Fisheries Training Courses Review for Advancement

Report of The Fisheries Training Courses Reviewing Committee

Partial translation of Suisan Bunya Kensyu Kosu Minaoshi Kentou Houkokusyo

March 1998

Japan International Cooperation Agency

Kanagawa International Fisheries Training Centre

Contents

Preface

The World fisheries production is reported to be 115 million metric tons (which include 31.5 million tons of fish meal) in 1996.

According to a prediction done by Food and Agriculture Organization (FAO), the demand of fisheries products will be 120 million tons in the year 2010 (average consumption of 13 kg multiplied by the expected world population), while the supply will be declined to between 73 million tons to 105 million tons.

This will cause a shortcoming of 19 million tons even in a good scenario.

In order to counter this shortcoming, the following measures are essential to be carried out.

(1) Introduction of resource managed type fisheries

(2) Reduction of post harvest loss which is estimated to be 20 million tons and the reduction of by- catch disposals.

(3) Development of untapped resources

(4) Increased production through aquaculture

As the fisheries training courses of JICA need to streamline with this world trend, the Training Department of JICA has initiated a study to review the current training courses and their conducting methods to search for the desirable way of course structure and implementation.

The main concerns of the study are; (1) what kinds of courses that developing countries truly need, and (2) what kinds of courses are effectively conducted in Japan, which are also the goals of Kanagawa International Fisheries Training Center (KIFTC) of JICA as the major training hub in Japan. Discussion has started with the analysis of 14 courses currently offered by JICA and ideas for improvement are developed.

In the process of discussion, the framework for training courses was made and the future direction was suggested. The courses should have the following characteristics: (1) restricting the selection of participants by occupation, (2). courses designed to specifically fit to the participants countries and regions, (3) focusing on the course target, and (4) short course period. This framework will be applied not only at KIFTC but also at other training centers to develop and implement new training courses.

Viewing the establishment of Yokohama International Center (YIC) planned to be opened in the year 2002 and the transfer of the function of KIFTC to YIC, the ideas for desirable training courses are developed during the study. The role of KIFTC as a center of fisheries training speciality to implement these ideas during the transition period is vitally important and its aggressive involvement is expected.

I hope this study report will be utilized effectively for the improvement of training courses in fisheries sector. For the courses suggested to change to be started in 1999 according to this report, appropriate action should be taken immediately.

Finally, I would like to thank the Fisheries Training Courses Review Study Committee members for their advice and heated discussions to realize this report.

Naoyoshi Sasaki

Managing Director, Kanagawa International Fisheries Training Center

Japan International Cooperation Agency

Chapter 1 Course of direction for the review of fisheries training courses

1-1 Training overview

The number of participants in counterpart technical training scheme in fisheries sector received in Japan was 264 in fiscal year 1996 (accumulated number is 5,128 by this time). This figure indicates 15.1 % (19.3 % when accumulated) of all participants from agriculture, forestry and fishery sectors. The participant number of 1,745 (26,513 accumulated by 1996) is 2.4 % (3.4 % accumulated by 1996) of the overall number of JICA counterpart training participants which is 10,908 (151,936 accumulated by 1996).

The recent trend of the counterpart training undertaken by JICA shows the increase of human resources development in senior staff of developing countries' governments. The area of cooperation has shifted toward support of national democratization as well as global issues such as environment and population problems. This trend is evidenced, for example, in the increased share in number of participants who are in planning and administrative positions from 13.9 % in the past (accumulated by 1996) to 18.8 % in fiscal year 1996 .

With the recognition of this trend, it is hard to imagine that JICA is able to respond to every need of the countries in the world and to increase the number of participants only in the field of fisheries as there is organizational and budgetary constraints.
It is, however reasonable to predict the share of the number of fisheries sector participants to be somewhere around 3 % of the total number of JICA participants.
The next table shows the budget (actual disbursement) of JICA's technical cooperation activities in fiscal year 1996. This table also indicates that the share of fisheries area is about 3 % of the whole technical cooperation scheme.

Table 1-1 Budget of JICA

	Fisheries sector	Whole Agriculture sector	Whole JICA
Technical Cooperation Scheme of JICA (Disbursement base, unit 1000 yen)			
Counterpart training	758,362 (2.9%)	5,291,238 (20.0%)	26,555,167
Dispatch of Expert	2,617,053 (6.3%)	14,450,177 (31.6%)	41,721,246
Dispatch of study team	1,353,037 (3.0%)	9,102,550 (19.9%)	45,831,579
Dispatch of JOCV volunteers	270,657 (1.7%)	2,802,615 (17.2%)	16,246,262
Purchase of Equipment	562,578 (3.2%)	4,200,178 (23.6%)	17,800,021
Others	3,511 (0.1%)	22,877 (0.1%)	6,078,018
Total	5,565,231 (3.6%)	35,872,635 (23.3%)	154,235,293
Grant aid scheme (Commitment base, unit million dollar)			
Grant aid	76.38 (3.1%)	431.41 (17.8%)	2,416.06

Source: Japan's Official Development Assistance, 1997 Ministry of Foreign Affairs
JICA Budget Table, 1997.3, JICA

Considering the situation mentioned above, fisheries training courses need to focus on the important areas of cooperation and to give certain limitations on the target group. Furthermore, it is important to develop training curricula with scopes broader than fisheries field, including the components of other areas important to economic cooperation such as environment, marketing, economy, basic social needs (education, food, WID, welfare).

1-2 Summary of the course of direction

Following is the summary of the course of direction to be taken.

1. Training of people those who will be involved in coastal fishery (small scale and artisanal fishery) management and development. Key Words: Poverty, Organization, Resource management, Resource recovery, Sustainable and responsible fishery, Development of none utilized resources, Reduction of post harvest losses
2. Training of people those who will contribute to development of fisheries industry for local consumption as well as for export. Key Words: Promotion of industry, Processing of

fisheries products, Quality assurance of fisheries product for export, Sustainable and responsible aquaculture

3. Cooperation and coordination with other ODA schemes (Grant aid, Yen (OECF) loan, Project type cooperation, Development study, Expert and JOCV) to efficiently assist the recipient countries.

1-3 Summary of Important Points for the Implementation of Training Courses

1. Introduction of regional oriented training courses with consideration of significant differences among regions in terms of development stage, fisheries scale as well as language.
2. Introduction of 3rd country training scheme at countries where facilities and staff are well advanced as the result of implementing project-type technical cooperation and/or grant aid scheme.
3. Establishment of mutually beneficial cooperation with regional and international organizations such as SEAFDEC to create more effective training courses.
4. Development of the resource system to facilitate the individual needs of participant even for group training courses as the needs also differ from country to country.
5. Reinforce individual activities within group training courses and encourage the training for other area rather than within metropolis.

Chapter 2 Analysis of Training courses

2-1 The history of fisheries training courses and their issues

The first fisheries training course was developed in Japan by Asia Association in Misaki City, Kanagawa prefecture in 1961. It was named Misaki International Fisheries Training Center (MIFTC). The course was handed over to Overseas Technical Cooperation Association (OTCA), and its successor JICA. The location of the center was moved to Nagai in Yokosuka City in 1974, and the name was also changed to Kanagawa International Fisheries Training Center (KIFTC). By the end of 1996, 1420 (excluding individual training and the trainees in the field other than fisheries) participants were trained in these training centers.
New courses are added and some courses have been reformed in order to adapt to the changing needs of developing countries.

For JICA's fisheries training history, Misaki Center period (1961-1974) was the time of founding the base of training scheme. The next 9 years ending in 1982 were the period of expansion and, the next 9 years (from 1982 to 1991) were recognized as the period of substantial growth (KIFTC 1991, 30 years Foot Steps).

After these periods, an important study, " A Study for Fisheries Training and its Desirable Implementation System" was conducted in 1992. In accordance with the recommendation from the study, JICA' s fisheries training courses have drastically been reorganized.

The number of participants received annually at KIFTC has been increasing from 14 in 1961, 31 in 1974, to over 50 during 1980s, and over 110 participants (this number includes individual training participants) since 1994. It was a person-to-person type of time consuming training course in 1960s which trained the participants to be specialists for development of coastal fisheries in their countries. As the number of participants increased

and the number of training courses such as Fishery Cooperative Course, Aquaculture Course, Marine Engine Course were added to meet the needs of the developing countries in the 1970s and 1980s. 1990s is the turning period to conduct courses more efficiently by shortening the training period, rationalizing the course contents, and selecting courses that match the diversified needs of development countries.

However, to create new courses to meet diversified needs and ability of participants, the course contents have been rather specific, and the number of participants in a course have been reduced as the number of courses increased. In a way, KIFTC's group training course is shifting toward individualization. At the same time, there is an effort to conduct customized individual training to be grouped so that the participants with same interest areas can learn together. To meet the needs of participants and keep efficiency at the same time is always the challenge for JICA staff.

For JICA staff, it used to be hands-on experiences to arrange and support the lectures as well as taking care of the participants' daily life. As the number of courses increases and the courses are contracted out to outside sources, it can not be denied that the distance between the participants and JICA staff is not as close as desired.

With this extensive history of JICA's training courses, there are some lessons learnt and the following obstacles and difficulties are cleared.

There is no other institute that offers short training courses in fisheries all year round except for JICA's KIFTC. It was in Misakai 40 years ago when epoch making achievement to own training vessel and set nets for the training for participants from developing countries was made. It was also an important step to own a laboratory and experimental facility for the improvement of aquaculture training in 1980s. However, KIFTC did never have permanent researchers (and lecturer) to quickly adjust to the trend of fisheries development in

developing countries and upgrade the training and technical advancement nor there was enough support system for training as well as laboratory and research facilities.

Lecturers are from outside, and all the practical courses and laboratory experiments were outsourced to public institutions, public and private universities as well as private companies. This caused some instability in course management and the measures taken were always temporary.

For institutes that KIFTC wishes to outsource for training, there are only a few institutes which accept the duty as an organization. The reality is, it is a voluntary effort of a few staff members in the institutes that offer some training within their own capacity.
It is time to review the Japanese support system for the training as a whole.

There is a problem limiting effectiveness of training courses due to the difference in working languages. Especially, for Latin American participants whose mother tongue are Spanish or Portuguese, and for those participants who use French, courses conducted in English are not fully understandable. It has been pointed out that those who lack English language ability often had problems communicating with lectures and cannot participate in vital discussions.

Furthermore, there is neither follow-up nor support system for the participants when they go back to their countries. There are many cases those skills and knowledge obtained in Japan cannot be utilized as expected due to their countries' particular reasons.

There are cases that the information for invitation for the courses does not reach relevant organizations or individuals in prospective countries so that the selection process of the candidate is rather insufficient. Because of this problem, unqualified or unsuitable participants were recruited. This problem coupled with the fact that the country report is not

prepared beforehand obviously affects the effectiveness of course implementation.

Despite these obstacles and problems, JICA is making effort to improve the quality of training courses. As JICA is promoting "Japanese citizens participatory foreign assistance", more activities are encouraged to be done in local domain. There are a number of fisheries training courses conducted by JICA branch centers other than KIFTC nowadays.
At the same time JICA recognizes the effectiveness of 3rd country training courses (training course done outside of Japan for developing countries in the region and technically and financially supported by JICA). Technique-oriented and regional-specific courses are shifted to 3rd country training.

KIFTC, as the core center of JICA's fisheries training activities, has the important role to determine the course of future training, to control the contents and level of training and to manage the standard of effectiveness of all the fisheries training courses.

2-2 Analysis of Currently- Offered Courses

We will start the analysis by examining the implementation of the twenty courses recommended in " A Study for Fisheries Training and its Desirable Implementation System" (here in after, The Desirable Implementation Study).

