Food and Agriculture Organization of the United Nations

FAO's Blue Growth Initiative

Blue finance guidance notes

Aquaculture insurance for small-scale producers

Contents

Why aquaculture insurance?

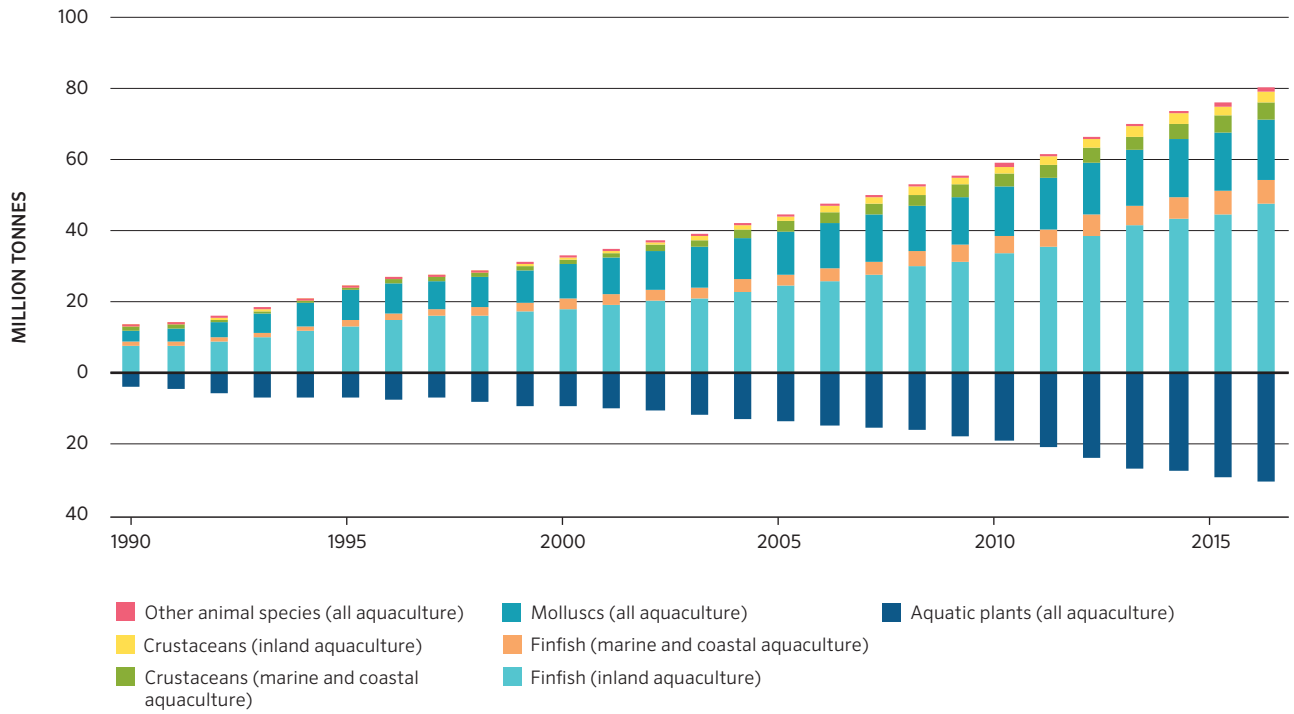
Rapid development of aquaculture

Demand for food and sources of protein will increase with the world's growing population, expected to reach 9.6 billion people by 2050. Today, fish and fish products supply a significant portion of the daily intake of animal protein in many developing countries. Aquaculture – the farming of aquatic organisms, including fish, molluscs, crustaceans and aquatic plants – supplies about 80 million tonnes of food fish each year, which is 53 percent of the total food fish consumed globally (FAO, 2018). Aquaculture is a growing sector (see Figure) and often a thriving business.

Risks in aquaculture

Aquaculture can take place in ponds, cages, tanks, rice fields, raceways and modern recirculation systems, and in combination with vegetable production in aquaponics. Marine aquaculture, also known as mariculture, is practised in the sea, in a marine water environment, while coastal

World aquaculture production of food fish and aquatic plants, 1990–2016



Source: FAO, 2018

Acquaculture & facts figures

Of the 171 million tonnes of global fish production reported in 2016, aquaculture represented **47** percent of the total, or **53** percent if non-food uses are excluded.

