

Organic fish farming:

a pioneer approach towards sustainable fish farming

Rajinder Kaur¹ and Tarang Kumar Shah²

Govind Ballabh Pant University of Agriculture and Technology, Pantnagar (Uttarakhand) 263 145

For Organic Agriculture, USDA's National Organic Standards Board presented a definition in 1995, 'Organic agriculture is an ecological production management system that promotes and enhances biodiversity, biological-cycles and soil-biological activity. It is based on minimal use of off-farm inputs and on management practices that restore, maintain and enhance ecological harmony'. The principal guidelines for organic production are to use materials and practices that enhances the ecological balance of natural systems and that integrate the parts of the farming system into an ecological whole.

Key words: Fish farming, Organic, Sustainable

ORGANIC AQUACULTURE is the farming of aquatic animals like shrimp, fishes, bivalves etc. and aquatic plants without using antibiotics, chemicals, and fertilizers by preserving the ecosystem and biodiversity. Organic aquaculture is a holistic system designed to optimise the productivity and fitness of the aquatic ecosystem including both flora and fauna. Organic refers to 'eco-friendly' method of farming and processing foods. It prohibits the use of chemotherapeutics, herbicides, genetically modified organisms and supplementary feeding is allowed only from organically certified inputs. Fish produced under natural conditions according to the organic agricultural principles should not be exposed to any protective additives and should not be subjected to genetic modifications and certified by a control agency is called a 'organic fish'.

Principles

There are four main principles of Organic farming according to the International Federation of Organic Agricultural Movement principles on which organic farming

is based on are as follows:

The principle of health: This emphasizes on the important of healthy soil and water. If the soil is healthy so it will grow healthy crops which will lead to healthy animals as well. Finally the humans will be health by consuming the healthy products.

The principle of ecology: According to this principle, production of crops and animals should be based on the land that is nutrients enriched. The main objective of this principle is to attain ecological balance through the farming so it focuses on recycling.

The principle of fairness: Organic farming is a strong supporter of fairness. Fairness means equity, respect, care and justice. This principle emphasize on the relationship fairness at each and every level and to all groups such as farmers, processors, distributors, suppliers and consumers. Every group should assure this that they will never harm the environment, soil, water, animals or any other thing this is the basic objective of fairness principle.

The principle of care: This is another important principle of

organic farming. To achieve all the above goals, it is essential to take good care of land and whole environment. This principle emphasized on responsibility that it is our responsibility to protect the land and environment from hazardous substances. Without this, it is impossible to achieve any of the other goals. So this is the last and the most important principle.

History

Organic fish production started with the certification of carp in the year 1994. Further attempts were made in Salmon and Rainbow trout in England in 1995-1998. Since then, the important species that have been organically cultured were Atlantic salmon, shrimp, carp, rainbow trout, seabass, mussel, tilapia, *Pangassius*, macro-algae etc. Table 1.

Organic production in aquaculture

In China, certified organic aquaculture operations (72) received the national Chinese regulation. In Europe, the lead product in organic aquaculture is Atlantic Salmon, followed by the Mediterranean species Seabass and Seabream,

freshwater salmonids (Rainbow and Brown Trout and charr species), and carp. In other Asian countries, there is an increasing organic production of Black Tiger Shrimp (e.g. Bangladesh, India, Thailand and Vietnam), *Pangasius* catfish (e.g. Vietnam) and micro-algae (e.g. India). Globally, organic aquaculture is limited to trout, shrimp and salmon contributing 36%, 18% and 14% respectively.

Species in organic aquaculture production

The number of species from organic aquaculture has increased from 4 species in 2000 to around 30 species in 2009, including at least 15 finfish species, 6 crustacean species, at least 1 molluscan species, 1 holothurian, 1 turtle, and at least 4 species of microalgae. By species, salmon had the highest production of 16,000 tonne/year in 2008, followed by 'shrimp' (combining *Litopenaeus vannamei* and *Penaeus monodon*) with 8 800 tonne/year and common carp with 7,200 tonne/year.

