
- Manila Chronicle* **Honda Bay selected as project pilot site** 14 April 16
- Manila Chronicle* **Honda Bay site of research project** 29 April 16
- Manila Chronicle* **International cooperation in Aggie research up** 22 April 16
- Manila Standard* **Coastal rehabilitation program** 9 September 18 19
- Manila Standard* **'Fishless sea' in the Philippines 2000?** L Baclagon 1 April 14
- Manila Standard* **RP firms up aquaculture policies as global food crisis looms** 1 March 3
- Manila Times* **Aquaculture feed mill boosts Mindanao's fish farmers** 7 November 19

- Manila Times* **Australia grants \$1 2M for research projects** 6 June 23
- Manila Times* **Send in the clams** S Timbangcaya 3 October 23
- Money Asia* **For those who depend on fish** 16 September 4
- Money Asia* **The San Miguel Bay story** RP's fishing sector has never been the same again  
TE Obnial 7 October 15
- NACA Newsletter* **Give parity to institutional issues, research workshop urges** 14(2) 1-2
- Nature* **Aquaculture, a solution, or source of new problems?** E Masood 86(6621) 109
- Nature* **Fisheries science, all at sea when it comes to politics?** E Masood 86(6621) 105-106
- Newsletter/Agricultural and Aquatic Systems Program, Asian Institute of Technology* **Roving Workshop on Integrated Agriculture-Aquaculture** H Demaine 2(1) 3,5
- New Zealand Journal of Marine and Freshwater Research* **FishBase 96 CD-ROM** M P Francis 31 282 284
- PCARRD Monitor* **RP praised for role in global agriculture research** 25(4) 3, 12
- People & Nature* **Saving the world's coral reef areas** J J Bacallan 5(2) 14-17
- Philippine Journal* **Fishery research may help great global food shortage** 6 March 12
- Philippine Journal* **ICLARM celebrates its 20th anniversary** 23 September 13
- Philippine Journal* **RP now at forefront of globalizing agricultural research** 21 April
- Philippine Panorama* **ICLARM's waterworld** B D Romulo 26(40) 12
- Philippine Star* **14-year red tide toll 106 dead, 1,798 hospitalized, cases continue to rise**  
R A Fernandez 14 April 6
- Philippine Star* **Australia donates \$1 2-M for IRRI, ICLARM projects** 1 June 22
- Philippine Star* **GIFT improves lives of RP's fishfarmers** R A Fernandez 1 June 23
- Philippine Star* **Reforms urged to stop RP's rapid overfishing - study** B Bernales 30 June 39
- PIMRIS Newsletter* **ICLARM's new ITP Program Leader** 9(2) 4
- Public Affairs Section, Australia Embassy (Philippines)* **For those who depend on fish** 1 p  
Released 9 September
- Reviews in Fish Biology* **Points of view putting fisheries management back in places** D Pauly 7(1) 125 127
- Reviews in Fish Biology and Fisheries* **Book reviews FishBase 96 concepts, design and data sources** G F Turner 7(3) 374 375
- Science (Washington)* **Brighter prospects for the world's coral reefs?** E Pennisi 277(5325) 491 493

- SEAFDEC Asian Aquaculture* **AQD in a consortium for community-based resource management** 19(1) 5
- SEAFDEC Asian Aquaculture* **Museums, gardens, zoos, and wildlife breeding centers in the Philippines** T Bagarinao 19(4) 9,10,32,33
- SEAFDEC Asian Aquaculture* **SEAFDEC tops user study of information systems in Asia** 19(1) 11
- SEAFDEC Newsletter* **SEAFDEC enters into a consortium for community-based resource management** 20(1) 14
- SEARCA Diary* **Experts report on Philippine biodiversity status** L L B Dupo 26(4) 14 15
- Skin Diver* **CORAL's internet diver reports** 46(3) 59
- Today* **RP tilapia farming faces bullish prospects** H D Tacio 15 July 15
- Western Fisheries* **Fish on CD-ROM** Autumn 11
- What's on in Manila & Expat Philippines* **ICLARM exhibition opening** 21 27 September 16

## Nonprint Media

- Bookmark, Inc* **Unpublished interview with J McManus and S Vergara by video crew of Lorenzo Tan** Makati City, Philippines 19 June
- CGIAR* **CGIAR, investing in the future** Two videocassettes Washington, DC, USA
- Channel 11* **Interview with M Prein on First RESTORE Training Course, Chiang Mai, Thailand, 9 13 June** Thailand, 9 June
- The Farming World, Broadcast no 1918, BBC World Service* **Interview with R Brummett and F Chikafumbwa, introducing IAA work in Malawi**
- Good Morning Asia, GMA-7* **Interview with J McManus** Quezon City, Philippines, 23 April
- Good Morning Asia, GMA-7* **Underwater footages taken during launching of the new book, etc ReefBase aquanaut survey manual, Senior author J W McManus** Quezon City, Philippines, 1 October
- ivdnUPDATE no 4* **ReefBase - a coral reef database (online)** 12 April Available at URL CGNET Services International <http://www.cgnet.com>
- Reefnet (online)* **John McManus gets the big picture on coral reefs, ReefBase data collection** Available at <http://www.reefnet.org/constrat4.html>
- Studio 23, ABS CBN Broadcasting Corporation* **Interview with J McManus** Quezon City, Philippines, 10 April

# Finances

## Financial Statements

### Letter from the Auditor

Report of Independent Accountants

To the Board of Trustees  
**International Center for Living Aquatic  
Resources Management, Inc (ICLARM)**  
(A nonstock, nonprofit organization)

We have audited the accompanying statement of financial position of the International Center for Living Aquatic Resources Management, Inc (a nonstock, nonprofit organization) as at December 31, 1997 and 1996 and the related statements of activities and of cash flows for the years then ended. These financial statements are the responsibility of the Center's management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with generally accepted auditing standards in conformity with international audit guidelines as issued by the International Federation of Accountants. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statements presentation. We believe that our audits provide a reasonable basis for our opinion.

As explained more fully in Note 2, the Center's financial statements are prepared on the basis of accounting practices prescribed for international agricultural research centers seeking assistance from the Consultative Group on International Agricultural Research. Such practices conform with generally accepted accounting principles.

In our opinion, the financial statements referred to above present fairly the financial position of the International Center for Living Aquatic Resources Management, Inc as at December 31, 1997 and 1996 and its activities and its cash flows for the years then ended, in conformity with generally accepted accounting principles.

To the Board of Trustees  
**International Center for Living Aquatic  
Resources Management, Inc**  
Page 2

Our audits were made for the purpose of forming an opinion on the basic financial statements taken as a whole. The supplementary schedules of grant revenue, restricted core and complementary funding, fixed assets, capital expenditures, capital fund movement, funds in trust and details of operating expenses for the years ended December 31, 1997 and 1996 are presented for purposes of additional analysis and are not a required part of the basic financial statements. The information in the supplementary schedules has been subjected to the auditing procedures applied in the audit of the basic financial statements and, in our opinion is fairly stated in all material respects when considered in relation to the basic financial statements taken as a whole.

*Priscilla Waterhouse*

Makati City, Philippines  
February 12, 1998

## Statement of Financial Position

### INTERNATIONAL CENTER FOR LIVING AQUATIC RESOURCES MANAGEMENT, INC

#### STATEMENT OF FINANCIAL POSITION (U S Dollar '000)

|  | Note | December 31 |       |
|--|------|-------------|-------|
|  |      | 1997        | 1996  |
| <u>ASSETS</u>  |      |             |       |
| CURRENT ASSETS   |      |             |       |
| Cash and cash equivalents, including the grant of \$2,826<br>from Japan for Abbassa, Egypt, site refurbishment in 1996 | 2,3  | 4,366       | 3,332 |
| Accounts receivable  |      |             |       |
| Donors (Exhibit 1)   | 4    | 3,401       | 1,413 |
| Employees  |      | 135         | 178   |
| Others   | 5    | 634         | 436   |
| Supplies inventory   | 2    | 15          | 30    |
| Prepaid expenses   |      | 154         | 191   |
| Other current assets   |      | 514         | 743   |
| Total current assets   |      | 9,219       | 6,323 |
| FIXED ASSETS (Exhibits 3, 3A and 3B)   |      |             |       |
| Center-owned   |      |             |       |
| Property and equipment   | 2,6  | 1,827       | 1,684 |
| Accumulated depreciation   |      | (1,091)     | (825) |
|  |      | 736         | 859   |
| In custody   |      |             |       |
| Property and equipment   |      | 2,694       | 1,149 |
| Total fixed assets, net  |      | 3,430       | 2,008 |
| Total assets   |      | 12,649      | 8,331 |
| <u>LIABILITIES AND FUND BALANCES</u>   |      |             |       |
| CURRENT LIABILITIES  |      |             |       |
| Accounts payable   |      |             |       |
| Donors (Exhibit 1)   | 7    | 5,142       | 4,034 |
| Employees  | 8    | 326         | 453   |
| Others   | 9    | 248         | 205   |
| Funds in trust (Attachment II)   | 10   | 1,032       | 5     |
| Accrued expenses   | 11   | 407         | 205   |
| Reserve for contingencies  |      | 200         | 200   |
| Total current liabilities  |      | 7,355       | 5,102 |
| NET ASSETS   | 13   |             |       |
| Capital invested in fixed assets (Exhibits 3, 3A and 3B)   |      | 3,430       | 2,008 |
| Capital fund (Attachment 1)  |      | 888         | 765   |
| Operating fund   |      | 923         | 425   |
| Total net assets   |      | 5,241       | 3,198 |
| CUMULATIVE TRANSLATION ADJUSTMENT  | 2    | 53          | 31    |
| Total liabilities and net assets   |      | 12,649      | 8,331 |