Then, we classify the courses into five sub-sectors : Fishery, Aquaculture, Hull and Engine Maintenance of Small Fishing Boat, Fish Processing, Fisheries Policy and Administrations. Each course is farther investigated within these sub-sectors.

2-2-1 The progress since "Desirable Implementation Study" and its constraints

The "Desirable Implementation Study" recommended 20 courses, but with the regional variety considered, it becomes 24 courses. Six years have passed since the Study, and 16 courses are now considered to be realized if 3rd country training courses are included. The achievement rate is 67%.

In addition to those courses, 3 other courses are also conducted.

Actual implementation situation in accordance with sub-sectors is as follows.

For fisheries sub-sector, course for African countries as well as course for Middle East countries have not been realized. There are courses offered in Oceania and in Latin America as 3rd country training.

For fisheries policy and administrative sub-sector, fisheries economics and management course as well as fisheries statistics course are not realized yet. Fisheries statistics course should include data collection practice and analysis method.

For aquaculture sub-sector, it has not been divided into 2 regional-oriented courses. Freshwater aquaculture course and Shellfish culture course are conducted as 3rd country training. However, these courses are regional and not satisfactorily developed yet.

Hull and engine maintenance of small fishing boat course was recommended to be divided into 4 courses: (1) Out board engine maintenance course, (2) Small diesel engine maintenance course, (3) Hull of small fishing vessel maintenance course and (4) Freezer and refrigerator maintenance course. As there have been no division, 3 courses were considered but not realized.

For fish processing sub-sector, 2 recommended courses were already realized.

The course of conservation of fishery environment was recommended and it is realized by the course called " Bioproduction and Environmental Management in Semi-enclosed sea" offered at JICA's Chugoku International Center.

By overlooking the situation, it becomes obvious that the courses for Spanish, Portuguese, and French speaking countries are still difficult to conduct.

2-3 Analysis of courses in Sub-sectors

2-3-1 Fishery Sub-Sector

There are the following 4 courses offered in Japan and 2 courses offered in 3rd countries.

(1)Coastal fishing training and extension course

(2)Fishing gear development and design course

(3)Seminar on fishery resource management

(4)Fishery science and technology course

(5)Coastal fishery technology course in Papua New Guinea

(6)International fisheries seminar in Argentina

Fishing technology differs in accordance with natural conditions, cultures and customs of the countries and regions (Technology has nationality). It is thus rather hard to conduct a group training course to satisfy all participants' need from all over the world. It is true that during the beginning of fishery development, training of basic technology and fishing method was beneficial for all of the developing countries. However, as basic technology has been widely used nowadays, it is important to reconsider the direction and needs of training.

For Coastal fishing training and extension course, it is increasingly harder to conduct practical fishing training. It is also found that the occupation of participants themselves are now shifting more to land-based than sea-going. There are not so many chances to utilize what they learnt in Japan at their home countries even though this course recruits participants mostly from young staff members with high school-level education as well as fishermen. It is also hard to recruit participants who take leading role in the field of fishing technique. In order to seek for more effective training, the number of participant in this kind of course is appropriate to be limited to five.

There are overlaps among lectures in Fishing gear development and design course, Seminar on fishery resource management, and Fishery science and technology course. Seminar on fishery resource management also has some overlaps with "Fishery oriented resource management course" in Aquaculture sub-sector. Fishing gear development and design course is lecture-oriented course and requires both field-type technique (mending net, fishing technique and etc.) and academic ability (for example, mathematics and physics). It was found difficult to recruit well-qualified participants. This course has particularly many overlaps with other courses mentioned above.

The application rate for the Fishery sub-sector courses in the past 3 years is as follows.

Table 2-1 Demand rate of Fishery Sub-sector Courses

(1)For Coastal fishing training and extension course	211 %	278 %	167 %
(2)Fishing gear development and design course	173 %	100 %	111 %
(3)Seminar on fishery resource management	278 %	486 %	n.a.
(4)Fishery science and technology course	143%	300 %	342 %

n.a.: not available as the information was not available at the time.

From the above table, demand for Fishing gear development and design course seems minimal.

In order to make Fishery sub-sector courses more efficient and effective, there is a need to look into the overlaps of course in more detail so that the curriculums are reorganized. Shaping and merging as well as abolishing some of the course contents should be also considered.

Course / Year	[illegible]	[illegible]	'97
1. For Coastal fishing training and extension course	[illegible]	[illegible]	[illegible]
2. Fishing gear development and design course	[illegible]	[illegible]	[illegible]
3. Seminar on fishery resource management	[illegible]	[illegible]	[illegible]
4. Fishery science and technology course	[illegible]		

In order to reorganize the courses, 3 main themes (courses) of the fishery sub-sector are suggested here. They are (1) Resource management type of fishery (approach of fishery from biological, fishing gear efficiency, social, economic and political viewpoints), (2) Resource survey and analysis (including statistics and stock assessment), (3) Promotion of fisheries through diversification of fishing methods and development of unutilized resources.

For those fishing techniques and methods which were introduced and proved to be successful though not well used in the region, 3rd country training is appropriate.

Coastal fishery technology course offered in Papua New Guinea is a good example of such course. Its practical part of course is well developed. This course is going to be terminated by next year. The implementation of cost sharing of the course is one of the difficulties, which may cause the discontinuation of the course.

The international seminar course offered in Argentina is purposed to provide the latest knowledge and technology in fisheries sector for government staff of Latin American countries. Although the course receives high appreciation from the participants, the participants themselves are often from other sectors than fisheries, which reduces the effectiveness of the course.

There is a regional fisheries training center, SEAFDEC in Thailand for the South East Asian countries. It will be ideal to cooperate with this institute and conduct 3rd country training course. It is appropriate for Japanese government to continue supporting SEAFDEC through facility improvement, replacement of equipment and dispatch of experts.

2-3-2 Aquaculture sub-sector

There are following 4 courses offered in Japan and 3 courses offered in 3rd countries.

(1)General aquaculture course

(2)Fishery oriented resource management course

(3)Fish pathology and environmental management of aquaculture course

(4)Bioproduction and environmental management in semi-enclosed sea course

(5)Fresh water aquaculture course in Malaysia

(6)Coastal aquaculture course in Philippines

(7)Shellfish culture course in Chile

Considering the effectiveness of the General aquaculture course, it seems more effective when KIFTC had its own aquaculture facility because the participants could practice and experiment even at nighttime. As the practical part of course is outsourced, it is divided into small segments, and nighttime experiment is hard to conduct.

The program contents of General Aquaculture Course include issues from cultivation of natural food organisms, fish rearing, fish diseases, and management of aquaculture farm, which cover the knowledge of all the areas of aquaculture so that the participants can learn basic techniques of aquaculture. It is, however, difficult to satisfy the needs of all the participants as their technical and objective level as well as the species they are interested in are widely varied. The need to divide this course into marine water aquaculture and fresh water aquaculture has been pointed out often, though it has not been realized yet.

The demand for this course has been constantly high over the past three years (1995-1997) with the demand rates of 215%, 227% and 282% respectively.

Despite the implication of the course name, Fishery-oriented resource management course is actually a re-make of its predecessor, Marine ranching course that was also offered at Kochi University. It will be more appropriate if the name is changed to Aquaculture-based fishery course (*Saibai gyogyou*), or Fishery based on produce and rearing course (*Tsukuri sodateru*

gyogyo), or New marine ranching course to fit the contents of the course and avoid confusion with Fishery sub-sector course. This course has characteristics of offering selective subjects to meet the diversified interests of the participants. There are some overlaps in lectures with Fishery sub-sector courses, but it is unavoidable as the theme itself includes both aquaculture and fishery.

Although Japan is the most advanced in this area, it is now necessary to develop the technology that can be easily applicable (monetarily as well as technically) to the developing countries. This type of course should be conducted continuously at universities and/or research institute (laboratory). The demand for this type of course is considered high in the South East Asia and Latin American countries that havemore advanced fishing industry than other developing countries. The demand rate for this new course was 111 % (1998).

Fish pathology and environmental management of aquaculture course deal with highly demanded area of fish disease and red tide problem. This course is adapted from Fish physiology and pathology course which was also conducted at Shimonoseki Fisheries College. This course is targeting at the participants from South East Asia, Middle East, and Latin American countries that have more developed aquaculture than other developing countries. As there is a problem in the language, it may be more appropriate to conduct the course alternatively in English and Spanish. The demand rates of the course in the past 3 years are 143 % (1995), 114 % (1996) and 286 % (1997).

Bioproduction and environmental management in semi-enclosed sea course is a new course offered at Hiroshima University under JICA's Chugoku International Center. It is expected to provide training in fishery environment conservation.

There is another new course developed, which is related to aquaculture, that is Sustainable Use of Marine Micro Organisms and Marine Natural Chemicals course. This course will provide a training that is related to biotechnology.

As these courses have not been started at the moment of this study, it is too early make any comment.

Coastal Aquaculture Course offered jointly by Ministry of Agriculture of the Philippines and SEAFDEC Aquaculture Department is receiving participants not only from South East Asia but also from other Asian countries. SEAFDEC Aquaculture Department has been conducting research and development of aquaculture suitable for the South East Asia for many years and providing training for member countries. This institute also publishes newsletters and reports to provide the latest information to the ex-participants and relevant institutions in the world.

The Fresh water aquaculture course offered at Agricultural University of Malaysia seems to use the facility at the University and the faculty staffs are initiating the course management. There are other countries that also have potential to offer this type of course in the region such as Thailand and the Philippines. If a course is to be offered in other places, it is suggested together the know-how learnt in the present course.

Shellfish Culture Course in Chile is useful for Latin American countries and should be considered to continue. As the needs for this kind of course is high in Oceania, a 3rd country training in Oceania should be also considered.

2-3-3 Fish processing sub-sector

There are following 2 courses offered in Japan and 1 course offered in 3rd countries.

(1)Handling and Primary Processing of Fisheries Products Course

(2)Quality Assurance of Marine Food Course

(3)Fish Processing Course in Peru

Handling and Primary Processing of Fisheries Products Course has weight on on-board handling of fish and primary processing. This course is targeting at the participants who require only basic technology for their works. There is still request from participants to increase practice on board. However, it is found that the knowledge levels of participants are not equal and the demand differs so much. There is a need to clearly describe the purpose and the level of the course to differentiate from Quality Assurance Course, and the education level required for this course should be lowered to high-school graduate level not university-graduate level.

The technology used in Japan is very advanced and not always applicable in developing country and the level of lecture seems a little advanced too. This course should be conducted more on practical and experimental basis rather than lecture-oriented such as on-board handling of fish and usage of ice.

For the lecture of this course, there are some overlaps with Quality Assurance Course. It is inevitable to have same topic in the lecture, however, the contents of the lecture should be much simpler in this course. There is a need to review the contents of lecture, and the composition of lecture and practice. Shortening the period of the course should be considered too.
Demand rates for this course in the last 3 years are 175 % (1996), 225 % (1997), and 338 % (1998). The demand is getting rather high in this course.

For Quality Assurance for Marine Food Course, there is the same problem as Handling Course as the knowledge levels of participants differ significantly. Clearly stated course contents and careful selection of participants are recommended. Further, there is a shortage qualified HACCP lecturer to meet the need of developing countries. Visit to fish processing factories is limited to seeing the process through observation view window. However, the demand for this course is rising from 120 % in 1995 to 167 % in 1996, and 238 %

in 1997.

Fish processing course conducted in Peru as a 3rd country training offers wide range of training subject. This course deepens the basic knowledge of fisheries resources and processing. The course deals with topics ranging from handling of raw materials to development of new fishery products. It also offers lecture on HACCP. As this course is open for Latin American countries and beneficial, JICA should consider continuing it.

2-3-4 Hull and Engine Maintenance of Small Fishing Boat Sub-Sector Course

There is only one course available in JICA training course. However, Coastal Fishery Course offered in Papua New Guinea includes similar components.

