

Aquaculture insurance

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INTRODUCTION

The term “aquaculture insurance” describes all the various types of insurance that would normally be used to protect an aquaculture business operation. For a reasonably large aquaculture company, this would include insurance protection for buildings and equipment, employees, stock, livestock, liabilities, motor vehicles, vessels and divers, goods in transit, and other insurable interests. The purpose of this review is to focus on the aquaculture insurable interests that are difficult to insure, generally as a result of the unique nature of the aquaculture industry, i.e. what it actually does, how it does it and the unusual risks it faces.

There are four challenging areas of insurable interests in the aquaculture portfolio, which are described in detail in Section 3. However, the most difficult insurable interest to insure is its livestock, or more specifically, the aquatic animals and plants under culture. Insuring aquaculture livestock presents many problems to the insurance industry, yet it is probably the most important insurable interest in any aquaculture operation. In addition to directly securing the value of livestock for the business, other indirect benefits of insuring stock include, for example, improved access to capital, greater security for employees and other stakeholders, and more reliable access to markets. In the light of these considerations, reference to “aquaculture insurance” in the title and text of this review will imply only the insurance of aquaculture livestock. Any reference to the other special insurable interests of an aquaculture business operation will be highlighted as necessary.

Aquaculture is a relatively new industry that is currently undergoing rapid expansion. It produces aquatic animals and plants as food for human consumption, and includes sectors that raise diverse aquatic products for jewellery, leathers, arts and crafts, cosmetics, tropical aquariums, baitfish, medicines and drugs, and medical research. But despite this diversity and its impressive growth and value, the global aquaculture industry cannot expect to be treated by the insurance industry any differently from any other sector.

Aquaculture insurance has to be a profitable business to underwrite or insurers will not provide cover. All insurance companies and underwriters are motivated by profit, but they are controlled in the way that they operate by national laws and regulations, and by the codes and conventions of their industry. Therefore, if the many individual production operations that make up the aquaculture industry are to get protection from the insurance industry and benefit from the valuable risk assessment and management techniques that it has to offer, the aquaculture industry must conform to how the insurance industry operates, and observe its standards and practices, which have been built up over hundreds of years of handling risks.

1. AQUACULTURE INSURANCE INDUSTRY STAKEHOLDERS AND THEIR ROLES

1.1 The structure and function of the insurance industry

An understanding of the structure of the insurance industry and the way it functions is essential if the issues surrounding this specialized class of aquaculture insurance are to be understood.

The insurance industry is a very flexible market with an international scope. It is highly sophisticated in the way it functions, and diverse with regard to the parties that

operate within it. It is also highly regulated and in some instances, it is virtually an agent of the government.

Insurance protection (also referred to as “insurance cover”) is purchased on the international market through one or a combination of three groups of key participants in the market, namely **reinsurance companies**, **insurance companies** (often referred to as “underwriters”) and **insurance brokers**. While reinsurance companies are an extremely important component of the international insurance market, insurance buyers are not generally directly involved with them. Buyers purchase cover either directly from insurance companies or indirectly through insurance brokers; however, the extent of the insurance that they obtain will almost certainly be dependant on the reinsurance protection available to the company they decide to deal with.

1.1.1 The insurance company and Lloyd's of London

Insurance companies and underwriters who constitute the supply-side of the industry are motivated by profit. There are different kinds of insurance companies, including ordinary common stock companies, mutual companies and captive companies. For the purpose of this review, the differences in their roles and functions are really academic; their purpose and objectives are the same – to spread risk. However, their function and *raison d'être* are relevant. Mutual companies, for example, are owned by their policy-holders, and their premiums earn them a proportional share of the profits of the company. Captive companies are operated solely for the benefit of their owners; their existence is partly due to the fact that in many countries, the insurance industry benefits from certain tax advantages and owning a captive company can be financially attractive, although this usually only applies to large organizations. There are also insurance cost benefits to be gained from using a captive insurance company, although again, these generally only accrue to large producers.

Lloyd's of London is an important component of the international insurance market, but it falls into an entirely different and unique category. It is not an insurance company *per se*, but an insurance market in its own right. It is made up of different underwriting organizations (known as syndicates) and is in effect a market within the market, but its objective is also to spread risk.

All insurance companies, including Lloyd's of London, are controlled in how they operate and act, by the applicable insurance laws and regulations of their country of incorporation, and by those of the countries in which they do business. They also follow the many conventions of their own industry. Of particular importance, they are limited in the amount of business they take on by the size of their capital base.

1.1.2 The insurance broker

Insurance brokers play a very important part in insurance processes. Their job is to represent an insured or an insurance buyer in the insurance market, first by finding insurance companies to underwrite their business, then by helping them through the insurance policy compliance processes, and finally, by supporting their interests in claim situations.

Insurance brokers develop underwriting capacity and encourage new insurers to get involved in the industry. They provide insurers with facts about the industry and persuade them to use their underwriting capacity to cover the risks and hazards of the companies involved. In this respect, aquaculture is an emerging industry that has yet to achieve a satisfactory claims experience. It is a difficult field to insure, and consequently, a specialist broker requires considerable knowledge of the species being raised, of the many rearing systems and practices available, and of their individual risks and hazards.

In aquaculture insurance, the role of the insurance broker is probably one of the most important. The insurance market is small for the difficult parts of the aquaculture insurance portfolio; the insuring terms and conditions are restricted, and insurance

policy compliance requirements can be onerous. Under such circumstances, insureds need the advice of specialists, whose role is to find insurers who will assume the risks of their aquaculture clients, on the most favourable terms and at the best prices. The specialist aquaculture brokers provide valuable advice and guidance for which they are paid commission, which is earned on the business that they arrange for their clients.

1.2 Underwriting

The volume of business that any individual insurance company can underwrite is limited by its underwriting capacity. Insurance companies have to comply with legal and corporate requirements in this area, and are restricted as to what they can underwrite by the size of their capital base. In practice, this means that they must coordinate the business they accept, controlling their overall exposure to certain risks, by location, insured value and the insured value in relation to the insured values of other risks they underwrite, which may be affected by common risks and hazards (See Section 1.3)

Underwriting practice must equally be governed by principles of prudence and conservatism. Insurance companies must use their capacity wisely and use their skills to underwrite business that is profitable to their shareholders and protective of their capital base. To achieve this, they must be selective about the business they accept. They must always seek to underwrite the best risks in good industries, avoid the bad ones, and protect their book of business with appropriate reinsurance. But ultimately, the volume of business that any insurance company can underwrite is not related to the quality of the business. A specific risk may be a very good one to insure, but if the underwriting capacity of a company has already been exhausted on other co-exposed risks, it cannot underwrite it.

These limitations and constrictions mean that insurers constantly assess:

- the sums insured under their individual policies;
- the perils covered under them;
- the amount of premium underwritten;
- the relationship between individual risks insured and all the other risks covered by the company.

Of great importance, therefore, is how the risks and hazards to which an industry such as aquaculture is exposed may operate and interact at any one time. For example, the combined value of all the aquaculture farms in a group may be too much for one company to handle if they are all located in the same area and exposed to the same environmental and physical risks and hazards such as storm, flood or plankton bloom. But farms do not have to be close to each other to be linked. Farms that are widely distributed geographically or located on different water sources might not, in theory, be exposed to the same environmental and physical perils, but in practice be jointly exposed to other risks. For example, if their seedstock originates from the same hatchery, they may all be susceptible to a common outbreak of disease. They may also be exposed to identical problems if feed is provided by the same manufacturer.

1.3 Managing capacity in the insurance market

Aquaculture businesses vary from small artisanal farmers to large multinational producers. The former may not be suitable candidates for insurance for many reasons, but the latter are substantial buyers of cover and generally have extremely large stock values. Between these two extremes, there is a wide range of farm sizes and aggregations of value.

The insurance industry faces a challenge that is often related to a particular country or aquaculture industry sector, which is to accommodate as many configurations of aquaculture production as possible while staying within its rules of prudence and within its capacity limitations.

The aggregation of values in aquaculture presents practical underwriting difficulties to insurers and directly affects expansion of the insurance market. There is no better example of the extensive damage that can be caused by a single event than the Tsunami that devastated Southeast Asia in late 2004. Aquaculture sites in thousands of miles of coastline were affected, from Indonesia where the Tsunami originated, to Myanmar, Thailand, southern India, Sri Lanka, the many islands in the region, and across to the coast of Kenya. Many shrimp farms were affected, but the disaster would have been proportionately greater if the aquaculture had been much more developed.

No insurance company can afford to ignore what happened in 2004; the event has made aquaculture **much** more difficult to insure. So much of the industry is concentrated along coastlines, long sections of which are exposed to major storms, plankton blooms and tsunamis. This 2004 event inevitably reduces the wide availability of insurance cover.

There are a number of techniques that enable the market to deal with capacity problems, two of which are important: *proportional underwriting* and *reinsurance*.

1.3.1 Proportional underwriting

Proportional underwriting (also known in the industry as “line slips”, “quota share facilities” or “treaties”) involves the sharing of risks among individual insurers. Proportional underwriting facilities are led by specialist underwriters, known as *leading underwriters*, who know a particular business and all its difficulties and problems. Their judgment is respected by all the other companies, who are strongly committed to support what they do. The *leaders* are responsible for the terms and conditions of insurance offered and for settling all claims. The other insurers take a fixed percentage (or proportion) of every risk underwritten under a facility and also take their percentage of all premiums and losses under it.

Using proportional underwriting techniques, the underwriting capacity of all the subscribing insurers can be used to provide cover to groups of businesses that no single company could insure by itself. The system has the added advantage of facilitating expansion of the market’s capacity because it enables the knowledge of experienced insurers to be used to protect the interests of less well-informed ones, which in turn enables the latter to participate in a business they would otherwise avoid.

1.3.2 Reinsurance

The second technique of spreading risk is *reinsurance*. In simple terms, it is the practice of insurance companies buying insurance protection for themselves. This is done through the reinsurance market, which is international in scope. Through the purchase of reinsurance, the capacity of an insurer is increased, allowing it to underwrite much larger insured amounts. All companies across the insurance market buy reinsurance protection.

The reinsurance market is a vitally important component of the international aquaculture insurance market. If reinsurance underwriters decided that they would no longer provide reinsurance protection for aquaculture, then the insurance market for this class would be in serious trouble. Reinsurers have considerable capacity and are “insurers of last resort”. Whenever large disasters occur, such as major fires, hurricanes or tidal waves, the financial payments made by individual insurance companies are often met only because of the reinsurance payments they receive.

2. AQUACULTURE POLICY TYPES AND CONDITIONS

An insurance policy is a contract between the insurer and insured that sets out the terms and conditions of the insurance arrangement. The objective of all policy wordings is to represent fairly both the interests of the insured and insurer. Over many years, aquaculture policies have been created to address the important issues and difficulties

of insuring aquaculture, and provide a framework within which underwriters and insureds can operate with confidence.

2.1 Types of policies used in aquaculture insurance

The insurance market offers two types of aquaculture livestock policies: *All Risks* and *Named Perils* policies. The difference between them is that the starting point of All Risks policies is to cover every risk and then exclude certain perils that underwriters do not wish to cover, whereas Named Perils policies only cover specific risks, adding and defining where necessary any extra risks for which cover is offered.

Every insurance policy broadly addresses key issues. In brief these are:

- what is insured;
- where it is insured;
- what risks it is insured against;
- how it is valued;
- what the policy-holder should do if a claim occurs;
- what general conditions apply.

Although All Risks and Named Perils policies are different in their approach, both deal with all these issues. However, individual insurers structure their policies to suit their own requirements. Many use clauses that have the same purpose but may be worded differently, in subtle ways; one of the roles of an insurance broker is to guide clients through such technical issues.

An analysis of common insurance conditions is shown under *Basic Terms and Conditions* in Appendix B and examples of All Risks and Named Perils terms and conditions are shown in Appendix D.

3. AQUACULTURE INSURANCE – DEVELOPMENT CONSTRAINTS AND OPPORTUNITIES

In theory, the insurance industry can provide the aquaculture industry with routine types of policies common to commercial insurance portfolios without great difficulty. There are competitive insurance markets for most onshore aquaculture company assets and business activities, including buildings, equipment, motor insurance and public liabilities. Some types of insurance, for example, certain liability cover, presents difficulties to all industries and the aquaculture industry is no exception. There are also specific activities viewed by the insurance industry as "high risk", regardless of which industry indulges in them. Aquaculture has its own industry-specific supply-side insurance challenges in four areas:

- the insurance of offshore operations;
- some aspects of employers' liability, particularly for offshore workers, and employers' liability for divers;
- insurance of the end product, especially product recall and products liability;
- insurance of livestock (the aquatic animals and plants).

However, there are a number of practical constraints that prevent all but the most sophisticated producers from buying insurance.

As already emphasized, insurers are driven to attain profitability, and to achieve this, they require that insureds meet high management standards, especially in the area of stock control. They also demand that the producers they insure take a proactive approach to managing fundamental risks before they even consider providing coverage. This militates against small producers, especially artisanal growers.

For example, well-capitalized producers have a much greater ability to select sites for their low risk characteristics. At the same time, they can focus more resources on managing the risks that cannot be eliminated through the process of site selection. They can also build up-to-date management processes into their production systems and, for example, incorporate into them the latest disease avoidance and control techniques.

Small artisanal producers are rarely able to select where to farm. More often than not, they are restricted to the land that they either own or hold tenure over. In general, they cannot afford to employ sophisticated management techniques, and their small size alone may place them within the minimum value levels that justify the minimum premiums insurers demand. Such constraints can apply to all types of cover.

3.1 The insurance of offshore operations

The insurance of offshore aquaculture equipment and operations requires a specialist underwriting approach. The environment offshore is almost always hostile at some point and managing its risks can be difficult and expensive. Offshore operations are subject to extensive health and safety regulations in many countries, which often have implications for the insurers of employers' liability and workman's compensation. There is a large marine insurance market that can handle the insurance of boats and other equipment used in offshore aquaculture as well as their associated marine liabilities, but not the biological risks to the livestock in offshore aquaculture installations.

Operating offshore creates a broad range of challenges. It demands the use of appropriate equipment that must be constantly serviced and regularly replaced. However, the use of safety equipment and provisions for health and safety can both reduce aquaculture production efficiency, and in some cases, adversely affect the safety of livestock. Operations at sea also incur larger and more frequent losses, and thus generate high underwriting expenses and handling costs.

Global warming is an issue of increasing relevance to marine aquaculture because of its potential to create problems in the future. For example, changes in plankton profiles and more extreme weather conditions are likely to arise as global warming takes effect. There are already indications that this is happening, and aquafarmers have recognized that to offset some of these potential problems and open up new areas to farm, the industry must move offshore and underwater.

Moving offshore and underwater may help to mitigate some of the hazards of surface operation, but undoubtedly it will generate new issues and problems. For example, it may be harder to monitor stock and deal with disease issues underwater; and clearing mortalities may also be more difficult. Going underwater will also generate a significant increase in diving activity, the insurance of which is expensive. Capital costs of operating underwater are also likely to be much higher. It remains to be seen whether any overall reduction of risk will be achieved by moving offshore and underwater, but on the basis of the industry's evolutionary experience to date, there are bound to be some unpleasant surprises.

3.2 Aquaculture employers' liability insurance (including diving)

A key insurable interest for every aquaculture production operation is its liability to its employees and to third parties. Employers' liability insurance (known in the United States of America and Canada as "workman's compensation insurance") is developing into a difficult insurance class in many industries and countries. This arises from wide-ranging social changes, the increasing sophistication of industrial processes, improved diagnosis of industrial health problems, and increasingly litigious trends in societies, especially those in the developed economies.

The hazards involved in all types of employment are constantly analysed by insurers and by governmental health and safety organizations. Virtually every industry is under continual scrutiny. Increasing industrial injury and compensation claims drive tougher health and safety legislation, factors that are leading to more and greater employers' liability insurance losses and substantial increases in premiums. In many countries, the purchase of employers' liability insurance is mandatory, so self-insurance is not an option.

Onshore aquaculture has a reasonable health and safety record, but the offshore industry is judged to be high risk in two areas – marine operations, including the use of working boats and cages, and diving. Commercial diving is a business activity viewed as high risk by insurers, irrespective of the particular industry involved. Diving, which is a difficult class of insurance, can be complicated by its very nature, in particular, the operational depth involved in the diving activity. While diving insurance is a widely-used term applied to the insurable interests of specialist diving companies, including the insurance of equipment and premises, third party liabilities and a number of other routine interests (as far as aquaculture is concerned), the term refers solely to employers' liability coverage on divers. Employers' liability on aquaculture divers is an area attracting increased attention of insurers and health and safety authorities in many countries. It is important that the newly developing offshore aquaculture industry recognize the issues involved. A great deal risk management input will be needed if insurance costs in this area are not to escalate.