(See accompanying notes to financial statements)

## Statement of Activities

### INTERNATIONAL CENTER FOR LIVING AQUATIC RESOURCES MANAGEMENT, INC

#### STATEMENT OF ACTIVITIES (U S Dollar '000)

|   | Note                      | For the year ended December 31 |            |       |               | TOTAL |       |
|---|---------------------------|--------------------------------|------------|-------|---------------|-------|-------|
|   |                           | Unrestricted                   | Restricted | Total | Complementary | 1997  | 1996  |
| <b>REVENUES</b>   |                           |                                |            |       |               |       |       |
| Total grants (Exhibit 1)                                | 2                         | 5,628                          | 3,417      | 9,045 | 2             | 9,047 | 9,574 |
| Other revenues  |                           | 343                            |            | 343   |               | 343   | 361   |
| Total revenues  |                           | 5,971                          | 3,417      | 9,388 | 2             | 9,390 | 9,935 |
| <b>OPERATING EXPENSES</b>                               |                           |                                |            |       |               |       |       |
| Research programs                                       |                           | 1,947                          | 3,330      | 5,277 | 2             | 5,279 | 5,069 |
| Conferences and trainings                               |                           | 75                             | 70         | 145   |               | 145   | 474   |
| Information services                                    |                           | 640                            | 17         | 657   |               | 657   | 948   |
| General administration                                  |                           | 2,509                          |            | 2,509 |               | 2,509 | 2,115 |
| General operations                                      | 2                         | 793                            |            | 793   |               | 793   | 625   |
| Total operating expenses                                |                           | 5,964                          | 3,417      | 9,361 | 2             | 9,383 | 9,231 |
| Recovery of indirect costs                              |                           | (447)                          |            | (447) |               | (447) | (493) |
| Total expenses (Exhibit 2 and Attachment III)           |                           | 5,517                          | 3,417      | 8,934 | 2             | 8,936 | 8,738 |
| <b>EXCESS OF REVENUES OVER EXPENSES</b>                 |                           |                                |            |       |               |       |       |
|   |                           | 454                            |            | 454   |               | 454   | 1,197 |
| <b>ALLOCATED AS FOLLOWS</b>                             |                           |                                |            |       |               |       |       |
| Operating fund  |                           | 454                            |            | 454   |               | 454   | 167   |
| Reserves  |                           |                                |            |       |               |       | 200   |
| Capital fund  |                           |                                |            |       |               |       | 830   |
|   |                           | 454                            |            | 454   |               | 454   | 1,197 |
| <b>MEMO ITEM</b>  |                           |                                |            |       |               |       |       |
| Operating expenses                                      | By natural classification |                                |            |       |               |       |       |
| Personnel   |                           | 2,996                          | 2,036      | 5,032 |               | 5,032 | 4,623 |
| Operating costs   |                           | 1,918                          | 878        | 2,796 | 2             | 2,798 | 2,749 |
| Travel  |                           | 323                            | 503        | 826   |               | 826   | 1,122 |
| Depreciation of fixed assets                            |                           | 280                            |            | 280   |               | 280   | 244   |
| Total operating expenses (Exhibit 2 and Attachment III) |                           | 5,517                          | 3,417      | 8,934 | 2             | 8,936 | 8,738 |

(See accompanying notes to financial statements)

## Statement of Cash Flows

### INTERNATIONAL CENTER FOR LIVING AQUATIC RESOURCES MANAGEMENT, INC

#### STATEMENT OF CASH FLOWS (U S Dollar '000)

|   | For the year ended |                |
|---|--------------------|----------------|
|   | December 31        |                |
|   | 1997               | 1996           |
| <b>CASH FLOWS FROM OPERATING ACTIVITIES</b>   |                    |                |
| Excess of revenues over expenses  | 454                | 1,197          |
| Adjustments to reconcile excess of revenue over expenses to net cash provided by (used in) operating activities |                    |                |
| Depreciation  | 280                | 244            |
| Disposal and writ-off of property and equipment   | 30                 |                |
| Changes in  |                    |                |
| Accounts receivable   |                    |                |
| Donors  | (1,988)            | (508)          |
| Employees   | 43                 | (94)           |
| Others  | (198)              | (123)          |
| Supplies inventory  | 15                 | (7)            |
| Prepaid expenses  | 37                 | (144)          |
| Other current assets  | 229                | (699)          |
| Accounts payable  |                    |                |
| Donors  | 1,108              | (795)          |
| Employees   | (127)              | 117            |
| Others  | 43                 | 318            |
| Funds in trust  | 1,027              | (53)           |
| Accrued expenses  | 202                | 105            |
| <b>Net cash provided by (used in) operating activities</b>  | <b>1,155</b>       | <b>(442)</b>   |
| <b>CASH FLOWS FROM INVESTING ACTIVITIES</b>   |                    |                |
| Acquisition of property and equipment   |                    |                |
| Center-owned  | (187)              | (497)          |
| In custody  | (1,545)            | (323)          |
| Funds invested in property and equipment  | 1,422              | 576            |
| Increase in capital fund  | 123                | 577            |
| Increase (decrease) in operating fund due to transfer of funds  | 44                 | (963)          |
| Cumulative translation adjustment   | 22                 | 36             |
| <b>Net cash used in investing activities</b>  | <b>(121)</b>       | <b>(594)</b>   |
| <b>NET INCREASE (DECREASE) IN CASH AND CASH EQUIVALENTS</b>   | <b>1,034</b>       | <b>(1,036)</b> |
| <b>CASH AND CASH EQUIVALENTS</b>  |                    |                |
| Beginning   | 3,332              | 4,368          |
| End   | 4,366              | 3,332          |

(See accompanying notes to financial statements)

## Notes to Financial Statements

### INTERNATIONAL CENTER FOR LIVING AQUATIC RESOURCES MANAGEMENT, INC (A nonstock, nonprofit organization)

#### NOTES TO FINANCIAL STATEMENTS DECEMBER 31, 1997 AND 1996

##### Note 1. General

The International Center for Living Aquatic Resources Management, Inc (ICLARM) was established in 1976 by the Rockefeller Foundation and formally incorporated under the laws of the Republic of the Philippines on January 20, 1977 as a nonstock, philanthropic and nonprofit corporation. The Center is also an autonomous, international, scientific and technical research center with a broad mandate to conduct and catalyze strategic research on all aspects of aquatic resources management which aims to improve productivity of culture and capture fisheries and small scale rural subsistence and market fisheries. It also publishes findings and recommendations and holds conferences to discuss current problems related to aquatic resources.

ICLARM is a member of the Consultative Group on International Agricultural Research (CGIAR), an informal but highly successful association of public and private sector donors supporting international agricultural research centers.

On November 28, 1996, an international agreement that recognizes the Center as an international organization was signed. The agreement grants the Center juridical status to enable it to more effectively continue its international efforts and activities in living aquatic resources management.

On October 7, 1997, Resolution No. 62 was adopted by the Philippine Senate and grants the Center certain privileges and immunities which include the following exemptions:

- a. exemption from payment of all taxes which extend to goods imported by the Center intended for its official use,
- b. exemption from payment of gift tax, all gifts, bequests, contributions and donations to the Center are considered allowable deductions for determining the income tax of the donor,
- c. exemption from payment of all customs duties and related levies of any kind,
- d. exemption from payment of income tax of non-Filipino citizens serving on the technical and scientific staff on salaries and stipends in foreign currency received solely from and by reason of, service rendered to the Center,
- e. exemption from prohibitions and restrictions on the import or export of articles intended for its official use.

Page 2

**Note 2 - Basis of financial statement presentation and significant accounting policies**

The accompanying financial statements, expressed in US dollars, are prepared on the basis of accounting practices prescribed for international agricultural research centers by CGIAR. The CGIAR prescribed accounting practices conform with generally accepted accounting principles. A summary of the Center's significant accounting policies is set forth to facilitate the understanding of data presented in the financial statements.

Cash equivalents Cash equivalents are short term, highly liquid investments that are readily convertible to known amount of cash with original maturities of three months or less.

Foreign currency transactions Philippine peso and other foreign currency denominated transactions are translated to US dollars for reporting purposes at standard bookkeeping rates which approximate the exchange rates prevailing at the dates of the transaction. Exchange differences resulting from a) the collection of foreign currency denominated receivables, b) the settlement of foreign currency obligations, and c) translation of balances of foreign currency denominated accounts at rates different from which they were originally booked are credited/charged to operations. Exchange differences resulting from the translation of balances of foreign currency denominated accounts are carried in the "Cumulative Translation Adjustment" accounts.

