

The role of rural extension in the sustainable development of Chinese aquaculture

Min Kuanhong

Senior Aquaculturist/Extensionist
Freshwater Fisheries Research Center
Chinese Academy of Fishery Sciences
Wuxi, 214081 China

The need for extension

The improvement of farming systems, the enhancement of farming technologies and the input of research findings are key factors in increasing aquaculture production. However, application of these factors demands effective extension methodologies that bridge the gap between researchers and farmers, thus converting the research outputs into production power at the farmers' level and sustaining the development of aquaculture.

Establishment of the Extension Institutions on the Sustainable Development of Aquaculture

Many institutions are capable of carrying out effective extension with farmers. In China the following institutions are the key bodies with this responsibility:

Government extension

In the early 1990s, the Chinese government launched the "Harvesting" and "Sparkling" programs in fish farming areas. These were highly successful extension programs that brought about a great use of new species, new technologies, new outputs and promoted great economical growth for communities and farmers. It is clear that the projects from the government have a strong power in organizing the communities and the farmers, but the projects should keep in line with the national development programs without any contradictions, the beneficiaries have the least risks.

Research Institutions, Universities and Colleges as Extension Services

In many cases, the research and teaching sectors directly transfer their research findings to the farmers without any intermediate links through teaching and demonstrations. For example, the Freshwater Fisheries Research Center (FFRC) of the Chinese Academy of Fishery Sciences, Wuxi successfully produced a new common carp *C. carpio* var. jian with almost 20 years research. The scientists conducted various combinations for crossings and gynogenesis with the new technologies and techniques to produce, finally, a variety with stable genetic characters, good body shape and fast growth rate. A number of seed supply/training centers were constructed in various places in Chinese rural areas. The fish was highly accepted and utilized in rural areas within three years and considered as a major and first choice for polyculture.

Civil Institutions and Associations as Extension Services

In order to sustain and facilitate the development of the aquaculture in a large scale of fish farming zones, Chinese farmers have organized local associations and societies addressing issues such as fish disease, culture associations and seed supply clubs to solve the critical problems that farmers have encountered. These organizations have regular meetings and workshops and encourage mutual assistance between farmers. The farmers in East Lake region in Hunan Province have these activities for years. They not only solve the problems for the members themselves but also for the farmers in adjacent areas.

There are also a good number of specialist extension services for

particular types of aquatic animals. The national aquaculture extension service has organized a number of research institutions, provincial and municipal extensions services to form associations for eels, shrimps and crabs, ice fishes and others. These also have regular workshops and meetings to discuss the farmers' problems, deliver the leaflets and newsletters. The farmers gain a lot through such media.

Business and Companies as Extension Services

These sectors have a specific target for extension based on the products that they sell to the farmers. They invite customers for workshops and meetings held at regular intervals to obtain the feedback so that they can adjust to meet the needs of the farmers. Presently there are good extension services in this regard for fish feeds and medicines.

Effects of the Extension Projects on the Sustainable Development of Aquaculture

The national government establishes specific programs and the guidelines for the local development. In the resource-poor, less developed areas with difficult terrain the local government establishes site specific development programs tailored to meet local conditions. For example, in the Central part of Sichuan province where there are hills and mountains, water wells, tanks, reservoirs and cage culture are recommended. In southern parts of China dominated by plains, paddy field culture is recommended. In the northern part of China, where the climate is very cool, thermal groundwater is used so as to extend the culture period.

Our experience is that extension projects should be in line with the local development needs and environmental

conditions before they will be accepted by the farmers. There is a need to balancing the relations between economical returns and environmental impacts, between the use and conservation of biodiversity and between traditional and modern farming practices.

Relations Between the Economic Returns and Environmental Impacts

Most types of water bodies such as reservoirs, lakes, ponds and water wells can provide a good economic return. However, in developing the fish farming industry for economic purposes, environmental considerations should be placed in an equal position, so that the business can be successfully operated sustainable and indefinitely.

