

## Small-scale Aquaculture: Organization, Clusters and Business

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Aquaculture now contributes nearly half of the global food fish production and, by the year 2030, estimates are that an additional 27 million tonnes, or over 50 percent from the current production, will be needed to meet the growing demand for food fish. Globally, aquaculture provides key social and economic services, such as through:

- contributing to global and regional food supplies;
- national food security, including meeting demands of growing urban populations;
- providing direct self and paid employment for rural and peri-urban communities;
- creating upstream and downstream employment through services, supplies and trading activities;
- contributing increasingly to national and international trade; and
- generating household and national income.

Small-scale producers – characterised by a low-asset base and low productivity – dominate the agriculture landscape throughout the developing world, and similarly play an important part in aquaculture in many countries, sometimes through livelihoods which integrate aquaculture, livestock, farm crops and other on- or off-farm activities, and sometimes through increasingly more specialisation in aquaculture as a household-

managed enterprise. Small farms are characterized as largely owned and operated by households with limited access to assets – land, water, finance and material inputs (seed, feed, etc.) – and consequently, farm production volumes tend to be low. Small-scale producers face varying degrees of financial, knowledge, market access and other constraints, and therefore commonly face difficulties in raising productivity and incomes – moving up the “enterprise ladder” to become more competitive micro- and small enterprises.

Aquaculture’s importance as a source of income, food, and employment for many poor people is widely recognized – indeed some figures in this edition of FAN (see pages 24-25) place a global employment figure of over 23 million full-time employment – yet its true social and economic significance – now and in the future – is not easily estimated.

Aquaculture will continue to grow, but faces a host of challenges in sustaining let alone increasing the provision of social and economic services to rural and urban populations worldwide. A number of over-arching external drivers influence the sector, such as increasing competition for ecosystem services, the use of available land and water resources for aquaculture expansion, pollution, climate change, natural disasters and biosecurity emergencies, HIV/AIDS epidemics, governance challenges, and local risks associated with increasing globalization and others. Internal sectoral dynamics, related to globalization drivers are strongly influencing the sector’s growth, with increasing integration of supply chains for many internationally-traded commodities, now merging into domestic markets in Asia, ever higher market standards, and competitive forces driving



*Grouper hatchery in Bali, Indonesia*

M.Phillips, WfC

investors and buyers to most efficient and reliable producing countries.

Within this generally dynamic picture of growth and change, small-scale aquaculture farmers, in common with agriculture farmers, face significant challenges. Limitations related to infrastructure, producer capacity, access to finance, public sector servicing capacity and other factors often create a cycle in which low productivity depresses income and thus a “vicious cycle” of deepening problems. They are also among the most vulnerable to external drivers such as climate change, market demands and other factors which are largely out of their control. Coordinated engagement by private and public stakeholders, including the business sector, can help address such dynamics.

While globalization has opened new markets for aquaculture products, it has also required stricter standards related to food safety, traceability and other non-tariff requirements. Thus, smaller producers face major constraints, especially with respect to the export market. They find it increasingly difficult to participate in the modern value chains. Those who are able to access markets can find themselves disadvantaged due to their weak bargaining position. Requirements being driven by retailers and public concerns for certification of the safety and quality of aquaculture products along with the social and environmental impacts of aquaculture production can add further hurdles to market access, with small farmers set to face particular difficulties. Suitable equivalence mechanisms among the various emerging certification schemes as yet do not exist.

Fish and shrimp farming are important livelihood activities for many poor people living in the coastal areas of the Indonesian province of Aceh. Nearly 100 000 households, mainly along the north-east coast districts, depend on aquaculture for income, although productivity is very low and poverty remains endemic. Shrimp and milkfish are the major aquaculture products from Aceh, a mix that contributes to export earnings and food security, along with growing volumes of tilapia, and minor species such as catfish, crabs, seabass and grouper. A coalition of partners\* has worked together in Aceh since 2005 to assist coastal fish and shrimp farmers and communities recover from the December 2004 earthquake and tsunami, and to build better livelihoods. Good progress has been made in physical rehabilitation of ponds and canals, introducing improvements in farming practices – so-called “Better management practices or BMPs” which have been well accepted by farmers – and rebuilding a traditional system of village farmer groups supported by innovative Aquaculture Livelihoods Service Centers (ALSCs). This approach – helping farmers to organize themselves and development of community services – run on business lines by local people for the local farming community – has worked well. In 2010, over 2600 poor households from 82 villages joined a voluntary BMP program, supported by the four ALSCs, generating increased household incomes of USD 600-800/farmer – a substantial improvement in a poor province. The approach is becoming exceedingly popular, with an estimated 6 000 farmers now showing interest and other farming communities wishing to establish ALSCs in their areas. The opportunities for creating efficiencies through an expanded network of ALSCs in Aceh, to sustain these services through a business approach, and to deliver development benefits to poor farmers are growing.