Revenue Revenue from unrestricted core grants are pledged on an annual basis and are recognized in the accounts when there is probability of collection in the year the grant is pledged. If the pledge is later judged to be uncollectible, it is written off against revenue of the year in which it is determined to be uncollectible. These grants are utilized to fund core programs and the regular operating requirements of the Center.

Restricted core grants and grants for complementary projects are recognized as income when funds are committed or received from the donors to the extent of expenses actually incurred. Disbursements from these sources are limited by conditions embodied in agreements with donor organizations. Excess of grants received over expenses, representing grants applicable to succeeding years, is classified as 'Accounts Payable - Donors' in the Statement of Financial Position. Excess of expenditures over receipts are reflected as receivable from respective donors.

Inventory of materials and supplies Inventory of materials and supplies is stated at cost using the moving average method.

Property and equipment Land is stated at historical cost. Property and equipment are carried at cost less accumulated depreciation. Replacement and renovation of assets and property are financed through reserves funded primarily by depreciation. Depreciation of assets owned by the Center is computed on the straight-line method over the following estimated useful lives of the related assets:

| Category description                      | Estimated life in years |
|---|-------------------------|
| Infrastructure and leasehold improvements | 5                       |
| Furnishing and equipment                  | 5-10                    |

Page 3

Property and equipment acquired through restricted and complementary funding are assets in custody and remain the property of the respective donors until the expiration of the agreement/contract after which disposition is to be decided upon by the donors. Such assets are separately accounted for in the books as prescribed by CGIAR.

### Note 3 Cash and cash equivalents

Cash and cash equivalents at December 31 consist of

|              | 1997        | 1996  |
|--------------|-------------|-------|
|              | (US\$ '000) |       |
| Unrestricted | 824         | (702) |
| Restricted   | 3,542       | 4,034 |
|              | 4,366       | 3,332 |

### Note 4 - Accounts receivable - donors

Accounts receivable from donors consist of unreleased balances of approved grants and expenses incurred in advance of receipt of project donor funds as at December 31 and are classified as follows

|                          |         | 1997       | 1996  |
|--------------------------|---------|------------|-------|
|                          | Exhibit | (US\$ 000) |       |
| Unrestricted core grants | 1       | 2,762      | 1,268 |
| Restricted core grants   | 1       | 639        | 145   |
|                          |         | 3,401      | 1,413 |

### Note 5 Accounts receivable - others

Other receivables at December 31 consist of

|                      | 1997       | 1996 |
|----------------------|------------|------|
|                      | (US\$ 000) |      |
| Advances to projects | 544        | 367  |
| Others               | 90         | 69   |
|                      | 634        | 436  |

**Note 6 - Property and equipment leases**

Property and equipment at December 31 are classified under the following accounts

|                              | 1997        | 1996  |
|------------------------------|-------------|-------|
|                              | (US\$ '000) |       |
| Owned                        |             |       |
| Cost                         |             |       |
| Land                         | 43          | 43    |
| Infrastructure and leasehold | 209         | 180   |
| Furnishing and equipment     | 1,575       | 1,461 |
|                              | 1,827       | 1,684 |
| Accumulated depreciation     |             |       |
| Infrastructure and leasehold | 52          | 51    |
| Furnishing and equipment     | 1,039       | 774   |
|                              | 1,091       | 825   |
| Net book value               | 736         | 859   |
| In custody                   |             |       |
| Infrastructure and leasehold | 1,835       | 447   |
| Furnishing and equipment     | 859         | 702   |
|                              | 2,694       | 1,149 |
|                              | 3,430       | 2,008 |

In the event of termination of the activities of ICLARM, all of its physical assets shall become the property of the University of the Philippines System. If such system is unable or unwilling to accept all or any part of the physical assets, these shall be disposed of exclusively for charitable, educational or religious purposes, as may be determined by the Board of Trustees.

The Center leases its administrative offices, renewable on a yearly basis, at the option of ICLARM. It also leases several housing units for its Internationally Recruited Staff for a period of up to 2 years and renewable upon expiration under such terms and conditions acceptable to both parties. Annual rentals on these leases aggregate to \$478,000 (US\$403,000 in 1996) and the advance deposits which the Center paid under the terms of the covering leases were shown as part of other current assets in the statement of financial position.

**Note 7 Accounts payable - donors**

Accounts payable to donors represent grants received in advance and applicable to succeeding periods.

**Note 8 Accounts payable - employees**

Accounts payable to employees consist of borrowings from the provident fund of the Center and employees' tax savings fund which bear interest ranging from 10.50% to 16.80% per annum.

Page 5

**Note 9- Accounts Payable - others**

Accounts payable others consist of liabilities to various suppliers of goods and services

**Note 10 Funds in trust**

Funds in trust consist of funds held in custody for a certain donor and funds provided by donors and managed by the Center with an ultimate beneficiary other than CGIAR centers

**Note 11 - Accrued expenses**

Accruals at December 31, 1997 consist of various liabilities to suppliers and benefits due to certain employees

**Note 12 - Provident fund (Staff benefit plan)**

The Center maintains a non contributory provident fund for the benefit of its Nationally Recruited Staff. Monthly contribution to the fund is computed at 10% 15% of the employees basic salary. The plan provides lump sum payment to qualified employees/members, upon separation from the Center, under certain conditions.

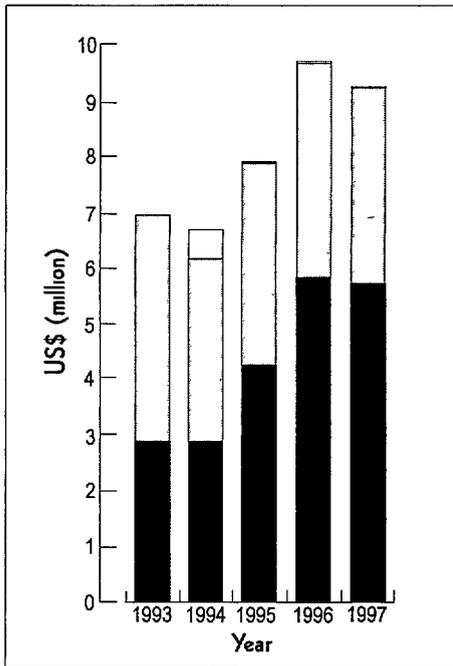
Contributions to the fund amounted to US\$79,000 (1996 US\$99,000)

**Note 13 - Changes in fund balance**

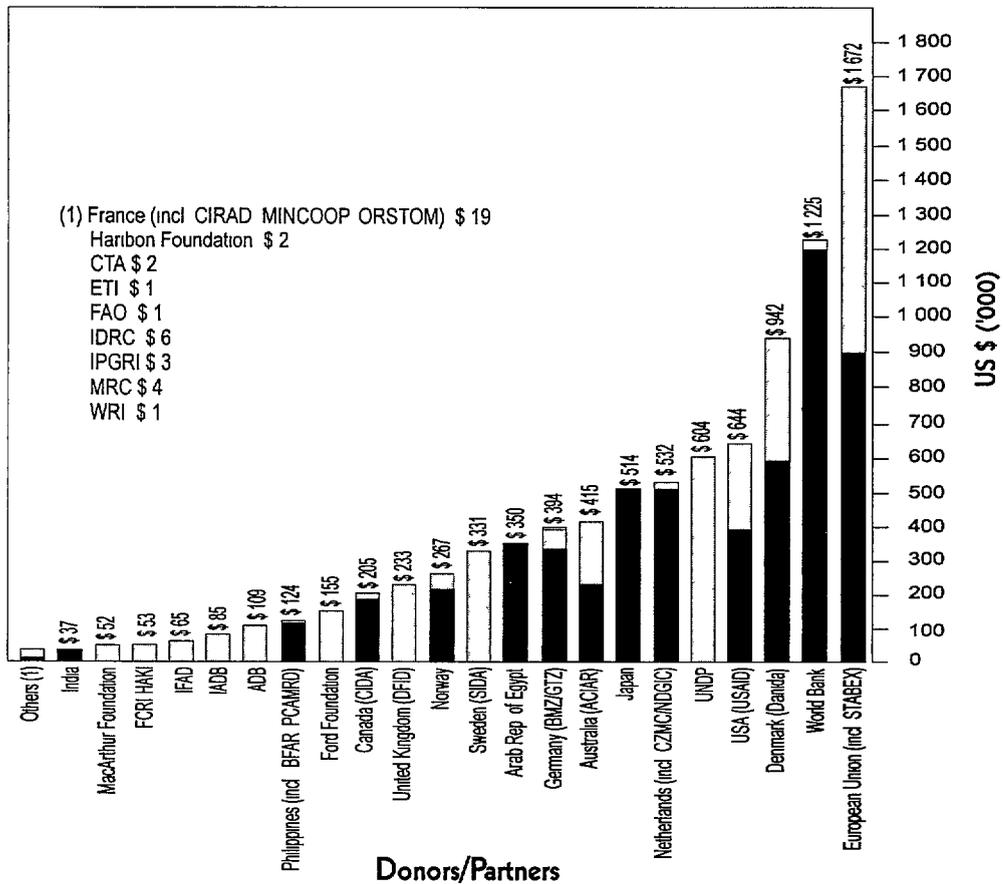
|                                 | Capital invested<br>in fixed assets | Capital<br>fund<br>(US\$ 000) | Operating<br>fund | Total |
|---------------------------------|-------------------------------------|-------------------------------|-------------------|-------|
| Balance, December 31, 1996      | 2,008                               | 765                           | 425               | 3,198 |
| Additions (deductions), net     | 1,422                               | 123                           | 44                | 1,589 |
| Excess of revenue over expenses |                                     |                               | 454               | 454   |
| Balance, December 31, 1997      | 3,430                               | 888                           | 923               | 5,241 |

