

Aquaculture in India – growing a new industry

India's marine food exports rose from USD 1.64 billion in 2009/10 to USD 4.95 billion in 2013/14. Most of this growth stemmed from aquaculture – an industry set to advance.



Increasing domestic and foreign demand is fuelling expansion of India's aquaculture industry. Stronger commercial orientation is also driving change. Cooperatives and farmers' associations now need credit to build their business.

Banks are reluctant to lend, however, because risks threaten to hamper fish farmers' ability to service their loans.

Disease can kill shrimp, algae blooms can suffocate fish, and typhoons and earthquakes can breach the banks of ponds, washing the harvest into the sea.

The insurance industry must rise to these challenges by providing the protection this nascent industry needs. With its international experience in aquaculture risk management and its underwriting expertise, the insurance industry can help the Indian market realise its full potential.

Aquaculture in India – a story of growth

Aquaculture – the farming of fish, shrimp, algae or shellfish – is the backbone of the fishery industry’s economic success in India. Between 1991-92 and 2012-13 the country’s total fish production more than doubled. India’s export income from this business amounted to USD 4.95 billion in 2014, contributing to the diversification of the Indian fishery industry as a whole.

Given the many risks that it faces, it is amazing that this business is heavily under-insured – both in India and many other parts of the world.

In Ecuador in 1999, the virus known as the White Spot Syndrome caused damage of USD 280.5 million to the shrimp industry. The following year saw the same disease inflict a loss for the country of USD 400 million.

White Spot Syndrome also hit India and Bangladesh in the early nineties. Today, shrimp farming in these countries is five times the size of what it was then, increasing the impact of an epidemic considerably.

Another disease is Early Mortality Syndrome (EMS). Since EMS was first reported in China in 2009, it has spread to Vietnam, Malaysia and Thailand, and now causes annual losses of more than USD 1 billion. EMS outbreaks typically occur within the first 30 days after stocking a newly prepared shrimp pond, and mortality can exceed 70%.

Today, an EMS or a White Spot epidemic in India would have devastating consequences both for the business and for the people it employs.

Aquaculture definition by the Food and Agricultural Organisation

“Aquaculture is understood to mean the farming of aquatic organisms including fish, molluscs, crustaceans and aquatic plants. Farming implies some form of intervention in the rearing process to enhance production, such as regular stocking, feeding, protection from predators, etc.

Farming also implies individual or corporate ownership of the stock being cultivated. For statistical purposes, aquatic organisms, which are harvested by an individual or corporate body, which has owned them throughout their rearing period, contribute to aquaculture. On the other hand, aquatic organisms, which are exploitable by the public as a common property resource, with or without appropriate licenses, count as the harvest of fisheries.

Aquaculture production specifically refers to output from aquaculture activities, which are designated for final harvest for consumption. At this time, harvest for ornamental purposes is not included.”

<http://www.fao.org/fishery/statistics/global-aquaculture-production/en>

Marine and inland fish production

1991 – 92

2447

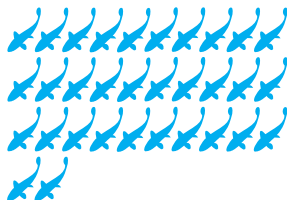


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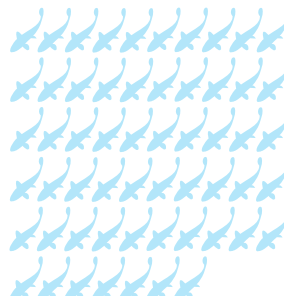