For insurance purposes, diving can be divided into two areas – offshore commercial diving, and all other types. The latter includes inshore commercial, underwater scientific, underwater film and media, and recreational scuba diving. Aquaculture diving is currently classified by most insurers and health and safety authorities as an inshore commercial diving activity. However, this will only apply to aquaculture farms located inshore, in comparatively shallow waters. Farms located offshore, using underwater cages in deeper water, are almost certain to come under the more onerous and more expensive offshore commercial classification.

Aquaculture has unfortunately developed something of a reputation as far as diving is concerned. Relatively few producers do their own underwater work and the general practice is to contract local diving companies to maintain and repair the underwater installations and remove mortalities. However, change is on the way.

Aquaculture producers operating under the jurisdiction of the EU can now be held responsible for death or injuries suffered by divers employed by unregulated diving contractors. Thus, the practice of using cheap, unregulated contractors, avoiding the costs of first-class equipment and proper diving protocols, and employing in-house divers, is rapidly coming to an end. Diving protocols and practices in the aquaculture industry vary enormously. Since a number of deaths have been recorded in recent years and in some specific aquaculture areas, the diving industry has gained a reputation for operating in the "twilight zone" of regulation. Unless the local diving contractors choose to modify their practices as the industry moves offshore, which is considered unlikely, claims and losses are likely to increase and the industry will attract the attention of ever more rigorous health and safety legislation, as well as higher insurance premiums.

Diving is a fundamentally dangerous occupation to which health and safety authorities are paying increasing attention. Some diving practices are particularly dangerous; for example, repetitive "bounce" diving using air, which may be especially important for underwater cage systems. Dive teams and the adoption of sophisticated (and expensive) safety and communication systems are further issues that aquafarmers will have to address. In the end, the industry will not be able to avoid tightening legislation and tougher insurance terms and conditions.

The implications for aquaculture are clear. All areas of health and safety at work face steadily tightening employment legislation and insurance costs. Aquaculture must change to meet new challenges. It must routinely adopt rigorous risk assessment and exposure analysis of its general employment practices, especially its diving practices, and prioritize the implementation of health and safety routines.

3.3 Products liability insurance and product recall insurance

Society is becoming progressively more litigious. Products liability and products recall insurance are likely to be important to the aquaculture industry, especially to producers selling into the supermarket chains. Comprehensive traceability of the origin of aquaculture produce is a growing demand in many countries, and there are also signs that consumers and their advocates are watching the industry closely. Again, the track record of aquaculture will determine future availability and cost of these classes of insurance.

3.4 Stock insurance

The livestock, whether fish, molluscs, crustaceans, or plants and creatures of other kinds, are at the core of every aquaculture operation. They are arguably the most important insurable interest that a producer has. In practice, however, it seems that only a comparatively small percentage of aquaculture operations insure their stock. The perception is that the insurance is too expensive, yet many insurance underwriters would argue that the protection is too cheap based on their experience with losses.

From the point of view of the insurer, aquaculture is a technically challenging class of business that has proven to be an expensive one to service. It presents insurers with many practical issues, which can be summarized as follows:

- The industry's resources of personnel knowledgeable in aquaculture and its risks are limited.
- The aquatic environment is physically challenging for aquaculture operations and therefore difficult for insurers to handle.
- Services essential to the implementation of insurance are inadequate in many areas where insurance is required.
- Local laws often make insurance difficult or impossible to provide.
- The nature of aquaculture makes it difficult for insurers to service the sector because of insurers' capacity limitations, internal operating restrictions and procedures.

If aquaculture stock insurance cover is to become globally available for a wide range of species and growing systems, as well as for different levels of the industry, some significant difficulties in these areas will have to be overcome.

3.4.1 Lack of underwriting, broking and risk management skills

Skill shortages in the aquaculture insurance industry will become an important constraint if the market expands. Successful handling and underwriting of the class require sophisticated skills across a wide range of professions. Leading brokers and insurers in the sector have expressed concern over the expansion limitations in this area.

Underwriting the risks of aquaculture stock is a difficult task. It demands a high level of insurance underwriting ability and an extensive knowledge of the aquaculture industry and its risks, some of which are complex and technically difficult to identify. There are currently only a small number of underwriters able to handle the class and no established training facilities to teach skills to new underwriters.

The sector also relies on a supporting infrastructure of brokers and agents, risk management surveyors and loss adjusters. Brokers and agents are needed to develop the comprehensive underwriting information that insurers must have in order to evaluate production facilities and set correct terms and conditions; risk management surveyors are needed to survey new farms and to inspect changes and alterations to farms that are already insured. Finally, professional loss adjusters are required to deal with losses and the emergencies that can be especially difficult to handle. The skills of all these people take a long time and a great deal of investment to develop.

3.4.2 The need to expand in order to spread risk effectively

Arguably, current aquaculture livestock insurance is too narrowly focused on a small number of species located in comparatively congested areas. The market handles disproportionately large business volumes of salmonids, tuna, sea bass and sea bream farming, much of which are concentrated in a small number of comparatively narrow geographical areas. Large losses have occurred in some of these sectors and have caused poor underwriting results across the entire aquaculture insurance market, prompting a number of insurers to stop underwriting the class. This suggests that a much greater spread of risk is needed. In order to overcome such an imbalance, insurers need to take on a broader selection of business across a much wider geographical area, as well as a broader range of species, production systems and producer size.

3.4.3 A difficult insurable interest in a difficult environment

The key perils that the owners of aquaculture production operations generally want to insure are disease, infestations of parasites, predation, temperature fluctuations and plankton blooms, as well the more typical hazards such as drought, storm, flood, earthquake, equipment and system failure, vandalism and manmade pollution.

Water is an inconsistent environment to deal with, even in its most benevolent state. Perils regarding water can range from its absence when needed to its being highly destructive when present. It is, at once, a life support system for aquatic creatures and plants, and a carrier of disease and pollution; it is highly temperature-sensitive, prone to fluctuations in its chemical constituents, and is a constant problem as far as stock control is concerned. Being raised in water makes it difficult to count aquaculture livestock, treat it for disease, and provide for their all-round protection.

Living creatures of the aquatic environment have evolved a number of strategies to deal with the extremes of its constantly changing ecosystem. The simplest strategy for most living organisms is to move away from threatening or extreme dangers, such as a plankton bloom. However, such natural risk management strategies operate against the prime *modus operandi* of aquaculture, which is to keep stock together in controlled production units where husbandry practices can be comprehensively applied. Many of the perils facing aquaculture livestock are thus a product of aquaculture itself, of growing candidate species in restricted areas and in numbers that, in their wild state, would not be found in such large numbers together. The industry's husbandry techniques must therefore compensate for the loss of the natural risk management strategies of wild species. They must also compensate for a whole range of risks and hazards that are induced by keeping stock in static growing units in largely mechanically controlled conditions and by feeding them on artificial feeds.

Here again, future climate change may affect the aquaculture environment. Climate change is now an accepted happening. There is evidence that weather patterns are changing and some weather phenomena are becoming more extreme. In the future, increases in sea level or ambient temperatures could eliminate some growing areas, while obviously creating new ones. However, aquaculture is possibly more exposed to the uncertain overall effects of global warming than any other farming sector.

After some 30 years of development, contemporary aquaculture is still evolving new ways of doing things: it is introducing new species, using new rearing systems and opening up in new areas. It is also discovering new problems. While its techniques for rearing the better-known farmed aquatic species such as marine shrimp, salmon, trout, sea bream, tuna and catfish have advanced significantly, new diseases and biological problems are still distinct and unquantifiable risks that must be factored into the insurance terms, especially for new branches of the industry.

The historic underwriting experience in aquaculture clearly demonstrates that the risks of each new species are unknown and that each one represents a new learning curve for the industry and its insurers. New countries and new growing areas also

present new underwriting challenges. Thus, every new situation has to be addressed by insurers who must understand its implications and create the right policy conditions and rates of premium to accommodate it. This is an immense challenge to the insurance market.

3.4.4 Availability of veterinary and diagnostic services and fish husbandry skills

Disease is an important risk in the aquaculture industry, which most producers want to protect themselves against by buying insurance. In order to provide cover, however, insurers must be able to count on the availability of competent disease diagnostic laboratories and fish veterinarians. In aquaculture, diseases have to be diagnosed and treated quickly if they are not to take hold. Detection requires the right diagnostic facilities; treatment requires that the right drugs be available and licensed for use on fish for human consumption.

To deal with the inevitable problems that are characteristic of the industry, the aquaculture workforce must be equipped with good husbandry skills, from senior farm managers downwards. Management standards and employee skills are the most important underwriting factors that insurers look for when evaluating a risk. If farms do not have managers and key staff with satisfactory levels of experience, insurance will either be unavailable or available only on restricted terms and conditions.

Unfortunately, the insurance of aquaculture livestock in many countries is compromised by a lack of adequate disease diagnosis and treatment infrastructure, especially at the local level. But there is also a danger that good facilities and expertise may be effectively hidden from insurers, so much better information needs to be organized. To meet this need, efforts are being made by insurers and other stakeholders to establish online directories of aqua-veterinarians and diagnostic laboratories that are available to the public. This will greatly facilitate easy access to the expertise required.

3.4.5 The importance of aquaculture legislation

The lack of legislation for aquaculture can present considerable difficulties for insurers. Aquaculture is a new and unconventional industry that fits awkwardly into national legislative frameworks; too often its operating framework is designed for agriculture or fisheries. For example, the law in some countries does not actually uphold rights of ownership of fish in fish farms. If ownership of the stock cannot be legally upheld, then it is extremely difficult to insure them.

In 2003, a State Court in Maine, the United States of America, ruled that salmon farmers may only rear indigenous strains of salmon. In effect, the decision bans the use of genetic strains of salmon developed outside the state. From an insurance point of view, this type of decision only increases the biological risk since genetic improvements peculiar to stock that have undergone generations of husbandry will be lost. Insurers cannot be expected to take on the added risks that result from such decisions. Similarly, the availability and use of certain approved drugs influence the availability of disease cover. If insurers are to cover disease risks, it is essential that the drugs needed to treat diseases are available and licensed for use in aquaculture, especially for food fish.

All legislation relating to aquaculture is extremely important to insurers. However, at the international level, the differences in aquaculture-related legislation are large, causing confusion and uncertainty among both aquafarmers and insurers. Many countries have no disease legislation at all; in those that do, laws may sometimes operate inadequately and with uncertainty, yet their structure and intent is inextricably linked to insurance. They can have a direct impact on underwriters, adversely affecting their claims experience, their profits and ultimately their willingness to provide cover.

Insurance should be a protection of last resort, but inadequately worded laws can frequently defeat its purpose. Nowhere is this more relevant than in the area

of government-ordered (compulsory) slaughter of stock or in the restriction of its movement. If a government has the overriding power to arbitrarily determine under what circumstances slaughter or restriction of movement of aquatic stock can be imposed, insurers find it very difficult to take on the risk. In some countries, the national authorities are able to raise the status of any disease to a legally-established category of importance under which compulsory slaughter or restriction of movement can be invoked. Insurers cannot become a tool of the authorities in such circumstances. It is an inevitable temptation, if farms are insured, for public officials to order slaughter, effectively causing insurers to become instruments of public policy.

If it is in the public interest that livestock be quarantined or slaughtered, then logically the public, i.e. the taxpayer, should compensate the farmer for his or her losses. Governments, however, are almost always reluctant to use tax revenue for such purposes; only a limited number of them will adequately reimburse farmers if they lose financially from a government order. A small number of countries will compensate farmers but inadequately, which only encourages them to hide outbreaks of disease. Most governments will not provide any compensation at all.

Restrictions of movement and compulsory slaughter orders offer effective ways of mitigating the effects of outbreaks of important diseases, but their imposition can severely impact producers financially. It should be possible for insurance to protect them, but only if the laws under which such orders are enacted create the neutral, fortuitous claims environment that insurers need in order to operate.

3.4.6 Aggregation of risk in aquaculture

Prudent practice requires insurers to monitor “worst case scenarios” or “aggregations of risk” among the businesses they insure. The December 2004 earthquake in Indonesia and the tsunami that followed highlight the problems faced by aquaculture insurers and show how difficult it is for them to calculate the worst case scenario after such an event.

Insurers are cautious, and while they may want to take on more business of a certain kind, uncertainty regarding the effects that storms, plankton blooms, tsunamis and other major perils may prevent them from doing so. Aquaculture production tends to congregate in suitable areas, such as rivers, aquifers and favourable coastal areas. The financial exposure at a single production site will always be a clear and finite monetary amount; the uncertainty lies in calculating the total values of all sites that may be affected by a single event, within or across a geographical area, or along an extended coastline. This uncertainty directly affects the availability of aquaculture insurance in many areas.

3.4.7 High underwriting expenses

Aquaculture has proved itself to be an expensive class of insurance to handle. Many production facilities have to be surveyed before coverage can be put into effect and almost all have to be surveyed again at the time of policy renewal or if any mid-term material changes are made to the growing systems.

The industry’s claims are also expensive to handle. The industry has high levels of small claims, most of which are excluded by self-insured factors. Nevertheless, whenever an event occurs that might grow into a loss, it has to be handled quickly, expertly and with a high level of skill. Very often, an adjuster has to attend. As a result, while many claims come to nothing, there are still costs to be paid by insurers.

The assessment and management of risks and the prompt and expert response to even minor loss events, are so essential to the conduct of aquaculture insurance that it is impossible to see how costs in this area could be reduced without increasing risk levels. Aquaculture insurance is therefore a sector with high operating costs.

3.4.8 Supply-side premium levels and underwriting profitability

The availability of any product or service is influenced by its price. If a service is too cheap, the providers cannot profit by making it available; on the other hand, if it is too expensive, then end-users will not buy it. Aquaculture insurance is precisely in such a predicament. While many fish farmers appear to show considerable resistance to buying insurance, some considering premiums to be too expensive as far as the supply side is concerned, insurance underwriters do not seem to be making the necessary underwriting profits to stay in the business.

Aquaculture has a track record of generating significant losses on a fairly consistent basis. Since the contemporary insurance market formed in the early 1970s, neither primary underwriters nor reinsurers have achieved the level of underwriting profits that generate the stability needed if the market is to survive, let alone expand. Underwriting results have been marginal at best, which explains why insurance rates and self-insurance factors are high and why there has been a continuous turnover of insurers who leave the market because of underwriting losses.

3.4.9 Widening insurance availability to smaller producers

Clearly, significant sections of the aquaculture industry are ignorant of insurance, how it works, the operating standards that it demands and how to obtain cover. In addition, there is a further restraint on buying cover: it depends on a farmer meeting high managerial and operational standards. A study of the insuring terms and conditions and example proposal forms and wordings (Appendices B and C) give an idea of what is required by insurers. The information required by the insurers requires a standard of management that is difficult for many small operators and artisans to attain. At the same time, the insurance industry has put considerable effort into managing the risks of aquaculture and accumulated considerable experience that can benefit the aquaculture industry as a whole. With the help of international agencies, this expertise could be made available to the less developed levels of the global aquaculture industry.

The long-term objectives of such an approach would be first to improve farm management standards in the less developed areas of the industry, and second, to raise operational standards in smaller farms to a level at which they would become eligible for insurance. It would also help the insurance industry to defray the costs of its risk assessment and risk management capability, and assist it to expand its risk assessment and management capabilities. To meet such objectives requires establishing a dialogue between insurers and the public bodies responsible for looking after and promoting aquaculture in each country.

3.5 Insurance of onshore aquaculture infrastructure

As far as onshore operations are concerned, aquaculture's interests are not difficult to insure. The onshore infrastructure of aquaculture includes many components that are common to other businesses, and local insurance markets in most countries are capable of providing properly designed and competitively priced policies. However, small artisanal operations often encounter difficulties in meeting standards of ownership and operational management that insurance companies require.

3.6 Insurance of live fish transits between hatcheries and grow-out farms

Live fish transits, whether on land or by sea, are not difficult to insure. From an insurers' point of view, each risk is of short duration; the value of transported fish is generally very small compared to that of the fish at risk on a farm; and there is usually a spread of risk across a number of shipments. Exactly the same considerations apply whether the owner of the transported stock is a farm or a hatchery. Fish hatcheries, however, often choose not to insure fish in transit, preferring to replace any stock lost from within the contingency margin that they maintain in running their hatcheries.

A key issue for the farmer is to determine who is carrying the risk of each transit. Hatcheries normally offer to cover transit risks; they are well placed to do since they take on many shipments and usually have their own insurance scheme for covering them. Accordingly, their premiums tend to be much cheaper than what a farmer can get on limited numbers of shipments.

