6. Legal, institutional and management aspects

INTRODUCTION

This review is underpinned by the basic goal of sustainable development and two fundamental purposes of governance which are to ensure harmonious development and to deliver its benefits equitably. The review begins with a brief overview of fundamental concepts of governance to achieve the prime objective of sustainability, and then draws on examples of the application of these concepts from regional reviews and other sources.

Role of the public administration: Policy-making, planning and public administration for aquaculture development and management in any country should promote an economic and social environment that is optimal to fish farmers while ensuring that their activities do not cause undue costs for others. Thus, the public sector intervenes to promote efficient production, protect the environment including ensuring biodiversity and ensure that the evolution of the sector is socially acceptable (Wijkström, 2001).

Role of the government: Government can effectively foster sustainable development by playing three important implementation roles, namely: *cheerleader* or promoting particular developments; gatekeeper, or regulating and enforcing to require sustainability; and facilitator, or actively intervening to encourage sustainability (Corbin, 1997).

Sustainable aquaculture and the law: Although the moral force of the principle of sustainable development is readily apparent, morality by itself is not always sufficient to compel individuals to act wisely. Individual, corporate, national or international competitiveness may provide an incentive for short-term gains to be secured over longer-term cost. This requires balanced implementation of law to prevent "free riders" from benefiting at the expense of others who are prepared to behave responsibly towards the environment (Pillay, 1992).

The need for sustainable development to be supported by a legal framework should not be interpreted as an assertion that law is the only mechanism for realizing the objective of sustainability. Technical improvement and expansion of knowledge about good environmental practice are equally as important as the law. Likewise, markets and fiscal systems could function to reflect environmental preferences and policy objectives. Nevertheless, given the character of human nature, to pursue the range of approaches for the sustainable development of aquaculture without any legal basis is difficult to conceive (Howarth, 1998).

Legal and institutional domains of aquaculture management: Aquaculture, in common with other food production activities, interacts with the environment, as it is dependent on land, water and aquatic species, and thus causes environmental change. Production must also lead to a product safe for human consumption by domestic and foreign consumers. Therefore its development and management is likely to fall within the scope of various legislations and the expertise of various institutions (Van Houtte, 2001).

Market incentives: A market incentive works by the producer bearing the costs of polluting, or, not polluting the environment. In the first instance, a tax is imposed for pollution. The tax collected is then used to either clean up the pollution or compensate

BOX 1

Guidelines for the Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries

These Guidelines were adopted by the twenty-sixth session of the Committee on Fisheries (COFI), Rome, 7-11 March 2005, with some observations and reservations. They can be found in paragraphs 64 to 67 of the COFI report (FAO Fisheries Report No. 780). These guidelines are applicable to ecolabelling schemes that are designed to certify and promote labels for products from well-managed marine capture fisheries and focus on issues related to the sustainable use of fisheries resources. The following principles should apply to ecolabelling schemes for marine capture fisheries:

- Be consistent with the 1982 United Nations Convention on the Law of the Sea and the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, the FAO Code of Conduct for Responsible Fisheries and the World Trade Organization (WTO) rules and other relevant international instruments.
- Recognize the sovereign rights of States and comply with all relevant laws and regulations.
- Be of a voluntary nature and market-driven.
- Be transparent, including balanced and fair participation by all interested parties.
- Be non-discriminatory, do not create unnecessary obstacles to trade and allow for fair trade and competition.
- Provide the opportunity to enter international markets.
- Establish clear accountability for the owners of schemes and the certification bodies in conformity with international standards.
- Incorporate reliable, independent auditing and verification procedures.
- Be considered equivalent if consistent with these guidelines.
- Be based on the best scientific evidence available, also taking into account traditional knowledge of the resources provided that its validity can be objectively verified.
- Be practical, viable and verifiable.
- Ensure that labels communicate truthful information.
- Provide for clarity.
- Be based, at a minimum, on the minimum substantive requirements, criteria and procedures outlined in these guidelines.

The principle of transparency should apply to all aspects of an ecolabelling scheme including its organizational structure and financial arrangements.

society for the damage caused by the pollution. In the second instance, the farmer pays for the cost of abatement of pollution so that no pollution is imposed on society. This underlies the polluter pays principle and since this affects personal cost and benefits, its purpose is to induce individuals or firms to change their behaviour to more socially desirable alternatives (Bailly and Willmann, 2001).

Another market instrument is ecolabelling, of which many voluntary schemes have been introduced in various sectors and for different objectives (Bailly and Willmann, 2001) by non-governmental organizations (NGOs), government and industry. The common feature of such schemes is to take into account attributes of the products other than their price and quality and safety standards. These attributes can relate to economic and social objectives such as fair trade, support to small-scale farmers, discouragement of child labour and health related traits such as organic, environmental, and ecological ones. The purpose of ecolabelling is to provide consumers the

opportunity to express their environmental and ecological concerns through the choice of products. Such preference is expected to result in price gap or market share disparity between ecolabelled products and those products that do not qualify for ecolabelling or whose producers chose not to seek an ecolabel. The ecolabel is obtained through a certification process based on a set of criteria that define the desired standard. It is the potentially better price and/or increased market share that provides the incentive to seek certification.

Self-regulation and co-management: Faced with increasing difficulties with regulating aquaculture activity, increasing importance is given to voluntary arrangements and co-management practices. Their practical application is in the adoption of best management practices, codes of conduct and codes of practice by farmers and industry. Self-regulation and co-management imply divesting the government of some responsibilities. Usually these are in the operation and maintenance of systems in favour of the industry, although certain features of voluntary and co-management arrangements automatically remove the need for such usual government functions as monitoring of compliance with rules and regulations and imposition of penalties to violations (Van Houtte, 2001).

TRENDS AND DEVELOPMENTS IN SECTOR MANAGEMENT

An appropriate introduction to this topic might be the observations of a meeting of the Latin American and Caribbean aquaculture experts in Panama in September 2005 (FAO/OSPESCA, 2006). On the relationship between institutional capacity and aquaculture development, the meeting noted that the countries in which aquaculture had progressed the most normally had significant institutional support and was generally driven by the private sector. Development was often hampered by duplication of effort and an excess of rules and powers in the hands of the authorities.

Other outcomes of the meeting were also particularly relevant. An increasing trend in the management of aquaculture development is the gradual replacement of some of the command and control measures by economic incentives. A gradual transfer of more management responsibility from public administration to the private sector is occurring. This implies greater roles of producers, associations, and the private industry in managing the sector. Civil society groups, i.e. NGOs and People's Organizations, have also been demanding and playing a greater role, in most cases by advocating greater environmental and social responsibilities.

In a broad sense, this is co-management involving all the primary stakeholders, with the state itself as one stakeholder, in policy formulation, planning and management decisions at various levels. The ultimate application of the concept of co-management is the recent development model of stakeholder involvement in the management processes. This model seeks a different role for government that is based on consensus among all primary and legitimate stakeholders (Sen, 2001).

Sen (2001) described three ways by which stakeholders' participation can take place, namely: (i) Instructive, where the government is the decision maker but mechanisms exist only for limited exchange of information with other stakeholders (government informs stakeholders of the decisions they plan to make); (ii) consultative, where the government remains the decision maker although there are formal and informal mechanisms for consultation; and (iii) cooperative, by which all primary stakeholders work together as partners in decision-making and secondary stakeholders play a consultative role. These are not mutually exclusive, none is more desirable than the others, and they can be used in combination.

A democratic setting, good governance and transparent procedures are the contexts for involving stakeholders in policy. Such involvement is seen as critical to government and stakeholder partnerships, which is expected to yield two positive outcomes: (i) realistic and more effective policies and plans; and (ii) improved implementation.

The succeeding discussions provide specific examples of various strategies being adopted to manage the sector, which support the observation that there is a growing trend towards greater participation in sector management by the private sector, better complementation of *Command and Control* measures with economic instruments and assumption of more responsibilities for sector management by producers.