# Key Financial Statistics

## Funding by Year (1993-1997)



## Funding by Donors and Partners (1997)

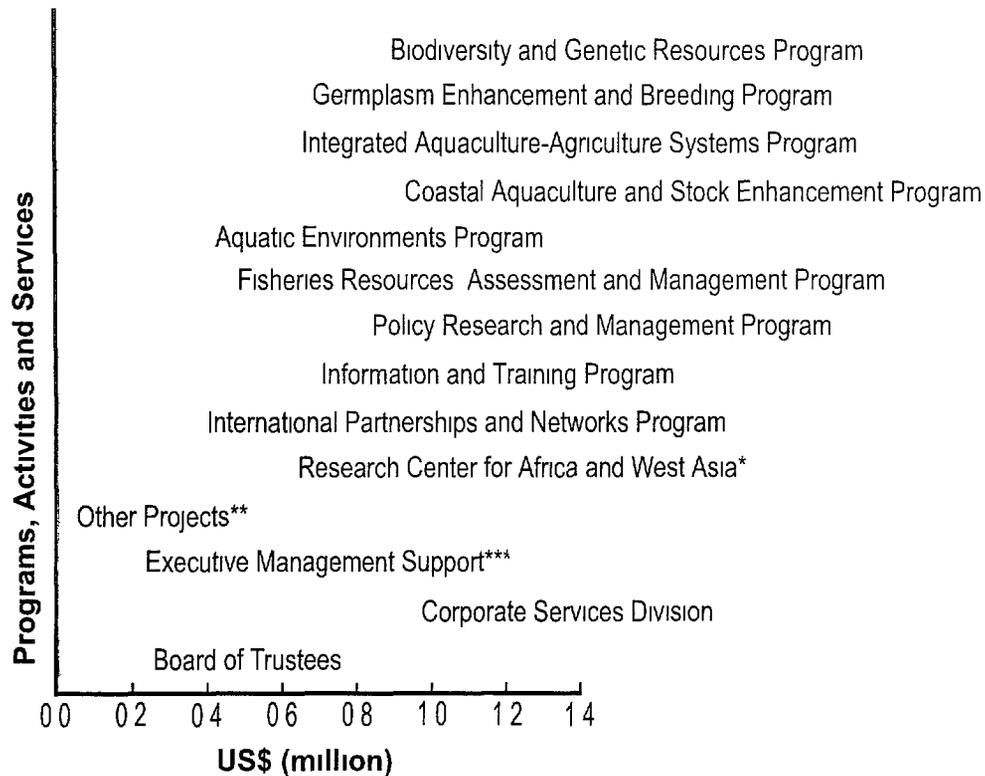


**Unrestricted core**  
 (may be allocated at the Center's discretion to support general operating costs programs or project)

**Restricted core**  
 (designated by contract with the donor to support specific project activities)

**Complementary**  
 (designated by contract with the donor to support specific project activities that are outside ICLARM's main programs and functions)

## Resource Allocation (1997)



### Legend

#### Unrestricted Core

(May be allocated at the Center's discretion to support general operating cost programs or projects)

#### Restricted Core

(Designed by contract with the donor to support specific project activities)

Funds allocated for work through ICLARM's Research Center for Africa and West Asia but with no further restrictions. An additional \$1.38 million restricted funding (not shown) was spent on renovations of the facility.

Support for the Asian Fisheries Society

Includes

- Office of the Director General
- Office of the Deputy Director General (Programs)
- Office of the External Relations
- Contingency Funds
- Principal Science Advisor
- External Relations Office
- New ICLARM Headquarters Facility

# ICLARM at a Glance

## ICLARM's Commitment

ICLARM is committed to improving the well being and livelihood of present and future generations of poor people in developing countries

### We aim for

- poverty eradication,
- a healthier, better nourished human family,
- reduced pressure on fragile natural resources, and
- people centered policies for sustainable development

### A way to achieve this

We achieve this by undertaking, facilitating and disseminating scientific research to improve the production, management and conservation of aquatic resources such as fish. Our objectives are

- raising and sustaining the productivity of fisheries and aquaculture systems,
- protecting the aquatic environment,
- saving aquatic biodiversity,
- improving policies for sustainable development of aquatic resources, and
- strengthening the capacity of national programs to support sustainable development

We believe this work will be most successful when undertaken in partnership with national government and nongovernment institutions and with the participation of the users of the research results

### The guiding principles for our research are

- sustainability,
- equity,
- gender role in development,
- participation,
- systems approach, and
- anticipatory research

### The values of our work are

- excellence in achievement,
- relevance to our beneficiaries' needs,
- partnerships,
- centerwide teamwork,
- communication,
- efficiency and flexibility in program delivery, and
- continual growth in our knowledge and understanding

### International links

ICLARM has its headquarters in the Philippines and research sites in Malawi, the Solomon Islands, Bangladesh, the Caribbean and Egypt. We also have outposted officers in Denmark, France and Canada. In 1992, ICLARM joined the CGIAR which is under the umbrella of four co-sponsors: FAO, World Bank, UNDP and UNEP.

## CGIAR and ICLARM

### About the CGIAR

The Consultative Group on International Agricultural Research (CGIAR), established in 1971, is an informal association of more than 50 public and private sector donors supporting 16 research centers worldwide. Through the research generated by its participating centers, the CGIAR aims to improve food security in developing countries. Critical elements of this mission include the alleviation of poverty, protection of the natural environment, promotion of sustainable agriculture and development, and emphasis on people centered policies.

Partners from national governmental agencies, nongovernmental organizations, community groups, farmer associations, academic research institutions, the private sector and others contribute to decisions on research policy and programs carried out by the CGIAR centers. Members in the Consultative Group provide voluntary grants to support the research agenda, for which programs are proposed, evaluated and agreed annually. The CGIAR's agenda is designed to evolve over time, incorporating social, ecological, economic as well as technical factors in developing new and more effective agricultural technologies and policies. The CGIAR in turn provides service to national agricultural research systems in developing countries on topics ranging from forestry and livestock to food crops, irrigation and aquatic resources.

### ICLARM's Role in the CGIAR

- ICLARM joined the CGIAR in 1992. It is the only CGIAR center with a mandate for living aquatic resources. The importance of this unique responsibility is underscored by the fact that
  - water covers over 70% of the earth's surface,
  - about one billion people rely on fish as their primary source of animal protein,
  - nearly 50 million people are involved in small scale fisheries through catching, processing and marketing, and
  - fish production provides some 150 million people with employment.
- ICLARM brings issues and opportunities concerning aquatic resources onto the CGIAR agenda and into the broader international, traditionally land based agricultural arena.
- ICLARM initiates the integration of aquaculture with agriculture for improved productivity and hence increased food supply.
- Through its knowledge of aquatic environments, ICLARM helps complement the information needed for agricultural research, such as connections and interactions between aquatic and terrestrial ecosystems.