As an example, Taihu Lake is one of the four largest freshwater lakes in China. In the early 1980s protein-rich food was in short supply. The farmers around the lake adopted cage culture, pen culture and other types of enclosures as some of the local areas had a large-scale external waste input for natural food production. However, due to accumulation of various wastes the lake became highly eutrophic. This illustrates that unsustainable short-term economic growth can lead to losses in the long term. Therefore it is necessary to consider the economic, social and environmental consequences of a project proposal so as to ensure long term success.

Relations Between the Use and the Conservation of the Biodiversity

Biodiversity is a base for human existence and development. It both provides amount of indispensable necessities for live existences, increase the living quality and formulates a biocycle of human development. Fishery biodiversity is also a base for the development of aquaculture activity. Use and conservation of biodiversity are one of the important tasks for extension services. There are 3,826 fish species in China, 770 of which occur primarily in freshwater. 200 of these are currently considered to have direct economic potential and farmers have already

successfully domesticated 50 species, which play a vital role in aquaculture.

Jiangxi province has protected the “Three Red Common Carps” - *C. carpio* var. xinguonense; *C. carpio* var. wuyuanese and *C. carpio* var. wananeese, which are quality fishes in freshwater culture. They have unique external features, red in color, and have excellent genetic characters. In early 1970s, the cross-bred “Feng common carp” and in 1980s, the cross-bred “Yiyu crucian carp” all had strong hybridity in production, but their one of the parental line is either *C. carpio* var. xinguonense or *C. carpio* var. wuyuanese. In order to maintain these pure genes for crossing and studies local government officials isolate fish farms in a remote hilly areas. They have built ‘gene reservoirs’ away from the cities and business centers and easy access to the transportation. They use water sources from the mountainous leakages or reservoirs without any external disturbances. In some cases, farmers have even requested that strains of common carps should not be allowed within 15 km of these gene reservoirs to avoid accidental crossing affecting these valuable genetic resources.

Further Efforts in Extension Science Studies

Practical training needs to be developed for extension officers so as to fit the Chinese rural situations and the farmers. Thus trained, the extension personnel will be better able to help farmers select appropriate projects addressing the needs of the individual farmers, local communities and social and environment impacts.

The knowledge of the extension personnel should be upgraded. At present the most of the extension personnel from the central, provincial and municipal government are well equipped with sufficient subject matter knowledge as they are the graduates from the universities. However, extension is a science of teaching, knowledge conversion related to pedagogy, psychology and methodology. If one obtains a successful extension of a specific project, the subject matter knowledge is important, the extension skill and knowledge are equally important as the use of the dialects, good gestures, pleasant motivation and local customs. This will

help establish good rapport with the farmers.

Strengthening Extension Teams

The success of project extension demands a good quality extension team, which is always available for the farmers. However, those who are working in this area should be equipped with the additional knowledge to make extension better: Those who work with the extension should regularly upgrade their knowledge of the subject matters. Most of these technical people have acquired the knowledge from books; they need to follow the farmers’ new trends. The farmers know what products are in most demand by the consumers; therefore, the extensionists who will offer services and guides for the farmers have to understand the technical know-how. In rural extension officers have less access to fresh knowledge. Moreover, these extension people are not only assigned to work with the extension but have to carry out more other activities to earn the money for their daily expenses and even salaries. They have to divert their efforts and attention for something else which is not necessary for the farmers’ purposes. This can sour relations between village-level extension officers and farmers. Municipal extension services are the important linking between the national and village-level extensions, they often have to work as a bridge between these two.

Strengthening Input of the Extension Services

Various levels of the government in China have a good amount of input for the extension services in terms of structural setup, staffing, fund allocation and office facilities.

The output of the extension services is mainly dependant on funding input. Although quite many local extension institutions provide paid services, this limited amount of the income can not satisfy the needs of the necessary daily expenditures of many extension people. Circumstances are much more difficult in rural areas where the system suffers from funding constraints. The extension service in the fisheries sector is quite poor in terms of equipment supply and staffing compared with other sectors in

agricultural fields. It has only quite recently been established with limited funding. In light of the requirements from the Central Extension Authority, there should be available with service structure, staff teams, training facilities and the pilot test farms. However, the insufficient supply of the staffing and facilities will certainly handicap technical progress. In the early 1980s, the contribution from technical progress

in the aquaculture sector accounted for 16% of the increase in production. However, the contribution to the improvement reached 48% in the 1990s. Undoubtedly, the research output is a powerful source in enhancing and developing fisheries, but the extension services are equally important.