Some of the more significant developments in recent years include the promulgation of policies and programmes that are pro-poor, development or strengthening of legal and institutional support for environmentally and socially responsible aquaculture, implementation of strategies that engender wider participation in policy formulations, development planning and research, integration of aquaculture in rural development, and support or encouragement to farmer associations. The latter has been accompanied by the development of and encouragement to adopt voluntary codes of conduct, self-regulatory practices, and standards and certification schemes.

Globalization has made trade and market access increasingly the driver to aquaculture development. Its impact is two-fold: (a) strengthening of national, inter-provincial or inter-state, as well as regional and international biosecurity and food safety measures; and (b) enhancing ability, through legislation, codes of practice, certification, traceability schemes of governments and producers, to comply with trade and market access requirements. Countries are collectively harmonizing import and export standards and protocols. Direct subsidies are giving way to more market-friendly modes of technical assistance to the production sector.

The government continues to be the mainstay in the promotion of responsible aquaculture. However, the important roles of NGOs and farmers' associations are worth noting. The development and promotion of codes of practice, certification systems and standards have required the strengthening of farmers, through their being associated and thus better empowered, for their role in carrying out sustainable aquaculture. The desired status is that the various stakeholders participate and have co-ownership in the development of policies and research and development programmes to attain such objectives as equitable access to resources and share of the returns from aquaculture, environmentally and socially responsible farming, harmony and cooperation.

Banks and microfinance providers have widened their portfolio to include not only trading and processing but also for providing working capital to small-scale aquaculture ventures. Responsible aquaculture practise is now increasingly considered as one of the criteria used in loan approval.

Pilot studies and a number of in-country experiences are now providing concepts and methodologies that could be shared and adopted over wider areas. These include voluntary codes of conduct, as well as best practise, jointly developed and promoted by government, civil society and farmers associations. They are then promoted for adoption by farmers through their associations, with supporting evidence that productivity and profitability, as well as quality of produce, have improved.

As to sector management, it is well to distinguish between policy concerns, international trade and directions from the day-to-day activities of administration such as licensing, permitting and enforcement. Policy, international trade and directions are all national concerns. In some countries, these can be at the second level of government (directorate-general or bureau), or at the third level (directorate or division). Most of the Pacific islands manage aquaculture at the ministerial level within the same umbrella responsible for capture fisheries. Few countries have ministries specific for aquaculture, although in 2001, French Polynesia established a separate pearl ministry responsible to the president in recognition of the national importance of this industry.

In managing aquaculture the relevant national agency directly concerned with aquaculture often has to relate and work with other national agencies. This is unavoidable since aquaculture activities always require other non-fisheries services. For example, in Australia, the Department of Agriculture, Fisheries and Forestry

(DAFF) interacts at the highest level with the Primary Industries Ministerial Council (PIMC) on issues of national importance to better integrate Australia's conservation and sustainable production objectives. In Bangladesh, leasing of public water bodies is under the jurisdiction of the Land Administration and Land Reform Division (LALRD), while aquaculture, as part of rural development, is carried out through the Bangladesh Rural Development Board (BRDB). The use of mangrove forests in the Philippines is administered by the Bureau of Forestry under the Department of the Environment and Natural Resources (DENR), which also enforces environmental compliance of all aquaculture activities through its Environmental Management Bureau (EMB).

Exports and trade issues on aquaculture products are handled by the agency concerned with trade in general such as the Export Promotion Bureau (EPB) in Bangladesh and the Bureau of Export Trade Promotion (BETP) of the Department of Trade and Industry (DTI) in the Philippines. In India, a special body, the Marine Product Export Development Authority (MPEDA) under the Ministry of Commerce, was created exclusively to promote exports of shrimps and other fisheries products.

In all sub-Saharan African countries, except South Africa, aquaculture is promoted under the relevant Poverty Reduction Strategy papers. This indicates that governments throughout the region recognize the potential of the sector particularly for rural development. With the exception of Kenya and Uganda, the aquaculture specific legislation and regulatory frameworks in almost all countries are either non-existent or weak, though in concert with other legislation is adequate from an environmental management perspective. While all countries subscribe to the responsible development of the sector, very few have a specific Aquaculture Act (Namibia), a draft act (Zambia), or in the process of developing one (South Africa and Sierra Leone). Regulations specifically governing commercial aquaculture (i.e. mariculture exist only in Uganda, Madagascar, Mozambique, Congo Brazeville and South Africa. General regulations from other acts specifically those dealing with water, land and environmental and genetic conservation are used most often for managing the sector, while the Fisheries Acts provide the framework for issuing a licence or permit. It would further appear that current legislation in all countries pertains only or mainly to medium to large-scale commercial aquaculture.

While all countries have a policy for aquaculture development, most lack specific strategies to reach policy goals., Several countries, however, have recently developed national aquaculture development strategies or master plans (e.g. Angola, Cameroon, Madagascar, Malawi, Zambia) while plans are in preparation in the Democratic Republic of the Congo, Ghana and Mozambique. Nigeria has the preliminaries of a strategic plan though it has yet to be adopted by the federal government.

There is also the case of well-defined policies for the poor but the implementation of which is blunted by many factors. In the Philippines, for instance, official policies for freshwater aquaculture are markedly pro-poor with numerous provisions that favour small-scale operations and community welfare, but these policies are not implemented effectively. They are hindered by vested interests and by complex and confusing legislation. The Asian Development Bank (ADB) noted that fish farmers (in Central Luzon) are aware of only the few administrative orders that relate to illegal fishing practices. Awareness of other regulations is limited and compliance poor. For instance, farmers with fishponds larger than 300 m^2 are required to secure an environmental compliance certificate from the Department of Environment and Natural Resources. Very few farmers are aware of this. It observed that limited budgets, the voluntary nature of a code of practice for aquaculture and weak enforcement capabilities of national and local governments constrain enforcement of environment-friendly regulations (ADB, 2004).

Within the European aquaculture sector there is an increasing trend towards creating partnerships between aquaculture producers and scientists, government and

other stakeholders. Producers are recognized as key players for establishing sustainable aquaculture development being direct users of resources in food production. The need is seen to promote better interaction and communication as well as coordination among producers and scientists (Hugh, New and Barg, 2004).

NATIONAL INSTITUTIONAL SUPPORT AND LEGAL AND POLICY FRAMEWORKS

Some examples of developing country government's support to promote as well as to ensure orderly aquaculture development with policy and institutional support are found in Asia.

Governments have the common role of promoting technology through any combination of the following activities:

- establishment of a hatchery and making seedstock available;
- establishment of a demonstration and training farm;
- training of farmers, selecting and giving full assistance to a key farmer to apply and showcase a specific culture system;
- fielding of extension workers;
- provision of special loan programme and sometimes marketing assistance;
- financial incentives for large-scale development.

To jumpstart development in an orderly and rational manner, some governments have set aside public lands for managed aquaculture development. The government, through the existing institutions or a quasi-governmental corporation, undertakes the physical planning and development before distributing farm lots or ready-to-operate farms to smallholders. In some cases, this may be left to a private investor under specific development guidelines. A common central facility to produce seedstock and feeds as well as to process and market the harvest often, but not always, comes with such development. Some examples are provided below.

In Indonesia, the government allows large-scale development only if provision (or consideration) is made for the participation of small-scale holders through a nucleus-estate type of development. Individuals or companies going into brackishwater aquaculture are limited to 30 ha within Java and 50 ha in the outer islands. Beyond such size, the development has to follow the nucleus-estate concept wherein the excess area is developed into viable farm units for distribution to qualified smallholders.

The Islamic Republic of Iran launched the development of its shrimp culture industry by pre-identifying thousands of hectares of coastal scrub land along the Persian Gulf and allocating these for shrimp farm development. The government undertook the design, engineering and construction of common facilities. Financing was provided for the recipients to develop their respective farms according to a prescribed design. The production of seed and feeds is left to private investors with the government providing financing. The marketing of shrimp is likewise left to private traders. The government provided technical support to both hatchery operators and growers in terms of laboratory analysis and allowed them to hire foreign technicians. Brunei Darussalam undertook a similar approach but invited individual investors to design and construct the farms.

