

Communicating Research Results to Farmers—a Key Issue for Sustainability

Dilip Kumar* and P.C. Choudhury†

IN Asia, aquaculture has been primarily oriented towards meeting local food requirements, creating gainful employment opportunities and supplementing family income. As a result, the majority of the sectoral contributors are small farmers. Inputs from research institutions and intra-regional exchange of information have accelerated the pace of development of Asian aquaculture. Large-scale commercialisation of aquaculture activities is a recent development in Asia that has been influenced by the price structure and increasing demand for high-value aquaculture products, especially shrimp. Governments in the region have also given high priority to the development of aquaculture because this sector is a major source of foreign exchange earnings through export of high-value products like shrimp.

Aquaculture extension services are recognised as the vital link between researchers and primary producers. The governments of countries within the region have worked diligently to expand and improve the network of field staff available to assist the aquaculture industries. In almost every instance, federal governments provide the framework for extension services. The main objective of these is to transfer appropriate technology packages to farmers to help them raise farming efficiency, production and profit. However, aquaculture extension services did not get parity with the growth of the sector and as a result the system functions under a limiting environment.

Unlike agriculture, hardly any research was undertaken to develop effective and appropriate extension methodologies, approaches, training materials and tools. Sustainability issues are yet to be incorporated in the extension delivery system.

Highly Diversified Groups of Primary Producers

Aquaculture helps to intensify lowland development and fits within the framework of rural development. Aquaculture is both a primary source of livelihood as well as a secondary or supplementary activity. Again, aquaculture may be an income-generating activity or contributor to local and national food security. Whether it is small-scale or large-scale, the principle activities are cultivation, harvesting, processing and trading. At one end, there are small-scale shrimp farmers, fry collectors and workers and, at the other, large-scale farmers, corporate groups, manufacturers, processors and marketing agents, national and international investors, and agencies.

As culture technologies became more economically viable, the sector attracted a lot of 'outsiders'. However, such developments created several social problems and the uncontrolled development resulted in negative environmental impacts. This phase of the development was quite quick and without much input or advice from extension services. Most of the recent entrants are either multi-national business houses or large local companies. They have the ability to hire technical consultants and experts and their main objective is income generation.

Large-scale farmers, the corporate sectors and large companies are highly organised, having access

* NACA (Network of Aquaculture Centres in Asia-Pacific), PO Box 1040, Kasetsart Post Office, Bangkok 10903, Thailand.

† FAO (Food and Agriculture Organization of the United Nations) Regional Office for Asia and the Pacific, Malivan Mansion, Phra Atit Road, Bangkok 10200, Thailand.

to information and innovations, and enough resources to benefit from new technologies. These groups also have better access to policy-making institutions and they are well organised and powerful enough to influence decisions.

On the other hand, the small-scale or subsistence-level farmers have relatively limited resources and little access to technical innovations. Small-scale farmers make up a relatively enormous sector, are highly unorganised, have a poor level of education, and little awareness about environmental implications and regulations. To ensure that the small-scale sector get the benefit of modern technology, it is desirable that information from research is channelled to them through an efficient extension services system. The task becomes more difficult when the technologies to be introduced are developed with the objective of long-term benefit and sustainability. It is easier to convince them of the benefit of modern technology through demonstrating an increase in production and profit than to show the long-term benefits from sustainability and reduced impacts on the environment. Alternatives, incentives, education and a lot of persuasion are needed to re-orient their attitudes and actions.

Sustainability—Issues and Considerations

As with other farming systems, the issue of sustainability is the focus of the shrimp industry's attention. Sustainability of shrimp aquaculture became an issue after the collapse of shrimp culture in Taiwan, provinces of mainland China and subsequently in several other countries in Asia. Negative impacts, like mangrove destruction and the consequent depletion of local fisheries, pollution, and other forms of land and water degradation are often highlighted. The social impacts on local communities that live in the tropical coastal regions where shrimp aquaculture is an increasing source of income include disrupting traditional systems of production, distribution and social relations. As defined by the Food and Agriculture Organization of the United Nations, "sustainable development is the management and conservation of the natural resource base and orientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations. Such sustainable development (in the agriculture, forestry and fishery sectors) conserves land, water, plant and

animal genetic resources, is environmentally non-degrading, technically appropriate, economically viable and socially acceptable" (FAO 1988). This definition clearly implies environmental, economic and social components of sustainability. However, the parameters of sustainability are yet to be made clear to all stakeholders. Again, this reflects the poor communication between the policy-makers and the primary producers.

