FAO Fisheries Report No. 611 FIRI/R611
ISSN 0429-9337

Report of the
FAO/NACA CONSULTATION ON AQUACULTURE FOR SUSTAINABLE RURAL DEVELOPMENT

Chiang Rai, Thailand, 29-31 March 1999

Food and Agriculture Organization of the United Nations

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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
Rome, 1999

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ISBN 92-5-104397-3

PREPARATION OF THIS DOCUMENT

This document is the final report of the Consultation on Aquaculture for Sustainable Rural Development held at Chiang Rai, Thailand on 29-31 March 1999. The consultation was a collaborative activity of the Network of Aquaculture Centres in Asia-Pacific (NACA) and the Fisheries Department of the Food and Agriculture Organization (FAO). The document was finalized into its present form and content after ratification of the report by the participants.

The document was prepared by Dr Dilip Kumar, Senior Aquaculturist and assigned officer for this Programme in collaboration with other NACA staff and Dr Ziad Shehadeh, Senior Fishery Resources Officer of the Fisheries Department of FAO. The ASRLD (Aquaculture for Sustainable Rural Livelihood Development) Programme framework was drafted by the consultant Dr Malcolm Hall incorporating the outputs of the Working Groups and recommendations made by the consultation. The concept of the SARDev (initial title) programme presented for discussion by Dr Malcolm Hall was the improved version of the basic programme concept developed by the joint NACA/FAO consultative group in 1997. A joint FAO/NACA Programme formulation mission was fielded, as follow up to the consultation, to formulate the ASRLD programme based on the guiding principles developed by the consultation. The programme document is being published separately as a joint NACA/FAO document.

FAO Fisheries Department; Network of Aquaculture Centres in Asia-Pacific (NACA). Report of the FAO/NACA Consultation on Aquaculture for Sustainable Rural Development.
FAO Fisheries Report. No. 611. Rome, FAO. 1999. 34p.

ABSTRACT

This is the report of the consultation on Aquaculture for Sustainable Rural Development jointly organised by FAO and NACA in Chiang Rai, Thailand on 29-31 March 1999 to develop the detailed structure of a regional programme on aquaculture for sustainable rural development and propose a strategy for its implementation. The consultation took an overview of the relevant information emerging from presentations of country reports; lessons learned by specific projects; experiences of regional and international organizations and donor agencies; and findings of expert reviews. More sharply focused examination of critical issues, and discussions on specific components of the draft Programme concept were followed through parallel working group (WG) discussions. The outputs of the working groups were further discussed during the concluding plenary. Finally, a detailed Programme framework on “Aquaculture for Sustainable Rural Livelihood Development (ASRLD)” was conceived through consensus to serve as guiding principles for the formulation of the Programme. National experts, expert reviewers and representatives of most of the major international and regional stakeholders involved in initiatives that promote aquaculture in rural development in the Asia-Pacific region, such as: AIT, DANIDA, DFID, FAO, IFAD, ICLARM, IIRR, Mekong River Commission (MRC), NACA-RLCs, SEAFDEC, PD/ACRSP, HAKI etc., played active roles in this participatory exercise and in making the Programme of greater national and regional relevance, and practical and effective in achieving the proposed objectives.

Distribution:

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Abbreviations and Acronyms

APFIC	FAO Asia-Pacific Fishery Commission
AIT	Asian Institute of Technology
BGD	Bangladesh
BRAC	Bangladesh Rural Advancement Committee
CHN	China
CPR	Common Property Regime
DANIDA	Danish International Development Agency
DFID	Department for International Development of the British Government
FAO	Food and Agriculture Organization of the United Nations
FAO/RAP	FAO Regional Office for Asia and the Pacific
FARM	Farmer-Centred Agricultural Resource Management
GO	Government Organization
HAKI	Fish Culture Research Institute, Szarvas, Hungary.
ICAR	Indian Council of Agricultural Research
ICLARM	International Centre for Living Aquatic Resources Management
IFAD	International Fund for Agriculture Development
IIRR	International Institute for Rural Reconstruction
IND	India
INS	Indonesia
IPM	Integrated Pest Management
LIFDCs	Low Income Food Deficit Countries
MAEP	Mymensingh Aquaculture Extension Programme
MRC	Mekong River Commission
NACA	Network of Aquaculture Centres in Asia-Pacific
NACA-RLCs	NACA Regional Lead Centres
NFRDI	National Fisheries Research Development Institute
NGO	Non-governmental Organization
PAP	Participatory Assessment and Planning
PAR	Participatory Action Research
PD/ACRSP	Pond Dynamics/Aquaculture Cooperative Research Support Program
PHI	Philippines
R&D	Research and Development
RLC	Regional Lead Centre (NACA)
RRA	Rapid Rural Appraisal
SARDev	Sustainable Aquaculture for Rural Development
SEAFDEC	South East Asian Fisheries Development Centre
SIDA	Swedish International Development Agency
SIFAR	Support Unit for International Fisheries and Aquatic Research
SIFR	Study on International Fisheries Research
SPFS	Special Programme for Food Security
TAC	Technical Advisory Committee of NACA
TCDC	Technical Cooperation among Developing Countries
TCP	Technical Cooperation Programme of FAO
THA	Thailand
TREF	Training – Research – Extension – Farmer
VIE	Viet Nam

REPORT OF THE FAO/NACA CONSULTATION ON AQUACULTURE FOR SUSTAINABLE RURAL DEVELOPMENT
CHIANG RAI, THAILAND
29-31 MARCH 1999

BACKGROUND

1. The FAO/NACA Consultation to develop a Regional Collaborative Programme on Sustainable Aquaculture for Rural Development was organised to respond to three major developments.

First, it was to comply with the directive of the Governing Council of NACA. During its Ninth Meeting in Hanoi in December 1997, the Council proposed the development of a Regional Programme on Sustainable Aquaculture for Rural Development. The purpose was to promote aquaculture initiatives that contribute directly and indirectly to rural development in countries of the Asia-Pacific region.

Second, the findings of the FAO/NACA regional study on “Aquaculture Development Research Priorities and Capacities” indicated that rural aquaculture and the associated and inter-linked issues of local food security, poverty reduction and environmental degradation are high priority areas for regional aquaculture research and development. The final workshop of the study identified aquaculture research for rural development as one of seven priority themes for regional cooperation. Accordingly, seven regional project concepts were developed including the one on Aquaculture Research for Rural Development.

Third, APFIC, during its 26th Session (1998) in Beijing, agreed that small-scale rural aquaculture was an effective vehicle for rural development and established an *Ad Hoc* Working Group of Experts on Rural Aquaculture to advise it in this field.

2. The outline for the Regional Programme was first conceptualised in 1997 by a consultative meeting attended by participants representing NACA’s Regional Lead Centres (NACA-RLCs), regional and national centres and institutes, government fishery departments, FAO/RAP, and the NACA Secretariat. Subsequently, the NACA Technical Advisory Committee (TAC) at its Fifth Meeting held in India in June 1998 reviewed the programme concept, clarified its objectives and outputs and recommended to the Secretariat a plan of action to develop the proposal.

3. In view of these developments and recommendations, FAO and NACA planned this joint Consultation. The aim was to frame the detailed structure of the programme through participatory approach, drawing on the outcome of past development efforts in the region and on lessons learnt through the findings of relevant research studies and reviews.

4. The groundwork for the meeting included the preparation of country reports on the status and role of aquaculture in rural development in selected Low Income Food Deficit Countries (LIFDCs) in Asia. In addition, drawing on lessons learnt by other international and regional organizations and donors from their past development projects and reviews of implementation approaches and inter-linked issues by experts.

OBJECTIVES

5. The main objective of the consultation was to develop a comprehensive framework for the regional programme and propose a strategy for its implementation. In doing so, the consultation was expected to take an overview of relevant information emerging from national presentations, lessons learnt and experiences of specific projects, regional and international organisations, donor agencies and expert reviews. Subsequently, to use the knowledge to:

- suggest appropriate objectives, activities and outputs that are most relevant to national needs;
- suggest geographic coverage and involvement of local, national and regional institutions, NACA centres, etc.;
- identify potential current and planned projects on the same or related themes at the national and regional levels and recommend an appropriate mechanism for effective linkage to the Programme;
- further develop the proposed regional strategy for coordination and programme implementation;
- suggest possible ways to catalyse the development of the programme.

PARTICIPATION

6. The Consultation was jointly organised by FAO and NACA in Chiang Rai, Thailand from 29 to 31 March 1999. A total of 54 participants attended the meeting including national experts from seven countries. In addition it was attended by representatives of international and regional institutions and organizations involved in initiatives that promote aquaculture in rural development in the Asia-Pacific region, such as: AIT, DANIDA, DFID, ICLARM, IFAD, IIRR, Mekong River Commission (MRC), SEAFDEC, FAO/UNDP Project in Lao PDR, PD/ACRSP, HAKI etc. A detailed agenda and timetable and the list of participants are attached as Appendix A and B respectively.

OPENING OF THE CONSULTATION

7. In the opening speech, the NACA Coordinator, Mr Hassanai Kongkeo highlighted the various programmes developed in close collaboration with FAO in the region. He pointed out that promotion of small-scale aquaculture for providing food security and reduction of rural poverty was one of the top priority programmes of NACA.

8. Mr Hassanai briefed the house about the history of NACA and outlined recent development trends in aquaculture in the region. He mentioned that the early focus of the organisation was on aquaculture technologies to increase yields, and on farming systems to increase productivity. Subsequently, the attention was more towards aquaculture sustainability with emphasis on economic, social and environmental issues. In the past two years increasing attention was paid to the development of policy guidelines and capacity building to assist member governments in the implementation of the FAO Code of Conduct for Responsible Fisheries.

9. Due to the increasing concern of all governments in the region, with regard to dealing with the problems of poverty alleviation, food security and environmental degradation, the member governments directed NACA to develop and implement a cooperative programme to promote aquaculture as a means to create sustainable livelihoods for poor rural communities. He requested the help of the participants to develop a cooperative programme framework for rural livelihood development through aquaculture.