Zoning and the establishment of mariculture parks are tools for encouraging investment and promoting orderly development of aquaculture. Malaysia set up the Aquaculture Investment Zones (AIZ). Investors participating in the AIZ are entitled to many financial incentives offered to large-scale agriculture development and production projects including seed and feed production.

In the Philippines, the government has taken the planned development concept to open waters through mariculture parks. Marine waters are identified and set aside for mariculture park development where infrastructure, in the form of mooring facilities, is provided. Fish cage operators pay an annual user fee, part of which goes to upkeep, security and technical assistance. For those who lack the capital to put up their own

BOX 2

The General Fisheries and Aquaculture Law (Ley General de Pesca y Acuicultura, 1991) of Chile

This is the main legislation regulating the conservation of living aquatic resources, the activities of capture fisheries, aquaculture, fisheries for research purposes and recreational fisheries, as well as the processing, storage, transportation and marketing activities. The Title VI is dedicated to aquaculture, although it only deals with the authorization system governing the establishment of aquaculture facilities.

The main institution responsible for the administration of fisheries is the Ministry of Economy, Promotion and Reconstruction (Ministerio de Economía, Fomento y Reconstrucción). It is also referred to as Ministry of Economy and Energy (Ministerio de Economía y Energía), which has the power to take action aiming at conservation of living aquatic resources, such as: the temporary prohibition of fishing in certain areas; the permanent or temporary prohibition of the capture of protected species; the establishment of marine parks; and the setting of the landing percentage of by-catch species. In the aquaculture sector, the Ministry has the power to take action to avoid the introduction of high risk diseases, prevent their spreading and ensure their eradication. Furthermore, environmental measures may be taken to ensure, among other things, that the development of aquaculture facilities does not exceed the carrying capacity limits of each water body.

The Under Secretariat for Fisheries (Subsecretaría de Pesca – SubPesca) also has a prominent role in the aquaculture sector, being the responsible authority for granting permits for practicing aquaculture and providing advice. Within the same administration, the National Service for Fisheries (Servicio Nacional de Pesca – SerNaPesca) is in charge of maintaining the national registers for fisheries and aquaculture and other minor administrative functions.

In addition, the Ministry of National Defense (Ministerio de Defensa Nacional) has the power to grant concessions over State property for aquaculture and shall establish, by decree, which areas are suitable for the development of aquaculture activities, as identified by the Under Secretariat for Fisheries.

Finally, the Under Secretariat also coordinates the preparation of plans for aquaculture and fisheries for research purposes.

Source: FAO National Aquaculture Legislation Overviews

cages, pre-installed cage frames are provided for a yearly fee so that the farmer needs to invest only in the net-cages, fingerlings and feed.

In India, the establishment of the Fish Farmers' Development Agency (FFDA) at district levels has been credited in popularizing freshwater and brackishwater aquaculture. As many as 442 such FFDAs had been set up. They organized farmers for more focused provision of extension and other technical services.

In Bangladesh, the effort of the government has been on culture-based fisheries rather than on aquaculture itself. Increased production of higher value fish species in oxbow lakes and the 68 000 ha man-made Kaptai Lake has been attributed to a regular stocking programme using major carps and exotic carps.

In Eastern Europe, the need for the establishment of aquaculture associations and societies as well as for specific legislation on aquaculture issues has also been expressed in order to get aquaculture recognized as a legitimate and equal-right user of resources that is eligible for institutional and financial support. There have been various responses to the above issues in different countries depending on the relevant political

and economical situation. Aquaculture is only a minor segment of the agricultural sector in most Eastern European countries; therefore relatively limited resources are available for aquaculture development. However, in those countries where the importance of aquaculture in rural development has been recognized, more resources are allocated for the aquaculture sector within the framework of agricultural and rural development policies. In many countries of the region, there is a continuous need for the development of appropriate legal and regulatory frameworks for aquaculture. Governments provide support for aquaculture research institutions and also for fisheries and aquaculture faculties at various universities.

In the European Union (EU), member countries of Eastern Europe, the existence of the separate Common Fisheries Policy (and the Financial Instrument for Fisheries Guidance (FIFG) structural fund) helps to distinguish aquaculture from agriculture, which may have a positive effect regarding the recognition of special values of aquaculture. In countries where the status of the aquaculture sector is uncertain, however, further efforts are needed to get this sector accepted as an equal-right user of resources. National development strategies have a great importance with a view to providing and enabling policy frameworks, including institutional recognition and adequate financial measures in supporting aquaculture.

In Latin America and the Caribbean, a relevant trend is the policy of regional and sub-sector integration for the development of their fisheries and aquaculture sectors. The Central American countries have jointly collaborated to improve the management of fisheries and aquaculture according to their regional objectives and strategies, which reinforce their policy of integration.

Chile's modification of its 1991 Fishing and Aquaculture Law provides a good case of improving the legal framework to address abuses in acquisition of aquaculture space. It also encourages farmers by cutting the red tape and simplifying paperwork. More specifically, it establishes new reasons for cancelling licences together with more stringent regulations and fines for violation. To provide a legal remedy, the government of Chile created two kinds of regimes for aquaculture concessions and licences. The first regime occurs with the issue of the concession and its licence for which the holder pays 42 taxable units (US$2 500 per hectare or fraction of, with a maximum of 210 taxable units (US$7 600). In the second regime, it is not necessary to deposit cash for processing a concession request but the rights of the holder are limited. The cost of licence is proportional to the surface area of water occupied. These modifications are aimed at improving sanitary and environmental aspects of fish farming. It also allows a longer period to begin operations and therefore enough time to recover. As to seaweed farming, the law is favourable to individual native farmers with less than one hectare of total concession surface, because their licence debts are condoned.

Weaknesses in implementation

While most Asian countries already have adequate laws for the routine administration of aquaculture, they usually lack well-designed programmes to propel development towards a specific vision. Or, where there is a specific vision and programme, actual implementation is hampered by the lack of funding support at the institutional and farm levels. This is exacerbated by a lack of trained field personnel. The lack of personnel is particularly true in extension work.

The countries of the Near East and North Africa exhibit a broad diversity of strategies for aquaculture, ranging from government designation of aquaculture development as a high priority (often with a strong supporting legal, institutional and economic infrastructure) to an absence of economic development plans and no published policy. Countries in which aquaculture development is afforded a high priority include Egypt, Libyan Arab Jamahiriya, Oman, Saudi Arabia and the Syrian Arab Republic. Recognizing that the economic and social benefits of aquaculture

growth are not without their negative consequences, some countries in the Near East and North Africa have strategies that promote sustainable development and good stewardship of the environment. Examples are Bahrain, Iran (Islamic Republic of) and the Syrian Arab Republic.

Within the Near East and North Africa, while all countries have legislation and regulation pertaining to basic establishment and operation of aquaculture facilities, few countries have legislation and regulation pertaining to such aspects as use of chemicals and drugs in aquaculture, control of disease outbreaks, and emergency and contingency plans. A critical shortage of technical experts in some countries compromises their capacity and ability in such areas as development planning and policy, quality control and enforcement of existing regulations. Laws and regulation may be updated in cooperation with adjacent countries, as will likely be proposed for all countries that are members of RECOFI (Regional Commission for Fisheries, within the framework of FAO), namely Bahrain, Iran (Islamic Republic of), Iraq, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates.

PARTICIPATION OF THE CIVIL SOCIETY AND THE PRIVATE SECTOR IN MANAGEMENT

In several sub-Saharan African countries, there have been major shifts in government policy with respect to the private sector. In Kenya, for example, government is gearing itself to play a purely supportive role for the private sector by:

- promoting self-regulation;
- providing basic infrastructure for aquaculture development (roads, electricity, improved telecommunications, schools, water and health services);
- providing conducive legal and investment frameworks;
- providing a research platform;
- monitoring and evaluation;
- zoning for aquaculture and provision of land;
- fostering participative policy formulation; and
- establishing public/private partnerships.