2012 – 13

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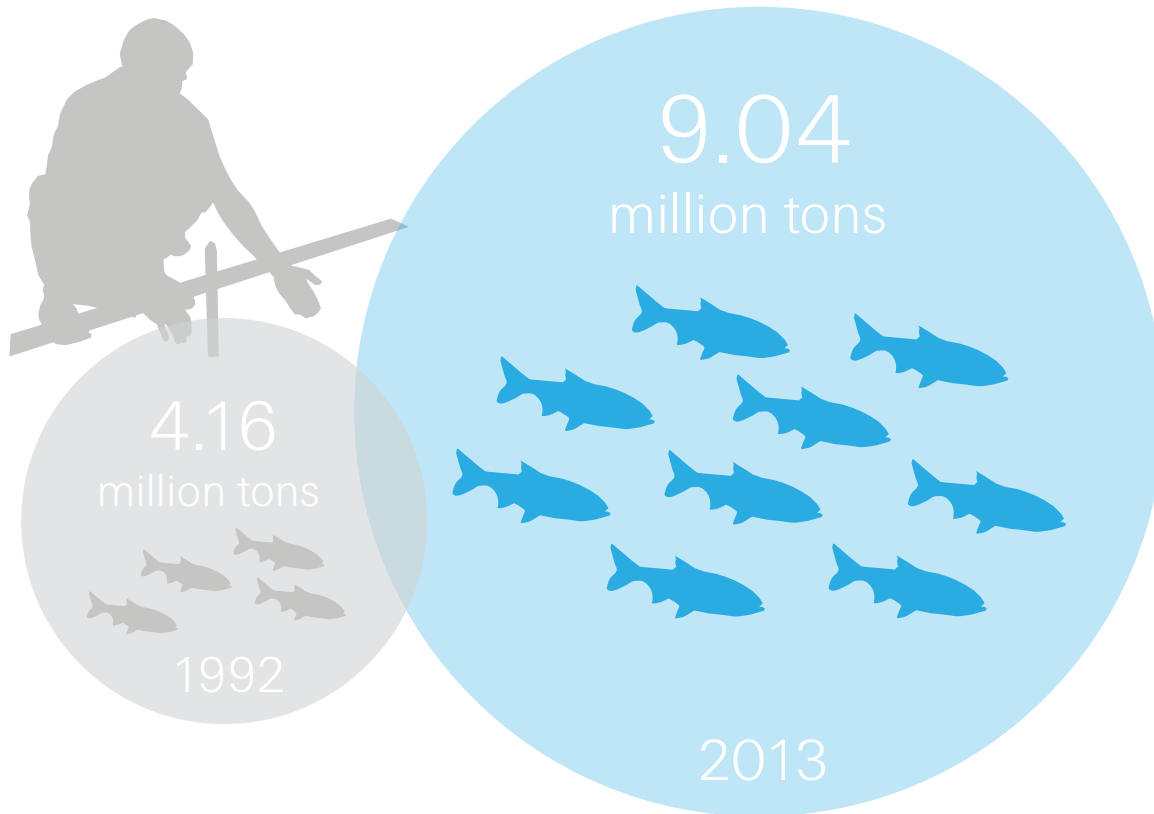
 Marine

 Inland

 Values in '000 tons

A story of growth

Marine and farm fish harvests have more than doubled



A 2006-08 assessment put potential losses due to shrimp diseases in India at 48.717 metric tonnes of shrimp valued at USD 164.85 million, and employment of 2.15 million man days.

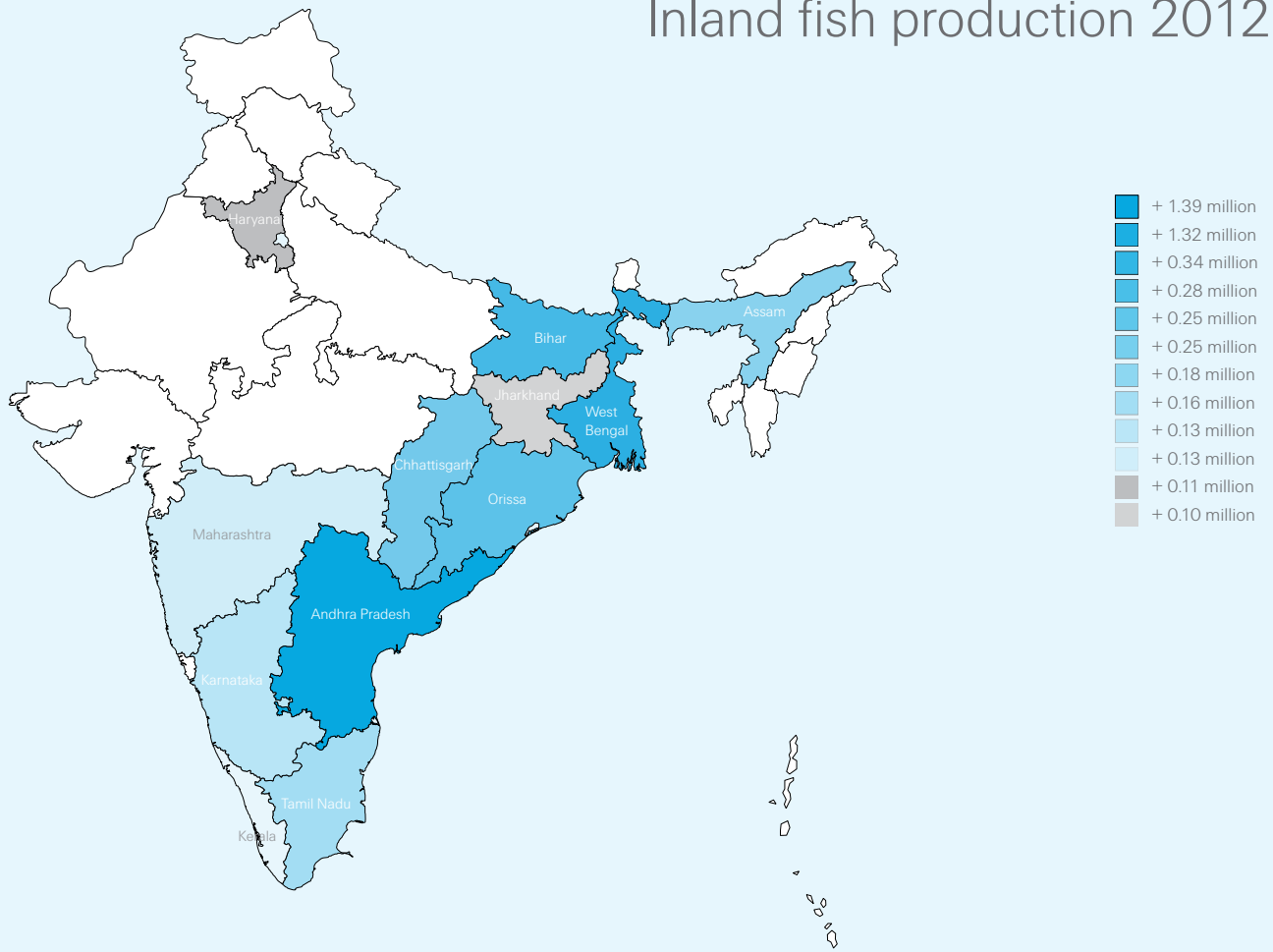
In recent years, fish farming has generated new jobs for many in India. Currently, 14.6 million people make their living from fishing.

