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REGIONAL REVIEW ON STATUS AND TRENDS IN AQUACULTURE DEVELOPMENT IN ASIA-PACIFIC – 2010

Regional Review on Status and Trends in Aquaculture Development in Asia-Pacific – 2010

by

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PREPARATION OF THIS DOCUMENT

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ABSTRACT

This review covers the vast Asia-Pacific region comprising Oceania, South, Southeast, East and Central Asia. In 2008, the region produced 92.5 percent of the world's total aquaculture production by volume but also consumed 70 percent of the global output. It should produce an additional 30–40 million tonnes more by 2050 to maintain the current consumption in the region at 29 kg a year per person. From past performance, it is seen to be capable of doing so, but will have to resolve a range of productivity, environmental, social and market access issues. The status of aquaculture production, its stage of development and the relative importance of each issue are unsurprisingly diverse across the many countries and territories. The outstanding regional characteristics are the dominance (except in Central Asia) of small-scale mostly commercially oriented farms, the dominance of cultured freshwater species in number and output and, as a recent FAO survey reveals, the low productivity of labour and the low employment multiplier of aquaculture in general, except in Oceania. These are circumscribed by the diminishing availability of land and freshwater, climate change and globalization of trade. To cope, farmers in the region will have to become more efficient, environmentally and socially responsible and competitive. The governance of the sector has set them towards the proper direction to acquire these capacities; its main features are the increasing use of market-based incentives and the adoption by farmers of voluntary governance mechanisms that include better management practices (BMPs) and codes of conduct (CoCs), bolstered by their being organized into associations. Guided by progressive policies and regulations, these have shown that they can stimulate higher production, enable better returns, induce responsible farming practices, and produce higher quality and safer aquatic products. This, in capsule, is the major lesson from the region's recent history of aquaculture development. The challenge is to widely promote, adopt and sustain it in practice.

ACRONYMS AND ABBREVIATIONS

ACC	Aquaculture Certification Council
ACIAR	Australian Centre for International Agricultural Research
ADB	Asian Development Bank
AIDS	acquired immune deficiency syndrome
AIT	Asian Institute of Technology
APEC	Asia-Pacific Economic Cooperation Council
APFIC	Asia-Pacific Fisheries Commission
ASEAN	Association of Southeast Asian Nations
BDS	Bangkok Declaration and Strategy
BMPs	better management practices
BOBP	Bay of Bengal Programme
CAR	Central Asian Republics
CBD	Convention on Biological Diversity
CBF	culture-based fisheries
CCRF	Code of Conduct for Responsible Fisheries
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CoCs	codes of conduct
EAA	ecosystem approach to aquaculture
EIA	environmental impact assessment
EU	European Union
EPA	Environmental Protection Authority
EUS	epizootic ulcerative syndrome
FAO	Food and Agriculture Organization of the United Nations
FAO SEC	FAO Subregional Office for Central Asia
FCR	feed conversion ratio
FIRA	Aquaculture Service of the FAO Fisheries and Aquaculture Department
GAA	Global Aquaculture Alliance
GAqP	good aquaculture practices
GDP	gross domestic product
GIFT	genetically improved farmed tilapia
GSIT	genetically supermale Indonesian tilapia
GTZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
HIV/AIDS	human immunodeficiency virus/ acquired immune deficiency syndrome
Hong Kong SAR	Hong Kong Special Administrative Region
HYVs	high yielding varieties
ICT	information and communication technology
IMNV	infectious myonecrosis virus
INFOFISH	Intergovernmental Organization for Marketing Information and Technical Advisory Services for Fishery Products in the Asia and Pacific Region
IRA	import risk analysis

