Current Trends in Aquaculture Production

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Abstract— The present paper highlights the recent development in aquaculture production in India. Recent FAO data indicate that world aquaculture production includes 80 million tonnes of farmed food fish with major contribution continuing from Chinese carps and tilapia. In shellfish production, major contributors include whiteleg shrimp and cupped oysters production. Asia accounts for more than 85 percent of world aquaculture production, and the major producers include China, India, Indonesia, Vietnam and Bangladesh. The three Indian major carps contribute bulk of the Indian aquaculture production. In recent years, cage culture of marine fish has been promoted in India. Globally, an increase in the availability of genomic information of farmed fish and technological advancement in the aquaculture production systems are likely to contribute in the aquaculture development in India.

Keywords: Aquaculture Production, Finfish, Shellfish, FAO

I. INTRODUCTION

With capture fishery production relatively stagnant since 1980s, world aquaculture production has been responsible for the continuing positive growth in fish production (FAO, 2016). World fish production peaked at about 171 million tonnes in 2016, with aquaculture representing 47 percent of the total. World aquaculture production in 2016 included 80 million tonnes of farmed food fish and 30.1 million tonnes of farmed aquatic plants, mainly represented by seaweeds. Farmed finfish production included 54.1 million tonnes; shellfish included 7.9 million tonnes of crustaceans and 17.1 million tonnes of molluscs, respectively (FAO, 2018). The top ten finfish species contributing to world aquaculture production include grass carp, silver carp, common carp, Nile tilapia, bighead carp, crucian carps, catla, freshwater fish of the genus Osteichthyes, Atlantic salmon, and rohu. The major farmed crustacean species include whiteleg shrimp, red swamp crawfish, Chinese mitten crab, giant tiger prawn, oriental river prawn and giant river prawn. Among the above, farmed marine shrimps dominate the production, with farming activities undertaken in coastal and inland waters. The major farmed molluscan species include cupped oysters, Japanese carpet shell, and scallops, farming primarily undertaken in coastal waters. World aquaculture production of molluscs is contributed by mussels, clams, scallops, oysters and, to a lesser extent, abalone (FAO, 2016, 2018). Asia has accounted for more than 85 percent of world aquaculture production. The major producers of farmed fish production included China, India, Indonesia, Vietnam, Bangladesh, Egypt and Norway. Level of overall aquaculture development varies greatly among geographical regions. Particularly, marine fish farming is dominated by developed countries with inland dominated by developing countries. The rapid growth in this region has been driven by a variety of factors, including pre-existing aquaculture practices, population and economic growth, relaxed regulatory framework and expanding export opportunities (Bostock et al., 2010).

In India, aquaculture has now emerged as the main way forward in sustaining fisheries production and augmenting fishery resources and is integral to the economies of many Indian states, providing livelihood security to rural population in coastal communities. This has relieved pressure on capture fisheries, harvest of wild stock from lakes, rivers, oceans and other open-water resources (Leena Nair, 2014). Carp in freshwater and shrimp in brackishwater form the major areas of activity in Indian aquaculture. The three Indian major carps, viz. catla, rohu, and mrigal contribute bulk of the production, and the three domesticated exotic carps such as silver carp, grass carp and common carp form second important group. Several other medium and minor carps are used in the carp polyculture system because of their high consumer preference, higher market demand, and growth potential in farming system. Among the cultivable freshwater prawns, the giant river prawn forms an important species. Slow growth rate, poor survival, disease outbreaks and increase in cost of production has necessitated development of genetically improved finfish and shellfish for aquaculture. In recent years, use of genetically improved fish varieties like GIFT tilapia, Amur strain of common carp and Jayanti rohu are utilized for freshwater finfish farming in India (WorldFish centre, 204; Basavaraju et al., 2005; Das Mahapatra et al., 2007). Also, encouraging results have been demonstrated in genetic improvement of freshwater prawn in India (Pillai et al., 2011). The commercial brackishwater farming is confined to whiteleg shrimp. In addition, there are a number of shellfish species, viz. giant tiger prawn, Indian white prawn etc. and finfish species like Asian seabss, milkfish, grey mullet, pearlspot, and mud crabs. Mariculture activities include cage fish farming, bivalve farming, and seaweed culture. Green mussel, brown mussel, Indian backwater oyster, golden pearl oyster, crab and lobster fattening formed the major component of mariculture. In recent years, cage culture of grouper, cobia, pompano, snapper, and rabbitfish has been initiated in coastal areas, and likely to contribute for development of coastal aquaculture and mariculture in India (Ranjan et al., 2017). Presently, there are 429 fish farmers development agencies (FFDAs) and 39 brackishwater fish farmers development agencies (BFDAs) for promoting freshwater and coastal aquaculture in India (Ghoshal et al., 2019).