Each individual shipment will usually be subjected to a self-insurance deductible of anything up to 10 percent of the value of the shipment. Here again, however, because they are making many shipments, hatcheries can normally obtain much better terms than the farmer.

3.7 Premium charging methods

To appreciate the implications of insurers' need for profitability, the role of insurers in the insurance process needs to be fully understood.

Contrary to widespread belief, insurers are not risk carriers, but risk spreaders. To paraphrase a historic version of the fundamental principle of insurance, "*A loss falls less damagingly on many people than it does on an individual.*" In accordance with this principle, the insurers' role is not to take on risks themselves, but to be society's professional risk spreaders. Their task for aquaculture is to assess the risks of the business, design premium and compensation structures, and then put them into practice. In the process, they collect premiums and pay claims that result from the operating terms and conditions.

Historically, structuring premiums has been difficult in aquaculture because of the nature of the business. The difficulty arises from the erratic and uncertain way that policies perform in the face of the unique challenges of the industry. In simple terms, it is hard to establish a premium without knowing how a particular policy would work in practice. Nevertheless, a premium structure has emerged that relies on substantial rates, tempered by the kind of incentives that are used in all other classes of insurance. These include, for example, reduced premiums for higher levels of self-insurance, no claim bonuses and special schemes for groups of operators.

After many years of development, terms and conditions are now structured to reflect aquaculture's peculiarities, including the fact that it suffers frequent small losses that insurance is truly not designed to insure and are thus taken out of the insurance equation by imposing deductibles.

A reasonably fair and equitable covering and cost format is now available. While it may not suit every type of producer, it does satisfy the needs of many of them. At the same time, standard methods of calculating and adjusting premiums have evolved, which again may not be ideal for some producers but are satisfactory for many. The premium charging systems that have been developed take into account the fluctuations in value on the average farm and also make allowances for losses that fall below self-insurance levels and cannot be claimed. In general, the systems now in use are fair to both sides.

3.8 Special insurance schemes

The concept behind an insurance scheme is that a pre-arranged set of insuring terms and conditions can be applied to producers that fall within certain parameters. The benefits are typically automatic cover for members, lower premiums, and possibly, more favourable self-insurance factors.

The insurance arrangements of multinational companies that insure all their aquaculture operations under one combined policy, irrespective of what species they are rearing or where they are located, could be described as "schemes". However, a more appropriate description of a scheme would be, "a specially arranged insurance facility that is open to operations under different ownership, within a clearly defined

geographical area, and which uses consistent production technologies and rears common species.”

In practice, schemes in aquaculture are not commonly available. All aquaculture operations are different, in the standard and construction, as is each owner’s experience. The skills and experience of management also vary considerably between units. The current practice of aquaculture insurers is to treat every farm separately, gather specific information on each one, and avoid offering discounts and other benefits that are not substantiated by the overall loss experience of the industry sector involved. This approach is likely to continue for the foreseeable future. However, if the steps to extend the market are to come about, then insurance schemes could have a significant role to play by making insurance available to groups of farmers who individually would not otherwise be eligible for cover.

Governmental administrations and others responsible for aquaculture may have a contribution to make in this respect. It is within the power of such bodies to help small producers group together to improve standards, combine their marketing efforts and improve their purchasing power. It is also possible for such organizations to create “halfway houses” between government support and full insurance; for example, public bodies could possibly provide security against severe risks that insurers cannot handle, leaving insurers to take on the other perils that they can handle.

The issues involved in the establishment and maintenance of government support schemes, not least the implications under world trade agreements, are complicated. However, there are real possibilities of broadening the availability of insurance in this area, making it available to a wider section of industry that is presently excluded and missing out on all the advantages of being covered.

4. THE PROCESSES OF THE INSURANCE MARKET

4.1 Needs assessment

Every aquaculture operation needs to assess which parts of the business it should insure and then seek competitive quotations for the various types of cover. The assessment process is an important task, but tends to produce unsatisfactory results, especially as far as small and medium-sized enterprises (SMEs) are concerned. They often cannot afford to insure interest that should be covered.

Ideally, every insurable interest of a company should be insured, but this is rarely realistic in practice, usually due to costs, but occasionally to lack of insurance market capacity. For most businesses, it is possible to insure key assets and liability exposures for acceptable costs and on reasonable terms. But it is common for business managers to be forced to decide not to cover certain parts of the business due to the costs involved – never a satisfactory situation but a fact of life. When it is decided not to buy cover for certain risks, it is important to manage these uninsured risks.

As far as aquaculture is concerned, most of the insurance protection needed by normal onshore and offshore operations can be provided by insurance markets at a reasonable cost, with the possible exception of crop mortality cover.

4.2 Risk proposal and assessment

Three steps are usually involved in obtaining cover on aquaculture livestock. First, a detailed proposal has to be completed by every farmer who wants to buy cover. This has to be sent to insurers who will use it to conduct an initial risk assessment of a producer’s farm operation. If the information is acceptable, an insurer will provide an indication of rates, terms and conditions. This is not a binding commitment to provide cover, but a stage in the negotiation process when the insurer gives the producer a general outline of what to expect in terms of covering conditions, and, importantly, its cost. If the producer does not like the terms indicated, the process can stop at that point.

If the indication of terms and conditions is acceptable, the process can go forward, in which event the producer will almost certainly be required to undergo a risk management survey of his or her production unit(s). The survey will be carried out by an experienced insurance surveyor who will produce a comprehensive report for the insurer. If the risk management report is satisfactory, the insurer will then provide a firm quotation of the policy terms and conditions that will apply and confirm the policy premium that will be charged.

This detailed risk analysis examination is an integral part of the application process and a valuable and often revealing exercise for the applicant. It must be seen in the context of the leading aquaculture insurers that have over 30 years' experience in insuring aquaculture in all its forms. They apply their extensive experience to probe all aspects of the production operation that they are asked to insure, which serves the basis for their assessments, as well as the conditions and warranties that they apply in any terms they offer. In this context, it can be argued that buying insurance is a valuable process in its own right.

4.2.1 Completing a proposal form

For the insurance application process to have validity, it is important that insurers use well-structured and appropriate methods of developing information on individual farms. In this area, the insurance industry is well organized and has developed good tools. For example, over many years, some extremely well- designed proposal forms have evolved, which get to the core of the risks of aquaculture. They ask important questions and give applicants full freedom to provide all the information that they feel will adequately explain their operation and its systems. Two such forms are provided (see Appendices C1 and C2), which illustrate their versatility and how the application process caters to different aquaculture systems.

Every specialist insurer tends to have its own proposal forms, but all ask roughly the same fundamental questions about an operation. Each form must be completed carefully, and failure to disclose key information or material facts can lead to the invalidation of an insurance policy. This is because the proposal form in effect becomes part of the insurance policy if insurance is subsequently arranged. Every question must be answered comprehensively and each form must be supported by maps, plans and photographs of production facilities.

Although individual insurers prefer that their own application forms are used for each application, many are willing to accept a competitor's form. A completed form can then be sent to a range of insurers for alternative quotations. In practice, a form will always have to be completed for a new farm applying for insurance for the first time and almost always has to be used again, every time a policy is renewed, and sometimes when significant changes are made to the structure of a production unit.

Having received a completed proposal form, an insurer will review the information provided by the applicant and assess the general risk profile of the operation. The underwriter will then either decide that the risk is not insurable by the underwriter or supply an indication of terms and conditions. The underwriter's approach often depends on whether he/she is familiar with the geographical area of the farm site, the growing system used and the species being raised. Very often, additional information will be requested, and in some cases, no indication of the terms and conditions will be provided until a risk assessment survey is carried out.

4.2.2 Risk assessment surveys

In some cases, information provided in a proposal form will not be sufficient for an underwriter to decide the underwriting approach, so the insurer will request that a risk assessment survey (rather than a full risk management survey) be carried out before

terms and conditions are indicated; the risk assessment survey is more superficial than a full risk management survey.

Risk assessment surveys focus on many of the same things as a full risk management survey but in less detail. In the case of a cage farm, for example, a risk assessment survey might involve some preliminary estimations of wave characteristics, storm exposure and the mooring structures needed to deal with them, whereas a full risk management survey would examine the wave climate in detail as well as mooring configurations, maintenance procedures and many other engineering issues. Similarly, overall housekeeping and management systems may be superficially examined in an assessment survey of a hatchery, while a full survey will cover stock control procedures, alarm systems, and hygiene and disease prevention processes, among other issues.

Risk assessment surveys accompanied by well-developed proposal forms are a thorough method of evaluating production facilities for insurance purposes.

4.2.3 Indicating provisional terms and conditions of cover

Having assessed all the information in a proposal form and attachments, an underwriter may decide to not provide cover on a farm, in which case the producer will be informed and can argue the case accordingly. In most cases, however, terms and conditions of insurance will be prepared and offered to the producer. The producer is again free to either accept or decline what is offered, or to try and bargain for a better deal.

Unfortunately, for the above reasons, the market is small and there is not a great deal of competition between insurers, although the same is not true between insurance brokers. As a result, the producer is not in a strong position to bargain over terms and conditions, and if a bank is involved in financing the farm, or if insurance is a requirement of extended payment terms that were negotiated with a feed supplier, for example, the producers' bargaining position may be weakened still further. Nevertheless, terms and conditions can be agreed and then the relationship between the producer and the insurer begins.

4.3 Risk management

It is important to aquaculture that the insurance industry employs the same risk analysis and management – led approach that it uses in all other industries. In this respect, the aquaculture insurance market has developed along very appropriate lines, and the contemporary market offers a well thought-out and comprehensive approach to risk-managing aquaculture that closely parallels the way it handles other high risk industries.

It is often not widely appreciated that the insurance industry has a long and honourable tradition of developing and applying risk management techniques that have contributed a great deal to the well-being of society and to the success of many industries. For example, the development of sprinkler systems, the limitation of pilot flying hours, the development of fire brigades, fire and burglar alarms, and the promotion of a whole range of other risk management products and techniques can all be credited to the innovative and thorough approach to risk management adopted universally by the insurance industry.

Nowhere is such an approach more relevant than in aquaculture. Risk management is a crucial part of the ongoing aquaculture insurance process, and all the specialist aquaculture insurers of all the industry's difficult portfolio areas devote a great deal of time and effort to putting it into practice, particularly in the livestock and diving areas. For this reason, management of risk should be seen as key to the future health and profitability of aquaculture; it is certainly key to the availability of aquaculture insurance.

4.3.1 Risk management surveys

All the specialist insurers use site surveys to assess the physical risks inherent in production units and to ensure that high standards of operation are always maintained on farms they insure.

Surveys are carried out by individuals who have either been trained in aquaculture inspection techniques or who are drawn from the insurance industry's world-wide inspection force of professional surveyors. Although the latter are unlikely to have experience of the peculiar risks and hazards of aquaculture, many of their skills are directly relevant to the physical arrangement and components of aquaculture systems. This especially applies to marine sites, which use extensive pumping and aeration technology, and sites that rely on sophisticated alarm systems.

The industry's marine surveyors are familiar with the extremes of wind and wave forces, and the currents and tides that occur along local coastlines. They can materially assist in the location and maintenance of cages and their moorings. Its electrical and mechanical engineering surveyors can evaluate generators, pumps and alarm systems used in aquaculture operations to ensure that they are appropriate for each job and that they are properly installed and maintained. In addition, there are specialist insurance surveyors in numerous other disciplines, including health and safety, fire and food processing.

It would be wrong to conclude that these services are only available to those aquafarmers who buy insurance. The services of almost all the insurance industry's surveyors are available on a fee basis to anyone, whether or not insurance is involved.

4.3.2 Biological surveys

Biological risks present different risk management challenges for underwriters and need to be surveyed separately by specialists. Disease, for example, is one of the major economic perils for any livestock operation and a major source of aquaculture insurance claims. Biological surveys are therefore an essential aspect of the process.

The insurance industry treats the biological risks of aquaculture separately from physical risks, but accepts that physical risk management, if inappropriately applied, can have an adverse impact on health management. The specialist insurers either employ their own in-house biological specialists or draw surveyors from a pool of experts who have been involved in aquaculture insurance issues and who have a considerable knowledge of the biological risks of the industry.

Although biological inspections are carried out for insurers and are a key component of the risk management of aquaculture production units of all kinds, the first resort of insurers is to ensure that the management of a farm is experienced enough to deal with disease problems and that each farm has readily available disease diagnostic facilities to rely on as well as knowledgeable fish veterinarians. This is an important point. Insurers do not expect to call on their own experts to operate farms; they expect farmers to have the skills to do so themselves. However, biological issues are so important in aquaculture that when problems arise, experts should be brought in. Biological surveyors are, therefore, not only used for risk management, but also in response to disease outbreaks or situations where changing farming methods may require further assessment.

4.3.3 Survey costs

Aquaculture risk management surveys are expensive. They are carried out by skilled professionals who command high fees. The cost of surveys is handled by insurers in a number of ways. Some survey costs are simply absorbed by insurers as an expense offset against premiums. This approach tends to be applied to clients with good track records, whose business the insurer is keen to keep. In other cases, an insurer may

require that a survey be carried out at the producer's expense. This often occurs when the record of a producer is not good, and the insurer is uncertain whether the business is desirable, be it a new farm or a policy renewal. Another possibility occurs when a producer is new to an insurer who is asked to compete for the business. Since the insurer may not get the business, a survey is likely to be carried out at the producer's expense; however, the insurer might offer to pay all or part of the costs if the business is obtained.

Ownership of a survey is another important issue, because it is connected to the right to see its contents.

The rule is that the payor of the report is entitled to a full copy. In theory, the owner of the report is not obligated to let anyone else see it. In practice, of course, a producer always let the underwriter see it, but the reverse is not always the case. This prompts the question – why would an insurer not show a survey report to the farm owner? The answer is that a surveyor must be free to deal with all issues and comment on them, positively or negatively, to the insurer. Understandably, surveyors are reluctant to comment adversely on an operation if their comments may be seen later by the owner. Since it is vital that surveyors act with integrity, insurers should always keep their comments to themselves.

4.3.4 Better management practices

The survey facilities built up by insurers are an extremely valuable asset that should be extensively used by aquaculture, irrespective of any insurance objectives involved.

Some producers argue that survey costs are too high, believing that they can carry out their own surveys perfectly satisfactorily. This belief is dangerous. Almost all owners and farm managers are so familiar with their operations that they overlook their critical weaknesses. On the other hand, an independent surveyor who is unfamiliar with the structure and workings of a site will be much more critical and will investigate every aspect of its operations..

Experience shows that independent risk management surveys are effective at preventing losses. However, every operation also needs to implement an active risk management plan. This should not only address the practical issues associated with the production system, such as managing the risks to marine cages and onshore tanks, for example, but it should also constantly seek to adopt the available BMPs.

There have been many developments in or BMPs in many areas of aquaculture, and details of their characteristics are becoming widely available. The Internet provides a rich source of such information. The challenge for aquaculture operators is to develop BMPS at every level of the production process and to continue improving them as technology and systems evolve.

4.4 Claim handling procedures

Claims are the end-product of insurance and the reason that people buy insurance cover. Processing and paying claims expediently and fairly is vital in all classes of insurance.

Aquaculture claims have to be handled with special care. Because of the nature of the industry and the potential fragility of its stock, it is necessary to respond to events before they even reach the level of actually becoming a claim. Aquaculture insurers have put considerable effort into responding to potential losses quickly and effectively. The claim handling system used by all insurers requires insureds to report any event that **might** lead to a claim. The purpose of such a tight reporting system is to respond to issues as early as possible.

Experienced insurers recognize the industry's difficulties due to the unusual nature of the business. The fact that stock is grown in water, where it cannot always be easily seen or counted, is an important factor. The speed with which simple problems can escalate into severe ones is another factor to be taken into account. Although

aquaculture insurance policies contain substantial deductibles in the form of self-insurance, which remove insurers from small incidents, experience shows that when aquaculture losses occur, they tend to accelerate quickly, often overwhelming farm staff in the process.

To face the above difficulties, insurers have developed procedures for farmers, which depend on:

- the immediate reporting to insurers of any problem that **might** lead to a claim;
- the recognition and identification of problems as they arise, by competent farm staff;
- the immediate deployment of expertise to help mitigate each situation.

4.4.1 Immediate reporting of and responding to problems

In every specialist policy, there are clauses that give instructions identifying the individuals to be contacted in an event that **might** cause a loss. It is vital that problems be reported immediately to these representatives of the insurers, whether they appear to be significant or not. The word “**might**” must be stressed as it is one of the key features of handling losses.