IRR	internal rate of return
KHVD	Koi herpes virus disease
LFFRT	live food fish restaurant trade
MPEDA	Marine Products Export Development Authority
NACA	Network of Aquaculture Centres in Asia-Pacific
NACEE	Network of Aquaculture Centres of Central and Eastern Europe
NaCSA	National Centre for Sustainable Aquaculture
NASO	National Aquaculture Sector Overview
NGOs	non-governmental organizations
nei	not elsewhere included
NTBT	Non-tariff barriers to trade
OIE	World Organisation for Animal Health
PCR	polymerase chain reaction
PICTs	Pacific Island Countries and Territories
PNG	Papua New Guinea
QAAD	Quarterly Aquatic Animal Disease Reporting System in the Asia-Pacific Region
R&D	Research and Development
SARS	Severe acute respiratory syndrome
SEAFDEC	Southeast Asian Fisheries Development Center
SEAFDEC-AQD	Southeast Asian Fisheries Development Center – Aquaculture Department
SPC	Secretariat of the Pacific Community
SPF	specific pathogen free
TCDC	Technical Cooperation among Developing Countries
TCP	Technical Cooperation Programme
TS	Taura syndrome
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNU-FTP	United Nations University Fisheries Training Program
USP	University of the South Pacific
USSR	Union of Soviet Socialist Republics
VAC	integrated garden (V), fishpond (A) and livestock (C) system (VAC in Vietnamese is *vuon, ao, chuong*, which means garden, pond and livestock)
VASEP	Vietnam Association for Sea Food Exports
VNN	viral nervous necrosis
WB	World Bank
WSD	white spot disease
WTD	white tail disease
WWF	World Wide Fund for Nature

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EXECUTIVE SUMMARY

The Asia-Pacific region[1] contributes the major share to global food fish supply from farming; China continues to be the biggest producer. It and seven other countries in the region (India, Indonesia, Thailand, Viet Nam, Bangladesh, the Philippines and Myanmar) are in the top-ten ranked aquaculture producers in volume and value. The region has a high rate of food fish consumption, estimated at 29 kg per person per year. To maintain this level for the next three decades would require producing an additional 30 to 40 million tonnes of fish per year by 2050 to meet the demand from a growing population. It has demonstrated the capacity to do so; during this decade many of the countries have produced more food fish from aquaculture than from capture fisheries, and all six countries (China, India, Indonesia, Thailand, Viet Nam and Bangladesh) that have attained a production level of more than one million tonnes a year are in the region.

Aquaculture systems and species are diverse in the region, but the bulk of its food fish output comes from a few species groups that include cyprinids, tilapias and catfish. All three comprise freshwater species bred in hatcheries, feeding low in the trophic chain and cultured mostly in pond systems. The culture of marine finfish, raised mostly in small floating cages that are located in protected inshore waters is seen to grow rapidly. Large offshore operations using higher-technology cages have begun and are now adding to marine fish output; however, for technical reasons they are not expected to become widely adopted. The region remains the biggest producer of marine shrimp, now consisting mostly of whiteleg shrimp (*Litopenaeus vannamei*), a Latin American species introduced towards the end of the 1990s.. The production of aquatic plants for food, mostly in China and East Asia, is stable, whereas production of aquatic plants for biopolymer, largely in Southeast Asia, is increasingly driven by a rising world demand. Mollusc production is generally stable but has decreased in some countries. There are a growing number and volume of niche species.

The structure of the sector in much of the region is characterized by the predominance of small-scale independent farms distributed over wide areas and until recently, largely unorganized. The market is also fragmented. These make the management of its development complicated and underlines the importance of a strong progressive governance system. Improvements in the governance mechanism have been felt during the past decade, as indicated by fewer conflicts over resources and effluent discharges to public waters, reduction in crop losses from disease, and fewer non-tariff trade barriers faced by shrimp exports. These are largely the outcome of the sector becoming better regulated by a mix of command and control, market-based and voluntary management measures. Organized farmers adopting better management practices (BMPs) have been the key to this progress. The major driver has been market access; although small-scale, almost all of the farms in the region are geared towards producing part or all of the crop to sell to the neighbourhood, the local market or the world. Concerns for food safety and quality have heightened, largely driven by a more health and quality-conscious public whose purchasing power is becoming stronger. This has been abetted by the growth in coverage and influence of the modern retail chains. This pressure to produce safe and healthy products in an environmentally responsible way has come from buyers, regulators, civil society and the mass media, transmitted through trade.