Hull and Engine Maintenance of Small Fishing Boat Course offers the lectures and practices on structure of fishing vessel, diesel engine maintenance, outboard engine maintenance, electrical equipment maintenance, refrigerator and freezer maintenance. Majority of the course contents is in practice. There is a small but continuous need for this course to help maintaining the equipment donated by Japanese grant aid. This course is offering more freedom in selecting the specialty during the later part of the course in order to meet the needs of each participant. There was a suggestion to give certificate (such as engine maintenance license) to the participants after a successful completion of the course as an incentive to raise their learning motivation. However, it is cautioned that the participants with such a license are more likely to resign from the government and to start their own business.

It was recommended in the 1992 "Desirable Implementation Study Report" that the course should be divided into four courses; Hull Maintenance, Outboard Engine Maintenance, Diesel Engine Maintenance, Refrigerator and Freezer Maintenance Courses. Effort was made but it was found that the course could not be split due to difficulty in negotiation with

contracted institutions and the loss of efficiency as some of the recommended courses will become extremely short. Nonetheless, it seems possible to set Outboard Engine and Diesel Engine as separate courses. The Hull Maintenance, however, served only limited needs, making it unfeasible to be set out separately.

The demand rates of this course in the last 3 years are 156 % (1995), 78 % (1996) and 112 % (1997).

There is no 3rd country training conducted in this sub-sector. It may be possible to start 3rd country course based on the JICA project in Paita, Peru. Private sector's involvement in this field to conduct local training should also be sought.

2-3-5 Fisheries Policy and Administrations Sub-Sector Course

There are following three courses currently offered in Japan. No 3rd country training is offered.

(1)Seminar on Fisheries Development Planning Course

(2)Fisheries Management and Cooperatives (Intensive) Course

(3)Seminar on Planning and Management of Fishing Port and Marketing System Course

Seminar on Fisheries Development Planning Course offers general subjects such as fisheries regulations and laws, fisheries resource management, aquaculture development, marine environment conservation, coastal zone management as well as a special subject that is selected each year. All course work consists of lectures and discussions. It is emphasized that this sort of course is useful to obtain knowledge to make a Master Plan for the country's fisheries development. It is also suggested that the age limit of the participants should be increased to 50 years old instead of current 40 years old so that more high-ranking planning officer can be qualified for this course.

This course has been popular and the demand rate of this course has increased for the last 3

years from 160 % in 1995 to 330 % in 1996, and 378 % in 1997.

Fisheries Management and Cooperatives (Intensive) Course is a result of a reform of the course which has been offered more than 20 years. The course period was shortened so that the high-ranking administrative officers can participate with minimum absence from their office. As there is a need to learn Japan's advanced fisheries cooperative organization system, the demand for this course has been constant. The reputation of this course is high among former participants. There is a tendency for highly motivated participants to come to this course. This course has increased the time for discussion and introduced new research and management skills to the participants.
The demand rates for this course in the past 3 years are; 100 % (1995), 180 % (1996), and 200 % (1997).

However, seeing the fact that fisheries cooperative does not work most of the time in developing countries, there should be more emphasis in discussion on organization and institution building method as well as the case study of successful cooperative activities. The case study should start from the beginning stage of formation of organization, and practical example should be used. The approach and attitude of administrative officer to poor fishermen is important and the skills for participatory rural appraisal are essential to learn.

In order to attract busy government administrator, further reduction of course period may be needed. Nonetheless, busiest high-ranking officials may attend shorter seminar courses rather than this course. The target group of this course should be core persons responsible for extension and awareness program for fishermen's organization. It is recommended that extension officers in charge of fish market and distribution system should attend the Seminar on Planning and Management of Fishing Port and Marketing System Course.

Seminar on Planning and Management of Fishing Port and Marketing System Course offers lectures on establishing fishing port and distribution system as well management of facility and system. For the lectures on facility management and distribution, there are some overlaps with Fishery Cooperative Course. As mentioned in the previous paragraph, selection of participants is important and currently done through consideration of their job description. Physical part of the management, however, is needed to be more emphasized as the size and function of the port and equipment affect the financial plan greatly. Knowledge useful for the planning stage of the project is necessary. As we expect to receive participants with experience, the period of time should be able to satisfy their needs.

The demand rates of this course in the last 2 years are 214 % in 1996 and 229 % in 1997.

2-4 Analysis of 3rd Country Training in the Fisheries Sector

JICA offered 99 3rd-country group-training courses in 23 countries in 1996. It is 10 courses more than the previous year. The number of participants was 1,538 from 117 countries (242 from host countries and 1,296 from other countries). 61 (sixty one) % of the 3rd country courses are offered in Asia and the Oceania region, followed by Latin American region (22 %), and Middle East and Africa region (17 %). (Source: Summary Table of 3rd-Country Training, 1997.4., JICA Training department)

Though it is a planning stage, JICA is receiving 1,527 participants in 112 3rd-country training courses offered in 22 countries in 1997. As the total number of participants JICA is receiving in 1997 is 6,120, the share of 3rd-country training participants is already a quarter of the participants.

There are six (6) fisheries sectors in 3rd country training courses receiving 109 participants in 1997. The course names and the number of participants being received are as follows. (Source: Summary Table of 3rd-Country Training, 1997. JICA Training department)

(1)Fresh water Culture Course in Malaysia (15 participants)

(2)Coastal Aquaculture Course at SEAFDEC in Philippines (17)

(3)Coastal Fisheries Development Course in PNG (16)

(4)International Fisheries Seminar course in Argentine (18)

(5)Shellfish Culture Course in Chile (22)

(6)Fish Processing Course in Peru (25)

Besides the 3rd-country group training course, there is a 3rd-country individual training scheme in JICA. This course is mainly for the counterparts of Japanese experts to be trained in 3rd countries. Thirty-six participants utilized this scheme in 1996. The same

number is planned for 1997.

For fisheries sector, 4 counterparts are being trained in Philippines (2 participants for fresh water culture), Bolivia (trout culture), and Chile (shellfish culture).

As seen above, JICA is promoting 3rd-country training in recent years, and the significance of this move is summarized in the box, next page.

This significance is fully applicable to fisheries sector courses. In principle, most of technique-oriented courses except for those only available in Japan should be conducted as 3rd-country training course. In reality, however, it is still hard for a number of developing countries to financially and administratively co-sponsor the course. There are still needs for substantial amount of support for developing countries until they can initiate the course. Therefore,3rd-country training is most applicable at the site that had completed JICA's Project Type Technical Cooperation or regional and international training institution where facility as well as manpower is well developed.

In fisheries sector, SEAFDEC (South East Asian Fisheries Development Center), NACA (Network of Aquaculture in Asia), Fisheries Department of SPC (South Pacific Committee) and Caribbean Fisheries Development and Training Center are some of the available regional institutes.

Box 2-1 The significance of 3rd-country training

(1) It will make possible the transfer of more appropriate technologies to the participating countries as technologies locally adapted are easier to transfer than the complicated ones developed in advanced countries.

(2) The environment of the training is more acceptable for the participating countries because the culture, language, weather and climate of the host countries are similar to the countries in the region.

(3) As the cost of the training course is usually less expensive in developing countries than in Japan due to lower per diem cost and travel expenses, it is possible to invite more participants.

(4) As the host country is responsible in organizing the training course such as preparing curriculum and recruiting participants, organizational skills and further acknowledging self-help effort will be improved.

(5) By exchanging and sharing technologies, knowledge, and experience among the participants in the same region, and workingtogether for mutual development, it is hoped to support the participating countries to achieve self-reliance as a group.

Although the 3rd-country training system is limited to technical transfer in general, it is suggested for the future, that 3rd-country training course should focus on the problem-solving type courses that will tackle particular problem in the region or realize the opportunities.

In order to make the courses more effective, the course is put into a 5-year series of workshop possibly with equipment and short term experts provided. The contents of the course should be evolved as the workshop deals with new problems and finds solutions each year.

Box 2-2 Three styles of 3rd -country training courses

(1) 3rd-Country Group Training Course: Upon the request of a host country, JICA will approve the course after studying the training institute and curriculum. The course is usually set for 5 years and recruit 10 to 15 participants from neighboring countries.

(2) 3rd-Country Individual Training Course: Institutions suitable for 1-2 person training in developing countries are identified by JICA each year. Participants in the relevant area are recruited.

(3) There is also a scheme to complement a 3rd-country course by offering a part of the course in Japan so that the updated information regarding the training course is instructed in Japan.

In the Fisheries sector, type (1) and (2) courses are already offered. In the future, type (3) course may be more appropriate when Fresh water culture course is realized.

2-5 Analysis of training Courses offered by other Organizations

In this section, we mainly observe courses offered by Overseas Fisheries Cooperation Foundation (OFCF), Japan, and South East Asian Fisheries Development Center (SEAFDEC).

2-5-1 Training Courses of OFCF

OFCF's training courses are mainly for the technical staff as well as fishing boat crew of Japanese joint- venture companies and technical tie-up companies. There is only one course offered for administrators and researchers of recipient countries (1998 plan), and the number of participants is 5 compared with the total OFCF participants of134.

Outline of the courses is as follows.

-Group training course: 21 weeks, 30 participants-

This course is offered for fisheries technical staff of Japanese joint-venture and technical tie-up companies. The purpose of the course is to train the staff to promote smooth management of the companies.

-Short training course: 8 weeks, 15 participants-

This course is offered for senior technical staff of the joint-venture companies and the participants who have completed the Group training course to improve technical skills.

-Management course: 8 weeks, 15 participants-

This course is offered to middle to senior management staff of the joint-venture companies to provide wide range of operation and management knowledge and understanding of Japanese system.

-On-land training course for fishing vessel crew: 11 weeks, 13 participants-

This course is for the officers and cadets of fishing vessels. It is composed of lectures and practices on land to provide essential knowledge.

-On-board training course for fishing vessel crew: 44 weeks, 30 participants-

This course is for fishing vessel crew of the joint-venture companies. Participants obtain fishing techniques through on-board practices.

-Training course for leader in fisheries sector overseas: 35 weeks, 5 participants-

This course is for administrator and researchers of the countries which have fishing agreement with Japan. The course offers a chance to study at fisheries education institutes and research laboratories to educate leaders to understand Japanese fisheries.

-Fishing technology course for the South Pacific countries: 10 weeks, 16 participants-

This course is for the participants recommended by Pacific Island Countries that have friendly relationship with Japan. This course offers coastal fishing technology practice, maneuvering and maintenance of small fishing boats.

Individual training course: 10 participants

This course responds to the particular individual training needs .

2-5-2 SEAFDEC Training Department (Thailand)

SEAFDEC Training Department offers regular as well as special-subject training courses for international, regional, and local participants. Three regular courses are conducted for the period of 4 to 5 months. The courses are Marine Fishing Technology, Marine Engineering, and Fisheries Extension Courses. The courses vary slightly year by year. Special-subject courses are usually shorter. Following is the training course plan for the next 3 years.

Underlined are regular international or regional courses.