10. Dr Ziad Shehadeh of the FAO welcomed the participants on behalf of the FAO Director General and the FAO Regional Representative. He cited that the theme of the Consultation was relevant to the global objective of alleviating poverty and increasing food security. These were central to FAO’s Regular Programme activities. He mentioned that the potential role of aquaculture in rural development was recognised by the World Food Summit Plan of Action (1996), APFIC and the NACA member governments. What was significant was that aquaculture was incorporated into the FAO Special Programme for Food Security (SPFS) to help improve national food security in low-income food-deficit countries.

11. Some of the recent initiatives and actions clearly reflect the appropriateness of the theme to the immediate needs of countries of the region. Important ones are: - the decisions of the NACA

Governing Council to develop a regional cooperative programme for sustainable rural livelihood development through aquaculture; the establishment of the *Ad-Hoc* Working Group of Experts on Rural Aquaculture by the APFIC; and small-scale aquaculture activities as one of the important components of the on-going programmes of many regional and international organisations like AIT, MRC, SEAFDEC, ICLARM etc.

12. Dr Shehadeh also underlined the importance of enabling conditions, methods and approaches for drawing the participation of local communities into development actions and information transfers promoting aquaculture for sustainable rural livelihood development. He sought the assistance of the participants for their valuable inputs in developing a framework for a regional cooperative programme, intended to strengthen the focus on aquaculture for rural development. Opening addresses are provided as Appendices C and D.

OVERVIEW OF THE CURRENT SITUATION OF SMALL-SCALE AQUACULTURE IN THE CONTEXT OF RURAL LIVELIHOOD DEVELOPMENT

13. Presentations included: (a) seven country reports on the status and role of aquaculture in rural development in Bangladesh (BGD), China (CHN), India (IND), Indonesia (INS), Philippines (PHI), Thailand (THA) and Viet Nam (VIE); (b) twelve presentations by organizations, donor agencies and NGOs on their experience, lessons learnt and issues related to aquaculture and rural livelihoods; (c) seven expert reviews on themes of relevance to aquaculture in rural livelihood development.

Country Reports

Chairperson: Mr H. Kongkeo
Rapporteur: Dr M. Halwart

Bangladesh

14. The aquaculture development objectives are highly geared to social objectives. These include increasing fish production, ensuring availability of fish to meet animal protein requirements, increasing rural employment opportunities and improving the socio-economic condition of poor and marginal farmers. The carp polyculture system is considered as the most appropriate technology for all categories of farmers. Integrated culture systems in semi-enclosed water bodies are expanding among poor and marginal farmers through extension programmes of the government and the NGOs.

15. Production and economic performance, as well as resource potentials indicate the suitability of several culture systems for small-scale and resource-poor farmers. Freshwater pond fish culture is the largest source of aquaculture production in Bangladesh, representing more than 70 percent of all freshwater aquaculture production. The majority of farmers produce fish in polyculture systems using native and exotic carps and silver barb. Average fish yield is about 2 300 kg/ha from perennial ponds and 1 000 kg/ha from seasonal and semi-enclosed water bodies. It is estimated that a pond with an area of 0.25 ha will produce annually about 750 kg of fish at an estimated operating cost of Taka 20 000 and with an annual income of Tk 30 000. There are over 1.3 million ponds covering an estimated area of 147 000 ha. In addition to this, there are considerable culture resources in the form of seasonal water bodies. Pen culture in semi-enclosed water bodies ranks second in importance to freshwater pond culture. A pen of three ha can produce 3 000 kg of fish per year at an operating cost of Tk 80 000, generating an income of Tk 120 000. Culture-based oxbow lake fisheries can be a community enterprise. A unit of 100 ha can produce about 75 000 kg per year, at an operating cost of Tk 2 million and yearly income of about Tk 3 million. Fish cage culture, which is suitable for landless and poor farmers, has been introduced (by CARE Bangladesh) and shows potential: yields are fairly good from 30 to 40 kg per cubic metre. Rice-fish culture is presently practised in some 10 000 ha of rice fields, with an average yield of 250 kg of fish per ha. There are 10 million ha of irrigated paddy

fields in Bangladesh, which represents a huge potential for low-cost fish production, although the system faces several social and technical constraints. Other systems that have the potential for generating more income and some employment for farmer groups – the investment can be high, but so are the returns – include the operation of small-scale fish and prawn hatcheries and nurseries.

16. Bangladesh is beneficiary to numerous donor-assisted and NGO-implemented aquaculture development projects with heavy social orientation. Credit support to ease poverty in the fishery sector is receiving major emphasis in government programs. Integrated culture systems in semi-enclosed water bodies are expanding among poor and marginal farmers, through extension programmes of the government and NGOs. A Trickle Down System of aquaculture extension is considered as a sustainable extension approach for farmers who have access to pond resources and the ability to bear the production cost. The government is now running a nation-wide extension project based on this system. Constraints ranging from technical to social, cultural, institutional and legal impact on the development of small-scale aquaculture. The major ones include: limited access to public water bodies and the short term lease of these public water bodies for aquaculture purposes; and despite the emphasis on credit, there is still a complex credit norm that limits access to those without collateral such as the landless and women. Other potential constraints are multiple use and multi-ownership of ponds, land-use conflicts, lack of security, weak infrastructure and even a weak database for planning.

The People's Republic of China

17. The social-oriented objectives of the People's Republic of China's aquaculture development are highly geared to food security. The objective of increasing the component of aquaculture products in the diet is to reduce grain consumption. Other purposes are to improve the economy of inland areas, which tend to be poorer than coastal provinces, absorb surplus labour from other sectors and geographic areas and create employment for the unemployed and the underemployed. China's integrated fish farming system stands out as probably the most suitable rural aquaculture system for most developing, and especially resource-poor, economies. It is environmentally sustainable and highly productive per unit area of water and/or land. Economic studies have confirmed its viability and stability as a farming system. The emerging issues that impact on China's aquaculture programme aimed at the resource-poor include; the increasing trend towards monoculture of high value species, the intensification of carp culture systems (both of which impact on the availability of on-farm resources and commercial inputs), the increasing pollution of water bodies and the greater occurrence of disease problems.

India

18. Aquaculture is widely accepted as a potential tool for rural livelihood development. There are a large number of rural development programmes in the country with aquaculture as an important activity. Culture systems are available to suit various strata of rural communities living in a wide range of agro-ecological conditions. Recognising that economic growth alone does not ensure percolating the fruits of development to the disadvantaged sections of society, the government of India has now been targeting disadvantaged groups through a number of poverty alleviation programmes. The Integrated Rural Development Programme (IRDP) is aimed at the rural poor belonging to the families below the poverty line (BPL). Such target groups consist of small and marginal farmers, agricultural labourers and rural artisans having an annual income below Rs 11 000 (about US$ 260). Furthermore, 40 percent of the coverage is being targeted towards women beneficiaries and three percent to handicapped persons. The constraints for rural aquaculture development in India are: non-availability of suitable databases; lack of diversification of aquaculture practices; weak linkage between research and development; weak extension services system; lack of infrastructure facilities; lack of awareness among financial and insurance agencies with regard to extending credit support and insurance coverage to the small-scale aquaculture sector; inadequately trained human resources for research and development. Emphasis was given on the need to develop

strong linkages between research and extension and promote active participation and involvement of various stakeholders, e.g. State Governments, NGOs, farmers and cooperative societies.

Indonesia

19. There are two programmes with emphasis on rural aquaculture and the social objectives of development. Aquaculture systems suitable for poor farmers include cage culture in lakes and reservoirs (which has been increasing in area by 57 percent a year) freshwater pond culture, and rice-fish culture. A sustainable system for the coastal poor is the culture of fish, shrimp and crabs in mangrove areas – i.e. silvofishery. Profitability of this system has been studied using milkfish, seabass, tilapia, shrimp and crabs, with shrimp and seabass giving high returns. Seaweed culture is a good income-generating activity for coastal dwellers. On the other hand, Indonesia’s extensive freshwater reservoirs and lakes have provided good opportunities for landless people to utilize the resource for highly productive cage or pen culture of carps. However, increasing cage densities have begun to cause conflicts and pollution. Support to Indonesian small-scale farmers is wide-ranging, with the government promoting intensification of rice-fish culture, development projects for cage culture in open waters, intensive training and extension activities and infrastructure rehabilitation and development. A growing threat to small farmers in inland open water bodies is poor environmental quality, with increasing incidences of water pollution and related fishkills and disease outbreaks.

Philippines

20. The current socio-economic programme of the Philippines promotes rural development that is heavily biased towards the poor. Self-sufficiency in fish supply has as high a priority as income and employment generation. The new fishery code places much emphasis on poverty alleviation, social equity, food security, and people empowerment. This pro-poor policy will rely on aquaculture to increase fish production by increasing the productivity of all water bodies available for aquaculture. Rural aquaculture in the Philippines, however, is faced with problems that relate to ownership of, or access to, land-based systems. Therefore, the option for the rural poor is to use water-based systems. There are many suitable systems available including cage culture of fish, culture of molluscs in bays, open seaweed culture and culture of many suitable aquatic species in swamps. A review of the relative performance of existing culture systems shows their suitability for resource-poor households: rice-fish farming has been shown repeatedly to be viable, if practised using suitable fish species; culture of fish (especially of high value species like grouper) in small cages tends to be more profitable per unit volume than in large ones; mussels and oysters require little investment as there is a vast coastal resource waiting to be tapped; seaweed farming, although its output is not directly a food item, provides employment and good income to rural communities on the coast. Research has also demonstrated the viability of pen culture of crabs and shrimps in mangrove areas.