The issue of sustainability in aquaculture is invariably discussed at different forums. For farmers, investors and government agencies, sustainability of shrimp aquaculture relates to maintenance of at least the current level of production and profit. For environmentalists, sustainable aquaculture refers to sustained production at a level that creates minimal negative impact on the environment and ensures no further environmental degradation. To social activists, it is a program of development that is sensitive to the question of social equity. Until all stakeholders in shrimp aquaculture come to a generally acceptable definition, it is wise to get hold of all three focal points—economic efficiency, ecological security and social equity.

Dr M.S. Swaminathan made the proposition in 1990 (see Jian 1994) that "development which is not equitable will not be sustainable, and a better common present is essential for a better common future". According to Jian Song (1994), the variables of economic efficiency and ecological security deserve heaviest weight and are the decisive factors for the elimination of poverty and achievement of a dignified life for the rural poor. 'Consumer awareness' and trade barriers have also been placed on the agenda, especially in the West, as a tool which could be used against the potential negative consequences of inappropriate growth of shrimp aquaculture. In any case, bi- or tri-faceted models of sustainable shrimp aquaculture demand greater participation of the local community.

Extension and its Potential Role in Bringing Sustainability to Shrimp Aquaculture

Before research findings can be made effective, there needs to be a radical change in the role of government departments involved in controlling and coordinating industry activity (Jenkins et al. 1995). Barraclough and Finger-Stich (1996) concluded that effective policy and institutional reforms are required at all levels

with close cooperation at the grassroots. Stability and sustainability, however, will come only through long-term planning and participatory implementation programs. This will be difficult because the majority of primary stakeholders do not possess an adequate understanding of the concept of sustainability in shrimp aquaculture. The problem is acute in countries where the majority of primary producers are small-scale farmers with a low level of literacy. This deficiency leads them to follow blindly anyone offering a potential short-term solution to their problem.

A Difficult Task Ahead

The task of educating and involving local communities in the management of resources, so that they can be exploited on a sustainable basis, is a matter of discussion at conferences and symposia but is yet to be widely introduced. The majority of local communities are poor and believe that “something of today is better than much of tomorrow”. Tomorrow is always masked by uncertainties. According to Sir Shridath Ramphal (1994), “poor people often destroy their environment—not because they are ignorant, but to survive”. They over-exploit the soils, overgraze fragile grasslands, and cut down dwindling forest stocks for firewood. In the context of the short-term need for survival, each decision is rational; in the long-term and wider context, the effects are disastrous. Poverty is both a cause and an effect of environmental degradation. However, it is not only the small-scale and poor farmers who are less concerned with environmental issues. Environmental aspects are also ignored by certain groups of self-centred and short-sighted, large-scale farmers. This is in spite of the fact that they have access to information and the capacity to buy it, and employ well-trained staff and technicians who are capable of developing and implementing sustainable farming practices.

When the support from extension services is not adequate, the small-scale operator has to depend upon external sources for information. Aquaculture extension will have to widen its scope to include the entire ecosystem and the issue of social equity as well. Naturally, the extension services will have to bear additional responsibilities. For performing such a role, they need major institutional reorganisation, increased operating capacity, innovative methods and adequate support.

Ineffective and Irrational Communication

The task of educating farmers and investors in the industry about the negative consequences of environmental degradation, social inequity and the benefit of sustainability, has been ignored. These issues are discussed at many national and international forums, which are dominated by environmentalists, scientists, administrators and policy-makers. However, the national governments have not addressed these issues with the farmers and with the industry. Fegan (1996) reported that this lack of communication is compounded by the sense of unfairness felt in the aquaculture industry at being repeatedly branded as environmental terrorists and the consequent reluctance to communicate for fear of inviting more troubles for themselves.