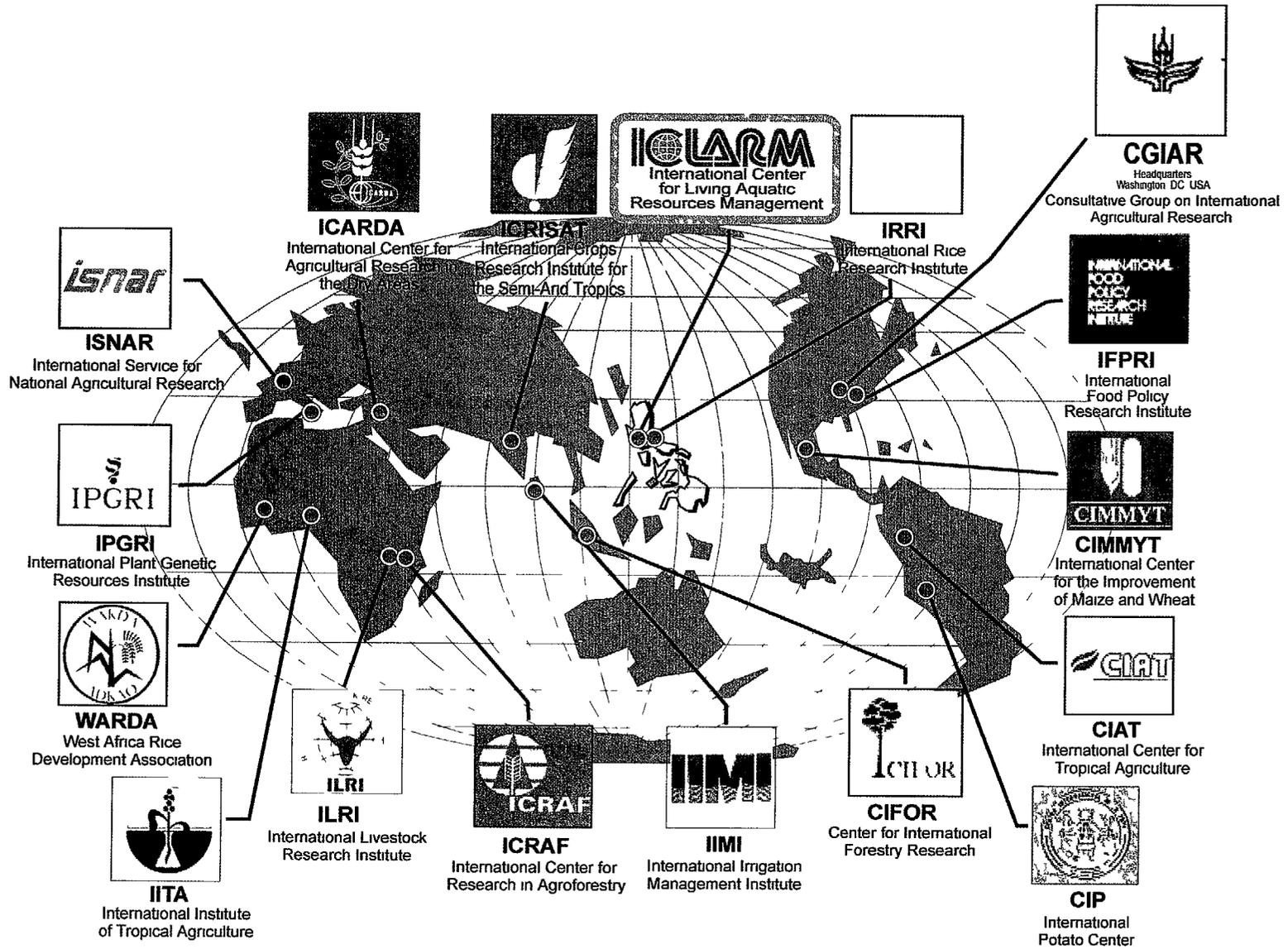
- ICLARM attends CGIAR meetings, participates in various systemwide initiatives, and interacts with the CGIAR's Technical Advisory Committee on technical reviews and other activities. Specifically, ICLARM is involved in two systemwide initiatives.

The first is the System wide Genetic Resources Program (SGRP). Five of the 16 CGIAR centers contribute to this program through ex-situ genebanks, germplasm distribution and research on in situ conservation, for which ICLARM has been assigned a lead role for database activities. ICLARM's role in aquatic resources is to concentrate on strategic research, training and information towards natural resources management.

This program also enhances access to genetic resources data held by the CGIAR through the System wide Information Network on Genetic Resources to which ICLARM contributes data. In 1997, the majority of all the genetic resources data held by the various centers was made available for searching through a common user interface.

The second is on water management. The System wide Initiative on Water Management has the overall objective of enhancing the productivity of water in agriculture in an environment of growing scarcity and competition and provides an umbrella for several projects executed jointly by multidisciplinary partners. ICLARM, through its Integrated Aquaculture-Agriculture Systems Program, collaborates with one project within this umbrella, entitled "Valuing the Multiple Uses of Irrigated Areas" which is administered jointly by the International Irrigation Management Institute and the International Food Policy Research Institute. The purpose of this project is to generate knowledge and understanding of the choices of users, and the determinants, value and the consequences of multiple uses of water in irrigated areas (i.e., domestic water supply, livestock, home gardens, fisheries and other rural enterprises, including human and environmental health issues).

# Consultative Group on International Agricultural Research (CGIAR) Centers



## Board of Trustees

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Ministry of Agriculture  
and Land Reclamation  
Cairo, Egypt  
Board Member since 1997

## Committee Membership and Attendance

| Member                                    | Committee | Number of meetings attended |   |                          |    |     |                        |     |                      |    |                           |    |                                 |  |
|---|-----------|-----------------------------|---|--------------------------|----|-----|------------------------|-----|----------------------|----|---------------------------|----|---------------------------------|--|
|   |           | Board                       |   | Executive Committee (EC) |    |     | Program Committee (PC) |     | Audit Committee (AC) |    | Nomination Committee (NC) |    | Headquarters Committee (Ad hoc) |  |
|   |           | J                           | S | J                        | M  | S   | J                      | S   | J                    | S  | J                         | S  | J                               |  |
| Kurt Peters <sup>1)</sup>                 |           | X                           | X | X <sup>8)</sup>          | X  | X   | X <sup>9)</sup>        | X   | - <sup>9)</sup>      | X  | NM                        | X  |                                 |  |
| John Dillon <sup>2)</sup>                 |           | X                           | X | X                        | X  | X   | X                      | ( ) | X                    | NM | X                         | O  |                                 |  |
| Nyle Brady                                |           | X                           | - | X                        | NM | X   | X                      | X   | X                    | NM | X                         | NM | X                               |  |
| Ellen Bortei-Doku Aryeetey <sup>3)</sup>  |           | O                           | - |                          | NM | O   | -                      |     | NM                   |    | -                         |    |                                 |  |
| Salvador Escudero III                     |           | -                           | a | a                        | X  | -   | NM                     | -   | NM                   |    | NM                        |    | a                               |  |
| Masaru Fujiya                             |           | X                           | X |                          | NM |     | -                      |     | NM                   |    | NM                        | -  | -                               |  |
| Serge Garcia/Robin Welcomme <sup>4)</sup> |           | X                           | X |                          | NM |     | X                      | X   | NM                   |    | NM                        |    |                                 |  |
| Joan Joshi <sup>5)</sup>                  |           | O                           | X | O                        | NM | ( ) | O                      | ( ) | O                    | X  |                           | NM |                                 |  |
| Yehia Hassan Khalil <sup>6)</sup>         |           |                             | X |                          | -  | X   | ( )                    | ( ) |                      | NM |                           | NM |                                 |  |
| Jacqueline McGlade <sup>7)</sup>          |           | X                           |   |                          | NM |     | X                      |     | NM                   |    | NM                        |    |                                 |  |
| Briitha Mikkelsen <sup>7)</sup>           |           | X                           |   |                          | NM |     | ( )                    |     | NM                   |    | X                         |    |                                 |  |
| Nyawira Muthiga                           |           | X                           | X |                          | NM |     | X                      | X   | NM                   | X  | X                         | NM |                                 |  |
| Mohamed Shariff                           |           | X                           | X |                          | NM | X   | X                      | ( ) | NM                   | X  | X                         | X  | X                               |  |
| Aprilani Soegiarto <sup>3)</sup>          |           | O                           | X |                          | NM |     | O                      | X   |                      | NM |                           | NM |                                 |  |
| Benedict Satia                            |           | -                           |   |                          | -  |     | -                      |     | NM                   |    | NM                        |    |                                 |  |
| Meryl Williams                            |           | X                           | X | X                        | X  | X   | X                      | X   |                      | NM |                           | NM | X                               |  |

### Notes

J = January 1997 meeting

M = May 1997 meeting

S = September 1997 meeting

NM = nonmember

X = present

- = absent

O = attended as observer or resource person

( ) = nonmember but attended

a = alternative member Mr Joemari Gerochi attended

<sup>1)</sup> Chair effective after January 1997 meeting <sup>2)</sup> Chair until January 1997 meeting <sup>3)</sup> Attended January 1997 meeting as observer, elected to membership at conclusion of meeting <sup>4)</sup> Nominees of the Director General of FAO Dr Garcia attended the January 1997 meetings and Dr Welcomme the September 1997 meetings <sup>5)</sup> Attended January 1997 meeting as resource person, elected to membership at conclusion of meeting

<sup>6)</sup> Nominated by the Deputy Prime Minister and Minister for Agriculture and Land Reclamation, Government of the Arab Republic of Egypt

<sup>7)</sup> Ended term after the January 1997 meeting <sup>8)</sup> Prof Peters attended in place of Dr Satia <sup>9)</sup> Prof Peters chaired the meeting in place of Dr Satia Audit and Program Committee meetings coincided

## Board of Trustees

The Board of Trustees is responsible for the corporate governance of the Center, including setting the strategic direction, establishing operational policies and monitoring the conduct of operations and achievement of objectives. The Board delegates responsibility for executive management of the Center to the Director General.

In accordance with the ICLARM Constitution (updated January 1997), the Board currently comprises six members elected at large, three members elected on the recommendations of the CGIAR and three members *ex officio*. ICLARM's Director General, the Secretary of the Department of Agriculture of the Government of the Philippines and a nominee of the Minister for Agriculture and Land Reclamation. In addition, a representative of the Food and Agriculture Organization, appointed by its own Director General, serves as a non-voting member. The Associate Director General/Corporate Services is the secretary to the Board and to the Executive and Audit Committees. The DDG/Programs is the Secretary to the Program Committee and the Executive Assistant in the Office of the Director General is Secretary to the Nominating Committee.