Disease is by far the biggest cause of aquaculture claims. It is not that the industry suffers from specific major diseases, but that disease is often a by-product of stress, which may be caused by a natural event, such as a storm, high water temperatures or a plankton bloom. Once the symptoms of a disease occur, they may be difficult to treat, because sick fish invariably go off their feed, the form in which medication is usually given. If the disease is new or unfamiliar to a management team, it may be difficult to identify a treatment quickly. In all cases, the producer needs to notify his insurers immediately and keep them appraised. If at any time the insurers think that the situation may lead to a claim, they will almost certainly call in experts.

4.4.2 Expertise of farm management

The competence of the farm’s management and the fish husbandry staff is vital in claim situations, which is one of the reasons that it is a crucial factor in underwriting.

The qualifications and experience of the management team and staff are one of the first things that an insurer assesses when evaluating a farm. Its importance is emphasized by the fact that insurers reserve the right to change their underwriting terms or even cancel cover altogether if key managers leave. Good husbandry skills are vital when it comes to responding to problems and taking the right action to prevent small problems from escalating.

4.4.3 Expert help in claim situations

The reaction to any situation that might lead to a claim has to be fast, effective and knowledgeable. It is for this reason that the policy claim handling procedures are so important and designed to put in motion the most effective mitigating actions as quickly as possible.

Once the insured has advised the representatives of the insurers on a situation, both the farmer and insurers are united in a common cause, namely, to stop the problem as quickly and effectively as possible. Because all specialist policies contain self-insured factors (at least 10 percent and possibly 20 percent or more in the case of disease), the financial involvement of underwriters does not come into effect until the amount of livestock lost exceeds the deductible level. Nevertheless, since the interests of both the insured and the underwriters are still identical, it is not difficult for them to agree on what action needs to be taken to deal with the problem.

There are many benefits from having the backing of insurers in claims situations, but the ability to call in expert advice – possibly legal, and at times external -- is one of the most valuable.

If substantial stock values are at risk, insurers will exercise considerable efforts to mitigate losses; policies are designed to clear the way for them to do so.

4.5 Eligibility for insurance

The operational standards required by insurers before they will consider providing even limited insurance cover effectively rule out the availability of insurance to substantial subsectors of aquaculture. There is no way around this, except overlooking a commercial approach by insurers. Due to their profit motive, they have no alternative but to restrict cover to those producers who run their operations to the highest standards.

The fundamental safety and security of a site is of prime importance; further in order to get insurance, a producer must demonstrate high levels of experience, not necessarily with the species in hand, but in aquaculture husbandry in general. Farms must have sound management, supported by capable husbandry staff and by experienced outside professional organizations, such as fish veterinarians and diagnostic laboratories. It is also essential that a farm is well managed and up-to-date, and maintains accurate stock control records.

It is impossible to operate any insurance arrangement without good records; they are fundamental to the levying of premiums and the calculation of claims. Moreover, stock records should not be numerical counts of what is on hand, but should include all egg/juvenile/lava purchases, as well as details and dates of grading and grading sizes, data on minor losses and harvesting numbers. They should also give details of the feed consumption, ambient water temperature (a significant factor in stock growth), water quality parameters, and details of any treatments administered or problems that have arisen. These requirements may seem onerous, but good stock control is tantamount to good management practice.

Due to the requirement to keep accurate stock records and to prove the cause and extent of any losses, it is difficult to insure certain stocks, such as marine shrimp in ponds and mollusc beds.

Some insurers are beginning to experiment with shrimp farm policies, but the problem of counting mortalities and linking them to specific events will always remain. Most insurers need to link the cause of a shortfall in production to a precise peril, and establish, to a reasonable level of accuracy, how much stock was lost to a certain peril. Unless this can be done, the application of self-insured factors becomes difficult and there is always a danger that insurers will pay for stock that died from other causes.

A number of national and international organizations have indicated that they want to encourage the spread of insurance, making it available to lower levels of the industry. One of the best ways to do this is to determine what prevents producers from being eligible for insurance, and rectify the situation. Poor practices are at the root of much insurance disenfranchisement.

4.6 The benefits of being insured

The commercial benefits of buying insurance are well known. Aquaculture livestock insurance in effect turns what banks perceive as a perishable crop in a high risk situation, into a bankable asset. Raising funds is made easier and cheaper if a farm is insured. If a farm suffers a loss, insurance payments can help fund the purchase of alternative stocks to meet market commitments and new seedstock to keep the farm in business.

Insurance is especially valuable when a loss is caused by a third party. A producer covered by insurance is a formidable adversary, particularly in cases of pollution where a large company might be negligent. The potentially high financial support from insurance companies allowing to hire lawyers and work together with other insurers can achieve results that individual aquafarmers cannot.

There are many benefits to being insured. Cover may be difficult to purchase, but there is no doubt that the producers who buy insurance obtain significant advantages in the form of many hidden benefits.

4.7 The cost of buying insurance

The benefits of insurance are academic if the cost of cover puts insurance out of the producer's reach. Unfortunately, as stated previously, aquaculture livestock insurance costs are so high that many producers opt to be self-insured.

Some examples of rates and premium costs shown in Appendix B show that rates are linked to substantial self-insurance factors of various levels; therefore, insurance costs can be adjusted downwards by raising self-insurance. Costs can also be reduced by excluding certain risks. If disease is excluded, for example, rates can be reduced substantially. In spite of these flexibilities, however, many producers still see premium costs as too high and therefore take the self-insured route.

On the other hand, many insurers regard premiums as generally too low; over the last ten years, the lack of underwriting profitability has compelled some insurers to pull out of insuring aquaculture livestock, several of which after being involved for a long time. More unfortunately, because of the reputation of aquaculture as being high risk, with administrative difficulties and big expenses, potential new insurers to the sector have declined to become involved.

There have been a number of large individual livestock losses over the years, which have resulted in substantial claims to insurers. In particular, there have been widespread outbreaks of *infectious haematopoietic necrosis* (IHN) and *infectious salmon anaemia* (ISA) in salmon. There have also been losses caused by extreme climatic events, such as floods, droughts and superchill, environmental events, such as plankton blooms, and some well-publicized events in the new tuna-fattening sector. In addition, there has been a steady stream of small losses across the industry, the combined effect of which has consumed considerable amounts of premium and largely destroyed underwriting profitability.

Premiums cannot be both too high *and* too low. Either producers do not appreciate the risks of their business or insurers suffer losses by taking on the wrong type of business. Possibly, insurers have been beguiled by the large premiums on offer from insuring the major producers and have not appreciated the degree to which these producers concentrate their risks into limited areas or the risks involved. Also, insurers may not have been sensitive to the fact that producers may have been pushing forward and implementing new technology without proper evaluation, and that this has resulted in some of the losses.

Many producers, on the other hand, are highly focused on managing the risk in their operations and may be flawed in believing that they have largely eliminated risk. All they may have achieved is better husbandry and a reduction in the number of incidental husbandry risks, but with no affect on the long-term exposure to catastrophic risk.

Insurance should be concerned with protecting against catastrophic loss and not with exchanging premiums over small chronic losses. It can be argued that too much of the premium that underwriters currently charge goes to pay for non-catastrophic losses, and that they are not therefore accumulating sufficient reserves to meet the catastrophic losses of the future. In practice, however, this is difficult to rationalize.

Commercial sensitivities make it almost impossible to get data on the historical experience of the aquaculture insurance market or that of producers. In the absence of accurate statistics from across the whole market, it is impossible to determine the real picture on current losses. At the same time, the picture of catastrophic losses can only emerge over time, so the historical record achieved so far may be proven inaccurate. But it is clear that premiums will not come down if the loss experience continues at the

same level; they may even go up. However, the worst scenario is that the continued loss experience will compel insurers or their reinsurers to pull out of the market entirely.

In conclusion, the supply side of aquaculture insurance is constrained by limited underwriting capacity with an uncertain future and the belief of some aquafarmers that protective insurance is not worth buying. The solution is for producers to adopt the highest management standards and to concentrate on the constant application of risk management. If this is achieved, then premiums for insurance cover become moderate, and availability will improve as underwriting profits improve. But until then, individual producers wanting cover will have to accept the rates on offer and do their best to achieve a good track record to earn no-claim bonuses.

5. DEVELOPING THE MARKET FOR AQUACULTURE INSURANCE

5.1 Awareness raising, promotion and outreach

For most domestic insurers, the lack of experience of the problems involved make it difficult to handle the business profitably and they must almost always look beyond their local markets to the international markets for experienced support.

The most experienced international aquaculture market, with the capacity and flexibility, is mainly located in Europe. London is the largest market and the global centre, but there are also large reinsurance markets in Switzerland, Germany and France. Outside Europe, the more significant insurance and reinsurance centres are the United States, Australia, New Zealand, India and Japan, followed by some countries in Asia.

One of the best developed markets for aquaculture insurance is in Norway, a country that produces some 700 000 mt of aquaculture products annually, most of which is Atlantic salmon. A group of insurance companies has specialized in the class since salmon farming began in the early 1970s. These companies have as much knowledge and experience of underwriting the specialist risks of aquaculture as can be found anywhere. However, although Norwegian insurers will underwrite some non-Norwegian business, their primary commitment is to Norwegian producers and their international interests. This illustrates one of the complexities of the international market for aquaculture insurance: what appear to be domestic insurance arrangements in a country may in fact be nothing of the sort. Norwegian fish farming companies, for example, have interests all over the world, but the fact that one of their subsidiary companies in a particular country is fully insured does not mean that aquaculture insurance is generally available to all producers in that country.

In most countries, aquaculture insurance is only available through the international market, and local companies know little or nothing about it. However, the insurance of domestic aquaculture industries does not have to remain in the hands of outside markets forever. The insurance industry is dynamic and the international market, backed by reinsurance, can assist local companies to provide capacity where needed. By purchasing reinsurance and by relying on more experienced insurers to provide assistance with basic underwriting terms and conditions, handling claims and other technical issues, national companies can develop the skills to handle the class in their own national industries.

The Norwegian case illustrates confusion in identifying the countries in which aquaculture insurance is available. There are a number of examples where cover is apparently provided locally, but is in fact underwritten internationally. Large producers may arrange insurance for their subsidiaries in different countries through group schemes underwritten in the international market. Alternatively, local producers may buy insurance by going through an international broker to buy cover, but again on the international market. Local producers may also be able to buy insurance through a local insurer who passes a major part of their risks to reinsurers outside the country.

In all these cases, local aquaculture producers are insured, but not by a specialist aquaculture insurance market in their homeland.

The above situation could change if aquaculture itself expands in different countries and improves its operating standards to the extent that local industries become viable consumers of aquaculture insurance. If this happens and overall aquaculture underwriting results also improve, genuine local insurance markets will develop.

This prompts consideration of how the insurance industry promotes itself and generates new business.

As discussed, aquaculture insurance has a very poor track record in terms of underwriting profitability. Insurers and reinsurers are therefore generally unenthusiastic about the class and have rarely marketed themselves and their capacity to aquaculture. It is more attractive to most of them to use their limited underwriting capacity on other, more profitable, less demanding and less risky businesses. The situation may be changing, however. One of the major international insurers has recently started to actively promote its aquaculture facilities. This may be a sign that aquaculture is finally becoming profitable and thus starting to generate the competition among insurers that other classes benefit from.

Brokers, however, are remunerated according to the amount of insurance business they can arrange for. Aquaculture is very attractive to them because its rates and premiums on which their commissions are calculated are high. Accordingly, they have an incentive to develop as much business as they can.

All the specialist brokers of aquaculture promote themselves and their skills to the international aquaculture industry. They attend conferences and exhibitions, and advertise extensively. They also travel widely and visit the industry in many countries and regions.

5.2 Capacity building in aquaculture insurance and risk management

The only way to increase capacity in insurance markets is to prove to insurers that aquaculture can be a profitable field for them to operate in. Only when that is achieved will a truly competitive market develop, especially for mortality insurance.

In the stock mortality field, the track record of aquaculture has historically been characterized by periods of reasonable underwriting profitability followed by severe losses from storms, diseases, plankton blooms and in certain areas, superchill.

The 2004 Asian Tsunami influenced the market negatively, not so much because of the losses it caused, but because of its extremely widespread effect. Insurers, particularly reinsurers, were severely taken aback by the losses they **might** have incurred had they been heavily involved. The event would have been particularly severe if the shrimp industry based in the low-lying coastal areas of Myanmar, Indonesia, Malaysia, Thailand, Sri Lanka, India and the islands in region had been insured.

Aquaculture has rightly labelled the industry as “high risk” – a reputation that it will have difficulty in overcoming. Such widespread disasters as the Tsunami do nothing to conquer the impression among insurers that there is always some catastrophe waiting to hit the industry wherever it is located.

Unfortunately, the insurance market is its own worst enemy in some respects. Competition is always perceived as being a good thing, but it occasionally has negative effects. In aquaculture, there has been a tendency for inexperienced insurers, attracted by high premiums, to enter the field, suffer financially and get out again. There is a very professional core of practitioners in the aquaculture insurance market who understand the industry very well and know how to underwrite its risks profitably. They cannot, however, compete against the ignorance of market newcomers, who are attracted by the high premiums involved but unaware of the high risks. While the involvement of such “soft” insurers has worked to the temporary benefit of some aquafarmers and

some sections of the industry, it has only done so for a limited period, because they have pulled out in the end. This short-term focus has worked against the development of a broader and more stable insurance market.

Aquafarmers are responsible for looking for experience and professionalism from their insurers. They need to recognize that the cheapest quotation is not always the best. All insurance buyers are well advised to look for long-term partnerships with their insurance carriers and to demand that they have high levels of expertise and experience.

While the only way forward for producers is to constantly improve management standards, particularly in the area of risk management, the only way forward for insurers is to invest in learning about aquaculture and in training their underwriting personnel. In general, insurance underwriters are highly educated people, usually with university degrees, mainly in economics and similar subjects. But that does not make them experts in aquaculture and its risks. The market can only expand with the support of underwriting profitability, which will only be achieved through a commitment on the part of insurers to get involved on a professional, long-term basis, which includes teaching their underwriting personnel about aquaculture.

The way forward for all sides is to apply a total risk management approach at every level, improve management standards, especially standards of stock control, and strive to ensure that management standards are increasingly in demand and practised by the less sophisticated sections of the industry who presently find it virtually impossible to buy cover. No matter how profitable the insurance industry becomes, insurers will never extend cover to farms that do not reach adequate standards of management.

5.3 Institutions and companies involved in the market

Direct Insurers:

Canada:	American International Underwriters, Toronto
Chile:	Royal & SunAlliance Seguros (Chile) S.A.
France:	Groupama
Greece:	Hellenic Agricultural Insurance Organization
Norway:	Gjensidige Forsikring AS IF Forsikring AS Norway Energy and Marine Insurance AAS Vesa Forsikring AS
Poland:	Powszechny Zaklad Ubezpieczen S.A. Centrala
Spain:	AGROSEGUR
UK:	Royal & SunAlliance Sunderland Marine Mutual Insurance Company Underwriters at Lloyd's of London
United States:	Hartford Fire American Live Stock Insurance Company

Specialist Aquaculture Transit Insurers:

United Kingdom: Crowe Livestock Underwriting Ltd.

Reinsurers:

Germany:	Munich Reinsurance Company
France:	SCOR Global P & C
Switzerland:	Partner Reinsurance Co. Swiss Reinsurance Zurich Reinsurance

Specialist Brokers and Underwriting Agents:

Canada, East: Marsh, Canada

Canada, West:	Morris McKenzie Inc.
Norway:	Aon Greig
	Marsh, Norway
Spain:	Artai BV
United Kingdom:	Aquarius Insurance Services Ltd. (exclusive agents for Royal Sun Alliance) S.B.J. Nelson Steavenson Ltd. Willis

6. LESSONS LEARNED

A number of important lessons have been learned since the establishment of the aquaculture insurance market.

First, risk management practice is the key to reducing loss and wastage in the industry, and a vital tool for both producers and their insurers. It has to be constantly applied at every level of the industry. Aquaculture is not an industry in which corners can be cut.

The second lesson is that for small to medium-sized producers and family operations in less developed countries, access to insurance is, at best, very difficult, and at worst, completely unobtainable. The insurance industry cannot be expected to change this situation. It is up to governments to provide the right legal, educational and other support frameworks to help raise the operating standards of small producers to levels at which they can be insured, if not individually, then in cooperative or coordinated groups.

The third lesson is particularly important: the surveyors and survey skills of the insurance industry are not exclusively reserved for the use of insurers and their clients. They are available to anyone, including governments. Governments in particular need to appreciate that the specialist aquaculture insurance industry has more practical all-round experience in what can go wrong in aquaculture than any other body or collective group.