With a rich diversity of freshwater, brackishwater and marine ornamental fish, India has great potential in ornamental fish production due to the presence of rich species biodiversity and favourable climatic condition. Recently, breeding technology for several species has been developed and scope for further development possible through the use of advanced hatchery techniques such as enriched live feeds, recirculatory aquaculture systems, and improved farming systems (CMFRI, 2018). In India, marine ornamental fish species diversity is rich in the reef area of Andaman and

Nicobar Islands, Lakshadweep Islands, Gulf of Mannar and Gulf of Kutch. Freshwater ornamental fish resources are rich in the rivers and streams of the Western ghats and North East India. Recently, to boost the ornamental fish production, Fisheries Division of Indian Council of Agricultural Research has initiated a network project.

With the introduction of exotic fish and shellfish species and improvement in farming systems, Indian aquaculture production has grown steadily in recent past. For aquaculture diversification, and enhancing the fish production, the Government of India has also released the guidelines for "Responsible Farming of tilapia in India" and "Cage culture of fish in inland open water bodies" (nfdb.gov.in). Following these guidelines, there has been a noteworthy expansion, and much of this development has been taken place in Andhra Pradesh, Odisha, West Bengal, Karnataka, Tamil Nadu and Punjab. Besides, use of modern aquaculture technologies has made rapid growth in Andhra Pradesh, Odisha, Tamil Nadu, West Bengal, Bihar, Chhattisgarh, and Jharkhand (Mishra et al., 2017).

Aquaculture is growing at the pace of 4.5 % annually, contributing to national income, employment generation and foreign exchange. In recent years, freshwater and brackishwater aquaculture sector contributed to the economy and livelihood security of the peoples living in close vicinity in the sundarbans, an ecologically sensitive area of West Bengal (Sundaray et al., 2019). Similar development for freshwater fish farmers of dry regions of India can be undertaken. The Rajiv Gandhi Centre for Aquaculture has successfully developed technology for production of year round quality seeds of seabass, mud crab, GIFT tilapia, cobia and silver pompano in the hatcheries. Use of recirculation aquaculture systems, promotion of cage farming, and modification in existing semi-intensive farming systems are likely to boost aquaculture production in India. Additionally, adoption of pond based raceways, aquaponics and integrated multitrophic aquaculture systems, followed widely in other developed countries would contribute to increased aquaculture production. Recently, expression of interest invited jointly by MPEDA-RGCA-NFDB for establishing finfish and shellfish hatcheries for diversified aquaculture species by the private aquaculture entrepreneurs (rgca.org.in). These initiatives are likely to increase the aquaculture production in India. Globally, an increase in access of genomic information of farmed fish, technological advances in fish farming, and improvement in existing seed production systems, are likely to contribute for increased world aquaculture production.