Global aquaculture production in 2016 included **80** million tonnes of food fish and **30** million tonnes of aquatic plants.

Mariculture and coastal aquaculture produced **28.7** million tonnes (USD **67.4** billion) of food fish in 2016.

Of the total first-sale value of fisheries and aquaculture production in 2016, estimated at USD **362** billion, USD **232** billion was from aquaculture production.

Global annual per capita fish consumption grew from **9 kg** in 1961 to **20 kg** in 2016.

Approximately **60** million people globally are employed in the fisheries sector, of which **19** million (**33** percent) are working in aquaculture and many millions more are employed in the aquaculture value chain.

Employment in aquaculture is concentrated primarily in Asia (**96** percent), followed by Latin America and the Caribbean and Africa.

Employment in the **aquaculture** sector has **grown faster** than the world's population and faster than **employment** in traditional agriculture.

Source: FAO, 2018

aquaculture is practised in completely or partially human-made structures in areas adjacent to the sea, such as coastal ponds and lagoons.

Most aquaculture worldwide is done by small-scale farmers. Aquaculture enhances the quality of life of small-scale farmer households and contributes to social and economic inclusion for some of the poorest people in the world. Aquaculture can contribute significantly to poverty reduction through:

- provision of food for direct family consumption or local sale (backyard fish culture, rice–fish culture, urban fish culture);
- improved availability of low-cost and nutritious food in domestic markets; and
- diversification of income, providing stability and a safety net for the poor.

However, aquaculture farmers face many risks that can threaten their production, their incomes and their consumption. Farmers can generally cope with small and recurrent risks by adopting best management practices and self-insurance tools such as savings and contingent credit. Yet they are often not able to manage the less frequent but more severe losses resulting from:

- diseases,
- theft,
- predation,
- floods and water shortages,
- water pollution by herbicides and pesticides used nearby,
- storms and swells,
- climate change–induced perils such as warming of the waters, coupled with deterioration of water quality, increased damage from epizootics, anoxia and harmful algal blooms.

When fish farmers suffer from disastrous crop losses, the entire value chain is affected. Losses can affect the entire economy, especially if aquaculture products are important export commodities for the country.

Appropriate financial services, such as insurance, are thus imperative to prevent such losses from becoming catastrophic for aquaculture farmers and for society as a whole.

What is aquaculture insurance?

Aquaculture insurance is a financial tool that provides a mechanism for transferring risks faced in aquaculture production. It is a specialized insurance class available for aquaculture operations and fish farms producing a wide range of aquatic species. It is used primarily to hedge against the risk of production losses.

Perils covered under aquaculture insurance include technical failure, extreme weather events, environmental pollution and natural disasters, which, separately or in combination, may cause fish stock mortality and damage to aquaculture facilities.

Hazards commonly covered in aquaculture insurance policies

Natural hazards
Such as flood, drought, storms, cyclones, hail, strong winds, tidal wave, lightning, fire, explosion, landslides, subsidence, earthquake, tsunami, freezing, frost, ice

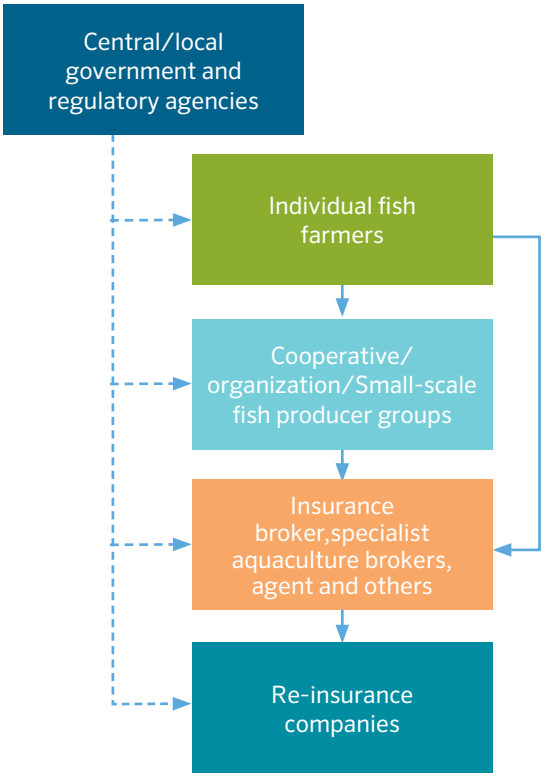
Biological hazards
Such as disease, predation, deoxygenating due to vegetation and microbiological activity, including upwelling