Finally, if the aquaculture insurance is to grow, training centres/facilities must be established that can provide basic education in aquaculture insurance.

In recognition of the need to communicate with all parties, especially governments, the insurance industry has established a widely representative liaison group, which is in a position to open a dialogue with governments and others who are interested in tapping into the industry's body of expertise: FAO participates in this group.

7. SUMMARY OF SHORT- AND MEDIUM-TERM OPPORTUNITIES

The insurance industry will not undertake to spread the risks of industries whose participants do not meet basic management standards and whose fundamental risk profiles are unacceptably high. Only governments with wider political and social obligations can create the legal, educational and support structures necessary to bring risk levels and management standards under control. However, in exercising their social and political responsibilities, governments can greatly aid the future transfer of risk spreading to the commercial insurance markets by adopting a progressive approach to the way they manage and develop their aquaculture industries.

The immediate objective should be to establish the right legal and operating framework for aquaculture, in any jurisdiction where it operates. This is probably best implemented by establishing a comprehensive licensing system for all producers in a region; the withdrawal of a license is the best way to enforce compliance with required standards.

In practice, disease is the area of greatest concern. The importation of non-indigenous species into a region must be carefully controlled and key diseases must be notified, supported by the appropriate restriction of movement and compulsory slaughter regulations. Such control measures have to be supported by comprehensive

diagnostic laboratory facilities, adequate testing capabilities and appropriate sanctions if control measures are not adhered to.

Once such regulations are in effective operation across well defined production areas, all the producers covered by them are likely to become better insurable risks. Such structural organization creates a level of control that makes the accurate calculation of the monetary values of production areas and individual units a feasible proposition. This in turn makes organizing viable insurance programmes a realistic possibility, even those of a part government, part insurance industry nature.

The short-term objective should therefore be to establish areas of licensed and controlled aquaculture production. In the medium term, the objective should be to establish disaster compensation/insurance programmes against key perils; the long-term objective should be to establish fully self-supporting insurance arrangements for individual operators.

8. ACKNOWLEDGEMENTS

The author gratefully acknowledges the support of the following companies for providing their insurance terms and conditions, which form the examples of the insurance wordings shown in Appendices B--D: (i) Sunderland Marine Mutual Insurance Company Ltd. Sunderland, United Kingdom, for kindly providing an example of All Risks policy conditions (see Appendix B); and (ii) S.B.J. Nelson Steavenson Ltd., London, U.K., for kindly providing an example of Named Perils policy conditions (see Appendix D2).

The examples provided by these two companies are for illustrative purposes only. While each illustrates how such policies are structured, readers must be aware that every policy is underwritten individually and may attract conditions that are not reflected in these wordings.

Thanks are also extended to Aquarius Insurance Services Ltd., whose comments on a number of issues affecting the aquaculture insurance market are very gratefully acknowledged, as are the comments and advice of many other professionals in the aquaculture insurance market.

Role of better management practices (BMPs) in aquaculture insurance

Pedro B. Bueno,¹ Michael J. Phillips,² C.V. Mohan,³ Arun Padiyar,⁴ N.R. Umesh,⁵ Koji Yamamoto⁶ and Flavio Corsin⁷

There is a broader range of hazards and risks faced by small aquafarmers and their families than those that cause the loss of crops only. These added risks are those that impact on life, assets and livelihoods. The major risks to livelihoods are: (i) risks to fish farming activity, mainly from natural factors, such as lack or excess of water, storm surges, harmful algal blooms, typhoons, predation and disease; economic factors, such as those related to the cost of inputs and the price of products; and social factors often expressed in lack of security to crop; (ii) risks to assets used in farming and non-farming activities; and (iii) risks to health.

Risks to aquafarming activities are addressed by a combination of approaches such as reduction of risks through implementation of better management practices (BMPs) and mitigation or risk spreading through financial instruments such as insurance. While risks to household assets and health are not addressed in this review, it should be borne in mind that loss of assets and impairment of one's capacity to work productively due to injury or illness can have severe impacts on the capacity of a farm family to earn a livelihood.

This review will try to show that BMPs can be a tool to help small and poor aquafarmers acquire the capacity to access financial products. The objective of BMPs is to enable small aquaculture farmers to produce more sustainably. A large part of this capacity comes from knowledge and skills to manage on- and off-farm risks. This ability improves chances for a successful crop, which makes the farmer insurance- and credit-worthy. In turn, a case will be made for insurance as a tool to encourage farmers to take up BMPs and to organize themselves into groups, clusters and associations so that insurance would truly become a risk management tool and, beyond that, a part of the total service support system for small farmers.

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We are grateful to the comments, information and advice of our many colleagues. We acknowledge the shortcomings of this review, which reflect the limits of our knowledge in insurance matters.

I. INTRODUCTION

This review aims to show that small aquafarmers are a good insurance investment and thus also credit-worthy. The as-yet small but encouraging body of evidence is suggested by results of pilot projects to promote the adoption of BMPs among small-scale shrimp farmers in India and Viet Nam, as well as Thailand's experiences in promoting schemes targeted at shrimp aquaculture, namely, good aquaculture practices and a code of conduct. These projects also suggest strategies to support farmers in mitigating and managing risks better.

Are small-scale farmers a good investment? This statement paraphrases the question posed by *The Economist* in a microfinance survey: "Are the poor a good investment?" The short answer was that, in a strictly financial sense, doing business with the poor can produce profits ("The hidden wealth of the poor", 5 November, 2005).

Charity or business? *The Economist* article emphasizes that microfinance services should not be provided for the sake of equity or fairness, nor seen as yet another public good, which would limit its scope to charity, philanthropy and government dole-outs and grants. The survey questioned claims of success based on the single fact that microfinance clients repay their loans. On the other hand, it also described successful cases and promising innovative schemes in many developing countries in Latin America, Africa and Asia. It also referred to the trend among the world's biggest banks and insurers in becoming increasingly interested and involved in microfinance.

The Asia-Pacific Rural Agricultural Credit Association (APRACA) can provide more specific institutional cases, experiences and lessons learned on microcredit. At this point, to borrow from C.K. Prahalad's bestselling book, *The Fortune at the Bottom of the Pyramid* (2003), profit can be made by doing business in financial services with the poor. The catch, however, as Prahalad illustrates from the ITC e-Choupal story,⁸ is to enable the poor to produce more so they can consume more. The article, *Breaking the vicious cycle of poverty through micro-credit*, highlighting the strategies adopted by the Grameen Bank of Bangladesh, gives a microfinance case in point⁹ (Annex 1).

II. PRINCIPLES TO PRACTISE: CREATING CAPACITIES OF SMALL-SCALE FARMERS TO ACCESS FINANCIAL PRODUCTS

Prahalad described three founding principles in creating the capacity to consume at the bottom of the pyramid – *affordability, access and availability*, but stressed that the ideal is to "create the capacity to earn more so that the bottom of the pyramid can afford to consume more". On the other hand, A. Karnani (2006) takes up the idea that the poor should be seen first and foremost as producers. As such, he/she places priority on enabling them to be more productive before asking them to buy more consumer goods.

⁸ The Indian Tobacco Corporation e-choupal experience shows how aquafarmers with facilitated access to the Internet and market and technical information on commodities can increase their incomes by 5 to 10 percent. Farmers can decide when and how much to sell based on their understanding of the likely price movements for their products. Modern technology not only allows them to realize better prices, but also to improve their logistics. The aggregation of food grains allows for efficiencies for both farmer and buyer.

⁹ See www.grameen-info.org/bank/bcycle.html.

BOX 1

BACKGROUND ON THE INTERNATIONAL PRINCIPLES

In 1999, the Consortium on Shrimp Farming and the Environment was formed through a partnership between the World Bank, the Network of Agriculture Centres in Asia-Pacific (NACA), FAO, the World Wildlife Fund (WWF), and in 2005, the United Nations Environment Programme/the Global Programme of Action for the Protection of the Marine Environment (UNEP/GPA). The objective of this global programme was to identify shrimp farming issues and broadly advise on better management of the shrimp farming sector. The programme has supported a wide range of case studies and stakeholder consultations involving governments, the private sector, academia and NGOs, consisting of over 100 researchers in 20 countries over a five-year Period. The studies came up with 17 conclusions, which have informed and become the core basis for the formulation of the International Principles. The conclusions relevant to this review are that:

- eight to ten activities cause most impacts – three to five per farm;
- BMPs reduce impacts to acceptable levels;
- most BMPs pay for themselves within 2-3 years;
- social BMPs are important to reduce impacts and increase profits;
- the greatest barrier to adopting BMPs are lack of information
- regulations encourage compliance, not innovation;
- better managed operations have better returns and fewer impacts.

A key finding from the Consortium programme was that BMPs based on the International Principles lead to more efficient farming, reducing risks and improving profitability; this finding has greatly facilitated streamlining of shrimp farms across Asia and has opened opportunities for making broad changes across the sector.

A. Principles

The broadest principles for sustainable aquaculture are provided by the Code of Conduct for Responsible Fisheries (CCRF). CCRF has been the basis for the development of more specific principles and guidelines. Among these are the “International Principles for Responsible Shrimp Farming” (FAO/NACA/UNEP/WB/WWF Consortium on Shrimp Farming and the Environment, 2006).

The Principles provide an international framework for improving the sustainability of the shrimp farming sector. Intensive consensus building, advocacy and partnership building involving public and private partners and NGOs have helped mainstream the Principles into environmental management initiatives at the farming community through to the international level.

As international discussions focus on certification of aquaculture products, it is likely that the International Principles, or documents based on them, will play a role in setting market-driven certification standards. These are the first principles of this kind for the aquaculture subsector, based on the Code of Conduct for Responsible Fisheries (CCRF) and can be used as a model for the development of principles for other forms of aquaculture. Formal endorsement of the International Principles by the NACA Governing Council, consisting of 17 Governments, and the support shown by the FAO Committee on Fisheries, Sub-Committee on Aquaculture also indicate that the scope of this approach goes far beyond the countries involved in the initial steps of implementation, whose experiences are presented here.

Initiatives in India, Viet Nam and Thailand (and Aceh Indonesia, as part of the rehabilitation projects) have led to the uptake of better environmental management practices at the grassroots level. In India, a partnership among local farmers and

government agencies has been growing; as at 2006 it has over 700 farmers in five coastal states, leading to unprecedented improvements in environmental performance among small-scale shrimp farming communities. Environmental benefits from the Indian experience included a reduction in environmental loads of pond effluent and chemicals, reduced disease risks and improved product quality. Based on the successful outcomes in India, the Ministry of Commerce invested in a new National Centre for Sustainable Aquaculture (NaCSA), with a five-year programme to extend the International Principles to around 100 000 farmers in coastal India. In Thailand, the International Principles provide the basis for their Good Aquaculture Practice and Code of Conduct, which have been used by shrimp farmers to better access markets. Viet Nam has used the International Principles to adapt legislation and develop its national programme towards better management of shrimp farming. Rehabilitation measures in Aceh for tambaks, a large segment of which is for shrimp culture (as well as milkfish), include the adaptation of the BMPs developed in India.

B. Practice

Better management practices (BMPs) have been used in several countries to put into practice the more general principles of responsible shrimp farming. Experience has shown that well-designed and implemented BMPs can support producers to:

- increase efficiency and productivity by reducing the risk of shrimp health problems;
- reduce or mitigate the impacts of farming on the environment;
- improve food safety and quality of shrimp farm product;
- improve the social benefits from shrimp farming and its social acceptability and sustainability.

Two in-country projects, in India and Viet Nam, provide good examples of translating the international principles into specific BMPs adapted to local farming conditions and ensuring their implementation by relevant stakeholders. They show the advantages of small-scale farmers being organized (aquaclubs/associations/societies), sharing resources, helping each other and adopting BMPs. The results include improved yields, less impact on the environment, wholesome products and better relations among players in the market chain. In short, the implementation of BMPs has provided benefits to the farmers, environment and society.

India

Since 2002, village demonstration programmes have been conducted as a part of the technical collaboration between Marine Products Export Development Authority (MPEDA), NACA, the Indian Council of Agricultural Research (ICAR) and the Australian Centre for International Agricultural Research (ACIAR) on shrimp disease control in India. These programmes involved organizing small-scale farmers into self-help groups known as aquaclubs for adopting BMPs. The practices developed with farmer participation and then promoted for adoption included: pond preparation, seed quality, water quality, feed management, pond bottom management, health management, harvesting, emergency harvesting, and mangrove maintenance and replanting.

From ten demonstration ponds and five farmers in 2002, the project has grown to 1 370 ponds in 813 ha, and 730 farmers in 2006. It has set out the basis for the establishment a national extension agency, the National Centre for Sustainable Aquaculture, in March 2007. The graphic illustration of this expansion appears as Annex 2.

The BMP programme has led to several benefits, the most important of which are:

- 1. Reduced disease prevalence.** One of the most significant outcomes of this project is the significant reduction in disease prevalence in aquaclub farms.

Successful implementation of BMPs reduced disease prevalence and increased the number of planned (normal) harvests, leading to better crop outcomes. The disease incidence in the demonstration ponds of Andhra Pradesh dropped from 82 percent in 2003 to 15 percent in 2005, which represents a 67 percent reduction in disease incidence and a 27 percent improvement over non-demonstration ponds. Even better results were obtained in 2006 from the demonstration ponds of Gujarat, Karnataka and Tamil Nadu.

2. *Successful crop resulting in improved profits.* In 2006, less disease incidence improved profits from a successful crop. In Andhra Pradesh, 550 farmers (957 ponds) produced 500 tonnes of shrimp. The crop results from 930 demonstration ponds spread over 461 ha in 19 aquaclubs in Andhra Pradesh showed that for every 1 000 rupees invested, demonstration farmers made a profit of approximately 510 rupees.
3. *No antibiotic use in ponds.* No antibiotics were used in aquaclub shrimp farms. The use of other chemicals were also discouraged or minimized by the implementation of BMPs. Farmers were encouraged to prevent the disease rather than treat it. In 2006, all 32 random shrimp samples from 957 aquaclub ponds of Andhra Pradesh tested negative for the presence of banned antibiotics. Similarly, random samples tested from aquaclubs in Gujarat, Karnataka and Tamil Nadu had no trace of banned antibiotics.
4. *Traceability of shrimp from aquaclubs.* Cluster farming through aquaclubs/ societies provided a novel approach in producing high-quality, traceable BMP shrimp. Cooperation and coordination among all the stakeholders (hatcheries, nurseries, farms and processors) are needed to sustain an efficient traceability system.
5. *Increased cooperation among farmers.* Social effects from aquaclub management included: increased interaction among farmers, improved community dialogue, more opportunities for mutual help and assistance to disadvantaged farmers. Some key benefits include:
 - regular information exchange, knowledge sharing and increased awareness on BMPs among farmers;
 - cooperation in buying high-quality farm inputs such as seed, feed and lime at competitive prices;
 - stronger bargaining power of aquaclubs was applied in purchasing farm inputs and sale of harvest;
 - increased co-operation in sharing common facilities and in area improvements such as deepening inlets and unclogging drains;
 - a collective approach to dealing with common problems including local environment protection, especially the protection of common water sources.
6. *Better cooperation between farmers and hatchery operators.* Under the contract hatchery system, Aquaclub farmers are able to place bulk orders with a hatchery 45-60 days in advance of the stocking date for the production of the required quantity and quality of seeds. Through a consultative process initially facilitated by the project team, mutual agreement is arrived at by selected hatcheries and aquaclubs, which cover the use of BMPs in hatcheries and other terms and conditions for production and procurement of good quality seed.
7. *Increased interaction between farmers and processors.* Some of the processing plants in India are well equipped to maintain very high quality processing standards in accordance with international market requirements. MPEDA-NACA are working towards bringing processors and farmers together to

BOX 2

Membership in aquaclubs facilitates access to credit

Organized farmers are now also able to access credit on better terms, as illustrated by a recent development: the State Bank of India (SBI) has decided to provide crop loans (up to 75 percent of the crop expenses) to farmers who are members of aquaclubs or farmer societies.

improve harvest and post-harvest practices to further increase the quality of shrimp farmed supplied to the processing plants.

The MPEDA-NACA village demonstration project gives a good example of translating international principles into specific BMPs. BMP implementation through cluster farming reduced disease risk and significantly improved yield, quality, safety and farmers' financial return.

The Indian experience shows that the direct benefit from traceability is better market access and higher demand for a quality product, which potentially translates into a premium price. Its impact on risk reduction is the incentive for farmers to manage their crop without the aid of banned drugs and chemicals, which generally means having to pay more attention to health management protocols both on-farm and in the area.