\*Asian Development Bank/Earthquake and Tsunami Emergency Support Project, OISCA/Japanese Fund for Poverty Reduction, BRR, MMAF, FAO/American Red Cross, WorldFish Center, Network of Aquaculture Centres in Asia and the Pacific, and World Wildlife Fund

The aquaculture sector is also changing, with notable growing importance in some regions and countries of larger enterprises, and multi-national corporations. Indeed, in some developing countries, medium and larger enterprises comprise increasingly significant contributions to aquaculture production. Larger buyers risk management strategies and the need for large and regular supplies of aquaculture product reinforce the trend towards larger operations. This trend can have positive implications for food supplies, such as supplying growing urban populations with low cost product, and creating employment, but can have negative implications for small-scale farmers, who face difficulties in competing and accessing the necessary services, finance and markets to remain competitive. The reality in many countries is the presence of a spectrum of aquaculture farmers and systems –

from subsistence level through to highly industrialized operations. This raises important questions around future direction for aquaculture development. What are the necessary investment and policy interventions for creating optimal development impact? In what ways can aquaculture optimize its social and economic contributions? How can small-scale farmers best benefit from the continued rapid growth of the aquaculture sector, and demand being created for food fish as populations grow and capture fisheries production stagnates? What synergies between small-scale producers and larger enterprises can best benefit poor rural and urban households in terms of employment, food supply and better livelihoods? How can the required technical and financial services be provided to small-scale farmers to improve and remain competitive in modern markets?

Some new approaches are emerging. Investing in better organization of smaller producers and improved technical and financial services can pay dividends. Small business-oriented services are emerging in several rural areas in Asia, leading to significant improvements in profitability of small aquaculture enterprises. An important opportunity to improve governance and management of the aquaculture sector and thus increase the social and economic benefits to small-scale producers lies in promoting and developing collective action in the form of farmer organizations or “clusters”. Clustering of smaller producers can create economies of scale and volumes that attract business, sellers of fish feed and fry, buyers of aquaculture products, and build social capital.

Farmer cooperatives have been widely promoted mechanisms in agriculture, but there is little well documented information on cluster farming by commercially-oriented small-scale aquaculture producers. Recent experiences in the field show that promotion of cluster farming in aquaculture and managing these clusters with technical improvement, such as through application of better management practices (BMPs), can yield benefits. Such approaches can be successful tools for improving aquaculture governance and management of small-scale producers to work together, improve production, develop sufficient economies of scale and enhance knowledge that allows participation in modern market chains and thus reduce vulnerability. Such governance and management approaches can lead to improved economic performance of the aquaculture sector, better farm incomes and improve resilience of farm production systems and households. Whilst more studies are needed, economic



M. Phillips, WRC

*Women sorting black tiger shrimp juveniles at a shrimp nursery in Andhra Pradesh, India*

analysis also suggests that investments in services can yield substantial social and economic benefits – investments of the MPEDA/NACA project in India for the period of 2004-2006 showed that for each one Indian Rupee invested in the technical assistance program, a profit of nearly 16 Rupees was provided for coastal shrimp farmers (Umesh *et al.*, 2010).

At the same time, the establishment, maintenance and enforcement of appropriate legal, regulatory and administrative frameworks in developing countries (producers of majority of aquaculture products) are key requirements towards responsible and sustainable aquaculture sector. These frameworks should cover all aspects of aquaculture and its value chain and provide economic incentives that encourage best practices, thus, prompting and assisting farmers to elaborate, support and enforce self-regulating management codes and promote sustainability-

conductive production systems. In an increasingly globalised and market-oriented economy, we also need to find ways in which the larger private sector players can contribute more effectively - business solutions that work for small-scale farmers, organizations and small-scale farm services are required. Commonly, small projects investing in farmer organizations and improved practices can work well, but sustaining these beyond the subsidy of the project requires more business-oriented approaches and solutions. The challenge today is to help build the capacity of smallholders and their organizations so that they can deliver what the market requires, and in turn encourage businesses to adapt their models to be inclusive and supportive of small-scale producers (Vorley *et al.*, 2008). It also means bringing together different players and skills along the value chain for sustainable enterprise development. ■