Standing committees of the Board include the Program Committee, which oversees the Center's scientific program, the Audit Committee, which aids the Board in discharging its fiduciary responsibility, and the Nominating Committee, which ensures an appropriate mix of expertise and experience among trustees and for evaluating Board performance. An Executive

Committee acts when necessary in the absence of the full Board and holds primary responsibility for overseeing the Center's financial position and its human resources policies. *Ad hoc* committees are appointed from time to time to undertake specific responsibilities, for example the Headquarters Site Selection and Financing Committee.

Members of the Board of Trustees are remunerated for Board Service on the basis of meeting days. Two full meetings of the Board and each of its Committees were held in 1997. In addition, a special meeting of the Executive Committee was held in conjunction with the inauguration of ICLARM's new Research Center for Africa and West Asia in Egypt in May 1997.

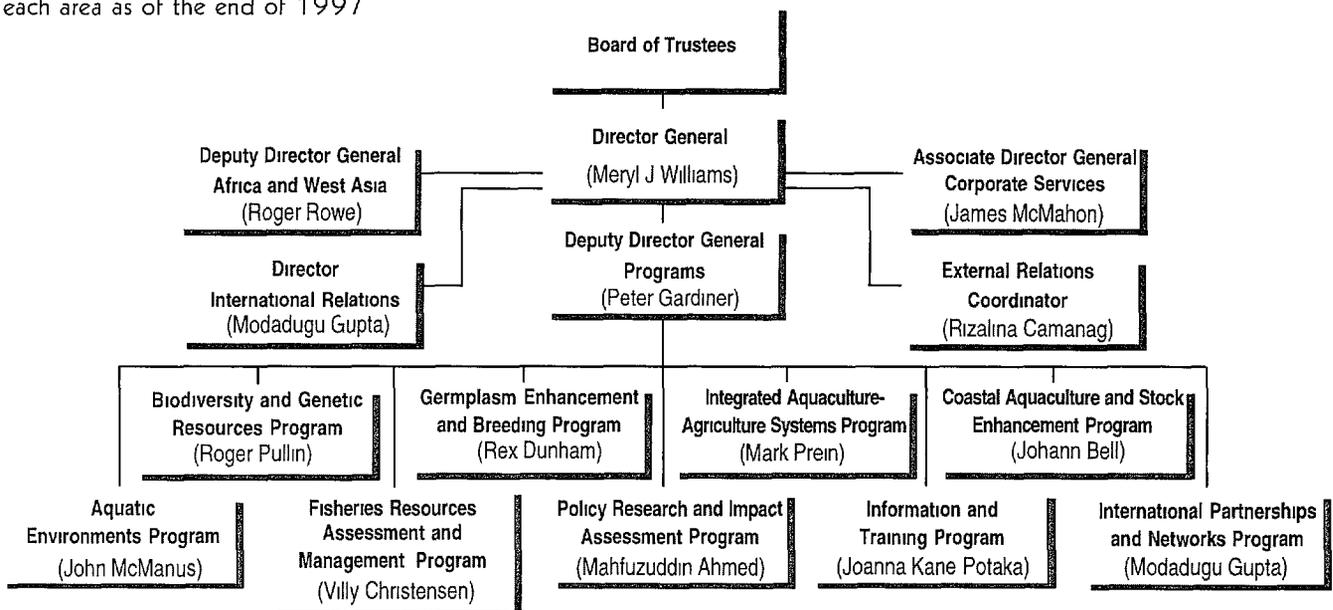
The Director General has a contract of employment with the Center. Each year, her performance is evaluated by the Board on the basis of a performance agreement drawn up at the start of the year.

All Board members are expected to act with integrity and objectivity and to maintain ethical standards in accordance with the Board Rules of Procedure (last updated April 1997), code of conduct and Board mission statement, and to adhere to the policies and procedures of the CGIAR.

At each meeting, the Board seeks to interact with staff within the organization at a professional level, to gain a greater insight into the Center's work and its conduct and to provide feedback and guidance to the Center.

## Organizational Structure

ICLARM's executive team oversees nine programs, diversified from three large programs in early 1996. A tenth program, focusing on fish health, is being developed. Below is the ICLARM organizational structure including the Director/Leader for each area as of the end of 1997.



## Staff

### Office of the Director General

Meryl J. Williams Director General  
Josephine Hernandez Executive Assistant  
Annabelle Ramirez Secretary (left 14 Oct)

### *Office of the Principal Science Adviser*

Daniel Pauly Principal Science Adviser  
Flordeliza Bravo Clerk Typist (left 31 Mar)

### Office of the Deputy Director General (Programs)

Peter Gardiner Deputy Director General/Programs  
Geraldine Gilera Secretary (left 15 May)  
Ma Lourdes Hortelano Senior Secretary (joined 1 Sep)

### Office of the Deputy Director General (Africa and West Asia), Egypt

Roger Rowe Deputy Director General (joined 15 Jan)  
John Craig Principal Scientist (joined 4 Feb)  
Brian Tierney Facilities Manager (joined 5 Feb)

### International Relations Office

Modadugu V. Gupta Director/Program Leader  
Edna Tuico Secretary

### External Relations Office

Marian Fuchs Carsch External Relations Director (left 31 Mar)  
Rizalina Camañag External Relations Coordinator (joined 21 Jul)  
Edeena Pike External Relations Assistant (left 30 May)

### Corporate Services Division

Susan C. Bonetto Associate Director General (left 19 Apr)  
James T. McMahon Associate Director General (joined 2 May)  
Rachel C. Josue Personal Assistant

### *Finance and Management Information Unit*

Yolanda Songsong Manager (left 3 Mar)  
Josefina Huldong Manager (joined 19 May)  
Arlene Balane Assistant Manager  
Ofelia Celestino Project Accounting Supervisor (left 30 Apr)  
Maruja Ventura Project Accounting Supervisor  
Edita Artates Senior General Accountant  
Liz Fernandez Financial Services Staff (left 30 Apr)  
Grace Marie Batario Project Accountant  
Maricar Narvacan Project Accountant (left 30 Jun)  
Mildred Pepito Project Accountant (joined 2 Aug)  
Napoleon M. Bulaquino Project Accountant (joined 2 Nov)  
Abcelyn Solidum General Accountant (joined 23 May)  
Ronabeth Icabardi Cashier

Merlie Beringuel Accounting Clerk (joined 13 May)

### *Projects and Administrative Services Unit*

Paulino V. Manese Manager  
Edgardo Nitorreda Administrative Services Staff (left 1 Jul)  
Esperanza M. Sadiua Management Associate (joined 17 Nov)  
Lorna Lou T. Arenas Program Assistant  
Rosenne Funk Program Assistant  
Nylofar Celia Gonzalez Program Assistant  
Jennifer Navarro Program Assistant (left 31 Jul)  
Maximin Luna Program Assistant (joined 14 Jul)  
Milagros Irene Robel Program Assistant  
Ma Gemma Calderon Administrative Assistant  
Ma Clotilde G. Alcantara Purchasing Assistant  
Belen R. Dagmil Communications Clerk  
Remedios Ugalde Receptionist/Administrative Clerk  
Adielle Ma. Corazon Teodoro Receptionist/Telephone Operator (left 31 Oct)  
Hazel Grace M. Tardo Receptionist/Telephone Operator (joined 28 Oct)  
Dominador Gomez Mechanic/Driver  
Benjamin Bayron Driver  
Florentino Paulino Driver  
Pedrosino Catubig Office Aide/Messenger  
Hermenegildo Magsino Office Aide/Messenger  
Emmanuel San Juan Office Aide/Messenger

### *Human Resources Unit*

Ana Isabel Llanaza Manager (left 5 Apr)  
Arnt Tore Valsvik Manager (joined 11 Apr)  
Theresa Anne Diaz Compensation Specialist (left 25 Jul)  
Susan Ballad David Management Associate (joined 15 Sep)  
Angelica Dayapan Human Resources Assistant

### *Computer Services Unit*

Wilfredo Fontano Local Area Network (LAN) Administrator/Unit Head (left 15 Nov)  
Cristina M. Carpio Information Technology Manager (joined 1 Dec)  
Allan Sesbreño Assistant LAN Administrator  
Samuel Adalia Programmer  
Noel Villanueva Programmer (left 31 Jan)  
Romeo Oite Computer Technician

### Biodiversity and Genetic Resources Program

Roger S. V. Pullin Program Leader/Principal Scientist  
Rainer Froese Senior Research Scientist  
Jan Michael Vakily Training Coordinator  
Ma Lourdes D. Palomares Software Development and Database Scientist  
Estelita Emily Capuli Research Associate  
Christine Marie Casal Research Associate  
Rodolfo Reyes, Jr. Research Associate  
Crispina Binohlan Senior Research Assistant