Kenya is now expecting private entities to be the engine for the growth of the sector. Several other countries (Uganda, Madagascar, Mozambique, Malawi, Côte d'Ivoire and Ghana) have adopted similar policy decisions. These shifts in government thinking should contribute to the rapid evolution of the commercial sector over the next decade. This approach has been part of the scene in Nigeria (the National Agenda for Fish Production) for a long time and, in conjunction with a vibrant private sector, has contributed to and underpinned the development of commercial aquaculture there.

PRIVATIZING RESEARCH FACILITIES

A call was made in 1999 (FAO, 2000) to privatize government facilities. There was some movement in this respect, particularly in Madagascar where significant progress has been made. Malawi has partially privatized one of its largest stations and some progress is being made in Ghana and Republic of Congo while Nigeria has now developed a policy for the privatization of its stations. The benefits of privatizing "research or demonstration" stations for the development of the sector are immense and include amongst others, income to government and enhanced extension services as part of the lease agreement. Privatized demonstration stations act as real demonstration units that encourage development, investment, generation of employment and enhanced rural fish supply.

The pitfalls of privatization

In Africa, the original purpose of fisheries stations serving as hubs for extension was clearly neither successful nor sustainable. The privatization of government stations,

such that they may serve as hatcheries and nurseries to address the shortage of fingerling throughout the region, should, however, be preceded by comprehensive economic feasibility studies to ensure sustainability and after establishing transparent privatization policies. Care should also be taken that the process of privatization does not lead to the dissipation and/or loss of research and development capacities.

Privatization has its merits, but the experience of Sri Lanka underlines the need for adopting the approach carefully; particularly in retaining essential state support that the private sector would find no incentive to undertake. In 1990, the government of Sri Lanka withdrew state patronage from inland fisheries and aquaculture. In effect, the whole bureaucracy involved in inland fisheries and aquaculture was disbanded and the implementation of the aquaculture component of the National Fisheries Development Plan was discontinued. Shrimp farming and ornamental fish breeding continued since these were completely in the hands of the private sector. With seed supply, extension and technical support terminated, production from inland fisheries and aquaculture declined from about 40 000 tonnes in 1990 to only 12 000 tonnes in 1994. Sri Lanka has since resumed its inland fisheries and aquaculture programmes with the establishment of the National Aquaculture Development Authority (NAQDA) in 1998.

In most Latin American countries, the participation of the private sector in governing and promoting aquaculture is achieved through National Consultative Commissions. These commissions work with government authorities in searching for solutions that may benefit this sector. The participation of various governmental entities in the licensing and granting of aquaculture permits and concessions tend to become an obstacle for the harmonious development of aquaculture. Similarly, a greater coordination between the different public and private research institutions becomes necessary because research priorities are not always clear or consistent, causing duplicity in the use of resources, and often failing to achieve solutions to the problems posed by the sector.

The Eastern European experience underlines the increasing role of the private sector, in general, and farmers associations, in particular, in a market economy. Privatization of individual fish farms has exposed the farmers to market conditions and to the sometimes difficult economic environment. In this new situation, fish farmers gradually realized that they needed a new type of cooperation that would allow them to protect their interests and achieve common objectives. Efficient industry representation in policy making has not been achieved yet in many Eastern European countries. Responsibility and mandate for sector management is often unclear. The status of the aquaculture sector has been, and still is, uncertain in some countries. In many cases, new producers' associations have been developed out of the previous cooperatives or state-owned associations. However, there have been significant changes in the structure and function of the old-type organizations while they have been converted into "real" producers' associations, which also resulted in conflicts in many cases.

Civil society groups, i.e. NGOs and People's Organizations have been playing greater roles in sector management. In most cases, the advocacy role has been focused on environmental and social responsibilities directly addressed at communities, governments and the farming sector. But it is now also expressed in consumer movements where awareness has been promoted among consumers on the attributes of products so that they can express their preference towards those that are reasonably priced, safe and wholesome but also towards how and under what conditions they were produced. Another important role of civil society groups has been their highlighting of inequitable arrangements in communities. This brought these otherwise ignored or tolerated inequities into public scrutiny, debate and study; and in many cases, are now being addressed in policy, regulations and stakeholder negotiations. A case in point is the ban on coastal shrimp culture imposed by India. This is further discussed in Chapter 7 of this document.

Several NGOs have also chosen to exercise their advocacy roles in the context of partnership with governments. This is exemplified by the Partnership in Development in Kampuchea (PADEK) in Cambodia, a civil society organization that, amongst other roles, worked with the government to improve national research and extension capacities, promoted the role of women in fisheries in Cambodia and the greater Indo-China region, and directly worked with farmers to improve technical efficiency and environmental sustainability of fish farming.

EXPERIENCE OF FARMER SOCIETIES

Following the adoption of FAO's Code of Conduct for Responsible Fisheries (CCRF), specific issues and challenges for attaining the long-term sustainability of aquaculture have been recognised. These include several areas, where associative professional structures have an important role to play, as follows (Hough and Bueno, 2003):

- comprehensive policies and corresponding legal and institutional frameworks that support sustainable development which cannot be developed without communication and consultation with the major stakeholders, the producers.
- enhanced participation and consultation of all stakeholders in the planning, development and management of aquaculture, including the promotion of codes of practice and best management practices.
- promotion of the appropriate and efficient use of resources, including water, sites, seed stock and other inputs.
- human resource development and capacity building, where training, technology transfer and the provision of and access to information are the most important components.
- voluntary self-regulatory mechanisms for attaining best practices.

The role of farmers' associations can vary but is generally one of uniting the views and actions of a profession for the common good. In fisheries or agriculture, in general, they provide support to the sustainable development and management of the sector. The roles of farmers' organizations as seen by different stakeholders, including the farmers themselves, include: (i) easier provision of government services to farmers; (ii) promoting and protecting farmers' interests; and (iii) more effective partnerships with other stakeholders.

In Latin America, the Salmon Producers Association (SOTA), which includes producers' associations from Chile, Canada and the United States, has recently achieved a regional certification system based on the Safe Quality Food (SQF) of the Food Marketing Institute (FMI) which includes the most important market chains and retailers in the United States and some in Europe and Asia.

A recent case study on 13 aquaculture farmer or producers' organizations in six Asian and one Latin American countries revealed that, while maintaining their economic viability is their primary concern, the associations also worked with government and other sectors of society to shape aquaculture policies and research and development agenda (Bueno and Hough, 2005). On the other hand, especially in developing countries, most of them remain dependent, to varying degrees, on government, which can compromise their effectiveness as a stakeholder in a country's aquaculture development. But they do possess the characteristics of being an effective partner to, but independent of, government. These include being legally established and legitimately representing their target constituents, establishing alliances with other institutions, sponsoring scientific and technical forums, bringing professional and scientific opinions and advice into public debates, and rendering a range of practical services to their members.

Professionalization of the association is seen as an essential measure that would lead to the development of an authoritative, credible, viable and independent association. In this regard, the Federation of European Aquaculture Producers' (FEAP) experiences

give valuable lessons in professionalizing a farmers' association (Hough and Bueno, 2003).

Establishing, operating and managing an association requires commitment, finance and results. For a regional federation such as the FEAP, its success can also be measured in terms of participation, encouraging the involvement of member associations and their representatives, without aspiring to be competitive to the function of the members. Maintaining a complementary balance between objectives and actions and providing the services anticipated are integral to successful operation.

SAFEGUARDING SMALL-SCALE PRODUCERS AND POOR FARMERS

Among the poor farmers and users and gatherers of aquatic resources, being organized into either a formal association or self-help group paved the way for collectively: (a) achieving a strong capacity to enter and stay in aquaculture; (b) effectively demanding and absorbing institutional services and technical assistance; (c) coping with natural hazards and economic risks; (d) addressing barriers to property and financial access; and (e) acquiring and using capital and operating assets (ADB, 2005). A number of cases can be cited here to illustrate the issue of protecting the small-scale producers from the impacts of compliance to international trading standards.