Fish farming not only secures economic survival. The protein derived from fish is

also an important part of the diet for many Indians. In addition, fishery and aquaculture diversify food sources, thereby contributing to the sub-continent's food security.

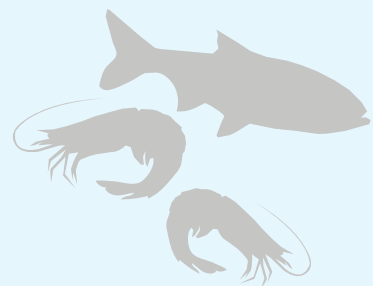
The two main pillars of Indian aquaculture are carp and shrimp farming. Carp accounts for 87% of output and is therefore the industry's most important fish. Shrimp is number two.

Inland fish production 2012



India's global market share
of aquaculture

6.3 %



India's rank in global
aquaculture

2

Aquaculture in India – a story of growth

Carp and shrimp farming is a family business and farm sizes reflect this fact. In shrimp farming, 91 percent of the farms are less than two hectares in size.

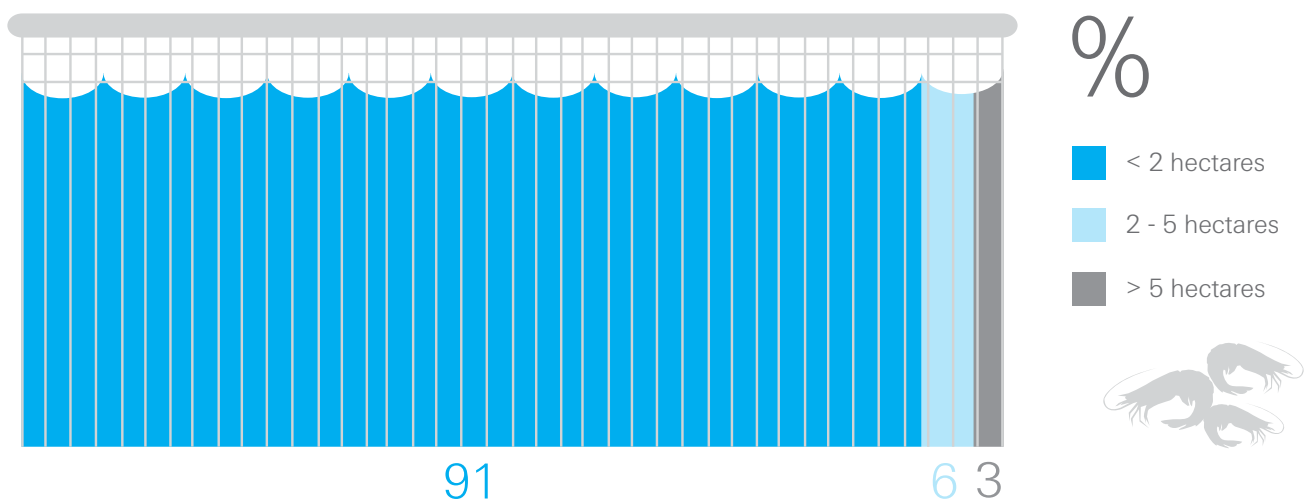
History explains why fish farms are still small and family-run affairs. Farming carp in rice fields and ponds is a century-old tradition in India. Raising exotic carp species in tanks and reservoirs only started in more recent times. Along the coast, trapping juvenile marine fish in coastal wetlands and growing them mirrored the activities taking place further inland.