Environmental and social issues persist. At the top of the causes of adverse public perception are the feeding of fish with fish and pollution. Substitutes for fish oil and low-value fish (fed directly or as fishmeal) are being developed and tested to mitigate the first issue. Better water and feeding management are helping lessen the volume and organic content of effluent. The region, as with the rest of the world, has shied from transgenics, but it has made effective use of biotechnology products such as vaccines, and of procedures particularly polymerase chain reaction (PCR), for health management.

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[1] The regional scope of this review includes countries in the Southeast, South and East Asia, Central Asia and Oceania. "Oceania" comprises Australia, New Zealand, Papua New Guinea and the Pacific Island countries and territories. The section on production trends has a group "Other Asia" which consists of some nations from East Asia (Japan, Democratic People's Republic of Korea, Republic of Korea and Mongolia), some from Central Asia (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan) and the Islamic Republic of Iran.

Happily, the destruction of mangroves is now much less of an issue. The ecological and genetic biodiversity impacts of the introduction and transfer of species for culture across borders remain a deep concern among scientists but still needing incontrovertible proof that it has happened, except with the Mozambique tilapia (*Oreochromis mossambicus*) which was introduced into the Asia-Pacific region in the 1950s and has become a pest in fresh and brackishwater pond culture systems almost everywhere in the Pacific and in some areas in Southeast Asia. That said, most other introduced species developed for aquaculture have boosted productivity and profitability of farms and have not shown evidence of adverse impacts on biodiversity or the environment, except for a few ornamental fish and the golden apple snail. A slightly different issue is the positive impact of aquaculture on the conservation of marine species and protection of their marine habitats, mainly the coral reefs. This has to do with the increasing use of hatchery-bred seed of some of the species for the live food fish trade. Complete reliance on hatchery-reared seed would in the future likely abate harvesting methods that are destructive to marine life and reefs.

Shrimp continues to be an important earner of foreign exchange for many countries. Tilapia exports are increasing in volume, and the pangasiid catfishes (striped/tra catfish, *Pangasianodon hypophthalmus,* and basa catfish, *Pangasius bocourti*), whose sole supplier to the word market is Viet Nam, has entrenched its primacy in major European markets and the United States of America, despite a number of non-tariff barriers to its trade and adverse publicity. The spectacular growth of catfish aquaculture was not predicted, yet it has yielded a rich vein of lessons in policy, technology application, farm management, and marketing and trade. The core of the lesson lies in its being a relatively low-value fish that small farmers are able to culture at high intensity with yields that no other culture system has come close to achieving, and then its dominance of the markets for white fish in the west. Likewise, many of the achievements in aquaculture development in the region and the process by which they were achieved, the strategies followed and the tools used can be instructive for policy-makers, programme planners, scientists and technologists, advisers to farmers and students. They have not been easy nor cheap to carry out. This review also describes the constraints and adversities that the sector has faced, the setbacks it has suffered and the ways and means to overcome them. A short selection of cases illustrates some factors of success.

The region has done its part in implementing all of the 17 action recommendations put forward in the Bangkok Declaration and Strategy. A broad assessment would rate overall performance at above average. This was largely helped by the presence of active regional indigenous organizations, which jointly or individually, often with the technical and/or financial support of international agencies, implemented programmes inspired by the Declaration.

The best achievements were made in aquatic animal health management, pro-poor livelihood oriented aquaculture, small farmer development and inter-regional cooperation. Environmental responsibility is above average, largely due to the wider adoption of better management practices (BMPs) and codes of conduct (CoCs).