The development of the aquaculture needs technical progress while the extension services demand good

systems. Effective extension is always welcome by the farmers. The extension services should develop themselves by carrying out business, trading and consultations for the farmers. The extension services in the years to come will play an increasingly more important role in developing the aquaculture sector and enhancing the technical contribution to the aquaculture production.

Aquaculture calendar

Regional Workshop on Sustainable Marine Finfish Aquaculture for the Asia-Pacific, 30 September-4 October, Halong City, Vietnam

A Regional Workshop on Sustainable Marine Finfish Aquaculture for the Asia-Pacific is to be held in Halong City, Vietnam, from 30 September to 4 October 2002. The workshop is one in a series undertaken by the Asia-Pacific Marine Finfish Aquaculture Network. This workshop will concentrate on recent improvements in production technology for marine finfish aquaculture, and will incorporate the end-of-project workshop for ACIAR project Improved hatchery and grow-out technology for grouper aquaculture in the Asia-Pacific region. For further information please contact mike.rimmer@dpi.qld.gov.au.

Aquaculture Europe 2002, Trieste, Italy 16-19 October 2002

The theme is Seafarming – Today and Tomorrow. Three workshops will be held in conjunction to encourage interactive discussion on future perspectives with industry. The workshops will address 1) applied solutions to health management in Mediterranean aquaculture; 2) new technologies for Mediterranean aquaculture; and 3) certification in aquaculture – HACCP, ISO Standards, Eco-labeling and organic. *More detailed information is available from the European Aquaculture Society website www.easonline.org or Email ae2002@aquaculture.cc*

Workshop on Health Management, 16 October, Trieste, Italy

Organized in cooperation with the European Fish Pathologists (EAFP). *Contact: EAS, Slijkensesteenweg 4, B-8400 Oostende, Belgium, Tel: +32- 59-32-38-59, Fax: +32- 59-32-10-05, E-mail: ae2002@aquaculture.cc*

Workshop on Certification in European Aquaculture, 16 October, Trieste, Italy

*Contact EAS, Slijkensesteenweg 4, B-8400 Oostende, Belgium
Tel: +32- 59-32-38-59, Fax: +32- 59-32-10-05, E-mail:
ae2002@aquaculture.cc*

Offshore Mariculture, October 29-31 2002, Bali, Indonesia

Contact: Jean Pritchard, Society for Underwater Technology Innovation Centre, Offshore Technology Park, Bridge of Don Aberdeen AB23 8GX, Scotland, Tel: +44.0.1224.823637, Email: jeansut@sstg.demon.co.uk or visit <http://www.sut.org.uk/pdf/maricultureflyer.pdf> for more information.

ExpoPesca and Acuicultura 2002, 20-23 November 2002, Santiago, Chile

Email Sue Hill for more information on sue.hill@informa.com

Mega Aquarium Shanghai 2002, 21-24 November 2002, China

Contact National Development Ltd. Room 3, 4th Floor, Albion Plaza 206 Granville Road, Tsimshatsui, Kowloon, Hong Kong. Tel +852 2369 1766, fax +852-2369 1799 or email info@megaaquarium.com.

5th Symposium on Diseases in Asian Aquaculture, 25-28 November 2002, Gold Coast, Australia

The Fish Health Section of the Asian Fisheries Society will host the 5th Triennial Symposium on Diseases in Asian Aquaculture (DAA5) from 25 – 28 November 2002 at the Gold Coast International Hotel, Australia. Two satellite workshops will follow the Symposium: Epidemiology and Risk Assessment 29-30 November 2002, and the Asia-Pacific Regional Molluscan Health Management Training Program Phase II 2-6 December 2002. For more information about the symposium contact OzAccom Conference Services, ph +61 7 3854 1611, or you can inquire at email daa5@ozaccom.com.au. *For more information about the workshops, contact Dr Chris Baldock - ph +61 7 3255 1712 (Epidemiology and Risk Assessment), email chris@ausvet.com.au and Dr Rob Allard - ph +61 7 3840 7723 (Molluscan Health).*