The same is true for shrimp farming. Raising shrimp in man-made impoundments in the coastal wetlands and salt resistant deep-water rice paddies required little inputs and supplied stable catches. Today, the farming of tiger and white prawns has diversified the business.

Although the industry has grown more than six-fold over the last two decades, there is still room for expansion. Of the 3.56 million hectares currently available, only a third is used. In addition, the over 8 000 km of coastline offer many possibilities to farm oysters and mussels – an opportunity not explored yet on a large scale.

Room for growth and an increasing demand from a rising global population signal rosy prospects for the industry. These will only be met though, if a transition from family to commercial farming takes place. If it is to work, such a development will require research, transferring aquaculture know-how to family farmers and the development of infrastructure around fish farms.

Shrimp farms in India by size



Farming fish – a risky business

India has recognised these facts by establishing a network of 429 Fish Farmers' Development Agencies (FFDA) covering all potential districts and states to propagate freshwater aquaculture. Thirty nine Brackish Farmers Development Agencies (BDFAs) set up in all coastal states and in the Andaman & Nicobar Islands support the activities of the shrimp farmers.

The agencies provide advice, transfer know-how on best farming practices and support business development to help with the transition from subsistence to commercial farming.

This transition also means a changing risk landscape. Larger operations, new species grown and the spread of the trade into new regions with no tradition

in fish farming change boundary conditions for the industry fundamentally.

Fish farming is facing several major risks, the first being all natural-perils related. Heavy monsoon rains can breach the dams around carp ponds or flood them. Fish can escape, and raising fry takes time. At the coast, the same can happen to brackish water ponds if typhoons and storms hit the shores. What is more, this threat is set to increase in the coming decades given the expected sea level rise due to climate change.

Earthquakes are another serious hazard in the area. The tremors can destroy embankments, tank installations and infrastructure necessary for the farms. Tsunamis can roll over low-lying areas



Farming fish – a risky business

along the shore, sweeping away shrimp, prawn, dams, dykes and infrastructure. Debris carried by floods and storm surges into the farm render ponds unusable. Contamination by oil spills or other agents can have the same effect, as the Deepwater Horizon tragedy in the Gulf of Mexico showed.

Another – often overlooked – effect is that water supplies and water temperatures change because of storms and earthquakes. Fractured pipes and channels can curtail water inflow for considerable periods. Temperature sensitivity of fish also comes into play. Most species only thrive at the right temperature and salinity levels. Sudden changes caused by floods can alter these parameters triggering the death of whole shoals.

Even if shrimp, carp or shell food do not die because of a natural disaster, it does weaken them, making them more susceptible to epidemics and diseases. Argulosis is one of the parasitic diseases

that pose a major threat to the freshwater aquaculture industry around the globe. The total loss due to argulosis has been estimated in the region of USD 615 per hectare per year in India. Management of this disease should be given top priority.

While such developments can follow a natural disaster, they can also occur in undisrupted farming activities.

The economic effects of epidemics are severe. Business interruption means loss of income. Restocking and starting up the operation needs capital – which is in short supply if facilities are out of action.

To avoid this fate, good farm management is a must. This will not only minimise the likelihood of epidemics but also help to manage other common risks in aquaculture. These include cannibalism triggered by overcrowding, malnutrition due to feed deficiencies or depletion of stocks by predators or escape.