21. With the intensified pro-poor development programme, support to aquaculture on all aspects – from technical to institutional – has been increased. For credit alone, five different funds have been established, including an aquaculture investment fund. There are also substantial credit sources available to small farmers from various government, non-government, business, and donor entities. Constraints are inter-linked with the sustained viability of small operations in the face of market forces and changes in institutional support capacity. These limitations occur when: a lot of production suddenly cannot be marketed or suffers a price drop; the capacity of services to sustain an intensive effort towards promoting aquaculture at all levels fluctuates; there are conflicts among common users; and the fear that small farmers will invariably end up as wage earners in consolidated large operations.

Thailand

22. The National Fisheries Policy is highly oriented towards the development of low-cost, small-scale rural aquaculture for food security, suited to the poor rural communities and as such there is a need to

develop low-cost, low-input – low-output technologies. Community based aquaculture (e.g. in village ponds) also plays an important role in providing local food security. The main factors affecting community-based aquaculture are the availability of appropriate technologies, the level of participation of community members and the extent of support provided by the extension services. Major constraints impeding the development of rural aquaculture include shortage of water supply, environmental degradation, economic disruption, inefficient institutional system, lack of resource persons and facilities, a weak extension and research linkage and inadequate funding.

Viet Nam

23. Smallholder aquaculture contributes significantly to household food security and in supplementing the family income of the poor rural communities including the most disadvantaged groups of upland ethnic minorities. This subsector also contributes more than 70 percent of total aquaculture production and is now under the top national priority programme. Geographic isolation, poor communication, highly inadequate extension and other support services, lack of institutional credit, lack of adequate quantity of quality seed and the lack of training opportunities are the major factors affecting the development of this sub-sector.

24. The main constraints and the key issues in promoting aquaculture for rural development, identified by the national experts, are summarised in the following table:

Main constraints in promoting aquaculture for rural development as identified by countries

A. Institutional
• Overlapping functions and responsibilities between various Government Organizations (BGD) • Lack of coordination between GOs and NGOs (BGD) • Weak linkages between research and development (IND) • Weak extension, both GO and NGO (BGD, IND) • Weak research and extension linkage (THA) • Inefficient institutional capacity (THA) • Inadequate human resources for R&D in aquaculture (IND, THA)
B. Technical
• Limited supply of high quality fish seed (PHI, VIE) • Limited supply of inputs, particularly fish feeds/fishmeal (PHI) • Lack of infrastructure and facilities (BGD) particularly for fish feed manufacture and distribution (IND) • Lack of diversification of aquaculture practices (IND) • Technical problems related to natural disasters (BGD, PHI) • Limited water availability (THA) • Inadequate production technology (THA)
C. Socio-economic
• Target group identification: NGOs target group is the landless and the poor farmers (BGD) • Geographic isolation of target groups and related problems (communication, extension, other support services) (VIE) • Limited access to water bodies for pen and cage culture (BGD) • High investment costs (BGD) • Land use conflicts (BGD) • Lack of security (BGD) • Multiple use of ponds and other water bodies (BGD) • Multiple ownership of ponds and other water bodies (BGD) • Financing of projects (PHI, THA) • Lack of economical incentive (THA) • Limited access to credit (BGD, VIE)

• Lack of awareness among financing institutions (IND) • Complex credit norms (BGD) • Lack of coordination between banks, extension, and farmers (BGD)
D. Others
• Need for information on different water resources and aquaculture production from different farming systems (BGD, IND) • Political will to promote food production and aquaculture (PHI, CHN) • Limited knowledge of farmers (BGD)

Key issues for successful rural aquaculture development

• National promotion of aquaculture (CHN) • Free market forces/market development (CHN, INS, PHI) • Technological progress, research to improve resource productivity and economic efficiency (CHN, THA) • Education and training (CHN) • Use of a wide range of water bodies including rice fields and marginal lands (CHN, INS) • Adoption of the Code of Conduct for Responsible Fisheries (INS) • Involvement of the private sector (PHI) • Good seed quality and transportation (THA) • Integration of aquaculture and agriculture (THA) • Strong linkage between research and extension and establishing research and development centres (THA) • Recognition of the community needs and their participation (THA) • Continuous assistance in extension services (BGD, THA)

Presentations of Regional and International Organisations and Projects

Chairperson: Mr P.C. Choudhury
Rapporteurs: Dr H. Demaine and Dr M. Prein

25. Dr Harvey Demaine presented the experiences of AIT from the implementation of its Aqua Outreach Programme. The presentation concentrated on the analysis of the programme's development and, in particular, the evolution of its emphasis on capacity building with national research and training institutions and its overall impact on the development of rural aquaculture. He also underlined the similarities between the Aqua Outreach Program and the proposed FAO/NACA regional programme and suggested that it might offer a suitable model for the programme. On the basis of the lessons learned, he emphasised focused surveys through RRA instead of complex agro-economic surveys; farming system research approach for the development of low-cost aquaculture for small-scale farmers; least prescriptive technical recommendations and the need for involvement of farmers at all stages of the research and development process, including designing training materials.

26. Dr Mark Prein outlined several objectives of the ICLARM programme in small-scale aquaculture, including improvement of productivity, assessment of the impact of integrated aquaculture and improved efficiency of water use. The programme worked at watershed and community level. Examples were provided from two projects in Asia: integration of fish into deepwater rice cultivation and pond aquaculture in upland communities as a contribution to forest buffer zone management. In the first case, he noted that farmers gave quick and positive responses to the introduction of fish culture. In the second, he described the stocking of small reservoirs that formed the source of irrigation for rice terraces. During the ensuing discussion, questions centred on issues of seed supply for isolated upland areas and risk minimisation. Lessons learnt from these two farming systems projects include risk reduction through diversification of farming activities.

27. Dr Zsigmond Jeney presented the underlying objectives of the MRC-READ project and the progress made so far. The project implementation was a little over a year in Viet Nam and six months in Cambodia. The development objective is to increase farm incomes through aquaculture. In Viet Nam, the emphasis was to develop an extension strategy in a pilot province (Tien Giang); while in Cambodia, it was to identify an initial development strategy and improve seed supply. For Viet Nam, the potentials and constraints for aquaculture development were outlined. Fish is the most popular source of animal protein and competition with marine fish supplies is limited. The basic aquaculture technologies were available, but resource poor farmers lacked specific technical knowledge. In this respect, the training – research – extension – farmer (TREF) continuum was poorly integrated and supported. Extension services were oriented towards blanket messaging to the more advanced farmers. Government policy continued to stress the ‘hard currency earning’ sector. Among several questions, Dr Qamar asked whether, in a resource-poor context, a pluralistic extension service might not be preferable. The Chair and Dr Luu noted that the recent decision in Viet Nam was to set up an aquaculture/fisheries extension department within the Ministry of Fisheries.

28. Dr N. MacPherson described DFID’s strategies with regard to fisheries and aquaculture in rural development and raised the issue of donor-host country conflict of objectives. He outlined DFID’s policy, noting the change from a transfer of technology approach, through agricultural systems concepts, to the new livelihood systems approach. The explicit focus was now on poverty alleviation through studies of people’s natural, physical (infrastructure/access), social, human and financial assets as mediated through policies, laws, cultural norms and workings of the wider economic system. The development challenge was where to intervene. This required a more holistic analysis: any technical intervention had to be evaluated in relation to its effect on people’s livelihoods. A new DFID regional project on aquatic resource management was likely to focus on Cambodia, Laos, Thailand and Viet Nam, but details had to be worked out. He pointed out that in any future involvement of DFID in Southeast Asia, the primary objective will be one of improvement in the livelihoods of poor people and it will apply relevant experience from ongoing and earlier programmes.

29. Lessons learnt from the DFID (earlier as ODA) supported initiatives and interventions in the aquaculture and fisheries of Bangladesh were summarised by Mr Don Griffith. A holistic approach to rural development; the use of indigenous knowledge; the desegregation of family members into specific target groups; the diversification of livelihoods to reduce risk; the use of low risk – low investment technologies the participation of key stakeholders in the programme; and the investment in human capital to enable the target groups to make their own decisions were amongst the important lessons learnt. Another key lesson from DFID’s two decades of experience in Bangladesh comes from the shift from the technology-led and production oriented approach to the people-led and livelihood improvement approach: people are now the “entry” point for development.

30. Mr Griffith informed the Consultation that the DFID Bangladesh programme had projects with six NGOs specifically targeting rural poverty alleviation and three projects with the Government of Bangladesh in the area of institutional strengthening. There was a wide geographic spread and the programme worked with a variety of aquatic systems, in both open and closed water bodies. A holistic approach was taken, including work in rice-fish systems, pond bank cropping, livestock etc. The present programme was targeted to reach 620 000 poor people. Under the Interfish Project, 90 000 farmers had increased average incomes from fish and vegetables by 38 percent and 95 percent had adopted IPM. In the NW Fisheries Extension Project, fish production had increased by 60 percent and incomes by 87 percent through the Model Villages Programme. Under the CARE Cage project, incomes had increased by US$65-130 annually. Mr Griffith also outlined the potential of small-scale aquaculture in rural livelihood development in Bangladesh. Major constraints were institutional weaknesses, but the environment had been created whereby the private sector was able to make major contributions. It was also noted that there were positive changes in the relationship between the government and the NGOs because of the programmes. There was now mutual respect for their different roles.

31. Dr Dev Nathan described the key issue of transferring certain common property resources like ox-bow lakes to local communities for their productive use in poverty alleviation and food security through participatory management. The paper highlighted the experience of the IFAD/DANIDA assisted Oxbow Lakes Project in the western part of Bangladesh. There were three possible strategies: privatisation, government management and management by the local community. Dr Nathan outlined the tenurial context of each, the nature of management and the effect on investment, including stocking and the mobilisation of labour. It was noted that in effect, most Common Property Regimes (CPRs) are "open access resources" and such a condition inhibits investment, which over time leads to these water bodies becoming derelict. For this reason, a system of establishing a CPR of the poor around the lake can help establish a system of "social fencing", which will enable higher investment of capital and labour in enhanced fisheries in the lake. The project demonstrated that such a CPR of the poor around the lake could be successfully established. Improved management strategies resulted in yields four to nine times higher compared to lakes under private and government management.