Training course plan for 1998

Regional training course in the operation and maintenance of marine engines (Feb- June)

Regional short-term training course in pelagic fisheries (Mar- Apr)

Local short-term training course in fishing technology for university students (Apr)

Regional short-term training course in refrigeration for fishing boats (Aug - Sep)

Regional training course in responsible fishing technology (Aug - Dec)

Local short-term training course in fishing technology for university students (Oct)

International training course for fishery extension officers in extension methodology and responsible fishing. (Oct - Dec)

Training plan for 1999

Regional training course in marine engineering for fishing boats (Feb - Jun)

Regional short-term training course in purse seine fisheries (Mar - Apr)

Local short -term training course in fishing technology for university students (Apr)

Regional short-term training course in hydraulic machinery (Aug- Sep)

Regional training course in responsible fishing technology (Aug - Dec)

Local short-term training course in fishing technology for university students (Oct)

International training course for fishery extension officer in extension methodology and fishery cooperative (Oct - Dec)

Training plan for 2000

Regional training course in the operation and maintenance of marine engines (Feb - Jun)

Regional short-term training course in longline fisheries (Mar- Apr)

Local short-term training course in fishing technology for university students (Apr)

Regional short-term training course in marine electricity and electronics (Aug - Sep)

Regional training course in responsible fishing technology (Aug - Dec)

Local short-term training course in fishing technology for university students (Oct)

International training course for fishery extension officers in extension methodology and the socio-economics of small-scale fisheries

2-5-3 SEAFDEC Aquaculture Department (The Philippines)

SEAFDEC Aquaculture Department offers six regular short-term courses each year. It also provides extension service and follow-up of training courses through newsletter publication, video tapes as well as research reports. Courses offered in 1997 are shown below. It has started to conduct 3rd country training of JICA since 1994 (Marine Aquaculture)

Production of food organisms	March 5 to April 3
Aquaculture management	April 1 to April 30
Management of fish health	April 15 to may 26
Marine fish seed production	June 9 to July 29
Fresh water culture	September 2 to October 10
Fish nutrition	October 23 to December 3

It is ideal for a training institution to have its own researchers, strong connection with universities and other research institute, own facilities and equipment in order to keep pace with the development of technologies and change of social environment. SEAFDEC seems to have realized the ideal situation. Besides the two departments introduced here, there are Marine Fisheries Research Department (Singapore, mainly fish processing), and Marine Fishery Resources Development and Management Department (Malaysia). Each department has strong relationship with universities and research institutes in the Asia.

2-5-4 Other Organizations

There are more international and regional organizations that have research and training functions. International Center for Living Aquatic Resources (ICLARM) in the Philippines,

South Pacific Commission (SPC) in New Caledonia, Caribbean Sea Fisheries Development and Training Center (Trinidad and Tobago) are some of them.

SPC has its own specialist stationed in its Head Quarter in New Caledonia and is organizing workshops and researches which fit the current need of each country. Its role as information dissemination and provider is quite important.

FAO also organizes and sponsors workshops flexibly so that it fits the immediate needs of the countries as well as making a long - term plan for development.

These training courses are practical workshop but the duration of the course is set minimum.

The role of universities and polytechnic schools in some countries is certainly important. Some of these schools provide education to fit the situation of the developing countries.

Chapter 3 Present situation and issues of Fisheries, The needs of developing countries

3-1 The World Fisheries Situation and Problems

3-1-1 International agreement

In 1994, United Nations Convention on the Law of the Sea has come into effect. Coastal countries have obtained the rights and responsibilities for the usage and management of the marine resources in the area up to 200 miles from the coast line (Exclusive Economic Zone).

FAO has passed the resolution on " Code of Conduct for Responsible Fisheries" in December 1995. In order to utilize fishery resources sustainably, a number of targets were established. Those target areas include fisheries management, fisheries operations, aquaculture, integration of fisheries into coastal area management, post harvest practices and trade, fisheries research, and special requirements of developing countries (more in the box on the following page).

At the International Conference on the Sustainable Contribution of Fisheries to Food Security held in Japan in 1995, Kyoto Declaration and Plan of action was formulated. The Kyoto Declaration and Plan of Action was later endorsed at FAO's Fishery Committee Meeting in Rome in 1997. In order to implement the Code of Conduct, both developed and developing countries have shifted their fishery policy from development-oriented to full and sustainable usage of the resources. During the meeting, the Committee also stressed to reduce the excessive fishing capacity and fishing effort, and the importance of resource survey, resource management, and aquaculture. It is confirmed that the need of regional as well as bilateral cooperation is necessary to manage highly migratory species and straddling stocks. Technical and financial assistance to developing countries is further required.

3-1-2 Fisheries production

The world fisheries production in 1995 was 120.7 million tons (including algae production). The production has been increasing, though slightly, both for marine and fresh water production since 1992. Production of fresh water fisheries product was 1.3 times and marine production was 1.1 times, and algae production was 1.2 times higher in 1995 than 1992. The increase of fresh water production was mainly from aquaculture in China. Marine fisheries production hasn't been growing in the recent years, perhaps due to El nino. Production of sardine has been declining all over the world.

From the prospect of longer period, the world fisheries production grew steadily during 1960s to 1980s. However, recent fisheries production shows the end of the production growth. By now, most of usable fishery resources have been tapped, and some resources are exhausted or near exhaustion condition.

When looking at aquaculture production, it grew 3.6 times from the production of 7 million tons in 1984 (when FAO started to include aquaculture production in its statistics) to 25.46 million tons in 1994. This amount is 22 % of the total production of 117.43 million tons in 1994. Further, the share in the supply for food purpose (77 million tons) is 33 %.
Fisheries production in the developing countries (excluding algae) was merely 30 % of the world production but it has increased to 40 % in 1995.

3-1-3 Demand and Supply Situation

In 1995, the fisheries production for food supply was 82.13 million tons, which is 73 % of the total production of 112.91 million tons (excluding algae). Average per capita consumption of fisheries product in 1991 to 1993 was 13 kg. Further, from economic development view point, it was 27.9 kg in developed countries, 10.3 kg at developing countries as a whole, and 9.2 kg in LLDC countries. Consumption at developing countries whose population is 80 % of world population increased by 10 % since 1988 to 1990 in average. On the contrary, the

consumption level decreased at developed countries by 14 %.

According to the prediction of FAO, in order to keep the 13 kg consumption level in 2010, 91 million tons of food supply of fisheries product (assuming the world population of 2010 as 7.032 billion) is required. In 2050 (with population assumed to be 9.8 billion), 130-million tons of supply are required.

3-1-4 Trading of Fisheries Products

The world trade of fisheries products in 1995 amounted to US$ 56 billion in total import, and US$ 42 billion in total export. The volume has been increasing year by year. The share of low-income food deficit countries in the export amount was 19 % and the share is gradually increasing. As such, the importance of developing countries in fisheries products trade is getting augmented. The share of the developing countries in the trade was estimated to be 48 % in 1994. For those countries experiencing economic development, fisheries is more prosperous.

However, as fish hygiene and quality assurance concept is introduced in the recent years in developed countries (such as HACCP; Hazard Analysis and Critical Control method), developing countries face the difficulties to fulfill the requirement due to lack of facility and technical expertise. This situation causes the refusal of import from developed countries and declining price.

As the demand-supply information spreads around the world within a second, it is not possible to make fisheries development plan for even the countries of far remote area without vision of global viewpoint.

3-1-5 Small-Scale Fisheries

The fisheries production by small-scale fisheries in the world is said to be about a half of the total production. Majority of small-scale fisheries production is for food supply. Further, this type of fisheries not only supplies food for the local community but also provides job opportunities vitalizing the local economy.

Nonetheless, the small-scale fisheries have problems such as declining of fisheries resources due to the coastal-area concentrated fishing operation, competition with capitalized fishing, and conflict over fishing grounds between upper-class fishermen (trawl) and lower-class fishermen (angling). As fishery shifts from harvesting to aquaculture-based, it poses technical, institutional as well as financial difficulties to the fishermen as it will cause poverty and unsuitable living conditions to fishing villages and fishermen who depend highly on fishing activities.

Box 3-1 Code of Conduct for Responsible Fisheries

Code of Conduct for Responsible Fisheries (Summary)

Adapted by the FAO Conference in December 1995

1. Fisheries Management

Introduce management measures.

Reduce excess fishing capacity for depleted stocks.

Trans-boundary, straddling and highly migratory stocks including high seas stocks Should be managed by the countries concerned multilaterally. For this purpose, Collaboration among the countries through sub-regional and regional fishery bodies Should be enhanced.

Collect and analyze reliable statistics on catch and effort and update them regularly.

Protect interests of small-scale fisheries by setting aside an exclusively reserved zone.

Conduct monitoring and surveillance and enforce laws and regulations on fishing Activities.

Conserve ecosystems and aquatic habitats.

2. Fishing Operations

Use selective, environmentally safe and cost-effective fishing gears and techniques.

Prohibit dynamite, poisoning and other destructive practices.

Minimize waste, discards, catch by lost or abandoned gear, catch of non-targeted Species, both fish and non-fish species, in particular, endangered ones.

Suspend fishing masters or officers who do not respect the rules and regulations relating to the operation of fishing vessels.

Install artificial reefs and fish aggregation devices for increasing stock population and Fishing opportunities.

3. Aquaculture

Use environmentally safe culture practices.

Minimize the harmful effects of introducing non-native species.

Minimize the use of hormones, drugs, antibiotics and other disease control Chemicals.

4. Integration of Fisheries into Coastal Area Management

Conserve coastal ecosystem.

Adapt multidisciplinary policy and program for integrated coastal resources Management.

5. Post-harvest practices and trade

Set minimum standards for safety and quality assurances (FAO/WHO Codex Alimentarius).

Reduce post-harvest losses and waste by spoilage.

Improve the use of by-catch.

Encourage the use of fish for human consumption and promote increased consumption of fish.

Develop value-added products for developing countries.

Respect the principles and obligation of the WTO Agreement regarding fish trade by Liberalizing trade and eliminating trade barriers such as duties, quotas, and no-tariff Barriers against fish products.

6. Fisheries Research

Research on all the fisheries aspects listed above should be encouraged to put fisheries

Development on sound scientific and sustainable basis.

7. Special Requirement of Developing Countries

Countries, relevant international organizations, whether governmental or non-Governmental and financial institutions should provide financial and technical Assistance, technology transfer, training and scientific cooperation to developing

Countries, including in particular the least developed among them and small island Developing countries so that they can develop their own fisheries as well as to Participate in high sea fisheries.

Box 3-2 Plan of Action on the Sustainable Contribution of Fisheries to Food Security

Plan of Action on the Sustainable Contribution of Fisheries to Food Security

The International Conference on the Sustainable Contribution of Fisheries to Food Security, Kyoto, December 1995

1. To assess and monitor the present and future levels of global, regional and national Production, supply and demand of fish and fishery products and their effects on food Security, employment, consumption, income, trade and sustainability of production.
2. To enhance sub-regional and regional cooperation and establish, where appropriate, sub-regional and regional fishery conservation and management organizations or arrangement for straddling fish stocks and highly migratory fish stocks; and cooperate to strengthen, where necessary, existing sub-regional and regional fishery conservation and management organizations and arrangements in order to carry out their assigned tasks.
3. To conduct, within their competence and, where appropriate, in cooperation with regional and other intergovernmental organizations, integrated assessments of fisheries in order to evaluate opportunities and strengthen the scientific basis for multi-species and ecosystem management.
4. To identify and exchange information on potential mechanisms to reduce excessive fishing capacity and implement action on programs to reduce excess capacity, where and when appropriate, as soon as possible.
5. To develop, promote and facilitate the exchange of information on the use of efficient and standardized methodologies for the study of social, cultural and economic

characteristics of fishing and associated activities; and, in particular, attempt to develop methods designed to permit verifiable indicators of the importance of such characteristics and their interaction and compatibility with management objectives.

6. To promote allocation of human and financial resources for an international program to investigate the effectiveness of multispecies management of commercial fishery resources.

7. To increase efforts to estimate the quantity of fish, marine mammals, sea birds, sea turtles and other sea-life which are incidentally caught and discarded in fishing operations; assess the effect on the populations or species; take action to minimize waste and discards through measures including, to the extent practicable, the development and use of selective, environmentally safe and cost-effective fishing gear and techniques; and exchange information on methods and technologies to minimize waste and discards.

8. To promote the exchange of information amongst research institutions and other relevant entities aiming to : (i) increase opportunities for the sustainable use of unexploited or under-exploited species as human food; and (ii) promote and support research activities in order to ensure improvement in scientific knowledge of existing fishery resources.