Tamil Nadu is one of the leading states in aquaculture production with different types of aquatic resources like marine, freshwater, brackishwater, riverine stretches and coldwater streams. In the policy note of fisheries (Policy note, 2018-2019), Govt. of Tamil Nadu has announced several new schemes for the promotion of fisheries and aquaculture in the state. In addition to previously developed technologies by Tamil Nadu Dr. J. Jayalalithaa Fisheries University, Nagapattinam, recently an ornamental fish park was established at Madhavaram campus to promote ornamental fish farming. Recently, Government of India established Department of Fisheries from erstwhile Department of Animal Husbandry, Dairying and Fisheries for the development of fisheries and aquaculture in India. Overall, recent developments indicate positive trend in the Indian aquaculture production.

REFERENCES

[1] Basavaraju, Y., Penman, D.J., Graham, M., 2005. Stock evaluation and development of a breeding program for common carp (Cyprinus carpio) in Karnataka, India: progress of a research project.
[2] Bostock, J., McAndrew, B., Richards, R., Jauncey, K., Telfer, T., Lorenzen, K., Little, D., Ross, L., Handisyde, N., Gatward, I., Corner, R., 2010. Philosophical Transactions of the Royal Society 365: 2897–2912.
[3] CMFRI 2018. Annual Report 2017-18. Central Marine Fisheries Research Institute, Kochi. 304 p
[4] Das Mahapatra, K., Saha, J.N., Sarangi, N., Jana, R.K.,Gjerde, B., Nguyen, N.H., Khaw, H.L., Ponzoni, R., 2007. Genetic improvement and dissemination of rohu (Labeo rohita) in India. In Proceedings of the seventeenth conference of the Association for the advancement of animal breeding and genetics.
[5] FAO, 2016. The State of World Fisheries and Aquaculture 2018 – Contributing to food security and nutrition for all. Rome. 200 pp.
[6] FAO, 2018. The State of World Fisheries and Aquaculture 2018 - Meeting the sustainable development goals. Rome. 200 pp.
[7] Ghoshal, T.K., Debasis, De, Biswas, G., Prem Kumar, Vijayan, K.K., 2019. Brackishwater aquaculture: opportunities and challenges for meeting livelihood demand in Indian Sundarbans: Increasing livelihood security. 10.1007/978-3-030-00680-8_11.
[8] Leena Nair, 2014. Emerging trends in indian aquaculture. Journal of Aquatic Biology and Fisheries, Vol. 2(1) 2014: 1-5.
[9] Mishra, S.S., Das, R., Das, B.K., Choudhary, P., Rathod, R., Giri, B.S., Debbarma, J., Sahoo, S.N., Barua, A., Sahu, A., Patil, P.K., Swain, P., 2017. Status of Aqua-medicines, drugs and chemicals use in India: A survey report. Journal of Aquaculture and Fisheries 1: 1-15.
[10] Pillai, B.R., Mahapatra, K.D., Ponzoni, R.W., Sahoo, L., Lalrinsanga, P.L., Nguyen, N.H., Mohanty, S., Sahu, S., Vijakuman, Sahu, S., Khaw, H.L., Patra, G., Patnaik, S., Rath, S., 2011. Genetic evaluation of a complete diallel cross involving three populations of freshwater prawn (Macrobrachium rosenbergii) from different geographical regions of India. Aquaculture 319: 347-354.
[11] Policy note, 2018-2019. Fisheries, Department of animal husbandry, dairying and fisheries, Minister for fisheries, Govt. of Tamil Nadu.
[12] Ranjan, R., Muktha, M., Ghosh, S., Gopalakrishnan, A., Gopakumar, G., Joseph, I. (Eds.)., 2017. Prioritized species for mariculture in India. ICAR-CMFRI, Kochi. 450 pp.
[13] Sundaray, J.K., Chakrabarti, P. P., Mohapatra, B.C., Hoque, F., 2019. Freshwater aquaculture in sundarbans India: increasing livelihood security. 10.1007/978-3-030-00680-8_10.

[14] WorldFish Centre, 2004. GIFT technology manual: an aid to tilapia selective breeding. WorldFish Centre, Penang, Malaysia, 56 p.
[15] †Information on recent developments mentioned in the text was obtained from the ICAR institutional websites.