	Disease	Type of fish/ animal affected	Years	Estimated Losses (USD)
Asia	Epizootic Ulcerative Syndrome	Fresh Water Fish (Carp)	Before 1990	Over 10 million
Western Europe	Viral Hemorrhagic Septicemia Virus	Fresh Water Salmon	Annually	60 million
China	White Spot Syndrome Virus	Shrimp	1993	250 million
India	White Spot Syndrome Virus	Shrimp	1994–1995	120 million
Malaysia	White Spot Syndrome Virus	Shrimp	1995–1999	25 million/year
Bangladesh	White Spot Syndrome Virus	Shrimp	1995	10 millions
Thailand	White Spot Syndrome Virus	Shrimp	1996	210–250 million
			1997	600 million
Ecuador	White Spot Syndrome Virus	Shrimp	1999	280.5 million
			2000	400 million

Source: World Bank Report Analysis

Risk management for aquaculture

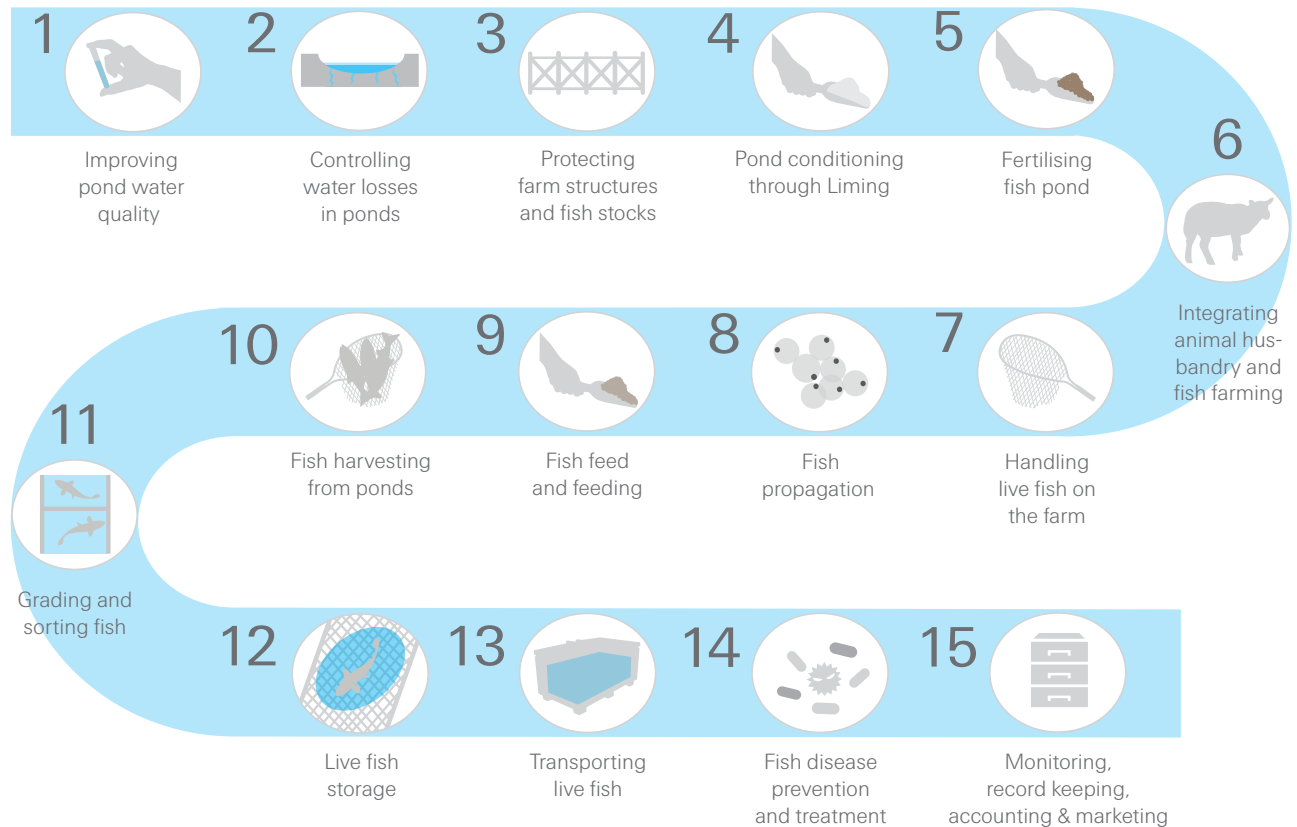
So how can risks in aquaculture be managed? The Food and Agricultural Organization (FAO) published recommendations on “Simple methods for aquaculture”. They provide very useful guidance on water management, fish feeding, fighting disease and protecting farm infrastructure.

India introduced knowledge transfer on risk management practice to farmers following the serious impact of White Spot disease on the country’s shrimp aquaculture in 1995 and 1996, which reached USD 120 million. In addition to the direct cost, other issues surfaced at the same time - most prominently the

overuse of antibiotics in shrimp farming. Antibiotic residue hampered Indian shrimps’ entry into the markets.