32. Dr Nathan noted that there were some problems in community management through political pressures, and splits within the groups as skills and social capital varied between different families. Larger lakes were more difficult to manage. He indicated, however, that the project had been successful to the degree that long-term users' right to such water bodies were given to the local communities. The ownership of such water bodies had been passed from the Ministry of Lands to the Ministry of Fisheries and Livestock for transfer to the local communities on a long-term use right basis, to be utilised through community management. In answer to a question from Mr Nazrul Islam, he recognised the important role of the NGO BRAC in the mobilisation of community participation and group formation.

33. Ms Susanne Thomsen described DANIDA's experience based on the Mymensingh Aquaculture Extension Project, including shifts from the individual farmer to the group approach and to a more intensive training effort. As a result, 16 000 people had been trained during 1998 alone. Initially, credit was provided by the project through the banks, but now this was channelled through NGOs. There had been a drawback, in that only the smaller NGOs were willing to collaborate with the project. Consequently, a number of small NGOs, instead of one or two larger ones, were involved as partners. The project had gender targets; at least 30 percent of those involved in planning, management and operation of the project should be women. This was not a problem at the farmer level or at the field level, but it was difficult to implement at the policy level. With regard to the role of credit, it was agreed that need-based micro-credit is an effective tool to help improve the capacity and efficiency of small and marginal farmers. Equally important is improving the accessibility of target groups to credit facilities and in ensuring that NGOs play a major role.

34. Dr Damrong Silpachai explained that SEAFDEC is an intergovernmental organisation with four technical departments, including the Aquaculture Development Department located at Iloilo, Philippines. It had mainly been engaged in research, training and information dissemination and it was only through the establishment of trust funds by the government of Japan that a project for community management of coastal fisheries had been initiated. He outlined the contribution and ongoing activities of SEAFDEC through its Aquaculture Department and highlighted the mangrove-based aquaculture project for the benefit of poor coastal communities.

35. Mr Laszlo Varadi described the long association of the Fish Culture Research Institute (HAKI), Szarvas (Hungary) with FAO and NACA, although this has been largely through training of Asian professionals and consultancy services. Its involvement in rural aquaculture in the region began with the "West-East-South" project in southern Viet Nam in 1995. The project was mainly oriented to provide institutional strengthening of the Can Tho University and certain research-extension activities during its terminal phase. Mr Varadi emphasised the need for regional cooperation. He pointed out that HAKI had learned a lot from AIT and ICLARM. It was noted that training was an important issue, but there was increasing need to focus on the lower levels, with the view that on-farm trials were an efficient tool to verify technical possibilities. He echoed the views of other speakers in stressing the great variety and diversity of aquaculture systems in the region.

36. There was a joint presentation by Dr Hillary Egna of PD/ACRSP and Prof. Kwei Lin of AIT. Dr Egna focused on issues of institutional sustainability and organisational behaviour. She first described the long experience of the CRSP in Southeast Asia, particularly in Thailand and in association with AIT. The programme was nearly 20 years old and was concentrated on research for the benefit of small-scale aquaculture. It had changed over time, from a concentration on production optimisation, towards an environmental and socio-economic focus. Outreach activities now constitute 25 percent of the work. The lessons learned included the need for: continuity of funding and commitment by donors and partners; the right balance between short and long-term objectives as well as between capacity building and technological development; and investments in social and economic research throughout the life of a project. Reliance on expatriate staff was decreased in favour of collaboration with local staff. CRSP experiences show that collaboration must be nurtured between administrators, donors and partners and through effective policies. Dr Lin briefly described some of the results of the research conducted in pond fertilisation in Thailand, starting from on-station research to on-farm trials under the AIT Outreach umbrella.

37. Dr C. Nandeesha outlined the activities of CARE in Bangladesh. CARE has a large programme in Bangladesh, covering agriculture, natural resources, health, infrastructure and institutional capacity building, with a staff of about 2 500 personnel. Five major projects, centred mainly around the development of rice-fish culture, have been initiated in aquaculture since 1993. He emphasised that in order to succeed aquaculture has to fit into the overall agricultural system. The programme's key features are experiential learning – especially through farmer field schools, participatory monitoring and introduction of ecology-based curricula in schools, where the field is the classroom.

38. Dr Peter Edwards related the outcome of the SIFAR meeting at the Fifth Fisheries Development Donor Consultation, held in Rome from 22 to 24 February 1999, which he had attended. The meeting included a special session on the impact of aquaculture on poverty alleviation. He briefly summarised the discussion papers, underlining the limited documentation on the impact. Inadequate knowledge amongst service providers appeared to be a constraint to the wide distribution of the already existing technical possibilities. There was a need for training, but the question was who to train, in what and how? Another question was whether direct contact with the farmers was necessary for the uptake of the technology, given the tremendous costs of conventional extension services.

39. Dr Edwards outlined a series of questions posed by the donor organisations and the response of specialists at the meeting, e.g.:

- *Can aquaculture close the gap between supply and demand?* Yes, because of the huge unfulfilled potential for aquaculture.
- *What should the research agenda be (for rural aquaculture)?* Emphasis should be on identifying the poor; determining where aquaculture can improve livelihoods; developing technological interventions through systems research and extension; and improving the capacity of the service providers.
- *Can aquaculture help the landless poor?* The landless can benefit from cage culture and enhanced fisheries, if they obtain secure tenure over the communal resources, and from employment in fish farms and related services.
- *Should donors work with the more developed countries?* Though much can be learned from the successes in these countries, circumstances of poor communities differ, making generic solutions difficult. Development should be considered in the context of local situations/issues.
- *Could aquaculture be promoted where there was no demand?* The greatest potential was in societies where fish eating was traditional.
- *Does aquaculture have an impact on poverty?* The experts felt intuitively that there was considerable impact, but corroborating evidence was not adequately documented.

Expert Reviews of Selected Themes in Aquaculture for Rural Development

Chairperson: Mr P.C. Choudhury
Rapporteurs: Dr H. Demaine and Dr M. Prein

40. To initiate expert presentations, the Chair remarked that it was important to learn from the experience of agriculture in rural development. With this in mind, several experts from the FAO and elsewhere had been invited to present trends in development thinking.

41. Mr Bishan Singh presented the case study of the Farmer-centred Agriculture Resource Management (FARM) Programme. FARM was a regional programme of UNDP and FAO, responding to Agenda 21. This had been launched in 1993 and revised after 1996 with considerable success. Eight countries had participated in the programme, which was focused on rainfed, upland areas and presented five challenges: to bring the farmers to the centre of decision making; to build their capacity in this regard; to improve production capacity and livelihood skills; to enhance the equity of women; and to improve the knowledge base within the communities. Each country had selected field sites, each with a site working group drawn from local agencies. At its core was the "Participatory Assessment and Planning" (PAP) process. This was a community planning process for development, through which development strategies were identified: an interactive decision making and planning process encompassing a multidisciplinary team of government officers, scientists and farmers.

42. It was suggested that many elements of the FARM Programme experience could serve as models for the proposed FAO/NACA regional programme. It was recommended that such a programme be centred on rainfed areas. The effectiveness of the farmers' groups proposed in the project was questioned, but it was pointed out that the success of the approach depended on the maturity of the society. In some cases, there was little trust between different groups or families. In such cases, community organizing and consensus building becomes important work.

43. Dr Tabrez Nasar of the IIRR presented a paper on "Strategies for Trainers' Training for Information Dissemination". He noted the importance of carrying out a needs assessment in each community and to blend indigenous knowledge with practices generated by the scientific establishment. Training should be seen as an opportunity to share and exchange between the two groups. Roving workshops were recommended because of their emphasis on field-based learning. There was a need for partnership between aquaculture resource institutions and rural development institutions in the design and evolution of customised training curricula. Education and training materials were an essential component for training and participatory workshops for producing these materials were recommended.

44. Dr Peter Edwards of AIT reviewed the technology options for small-scale aquaculture development. He emphasised that aquaculture had to fit into both the existing farming and social systems. It was important to look at the wider picture in assessing potentials, particularly the agro-ecological context, which might support or constrain adoption of certain technologies. Dr Edwards was of the opinion that seed supply remained a key issue in the promotion of aquaculture and recommended development of decentralised hatcheries. It was suggested that the role of centralised seed production facilities should be to supply quality brood-stock.

45. Dr Edwards reviewed the pros and cons of rice-fish culture, which had not taken off to the degree expected. Major constraints cited included labour requirement and theft of fish. Pond culture appeared to have more potential and the options in terms of fertilization and feed were reviewed. He felt the use of inorganic fertilizers was important to overcome constraints in resource-poor systems, a view that was supported by others. The possibilities were illustrated by examples from the work of AIT Aqua

Outreach in Northeast Thailand, Lao PDR and Viet Nam in which aquaculture provided 6-20 percent of family income.

46. Dr Qamar of FAO, reviewed recent trends in agricultural extension. The main developments included:

- a widening role, scope and focus,
- decentralisation and privatisation,
- a pluralistic extension service,
- client-oriented approach,
- a geographic-specific emphasis,
- use of information technologies, possibly for extension from a distance.

47. Dr Qamar recommended that aquaculture extension should follow these trends and that separate extension services for aquaculture should not be established. However, doubts were expresses whether a single extension service could work because of the expanded technical expertise required. A further complication is that different levels of development and target groups usually call for different types of services. It was stressed that new ideas emerging in extension should be incorporated into educational curricula, which remained too technically oriented.

48. Dr R. Balakrishnan's paper offered an overview of the gender issues that need to be incorporated in the promotion of aquaculture for rural development. It explained the differences between the ongoing debate over the focus on 'gender in development' and 'women in development.' It was noted that both schools fundamentally supported the position that women's roles were defined by social and cultural influences leading to inequity of access to resources. Noting FAO's commitment to improving the position of women, Dr Balakrishnan reviewed ongoing trends in the diversification of rural economies, with special reference to the model developed by the Aspen Institute. This had three major components: stewardship, or the responsible management of natural resources; economic development centred on building core capacities within rural societies; and civic capacity, enabling communities to work together. She reviewed the effect of these trends on women, with some specific reference to aquaculture.