A good case of a much focused effort by an organization to market a single product, to benefit all its constituents, is the Seaweed Industry Association of the Philippines, a national association of carageenan processors, traders and farmer groups. (Carageenan is a colloid from the red seaweed *Eucheuma* spp., of which the Philippines is the world's top producer and exporter.) While its various activities included developing better technology for growing and processing better quality colloid, achieved in alliance with academic institutions and other international associations, a major effort had been the addressing of the non-tariff and technical trade barriers on carageenan. It successfully lobbied to have the Philippine Natural Grade (PNG) carageenan re-classified by the Codex Alimentarius Commission from non-food to food additive, thus effectively widening its market and raising its price. The Seaweed Industry Association, in 1964, included traders, exporters and growers most of them small-scale and poor and also engaged in artisanal fisheries.

In Eastern Europe, there are initiatives to assist the networking of small enterprises and the establishment of producers' organizations in order to meet new market challenges in several countries. Unfortunately, the process is slow and sometimes unsuccessful (e.g. in Hungary) due to the reluctance of individual farmers to collaborate and share market information. Some small farms could be victims of such a situation because bargaining power of individual farms (especially small ones) is very weak against the domineering supermarkets.

In some Latin American countries, the government offers credit or specific financial funds for aquaculture as well as support schemes for producers, but others do not offer such facilities because aquaculture is considered a high risk investment sector. The issues above are only part of a wider spectrum of associated trade and marketing issues that aquaculture producing countries need to address seriously. It has become essential to assume responsibility not only for the quality of the product but for the actions taken, or not taken, in its production (NACA/FAO, 2001). Environmental and social responsibilities are joining food safety and quality assurance as requisites to market access. In Asia, for instance, most farms are small and producers are generally not well-organized, which makes it difficult and costly for small or even large farmers, individually, to comply with international standards, adopt better aquaculture practices or codes of conduct and to ensure consistent product quality and delivery. Food safety and quality are no longer the only requirements to accessing markets. Even sanitary and phytosanitary (SPS) measures have been used as an excuse to raise non-tariff barriers to trade. Linkages to environmental responsibility, animal welfare, labour and human

rights and bio-terrorism have become part of the international trading landscape, along with anti-dumping and other barriers.

The obvious and immediate impact of the increasing number and stringency of market requirements on developing country producers and exporters, many of which are small and largely unorganized, are higher costs of production and compliance. Not as immediate and not so evident, but a valid apprehension nevertheless, is that the high cost of compliance could become so onerous to the small aquaculture producers or even large but unorganized producers that they might eventually be pushed out of the business.

The impediments to trade providing benefits to poor countries have mostly come in the form of non-tariff trade barriers. The future of fish exports from developing countries is seriously threatened by regulations, which are being progressively imposed by the major fish importing countries. Producing countries have launched measures – some rather expensive for a developing country – to prevent banned chemicals from getting into seafood products. But some of the better measures include adopting codes of practice and/or better management practices that reduce or eliminate the use of chemicals and drugs in culture systems.

A very recent issue is bio-terrorism. At the 2003 AquaMarkets conference[1], the Bio-Terrorism Act in the United States was mentioned as a possible non-tariff trade barrier. At the very least, it added more steps and therefore costs to export procedures. It should be said that none of the complaints objected to the United States' desire to ensure that goods, particularly food commodities, shipped into the country do not become a vehicle for terrorist acts against its citizens. Efforts were in fact made to comply with the requirements of the law; a case in point: Thailand and the United States inaugurated (during the APEC Summit in Bangkok in October 2003) a joint initiative to ensure the security of transported products originating from two ports in Thailand to the United States. The bottom line to exporters is, however, additional procedures and costs.

Protectionist movements have come in the form of anti-dumping cases, notably those that have been filed by the catfish and shrimp producers in the United States. While industry observers in Asia and the United States have pointed out that such trade actions, rather than solve the problems of the producers in the importing country, usually tend to create uncertainties in the market place, limit supplies and drive consumer prices up. Farmers in exporting countries must face up to the reality that anti-dumping measures will remain a threat, whatever their motivations.

These realities facing producers and exporters of seafood products are, at best, an annoyance to governments, at worst, a threat to the continuing ability of farmers and exporters in developing countries to stay in business. On the other hand, with the growing concern over food safety and the environmental and social issues linked to aquaculture production, producers not committed to adopting and implementing programmes that address these issues will find it more difficult to compete with those that do have responsible programmes.

As to the effect of trade liberalization on poverty, doubts linger among some developing countries on the impact of liberalization on the competitiveness of their aquaculture sector. These doubts are heightened by the fact that economies of scale are not readily achieved by their thousands of small farmers. Studies have found strong relations between trade and growth, although the point is stressed that "liberalization alone cannot be an answer but needs accompanying policies, such as market reforms, macro-economic stabilization, exchange rate adjustment and adequate safety nets"

[1] Regional Seminar and Consultation on Accessing Markets and Fulfilling Market Requirements, organized by NACA in Manila, 2–6 June 2003. It was hosted by the Agriculture and Trade and Industry Ministries of the Philippines and assisted by FAO and WTO.

(UNESCAP, 2001). Recent studies on the impact of trade liberalization on the reduction of poverty show that it can alleviate poverty but evidence is still not strong since findings vary between countries (UNESCAP, 2001).

These issues have prompted an increasing need to bring a trade dimension to work on aquaculture development. The responses that have been initiated and the broad and specific options that have been recommended by NACA and FAO initiatives on trade in aquatic products include: (i) strengthening capacities to comply with SPS standards; (ii) engaging more actively and effectively in the standard setting processes of international instruments such as the Codex Alimentarius Commission and OIE; (iii) certifying aquaculture products; (iv) finding ways to benefit fully from market chains; and (v) building the effective institutions.

AquaMarkets 2003 emphasized transparency and cooperation in information sharing and the need to strengthen knowledge and intelligence capacities with information technology. It also raised the prospects of developing countries moving into e-commerce and establishing mutual arrangements that facilitate and reduce the cost of information flows, which speed up the processing of "documents" and improve the efficiency of handling and moving products. Among trading partners, establishing common customs procedures and operations would reduce very high compliance costs, which had been estimated to be 7–10 percent of the value of global trade (UNESCAP, 2001). Applied to global trade in aquatic products, that is a cost of US$3.9 to 5.6 billion.

The growing awareness that environmentally sensitive aquaculture makes good business sense and helps poor and small-scale farmers, has spurred efforts to promote further the adoption of environmentally and socially responsible farming practices through appropriate standards or codes of conduct. In this regard, and following on from AquaMarkets 2003, the December 2003 Global Aquaculture Forum held in Dhaka (jointly hosted by the Government of Bangladesh, the Bangladesh Shrimp Foundation and NACA) brought together some 70 participants from seven countries representing various stakeholders in shrimp aquaculture to share experiences and ideas on trade in shrimp and to seek solutions to problems and constraints.

The specific responses to the various market access and trade issues were marked by a focus on people and their well-being, and cooperation among farmers, stakeholders and governments to maintain transparency and achieve competitiveness, but more especially, to ensure responsible aquaculture and trade[2] (NACA/FAO, 2004).

Better management practices

Promotion of aquaculture has largely met little problem in most countries. On the other hand, if a certain aquaculture venture turns out to be profitable, governments often found it difficult to control or stop runaway development until a catastrophic mass mortality and other related problems occurred. Viewed in this light, industry growth is self-limiting. The problem is not so much promotion as management. Beyond issuance of permits and licences, governments in Asia are increasingly realizing the need to protect the environment and manage aquaculture resources in a sustainable manner. In New Caledonia, a rigid system of self-regulation applying to all prawn farmers (*P. stylirostris*) has been put in place in order for the industry to meet the high quality standards demanded of its niche markets in Japan and France.