The main fish species in organic

aquaculture are 'carp', 'trout', Atlantic salmon, 'pangasius', 'tilapia', 'seabream', European seabass (*Dicentrarchus labrax*), meagre (*Argyrosomus regius*) and red drum (*Sciaenops ocellatus*). The main species of shellfish are white leg shrimp (*L. vannamei*), giant tiger prawn (*P. monodon*), pink shrimp (*Metapenaeus ensis*), giant river prawn (*Macrobrachium rosenbergii*), blue mussel (*Mytilus edulis*) and Chilean mussel (*M. chilensis*). The three species with the largest production volumes are Atlantic salmon, 'shrimp', and 'Pangasius'.

Organic certification and standards

Organic certification is necessary to prove that your produce is organic in nature. There are no tests to distinguish between organic and non-organic food and hence a certification remains the only way of proving that your produce is organic. In such a scenario, it is necessary to know which agencies provide organic certifications. Certified 'Organic' assures that products were produced and/or processed under conditions

Table 1. Production of organic aquaculture products year-wise across the world in last decade.

Year	Products (tonnes)
2000	10,000
2003	20,500
2004	30,000
2005	40,000
2008	50,000
2010	53,000

required by National Standards and/or International standards for organic production. Standards are guidelines for the management of the whole production process, including post-harvest and sometimes social aspects.

Certifications are designed to regulate and expedite the production and sale of organically raised food to consumers. Each individual certification has a distinct service mark, and organic businesses often use their certifications to their marketing advantage. Organic products that are produced for export are often certified by agencies from the importing countries.

Scope of organic aquaculture in India

In India, the first trial on organic farming of freshwater prawns was initiated by MPEDA in Kuttanad in 2008. It adopted the organic prawn farming standards from Naturland, Germany and Indocert from India. Similarly National Centre for Sustainable Aquaculture (NaCSA) and Indian Organic Aquaculture Project; MPEDA took up a project of organic freshwater prawn farming in 5 societies of West Godavari district of Andhra Pradesh during 2009-2010. In north-eastern hills region in experimental level organic products were developed under the guidance of IOAP.

Indian Organic Certification Agency (INDOCERT) is a nationally and internationally operating, certification body established in India for the organic products certification. Hilly areas are having a high potential for the organic fish farming as these areas are less polluted and more suitable for the organic production. The north eastern hills region of India is identified as the potential zone of organic fish production because of two main reasons- thin population density and

Table 1. History of Organic Aquaculture

Year	Species	Country	Certifying organization
1994	Common carp (<i>Cyprinus carpio</i>)	Austria	Germany
1995	Atlantic salmon (<i>Salmo salar</i>)	Ireland	Naturland
1997	Organic aquaculture standard	Australia	National Association for Sustainable Agriculture, Australia
1998	Atlantic salmon	United Kingdom	Soil Association
1999	Shrimp (Penaeidae)	Ecuador	Naturland and GTZ
1999	Blue mussel (<i>Mytilus edulis</i>)	Ireland	
2000	Organic aquaculture standard	United Kingdom	
2000	Organic aquaculture standard	France	Agriculture Biologique
2000	Giant tiger prawn (<i>Penaeus monodon</i>) small-scale farmer groups	Vietnam	Naturland and SIPPO
2001	Basic organic aquaculture standards	Global	IFOAM
2001	Organic aquaculture standards	Australia	
2002	Tilapia (not species specific)	Israel	Naturland
2003	Aquaculture Group formed	Global	IFOAM
2004	Organic aquaculture standards	Denmark	Okologisk
2005	Organic aquaculture standards	China	
2005	Gilthead seabream (<i>Sparus aurata</i>)	France	
2005	Microalgae	Taiwan POC	
2005	Atlantic cod (<i>Gadus morhua</i>)	United Kingdom	
2005	Ban on labelling of organic seafood	California	USA State
2006	"Pangasius" (striped catfish, <i>Pangaslanodon hypophthalmus</i>)	Vietnam	Naturland and GTZ
2009	Organic aquaculture legislation	EU	CEC

*CEC, Commission of the European Communities; GTZ, Deutsche Gesellschaft für Technische Zusammenarbeit; IFOAM, International Federation of Organic Aquaculture Movements; SIPPO, Swiss Import Promotion Programme.

negligible use of inorganic inputs. In this region grass carp is widely cultured because of wide temperature tolerance. Organically grown *Azolla* is used as feed for producing organic fish. Organic fish has got good market value varying between US\$ 1.28 and US\$ 1.70/kg.