49. Dr A. Yakupitiyage's paper pointed out that improving the socio-economic situation of poor communities calls for developing mechanisms that help stimulate growth – credit, skills, technology, resources and markets – rather than focusing on short-term needs. This complex task can only be achieved by strengthening institutional capacity. He suggested new structures of collaboration for the development of aquaculture. Taking Sri Lanka as an example, but referring also to the work of AIT Aqua Outreach in Lao PDR, the speaker examined the complex institutional framework for aquaculture development. He called for the development of 'strategic alliances' between the main actors and proposed that the existing agrarian service centres should be the vehicles for the integration of fisheries into the wider rural development effort. It was noted that in Lao PDR the 'Regional Development Committee' in the southern part of the country was forming such a framework to coordinate technical support for the sector.

50. Dr N. Deomampo of FAO/RAP discussed resource requirements for rural development and strategies to strengthen access to these resources by small-scale farmers and fisherfolk. The recent emergence of holistic participatory approaches to development has lead to the formation of farmers' groups or associations that facilitate access to resources, technology and other services. Credit and other services are becoming more accessible to small-scale farmers, through micro-finance programmes, with the establishment of group-based rural finance projects. Micro-finance projects seem to be one of the most popular and accepted strategies for combating poverty. To gain access to resources, human resource development and capacity building should be given more attention. There is a need for better research – extension – farmer linkages to enhance farmer's participation. Finally, the role of women in aquaculture development should be recognized and women should be empowered to have more access to resources. Discussion centred on whether credit should be

considered a major constraint to development of rural aquaculture. It was noted that in the case of semi-subsistence societies (e.g. Lao PDR), credit may not be an effective stimulus for development.

REVIEW OF SARDev PROGRAMME FRAMEWORK

Chairperson: Dr P. Edwards
Rapporteur: Mr F. Yap

51. Dr Dilip Kumar gave a brief description of the background and regional relevance of the SARDev programme. It was mentioned that aquaculture is predominantly an Asian food production activity. About 75 percent of aquaculture comes from populous LIFDCs through the cultivation of low value species that are low in the food chain. The majority of aquaculturists are smallholder agricultural farmers. It was also pointed out that aquaculture offers livelihoods for resource poor rural communities that have no production bases, by utilizing untapped public aquatic resources.

52. There are wide variations in the culture practices of smallholder aquaculturists within the region, and among different communities of the same country, mainly because they have developed their culture systems over generations – without much outside interaction. Although efforts have been made towards improvements, based on indigenous knowledge, impacts remained localized and fragmented. Similarly, certain extension strategies and approaches have been successful in certain areas, but the region as a whole has not been able to take advantage of such experiences.

53. The objectives and organizational set up of the SARDev programme are designed to carry the development process further. During its last meeting in January 1999 in Colombo, Sri Lanka the Governing Council of NACA endorsed the programme and gave commitment to support its formulation, development and subsequent implementation. The draft framework of the Programme is shown in Appendix E.

54. Dr Malcolm Hall introduced the concept of the proposed Regional Programme including its overall vision, objectives, outputs, target groups and strategy for implementation. The overall vision of the programme is one where:

- aquaculture as an entry point makes sustained contributions towards (i) household food security, (ii) poverty alleviation, (iii) environmental protection, (iv) natural resource management and (v) gender equity;
- sense of ownership of the improvement processes prevails among the smallholder aquaculture farmers by drawing their full participation in problem identification and problem solving, facilitated by their increased technical and managerial capacity and strong, active grass roots institutions; and
- a key role for scientists and technicians in the promotion of sustainable rural development is interacting closely with smallholders and resource poor communities to improve their farming systems.

55. Dr Hall informed that the development objective of the Programme was to accelerate the social and economic progress of the rural poor, with a focused and integrated programme of regional aquaculture development, aimed at rural poverty, household food security, environmental protection and regeneration and the advancement of women, specific objectives included:

- promoting the development and utilisation of sustainable aquaculture technology and management systems through a participatory problem identification and solving approach;
- developing the capacities of poor rural communities – both men and women – to participate in the development, adaptation and application of improved technologies and management systems aimed at producing more food, generating more income and managing the environment and production resources in a sustainable manner; and

- strengthening the capabilities of regional, national and local institutions involved in technology development, dissemination and utilisation; training and capacity building; and information exchange.

56. The following were proposed as expected outputs of the project:
participatory strategies and techniques for the development and dissemination of improved aquaculture technology for use by rural communities;
technologies and management systems that are appropriate for sustained rural development;
trained human resources for participatory rural aquaculture development programming, farming systems research and extension, community organization and information generation and dissemination;
strengthened institutions and organizations that promote rural development through aquaculture A stronger and sustained network mechanism concerned with information and technical exchange for the promotion of aquaculture development activities in the region; and
functional linkages with institutions working in rural development activities with an aquaculture component.

57. The basic programme strategy is to exploit the complimentary roles of the two groups of organizations involved in the promotion of aquaculture. Research institutions, which are strong in terms of biological and technical issues, and NGOs and government extension services, which are more oriented towards socio-economic and development aspects. This will be achieved by facilitating the necessary capacity building within research institutions to enable them to market their services to NGOs, relevant government institutions and donor assisted aquaculture field projects.

58. Dr Hall proposed a five year Programme, implemented through three successive phases: an initial six month preparatory phase for the formation of a Coordination Unit (CU) and for planning; a second phase of eighteen months, during which the focus will be upon the interaction between the Regional Lead Centres (RLCs) and field projects, capacity building activities and expansion of activities by formulating projects with and establishing links to existing projects; and a final phase that will consist of a fully-operational network of field projects in several countries, including countries that are not members of NACA. The activities to be taken up would include four major areas: research and technical assistance; training and institutional capacity building; information and documentation; and regional/sub-regional networking. He also proposed provisions for external evaluation, to consider ways and means of sustaining the capacities created and the momentum built within the Programme.

GROUP DISCUSSIONS ON THEMATIC FOCUS AREAS, PRESENTATION OF RECOMMENDATIONS AND ADOPTION OF SARDev PROGRAMME FRAMEWORK

Chairperson: Dr N. MacPherson followed by Dr Z. Shehadeh
Rapporteurs: Dr M. Martinez, Mr P. Bueno, Dr M. Phillips and Dr N. Deomampo

59. Participants were organized into four working groups (WG), working in parallel to review and suggest amendments, if any, to the proposed SARDev programme concept and to present their findings for discussion in the final plenary session. The WGs focused on the following four topics:

- programme vision,
- development and specific objectives,
- outputs and activities,
- institutional arrangements for implementation.

60. Based on the assigned themes, the four WGs held discussions and presented their reports in the plenary session chaired by Dr Shehadeh. Due to similarities in the outputs of WG 1 and WG 2, the two reports were amalgamated. Dr Bishan Singh made a common presentation on behalf of both WGs, while Dr H. Demaine and Dr S. Ayyappan presented the outputs of WGs 3 and 4 respectively.

61. All the WGs agreed that the Programme Vision was essentially sound, although some minor amendments were suggested. Similarly, the proposed development objective of the programme was largely considered as appropriate, though a few alternative wordings were proposed. With regard to the specific objectives of the Programme, there was conformity among all the WGs. Poverty alleviation, household food security, improved environmental protection and the advancement of women were common elements. Stress was placed on strengthening the capabilities of the poor rural communities – the primary target group of the Programme – and the local, national and regional institutions involved in technology development, dissemination and utilisation. Promotion of participatory approaches to aquaculture development planning, resource management and the development and dissemination of technology were also emphasised.

62. WG 4 recommended that the LIFDCs of the Asia-Pacific region be covered by the Programme. No other working groups attempted to determine the geographic scope. Programme outputs, as suggested by the WGs, include the following:

- participatory strategies and techniques for effective development, dissemination and use of aquaculture technologies;
- appropriate aquaculture technologies and management packages for sustainable rural livelihood development identified and disseminated among rural communities through participatory extension strategies and methods;
- strengthening selected regional, national and local level institutions and organizations for the promotion of rural livelihood development through aquaculture;
- appropriate mechanism devised for bringing aquaculture to main stream national extension programmes; and
- establishment of functional linkages between the community, government and non-government institutions carrying out rural development activities with an aquaculture component.

63. Activities of the Programme, as suggested by the WGs, were categorised under: information and knowledge exchange; regional, sub-regional and national level training events and study tours; exchange among farmers' groups/associations; advisory services to projects through TCDC; and establishing links with and building on the experiences of field projects. All the groups were in favour of phased implementation of the Programme. After considerable debate, it was decided that the first 18 months of the Programme should concentrate on information exchange and training in concepts and approaches for rural aquaculture development. It was also suggested that during this phase the participating RLCs and national institutions be assisted to formulate pilot field projects, which would constitute the main thrust for the subsequent phase of the programme. With regard to institutional arrangements for the implementation of the Programme, it was generally indicated that NACA should take responsibility for coordination and management of the Programme at the regional level. Suggestion was also made to link programme development with the upcoming DFID programme formulation, as well as SIDA activities.

64. The main comments and suggestions brought out during the plenary discussion were as follows:

- The programme document should state what is new in the programme. The programme should be very clear about outputs and these should be quantified wherever possible.
- The programme should bring farmers to the centre of decision making. It should also emphasise how programme activities with farmers would continue beyond the immediate interventions.
- The identification of successful examples of rural aquaculture development should be a specific objective of the programme. The importance of building upon lessons learned in development approaches and successful pilot projects should be incorporated in the document. Consideration should also be given to re-ordering programme activities with initial focus on information and adequate refinement of the messages to suit small and subsistence farmers' needs.
- "Low input" aquaculture may not always be the most appropriate technical option; the programme should have some flexibility on this point.
- The participatory/training specialist should also have experience in extension.