It is also true that there are instances where the certain factors have been clearly singled out to highlight the negative impacts of shrimp culture. An organised and well-tuned aquaculture extension system is needed to counteract such unbalanced reports.

Sustainable shrimp aquaculture requires adequate blending of new technologies with indigenous practices and traditional knowledge. Without such considerations we may end up with simplistic and inept models which will be quickly rejected. Extension will have to play a role in this area.

In the absence of effective extension services systems, most information is volunteered by groups associated with manufacturers and dealers of chemicals, feed, appliances and equipment. Aggressive marketing efforts by these interest groups often push the farmers to over-intensify their operations, by luring them to short-term profitability.

During the early stages of the development of shrimp culture, mangrove areas were frequently proposed for siting extensive shrimp farms. Subsequently, it was found that mangrove areas are generally unsuitable for shrimp ponds due to acidic soils. Unfortunately this information was poorly disseminated among existing and prospective farmers. Farmers in many countries still look at mangroves as potential sites for shrimp farms. In Thailand, where the shrimp farming system is more intensive, it has been found that of the total mangrove area that has been cleared, only 17% is used for aquaculture.

Policy Issues for Sustainable Aquaculture

The possibilities for bringing about reform will largely depend upon the active participation of the key social actors at the grassroots level and alliances of concerned parties in both producing and consuming countries.

Some Asian nations have formulated regulatory measures for coastal resource management, such as issuance of permits for fishing, logging, mangrove harvesting and construction of shrimp farms. However, most of these measures have not proven effective, due partly to enforcement failure and largely to lack of support and active involvement of the communities concerned. A well-organised system of extension services with appropriate approaches and strategies is required for educating, convincing, persuading and mobilising the active participation of primary producers and other stakeholders for effective implementation of regulations.

Subsidies, in the form of cash and kind ranging from 10–50% of project cost, are available to fish farmers and shrimp seed hatcheries in some countries (Pathak 1989). Promotion of aquaculture without the provision of grants, credit or subsidies, but with extensive extension support is slow and difficult but takes place in a healthy, long-term environment and is a relatively more sustainable approach. The provision of material/credit assistance to small-scale farmers usually attracts a bigger crowd than the genuine farmers. As soon as the delivery of inputs are withdrawn, many tend to lose interest. They remain active in the ‘credit/free material input’ phase but avoid meeting the extension agent during the ‘credit recovery’ phase (Kumar et al. 1996). However, there are instances where small credit systems have worked well and complemented the extension program of small-scale aquaculture development.

Research—Extension Linkage

To facilitate the transfer of information and appropriate technologies, and mobilise mass participation for the promotion of sustainable shrimp aquaculture in the region, there is a need to improve the institutional capacities of the extension services system. Closer links and cooperation among administrators, scientific communities, development workers and primary producers need to be fostered. As appropriate, the private sector should be encouraged to provide support, not

only for research but also extension which is highly relevant to their needs. The various components of extension services, such as research, participatory management, training and information dissemination, should be integrated under a well organised extension services system. Capacity building and efficiency increase are simultaneously required at all levels (i.e. extension managers, field extension workers, primary producers and other stakeholders).

Areas needing attention are as follows.

- Developing appropriate organisations to tune the respective Departments of Fisheries with respect to their extension and training functions.
- Developing practical and cost-effective training tools and programs.
- Harnessing the potential of folk media for more effective communication. These range from individual skills in talks, running meetings, writing articles and leaflets, to techniques such as the use of drama groups, songs and the broadcasting media.
- Developing appropriate extension approaches and methodologies.

Appropriate Strategies for Extension Services

Popularisation of responsible, sustainable aquaculture needs an appropriate approach to be taken. The following are some of the strategies which need consideration.

Privatisation of extension services

Extension services could be supported by the organisation of the farms/local communities themselves. Perhaps participatory extension services would be a more appropriate term. In China in very recent years, efforts have been made to privatise extension services at the country level. The farmers pay fees for the extension services rendered and the amount usually depends upon the additional production achieved. Such a system adds efficiency to the system but how effective it would be in promoting sustainable aquaculture is a matter of experimentation and observation.