An area-wide vigilance can be achieved effectively through cooperation among all farmers in the area. Cooperation is better achieved by being formed into associations. The Indian experience demonstrates that a farmer association can more effectively deal with input suppliers (i.e. of feed and seed) to reduce the risk of contaminated feed and diseased seed being introduced into the farm.

Viet Nam

Viet Nam has registered a rapid growth in aquaculture production, in which shrimp farming has played a major role. According to FAO data (FAO FishStat Plus, accessed June 2006) over the five-year period from 1998 to 2003, production registered a four-fold increase, reaching over 220 000 mt while, according to national statistics, production grew constantly to reach around 350 000 mt in 2006. This sharp increase in production came at a cost, leading to escalating environmental deterioration and associated shrimp health problems. The occasional use of banned chemicals to control diseases prompted importing countries to impose restrictions on Vietnamese aquaculture products, which in turn most likely resulted in a negative impact on the livelihoods of farming communities.

The project that supported coastal aquaculture, which demonstrated the private and social benefits of adopting BMPs, was among the government's initiatives to promote a more sustainable development of the sector. Support was given to promote responsible development of the shrimp farming sector at all levels and for all links in the production chain. BMPs were developed for broodstock traders, hatcheries, seed traders and farmers. Focus was given to the development of simple and practical BMPs that addressed the needs of less-resourced small-scale farmers. Ten sets of extension material were developed and disseminated in close collaboration with the Ministry of Fisheries. The tangible outcomes include the following (Corsin *et al.*, 2005):

- Implementation of BMP for hatcheries was supported in six hatcheries and resulted in seed production up to 1.5 times higher and a price per unit seed of about 30-40 percent higher than non-BMP seed.
- BMP implementation was also supported in seven pilot farming communities (655 direct beneficiaries). Implementation led to a remarkably lower risk of mortality, higher production and higher probability of making a profit.

- Farming communes that introduced seed testing increased their chances of making a profit by over seven times.
- Average yields with BMP application were sometimes more than four times higher than in farms where not applied.
- The project BMPs were also incorporated into the draft standards for the production of organic seed.
- The project also strengthened the institutions involved in seed health management by conducting training courses and supporting the development of national- and provincial-level legal documents to improve the process of seed screening and certification.

Benefits of BMP application in Viet Nam were visible from the early stages of implementation: farmers complying with merely two recommended practices – testing of seed for white spot syndrome virus and removing sludge before stocking – **reduced the risk of crop failure from 61.0 to 47.8 percent**.

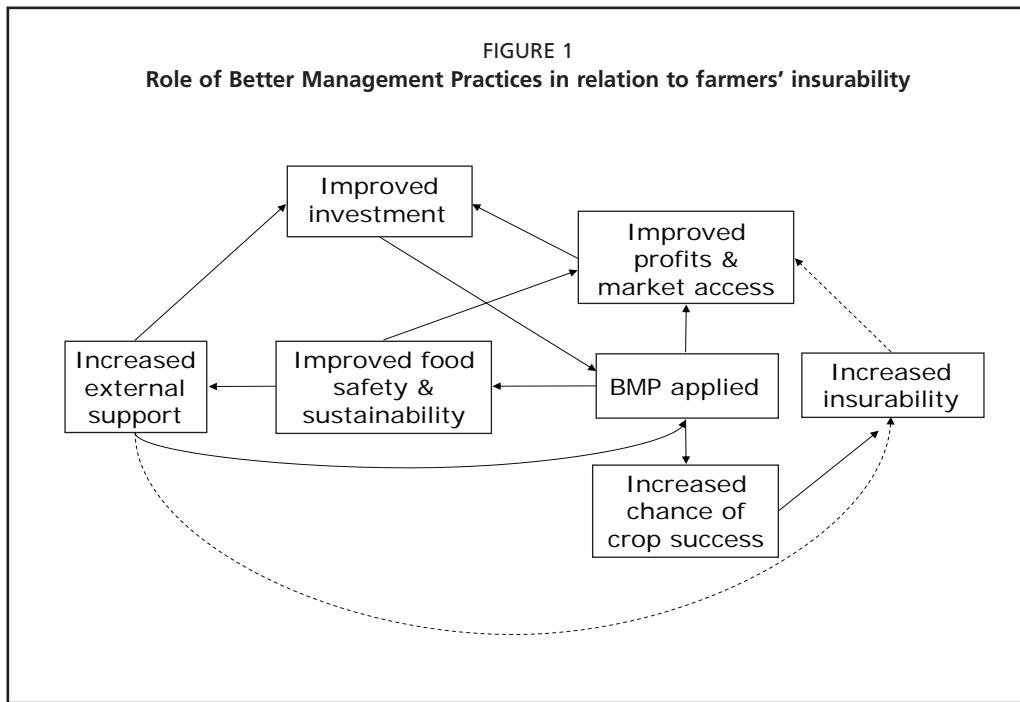
Viet Nam's BMPs hatcheries assure that farmers receive quality and disease-free seed. A discussion of the Thai CoC, as described below, reiterates the importance of disease and food safety considerations in farmers' perception of risks and adoption of good aquaculture practices and the importance of cooperation among farmers to collectively manage risk.

Thailand

In 2003, Thailand launched the Farm to Plate Programme to promote an international image of safe and responsibly produced aquatic food products. This comprised a scheme on GAPs, CoC, programme for shrimp farming, traceability schemes, detection of banned chemicals and drugs, HACCP and other standards, and quality certification schemes in food handling and processing. A food safety-oriented GAP and an environmentally-oriented CoC programme specifically designed to reduce disease risks and pollution were devised for shrimp farming. GAP has 17 750 shrimp farms and 700 hatcheries in October 2006, which are in fact equal to the number of all operating farms (DOF, October 2006).

An analysis of the Thai CoC programme suggests that a voluntary management scheme would need supportive policies and measures, including those that improve farmers' perceptions of long-term benefits and reduce perceived risks. This is critical to the success of voluntary adoption of a scheme that aims to promote environmentally-friendly practices, which is different from a scheme that directly improves market access. An insurance scheme would also reduce perceived risks associated with CoC adoption. A green insurance policy could be used to promote a BMP aimed at environmental protection (Pongthanapanich and Roth, 2006).

The study showed evidence of the potential vigour of the combination of incentive-based tools, such as green taxation, and non-incentive-based tools, such as coastal land use zoning (based on the carrying capacity of receiving waters), which optimally lead to both economically and environmentally responsible shrimp farming. It found that using effluent standard alone would not be as efficient, while a zoning scheme alone does not account for externalities. Zoning can limit impacts, but its effectiveness depends greatly on the efficacy of control over land and water use. Using voluntary management alone has some challenges and many pre-conditions for successful application. In this regard, an *incentive-based approach* (such as a tax) and a *mandatory control approach* are suggested as background threats – i.e. if a voluntary approach were not successful in meeting a satisfactory environmental quality, the other approaches would be implemented. A suggested option was to use the revenue from a green tax to support voluntary adoption of environmentally-friendly farms, in particular some **clearly specified practices that meet each environmental improvement objective** (Pongthanapanich and Roth, 2006).



The study concluded that: (i) small farmers were risk averse and would prefer to adopt a practice that did not expose them to (perceived) risks, but that was seen to improve profitability and/or market access; (ii) a practice that improved profitability and market access was seen as less risky than one focused on improving environmental performance; and (iii) technical assistance and good information would improve farmers' understanding of the risks and ability to manage them.

In summary, the lessons drawn from the above cases are: (i) organized farmers can successfully manage risks to crop loss from a number of factors, especially diseases, through the adoption of BMPs; (ii) yields and profitability, product quality and environmental performance are improved with BMPs; and (iii) more investments in the provision of better technical services to organized farmers further improve their capacities to adopt sustainable farming practices.

III. BMPS AND INSURANCE

The cases described above suggest two specific roles of BMPs in farmers' insurability:

- improving credit and insurance worthiness by making the crop outcome more predictable and farm profitability better;
- complementing other tools for assessing insurance risks.

The above roles of BMPs in relation to farmers' insurability are shown in Figure 1.

A. Credit-worthiness

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. The basis for this statement is that the supplier of inputs, the farmer and the buyer of products, all stand to gain more from mutually responsible behaviour than by mutual exploitation.

A fair assumption from the above statement is that credit institutions would consider the organized farmers using BMPs as reliable borrowers. Evidence to support this would be the recent decision of the State Bank of India (SBI) to extend, with no collateral, crop loans to shrimp farmers who are members of aquaclubs or associations

that have adopted BMPs (see Section B, above). As Figure 1 illustrates, this has the effect of farmers being able to further increase investments by having access to low-interest production loans. Such investments could include: farm improvements, such as an (intake) water treatment facility; on-farm operations required by BMPs, such as pond bottom treatment and better pond preparation, and by safeguarding against the introduction of disease to the farm by paying premium price to certified healthy seed from contracted hatcheries. The latter has in fact been practised by the BMP pilot project farmers in India: they have entered into contracts with hatcheries. The Viet Nam case additionally provides supporting evidence, i.e. “an investment in seed testing facility raised chances of profitability by over seven-fold”. Hatcheries adopting BMPs would be a reliable supplier of healthy seed while they also improve their profitability, as the Viet Nam project shows, i.e. “six pilot BMP hatcheries had seed production up to 1.5 times higher and a price per unit seed of about 30-40 percent higher than non-BMP seed”.

Insurance on loans reduces or distributes the risk for credit institutions; however, it is still unknown how this could directly encourage farmers’ adoption of BMPs. A common instrument – the loan guarantee fund – might have a direct influence on farmers’ adopting BMPs. A guarantee fund has two purposes: for the farmers, it leverages credit (for example, 1 million baht or pesos could leverage 10 million; and for the bank, it provides a guarantee against defaults based on these figures, the bank is assured that it can recover at least 10 percent of bad loans). Whatever the source of the guarantee fund, peer pressure would be a significant force to encourage repayment. Elaborating this further, and in the context of an organized farmer group, it is expected that forfeiting the guarantee fund due to the irresponsibility of a few members would be a compelling motive to guarantee that each group member would try hard to ensure the success of his or her crop. A practical question is where the guarantee fund comes from. There are a number of possible sources: the farmers’ association; the government; processors, a corporate body that, for instance, draws its supply of materials to process from the farmers (as with seaweed processing plants), or a combination thereof.

In sum, the relationship of credit-worthiness and BMP adoption can be characterized as mutually reinforcing: credit leads to increased on-farm investments in assets and operations that further improve farmers’ management capabilities.

B. Insurance-worthiness

Might the same apply to farmers’ insurability?

There are four general criteria used by insurance companies to decide whether or not to insure an event.

- a. There must be a larger number of similar objects so that the financial outcome of insuring the pool of exposures would be predictable. Accordingly, the insurer may set a “fair” premium.
- b. The losses have to be accidental and unintentional (i.e. on the insured’s part).
- c. The losses must be measurable, identifiable in location and time, and definite. An insurer also requires that losses cause economic hardship so that the insured has an incentive to protect and preserve his or her property in order to minimize the probability that the losses occur.
- d. The loss potential to the insurer must be non-catastrophic, i.e. it cannot put the insurance company in financial jeopardy.

In addition, premiums have to be economically reasonable; they cannot therefore be too high to prevent the insured from being able to purchase insurance cover. This suggests that BMPs offer a wide range of advantages, especially in making premiums reasonable and losses measurable. These two advantages result from the fact that BMPs reduce on-farm risk and make crop success more predictable.

As one of the tools for assessing insurance risks, BMPs should be based mainly on the fact that losses are a result of accidental or unintentional factors and must be measurable, identifiable in location and time, and definite. The array of BMPs developed in the Indian pilot projects address specific hazards such as: the introduction of pathogens through various sources including seed, water and disease vectors; water and pond bottom deterioration; water pollution from poor feeding regimes; and practices that help farmers avoid using chemicals and drugs, particularly those that are banned. The usefulness of the BMPs in risk assessment would be in indicating which risks/hazards cannot be addressed by BMPs and which can be mitigated by BMPs and at what cost to farmers. The cost of mitigation could be used as an indication of the premium level for insuring the hazards and risks. The hazards and risks that absolutely cannot be addressed could be either uninsured perils, insured for a higher premium, or the subject of group or mutual insurance schemes. Group insurance would be more feasible for organized farmers.

What risks to insure against?

What risks would farmers prefer to be covered by insurance? What risks would they take without insurance or for which they do not need insurance cover? These questions are prompted by the reality that it would be impossible or extremely expensive to have all or many risks and hazards insured against.

A fair indication of what risks farmers might wish to insure against is the history of the risk's occurrence, in particular, the known seriousness of its impact. Seriousness has three attributes:

- severity, or how much loss is incurred (i.e. from partial to total) when it strikes;
- prevalence, or how extensive its impact is on a farming area, i.e. how many farms or how many hectares are affected when it occurs;
- frequency of occurrence over a medium term, for instance, a five-year period.

A fourth element could be the *predictability* of its occurrence.

The attempt here is to find out whether farmers may wish to insure against the more serious risks or the least serious; against those that they can manage with some effectiveness; or those over which they have no or hardly any control; or finally, insure against all possible hazards.

In line with the proposition to use insurance to improve crop success, it would be reasonable to insure against a known hazard, such as a particular disease, which could have a severe impact only if the farmer fails to practice mitigation measures or if a BMP encourages or prescribes avoidance of a practice, such as applying chemicals and drugs. The Thai study suggests a *green insurance*, which covers the hazards to which farmers perceive that they are being exposed upon joining the CoC programme. Green insurance thus becomes an incentive to join the programme, adhere to standards and observe protocols.

Some forms of pollution directly affect the aquaculture industry at the on-farm level and some at the market level. The Thai study cites that: (i) "common practices" in intensive farming, characterized by the non-adoption of good management practices, are usually claimed as a source of water pollution due to discharges of untreated farm effluent into public receiving waters; (ii) disease outbreaks have been triggered by such factors as the deterioration of pond sediment quality, loss of essential minerals from pond soil and poor pond management; and (iii) disease outbreaks are commonly dealt with by farmers with a higher dosage of drugs and chemicals, and sometimes with non-prescribed drugs. It has also been the reason for which importing countries ban or destroy products found with traces of banned chemicals or drugs; i.e. farmers were denied access to markets.

BMPs deal with pollution to reduce environmental damages, minimize or prevent disease outbreaks, stabilize farm incomes, improve market access, and possibly, reduce

BOX 3
Barriers to insurance coverage

A recent fish kill in Thailand (of red tilapia, or tab tim, in cages along a stretch of the Chao Phraya River) points to the difficulty of farmers obtaining insurance, even should they wish to or if there is a service available. Some 218 farmers and 1 089 cages suffered a collective loss of an estimated 30 million baht (35 ThB=1US\$ as at March 2007). The government provides 22 000 baht per farm regardless of the number or size of cages and the extent of damage, while the Provincial Administrative Office (PAO) has agreed to pay the farmers from 40 000 to 90 000, depending on the loss sustained (the total payment from PAO reached 15 million baht). An investigation has been launched to pinpoint the cause(s) and the culprit(s) – the pollutant and where it came from. Investigation has pointed to the 650 tonnes of molasses tipped into the river when the barge carrying it sank as the source of the pollution. Initial suspicions pointed to a food seasoning factory since there were numerous processing plants along the river. The lessons learned from this incident are that a potentially severe pollution hazard around aquaculture farms makes the cost of insurance premium to the crop prohibitive, even in the unlikelihood that anyone would be willing to insure them. Second, it became clear that various measures are required to prevent and mitigate similar situations in the future. These measures include:

- (i) strict monitoring and enforcement of effluent discharges from factories;
- (ii) siting of the farms;
- (iii) compensation.

The first and third points above require human and financial capacities of the government agency; the second, which translates into a socio-economic issue, basically requires balancing the government's priorities between the manufacturing and the farming sectors. One option is to make it mandatory, if it has not been done so already, for the factories along the river and companies using the river to transport hazardous material, to buy liability insurance. However, this still does not address the difficulty and costs of surveillance and monitoring.

social conflict over resource use. In this light, pollution could be an insurable hazard. Cover could be made for damages from pollution from external sources but not self-inflicted pollution, which is dealt with by BMPs. Self-inflicted pollution should include pollution of the farm as a result of other farmers' discharging effluent into a common waterway. Covering this hazard, which in any case is addressed by BMPs (i.e. synchronized discharges and intakes) or by CoC (having an effluent treatment pond), would amount to paying for damage caused by violation of a prescribed farm management and area management protocol.

In sum, the combination of **insuring against pollution of external origin but not against self-inflicted pollution** and **insuring against losses from a disease outbreak that has been abetted by a management practice that prescribes non-use of chemicals and drugs** would be in line with the aim of encouraging farmers to organize and take up BMPs that require water treatment facility, effluent treatment facility, healthy seed, good pond bottom management and non-use of banned chemicals and drugs.