Chemical hazards
Such as change in water conditions (pH, salinity, dissolved oxygen) and pollution caused by external factors

Technical hazards
Such as structural failure, mechanical breakdown, accidental damage to machinery, electricity breakdown

Social hazards
Such as malicious acts, theft

Relationship among key players



Key players in aquaculture insurance and their relationships

- Insurance companies and brokers
- Specialist aquaculture brokers
- Individual fish farmers
- Re-insurance companies
- Regulatory agencies
- Central and local governments
- Meteorological departments and disaster management agencies (for providing back-up data required to assess damage and settlement of claims)
- Aquaculture organizations, cooperatives, clusters and associations
- Agents for marketing and servicing (e.g. microfinance institutions, aquafeed suppliers, NGOs)
- Small-scale fish producer groups (self-help groups)

Types of aquaculture insurance product

FARM INSURANCE

Farm insurance covers farm assets such as cages, aerators, pumps, farm buildings, vessels and monitoring equipment. Risks covered include natural hazards, accidents, destruction of farm assets due to fire, theft and sabotage of farm facilities and equipment. Coverage for loss of life and injuries is often bundled with the farm insurance policy.

INDEMNITY-BASED INSURANCE

Indemnity-based insurance is designed to cover the costs of the farmer's (main) costs of production inputs at the time the crop is declared lost and the claim is made, rather than the value of the lost stock. Cover is provided directly to individual farms, farmers' associations or cooperatives or through a mutual mechanism, in which members of a farmers' organization insure themselves. Coverage can be for all risks or for named perils (e.g. specified diseases or impacts to be covered). Loss adjustment (measurement of the damage) is required to settle the compensation.

INDEX-BASED INSURANCE/PARAMETRIC INSURANCE

This form of insurance is used in agricultural crop production and livestock husbandry and is now being piloted in aquaculture. It uses the level of rainfall as a "payout" trigger to cover damage from natural disasters such as flood, excessive precipitation and drought. In aquaculture, other parameters can also be used. In China, for example, index-based insurance schemes using wind speed (for laver seaweed insurance) and temperature (for crab, oyster and sea cucumber) are being tested.

Index-based insurance can be used at three levels:

- at the micro level, as a **financing tool** for social protection schemes for small farmers;
- at the meso level, as a **portfolio risk management tool** for institutions (e.g. input suppliers, banks and processors) that often lend either cash or products to a wide group of farmers and are therefore exposed to the farmers' production risk;
- at the macro level, as a **sovereign risk transfer tool** to help countries stabilize budgetary shocks, purchase food for vulnerable populations or finance social safety net programmes.

In the context of aquaculture it is at present only used at the micro level.

Index-based insurance offers several advantages:

- It makes it possible to avoid moral hazard (where the insured may take large risks because they know they are protected), a common pitfall for insurers in traditional indemnity-based insurance.
- Payout decision making not require a lengthy process, as it is triggered when the index goes above or below a prespecified threshold.
- As loss adjustment is not needed, the insurer's cost can be lower and payment of compensation can be faster.

POOLED INSURANCE

In insurance pooling, small enterprises or groups of farmers join together to increase the size of the risk pool so as to secure better insurance rates and coverage plans. Some farmers' associations apply this model as part of a strategy to raise farm efficiencies and reduce production and marketing risks. Positive outcomes can include:

- fish farmers' compliance with good practices, which can also lead to development of farm certification;
- stronger fish farmers' organizations, improving members' capacity to participate in the value chain;
- availability of credit for small-scale aquaculture farmers (e.g. for fish feeds) through the bundling of financial products with insurance, which is facilitated through pooling.