65. To enhance the quality of programme implementation, it was felt that there is a need to involve national institutions with expertise in rural development to compliment the role of NACA centres, whose strength is mainly in technology. Simultaneously, NACA centres may also be geared to reorient themselves along current development paradigms to better meet current development needs. In countries without NACA lead or national centres (e.g. Lao PDR), other appropriate mechanisms need to be identified for programme implementation. It was suggested that there should be a National Coordinator in each country, responsible for catalysing programme activities at the national level.

66. Regarding phasing of programme implementation, it was pointed out that this need not conform to FAO TCP funding. Phasing of activities may be viewed favourably by other donors, provided that details, including budgets, of all phases are included in the programme document and funding is sought for all phases simultaneously.

67. It was suggested that the title of the programme – "Sustainable Aquaculture for Rural Development (SARDev)" – should be changed to avoid confusion with the acronym SARD (Sustainable Agriculture for Rural Development), which is already in use. It was also suggested that the word "livelihood" be incorporated into the title to reflect accurately the programme objective.

68. An FAO Regional TCP was considered to be an important option to quick-start the programme. In order to avoid duplication of efforts, and to maintain momentum, it was suggested that the members of the APFIC Ad Hoc Working Group of Experts on Rural Aquaculture be drawn from those present at the consultation. The APFIC working party meeting will be a follow up to this consultation and hence, it would be desirable if the recommendations could be forwarded subsequently to APFIC for consideration.

69. In the end, there was consensus that the proposed regional programme was very timely and of considerable relevance to the needs of the countries of the region. The programme will serve as a platform for cooperation, offering adequate scope and conditions for donors, NGOs, regional and international organizations to participate and contribute.

70. Participants were informed that the inputs from the consultation would be used in the preparation of a Programme Concept paper. The latter would be prepared following an FAO/NACA programme formulation mission to consult with some countries in the region. The draft framework, as revised on the basis of suggestions from participants, is shown in Appendix F.

APPENDIX A

AGENDA AND TIMETABLE

Monday, 29 March 1999

Morning Session

Registration and opening

08:30-09:30	Registration of participants
09:30-10:00	Opening Ceremony/Inaugural speeches by Mr Hassanai Kongkeo and Dr Ziad Shehadeh
10:00-10:30	Coffee Break

Session 1 Overview of the current situation of small-scale aquaculture in the context of rural livelihood development

Sub-session I Presentation of Country Reports
Chairperson: Mr H. Kongkeo; Rapporteur: Dr M. Halwart

10:30-12:30 Introductory remarks followed by the presentation of seven country reports and discussion/clarifications.

Country	***Reporting Participant***
Bangladesh	Mr Nazrul Islam
China	Mr Miao Weimin
India	Dr S. Ayyappan
Indonesia	Dr Purwanto
Philippines	Mr Fred Yap
Thailand	Dr Cherdsak Virapat
Viet Nam	Dr Le Thanh Luu

12.30-13.30 Lunch break

Afternoon session

Sub-session II Presentations by organizations, donor agencies and NGOs
Chairperson: Mr P.C. Choudhury; Rapporteurs: Dr M. Prein and Dr H. Demaine

13.30-17.00 Presentations

Organization	***Participant***
AIT	Dr Harvey Demaine
ICLARM	Dr Mark Prein
MRC	Dr Zsigmond Jeney & Mr Nguyen Van Trong
DFID – HQ	Dr Neil MacPherson
DFID – BGD	Dr Don Griffiths
IFAD	Dr Dev Nathan
DANIDA	Ms Susanne Thomsen

SEAFDEC	Dr Damrong Silpachai
HAKI	Dr Lazlo Varadi
AIT – PD/ACRSP	Dr C. Kwei Lin and Dr Hillary Egna
CARE Bangladesh	Dr M.C. Nandeesha
SIFAR	Dr Peter Edwards

Tuesday, 30 March 1999

Morning session

Sub-session II (contd.) Review of selected themes in aquaculture for rural development

09:00-10:30 Presentation of expert reviews on specific aspects/issues that have bearing on the programme development. Each presentation followed by discussion.

Expert Presentations

Dr Bishan Singh	– Adviser FARM/FARMESA Community level planning for rural development with special reference to FARM programme and its implementation experiences
Dr T. Nasar	– IIRR Strategy and approaches for trainers' training for dissemination of information to rural poor households
Dr Peter Edwards	– AIT Technological options for aquaculture as rural livelihood
Dr M. Kalim Qamar	– FAO Rome Recent advances in extension system
Dr R. Balakrishnan	– FAO RAPA Gender issues in rural development
Dr Amararatne Y.	– AIT Aquaculture resources management to benefit the rural poor: Need for a better institutional framework
Dr Narciso Deomampo	– FAO RAPA Access to resources needed for rural development

10:30-10:45 Coffee Break

10:45-11:30 Expert review presentation. Continued.

Session 2 Review of SARDev programme framework
Chairperson: Dr P. Edwards; Rapporteur: Mr F. Yap

11:30-12:00 SARDev programme: Rationale and background. Dr Dilip Kumar
SARDev programme: Concept framework. Dr Malcolm Hall

12:00-12:30	Discussion
12:30-13:30	Lunch Break

Afternoon session

Session 3 **Group Discussions on Thematic Focus Areas**
Chairperson: Mr N. MacPherson; Rapporteurs: Mr P. Bueno, Dr M. Phillips and Dr N. Deomampo

13:30-14:00	Review and amendment of specific topics and organization of four working groups
14:00-17:00	Group discussion. Continued.

Wednesday, 31 March 1999

Morning session

09:00-10.30	Group discussion. Continued. Working groups: draft Programme framework

Session 4 **Final Plenary**
Chairperson: Dr Z. Shehadeh; Rapporteurs: Mr P. Bueno, Dr M. Phillips and Dr N. Deomampo

10:30-13:15	Presentations by Group Leaders and discussions
13:15-13:30	Final remarks by Chairperson and Close

APPENDIX B

LIST OF PARTICIPANTS

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APPENDIX C

OPENING ADDRESS

Hassanai Kongkeo

NACA Coordinator

It is, indeed, a great pleasure and privilege for me to extend on behalf of the NACA organization, a very warm welcome to our distinguished participants to this Expert Consultation on "Sustainable Aquaculture for Rural Development".

As many of you will know, NACA is a regional intergovernmental organisation – which grew out of a regional UNDP/FAO project – and became independent in 1990. There are now 14 member governments in Asia – including some of the world's largest aquaculture producers – and a number of other Asia-Pacific countries actively cooperate in the activities of the organisation. The objective of NACA is to promote sustainable aquaculture development in the Asia-Pacific region through technical cooperation, including research, training and information exchange. This expert consultation, jointly organized with FAO, we view as a timely and very important activity to further strengthen the activities under the NACA Regional Work Programme, in partnership with other national, regional and international agencies and organisations with a common interest in promoting aquaculture for sustainable rural development in Asia.

The history of the development of the NACA Work Programme reflects much of the recent development trends in aquaculture in the region. The early focus of the organisation was on aquaculture technologies and development of aquaculture farming systems. Our Regional Lead Centre in China (RLCC) provided a strong basis for the development and dissemination of information and training on integrated farming systems, which has had an important influence on the development of integrated farming systems in Asia. In India, our Regional Lead Centre (RLCI) developed technologies of composite carp culture which are now well developed and have contributed significantly to the increases in inland fish production throughout South Asia. However, as aquaculture expanded in the region, it became clear that the development of technology and farming systems was not sufficient to deal with the various constraints faced by aquaculture. During the 1990's therefore, the Work Programme has given increasing attention to aquaculture sustainability by incorporating economic, social and environmental issues into the organisation's activities through various research, training, information exchange and technical cooperation. Over the past two years, also, increasing attention has been given to the development of policy guidelines and capacity building to assist member governments in the region in the implementation of the FAO Code of Conduct for Responsible Fisheries, which we view as an important set of principles guiding further development of aquaculture.

Under the current five year Work Programme, which runs from 1996 until the end of year 2000, an important activity was the undertaking of a regional study with FAO on research needs and priorities. Among the various findings of this study, it became clear that there was still a strong focus in many national institutions on technical issues and limited application of research activities in dealing with complex rural development needs. Given the increasing concern by all governments in the region to deal with the problems of poverty alleviation, food security and environmental degradation, it was timely to look at ways to develop the NACA Work Programme in ways which specifically address the role of aquaculture in the development of sustainable livelihoods for rural communities, and particularly the resource poor rural people. I see this Expert Consultation with FAO as an opportunity to further promote regional cooperation to accelerate the development of sustainable aquaculture, which contributes positively to rural development, in line with the current needs of the Asian region.

The development of programme for " Sustainable Aquaculture for Rural Development", to be discussed during this Consultation, was first approved by the government representatives at the NACA Governing Council in Hanoi in December 1997. The concept was further elaborated during the Technical Advisory Committee meeting in India during May 1998. We view the approval of the senior government policy makers during the Governing Council as an important event, as perhaps for the first time the region's governments have together said " yes, we would like NACA to develop and implement a cooperative programme to promote sustainable aquaculture in ways which focus on rural development". We view this government commitment and involvement in the programme as critical – not only will lead to a smoother implementation of the programme activities, but it will also mean that the activities can directly inform development of national policy for aquaculture, aquatic resources management and rural development. We see the NACA organisation increasingly involved in assistance to the development of national policy – an example is the ongoing cooperation with the FAO and OIE on the development of regional guidelines on responsible movement of live aquatic animals, and other work on the Code of Conduct for Responsible Fisheries – and we would see this rural development programme similarly providing guidance, capacity building, examples of best practice and information required to assist in the development of an appropriate and need-based national policy.