To address all these topics, India turned to the FAO’s “Simple methods for aquaculture” and transferred these into Best Management Practices (BMP). State agencies promote them to fish farmers nationwide. The BMP projects have arguably enhanced trust and cooperation among the players in the market chain, which include hatchery owners, farmers and processors/exporters, as well as government agencies and banks.

FAO – Simple methods for aquaculture



Risk management for aquaculture

The enhanced trust had a positive effect on the perception of fishers by financial service providers. Credit institutions now consider organised farmers using BMPs as reliable borrowers. As a result, aquaculture has gained access to low interest production loans. Evidence to support this is the recent decision of the State Bank of India (SBI) to extend collateral-free crop loans to shrimp farmers who are members of aqua clubs or associations that have adopted BMPs.

Investments in farm improvements have become possible. These include intake water treatment installations, pond bottom treatment activities, better pond preparation and safeguarding against the introduction of disease by paying premium prices for certified healthy seed from hatcheries.

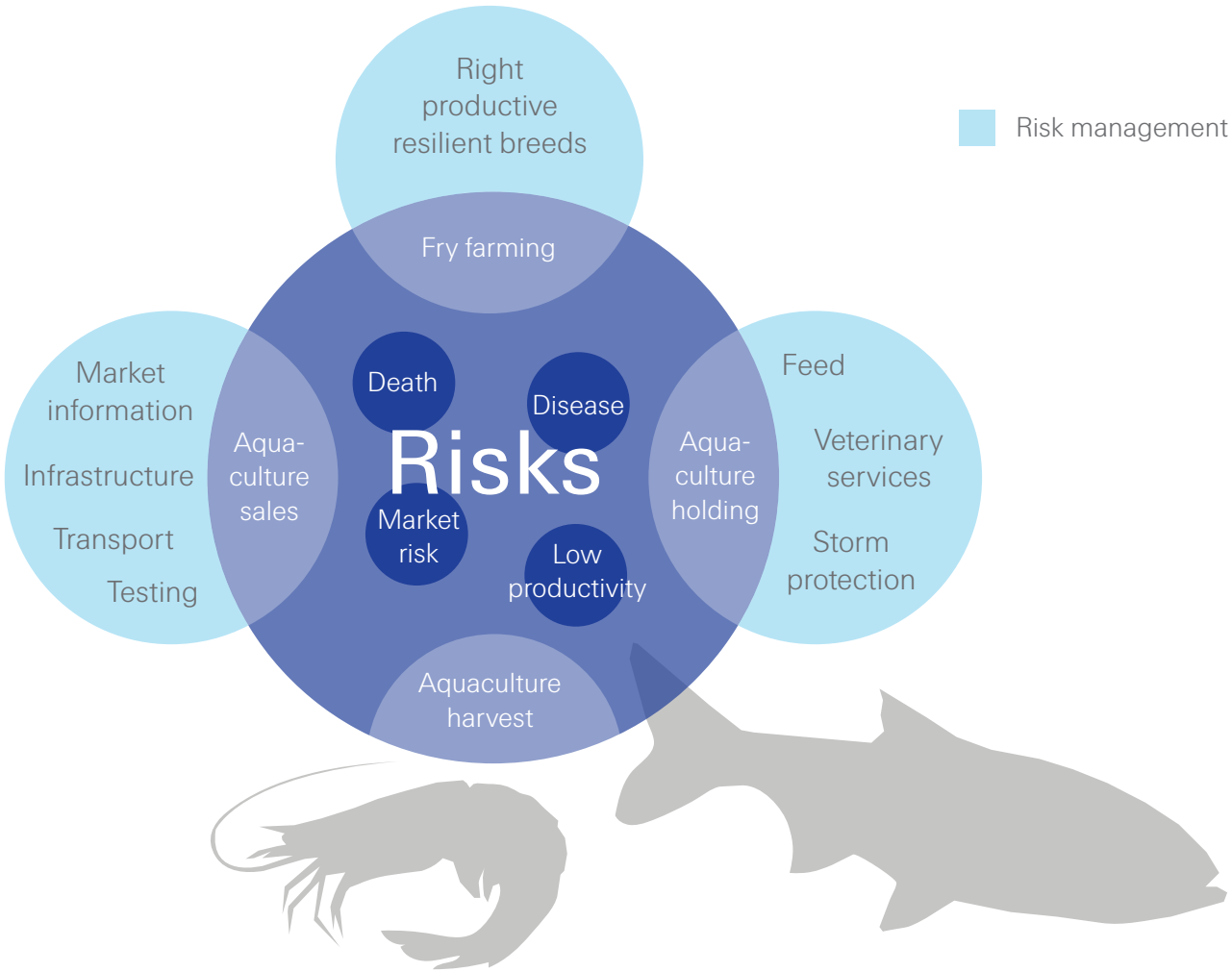
The BMPs have also contributed to improved production and reduced diseases without the use of antibiotics. Currently, 16 930 farmers in 772 societies covering 15 168 hectares in six states are working according to the BMPs.