Aquaculture insurance vs land-based insurance

An aquaculture farmer has many insurable interests that are similar to those of other industries, such as equipment, structures and employment, and protection against accident and loss of life. However, aquaculture has one unique insurable interest – its stock. Because aquaculture stock is grown in water and depends on water as a life-support medium, aquaculture stock is subject

to a unique set of risks and hazards that are unlike those of almost any other industry:

- In other sectors, risks for property, fixed structures or production units (such as crops, livestock or forests) can be objectively assessed, but in the case of aquaculture, except for some farm assets (such as cages, hatchery, storeroom, and farm equipment), the water-body structures or ponds used for rearing species cannot be classified as "buildings", so property insurance cannot be extended as a risk cover.
- The contractual aspects of insurance are limited, because small-scale aquaculture farmers often operate using shared water resourced and leased open-water bodies and the legality of the operation can be contested.
- The aquaculture assets (the standing stock of fish or shrimp) are not easy to estimate or assess, because its stock and growing processes are underwater.

Benefits and challenges of aquaculture insurance

Social, economic and environmental benefits

Increasing the access of small-scale aquaculture farmers to insurance will benefit all stakeholders – fish farmers, insurers, other actors in the value chain and the government. Here are some of the payoffs to society:

- embraced within a country's social security policy, insurance helps farmers recover quickly from disaster, forestalling costly post-disaster public compensation, which is commonly a strain on government finances;
- by enabling farmers to recover quickly from the impact of risk, insurance shortens the disruption of activities along the entire value chain;
- ssince the business viability of aquaculture insurance depends on aquaculture becoming.

Case study

©FAO/PT Cuong

A cooperative–commercial insurance model: a win-win partnership in Shanghai, China

The Axin Agriculture Insurance Company and a shrimp farmers' cooperative in Shanghai, China, developed a cooperative–commercial model in which the insurance company provides a professional insurance service to the cooperative, while the cooperative lends technical support to the company by assisting in identifying and characterizing the hazards and in assessing the risks involved. The insurance company entered into a contract only with the shrimp cooperative, which in turn contracted its members. This simplifies the administration of the policy.

In this model, the cooperative introduced good shrimp aquaculture standards and the use of closed production systems to its members, which prevented pathogen entry and reduced the use of drugs and chemicals in the production process. As the members farm the same shrimp species, they are able to share information and technology on better farm management practices, which collectively increases their ability to manage production risks.

The insurance company incentivized better practices through a bonus to the shrimp cooperative for keeping a low loss ratio, i.e. 60 percent or below. In the 2015 production season, the loss ratio was 53 percent. As agreed and promised, the insurance company returned 7 percent of the premium income to the shrimp cooperative. The members used the returned amount to purchase materials for water quality improvement.

Source: Yuan *et al.*, 2017

more efficient and less prone to risk, insurance can be used to encourage farmers to adopt better farming practices and more collaborative organization.

Benefits to small-scale farmers

- protection of capital invested;
- protection against events or natural hazards that affect health, assets and harvests;
- more secure incomes;
- increased stability and economic welfare;
- improved access to investment capital and credit;
- increased access to risk-management strategies and opportunities.

Challenges in delivery aquaculture insurance to small-scale farmers

Aquaculture insurance is an area of great growth opportunity, as less than 3 percent of the world's fish farms are currently insured – mostly large farms using sophisticated and advanced technology. Few companies offer aquaculture underwriting services, particularly in comparison with other insurance services (e.g. life, health and car insurance) (van Anrooy *et al.*, 2006). As a result, competition in most national markets is limited and individual aquaculture insurance underwriters have high market shares. Aquaculture insurance is available to most farmers in Europe, North America and Oceania, but the large majority of aquaculture farmers (large or small) in Africa, Asia and Latin America and the Caribbean have (as yet) no access to aquaculture insurance.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The main reasons in the low penetration of insurance services in the aquaculture business include the high-risk aspect of the sector and the inadequate accessibility of the services for small-scale farmers, especially those farming lower-value species. Furthermore, aquaculture is a technically challenging sector to insure because of limitations in:

- awareness among fish farmers about the availability of insurance;
- the use of best management practices and other management processes required for eligibility for insurance coverage;
- the presence of well-established associations and cooperatives that can act as insurance agents in developing countries;
- government policies and institutional and legal support for establishing aquaculture insurance for small-scale farms.