9. To strengthen coordination of national and international research programs aiming to stimulate environmentally sound aquaculture and stocking, giving emphasis to the development of international guidelines for the development and management of activities in particular on: (i) the impacts on the environment and biodiversity; (ii) the application of biotechnology; and (iii) the health of cultured stocks.

10. To provide and coordinate technical and financial assistance programs for developing countries, in particular low-income food-deficit countries (LIFDCs) and small island Developing states, and encourage cooperation between theses countries, in order to achieve the contribution of fisheries to food security through,

inter alia: (i) a rapid transfer of technology and know-how in enhancement in inland and marine waters;

(ii) an upgrade and increase of the capabilities needed to minimize post-harvest losses; and (iii) ensuring improved control of fishing activities within areas under national jurisdiction.

3-2 Present Situation and Problems of Japanese Fisheries

3-2-1 Fisheries Production

Fisheries production in Japan has been declining since 1985. It was 11.46 million tons in 1985 and became 7.489 million tons in 1995. This makes Japan rank four in world fisheries production following China, Peru and Chile. This decline is mostly due to the decline of sardine resource around Japan.

Looking at this decline by category, distant and offshore fishing production has declined 10 % in 1995 compared to the previous year. Though the coastal fishery production increased by 1 %, the coastal resource condition itself has leveled off or slightly declining. Thus it is hard to imagine further increase of production from the coastal area.

3-2-2 Trading

Japan is not only one of the top fisheries production countries but also has been the number one importer of fisheries products in the world since 1983.

Demand for fisheries products in Japan has been increasing gradually from 8.2 million tons in 1990 to 8.9 million tons in 1995. As the local production leveled off, import of high-valued fisheries product has been increasing. Because of the poor catch of Japanese sardine, it is also imported to fill the gap of demand for feed and fertilizer.

The import statistics shows that the amount of import increased to 3.58 million tons which was 9 % increase from the previous year. In terms of money, it was ¥1,721.2 billion (or approximately US$ 17 billion) and 1 % increase from the previous year. Major countries which export to Japan were the United States (¥30.0 billion, 13 % of the total), China, Thailand, Russia and Indonesia. The share of these 5 countries sums up to 48 % of the total import. Looking at the import by products, fish meal was mostly imported from Chile and Peru. These 2 countries' share was over 80 % in terms of money. Share of prawn and

shrimps imported from Indonesia, Thailand and India sums up 55 %. Tuna and marine were imported mostly from Taiwan and Korea, Cods are dominantly imported from the USA (80 %). For salmon and trout, they were imported from the USA, Canada, Chile, and Norway. Crab species are imported from Russia (50 %).

Export of fisheries products from Japan declined to 240,000 tons or 19 % less than the previous year. The value of the export declined by 10 % to be ¥110.8 billion in the same period.
Destinations of the export were Hong Kong, the USA, Taiwan, Korea, and Swiss. These 5 countries sum up to 60 % of the total export value.

The top export products were pearl amounting 35 % of the total export value. For fresh, chilled and frozen fish category, skip jacks, salmon and trout showed an increase.

3-2-3 Demand and Supply

Self-sufficiency of the fisheries products has declined from 86 % in 1985 to 59 % in 1995. The total supply of the fisheries product became 17.48 million tons with the help of import, though the total demand declined to 12.22 million tons that was 3 % less than the previous year. This figure is explained as the demand for feed and fertilizer has been declining though the demand for food is still increasing.

3-2-4 Financial Management of Fishing Bodies and the Work Force Structure

The number of fishing business has been declining in all marine aquaculture, set net and land based seine net fishery, coastal fishery, small medium size companies as well as large companies. The decline is due to the decline of income as well as the shortage of successors for fishing business.

The number of fishers was peaked 800,000 in 1953 when statistics survey started. Since

then the number has been declining steadily and shows the age of fishers older ever. Shortage of workers in coastal fishery and aging of the fishers present a threat of declining fishery production and disappearance of fishing villages. It is urged to recruit young and middle-aged fishermen immediately.

Decline of new recruitment for ship crew for fishing vessel is continuing too. As the age of ship crew becomes older, shortage of the workforce is becoming serious. As the number of licensed staffs such as officers and engineers are in short supply, there is a concern about the future of fishing activities.

As the shortage of ship crew continued, it is approved to hire foreign ship crew. There is an increased need for training of this foreign ship crew.

3-2-5 Fishery Promotion Policy and Fishery Management

United Nations Convention of the Law of the Seas (UNCLOS) was enacted in Japan in July 1996, and the 200 miles EEZ was declared. Following this action, Total Allowable Catch (TAC) for 6 species (Pacific saury;*Cololabis saira*, Alaska pollack; *Theragra chalcogrammus*, Jack mackerel; *Trachurus japonicus*, Spotlined sardine; *Sardinops melanostictus* Mackerels; *Scomber spp.* and Snow crab; *Chionoecetes apilio*) were declared thus the new fishery management system that monitors and manages directly the amount of catch is introduced.

This new management system together with the existing management system, resource managed type fishery and aquaculture based fishery are expected to sustain and increase the fisheries resources so that the Japanese will be able to enjoy stable and sufficient amount of fisheries product.

In this situation, Japanese fishery promotion policies in the sea surrounding Japan are; 1) to increase fisheries resource survey, 2) to promote appropriate fishery resource management, 3) to promote and establish managed-type fishery, 4) to reconstruct fisheries production

structure, 5) to promote and expand aquaculture- based fishery, 6) to promote rational use of the ocean, 7) to work on EEZ, and 8) to promote inland fishery.

These policies are in line with global trend of fishery policy and some of them are ahead of other countries.

Besides above mentioned policy, there are other important measures taken for Japanese fishery. Those are; counter measures to 1) the suffering fishing bodies enterprises, 2) distribution, processing and consumption, 3) environment protection, 4) fishing production facility, securing overseas fishing rights, and international cooperation.

3-3 Outline of Present Situation and Training Needs of Each Region

3-3-1 Oceania (Pacific Island Countries)

Fishery is an important economic activity in the Pacific Island Countries. In this region, the fishing activities are polarized into 2 groups. One is a subsistent fishery in coastal coral lagoon area and the other is offshore industrial fishery targeting at tuna species for export market. Per capita fish consumption in these island countries is estimated to be 40 kg, thus providing important protein source (FAO World fisheries and aquaculture 1996).

The fisheries resources in the coral area, however, are vulnerable and the increasing fishing effort and destructive use of dynamite and poison have caused the decline of resources.
Offshore tuna resources have been a big source of bringing foreign currency through entry fees (fishing right fee) from foreign fishing vessels coming into this area. Some countries have shifting their stance from earning entry fees to developing their own and joint-venture fleet to tap this important resource. Forum Fisheries Agency (a Regional Fisheries Management Organization under the Pacific Forum) has been working to manage and conserve highly migratory species (tuna species) as well as assisting fishing entry fee negotiation with distant water fishing countries.

Japan has provided a number of tuna long-line fishing vessels to some countries in the region under fisheries grant aid scheme. The operations of these vessels have not been successful under recipient countries' full operation condition mostly due to the difference of working customs and lack of management skills.

For aquaculture, there are some countries that have succeeded in pearl oyster culture that brings an important foreign currency to the countries. Efforts are being made to culture giant clam species (Tridacnidae) , top shell (*Trochus niloticus*) to re-seed or rehabilitate demolished resources. These kind of stock enhancement activities also provide chances to

have new export materials (for aquarium market and natural shell button market).

Papua New Guinea and Fiji have started tilapia and carp species culture for local consumption. By utilizing the characteristics of coral reef area environment where abundant of the solar energy, carbohydrate as well as nutrient salt are available, algae culture will be important in the future.

The accumulated number of participants who have attended JICA's group training courses in fisheries from the countries in this region by 1996 is as follows.

Fiji (28 participants), Kiribati (8), Federal State of Micronesia (9), Papua New Guinea (40), Solomon Islands (7), Tonga (11), Tuval (2), Vanuatu (2), Samoa (4), Marshall Islands (1)
Total 10 countries and 112 participants

It is reasonable to find the majority (over 60 %) of the participants were from Fiji and Papua New Guinea, the two most highly populated countries in this region. However, it should be mentioned that those of much less populated countries also sent participants for the countries' fisheries development.

The next table shows the share of the participants from this region classified by the characteristics of the courses.

Table 3-3-1 The number of Participants from Oceania Region to JICA Training Course in Fisheries (up to 1996)

Course Names	Number (% in the region)	Share of this region to the world (%)
Fishing tech. Type Practice/extension	47 (42 %)	8%
Fishing tech. Theory Type	12 (11 %)	6%
Fisheries Coop. and Management type	13 (12 %)	6%
Aquaculture General type	4 (4 %)	2%
Engine and Hull Maintenance type	28 (25 %)	25%
Fish handling and Processing type	3 (3 %)	5%
Policy, Management seminar type	5 (5 %)	11%
Total	112 (100 %)	8%

From this table it is seen that high percentage of participants was sent to Fishing Technology Practice/Extension Courses followed by Engine and Hull Maintenance Course. When looking at these figures to the world, the Engine and Hull Maintenance course's share is 25 % , much higher than the 8 % which is the share of Oceania for all courses. This shows the high priority of this course in Oceania. In the same way, the Policy Management Seminar is 11 % of the world share. On the contrary, the share of Aquaculture course is 2 %, which indicates that the demand for aquaculture was not high until this time. However, as research and development study for the potential of aquaculture have been going on in Tonga and other countries, unique aquaculture practices for Pacific Island countries is anticipated when resource enhancement and management method are established.

According to the JICA's Country Development Assistance implementation Guideline 1996 for this region, the main target is the economic independence and stable growing economy. Every country puts high priority in fisheries development such as expansion of fisheries

production, promotion of fisheries industries. Activities include development of fishing port, fisheries resources survey and management, fishing and aquaculture technique development and extension.

3-3-2 Asia (Southeast Asia, Southwest Asia, China)

The Oceans in this region have abundant fisheries resources and the number of population engaged in fisheries activities is large. However, there is a large gap between Southeast Asia where fish production as well as consumption is quite high and northern Southwest Asia where fish consumption is not common.

Special note is given to rapid development of China's fisheries. China has become the world number one fisheries production country as it started distant water fishery in 1985 and fresh water aquaculture developed. As the economy in the coastal area of China grows, the consumption of fisheries product shows a high demand. The action of China certainly affects the condition of world fisheries resources and marketing and distribution of the fisheries product. Pollution of rivers in China raises a problem of its inland fishery.

The accumulated number of participants who have attended JICA's group training courses in fisheries from the countries in this region by 1996 is as follows.

Bangladesh (26 participants), Myanmar (Burma) (29), Cambodia (1), China (13), India (14), Indonesia (79), Korea (5), Malaysia (61), Moldives (10), Nepal (1), Pakistan (10), Philippines (78), Singapore (15), Sri Lanka (58), Thailand (97), Vietnam (2)

Total 16 countries 500 participants

The share of Southeast Asian countries consisting of Thailand, Philippines, Indonesia and Malaysia is over 60 % of the participants from this region. Southwestern Asian countries like Sri Lanka, Bangladesh, and Myanmarfollow this group.

Cambodia sent only one participant in 1974, so as Nepal in 1991. Vietnam sent one in 1961 and the other one in 1974. India started to send participants in 1996 after 10-year absence. These countries are considered unable to send participant due to political reasons.
Korea stopped sending participants in 1983 and Singapore did the same in 1989, where economic development was well achieved.