Thus, while maintaining policies to encourage the development or further development of the aquaculture industry through liberal land-use policies with long-term and low-cost lease options, liberal financing, technology development and other incentives, most countries are also trying to mitigate the negative consequences of runaway development by measures such as: (a) instituting rules and regulations on

[2] www.enaca.org/aquamarkets

environmental impact assessment; (b) banning of further clearance of mangrove forests for aquaculture development; (c) imposing a green belt along the shoreline and river banks; (d) licensing of all aquaculture operations including hatcheries with the licence often required by banks for loan applications; (e) implementing allowable size of fish cages and spacing between such cages; (f) banning the use of a specific list of chemicals and therapeutants; and (g) implementing inspection and imposition of quarantine procedures on movements of live fish.

In Latin America, Codes of Conduct for Responsible Fishing and good practices in shrimp culture are adopted as in Brazil, good practices in aquaculture production in Colombia, qualification in good practices on handling and quality assurance of aquatic products in Costa Rica and Nicaragua, and Environmental Regulation for Aquaculture (RAMA) in Chile. Unfortunately, information on verification processes of the fulfilment of such initiatives does not always exist. In some countries, governments have introduced quality betterment systems and better practices for aquaculture and have supported the implementation of Hazard Analysis and Critical Control Points (HACCP), qualification and training of Good Aquaculture Production Practices (BPPA), [International Organization for Standardization] ISO 9 000 certification (quality), ISO 14 000 certification (environment), rules and regulations and product chains schemes. Similarly, in other cases, independent companies and producers associations have established standards and regulations or codes of conduct under Clean Production Agreements (APL) for salmon, shrimp and tilapia production, postlarvae production, processing, etc. Steps are being taken to set up traceability systems for fisheries and aquaculture products.

A research-extension pilot project in India on developing and promoting best-health management practices among small shrimp farmers organized into self-help groups has highlighted the importance of farmers being organized to be able to adopt cost-effectively best practices that improve their yield and the quality of their produce. A project evaluation in 2004 found that the farmers increased yields by 33 percent, harvested shrimp were 1.5 times larger and were affected 20 percent less frequently by diseases than surrounding non-adopting farmers. Moreover, their produce became more attractive to buyers because the shrimp had no antibiotic residues as the farm management practices they adopted exclude the use of banned drugs and chemicals. The project was subsequently expanded and another evaluation of the 2005 crop, with results from 930 demonstration ponds spread over 484 ha in 15 villages, showed a two-fold increase in production, 34 percent increase in size of shrimp and 65 percent reduction in disease prevalence compared to surrounding non-adopting ponds. Another outcome is the "contract hatchery seed production system" in which the organized small farmers could procure high quality seeds at reasonable price, and even offering premium price to hatchery owners for quality and reliable seed supply.

A second case, from NACA's activities, to demonstrate the private and social benefits of adopting best management practices (BMPs) was a project in Viet Nam that supported coastal aquaculture. Support was given to the promotion of responsible development of the shrimp farming sector at all levels and for all links in the production chain. BMPs were developed for broodstock traders, hatcheries, seed traders and farmers. Focus was given on the development of simple and practical BMPs, which addressed the needs of less resourced small-scale farmers. Ten sets of extension material were developed and disseminated in close collaboration with the Ministry of Fisheries. The tangible outcomes included:

- implementation of BMP for hatcheries resulted in seed production up to 1.5 times higher and a price per unit seed of about 30-40 percent higher than non-BMP seed.
- BMP implementation in 7 pilot farming communities (655 direct beneficiaries) led to a remarkably lower risk of mortality, higher production and higher probability of making a profit.

- farming communes that introduced seed testing increased their chances of making a profit by over 7 times.
- BMP application led to average yields that were sometimes more than 4 times higher than in farms where BMP had not been adopted.
- the project BMPs were also incorporated into the draft standards for the production of organic seed.

Self-regulation

The need to develop aquaculture has to be accompanied by the assumption by the production sector of the responsibilities expected of it. To assure sustainable aquaculture, the production sector has to be organized efficiently for the implementation of, or compliance with, the requirements now in place or that are anticipated. The debate on the sustainability of aquaculture has broadened from technical and environmental questions to the inclusion of economic, marketing and social responsibility issues. To these purposes, the use of *associations*, at the national and regional levels, provides the basis and the practical means of communicating with the sector that will lead to improvements in the management of resources and the sector. These considerations are specifically reflected by a survey of national associations (in Asia, Latin America, Eastern Europe, Canada and Australia), a regional federation (FEAP) and a global alliance of producers and allied industries (GAA). The survey shows a range of motivations for organizing and organizational goals, a number of which highlight the increasing tendency towards self-regulation. From the 13 associations surveyed which includes 12 from Asia and one from Ecuador, a number of motivations for organizing relate to their assuming functions that relate to self-regulation.

The pathways for attaining competitiveness were basically similar: Unifying the industry players to address common problems cohesively; strengthening bargaining power with suppliers of materials and credit and buyers; improving production efficiency with better technology; and cooperating with government in conducting promotional activities, technology trials, shaping of regulations and policy; and developing and promoting codes of conduct, good aquaculture practices and better management practices.

For specific examples, the Thai Shrimp Farmers, Producers and Exporters Association and Sri Lanka's Professional Ornamental Fish Producers Association essentially have similar goals to rationalize and synchronize the efforts of the various sub-sectors of the industry. Individual players in the Thai shrimp industry, namely, hatchery operators, growers, cold-storage operators and exporters each had their own agenda and activities in addressing the common industry problems of safety and quality of product, especially the antibiotic residue problem, removal of Thailand's GSP (Generalized System of Preferences)[3] status with EU resulting in higher tariffs, price fluctuation and lack of raw materials for the processors, and the anti-dumping charges. The association was meant to unify and direct these separate efforts. The Sri Lankan ornamental fish producers association was meant to redress the inefficient operations of similar associations whose inefficiencies were exacerbated by declining export values and revenues that had caused members to drop out or apply for inactive status. The new association enlisted as members, players from the various subsectors (including wild fish collectors), which, in effect, unified the market chain.

The second motivation of coping with threats to viability and improving the industry's image, also leads to the associations adopting their own measures to deal with three major threats to the industry, namely: diseases, low prices and a bad image. The first and the last are linked, and found common solution in better water and effluent management. The Thai national shrimp association (that grew from a provincial shrimp

[3] This has recently been restored.

BOX 3

Shrimp Aquaculture Better Management Practices applied by small-scale farmers in India and Viet Nam

a. pond bottom and water preparation

1. Sludge removal and disposal away from pond site.
2. Ploughing on wet soil if the sludge has not been removed completely.
3. Water filtration using twin bag filters of 300 µ mesh size.
4. Water depth of at least 80cm at shallowest part of pond.
5. Water conditioning for 10-15 days before stocking.

b. seed selection and stocking practices

1. Uniform size and colored PLs, actively swimming against the water current.
2. Nested PCR negative PLs for WSSV (using batches of 59 PLs pooled together. If test turns negative it means that the prevalence of WSSV infected PLs is less than 5% in that population at 95% confidence).
3. Weak PL elimination before stocking using formalin (100 ppm) stress for 15-20 minutes in continuously aerated water.
4. On-farm nursery rearing of PLs for 15-20 days.
5. Stocking during 1st week of February to 2nd week of March.
6. Seed transportation time of less than 6 hrs from hatchery to pond site.
7. Stocking into green water and avoiding transparent water during stocking.

c. post-stocking / grow-out

1. Use of water reservoirs, and 10-15 days aging before use on grow out ponds.
2. Regular usage of agricultural lime, especially after water exchange and rain.
3. No use of any harmful/banned chemicals.
4. Using of feed check trays to ensure feeding based on shrimp demand.
5. Feeding across the pond using boat/floating device to avoid local waste accumulation.
6. Regular removal of benthic algae.
7. Water exchanges only during critical periods.
8. Weekly checking of pond bottom mud for blackish organic waste accumulation and bad smell.
9. Regular shrimp health checks, and weekly health and growth monitoring using a cast net
10. Removal and safe disposal of sick or dead shrimp.
11. Emergency harvesting after proper decision making.
12. No draining or abandoning of disease affected stocks but emergency harvesting.