C. Roles of insurance

The reason for insurance is essentially to spread risk. In its most familiar form, insurance is provided through a policy purchased from an insurance company.

BOX 4

Insurance to induce adoption of BMPS

A study by Mitchell and Hannessy (2003) cites the green insurance policy that has been used in the United States of America to promote some BMPs aimed at environmental protection. For example, a corn root-worm integrated pest management (IPM) insurance is sold to a farmer following a certified crop consultant's recommendation not to apply insecticides. If the IPM recommendation fails, indemnity is paid based on the observed root rating and lodging (Mitchell and Hannessy, 2003). Other policies cited include a nitrogen fertilizer insurance against excess rainfall that would prevent side-dress nitrogen application on corn; a Bt corn refuge insurance that insures against yield loss due to insect damage; and other specific nutrient BMP insurance (Mitchell, 2004). The studies advocate insurance as a tool to increase farmers' incentives for adopting a BMP. Like other types of single peril insurance, green insurance could be privately provided without premium subsidies, and so attain the efficiency of market-based provision of incentives to adoption (Mitchell and Hannessy, 2003: 53). The authors warn of associated issues of insurance policy, however, such as moral hazard and adverse selection. (Moral hazard means that people with insurance may take greater risks than they would do without it because they know they are protected, so the insurer may get more claims than it bargained for.) Documentation requirements and a certified crop consultant to develop the practices were suggested as means to reduce this problem of moral hazard. Adverse selection occurs when, for instance, an insurance premium is based on average yield, but in fact there are differences in yields among farms, which translates as differences in risk expectations. Farmers with a higher average yield have a greater incentive to buy insurance since they are likely to receive a higher indemnity than the premium that they paid. Premium subsidies to farmers with lower yield and multiple-peril insurance premium have been suggested to mitigate this problem. While Babcock *et al.* (2003) suggest that insurance programmes may exclude small farms since paying premium increases their production costs, Pongthanapanich and Roth propose a group insurance scheme to cover all or most farmers, which could also facilitate their decisions to participate in the CoC programme.

Generally, the expectations of the insurer and the insured are different: the insurer does not wish the peril to occur whereas the insured fears that it might. In addition, the insured cannot know whether the insurance was needed until after the event. A better and more satisfactory outcome would be a congruence of expectations and objectives of the insurer and the insured: they stand to benefit more from working together to ensure that, to the extent possible, the peril does not occur, or if it does, that its impact is as minimal as possible. Based on this proposition, insurance can have two pro-active roles:

- i. In the context of a sector predominated by small and poor farmers, the insurance sector could be a more pro-active agent by providing insurance products that are affordable for small and organized farmers adopting BMPs. A scheme could be developed for group coverage and the providers of insurance could be part of the institutional support system and providers of technical advice, which include credit and extension.
- ii. In consideration of aquafarming being a risky activity and riskier still for small farmers, and of farmers being encouraged to abandon traditional practices in favour of innovations and BMPs, which are usually perceived as risky at the introduction and trial stages, insurance could be a means to reduce their perception of risks and therefore encourage adoption.

In regard to paragraph ii above, an insurance scheme to reduce perceived risks associated with CoC adoption by shrimp farmers in Thailand has been recommended (Pongthanapanich and Roth, 2006).

In sum, aquaculture insurance need not be seen solely as a means to transfer risks from crop failure or loss, or as risk management option. It is used to encourage profitable and sustainable farming and, as discussed below, becomes part of a broader support system to farmers.

IV. SERVICING SYSTEMS FOR SMALL-SCALE FARMERS

A short discussion follows on technical and financial servicing for the small-scale aquaculture sector.

Regulatory measures informed by science are essential in the overall management of the sector, which can be seen as reducing risks. An outstanding example of this is Norway's success in reducing the use of antibiotics to almost nil while consistently raising their production of salmon through a combination of scientific and technological solutions that industry was required to adopt under a regulatory framework.

On the other hand, faced with the increasing difficulty and cost of regulating aquaculture activity, increasing importance is now given to voluntary arrangements and co-management practices to complement command and control in the overall governance system. Their practical application is in the adoption of good or better management practices, CoCs, or practices by farmers and industry that can improve efficiency, reduce risk and likely improve profits. Self- regulation and co-management imply divesting the government of some responsibilities and thereby increasing the role of farmers and their associations in managing the sector.

Nonetheless, the success of sector management relies greatly on an appropriate and effective supporting institutional structure. In many countries, such supporting institutions and the services that they offer are deficient, both in the public and private sectors, and in some cases, almost non-existent. This sad state of affairs makes delivery of insurance services and products to the small-scale aquaculture sector – those who could benefit most – extremely difficult.

As seen in the start, small-scale farmers face a host of problems and providing services to them requires particular efforts associated with costs and business structures, access to value/market chains, risks, compliance to market standards, competition and other constraints. The sector undoubtedly needs institutional support, yet most commercial and government servicing are generally biased against the small-scale farmer. This is due to a variety of reasons, not always intentional, resulting from their weak voice in policy formulation and research programme planning. Small-scale farmers are also considered difficult to deal with. The above- mentioned government services are needed to allow the small-scale sector to participate in and access modern market chains, and for the delivery of financial services.

Given the importance of the small-scale aquaculture sector to production and socio-economic development in many countries, the lack of attention given the sector is surprising. It is further surprising considering that large number of small-scale aquaculture farmers present a significant business opportunity for investment by financial and technical servicing businesses and agencies. The success of business-oriented microcredit services in rural areas, notably the many that follow the example of the Grameen Bank, provide lessons that have, nevertheless, been poorly accepted or adopted in the aquaculture sector.

If the concept and arguments are accepted, a logical follow-up action would be to explore the options for designing the farmer servicing mechanism. Its outline might comprise well-trained extension agents providing technical support to small-scale farmers and supporting farmers in organizing themselves into groups, as experienced in the MPEDA/NACA project in India. It might include a communication system for disseminating information to farmers and a means of accessing technical and

financial services, and market information. Modern information and communication technologies (ICT) solutions, now being adopted more widely in rural areas in Asia, again with working examples in India, need to be explored more widely in the small-scale aquaculture sector.

A challenge will be to create a servicing structure that is financially sustainable, which should be based on some sort of business model. The business model for sustaining such services might include provision of insurance among the other technical, marketing and financial services needed by small farmers. A servicing system for the small-scale sector will also need to be organized so that farmers may have a direct interest in sustaining and using the services. An inclusive model would be a private-civil society-industry-government partnership where the private sector would find it worthwhile investing in the development and operation of such a service. The financial sector, including insurance servicing, has an important part to play here.

One-stop Aquaculture Supply and Information Shops (OASIS)

The lessons learned from a pilot activity started under the NACA/STREAM are worth examining. Based on experiences to date, the establishment of OASIS (One-Stop Aquaculture Supply and Information Shop) as a farmer-led mechanism to provide services to farmers can offer several advantages. This rural development experiment was initiated by NACA through its STREAM Initiative developed from an idea proposed by an Indian farmer leader, or *Jankar*. It began in India, which now has nine pilot One-stop Aqua Shops (OASs) and has spread to Pakistan and Viet Nam. The rationale for an OAS is that one of the most difficult aspects of fish farming is getting started, with farmers often traveling long distances to find help and information on fish, finance production systems and aquaculture management. These needs could be served by organizing all the necessary information and supplying it under one roof in a local institution. An OAS is a service centre for farmers and fishers who are interested in aquaculture. It also serves as a local contact point for rural banks, aquaculture suppliers and the Fisheries Department extension and other services. An OAS can make available information about supplies and prices, Fisheries Department programmes and provide advice and information on application processes for micro-credit from rural banks. It serves both new entrants and long-time farmers.

In India, a network of OASs has been established by the states of Jharkhand, Orissa and West Bengal, which is supported by Krishi Vigyana Kendra (agricultural science centres), rural banks, Fisheries Departments, the Orissa Watershed Development Missions and the STREAM India Communications Hub OASIS. In Viet Nam, several OASISs were established as part of the Danish International Development Assistance (DANIDA)-funded Fisheries Sector Programme Support. OASISs were meant to operate as private businesses and serve as both extension centres and input suppliers. They also play a role in the marketing of the harvest. At present, most of the established OASISs are still operating. In Quang Ninh Province, the OASIS acts as the physical centre for farmer groups from which loud speakers announce recommended management practices to farmers (such as stocking time) and alert the farming community on the status of disease outbreaks and weather forecast, among other information. OASISs also offer a venue for farmer meetings. The funds needed to operate the OASIS are generated through the sale of aquaculture inputs to farmers, such as feed and fertilizer, and the purchase and marketing of the farmer group's harvests. Similar experiences are being generated from the OASIS in Nghe An Province. Efforts are ongoing to promote the OASIS concept more widely in Viet Nam, for example, in Thua Thien Hue Province as part of the FAO/Integrated Management of Lagoon Activities (IMOLA) project.

V. CONCLUSIONS

The experiences in shrimp BMPs reviewed above show clearly that the voluntary adoption of BMPs by farmer groups leads to more environmentally responsible and economically efficient farming, as well as better quality and safer product. It also shows that farmers forming self-help groups or organizing into formal associations strengthen their capacities to produce and market products more efficiently, manage on-farm risks and collectively deal with risks that impact a farming area, such as the introduction of pathogens from water discharges, pollution, contaminated or poor quality feed, and untested seed. For marketing purposes, cooperation among producers would enable the delivery of products in the required quantity. It would minimize the risk of a member providing products tainted with banned substances. Producers' associations could more effectively promote their products to potential buyers, and initiate and sustain dialogue with buyers. The tendency of buyers using food safety as a pretext to take advantage of producers could be minimized with timely information on prices and knowledge of pricing mechanisms.

The question could be raised as to whether the need for crop insurance could be eliminated entirely or minimized greatly by the combination of better management, strong farmers' associations, and effective service delivery systems to farmers (with the assumption that policies and regulations are effectively enforced). The argument for this is that better management of the farm and the sector enables more effective management of risks, resulting in better productivity and income, and a sustained base for production: Would these not be powerful enough motivation for farmers?

In conclusion, the lessons learned can be summarized as follows:

1. Organized farmers can successfully manage certain risks to crop loss through the adoption of BMPs; yields and profitability, product quality and environmental performance are improved with BMPs and crop success becomes more predictable.
2. Credit-worthiness and BMP adoption are mutually reinforcing. Access to credit leads to increased on-farm investments in assets and operations, which in turn further improve farmers' management capabilities.
3. Aquaculture insurance is an important part of the small farmer servicing system. Investments in the provision of better technical services to organized farmers further improve their capacities to adopt sustainable farming practices.

Annex 1

Breaking the vicious cycle of poverty through microcredit

The Grameen Bank is based on the voluntary formation of small groups of five people to provide mutual, morally binding group guarantees in lieu of the collateral required by conventional banks. At first, only two members of a group could apply for a loan with Grameen bank at the same time. Depending on their performance record, the next two borrowers could then apply and, subsequently, the fifth member as well. The assumption is that if individual borrowers are given access to credit, they will be able to identify and engage in viable income-generating activities. Women were given equal access to the schemes and proved reliable borrowers and astute entrepreneurs; they have raised their status, lessened their dependency on their husbands, and improved their homes and the nutritional standards of their children.

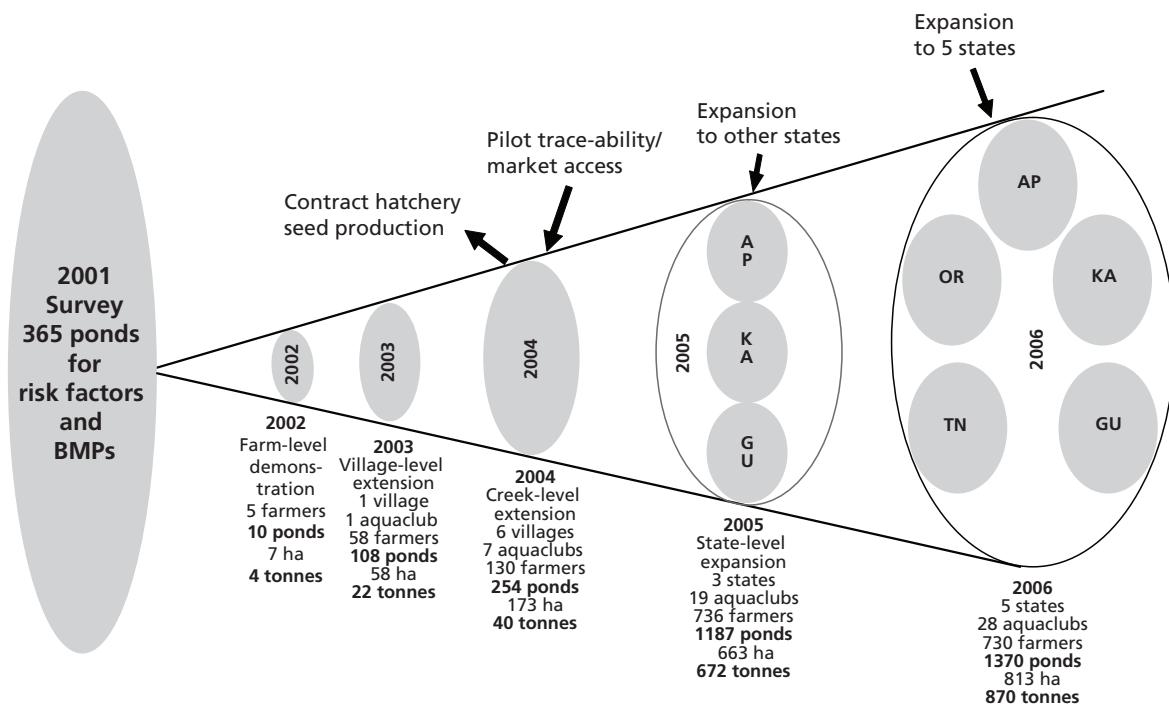
Intensive discipline, supervision and servicing characterize the operations of the Grameen Bank, which are carried out by “bicycle bankers” in branch units with considerable delegated authority. The rigorous selection of borrowers and their projects by these bank workers, the peer pressure exerted on these individuals by the groups, and the repayment scheme based on 50 weekly installments, contribute to the operational viability of the rural banking system designed for the poor. Savings have also been encouraged: there is provision for 5 percent of loans to be credited to a group fund.

The success of the approach has dampened a number of objections to lending to the poor, including that: the poor would not be able to find gainful work – Grameen borrowers have successfully done so; the poor would not be able to repay – repayment rates reached 97 percent; and poor rural women in particular were not bankable – they accounted for 94 percent of borrowers in early 1992. It was also thought that the poor cannot save – group savings have proven as successful as group lending; and that rural power structures would ensure that such a bank failed – the Grameen Bank has been able to expand rapidly. From less than 15 000 borrowers in 1980, the membership had grown to nearly 100 000 by mid-1984. By the end of 1998, the number of branches in operation was 1 128, with 2.34 million members (of which 2.24 million were women) in 38 957 villages. (The default rate at Grameen Bank is less than 1.5 percent among 2 500 000 customers).

The average household income of Grameen Bank members is 50 percent higher than the target group in the control village, and 25 percent higher than the target group non-members in Grameen Bank villages. The landless have benefitted most, followed by marginal landowners, sharply reducing the number of Grameen Bank members living below the poverty line: 20 percent compared to 56 percent for non-Grameen Bank members. There has been a shift from agricultural wage labour (considered socially inferior) to self-employment in petty trading. What started as a local initiative has grown to the point where it has made an impact on poverty alleviation at the national level.

Annex 2

Expansion of the BMP for shrimp project, India



Appendix A

Basic insurance policy terms and conditions

COMMON CLAUSES, DEFINITIONS, WARRANTIES AND EXCLUSIONS

Common clauses

Basis of valuation
 Premium adjustment
 No claim bonus
 Average
 Subrogation
 Non-disclosure
 Material changes
 Loss reporting
 Notice clause – assured
 Notice clause – underwriters
 Procedures in the event of loss
 Right of access
 Sue and labour

Warranties

Sound health of stock at commencement of insurance
 Protective maintenance

Definitions

Pollution definition

Exclusions peculiar to aquaculture

Normal trade mortalities
 Mysterious disappearance
 Malicious acts of the policy-holder
 Compulsory slaughter
 Losses commencing before the start of the insurance
 Property of others – unless agreed by underwriters
 Specific exclusions related to the farm insured

Standard insurance exclusions

War, terrorism, strikes, riots and civil commotion
 Nuclear risks (e.g. radioactive contamination)

ANALYSIS OF COMMON AQUACULTURE INSURANCE POLICY CLAUSES

Basis of valuation

The standard valuation method used in aquaculture policies is the “cost incurred value”, i.e. the costs paid in growing the stock to its final market size. These costs are used to create values in the basis of indemnity tables that policies contain. They establish values for each of a range of sizes, starting with the size at which stock arrives on a farm and

covering a number of logical size bands, until the final “table food fish” size, or the size at which the stock is sold, in the case of a hatchery, for example.