Organic scampi aquaculture in Andhra Pradesh

The National Centre for Sustainable Aquaculture, and India Organic Aquaculture Project, MPEDA took up organic fresh water prawn (*M. rosenbergii*) farming in two societies of West Godavari District of Andhra Pradesh. A total of 27 farmers, from Sri Venkateswara Aqua Farmers Welfare Society, Matsyapuri, and Sri Sainadha Aqua Farmers Welfare Society, Velivela were involved in the project covering 31 ha area. As the organic concept is new to the farmers, a series of awareness meetings were organized with the societies. In two of such meetings the consultant for the project Mr Mathias Krebs from Blueyou, Germany also took part.

Challenges: These include absence of universally accepted standards; the rules may vary between different countries or certification bodies; lengthy procedure for certification and the expenses incurred in the process; difficulty of sourcing and certifying organic juveniles; lack of government involvement and marketing institution towards effort for export, overseas certification process etc; organic farming is a time taking process, which is a bit slow in showing the result and thus making the process less favourite to farmers; and the organic products are quite expensive for common people to afford.

S WOT analysis for shaping the feasibility of organic aquaculture in India

Strengths: These include

Table 2. Top 10 Organic Certificates Worldwide

Name of the certification organization	Remarks
United States Department of Agriculture (USDA) Organic Certification	USA
Quality Assurance International (QAI)	US, Canada, the EU, Japan, and Latin America
Nature's International Certification Services (NICS)	World wide
EU Organic Certification	EU
SCS Global Certificate	One of the first agencies to be accredited by the USDA.
International Federation of Organic Agriculture Movements Certification (IFOAM)	First organic certification requirements in 1992
The Organic Materials Review Institute (OMRI) Certification	Commonly used for branding purposes
California Certified Organic Farmers (CCOF) Certification	Export organic products internationally.
Ecocert Certification	Over 80 countries
EarthKosher Certification	Europe and North America.

availability of herbivore species; practice to extensive farming is closer to organic; availability of plant sources as a substitute for fish meal; privilege of being the first producer of organic scampi; availability of organic seed and feed, and presence of suitable land for organic farming in eastern india.

Weakness: These include economic feasibility of organic fish production not secure, organic aquaculture not mentioned in existing agricultural policy documents, extension services not so strong, non-availability of standard and easy protocol for organic certification.

Opportunities: These include growing demand for fish as food, rising demand for organic products, and sea food considered healthier.

Threats: These include lack of government support, and freshwater pollution.

SUMMARY

Organic fish farming is a new concept and is still in the early stages of development and strives to re-establish a proper balance in aquaculture systems, for the benefit of fisheries, environment and the consumers. Organic fish farming

systems and standards that define them are likely to witness considerable evolution and refinement over the years. Nutrient cycling within closed systems, following the law of return, is a central organic principle. By exploring the strength and opportunities mentioned in the SWOT analysis and solving the threats and weaknesses would pave way for organic aquaculture to be a new revolution towards the sustainable fisheries in India and rest of the world.

Many organic aquaculture issues still need to be resolved. Steps should be taken to encourage and enhance the biological cycles with respect to nutrients management and to retain the integrity of the organic product from farmer to consumer and conversion requirement for moving conventional aquaculture system into organic system.

¹Assistant Scientist, Department of Aquaculture, College of Fisheries, GADVAS, Ludhiana (Punjab) 141 004. ²Ph.D. Scholar, Department of Aquaculture, College of Fisheries, GBPUA&T, Pantnagar, Uttarakhand.

Corresponding author's e mail: kunnushah4545@gmail.com



*Plant trees, Conserve water,
Protect environment.*