The introduction also shows the benefits to small-scale farmers of being organised (aqua clubs/associations/societies), sharing resources, helping each other and adopting BMPs. BMP implementation through cluster farming has reduced disease risk and significantly improved yield, quality, safety and farmers' financial returns.

India is now a model of how to translate international principles into specific BMPs adapted to local farming conditions and ensuring their implementation by respective stakeholders.



Risk management for aquaculture



Building insurance for a growth market

Insurance companies widely supported the aquaculture sector in its boom time in the mid-nineties. However, with uncontrollable disease outbreaks in aqua farms and lack of knowledge on incidence and control mechanism of the disease, they have stopped promoting aquaculture insurance services. There is a variety of insurance schemes in the Indian market for aquaculture; however, access to them is extremely difficult, which affects the number of policies issued. The table gives an overview of available covers:

Type of insurance	Perils covered	Insured	Implementation in India	Comment
Shrimp Prawn Aquaculture Crop Insurance Scheme (approved in principal in September 2014)		Registered farmers Premium rate of 3.5% and 6.5% for basic coverage and comprehensive coverage	Selected states of Andhra Pradesh, Odisha, Gujarat, Bihar and Himachal Pradesh on pilot basis for 1 year	National Fisheries Development Board has proposed to bear 50% of the premium as a subsidy with the remaining 50% of the contribution being met by beneficiary and / or the state Government. Proposed implementation through 4 public insurance companies
Brackish Water Shrimp Insurance Scheme	Total destruction of shrimp due to summer kill pollution (from external source only), poisoning riot and strike, malicious acts of third parties, earthquake, explosion/implosion, storm, tempest, cyclone, typhoon, hurricane, tornado, flood inundation, volcanic eruption and/ or other convulsions of nature, aircraft and other aerial devices or articles dropped therefrom, impact with any road vehicles or horses/cattle, terrorism	Licensed farms who adopt extensive/ modified growing system for <i>Penaeus species pluralis</i> of shrimps	Mainly Andhra Pradesh but also in Tamil Nadu, Orissa.	Cover for disease except that caused by bad management. Premiums surcharge for the cover: 4% on the premium for the basic cover Exclusions are as per policy. Only pond and tank growing systems insured 15% commission discount for Fish Farmers Development Agency projects
Fish ponds (Embankments) Insurance scheme	The policy covers only total loss of fry/ fingerlings/fish due to an accident or disease contracted or occurring during the period of insurance. Covered are terrorism earthquake, storm, volcanic eruption and/or other convulsions of nature.	Fish ponds (Embankments)	Perils covered are fire, flood cyclone, inundation, tempest, typhoon, hurricane, tornado, lightening, explosion/implosion, impact with any road vehicles, horses and cattle, aircraft and other aerial and/or space devices or articles dropped therefrom. Excluded are destruction or damage occasioned by pressure waves caused by such devices, riot and strike, malicious acts of third parties	Payout is either 10% of claim amount or INR 50 000 whichever is less. Premium is calculated at 1% per annum (gross) Minimum premium per policy is INR 30 000

Type of insurance	Perils covered	Insured	Implementation in India	Comment
Insurance of fish in ponds	The policy covers only total loss of fry/fingerlings/fish due to an accident or disease contracted or occurring during the period of insurance	<p>The entire period of crop varies from 3 to 12 months depending on the stages of fish as follows:</p> <p>(a) Fry to fingerlings – 3 month period in rearing pond.</p> <p>(b) Fingerlings to fish stage – 12 months period in stocking pond.</p> <p>(c) Breeders (age 1 yr. to 5 yrs.) 12 months period in breeder ponds.</p>		<p>The value of fish changes from fry, fingerlings stage to the final catch/harvest period. Hence there is no fixed sum insured under the policy. This is to be certified by an authorised officer approved in this regard, and a valuation table incorporated in the policy forming the basis for settlement of claims.</p> <p>Rate of Premium</p> <p>Type of scheme:</p> <p>a) For Bank financed & other projects for fish in stock pond or fry to fingerlings</p> <p>b) For scheme through FFDA/IRDIP</p> <p>Basic Premium Rate:</p> <p>2.4% gross on peak value, 3% net on average value</p> <p>Optional Cover (flood and allied risks) can be granted by charging additional premium:</p> <p>1% to 2% gross on value, 1.7% Net on Average Value</p>

Current policies cover the basic needs of fish farmers. To transform the industry into a commercial business able to supply growing cities, additional and new covers will be needed. These include credit-linked insurance, gross margin protection and hedging of input cost.