Table 3-3-2 The number of Participants from Asia Region to JICA Training Course in Fisheries (up to 1996)

Course Names	Number (% in the region)	Share of this region to the world (%)
Fishing tech. Type Practice/extension	225 (45 %)	36%
Fishing tech. Theory Type	81 (16 %)	42%
Fisheries Coop. And Management type	96 (19 %)	46%
Aquaculture General Type	44 (9 %)	24%
Engine and Hull Maintenance type	11 (2 %)	10%
Fish handling and Processing type	26 (5 %)	43%
Policy, Management seminar type	17 (3 %)	36%
Total	500 (100 %)	35%

Looking at this table, the number of both Fishing Technology Practice/Extension and theory seems large. This, however, is due to the fact that there were many participants in the early years of the history of JICA training course. There is no participant in these courses from Asia region in recent years. Fisheries Cooperative and Management course shows a constant demand.

The share of Asian participants to the world is 35 %. The fact that Fisheries Cooperative and Management course as well as Fish Handling and Processing type course show high percentage of 46 % and 43 % respectively indicating the significance of these areas .

According to the JICA's Country Development Assistance implementation Guideline in 1996 for this region, each country except for Singapore, Myamar and Laos recognized the importance of fisheries related assistance. The main targets for these countries are improvement of food self sufficiency, sustainable development and promotion of agriculture and fisheries. Their actions included improvement of fisheries and aquaculture technique and extension, resource management and conservation of environment.

3-3-3 Africa (Sub- Sahara)

Fishery has an important role in Sub-Sahara African countries as the supply source of animal protein, earning foreign exchange as well as providing employment. Fresh water fishery is especially important in this area for the local fisheries product supply, as the production becomes 40 % of the total fisheries production. However, over exploitation and introduction of exotic species have caused a change of ecosystem of inland waters in recent years. Problems of local species extinction and over luxuriant waterweed have been observed. Conservation of environment and resource management measure is urgently needed.
Small and extensive freshwater aquaculture is gradually becoming popular and it is hoped to be more popular.

The accumulated number of participants who have attended JICA's group training courses in fisheries from the countries in this region by 1996 is as follows.

Benin (14 participants), Cameroon (7), Cape Verde (1), Comoros (11), Equatorial Guinea (11), Eritrea (1), Gabon (2), Gambia (16), Ghana (11), Guinea (6), Guinea Bissau (3), Cote d'Ivoire (15), Kenya (32), Madagascar (2), Malawi (8), Mauritania (6), Mauritius (7), Mozambique (4), Nigeria (33), Sao Tome & Principe (12), Senegal (19), Seychelles (6), Siera Leone (4), Somalia (22), Sudan (10), Tanzania (28), Togo (2), Uganda (3), Zambia (4)
Total 29 countries 300 participants

African countries have started to send more than 10 participants per year since 1983. The number has been increased to 20 participants in recent years. Those countries that have sent more than 15 are; Nigeria, Kenya, Tanzania, Somalia, Senegal, Gambia and Cote d'Ivoire. The share of these countries in Africa is 55 %. Three countries are from East Africa facing the Indian Ocean and four are from West Africa facing Atlantic Ocean. All the countries are quite active in fisheries.

Half of the participants went for Fishing Technology Practice/Extension type courses followed by Fisheries Cooperative and Management course and Engine and Hull maintenance course.

Table 3-3-3 The number of Participants from Sub-Sahara Africa Region to JICA Training Course in Fisheries (up to 1996)

Course Names	Number (% in the region)	Share of this region to the world (%)
Fishing tech. Type Practice/extension	156 (52 %)	25%
Fishing tech. Theory type	26 (9 %)	14%
Fisheries Coop. And Management type	38 (13 %)	18%
Aquaculture General Type	24 (8 %)	13%
Engine and Hull Maintenance type	34 (11 %)	31%
Fish handling and Processing type	8 (3 %)	13%
Policy, Management seminar type	14 (5 %)	30%
Total	300 (100 %)	21%

The share of the African participants to the world is 21 % while Engine and Hull maintenance as well as Policy Management Seminar type courses show higher share of 31 %

and 30 % respectively.

According to the JICA's Country Development Assistance implementation Guideline 1996 for this region, each country except for Ethiopia and Cote d'Ivoire recognized the importance of fisheries related assistance. The main targets for these countries are improvement of fisheries and rational utilization of the resources. Their actions include development of freshwater aquaculture, conservation of inland water environment, improvement of distribution system and other infrastructure, improvement of fishing technology and extension work.

3-3-4 Latin America (Central and South America, Caribbean Island Countries)

These countries are diversified in terms of size and environment as well as the types of fisheries ranging from huge industrial purse seine fishery to artisanal fishery in island countries. Other characteristics of the region are that small pelagic fish is the major part of the fisheries production in this area, and the catch changes drastically as environmental changes and overfishing.

In Mexico, Peru, Chile, Argentine, Brazil and Uruguay, the development of marine fisheries and inland water fisheries have reasonably been developed and their direction is now toward such product processing improvements as utilization of by-catch species, decreasing the loss from processing, and processing of small pelagic species for human consumption.

For aquaculture development, shrimp culture is well developed in this region. Salmon culture is successful in Chile. Fresh water aquaculture is widely done.

The accumulated number of participants who have attended JICA's group training courses in fisheries from the countries in this region by 1996 is as follows.

Argentine (13 participants), Antigua and Barbuda (1), Barbasos (1), Belize (1), Bolivia (4),

Brazil (38), Chile (14), Columbia (36), Costa Rica (5), Cuba (7), Dominica (6), Ecuador (17), El Salvador (1), Grenada (3), Guatemala (2), Guyana (7), Haiti (3), Honduras (7), Mexico (74), Nicaragua (11), Panama (14), Peru (71), St. Christopher and Nevis (3), St. Lucia (1), St. Vincent (4), Suriname (2), Trinidad and Tobago (2), Venezuela (8), Uruguay (9), Dominica (1) Total 30 countries 366 participants

Those countries that have sent more than 30 participants are, from large one, Mexico, Peru, Brazil and Columbia. These four countries have sent 60 % of the participants from this region. Antigua and Barbuda, Barbados, Belize, and St. Lucia sentonly one participant more than10 years ago. Guatemala, Guyana, Haiti, St. Vincent, St. Lucia, Trinidad and Tobago have not sent a participant for more than 5 years.

Table 3-3-4 The number of Participants from Latin America Region to JICA Training Course in Fisheries (up to 1996)

Course Names	Number (% in the region)	Share of this region to the world (%)
Fishing tech. Type Practice/extension	133 (36 %)	21%
Fishing tech. Theory type	54 (15 %)	28%
Fisheries Coop. And Management type	49 (13 %)	24%
Aquaculture General Type	78 (21 %)	43%
Engine and Hull Maintenance type	27 (7 %)	25%
Fish handling and Processing type	19 (5 %)	31%
Policy, Management seminar type	6 (2 %)	13%
Total	366 (100 %)	26%

In Latin American region, 36 % of the participants took Fishing Technique Practice/Extension type courses followed by aquaculture course. However, the number of participants from this region for aquaculture course is 43 % of the world participants and

Fish Handling and Processing type course also shows a high share from this region which depict the priority of this region.

According to the JICA's Country Development Assistance implementation Guideline 1996 for this region, each country except for Costa Rica, Guatemala and Paraguay recognized the importance of fisheries related assistance. The main targets for these countries are increased fisheries production, increased competitiveness of export oriented products, development of undeveloped area and improvement of income in poverty-stricken area. Their actions included development of fisheries development plan, organizing fishermen group, improvement of fishing aquaculture and processing technique, extension work and resource management as well as conserving environment.

3-3-5 Middle East, North Africa and Europe

None of the country in the Middle East and North African region sees fisheries as a main economic activity. Fisheries are diversified, ranging from industrialized fishery off the Morocco's Atlantic coast where abundant of fisheries resources exist to a small scale artisanal fishery on coastal and inland water area. Throughout the region, there is a threat of environmental degradation due to oil leak, industrial and urban and agricultural wastewater pollution. By-catching of trawl fishery also presents a big problem.

Aquaculture is mostly done in fresh water and the production is not so high.

The accumulated number of participants who have attended JICA's group training courses in fisheries from the countries in this region by 1996 is as follows.

Algeria (2 participants), Bahrain (3), Egypt (15), Iraq (1), Iran (29), Kuwait (1), Lebanon (3), Liberia (3), Malta (1), Morocco (20), Oman (4), Qatar (2), Syria (6), Tunisia (13), Turkey (24), Yemen (6), Portugal (1), Yugoslav (2), Saudi Arabia (6)

Total 19 countries 142 participants

The countries that sent larger numbers are; Iran, Turkey, Morocco, Egypt and Tunisia in order large to small. These 5 counties' share is over 70 %. There are many countries that stopped sending participants. Lebanon has not sent a participant since 1970, so as Libya since 1980, Yugoslav since 1986, Syria since 1988, Qatar since 1989, Iran since 1991. Iraq, Kuwait, Portugal sent one participant in 1968, 1985 and 1988 respectively.

Table 3-3-5 The number of Participants from Middle East, North Africa and Europe Region to JICA Training Courses in Fisheries (up to 1996)

Course Names	Number (% in the region)	Share of this region to the world (%)
Fishing tech. Type Practice/extension	59 (42 %)	10%
Fishing tech. Theory Type	20 (14 %)	10%
Fisheries Coop. And Management type	12 (8 %)	6%
Aquaculture General Type	31 (22 %)	17%
Engine and Hull Maintenance type	10 (7 %)	9%
Fish handling and Processing type	5 (4 %)	8%
Policy, Management seminar type	5 (4 %)	11%
Total	142 (100 %)	10%

From this region, 42 % of the participants attended to Fishing Technology Practice/ Extension type of courses followed by aquaculture. When we see the share of the region's participants, it is just 10 % in total. The share of aquaculture course from this region is 17 % and that indicates the need of this region.

According to the JICA's Country Development Assistance implementation Guideline 1996 for this region, each country except for Egypt, Saudi Arabia, Jordan, Syria and European countries recognized the importance of fisheries related assistance. The main targets for these countries are promotion of fisheries and optimal use of the resources. Their actions

included development of fisheries resources and research, fisheries education, improvement of fish processing technology.

Chapter 4 Direction of Fisheries Training Courses Development

4-1 Fisheries Research and Development in Japan

In Japan, advanced technologies and systems are utilized for coastal fisheries development and utilization of the resources. Since the establishment of the 200 miles EEZ era, coastal fisheries have become more important for the promotion of coastal area development projects. These projects include the deployment of artificial reefs, release of commercially important fish seedlings (Saibai gyogyo: culture-based fishery). Technology and knowledge are now being integrated and a marine ranching development study has been started.

Additionally, studies toward responsible aquaculture is progressing as there is a strong requirement to consider bio-diversity and conservation of the environment. For resource management type fisheries to rationally utilize fisheries resources, the community based management system in Japan is an effective system. Scientific study to promote this system of participatory management is continuing. Study of technology to avoid non-target species and non-target sizes is also going on. Technical development for optimal utilization of the caught fish is advancing.

Fish processing research at the molecular chemistry level is progressing and many new products have been developed. Fish paste production technology is in one of the most advanced technologies developed in Japan. Preparation for quality control and assurance requirement to clear HACCP (Hazard Analysis and Critical Control Point) regulation set in the USA and Europe has started.

The following are outlines of the present situation of research activities in each sub-sector defined in the previous chapter.

4-1-1 Fishery Sub-Sector

-Studies on Fishing Gear Selectivity-

Mesh selectivity of trawl net, gill net and trammel net.