Creating an enabling environment for aquaculture insurance

Governments and other institutions can facilitate the delivery of insurance services in the aquaculture sector primarily in three ways:

- through **policy and legislation**, including government commitment to insurance as a risk management tool, clear policy guidelines and regulatory framework to facilitate the provision of insurance services to aquaculture farmers, and a strong national institution with outreach services that promotes and administers insurance systems;
- by helping to meet related **information** needs and building understanding and awareness of insurance as a safety net for aquaculture;
- by testing, piloting and promoting **innovative delivery models and products**, such as aquaculture insurance based on an index combining wind speed, temperature and hydrological parameters.

Several countries have policies that encourage mutual and commercial aquaculture insurance products through subsidies for premiums. Commercial insurance is provided by private companies through their provincial and municipal branches, and by international insurance and reinsurance companies. The commercial insurance companies cooperate with local government, fishery administrative agencies and aquaculture cooperatives in the provision of aquaculture insurance. The commercial insurance companies benefit from the expertise of fishery and aquaculture cooperatives in conducting risk identification and risk assessment. Both parties benefit from incentives, such as a bonus for a low loss ratio (the total compensation paid out divided by the total premium collected by the insurer) or a reduction in premium for a claim-free year, which encourage the fish farmers to adopt better management practices to reduce production risks.

Steps for developing an aquaculture insurance scheme for small-scale producers

Case study

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Collective action model for risk mitigation: an inclusive and integrated approach in Thailand

In Thailand, most shrimp farmers are small-scale pond holders, practising aquaculture in one or two ponds averaging less than 1 hectare per farm. Because the ponds are stocked at high density, the aquaculture industry periodically suffers from disease outbreaks. From 2012 to 2015, early mortality syndrome disease caused economic losses of more than USD 12 billion throughout the shrimp value chain in Thailand.

To combat old and new diseases, but also to introduce or provide safety-net and risk-mitigation tools, the Thai National Farmers Council, in collaboration with the Thai Chamber of Commerce, developed an innovative approach linking institutionalized farmer groups (so-called shrimp clusters) with other stakeholders – seed and feed producers, buyers, processors, exporters, technical agencies, credit institutions, government, regulators and insurers.

At the farm level, the shrimp clusters adopt and implement good aquaculture practices and product certification standards. In agreement with buyers, they also comply with specific product quality standards. As a consequence, the member farmers have become more insurance worthy from a risk management perspective – meeting a necessary condition for aquaculture insurance to become a viable business.

The model has demonstrated the importance of inclusiveness, involving all the stakeholders along the value chain. It has also shown that insurance cannot be a stand-alone risk management tool, but rather needs to be integrated with other value-chain improvements.

Source: FAO, 2017

Potential for providing aquaculture insurance services to small-scale farmers through the fish feed industry

Most farmers, small- and large-scale, now buy their feeds commercially. Feed costs typically account for 40 to 60 percent of production costs in aquaculture, and even more in some small-scale aquaculture farms where family members provide the labour. The market is shared by just a few large companies in each country. Fish farmers generally buy regularly from the same feed company representatives, who visit the farms and build relationships with the farmers. They also provide direct feed management advice to the farmers, both directly and via local sales points and farmers' associations. Thus in many countries feed company representatives have become beacons of trust for the farmers. An innovative approach would be to use their sales networks not only to supply farmers with fish feed, but also to broker insurance services.

This approach could provide farmers with easy access to an aquaculture insurance policy. A low premium cost could be added to the feed purchase cost; by paying about 2 to 3 percent more, the farmer could obtain insurance as well as feed. Since feed supply to farmers is often on credit, adding insurance to the package could provide a guarantee for getting the "feed loan" repaid in case of a disaster. Since fish feed suppliers know the value of fish stock at each farm from the amount of feed consumed, compensation can be based on the exact amount invested in the standing stock, or in the purchase of feed. This model would enable fish farmers to recover rapidly from losses due to diseases or natural catastrophes, and to restart their businesses and generate income, without needing to wait for government support or insurance settlement processes. Fish feeds would be immediate available after a disaster.