It is pleasing to note that FAO has felt that the programme is important, and has committed technical and financial assistance to its development, and expressed its willingness to strengthen future cooperation on the programme. I would like to take this opportunity to thank the FAO for this support.

I would like to thank other agencies, government participants and experts here for your time and commitment to this joint endeavour. The large number of participants in this Consultation – quite a bit beyond our initial expectations – I think shows both importance of this subject, and strong interest in future cooperation programme.

At this point, I would like to emphasize the importance of cooperation. NACA views this Programme on Sustainable Aquaculture for Rural Development as one of partnership. The programme we anticipate will be a 'platform' for cooperation on which different individuals, institutions and agencies, government and non-government bodies and other concerned organizations, can cooperate in ways which assist the region in the development of aquaculture to meet the ends of the rural communities, and particularly the poor and disadvantaged. The programme will be a complex one, involving the close interaction among different disciplines and expertise, and various forms of cooperation will be necessary for its development and successful implementation. I certainly hope this Consultation will be able to develop this partnership concept into a more concrete set of follow-up activities. The interest in and attendance at this Consultations is an excellent sign of the interest in the subject and willingness to cooperate and NACA certainly looks forward to working closely with you all, and the further strengthening of this partnership in the future. I can assure you that NACA will take approximate follow-up based on your recommendations.

Distinguished participants, the tasks that await your consideration over the next three days for developing a programme framework for the rural livelihood development through aquaculture is complex. The work you are about to begin is of great regional relevance and national priority of member governments. This three days long consultation promises to demand a lot from each and every one of you. Your valuable inputs will help us to set a framework for future course of action that will have bearing on the livelihood development of resource poor rural communities of the region through aquaculture development. I would like to thank you again, in advance, for your commitment to this activity.

With these few words, I thank you all once again for your cooperation, and wish you a pleasant stay in Chiang Rai. Please do not hesitate to contact myself and the Secretariat staff who will by more than willing to help you if you need any assistance.

Thank you for your attention.

APPENDIX D

OPENING ADDRESS

Dr Ziad H. Shehadeh

Senior Fishery Resources Officer
Fisheries Department, FAO

I am pleased to welcome you all to this consultation on behalf of the FAO Director General, Dr Jacques Diouf, and the Regional Representative for Asia and the Pacific, Assistant Director General Mr Prem Nath.

The theme of this consultation is relevant to the global objective of alleviating poverty and increasing food security, and central to FAO's Regular Programme activities. In 1994, the FAO launched the Special Programme for Food Security (SPFS), to help improve national food security, reduce production variability and improve access to food in low-income, food-deficit countries (LIFDCs). Aquaculture is incorporated into this programme as a means to diversify farming activities, reduce risk and increase income. In addition, the World Food Summit Plan of Action (1996) recognized the potential role of aquaculture in rural development and called for the promotion of environmentally sound and sustainable aquaculture to be integrated into rural, agricultural and coastal development. This is in line with Article 6.19 of the Code of Conduct for Responsible Fisheries, which declares that "States should consider aquaculture, including culture-based fisheries, as a means to promote diversification of income and diet".

The theme is clearly pertinent to the immediate needs of many countries of this region. This is indicated by action taken by the NACA Governing Council to develop a programme for regional cooperation and strengthening of institutional capacities in this area of development, by the recent establishment of the Ad Hoc Working Group of Experts on Rural Aquaculture by the APFIC and by on-going programmes of the Mekong Secretariat, AIT, ICLARM, SEAFDEC and others. It is also evidenced by the growing number of national projects and the support being provided by bilateral and multilateral agencies.

Recent development experience has been helping to define conditions under which aquaculture can contribute to rural development and how small-scale aquaculture might be integrated with other farm enterprises. New, more appropriate methods for the planning and execution of research and development activities, as well as new methods and mechanisms for the transmission of information to farmers, are being developed and tested. At the same time, the view of the potential role of aquaculture in rural development has also been changing – from a focus on specialized stand-alone fish farms to the adoption by the rural poor of aquaculture as an integral part of farming systems, but we are still at the beginning of a long journey. There is much we still need to understand about the socio-economic and ecological constraints to adoption of integrated farming system, and how to make such systems work sustainably. We also need to assess the effectiveness and impact of recent research and development approaches, methodologies and projects, and their implications, to help guide future efforts.

We must focus more squarely on the needs of people – their access to knowledge, technologies, markets, financing and land ownership. We must focus especially on the needs of women, who are the main food producers in many developing countries.

Protection of natural resources must remain central to our efforts. However, unless governments provide the policy incentives, the market opportunities, and the means for farmers to improve their standard of living, we cannot expect farmers to be good stewards of natural resources.

For the future, we especially need more people and institutions that can bring together the science, the policy, the finance and the capacity to enhance rural well being. The challenge is daunting and the time to tackle it is now.

We are pleased to join forces with NACA and with all of you to facilitate cooperation in rural aquaculture in Asia and the Pacific through the development of a framework for a *Regional Programme on Sustainable Aquaculture for Rural Development* (SARDev Programme), and to help identify cost-effective means for its institutionalisation and continuity. The programme is intended to strengthen the focus on aquaculture for rural development, undertake regional activities to strengthen efforts at the national level, and provide a forum for the exchange of information and experiences. We seek your assistance, based on your collective experience, to develop this regional framework so that it would be of significant practical value to countries of the region.

I wish you success in your deliberations and pledge our continued efforts to help, wherever possible, to make regional cooperation in rural aquaculture a reality.

APPENDIX E

DRAFT FRAMEWORK FOR A REGIONAL PROGRAMME ON SUSTAINABLE AQUACULTURE FOR RURAL DEVELOPMENT (SARDev)

1. BACKGROUND

The Fourth Technical Advisory Committee Meeting (TAC-4) in Islamabad in May 1995 recommended measures to strengthen the network. The rationale was that the effective implementation of the regional Work Plan through regional cooperation depended on a strong and appropriate institutional support. This, in turn, depends on the capacities of the participating centres and institutions, a clear definition of their functions and roles in the regional programme. The role definition will also involve effective linkage mechanisms among them.

TAC-4 proposed a number of measures to achieve this objective of network strengthening. One was a scheme of regional sub-networks to serve contiguous countries that have similar ecological and socio-economic situations and aquaculture development needs and problems. Another was the reiteration of previous plans to have lead centres for coastal resources management, seaweed research and development, and shrimp research and development. TAC recommended the formulation of a network development programme that would include the implementation and funding support schemes, to be carried out by a Task Force.

Proposal developed by the Regional Lead Centre in India – or CIFA – submitted to FAO and NACA to make the CIFA an international centre of excellence in freshwater aquaculture. The merits of the proposal have been duly discussed, particularly through a mission made by FAO RAP's Regional Aquaculture Officer to CIFA and New Delhi to consult with authorities of the Centre, the central government, and FAO and UNDP representations. The CIFA proposal also led to exploratory discussions among NACA secretariat staff and Dr Choudhury as to whether it might also be appropriate for CIFA – considering its strengths, experiences and strategic location – to serve as the focal point for a sub-regional or regional programme on rural aquaculture. Proposals focused on rural aquaculture were also prepared by NIFI (RLCT) and by RLCC Wuxi.

Regional study on aquaculture development research priorities and capacities by FAO and NACA. Relevant to the purposes of this consultation are the findings of the study that technology is not being effectively applied for lack of strong institutional and enabling mechanisms, and its confirmation that rural aquaculture and the associated and interlinked issues of *poverty alleviation, food security and environment degradation* as among the high priority areas for regional aquaculture development research. The five year programme also envisaged that the study on research priorities would form the basis of more specific follow-up regional and sub-regional programmes. The final workshop of the study proposed a number of subregional collaborative research designed to strengthen the institutional support for the conduct of research and the utilization of their results.

2. CONCEPT

From numerous forums in which NACA has been involved, it has become very clear that "Sustainable Aquaculture for Rural Development" with focus on (i) poverty alleviation, (ii) food security, (iii) environmental and natural resources management, and (iv) advancement of women is an appropriate, relevant and timely programme for regional cooperation.

2.1 Programme Title and Objectives

The regional programme shall be called **"Sustainable Aquaculture for Rural Development"**, with the following objectives.

Development objective:

Accelerate the social and economic upliftment of the rural poor with a focused, intensive and integrated programme of regional aquaculture development aimed at poverty, food security, environmental protection and regeneration, and the advancement of women.

Specific objectives:

(i) Promote the development and utilization of sustainable aquaculture technology and management systems that are appropriate for target rural communities through applied and adaptive research, manpower training and information exchange.

(ii) Develop the capacities of farmers and women in poor rural communities to adapt and apply technologies and management systems aimed to produce more food, generate more income and manage the environment and production resources in a sustainable manner.

(iii) Strengthen the capabilities of regional, national and local institutions including farmers and women's groups involved in technology development, training, information dissemination and utilization.

2.2 Programme outputs

- Technologies, management systems that are appropriate for sustained rural development
- Strategies and techniques for effective dissemination and use by the rural communities of the technology and management packages.
- Trained manpower for rural aquaculture development planning, research, extension, community organization and information.
- Strengthened institutions and organizations for rural aquaculture development
- A stronger and sustained network information and technical exchange mechanism for promoting aquaculture development activities.
- Functional linkages with other institutions working in rural development.

2.3 Programme Structure

The NACA Regional Lead Centres (RLCs), namely FFRC Wuxi, CIFA Bhubaneswar, and NIFI Bangkok, as well as the linked national aquaculture centres (i.e. NATC Janakpur, BADC Jepara, etc.) and collaborating institutions (i.e. AAHRI, Shrimp Research and Development Institute etc.) have been geared towards research, training and information development and dissemination on various problems associated with the four issues of poverty, food security, environment and women advancement. Therefore, a coordinated regional programme that integrates all these issues would consolidate the resources and efforts of the centres and linked institutions for a highly intensified and regional cooperative approach to tackle these issues. Each RLC would undertake activities in all four development issues (or themes).