Although social responsibility cannot be separated from environmental responsibility, it does have one distinct element, labour. It is difficult to assess this aspect of the region's performance. The antidumping charges that have been leveled on shrimp and pangasiid catfish exports include this issue. It remains contentious and needs closer and dispassionate study. As to the complaint that the charges of social dumping are without science-based evidence or based on isolated cases, the sector could do well to provide its own evidence. The answer could come from the higher productivity, better access to market and more favourable image gained by the shrimp farming sector from having adopted BMPs and adhering to standards. The latter provides measurable evidence of responsibility in farming. The bigger implication for Asian aquaculture is whether its competitiveness has been helped by low-cost labor and, if the answer is yes, whether this is sustainable. As a corollary, should labour cost increase for any reason, what strategies could the sector adopt to remain viable and competitive? Greater efficiency of farming is one, value addition is another. The region employs 92 percent of the world's estimated 23 million direct and indirect labour for aquaculture. However, its productivity is very low, and it takes almost three direct jobs to create one indirect employment. The former reflects a low

labour efficiency and the latter a short market chain and little value addition along the chain. Innovations in farm management, logistics and technology are always a reliable option, but improvement of skills to increase labour efficiency and productivity should not be overlooked. This has to be delicately balanced with the need to create employment rather than reduce the need for workers, as a growing number of people are entering the labour force in almost every country in the region.

Marketing and trade would be scored above average, not because of the increase in trade flow from the region to the traditional major markets, the European Union (EU), Japan and the United States of America, but because of the higher awareness and adoption of food safety and quality standards. Risk management has shown mixed results. Prevention and mitigation of the impacts of biological risks (mainly from pathogens) have been met well by a systematic regional health programme. The risks to biodiversity are being addressed with a regional genetic and biodiversity programme which was the offshoot of an initiative that assessed the impacts of alien and introduced species. However, market-based insurance to enable especially the small farmers to mitigate or cope with the many and increasingly severe perils to their crop and farm assets is yet to gain headway. A regional initiative on insurance for small farmers has raised awareness and spurred a few activities, but with little progress so far.

Policy support to sustainable development rates an above average mark, with the widespread formulation, enactment and strengthening of policy and development plans for aquaculture and the enabling regulatory measures. This is region-wide, with the Pacific Island countries and territories (PICTs) to the Central Asian Republics (CAR) recently adopting national as well as regional aquaculture development policies and plans. Achievements have not been widespread in the three other basic supports to sustainable aquaculture development – education, research, and information. Manpower development has continued at a steady pace via academic training and specialized short courses. The programmes were geared to improving the culture of specific commodities and strengthening specialized support services such as health management, risk management, breeding, molecular genetics and environmental management. Personnel exchanges between Asia and other regions and within the Asian region proceeded at a steady pace.

Research did not enjoy a surge in investments from national, private and international sources. There have been very few breakthrough innovations (other than genetically improved farmed tilapia (GIFT) and no recent results that would advance the genetic potential of any species for culture), although a notable shift is the broadening of focus from productivity to the inclusion of environmental and social issues. As in other economic sectors, information development and exchange have been facilitated by the new information and communication technologies (ICT), and some innovative farmer-oriented communication and marketing strategies have been piloted using ICT. However, this has yet to spread, and extension is still largely carried out using the traditional approaches with little investment to improve the capabilities of aquaculture extension workers or agencies. Capacities for statistics and information collection, analysis and dissemination are strong in many countries but need improvement in most of the Pacific Island and Central Asian countries.

The core issue of the vast and diverse aquaculture sector of the region is the sustainability of the small-scale farmers that compose most of it. During this decade, governing the sector has gradually moved from compelling farmers to become responsible to providing them with the incentive to produce more with a higher sense of environmental and social responsibility. This needed a nuanced redirection of policy: BMPs, CoCs and market-based incentives began to be more frequently used for sector management and farmer motivation, whereas legal instruments were kept in the background but firmly enforced when needed. To make this governance framework effective, the capacity to provide technical services and management advice to farmers, and the farmers' capacity – by being trained and organized – to make effective use of these, were improved. This, the most important set of strategic lessons that the region has learned during the past two decades, has been internalized in this decade. It should spread and become institutionalized in all the countries.