Credit-linked insurance offers fishers the possibility to enhance their production. Currently, only primary cooperative societies or national banks support growers with credit. The three million or more members of the National Federation of Fishers Cooperative Limited (NFFC) do not have easy access to credit and insurance. Leveraging a cooperation between the NFFC, banks and insurance companies in developing, providing and promoting credit insurance will boost the sector considerably as the successful crop loan insurance distribution in India shows.

This cover would protect the enterprise when an insured peril would affect the profitability or gross margins. Usable benchmarks to determine a loss are stock mortality or lost production due to adverse climatic factors, infectious diseases or pollution. A significant shortfall in gross margin will be the basis to determine indemnity payment.

Input cost from aquaculture feed companies fluctuates by nature. Currency exchange fluctuations or variations in input cost for materials or energy are risks that have a significant impact. To hedge these, a revenue cover insurance could be designed to stabilise companies in times of volatile markets. As a significant producer and user of aqua feeds, this will become more important for India in the future.

There is also a need to establish direct links between insurance and credit programmes so that insurance cover can form part of the collateral for a loan. These measures will massively enhance the aquaculture sector's prospects.

Having the right products in place is one thing, getting them to the clients is quite another. Infrastructure is not well developed and an obstacle to distribution. Overcoming the obstacle is possible by using existing trustworthy channels for distribution and knowledge transfer.

To reach farmers nationwide the insurance industry should collaborate with networks such as the National Federation of Fishers Cooperatives (NFFC), the network of Aqua Club Societies for shrimp farmers, the State Fisheries Seed Corporation (SFSC), the National Bank for Agriculture and Rural Development (NABARD), Aqua Chaupal, and retail companies like Reliance Delite, Spencer's Daily or fish feed producers.

Data to transform the sector for growth

Besides improving knowledge, distribution and the alignment of all stakeholders in the market, one final ingredient necessary for growth of the sector is data. Currently it is very difficult to estimate the percentage of total production insured due to limited data availability about production numbers.

This also has wider ramifications. At present insurance companies generally only compensate total losses; not partial damages. Since many losses are only partial, the actual insurance policies are not attractive to fish farmers.

The premium rate fixation is another constraint. Insurance premiums for aquaculture are between 3.0 and 7.5 per cent of the sum insured. However, it is only between 2.5 and 3.5 per cent for crop farmers involved in the National Agricultural Insurance Scheme. In addition, the small and marginal

agricultural farmers receive a ten per cent subsidy on premium, which is equally shared between the federal government and the states.

The combination of these factors is disadvantageous to the aquaculture sector compared to farming activities. Farmers can only afford a certain percentage of premium, hence products must be structured accordingly.

A subsidy provided by the government is ideally equal to the one for other farming activities, eg like crop farming. Having similar subsidies would allow to offer products with more coverage or lower deductibles. The National Fisheries Development Board of India (NFDB) is working out modalities to introduce a cover for shrimp and fish stocks at lower premium rates similar to the ones for crop and livestock insurance. This is a good sign for the industry.



The future of aquaculture in India

Fish farming is set to grow in response to expanding demand both domestically and globally. Medium-term fertility projections by the UN for 2030 forecast an increase of the population in India to 1.47 billion from the current 1.28 billion today. Globally, the world will grow from 7.32 billion to 8.42 billion people in the same timeframe.

Fish will be an important source of protein in India as well as abroad. India is in a prime position to benefit from this development, given the natural resources it has not yet developed.

Transforming the sector is a pre-requisite to realise the potential. The family farmers of today must become the commercial farmers of tomorrow, so their surplus can feed the world's growing population.

This will require capital and credit. With insurance, banks will be comfortable to lend, since they will know borrowers will be able to repay their loans should disaster strike.

Insurance has enabled growth in many regions and industries across the globe. In India, crop insurance has proven successful and today covers 20 million farmers in the country. Similarly, insurance for aquaculture could protect rural households and investments from natural disasters to help the industry grow to its potential.



Endnotes and sources

Unless otherwise cited the figures in this document are based on the following sources:

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