According to its distinctive capability, a Centre would take on an enhanced role in one of the first three themes. For instance RLCI would emphasize in the overall programme the poverty alleviation theme through low-cost, income generating, integrated systems; RLCC would emphasize on food security through integrated systems of aquaculture-agriculture; and RLCT could emphasize environmental protection and natural resources management. All three would integrate the theme of advancement of women in their programmes.

2.4 Programme Components

Thus, the regional program would have four main components: Poverty Alleviation, Food Security, Environmental Protection and Natural Resources Management, and Advancement of Women. To reiterate, all four would be undertaken by all three RLCs (as the nuclear or focal centre) but one of the three components would be emphasized in a sub-regional component. Each sub-regional component would be operated from an RLC with the participation of linked national institutes and centres in the same sub-region. The results of the activities – applied research, pilot studies, training, and information development – from the other sub-regions would be shared through TCDC and other mechanisms with the other subregions. Such region-wide sharing would require a regional coordinating mechanism, which would be provided from the NACA secretariat.

2.5 Subregional grouping

The subregions could be tentatively delineated as South Asia (Bangladesh, India, Nepal, Pakistan and Sri Lanka), Northeast Asia (People's Republic of China, Hong Kong SAR and DPR Korea) and SE Asia.

2.6 Subregional focus

Taking into consideration the priorities of the subregions, and the relative advancement of aquaculture R & D in each subregion on the first three issues, the South Asian subregion could take poverty alleviation with CIFA as the nuclear or focal centre, Northeast Asia on food security with an inland focus with Wuxi as the focal centre, and Southeast Asia could tackle environmental and natural resources management with NIFI, AAHRI and the Shrimp R and D Institute forming a trio of lead/resource institutions.

2.7 Regional Sharing and Exchange

The results of the activities in each subregional project would be disseminated through various mechanisms including training, workshops, information exchange and expert exchange such as in secondment schemes – within the region and among the subregions through the participation of RLCs and NACs and linked national institutes.

2.8 Regional Coordination

A regional coordinating mechanism would be required to provide the technical and management backstopping for the subregional projects and to coordinate the region-wide sharing and exchanges.

3. IMPLEMENTATION STRATEGY

Broadly, the strategy would include:

- development of a catalytic project to initiate the Programme,
- supportive activities to the above action would include:
    - drafting of a Programme document,
    - completion of the network institutional profiles including a cataloguing of ongoing activities that fall under the four SARDev concerns i.e. food security, poverty alleviation, environmental management, and women participation,
    - Programme formulation mission,
    - TCP project formulation,
    - formulation of bilateral-funded projects under the programme.

APPENDIX F

REVISED FRAMEWORK FOR A REGIONAL PROGRAMME ON AQUACULTURE FOR SUSTAINABLE RURAL LIVELIHOOD DEVELOPMENT (ASRLD)

1. BACKGROUND

One of the major findings of the 1996 FAO-NACA Survey and Analysis of Aquaculture Development Research Priorities and Capacities in Asia[1] was that technology is not being effectively applied due to the lack of strong institutional and enabling mechanisms. The study also affirmed that smallholder aquaculture, and the associated and interlinked issues of *poverty alleviation, food security and environment degradation*, are among the highest priority areas for regional aquaculture development research. It was envisaged that the recommendations of the study, and the guidelines formulated at the associated workshop, would form the basis for specific regional collaborative programmes. Seven project concepts were prepared for this purpose and one of these was entitled, "Aquaculture Research for Rural Development".

It was recommended that the resulting regional programmes should be implemented by networking, using existing institutional mechanisms supplemented by other technical lead centres as necessary. The development of a programme on "Sustainable Aquaculture for Rural Development" (SARDev) was approved by the Governing Council of NACA (Hanoi, December 1997), based on a concept prepared by a regional consultation of experts and lead centres in the field. In addition to these developments, APFIC, in its twenty-sixth Session (Beijing, September 1998), agreed that small-scale rural aquaculture was an effective vehicle for rural development and established an *ad hoc* Working Group of Experts on Rural Aquaculture to address issues and advise the Commission in this field.

In view of these developments, NACA and FAO agreed to collaborate on the establishment of a Regional Programme on Sustainable Aquaculture for Rural Development for the Asia-Pacific Region and signed a Letter of Agreement for that purpose. FAO will play a catalytic role – by assisting in planning and project formulation – in the context of its Regular Programme activities in this field. The organization will also continue to cooperate with the programme, once established, by means of specific joint activities in areas of mutual interest.

As a result of a consultative meeting organised in Chiang Rai, Thailand from 29 to 31 March 1999, attended by representatives of most of the major regional stakeholders in the development of small-scale rural aquaculture, the draft project concept paper was revised to reflect the views of the participants.

2. PROGRAMME VISION

The overall vision of the programme is one, where aquaculture and associated aquatic resource management is recognised as an important factor in improving rural livelihood systems that respond to concerns for: (i) improved household food security; (ii) poverty alleviation; (iii) environmental sustainability; and (iv) gender equity, through due empowerment of small-scale farmers and their full participation in the process of improving their farming systems based on active interaction with service providers.

[1] NACA/FAO (1997), Survey and Analysis of Aquaculture Development Research Priorities and Capacities in Asia. FAO Fisheries Circular No. 930, FAO, Rome. Nov.1997

3. PROGRAMME OBJECTIVES

3.1 Development Objective

To accelerate the social and economic progress of the rural poor through a regional programme of aquaculture development that addresses the issues of rural poverty, household food security, environmental protection and regeneration, and the advancement of women.

3.2 Specific Objective

To strengthen the capabilities of local, national and regional institutions involved in technology development, dissemination and utilisation with emphasis on participatory strategies and methodologies, and systems-oriented approaches.

To promote the development, adaptation and use of appropriate aquaculture technology and management systems through an interdisciplinary, problem-solving approach.

To develop the capacities of poor rural communities to participate in exploiting opportunities for aquaculture development and assume ownership of the development process.

To promote regional collaboration in aquaculture development (as a component of rural development).

4. PROGRAMME OUTPUTS

i) Aquaculture technologies and management systems that are appropriate for sustained rural development identified.

ii) Participatory strategies and techniques for effective development, dissemination and use by rural communities of improved aquaculture technology and management packages reviewed and disseminated.

iii) Flow of information concerning successful approaches, problem areas and opportunities for improvement established among projects/institutions.

iv) Trained human resources for interdisciplinary and participatory rural aquaculture.

v) Strengthened institutions and organizations capable of applying an interdisciplinary, participative approach to rural aquaculture development within a holistic farming systems perspective.

vi) Relevant policies regarding the development of rural aquaculture for small-scale producers including improved policies for service institutions developed.

vii) Functional linkages between institutions working in rural development activities with an aquaculture component established.

5. PROGRAMME ACTIVITIES

In order to ensure the delivery of the planned output the programme would develop four main groups of activities that can be summarised as follows:

- Information and documentation/exchange of experiences,
- Training and institutional capacity building,
- Advisory services,
- Research and development.

5.1 Information and Documentation

i) Create a forum for exchange of information and discussion of experience in aquaculture for rural development, including appropriate technologies and supporting policies.

ii) Document and disseminate individual experiences and indigenous knowledge.

iii) Organise cross-sectional analysis and documentation of lessons learned and relevant guidelines.

iv) Establish a data base/directories and clearing house for information relevant to programme objectives (updated implementation and research activities, experts and institutions).

5.2 Training and Institutional Capacity Building

i) Organise regional, sub-regional and national training events.

ii) Produce relevant guidelines and other training materials making fullest use of existing materials.

iii) Promote exchange programmes between relevant farmers' groups.

5.3 Advisory Services

i) Design and operate advisory services to ongoing projects.

5.4 Research and Development

i) Link with and build on the experience of existing field projects.

ii) Promote the identification of improved technologies and systems of aquaculture for application, refinement and use by small-scale producers.

iii) Encourage the adoption and adaptation of participatory approaches in the development of aquaculture.

iv) Facilitate new national and sub-regional field projects through a) identification of development opportunities, b) identifying and expediting donor support and c) collaboration on project design.

v) Institutionalise regional collaboration in programme subject matter.

6. TARGET GROUPS

i) ***Small-scale aquaculture farmers*** – including the landless communities – constitute the primary group of beneficiaries in the sense that the programme will be instrumental in accelerating the production and dissemination of appropriate aquaculture technologies that will enhance the status of household food security, lead to improved incomes, involve women farmers and ensure sustainable rural development.

ii) ***Regional and national institutions*** – The achievement of the programme vision will involve the creation of staff capable of functioning as community-oriented scientists and knowledge providers capable of solving problems at the grass roots level. The secondary target group of the programme, therefore, consists of those scientists and extension staff working within the network of research institutions that comprises the NACA, as well as other selected national and regional (Asia) institutions.

iii) ***NGOs and other institutions*** – A third group of beneficiaries is made up of the NGOs and the other institutions and organisations involved in the implementation of smallholder aquaculture projects, since they will benefit from the improved availability of technology, technical advice, information and training facilities provided by the NACA and other institutional partners within the programme.

This is the report of the consultation on Aquaculture for Sustainable Rural Development which was organized jointly by FAO and NACA and held in Chiang Rai, Thailand from 29 to 31 March 1999 in order to develop the detailed structure of a regional programme on aquaculture for sustainable rural development and to propose a strategy for its implementation. The consultation took an overview of the relevant information emerging from presentations of country reports; lessons learned by specific projects; experiences of regional and international organizations and donor agencies; and findings of expert reviews. More sharply focused examination of critical issues and discussions on specific components of the draft programme concept were followed through parallel working group discussions. The outputs of the working groups were further discussed during the concluding plenary. Finally, a detailed Programme Framework on Aquaculture for Sustainable Rural Livelihood Development was conceived through consensus to serve as guiding principles for the formulation of the programme.

ISBN 92-5-104397-3 ISSN 0429-9337

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M-40 X4208E/1/01.00/1350