-Studies on fish behavior-

Methodologies including the observation of fish behavior to fishing gears, to the study of behavior physiology, sensory organ physiology in relation to the accuracy of sight, light sensitivity, color sensitivity and the behavior of fish. These activities are assisting research into the control of fish and fish school behavior. For example;

1) Fishing techniques (control of fish response to the fishing gear and the improvement of the fishing gear function)
2) Resource management (fish species and size selectivity of fishing gear)
3) Aquaculture (improvement of off shore cage culture techniques)
4) Culture based fishery (control of reproductive behavior, improvement of seed fish management and releasing techniques)
5) Quality control (freshness of the caught fish, quality control, stocking technique of live fish, live fish distribution techniques)
6) Comprehensive management system (ecological management technique for marine ranching and ecologically controlled fishing technique).

-Studies on fisheries information-

Data processing and analysis of fish stock density changes and movement of stocks. Satellites are used to monitor fish stock distribution and migration, fish eggs and juvenile fish distribution as well as photo-plankton distribution. This study area will further progress as satellite sensor technology improves.

-Study on fishing instrument-

Utilization and improvement of advanced fish finder and scanning sonar for stock assessment including the identification of the length of fish by depth layer in the ocean.

-Studies on fisheries stock analysis and assessment-

The study of single species population dynamics has advanced considerably due to use of computers for data processing especially with respect to growth and mortality. Multi-species and ecological models are now available. Presently, more emphasis is placed on collecting reliable data since the mathematical models are reasonably developed. As the change of resource abundance is affected by the change of environment and other factors, efforts are also being made to include those influential factors to predict the resource situation.

-Studies on resource management-

Resource condition, fishing operations, and financial management of fishing bodies are the three components to be integrated into fishery management model to serve for the prediction of the effect of fishery resource management policy. Studies on ITQ (Individual Transferable Quota) system are on-going. Mathematical tools and theories being used to study resource management are; econometrics, optimal control theory, multi dimensional decision making theory, game theory, evolutional ecology, Bayesian theory, Fuzzy theory etc.

4-1-2 Aquaculture Sub-Sector

-Research on seed production-

More use of natural spawning and insemination method has been replacing egg stripping and insemination method since 1970s. These enable the production of large number of healthier eggs.

Rearing technique of brood stock is also improving so as to enhance egg health. For rearing juvenile fish, it is necessary to produce food organisms and micro algae (such as chlorella) simultaneously. A study of separating production process of food organisms (such as rotifer) and micro algae propagation is on-going. Long life rotifer eggs production is one example of such a study.

-Study of feed for fish-

The evaluation of feed is done by examining a number of indicators such as; growth rate, mortality rate, the condition of muscle, condition of fat content, color of flesh, condition of liver (during juvenile), fat tissue condition, mobility of stored fat, activity and physiological condition, resistance ability to diseases, meat condition, and egg condition (for blood stock). In order to develop micro particle size feed as an initial feed, research on nutrient, physical conditionand preference is on going.

-Study of fish diseases-

Studies on virus disease, bacterial infection, mycosis, protozoa infection, parasite, immunity /biological defense seitaibougyo are going on. As new disease occurs, more cooperation with researchers from other specialties such as medicine, veterinary medicine, immunology, molecule biology is required.

-Study on genetic breeding-

The Significance of genetic breeding has been recognized as a mechanism for preserving brood stock lineage and improvement of aquaculture species. Genetic breeding methods being developed include selective breeding (choosing brood stock that have superior characteristics such as larger size and higher growth rates), hybridization breeding, breeding with genome manipulation (a method of biotechnology, producing triploid, tetraploid), production and utilization of clone fish, and cell fusion.

As the number of artificially produced released seeds is increasing rapidly, it is important to assess the impact of those animals on the wild population and to preserve the genetic traits of the wild population.

-Study on Stock enhancement (Zoshoku)-

An economic activity that attempts to increase and sustain the fisheries resources in the wild water is called fisheries stock enhancement. Methods for stock enhancement includes seed releasing, resource management (limiting fish species, size, fishing gear, fishing methods, fishing season, fishing grounds), and construction of fishing ground (artificial reefs, artificial seaweed bed, improvement of environment by engineering method). In the past, these methods were utilized singularly, however, they are being combined and used as a system. Stock enhancement methods are successful in such species as silver salmon, red sea bream, flounder, tiger prawn, scallops, abalone, and sea urchin

4-1-3 Fish Processing sub-sector

-Study on frozen product-

As there is a quality as well as price difference between fresh and frozen product, studies on denaturation of proteins and changes in lipid form are progressing.

-Study on fish paste products (fish cakes)-

Fish paste products are the most typical fisheries products in Japan, and the technological development is quite advanced. A study on changing the taste and touch of the fish paste products made of Alaska pollack and sardine into that of meat (marine beef) has been conducted. As recognition on contents of healthy factors in fish is spreading, techniques to remove smell and fat without losing the nutrient factors is becoming necessary. Crushing

and removing fat from the flesh of fish such as sardine was developed (Underwater crushing and Underwater removing fat techniques) .

Note: Chapter 4-1 was written based on the following 2 reference books.

Taki, Y. edited . 1993.5. *Sekaino nakano nihon gyogyou* (Japanese Fisheries in the World). Seizandou shoten.

Nihon suisan gakkai syuppan iinkai edited. 1994.9. Gendai no suisangaku (Contemporary Fisheries Sciences). Kouseishakouseikaku.

4-2 Training Course Development Plan

Considering the experiences and the changing circumstances in the past 6 years since the Desirable Implementation Study in 1992, and recognizing the progress in Japanese Fisheries Sciences, the following sub-sector level development plan was produced.

4-2-1 Fishery sub-sector

Following the analysis in Chapter 2, this sub-sector development should be constructed based on 3 themes; "resource management type fisheries", "resource survey and assessment", and "diversification of fisheries".

Training in resource management type fisheries should be conducted in Japan. This course is considered as a unification of on going Fishing Gear Development Course, Fishery Science and Technology Course and Fisheries Resource Management Course (recommended but not realized yet). As fishing capacity increases rapidly, coastal fisheries resources have a tendency of being over-fished. In order to make the fisheries sustainable, the subject of training course should be shifted to:

- The development of selective fishing gears that catch only targeted fish sizes and lengths
- Prohibition of destructive fishing methods
- Dissemination of fisheries information
- Fishermen organization activities that assist the conservation activities of fishermen themselves.

For artisanal fishermen who have little or no opportunity for alternative income generating activities, conservation of fisheries resources and natural environment is of critical importance.

The focus of the training is on fisheries biology, ecology, and fishing gear and methods. In addition, improvement of the practice of stock assessment is needed. Through the course the participants will also learn the techniques to raise awareness of fishermen to conserve resources. Within this context, diversification of fishing method (and target species) is considered.

The course period is about 5 months (including an intensive Japanese language course). Invited countries should be divided in accordance with the region. Countries with same language should be selected together in one year, and the other language group should be invited in the next year so that same language group would be invited every other year. As the target of the course should be considered as a long term, group training course of 10 years will be appropriate with a particular countries needs being fulfilled in about 5 years.

In order to learn the necessary knowledge for political actions for resource management type fisheries, a seminar type course will be most appropriate. Participants for this kind of seminar course should be restricted to senior class administrators. They will be exposed to learn Japanese resource management policy and theory. It is necessary to give them chance to discuss the matter with scholars and administrators in Japan.

In the field of resource survey and assessment, there should be a new seminar type course to provide lectures and practices so that the participants will be able to construct appropriate system to collect and analyze data.

This type of course can be conducted in the South East Asia (in cooperation with SEAFDEC and/or ICLARM) and Latin American (cooperation with Fisheries University in Argentina or other institutes) regions. It is expected that these regional training courses will be able to develop and pioneer the coastal fisheries resource assessment activities. A Third Country Training Program of 5 years should be considered.

Diversification of fisheries and development of under utilized resources are the issues particular to some African countries, Middle East countries as well as island countries in Caribbean and South Pacific region where there still is potential for resource development. Japan's variety of fishing methods and resource management activities (especially in Okinawa) should be a base for study. With introduction of new fishing gear and methods, artisanal fishermen will be able to increase their income and divert the pressure from already heavily used resources. The participants will see many types of fishing gear and methods that are developed to catch so many different fish and shellfish species. They will learn how to construct the fishing gears that are appropriate to use in their respective countries. This course will also provide the Japan's experiences in depletion of numbers of resources and how these problems were developed and treated. Through this knowledge, the participants will be able to predict the future happenings, and will be able to prepare and prevent such problems. This kind of course may be conducted as a regional special course.

Where fishing gear and methods have been introduced and the main problem is extension, the Third Country Training Program would be most appropriate with active participation of Japan and leadership by a country within the region. In addition to the institutions mentioned in the previous paragraph, University of Papua New Guinea in the South Pacific Region and Fisheries Training Center in Trinidad and Tobago may be considered as a potential location.

4-2-2 Aquaculture sub-sector

High priority should be given to the separation of fresh water and sea water aquaculture in the current General Aquaculture Course.

There are a lot of techniques and experience to be learned from Japanese sea water aquaculture (mari-culture). Basic lectures and practices would be given at a university, and more practical training should be followed in the later part of the training program. The later part of the training should be divided into prawn culture and fish culture course that the participants should choose upon their needs. Rental of part of a fish farming center or other aquaculture facility and sending specialists with participants will ensure that the training will be more effective.

As mari-culture targets high value species to earn attractive short-term profit, mangrove forest have been destroyed, animals over-fed and growth hormones and antibiotics used to obtain higher profits and to prevent diseases caused by high-density culture. Recognizing the effect of these activities on natural environment, ecosystem and to the human body, guiding the participants to practice responsible aquaculture.

The countries to be invited should be those that practice mari-culture. For South East Asian countries, a Third Country Training Program will be appropriate. SEAFDEC will be the most appropriate organization for this course.

Course for Latin American countries and for English speaking countries should be separated and conducted in Japan in alternative years.

This should be a long term, 10 year training course. In the South America, there are number of potentials to conduct Third Country Training Programs. Mexico can provide fish culture training, Ecuador can do prawn culture training at National Fisheries and

Oceanography Research Center, and Chile can do rainbow trout culture training course at Norte Catholic University. Tilapia culture course can be conducted at any country in the Central America. There is a potential to conduct shellfish culture course in Tonga, in the South Pacific.

Fresh water aquaculture course will target those countries that have inland water in the South West Asian countries, African countries and Papua New Guinea where aquaculture is not developed yet. The objective of fresh water aquaculture is to encourage the development of income generating activities in inland area as well as improving the nourishment of rural population by supplying protein source. This kind of course should be conducted in the South East Asia (SEAFDEC, NACA, Thailand, Philippines, Malaysia), the Latin America (Bolivia and other countries) and Africa (Malawi), where extensive fresh water culture is in practice, under the Third Country Training Program. This course will train extension as well as aquaculture staff. Five year course period will be appropriate for this kind of course.

In relation with fresh water aquaculture, there is a need to develop a course for conservation and recovering the environment of lakes and marshes. In Africa, deterioration of water quality due to waste discharge from homes and factory together with introduction of exotic fish (animal) species in the water cause the over growing aquatic plants and danger of extinction of local species. Since urgent counter action need to be taken, a special course should be established utilizing the experiences in Lake Biwa and Kasumigaura in Japan. It is also necessary to consider the dispatch of experts or establish Project Type Technical Cooperation to follow up the training course for effective cooperation.

·Culture based fisheries (breeding and rearing for fishing)·

This course will provide training to learn latest technologies as well as issues and problems through Japan's experience and knowledge on culture based fisheries. The course may include artificial reef setting, creation of seaweed beds and fishing grounds, maintenance and

rehabilitation of fishing ground, and seed production and releasing program. There are positive as well as negative opinion on this kind of activity considering the impact on the natural environment. It is essential to include lectures and practices on oceanography, ecological, and environmental survey methodology to ensure conducting cautious approach before and after the implementation of the program. Participants from the South East Asian and the South American countries will be invited. The present title of the course Fisheries Oriented Resource Management Course is misleading and should be renamed. The words "Saibai gyogyo (sea farming, culture based fisheries)" should be defined clearly. This course will be a upper grade course in aquaculture sub-sector.