Source: NACA/MPEDA/FAO cluster management in small-scale shrimp farming in Andhra Pradesh, India. www.enaca.org/shrimp

farmers' association) enhanced its image further with successful and visible efforts at planting mangroves or rehabilitating them. To improve the industry's image, the Sri Lankan ornamental fish farmers association, the membership of which includes gatherers of ornamental fish and as yet depends to some extent on wild sources, has promoted the breeding of endangered species.

To promote a unified governance of the sector, the Vietnamese Fishery Society unified the Vietnamese Aquaculture and Vietnamese Fishery Associations. Two of their aquaculture products are major export items: shrimp and catfish. As such, while the society's activities do not include exporting, it does have a great interest in having the products and their farming and processing practices adhere to safety, quality and environmental requirements.

As with Viet Nam, the Ecuadorian association, which is in fact a national "chamber", consists of the entire range of industry stakeholders, but unlike Viet Nam, does not include government services. Its membership of nearly one thousand indicates the broad scope of representation in the association. In Chile, the "salmon cluster" involves not only the salmon farmers but also feed, nets and equipment producers as well as certain services such as processing, transport and cold chains. This cluster has been involved in a Clean Production Agreement with the government.

Self-regulation is enhanced by having a voice in policy and plans. At the local level, this is exemplified in India by the formation of associations of poor tribal farmers and scheduled castes, which was initiated by development agencies, government and an NGO in three eastern states to provide the environment and institutional support for poor farmers and aquatic resource users to enable them to demand the institutional support necessary and recommend policies and approaches needed to bring it about. To be even stronger, the small village associations have formed a network among themselves, albeit with assistance from the state governments and an NGO.

In Eastern Europe, the older and more organized associations have memberships that include producers, processors, traders and even independent experts. Their objectives are also more varied and organizational structures more sophisticated. Their goals, for instance, include protecting the rights of members and of the fisheries and aquaculture sectors, improving the national fishery and aquaculture legislations and adapting it to the EU Common Fisheries Policy, strengthening the position of the producers in the domestic and international markets and establishing links and cooperative activities with international organizations. A special mention was made of the producers' associations in the Czech Republic, Hungary and Poland which are described as more advanced than those in the other countries surveyed. The producers' associations of these three countries are also members of the FEAP.

The presence and extent of farmer associations in the Near East and North Africa typically parallel the state of development of the aquaculture industry. For example, in Egypt, the largest regional producer and long established, there are seven aquaculture cooperatives. In Iran (Islamic Republic. of) the second largest regional producer, there are three cooperative unions, one each for coldwater, warmwater and shrimp production; the unions have been formed to lead aquaculture development, to collaborate in decision-making and to support farmers. In Saudi Arabia, the third largest regional producer, there are currently no producer associations, although the government plans to facilitate the development of such associations in cooperation with the Chamber of Commerce.

Two farmers' associations, in Australia and Canada, illustrate the purposes, services to members and the role of the associations in the advancement of the aquaculture industry, in developed economies. The emphasis on scientific and manpower development is strong, and the focus on having a stronger representation in government policy-making is very evident.

The objectives of the Aquaculture Association of Canada (Association aquacole du Canada)[4] are to: (a) foster an aquaculture industry in Canada, to promote the study of aquaculture and related science in Canada to gather and disseminate information relating to aquaculture and to create public awareness and understanding of aquaculture; (b) promote, support and encourage educational, scientific and technological development and advancement of aquaculture in Canada; (c) gather and disseminate technical and scientific information on aquaculture development; (d) conduct seminars for the presentation, exchange and discussion of information, findings and experiences on all subjects and techniques related to aquaculture; (e) encourage the teaching of all phases of aquaculture and the training of aquaculturists in accredited colleges and

[4] www.apfa.com.au

universities; and (f) encourage private industry and government agencies to support education, research and development.

The Australian Prawn Farmer's Association (APFA)[5] aims to represent the interests and foster the development of the Australian prawn farming industry. The APFA has close to 100 percent coverage of growers across Australia, which means that it has a strong voice at all levels of government.

The APFA, in collaboration with the Fisheries Research and Development Corporation, helps direct funding to a number of core areas described in the APFA Research and Development Plan 2000–2005. The APFA has prepared a Five Year Research and Development Plan, the priorities of which are determined annually by members in a series of workshops and surveys.

The activities and purposes that relate to promoting sustainable aquaculture and better management of the sector, of two kinds of associations, a regional federation and a global alliance, are provided by the FEAP[6] and GAA[7].

The FEAP had 34 associations from 24 countries in 2005. Its primary goal is to provide a forum for the debate of issues (concerning European aquaculture primarily) common to its members and to communicate the results of such discussion to the appropriate authorities. One of the key objectives is the effective communication of these opinions to the authorities, which vary according to the topic, and cover all aspects of aquaculture operation. In Europe, many countries have adopted much of the harmonized legislation.

There has been a significant increase in the requirement for consultation with the professional aquaculture sector in recent years, reflecting changes in government policies where the higher involvement of stakeholders and the move towards self-regulation are important issues. When issues such as international trade and market stability, sustainability, development of standards (including organic farming and ecolabelling issues), governance and self-regulation have to be debated, with the professional point of view in mind, this cannot be done in a vacuum. The FEAP provides apolitical positions, based on science and/or good sense, which support the sector and its development.

The FEAP and GAA have been active in promoting Codes of Conduct and Good Practice and, since each has direct access to producers, this activity has been quite successful in transposing the desires of government into practical actions at farm level. The development of internationally-acceptable standards may also be seen as an activity that could be developed through regional cooperation between such bodies.

The GAA focuses on tropical shrimp production and its membership covers associations, private production companies and product importers. Its goal is to advocate aquaculture as an answer to global food needs and to educate producers, consumers and the media in regard of this, while furthering environmentally responsible aquaculture. Under its Responsible Aquaculture Programme, it has initiated the development of standards of good practice or codes of conduct. It also provides advice for monitoring and certifying adherence to standards or codes and has initiated the development and use of marks or logos designating adherence to such codes or standards.

Co-management

Co-management is an emerging trend and the concept has mostly been described through its application in the management of common resources and mostly at the community level. A review of co-management is included here to shed some light onto the existing and potential ways by which it is applied to the aquaculture sector (Carlsson and Berkes, 2005).

[5] www.apfa.com.au
[6] www.feap.info
[7] www.gaalliance.org

BOX 4

International Principles for Responsible Shrimp Farming

Farm Siting: Locate shrimp farms according to national planning and legal frameworks in environmentally suitable locations, making efficient use of land and water resources and in ways that conserve biodiversity, ecologically sensitive habitats and ecosystem functions, recognizing other land uses, and that other people and species depend upon these same ecosystems.

Farm Design: Design and construct shrimp farms in ways that minimize environmental damage.

Water Use: Minimize the impact of water use for shrimp farming on water resources.

Broodstock and Postlarvae: Where possible, use domesticated selected stocks of disease free and/or resistant shrimp broodstock and post-larvae to enhance biosecurity, reduce disease incidence and increase production, whilst reducing the demand for wild stocks.

Feed Management: Utilize feeds and feed management practices that make efficient use of available feed resources, promote efficient shrimp growth, minimize production and discharge of wastes.

Health Management: Health management plans should be adopted that aim to reduce stress, minimize the risks of disease affecting both the cultured and wild stocks, and increase food safety.

Food Safety: Ensure food safety and the quality of shrimp products, whilst reducing the risks to ecosystems and human health from chemical use.

Social Responsibility: Develop and operate farms in a socially responsible manner that benefits the farm, the local communities and the country, and that contributes effectively to rural development, and particularly poverty alleviation in coastal areas, without compromising the environment.