Continued on page 55

### Continued from page 39

Better understanding of the sector, dynamics among different components, small and large, and analysis of costs, risks and benefits of investments along the value chain can help in developing the right mix of financial and policy support for the sector to grow, and provide the social and economic services possible through responsible development – for the many small-scale producers in the sector, as well as the increasing numbers of consumers – poor and wealthy – that depend on aquaculture as a provider of fish for food. ■

#### Additional Reading:

Umesh, N.R., Mohan, A.B.C., Ravibabu, G., Padiyar, P.A., Phillips, M.J., Mohan, C.V. & Bhat, B.V. 2009. *In* S.S. De Silva and F.B. Davy (eds.). *Success Stories in Asian Aquaculture*, Springer Science+Business Media B.V. 2009.

Vorley, B., Lundy, M. & MacGregor, J. 2008. Business models that are inclusive of small farmers. Paper prepared for FAO and UNIDO as background to the Global Agro-Industries Forum, New Delhi, 8 - 11 April 2008.

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### Continued from page 45

This integrated, multidisciplinary approach is fostering closer collaboration within FAO, across departments and programmes, and among international partners, national governments, regional economic organizations, NGO's, universities, local communities, and farmers. It is recognised that anthropogenic-driven disease emergence is one of the most salient global health challenges of the future, but the solution also lies in innovative approaches of people. Research alone will not change people but education and innovative approaches to managing development, food and water security and safety, and livestock, wildlife, environmental, and public health will require social and cultural sensitivity. The way forward is through collaboration and integration - the approach being supported and fostered through the **“The FAO One Health Programme - A Comprehensive Approach to Health: People, Animals and the Environment”**. ■

<sup>1</sup>Arthur, J.R., Bondad-Reantaso, M.G., Campbell, M.L., Hewitt, C.L., Phillips, M.J. & Subasinghe, R.P. 2010. Understanding and applying risk analysis in aquaculture: a manual for decision-makers. *FAO Fisheries and Aquaculture Technical Paper*. No. 519/1. Rome, FAO. 2009. 113p.

<sup>2</sup>Working Document COFI/AQ/V/2010/5 – Aquatic biosecurity: a key for sustainable aquaculture development (prepared for the Fifth Session of the COFI/SCA, 27 September – 1 October 2010 (<http://www.fao.org/docrep/meeting/019/k7580e.pdf>))

<sup>3</sup>Charles, H., Godfray, J., Beddington, J.R., Crute, I.R., Haddad, L., Lawrence, D., Muir, J.F., Pretty, J., Robinson, S., Thomas, S.M. & Toulmin, C. 2010. Food security: the challenge of feeding 9 billion people. *Science* 327: 812-817; Smith, M.D., Roheim, C.A., Crowder, L.B., Alpern, B.S., Turnipseed, M., Anderson, J.L., Asche, F., Bourillón, L., Guttormsen, A.G., Khan, A., Liguori, L.A., McNevin, A., O'Connor, M.I., Squires, D., Tyedmers, P., Brownstein, C., Carden, K., Klinger, D.H., Sagarin, R. & Selkoe, K.A. 2010. Sustainability and global seafood. *Science* 327: 784-786. (accessed from [www.sciencemag.org](http://www.sciencemag.org) on 18 August 2010).

<sup>4</sup>Soto, D., Aguilar-Manjarrez, J. & Hishamunda, N. (eds). 2008. Building an ecosystem approach to aquaculture. FAO/Universitat de les Illes Balears Expert Workshop. 7–11 May 2007, Palma de Mallorca, Spain. *FAO Fisheries and Aquaculture Proceedings*. No. 14. Rome, FAO. 2008. 221p.

<sup>5</sup>Arthur, J.R., Bondad-Reantaso, M.G., Campbell, M.L., Hewitt, C.L., Phillips, M.J. & Subasinghe, R.P. 2010. Understanding and applying risk analysis in aquaculture: a manual for decision-makers. *FAO Fisheries and Aquaculture Technical Paper*. No. 519/1. Rome, FAO. 2009. 113p.