Recognising extension as an integral part of the research and development process

Incorporation of aquaculture extension into tertiary curricula and refresher courses is highly desired. Strategies which enable scientists and researchers to have

closer and frequent interactions with farmers/farms/extension workers need to be seriously considered. Likewise, involving extension workers in research planning exercises is equally important in fostering stronger links between research and extension.

Community organisations for managing aquaculture

The biggest problem in many developing countries limited critical resources and funds to carry out extension activities. Most of the extension staff are unable to fulfil their missions because of inadequate means of transport and shrinking budgets. They are not able to reach and effectively serve the farmers. However, this could be achieved through developing appropriate extension strategies and approaches. In addition to this, there is a need to design and test various tools for participatory and interactive training, as well as developing appropriate and cost-effective training materials, manuals and field programs. As an example, the results of an experiment in the forestry sector of Nepal are quite encouraging. The forestry department has now assumed the role of forestry extension service, giving forest dwellers the right to manage the forest themselves for sustainable exploitation. Dramatic improvement has been noticed since then. However, it needs substantial institutional reorganisation as well as adequate understanding of personnel of the elements of human resource management, as well as technical, environmental and social aspects.

Credit program and extension

Extension programs can also be integrated into credit programs. Credit programs are facing a number of constraints, such as widely dispersed communities that are difficult to reach, weak linkage between financial institutions and extension services, complex and time consuming lending procedures, and difficulties in arranging collateral. Certain experiences in promoting aquaculture through participation of women have been encouraging. It has been found that women follow the routine activities more diligently, are more sensitive towards family welfare and more concerned for the future of their children and family. In Lai Chau Province of Vietnam, the Women Union has successfully implemented a small-scale credit program ensuring quick delivery and timely recovery of credit.

Cooperative approach

Constraints on inter-departmental conflicts affecting aquaculture extension need to be studied to

develop appropriate approaches to foster greater collaboration.

Conclusions

There is a clear need for more field-based studies in order to better understand the social and environmental implications of shrimp aquaculture in specific social and ecological contexts. Inputs from such studies will help develop strategies to demonstrate how shrimp aquaculture can bring more benefits to local groups and how such activities can be made more participatory and sustainable. Self-sustainable development is difficult to introduce in one step. It has to be achieved gradually and through several progressive steps. Well organised and professional extension assistance could remove many constraints.

References

- Barracough, S. and Finger-Stich, A. 1996. Some ecological and social implications of commercial shrimp farming in Asia. United Nations Research Institute for Social Development, Discussion Paper, 74, 62p.
- FAO (Food and Agriculture Organization of the United Nations) 1988. Aspects of FAO's policies, programs, budget and activities aimed at contributing to sustainable development. Document to the ninety-fourth session of the FAO Council, Rome, 15–25 November 1988. Rome, FAO, CL94/6.
- Jenkins, S., White, I., Phillips, M.J. and Tookwinas, S. 1995. Key researchable issues in sustainable coastal shrimp aquaculture in Thailand. Draft Report to the Australian Centre for International Agricultural Research (ACIAR), 75p.
- Jian, S. 1994. SPARK program and sustainable development. In: Swaminathan, M.S., ed., Reaching the unreached. Biotechnology and rural development—a dialogue. Madras, India, MacMillan India Ltd., 4–10.
- Kumar D., Choudhury, S.N. and Ahmed, Q.J. 1996. Aquaculture extension concept and trickle down system (TD) approach. FAO (Food and Agriculture Organization of the United Nations) Project TCP/BGD/4451 (T), Field Document, 66p.
- Pathak S.C. 1989. A regional survey of the aquaculture sector in west Asia. UNDP/FAO (United Nations Development Programme/Food and Agriculture Organization of the United Nations) Report ADCP/REP/89/35, 62p.
- Ramphal, S. 1994. In: Swaminathan, M.S., ed., Ecotechnology and rural development—a dialogue. Madras, Macmillan India, 396p.