Source FAO/NACA/UNEP/WB/WWF. 2006.

What is co-management? In relation to natural resources, the term management can be understood as the "right to regulate internal use patterns and transform the resource by making improvement". These activities can be performed by single actors or jointly by groups of individuals or as a result of cooperation among different groups. Collaborative management, or co-management, has been defined as "the sharing of power and responsibility between the government and local resource users" (Carlsson and Berkes, 2005).

The World Bank has defined co-management as "the sharing of responsibilities, rights and duties between the primary stakeholders, in particular, local communities and the nation state; a decentralized approach to decision making that involves the local users in the decision-making process as equals with the nation-state" (Carlsson and Berkes, 2005). The same definition was adopted by the World Conservation Congress: "a partnership in which government agencies, local communities and resource users, nongovernmental organizations and other stakeholders negotiate, as appropriate to each context, the authority and responsibility for the management of a specific area or set of resources". This latter regards the state as only one among a set of stakeholders (Van Houtte, 2001).

Two different models try to conceptualize co-management between "folk-managed" systems and state-managed systems. On the one hand, there is a horizontal continuum from nearly total self-management to nearly total state management. On the other, there

is a vertical contracting out model of state-management powers which is characterized by devolution of rights. Although these models are not mutually exclusive, they are based on an implicit dichotomy comprised by the state and local resource users. Co-management can be looked upon as a continuum from the simple exchange of information to formal partnership.

The above definitions and conceptualizations of co-management have some common underpinnings: (i) they explicitly associate the concept of co-management with natural resources management; (ii) they regard co-management as some kind of partnership between public and private actors; and (iii) they stress that co-management is not a fixed state but a process that takes place along a continuum.

What is co-management good for?

Allocation of tasks: Many existing management systems need to operate at both small-scale and large-scale levels requiring different kinds of skills and knowledge to do so. This is possible because co-management brings together a variety of different capacities and comparative advantages. For example, marginalized producer groups in remote areas of the world need external markets for the realization of the value of the goods they produce; but they need links to the market through persons who know the structure of the demand, or have access to different types of commercial networks. This is only one example of allocation of tasks, but the principle is something that permeates all types of co-management systems. Division of labour enables specialization to increase efficiency.

Exchange of resources: Local groups may have a need for certain types of resources that they are themselves unable to provide, such as technology, scientific expertise and a diversity of information; but they may possess resources needed at the centre, such as information about harvesting volumes or status of the resource. A basic assumption about network relations is that one party is dependent on resources controlled by another, and that there are gains to be had by the pooling of resources.

Linking different types and levels of organization: Co-management is a means of linking different types of organization. In a bureaucracy, different layers of organization are linked to one another within a framework of coherent hierarchy. Co-management, by contrast, is a process by which representatives from different levels of organizations and types of organizations coordinate their activities in relation to a specific area or resource system. In practice, it means that, for instance, state-employed experts might work in concert with the board of a local community of resource users. In comparison with hierarchic ways of organizing management, the latter is more responsive to local circumstances. It is also likely that the flow of information is faster and more effective and that problems are addressed at a more appropriate level within the organization. In short, co-management agreements serve the purpose of constituting linkages among organizational groups that might not be otherwise connected.

Reduction of transaction costs: Transaction costs are the costs of measuring what is being changed and enforcing of agreements. These costs can be divided into long-term and short-term costs, although it is not easy to distinguish between activities aimed at a long-term reduction of transactions costs or for more immediate purposes. Although it may be the case that the initial phases of the establishment of co-management increase transaction costs, one positive, but often neglected, effect is the possibility that well-tailored systems help reduce transaction costs. If most instances of co-management consist of fairly rich webs of relations, these networks have certainly evolved over time. The function of individual links in these networks usually has to do with information, legal relations and monitoring, features that are usually associated with the exercising of property rights. If (as a result of an agreement) representatives of state authorities are entrusted the right to monitor the access to or appropriation of a resource, this will reduce conflict among members of the community. Consequently, users do not have to dedicate time and resources for solving these conflicts, thus reducing transaction costs.

Risk sharing: Many agriculture-based communities tend to diversify their crops. If one crop fails, they would still have a resource base for their subsistence living. In short, they do not put 'all eggs in one basket'. The same type of reasoning can be applied to institutions and governance systems. Systems that are composed by single administrative units and practise monolithic decision systems are more vulnerable than are polycentric arrangements and redundancy. This logic can also be applied to co-management networks. Webs of relations that have evolved over time make up diversified management arrangements. These webs serve the purpose of spreading the risk among involved parties. For example, it is less risky to share some management tasks among a number of actors, as compared to relying on one actor for their accomplishment.

Conflict resolution mechanisms and power sharing: The establishment of co-management systems may function as a means of conflict resolution between communities of local resource users and the state. The processes of negotiation, bargaining and setting up co-management agreements that codify the rights and responsibilities of involved parties (local groups, the state, commercial actors, etc.) reduce conflicts and might even function as a more long-term problem-solving mechanism. Successful reduction of conflicts is essential for long-term planning and for the willingness among individuals to invest in creating appropriate institutions.

Three examples, on culture-based fisheries (De Silva *et al.*, 2004), on community-based aquaculture (ADB, 2004), and on stock enhancement of low-trophic organisms in a coastal bed (Fjalland *et al.*, 2005), of the application of co-management in aquaculture are described below.

A good example of the application of co-management is in culture-based fisheries, a form of aquaculture practised communally in small water bodies in rural areas. It is increasingly popular with governments and communities in their attempts to increase rural fish supplies with minimal input of resources; it is also a good example of effective secondary use of water resources, which are primarily targeted for downstream agricultural activities. Culture-based fisheries are being practised effectively in countries such as Sri Lanka, Viet Nam and Bangladesh (in oxbow lakes) and involve the participation of the agricultural community that essentially manages, and are the beneficiaries of, the water resource. The community structure that has been organized previously for managing the water resource for agricultural activities (often a community organization formed through the existing legislative structures for agricultural activities, which is the only direct government intervention) are incorporated, encouraged and stimulated to take part in culture-based fisheries in the water body, without compromising the downstream agricultural activities. The operational activities of the individual culture-based fisheries practices are totally determined by the community (such as species to stock, time of stocking, time of harvesting, caring for the stock), on the technical advice of relevant authorities (De Silva, Amarasinghe and Nguyen, 2006).

Another example is provided by the community-based aquaculture programme in Northeast Thailand. The study does not describe the arrangements and processes but only the reasons for both good and unsuccessful outcomes (ADB, 2004). The evaluation found that the programme had contributed to the development of self-help initiatives, local ownership and decision-making in the communities. The main factors that influenced the success of community-based aquaculture were: (i) the demand for and the extent of interest in fish farming; (ii) social capital, including organizational arrangements that contribute to strong community participation, sharing access to resources and conflict resolution; and (iii) government assistance and partnerships with the communities. On the other hand, constraints to rural aquaculture have included water shortages, unfavourable biophysical conditions, low natural productivity and such farm management issues as stocking density, pond management, access to

feed and harvesting methods. Fish farming has also been affected by environmental degradation, limited financial and human resources, inappropriate links between extension and research and external shocks (such as the effects of the Asian financial crisis of 1997).

A third is one of field projects of a DANIDA-assisted project for mariculture and brackishwater aquaculture in Viet Nam (Fjalland *et al.*, 2005). Van Thang Commune is an island fishing community dependent on a combination of over-fished benthic resources (gastropod and bivalve molluscs) and unsustainable aquaculture practices (lobster grow-out in cages). A study identified a suitable area for a marine benthic resource management programme referred to as a 'seabed resource management'. The 30 ha area was demarcated and restocked with a range of species low in the food chain but economically valuable, including topshell (*Trochus niloticus*), abalone (*Haliotis asinina*) and sea cucumber (*Holothuria scabra*). The aim was to ensure that local communities would manage the area and continue to hold the legal rights for the sustainable use of their resources.

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