Pascualita Sa a Senior Research Assistant  
 Armi Torres Senior Research Assistant  
 Grace Pablico Research Assistant (joined 3 Feb)  
 Cristina Garilao Research Assistant  
 Portia Bonilla Programmer (left 31 Mar)  
 Alice Laborte Programmer (joined 24 Feb)  
 Jose Antonio Falcon HTML Programmer/Webmaster  
 Emma del Rosario Secretary (left 15 Oct)  
 Cynthia B Villaflo Secretary (joined 23 Oct)  
 Rachel Atanacio Artist  
 Ma Teresa Cruz Secretary

#### **Germplasm Enhancement and Breeding Program**

Ambekar E Eknath Program Leader/Senior Scientist (left 31 Dec)  
 Rex A Dunham Program Leader/Senior Scientist (joined 10 Nov)  
 Belen Acosta Research Associate  
 Marrietta De Vera Research Associate  
 Ravelina Velasco Senior Research Assistant  
 Hernando Bolivar Senior Research Assistant  
 Josephine France Rius Programmer  
 Cirilo Federigan Jr Administrative Assistant  
 Perla Virly Secretary  
 Florian Lopez Clerk Typist (left 31 May)  
 Jose Michael Igharas Clerk Typist (joined 6 May)  
 Norberto Cabrera Driver  
 Marietta Hechanova Research Assistant  
 Antonio Tadian Research Assistant  
 Rolando Villanueva Field Assistant  
 Leonardo Deguinat Field Assistant  
 Everlito Dela Cruz Field Assistant  
 Baldwin Reyes Field Assistant (deceased 5 Jul)  
 Mario Dela Cruz Field Assistant  
 Danilo Beltran Field Assistant  
 Camilo Celestino Field Assistant  
 Rogelio Estrada Driver/Field Assistant  
 Edna Dionisio Research Analyst  
 Felicima Longalong Research Analyst  
 Joseph Cruz Research Aide  
 Mario Danting Accounting Clerk  
 Teresita Gonzales Data Encoder

#### **Integrated Aquaculture Agriculture Systems Program**

Mark Prein Program Leader/ Senior Scientist  
 Mary Ann Bimbao Research Associate  
 Teresita Lopez Senior Research Assistant  
 Roberto Oficial Research Assistant  
 Farlyz Felix Villanueva Research Assistant  
 Emma Luisa Orenca Research Assistant (left 30 Nov)  
 Judith Foronda Secretary

#### **Malawi Office**

Randall E Brummett Project Director  
 Fredson Chikafumbwa Research Associate

Patience Kananji Project Assistant  
 Foster Makuwa Station Manager  
 Yusef Fulaye Technical Assistant  
 Issa Jaffari Technical Assistant  
 Alim Montjeza Technical Assistant  
 Silas Nsonthi Technical Assistant

#### **Bangladesh Office**

Satyendra Datt Tripathi Senior Aquaculture Specialist  
 Debashish Mazumder Research Associate  
 Bjoy Bhusan Debnath Administration Officer  
 Khan Golam Rasul Accountant  
 Abdur Razzak Driver  
 Rowshon Ali Messenger  
 Kazi Shafiqur Rahman Messenger  
 Tapan Chandra Sarker Messenger

#### **Coastal Aquaculture and Stock Enhancement Program**

##### **Coastal Aquaculture Centre, Solomon Island**

Johann Bell Program Leader/Senior Scientist  
 Rayner Pitt Manager  
 Stephen Battaglione Aquaculture Scientist  
 Idris Lane Assistant Manager  
 Annie Mercier Senior Research Associate (joined 1 Jul)  
 Evizel Seymour Research Associate  
 Kim Friedman Research Associate  
 Cletus Oengpepa Assistant Manager  
 Christian Ramofafia Scientific Assistant  
 Stephanie Pallay Information Officer  
 Kathy Launa Finance and Administrative Officer  
 Stenner Pitasua Administrative Assistant (joined 15 Sep)  
 Hugo Tafea Scientific Assistant  
 Feral Lasi Scientific Assistant  
 Patrick Timmy Scientific Assistant (left 14 Mar)  
 Ezekiel Jones General Mechanic  
 Riko Kell Secretary  
 Monica Beverley Receptionist  
 Henry Rota Purchasing Officer  
 Joseph H Boraule Purchasing Officer  
 Joseph Olisia Technical Aide  
 Jimmy Casper Technical Aide (joined 20 Oct)  
 Paul Mercy Technical Aide  
 John Suli Foreman  
 Andrew Peli Foreman  
 Derek Kalea Carpenter  
 George Lionel Labourer  
 Timothy Justilini Labourer  
 Texley Meve Labourer  
 Victor Simi Labourer  
 Fabian Matanikusika Assistant Mechanic (joined 15 Dec)  
 Rolland Jimmy Technical Aide  
 Jerome M Boraule Technical Aide  
 Jimson Te esanau Labourer  
 Solomon Saeti Labourer  
 Thomas T Teltoi Foreman  
 John Eke Technical Aide

Alfred Lau Technical Aide  
Mason Tauku Technical Aide  
Charles Toihere Technical Aide  
Tom Kavety Technical Aide  
Anna V Masuhuna Gardener/Cleaner  
Medlin Peli Gardener/Cleaner  
Grace Dalei Gardener/Cleaner  
Asneth Usu Gardener/Cleaner  
Rebecca Manisava Tour Guide  
Mary Naomi Tour Guide  
Margaret Faikiri Tour Guide (joined 8 Feb)

#### **Aquatic Environments Program**

John W McManus Program Leader/Senior Scientist  
Geronimo T Silvestre Research Scientist  
Ma Carmen A Ablan Research Associate  
Zoraida Alojado Research Associate  
Sheila Vergara Research Associate  
Len R Garces Research Associate  
Miriam Balgos Research Associate (left 31 August)  
Irene D Uy Senior Research Programmer  
Lambert Anthony Menez Senior Research Assistant  
Audrey Marie Banzon Research Assistant  
Maharlina Luz Gorospe Research Assistant  
Kathleen Patricia Reyes Research Assistant  
Ma Teresa Rodriguez Research Aide  
Cindy Cabote Secretary  
Kristine Santos Secretary

#### **Fisheries Resources Assessment and Management Program**

John Munro Program Leader/Principal Scientist  
Villy Christensen Senior Scientist  
Felimon C Gayanilo Jr Programming Specialist  
Francisco Torres Jr Senior Research Assistant  
Ma Rosandra Gayosa Secretary (left 28 Feb)

#### **Caribbean/Eastern Pacific Office**

Marguerite Watson Research Associate (joined 15 Feb)  
Anthony Peter Roberts Technician III (joined 31 Mar)

#### **Policy Research and Impact Assessment Program**

Mahfuzuddin Ahmed Program Leader/Senior Scientist  
Robert Pomeroy Senior Research Scientist  
Magnus Torell Secondment from SIDA  
Ingvild Harkes Associate Expert  
Brenda Katon Consultant  
Emmanuel Genio Jr Research Associate  
Arlene Garces Research Associate (left 30 Jun)  
Rowena Andrea Santos Senior Research Assistant  
Maritess Tiongco Senior Research Assistant  
John Marie Gacutan Research Assistant (left 31 Jul)  
Ma Josella Mayordomo Research Assistant (left 19 Nov)  
Marcel Gamon Research Programmer  
Anjanette Trinidad Juan Secretary

Ma Lucia Tungala Secretary

#### **Bangladesh Office**

Paul Thompson Social Scientist  
Gazi Nurul Islam Research Associate  
Manjural Kader Research Associate  
Khan Golam Rasul Accountant  
Anwarul Islam Computer Programmer  
Delwar Hossain Secretary  
Anwar Hossain Driver  
Rowshon Ali Messenger  
Kazi Shafiqur Rahman Messenger

#### **Information and Training Program**

Joanna Kane Potaka Program Leader  
Mary Judy Vizcarra Secretary (left 19 Dec)

#### **Publications Unit**

Leticia Dizon Managing Editor (left 24 Mar)  
Marie Sol M Sadorra Manager  
Rita Kapadia Senior Editor (joined 25 Aug)  
Sheila Siar Assistant Editor (joined 16 Oct)  
Ma Graciela Balleras Editorial Assistant  
Albert Contemprate Artist  
Alan Siegfried Esquillon Artist  
Alma Canuto Publications Assistant  
Rodel Resurreccion Distribution Clerk

#### **Library and Information Services Unit**

Rosalinda Temprosa Manager  
Norma Jhocson Librarian  
Erlinda Gonzalez Associate Librarian  
Adelina Mendoza Library Assistant  
Ma Isabelita Redulla Library Assistant  
Rosario Yabut Library Assistant  
Reynaldo Damalerio Library Aide

#### **Translation Services Unit**

Catherine Lhomme Binudin Translator/Consultant (left 30 June)

#### **International Partnerships and Networks Program**

Modadugu V Gupta Program Leader  
Madan M Dey Research Scientist  
Gaspar Bimbao Research Associate  
Natalie Macawaris Senior Research Assistant  
Maria Concesa Gayanilo Secretary