The model could also offer benefits to insurance companies, including economies of scale; low transaction costs for premium collection and payouts; standardized policy wordings; the ability to provide insurance coverage to many farmers for a wide risk spread; the possibility of outreach to small-scale farmers that have no bank account; and a large network of technical persons available for risk identification and assessment.

This model would obviously not be applicable in systems where no commercial feeds are used, such as the extensive carp culture systems in parts of Asia.

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Acknowledgements

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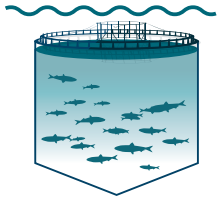
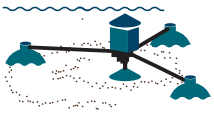
1 WHY AQUACULTURE INSURANCE?

- Global aquaculture products in 2016 included 80 million tonnes of food fish and 30 million tonnes of aquatic plants.
- Worldwide, 19 million people are employed in aquaculture and many millions more are employed in the aquaculture value chain.

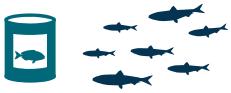


2 INSURED AQUACULTURE ASSETS

Ponds farm equipment



Products/fish



3 RISKS

- Natural hazards such as flood, drought, storms, cyclones, hail, strong winds, tidal wave, lightning, fire, explosion, landslides, subsidence, earthquake, tsunami, freezing, frost, ice
- Biological, such as disease, predation, deoxygenation due to vegetation and microbiological activity, including upwelling
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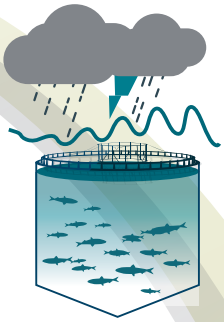
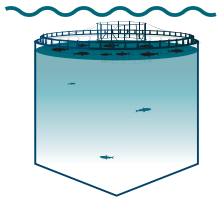


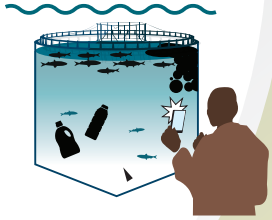
4 CONSEQUENCES

- Loss of stocks (loss of farm production)
- Loss of farm assets
- Loss of income or unemployment
- Depleted financial resources
- Indebtedness to creditors
- Limited scope to restart farm



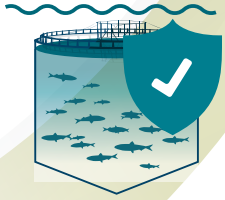
5 ENABLING CONDITIONS

- Facilitate the provision of insurance services to aquaculture farmers through policy and legislation
- Build understanding and awareness of insurance as a safety net for aquaculture
- Promote delivery models and products
- Develop insurance products



6 THE FUTURE

- Insurance will cover all aquaculture business under regulations.
- Insurance offers a concrete way to help fish farmers recover from recover from natural disasters and human error and to restart aquaculture business.



Financial investment in the fisheries and aquaculture sectors has traditionally been limited. Fisheries and aquaculture sectors' production and profitability have historically been rather unpredictable. Therefore they presented risky business models for the financial sector. However, our understanding of how to manage this unpredictability, through established best practices and ever improving technology, is shifting this paradigm. The financial sector and fisheries and aquaculture sectors can mutually benefit from collaboration given the important scale and economic impact of these sectors, including contributions to employment, value addition and food security. The Blue Finance guidance notes, prepared under FAO's Blue Growth Initiative, include brochures on microfinance and insurance for small-scale fisheries, insurance for small-scale aquaculture producers, blue bonds, blended finance and impact investment. The brochures aim to provide governmental, non-governmental, private and public stakeholders with information, resources and concrete pathways for obtaining finance to support blue growth transitions at local, national, regional and global scales.

The Blue Finance Guidance Notes series includes:

- Microfinance for small-scale fisheries
- Blue bonds
- Insurance for small-scale fisheries
- Blended finance
- Aquaculture insurance for small-scale producers
- Impact investment

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