-Other aquaculture courses-

Fish Pathology and Environmental Management of Aquaculture Course and Bioproduction and Environmental Management in Semi-enclosed Sea Course are upper grade course in aquaculture sub-sector. Each course needs to define the course objective (environmental difference, fish species difference, and difference in approach etc.) and select the participants whose needs precisely fit the course objectives. This course should be balanced and coordinated with the sea water aquaculture course and receive English speaking and Spanish speaking participants alternatively each year. These upper grade courses are held only in Japan.

4-2-3 Fish processing sub-sector

For artisanal fishermen, off shore tuna resources and high value coastal fishery resource such as grouper and snapper provide a good income source. A country can also benefit through foreign currency earnings by export. As strict quality assurance regulations have been implemented in the EU and the USA, it is becoming harder to export fish if the handling and quality control methods are not improved. It may be easier for industrial fishing company to adapt the regulations, however, it is impossible for artisanal fishermen to

comply the regulations. It is the government role to assist these artisanal fishermen to ensure their income and to stabilize foreign exchange.

Fish Handling Course contents should be simplified and give more emphasis and time for practices such as on board fish handling, use of ice, "ikishime" or quick killing of fish to keep freshness and others. Basic and simple fish processing practice as well as marketing strategy lecture should be sufficient for this course. Reducing lecture hours can shorten the course period. The education level of participants should be lowered to high school certificate level and to meet the current trend of qualification of the participants. The South East Asian and Latin American countries are ready for the Third Country Training Program (TCTP). In the near future, French speaking countries in Africa will be also ready to conduct TCTP.

Quality Assurance of Marine Products Course is offered for Asian and Latin American as well as the countries where fish processing is rather developed. This course provides more theoretical approach on fish processing and quality assurance. Observation tours are utilized so that the participants can see the application of the theory, the latest production facilities and products. If possible, HACCP certificates should be given to the participants after the completion of the course (conducted in Hawaii or other place if necessary). In the future, this course should be conducted as TCTP course in the Latin American and French speaking African countries.

4-2-4 Engine and hull maintenance sub-sector

Demand for this sub-sector training course is high because of the needs for upgrading skills of technical staff who maintain equipment and facilities donated by Japanese Fisheries Grant Aid. The main part of this course is maintenance of engine on small fishing boat and maintenance of freezing and refrigeration equipment. As demand for hull maintenance is limited, time allocated for this subject is quite small. It should be removed from the main

subject and removed from the course title. Hull maintenance can be offered as an option during the later part of the training course.

According to the Desirable Implementation Study of 1992, this course was to be divided into 4 courses. However, if it is divided, each course period becomes very short and will not be practical. It should rather continue as present form with minor modification mentioned above. In addition, out board engine maintenance course can be conducted as TCTP course. This type of course could also be conducted with a cooperation with private sector in developing countries and consider the future full privatization.

4-2-5 Administration and seminar sub-sector

All of the currently offered courses plus the recommended Fisheries Statistics System Course should be conducted in Japan. However, course contents and objectives need to be very specific and invite only senior class participants so that the quality of the course can be maintained. Discussions oriented courses are sought and lecturers are invited from the Japanese Fisheries Agency as well as from universities. Considering the busyness and responsibilities of the participants in respective government, the course period should be limited to less than one month for most of the courses.

The aim of the Fisheries Development Seminar is training of fisheries development planing officers providing with policy options and information about Japan's fisheries policy. For this purpose, administrators from Fisheries Agency and Provincial Governments are invited to join discussions. Participants are eager to learn Japanese policy making system and its background is well understood. There is no limitation in inviting countries. Plan to invite major countries in 5 years.

Fisheries Statistics System Course was recommended because statistical data collection and analysis as well as resources survey is an important task to understand the capacity of fisheries and their utilization. However, except for industrial fisheries, there are only a limited number of countries that have systems to collect data from artisanal fisheries. This course will examine, estimate, and practice data collection methods and the participants will learn data processing and analysis that fit to their countries. In order to make the course more effective, it is hoped that there will be a follow-up seminar in participants' countries and support ex-participants effort to collect and analyze actual information.

Fisheries Cooperative Intensive Course provides lectures and observation trips to learn activities of fishermen's organization. This course should put more emphasis on organization formation and awareness promotion methodology. Fisheries economics and management can be partially included in this course. The participants are the leaders of fishermen's cooperative or organization as well as government officers who assist the formation and monitoring of organizations. There will be no limitation in areas of inviting countries.

Seminar on Planning and Management of Fishing Port Facilities and Marketing System is a course aiming at training for managers who actually manage the fishing port. There are some overlap with Fisheries Cooperative Intensive Course however, this course will focus on total management of running the facilities. Participants will learn fisheries economics, management, and marketing as well as learning basic knowledge on deciding the scale and function of facilities. There will be no limitation in the area of inviting countries.

4-2-6 Other course development

There have been many discussions on the importance of the role of women in a country's development, and there is an example of success in fisheries field such as Bay of Bengal Project. There are active economic involvement of women in fishing villages through

fisheries cooperatives in Japan. At this stage, there has been no fisheries related courses that focuses on women's role in fishing village yet. It is important to see women's role in agricultural and fishing village development not only from the economic view point but also from primary health care and educational view point too. Women in development is an important area of JICA's activities, and it is appropriate to have such a course from fisheries view point.

Chapter 5 Fisheries training courses and their implementation system for the future

5-1 Important points for the implementation of training courses

Following points are considered when making new course recommendations. Attention should be paid when implementing the future training courses.

1) Technical and skill oriented courses should consider the differences of natural environment, social and economic factors in every developing country. Countries that have similar situations should be selected together in the same course for training. (Separation of courses by considering regional and language differences)
2) In order to comply with JICA's policy to promote Japanese local city involvement in international cooperation, give higher priorities to conducting practical training in local institutions outside the Tokyo area (such as local fisheries cooperatives, universities, and research laboratories).
3) For the curriculum development of group training courses, the course should be, (a)satisfying each participant's common needs, (b)including the technique and systems that are particularly advanced in Japan, (c)flexible by offering some part of the course as an elective.
4) For the practical parts of the course, it should consider (a) selecting a course period that fits the spawning season or fishing season, (b) avoiding the busiest time at receiving organizations, (c) ensuring the safety of participants during on board training and (d)paying appropriate contracting cost to the receiving organizations (such as a fish landing compensation for fishermen who gave up the day's fishing for the training of a particular fishing practice).
5) Utilize the resources and know how of private sector and other organizations by outsourcing the management and implementation of training courses. This will create an environment for the JICA staff to be able to spend more time in planning and

evaluating the training courses. However, JICA should keep some courses under its direct management so as to accumulate the technical information and brush up the skills of its own staff in the fisheries sector.

6) When deciding the course schedule, though there are external factors mentioned in 4), courses should be spread throughout the year as much as possible so that the JICA center will have a reasonable occupancy rate at all times.

7) In order to respond to the ever changing needs of developing countries appropriately and quickly, the following standards for reform and abolition should be kept.

(a) The life span of a group training course is 10 years. All the courses should be abolished after 10 years. However, if the demand from the developing countries is still very high, and the course evaluation results find it appropriate to continue, then the course will be started as a new course (Specified general course).

(b) The 'specified general courses' life span is limited to less than 5 years. Once the 5 year term is reached, the course is abolished. However, if the demand from the developing countries is still very high, and the course evaluation results find it appropriate to continue, then the course will be started as a new course (Another cycle of specified general course).

(c) For the 3rd country training courses, one of the conditions for the approval of a course is cost sharing by the host countries. When the host country is a grant aid receiving country, the cost share is 15 % of the total operation cost. For the countries that are no longer grant aid applicable, the share will be increased to 30 %.

5-2 Recommendations

As a result of series of discussion, the Fisheries Training Course Review Committee recommends the following 7 items for the role of KIFTC and its management system of the courses.

1. The KIFTC should be developed into an information dissemination center in the fisheries sector. In other words, the KIFTC should gather and organize the information on the fisheries situation in developing countries, and provide opportunities for the trainees to exchange and gather information from universities and research laboratories in Japan as well as from all over the world. Installation of computers with internet and email capability is urgently required.
2. As the organizational structure within JICA head quarters is changing from sector based operation to regional and country based operation with technical support sections, the new role of KIFTC as a specialty center is to become a technical backstopping of JICA's wide variety of fisheries sector cooperation.
3. Strengthen the existing support committee for project type fisheries technical cooperation by expanding the involvement of the training department, the expert dispatch department, the grant aid department, the development study department and the volunteer department. This new committee will draw up an implementation plan for the overall fisheries cooperation, and provide technical support.
4. Implement joint training programs cooperating with regional organizations such as the South East Asian Fisheries Development Center (SEAFDEC) and the South Pacific Commission (SPC).
5. For more effective implementation of training courses, review the role of course leader, training officer and training coordinator and strengthen the coordination among them.
6. For more effective training, selection of trainee should be appropriately done in accordance with the course requirement at the home countries. Country report should be

checked at JICA's country office and sent to Japan before the trainee leaves the country. The trainee will complete a study report while they are in Japan. Comments on their reports will be given during a presentation session and a course evaluation session. The study report may be considered as part of a project proposal for JICA's technical cooperation schemes and follow-up support will be given in such a case.

7. Trainees who have demonstrated their academic ability will be able to receive recommendations for further study using the Ministry of Education's Monbushyo scholarship.

5-3 Future prospect of fisheries training course

The Fisheries training course review committee meeting was first called in December 1997, and there were 3 meetings all together as well as more than 5 working group meetings held to compile this report. The recommendation was made through these discussions as well as the result of discussions on JICA's organizational restructure study meeting and the Fisheries sector supporting committee meeting which were held simultaneously during this period.

The review committee followed the recommendation of the "arikata report" (1992.3), studied the attainment of those 20 courses recommended , and through consideration of the present circumstances, a reform and abolition plan was made . As a result, 15 courses are recommended. Notably, a new training course "Women and fishing village development" was recommended , which was not included in the former arikata report.

For the training courses to be held outside of Japan, a sub-sector and regional based training course plan was made. A combination of the courses in Japan and the 3rd country's training will enable it to meet the specific topics needed in the region. New 3rd country courses such

as the fish handling course and the fishery's politics course in Morocco is proposed for French speaking African countries. A fisheries products quality assurance course to be held in the Ivory Coast is also proposed. The potential of a coastal fishery course as well as sea water fish culture, fresh water fish culture courses are suggested to be held at SEAFDEC. Furthermore, the potential of 3rd country training courses at project sites of fisheries technical cooperation schemes, namely the Fishery training course project in Oman, the Black sea aquaculture project in Turkey, and the Aquaculture research and development project in Tonga is also suggested.

For another development, a plan for establishing the Yokohama International Center was finalized in October 1997 and the cost for land procurement was budgeted in FY 1998 . According to the plan, the construction of the new center will be completed in FY2001 and starts operation in FY2002. This new center will inherit the function of KIFTC and the emigration center of JICA. The center is expected to take a major role for JICA's fisheries sector technical cooperation as a specialty center. At present, KIFTC directly manages 9 courses while 4 courses are contracted out to private companies. The ratio of direct and indirect course management should be kept around 50 % to 50 %, so that the center and its staff will maintain the function of a fisheries specialty center.

There is a plan for the director of KIFTC to attend a donor coordination meeting in (AFS/FAO Workshop) November 1998 to be held in Bangkok, Thailand and the current situation of the fisheries sector cooperation as well as the future plan of JICA will be presented.
It is sincerely hoped the recommendation presented in this report will be realized and the Review committee would like to request cooperation of all the relevant organizations and departments.