## Acronyms

|           |   |
|-----------|---|
| ACIAR     | Australian Centre for International Agricultural Research                         |
| ACP       | African, Caribbean and Pacific  |
| ADB       | Asian Development Bank  |
| AEP       | Aquatic Environments Program  |
| AFS       | American Fisheries Society, Asian Fisheries Society                               |
| AFSSRN    | Asian Fisheries Social Science Research Network                                   |
| AIT       | Asian Institute of Technology (Thailand)  |
| AKVAFORSK | Institute of Aquaculture Research of Norway                                       |
| ALCOM     | Aquaculture for Local Community Development                                       |
| APAARI    | Asian Pacific Association of Agricultural Research Institutes                     |
| APSF      | Australia and Pacific Science Foundation  |
| ASI       | Advanced Scientific Institution   |
| BCMELP    | British Columbia Ministry of Environment, Lands and Parks                         |
| BFAR      | Bureau of Fisheries and Aquatic Resources (Philippines)                           |
| BGRP      | Biodiversity and Genetic Resources Program  |
| BMZ       | Bundesministerium für Wirtschaftliche Zusammenarbeit                              |
| BRAC      | Bangladesh Rural Advancement Committee  |
| BRRRI     | Bangladesh Rice Research Institute  |
| BVI       | British Virgin Islands  |
| CAC       | Coastal Aquaculture Centre (Solomon Islands)                                      |
| CARICOM   | Caribbean Community   |
| CASEP     | Coastal Aquaculture and Stock Enhancement Program                                 |
| CEC       | Commission of the European Communities  |
| CFPQ      | Community Forestry Project Quirino (Philippines)                                  |
| CGIAR     | Consultative Group on International Agricultural Research                         |
| CHC       | Canadian High Commission  |
| CRED      | Centre for Resource and Environment Development (Bangladesh)                      |
| CRIFI     | Central Research Institute for Fisheries, Indonesia                               |
| CTA       | Technical Centre for Agricultural and Rural Cooperation                           |
| CTU       | CanTho University (Vietnam)   |
| Danida    | Danish International Development Assistance                                       |
| DARE      | Department of Agricultural and Resource Economics                                 |
| DEGITA    | Dissemination and Evaluation of Genetically Improved Tilapia in Asia              |
| DENR      | Department of Environment and Natural Resources (Philippines)                     |
| DfID      | Department for International Development (formerly ODA), UK                       |
| DGF       | Directorate General of Fisheries  |
| DIFRES    | Danish Institute of Fisheries Research  |
| DMC       | Developing member countries   |
| DOF       | Department of Fisheries   |
| EPOMEX    | Program of Ecology, Fisheries and Oceanography of the Gulf of Mexico              |
| ESCAP     | Economic and Social Commission for Asia and the Pacific                           |
| EU        | European Union  |
| EU STABEX | European Union Program to Stabilize Export Earnings                               |
| FAC/CLSU  | Freshwater Aquaculture Center of the Central Luzon State University (Philippines) |
| FAO       | Food and Agriculture Organization   |

|                             |   |
|-----------------------------|---|
| <b>FCRI/HAKI</b>            | Fish Culture Research Institute (Hungary)   |
| <b>FRAMP</b>                | Fisheries Resources Assessment and Management Program   |
| <b>FRI</b>                  | Fisheries Research Institute  |
| <b>FSP</b>                  | Fisheries Sector Program  |
| <b>GBRMPA</b>               | Great Barrier Reef Marine Park Authority  |
| <b>GCRMN</b>                | Global Coral Reef Monitoring Network  |
| <b>GEBP</b>                 | Germplasm Enhancement and Breeding Program  |
| <b>GIFT</b>                 | Genetic Improvement of Farmed Tilapias  |
| <b>GTZ</b>                  | Deutsche Gesellschaft für Technische Zusammenarbeit, GmbH (German Agency for Technical Cooperation) |
| <b>IAA</b>                  | Integrated agriculture aquaculture  |
| <b>IAASP</b>                | Integrated Aquaculture Agriculture Systems Program  |
| <b>IAB</b>                  | Institute of Aquatic Biology (recently renamed Water Resources Research Institute, Ghana)           |
| <b>IADB</b>                 | Inter American Development Bank   |
| <b>IDPPE</b>                | Institute for Development of Small scale Fisheries  |
| <b>IDRC</b>                 | International Development Research Centre(Canada)   |
| <b>IFAD</b>                 | International Fund for Agricultural Development   |
| <b>IFM</b>                  | Institute for Fisheries Management and Coastal Community Development                                |
| <b>IFPRI</b>                | International Food Policy Research Institute  |
| <b>IIMI</b>                 | International Irrigation Management Institute   |
| <b>IIRR</b>                 | International Institute for Rural Reconstruction  |
| <b>INGA</b>                 | International Network on Genetics in Aquaculture  |
| <b>IPGRI</b>                | International Plant Genetic Resources Institute (Italy)   |
| <b>IPNP</b>                 | International Partnerships and Networks Program   |
| <b>IRRI</b>                 | International Rice Research Institute (Philippines)   |
| <b>ISNAR</b>                | International Service for National Agricultural Research  |
| <b>ITP</b>                  | Information and Training Program  |
| <b>IUCN</b>                 | World Conservation Union  |
| <b>JCU</b>                  | James Cook University   |
| <b>JICA</b>                 | Japan International Cooperation Agency  |
| <b>MacArthur Foundation</b> | John D and Catherine T MacArthur Foundation   |
| <b>MAF</b>                  | Ministry of Agriculture and Fisheries   |
| <b>MAGFAD</b>               | Malaŵi German Fisheries and Aquaculture Development Project   |
| <b>MINCOOP</b>              | French Ministry of Cooperation  |
| <b>MOF</b>                  | Ministry of Fisheries   |
| <b>MOU</b>                  | Memorandum of Understanding   |
| <b>MRAG</b>                 | Marine Resources Assessment Group (London)  |
| <b>MRC</b>                  | Mekong River Commission   |
| <b>MTM</b>                  | Mid term Meeting  |
| <b>MTP</b>                  | Medium term Plan  |
| <b>NACA</b>                 | Network of Aquaculture Centres in Asia Pacific  |
| <b>NAGRI</b>                | National Aquaculture Genetics Research Institute  |
| <b>NARS</b>                 | National aquatic (or agriculture) research systems  |
| <b>NASA</b>                 | National Aeronautics and Space Administration   |
| <b>NCAR</b>                 | National Center for Atmospheric Research  |

|                |  |
|----------------|--|
| NFFTRC         | National Freshwater Fisheries Technology Research Center (Philippines)         |
| NGO            | Nongovernment organization(s)  |
| NORAGRIC/NORAD | Norwegian Center for International Agricultural Development                    |
| NRS            | Nationally recruited staff   |
| NSC            | North Sea Centre (Denmark)   |
| NTAS           | Network of Tropical Aquaculture Scientists                                     |
| NTFS           | Network of Tropical Fisheries Scientists                                       |
| OARD           | Office of Agriculture Research   |
| PCAMRD         | Philippine Council for Aquatic and Marine Research and Development             |
| PISCES         | Population Interdependencies in the South China Sea Ecosystem                  |
| PO             | Peoples Organizations  |
| PRIAP          | Policy Research and Impact Assessment Program                                  |
| PSU            | Prince of Songkla University   |
| RIMF           | Research Institute for Marine Fisheries (Indonesia)                            |
| RVAU           | Royal Veterinary and Agricultural University (Denmark)                         |
| SBMA           | Subic Bay Metropolitan Authority   |
| SEAFDEC/AQD    | Southeast Asian Fisheries Development Center Aquaculture Department            |
| SEARCA         | Southeast Asian Regional Center for Graduate Study and Research in Agriculture |
| SEED           | Sustainable Energy and Environmental Division (UNDP)                           |
| SGRP           | System wide Genetic Resources Program  |
| SIDA           | Swedish International Development Cooperation Agency                           |
| SINGER         | System wide Information Network on Genetic Resources                           |
| SLFSDP         | Sri Lanka Fisheries Sector Development Project                                 |
| SP PRCA        | Systemwide Initiatives Rights and Collective Action                            |
| SWIM           | System wide Initiative on Water Management                                     |
| TDC            | Tambuyog Development Center  |
| TNC            | The Nature Conservancy   |
| UBC            | University of British Columbia (Canada)  |
| UK ODA         | United Kingdom Overseas Development Administration                             |
| UM             | Universiti Malaya (Malaysia), University of Malawi                             |
| UNCLOS         | United Nations Conference on the Law of the Sea                                |
| UNDP           | United Nations Development Programme   |
| UNE            | University of New England  |
| UNEP           | United Nations Environment Programmes  |
| UPLB           | University of the Philippines at Los Banos                                     |
| UP MSI         | University of the Philippines Marine Science Institute                         |
| UPV            | University of the Philippines in the Visayas                                   |
| URI            | University of Rhode Island   |
| USAID          | United States Agency for International Development                             |
| USFRF          | University of South Florida Research Foundation Inc                            |
| WCMC           | World Conservation Monitoring Centre   |
| WRI            | World Resources Institute  |
| ZIM            | Zoological Institute and Zoological Museum (University of Hamburg)             |