Consequential loss insurance is not generally available to aquafarmers, but the cost incurred value formula can be extended to include a percentage element of profit.

Example of a basis of valuation (indemnity) table for salmon

	(US\$)
Smolts up to 100 gm	2.48
Post smolts 100–200 gm	3.30
200–500 gm	4.13
Young stock 500 gm–1 kg	4.95
1–2 kg	4.95 per kg
Fish over 2 kg	5.28 per kg
Broodstock	16.50 per kg

Premium adjustment clause

Deductible levels used in aquaculture policies are substantial and generally apply to each and every individual loss. Situations can arise in which a farm suffers a series of losses that cannot be claimed for because each one is below the deductible. Losses could amount to a substantial sum, however, which nevertheless could not be claimed under the policy. A farm can also have a “bad year”, with poor stock growth and high normal trade losses. Again, this would result in overall farm values being less than had been anticipated when arranging deposit premiums at the start of the policy.

The adjustable premium arrangement takes into account that in both situations, underwriters' exposure is reduced, so insureds should not be charged for a proportionate amount of the premium. The monthly reporting feature was devised for policies to cater to these fluctuations.

The common practice in designing a policy arrangement for a producer is to establish a maximum sum insured across the insured location, using projected growth and survival figures. This sum is then computed against the Basis of Valuation Table. The resulting figure becomes the Policy Sum Insured, which is used to calculate the policy's full premium using the policy rate. Projected monthly values are estimated and a deposit (for example, 75 percent of the premium) is then levied, which becomes the initial payment made at the start of the policy.

Deposit premium example calculation:

Maximum sum insured:	\$750 000.00
Premium rate: 4.25% of maximum sum insured	
Full premium: = \$750 000 x 4.25%	= 31 875.00
Deposit: = 75% of full premium	
Deposit premium = \$31 875.00 x 75%	<u>= \$23 906.25</u>

Each month during the policy term, a report must be made of the highest value on the farm during the month. At the end of the policy term, the value of all the reports are totalled and the full amount divided by the number of months in the policy terms. This produces an average value across the policy period to which the rate to produce an *earned premium* is applied. The earned premium is then related to the deposit premium; if the earned premium is higher than the deposit, an additional premium is charged; if lower, a refund (often limited to a maximum amount) is made.

Premium adjustment example:

Month	Reported values
January	\$750 000
February	\$797 000
March	\$850 000
April	\$840 000
May	\$750 000
June	\$610 000
July	\$450 000
August	\$227 000
September	\$223 000
October	nil
November	\$197 000
December	\$230 000
<hr/>	
Total	\$5 924 000

Average monthly value: $\$5\ 924\ 000 \div 12 = \$493\ 667$

Earned premium = average monthly value x the rate:

$$= \$475\ 167 \times 4.25\% = \$20\ 980.08$$

$$\begin{array}{ll} 75\% \text{ Deposit premium} & = \$23\ 906.25 \\ \text{Earned premium} & = \$20\ 980.08 \end{array}$$

The earned premium is less than the deposit premium, so a refund is due of \$2 926.17.

Similar systems for adjusting values are used in many aquaculture policies. They reflect the rises and falls in farm values and, to some extent, all parties' interests. If a site is empty, this is taken into account, as would any losses that are not recoverable. These systems also reflect the harvesting profile – if growth rates are good, values will be higher and more premium is payable, and vice versa.

No claim bonus clause

In general, underwriters in all classes of insurance seek to encourage their insureds not to make claims. Under the no claim bonus clause, the insured can earn a premium refund if claims are not made.

Average clause

Average clauses are common in all types of property insurance and perhaps better described as "under-insurance" clauses. They penalize policy-holders who do not insure their stock to its full value under the policy.

When a loss occurs, in addition to calculating the value of the stock lost, adjusters calculate what the total value of all the insured stock on the farm was at the commencement of the loss, according to the policy terms. If the sum insured in the policy is not high enough to cover that value, the insured will be proportionally penalized in any loss settlement. For example, if a producer has a policy sum insured of US\$500 000, but the actual value of the stock on the farm when a loss occurred is US\$750 000, the insured is loading the risk against underwriters because they would only be paid premium according to the policy sum insured, when in fact the actual

value is much higher. In this case, only two-thirds of any claim would be paid, which exactly reflects the ratio of the actual sum insured to the amount at risk.

Subrogation clause

In the event that a claim is paid under a policy, the subrogation clause gives the underwriters the right to benefit from any rights that the insured has, to recover from any third parties that can be held responsible for the loss. Such practice is common to all areas of insurance.

Non-disclosure

This is a clause that protects insurers from the failure of the insured to reveal anything that is relevant as far as assessing and underwriting an operation. If, for example, a farm is sited where floods occur regularly, and this fact is not disclosed when the insurance is arranged, underwriters have a justifiable reason to refuse to pay claims for flood. Questions often arise as to what is relevant and what is not. The best approach for the producer is to disclose all events, including the dubious ones, together with full information about them; the underwriters will then have the full picture and cannot claim non-disclosure.

Material changes clause

The crucial importance of this clause in aquaculture cannot be emphasized enough.

When an insurer agrees to cover a risk, it does so on the basis of information that it has been given on what its underwriter knows and on what a surveyor tells it in a survey report. If important changes are made to the system or the way of rearing the insured species – in other words, if “risk-related changes” are made, the *material changes clause* requires that they must be reported to the insurer. The insurer has the right to refuse to cover losses resulting from the changes, to charge an extra premium for them, or even to cancel the policy with immediate effect.

At first sight, this may appear to be a draconian clause, but it should not be seen as such. The insurer is not trying to get out of insuring the risk, but merely trying to avoid losses. In 90 percent of cases, there is no problem in making material changes to the layout of a site or to its growing procedures and systems – **provided underwriters are consulted in advance**.

The clause can leave the aquafarmer in a predicament of uncertainty in some circumstances as to whether a change of husbandry practice is material. Common sense will usually provide the answer, but the golden rule is to advise underwriters of the change whenever in doubt.

Loss reporting clause

Extensive reference is made in other sections of this background paper to the importance of handling losses in aquaculture in a proactive way. This approach is applied through the *loss reporting clauses* in policies. Almost universally, the clauses instruct policy-holders on exactly what to do in case of an event that **might** cause a loss. Such clauses usually contain the names and telephone numbers of local representatives who can act on behalf of underwriters. The intention is to give insureds clear instructions on whom to contact if a claim occurs.

Losses in aquaculture can occur at the worst times, for instance, on public holidays, in the middle of the night and on long weekends. Loss reporting clauses often go beyond specifying who should be contacted and under what circumstances. Specific instructions may be given about taking samples and giving underwriters and their representatives the right to take samples and have them analyzed. The clauses also confer on the representatives of underwriters the right to access the insured's farm in the event of a reported loss.

Notice clause

Underwriters retain the right to cancel a policy at any time by giving a specified period of notice – normally 30 days, but in the case of war, seven days. The insured is also able to cancel a policy at any time using an agreed on period of notice. The clause specifies the terms of cancellation, i.e. the period involved and the actual procedures to be used: for example, “by registered, recorded delivery” to a specific address.

Sue and labour clause

In the event of a loss or the threat of a loss, the insured producer is required to carry out any activities that will contribute to reducing or eliminating such loss. Insurers will contribute to expenses incurred in this way, according to the terms of the sue and labour clause.

Specific clauses, definitions and exclusions

All risks covering clause

This clause sets the terms under which the policy provides cover. A typical opening statement might read: “*This insurance policy covers the Insured against loss occurring during the period of insurance as specified hereunder.*”

Named perils covering clause

Again, this clause sets the terms under which a Named Perils policy provides cover. A typical opening statement might read:

The Underwriters hereby agree subject to the following terms and conditions to indemnify the Assured in respect of Mortality or loss of fish stock at the insured location(s) due to Pollution (as defined) and Perils as stated in the attached Schedule up to but not exceeding the sum insured and in accordance with the basis of indemnity stated in the Schedule or with the replacement cost of the said fish stock whichever is the less.

The risks covered under a Named Perils Policy might include:

Land-based systems:

- pollution (as defined);
- malicious acts, theft, predation;
- flood, tidal wave;
- storm damage, subsidence, landslip, structural failure, breakage or blockage of any part of the water supply system;
- drought, fire, lightning, explosion, earthquake;
- freezing, frost damage, frazil ice;
- mechanical breakdown or accidental damage to machinery and other installations;
- electrical breakdown, failure or interruption of the electricity supply, electrocution;
- deoxygenation due to vegetation, microbiological activity or high water temperature
- any other change in concentration of the normal chemical constituents of the water, including supersaturation with dissolved gases and change in pH or salinity;
- disease.

Marine systems:

- pollution;
- malicious acts, theft;

- predation or physical damage by predators or other aquatic organisms (excluding by sea lice or other ectoparasites);
- storm, lightning, tidal wave, collision, sudden and unforeseen structural failure of equipment;
- freezing, supercooling, ice damage;
- deoxygenation due to competing biological activity or to changes in the physical or chemical conditions of the water, including upwelling and high water temperature;
- any other change in concentration of the normal chemical constituents of the water, including change in pH or salinity.

Key named perils policy clauses, definitions and exclusions

Definitions

Definitions can differ from policy to policy, but the following is a widely used definition of “pollution”:

Pollution shall mean the presence of any foreign substance or material of a toxic nature that causes mortality or results in total loss of market value. Such presence is to be established by analysis of water samples taken at the time of the loss, and/or by examination of affected fish.

A key point to note is that the presence of pollution has to be proved by analysis of a water sample taken at the time of the loss.

Note also that the definition does not cover “the absence” of any substance, for example, oxygen, unless the absence is caused by “the presence of a foreign substance,” which might be a plankton bloom.

Self-insurance factors, bases of valuation

In the general insurance market, the process of setting insurance rates and corresponding terms and conditions varies from being a science to an art.

At the scientific end of the spectrum, insurers have extensive statistics on which to base rating decisions. Such statistics often cover many years of experience across wide sectors of an industry and represent data sources that are specific, accurate and relative to cover given; automobile and house insurance are classes that would fall into this area. At the other end of the spectrum, they are often new classes of insurance where there are either no or very little data.

Aquaculture insurance definitely falls into the “art” end of the rating spectrum. After nearly 30 years of experience, the processes for establishing rates in this class of insurance are only marginally more scientific than they were in the early 1970s. There are many reasons for this, none of which fit into any scientific rationale. First, aquaculture insurance is an extremely small insurance class. Second, there are few standard systems in use in aquaculture; virtually every growing system is unique. At the risk of oversimplifying an analogy, there are no standard “Ford production-line” systems that underwriters know will conform to closely established configurations for which they can establish rates, terms and conditions accordingly. Finally, the range of potential losses in aquaculture is extraordinarily wide and extraordinarily diverse in terms of effect.

In order to cater to the diversity of losses, and particularly, different extents of damage and loss, the market has developed a range of self-insurance techniques that enable underwriters to apply selective terms to specific perils according to their frequency and effect, all within a single policy framework.

Deductibles and franchises

In theory, an insurance policy could indemnify a producer for every single fish lost. However, the purpose of insurance is to protect against fortuitous losses and not inevitable ones. In any large population fish, there will always be an ongoing loss of small numbers of the population from multiple causes. These losses are described in aquaculture insurance policies as “Normal Trade Mortalities” (see above) and are a standard exclusion in all aquaculture policies.

In addition to Normal Trade Mortalities, farms are bound to suffer other small losses, none of which will cause serious financial loss. It does not make commercial sense, therefore, to bring such losses into the insurance arrangement – if insurers were to pay for each fish lost, the premiums that they would have to charge would be very high. The main purpose of insurance is therefore to protect against catastrophes. Two underwriting tools are used in aquaculture to eliminate common, run-of-the-mill losses:

The deductible – an amount, usually a fixed sum, or a percentage of the sum insured, which is deducted from each loss before payment is made.

An example of a deductible of 20 percent of the sum insured applied on an insurance for fish diseases, each event being treated separately. Thus:

Example A

Sum insured = US\$500 000 Deductible 20% = \$100 000

A disease loss of \$75 000 is below the deductible, so it would not be claimable.

A disease loss of \$120 000 is above the deductible, so \$20 000 would be paid.

The franchise – a monetary amount, or a percentage of the sum insured, which must be **exceeded** before a claim is paid. Thus:

Example B

Sum insured = \$500,000 Franchise 20% = \$100 000

A disease loss of \$75 000 is below the franchise, so it would not be claimable.

A disease loss of \$120 000 is above the franchise, so \$120 000 would be paid.

Sometimes, the two are used together and a franchise is applied with a deductible of, for instance, 10 percent. Thus, using Example B as basis for example C:

Example C

Sum insured = \$500 000 Franchise 20% = \$100 000 Deductible 10% = \$50 000

A disease loss of \$75,000 is below the franchise so would not be paid.

A disease loss of \$120 000 is above the franchise, so \$120 000 would be paid, less the deductible of \$50 000, i.e. \$70 000.

The pricing of aquaculture policies is complicated by the use of franchises and deductibles, of which there are unlimited combinations.

Rates and rating

The rating of aquaculture is much more an art than a science. This is further qualified by another factor – the need to attract business.

Rates are formulated to produce an underwriting profit. However, since the aquaculture market started, perceptions of the risks of the business by the underwriter and the farmer are often different. Underwriters believe – and the evidence so far suggests that they are right – that the industry is more hazardous than the producers believe it to be. Herein lies a conundrum in aquaculture insurance that has yet to be resolved.

The business that insurers are underwriting has undoubtedly proven to be high risk and of marginal profitability to them, yet there are large sectors of aquaculture that are well managed and sophisticated that do not buy insurance. Presumably, this is either because producers believe it is not cost-effective to do so or their business plans do not have room for premium payments at the rates that insurers are charging; they opt therefore to go uninsured.

To a certain extent, purchase of insurance is determined by the financial structure of the farm. If it is financed by borrowings secured on the business, banks will usually insist on insurance cover being purchased. However, if financing is through private equity or through borrowing secured by individuals as a last resort, insurance cover may not be purchased.

The acceptability of insurance rates and terms and conditions to the producer is an area of the business that urgently needs independent study. The insurance industry seems perplexed at why producers do not buy cover, especially when insured losses fairly regularly exceed the premiums gathered, which would indicate that insurance was a "good buy". But farmers think it is too expensive. There is no simple explanation of this contrary view; however, one significant factor is farm profitability. The margins in salmon farming and catfish farming are **extremely** small. It may well be the case that no matter how low rates are, the producers in both industries simply cannot afford to buy cover.

The very flexibility of such rating structures in aquaculture make giving examples of rates almost impossible to provide, especially those that will hold up against testing in the market; however, the following will help give a idea of what may be available:

All Risks example rates (note: rates change constantly):

Species and systems	Special terms and deductibles	Disease deductibles	Any other perils deductibles	Rates % of average monthly value	
				From – to	
Salmon (and trout) in gravity flow hatchery	C.S.* 50% of whole site	20% of site	10% to 15% of site	4.50 to 5.50%	
Salmon fry to smolt (and small trout.) in gravity flow tanks, ponds	C.S.* 50% of whole site	35% of site	15% to 25% of site	4.55 to 4.75%	
Salmon (and trout) in marine cages	C.S.* for ISA+ 50% of whole site.	30% per cage.	30% per cage	3.5% of average monthly value.	
Tuna in holding cages	C.S. cover not available.	20% deductible per cage		6 to 8%	
Cod in cages	Excluding Costia Spp. C.S* not available.	35% per cage group	35% per cage group	3.50 to 4.00%	
Fish in still-water ponds	No special terms	35% of site	15% to 25% of site	3.50 to 4.00%	
Oysters, mussels and shellfish	Rates and terms were not available when this report was prepared.				
Other species, e.g. abalone, turbot, halibut	C.S. cover not available.	35% per production section	20%	3.5 to 4.75%	

* C.S. = Compulsory slaughter. + ISA = Infectious Salmon Anaemia

Named Perils example rates:

Possible Named Peril Rates

Available From London Aquaculture Insurers - Autumn 2003

[shall we remove these huge bullets-maybe they came up as a default style]

1. OFFSHORE BASE DATA

Perils insured	Salmon/char	Bass/bream
Base rate	4.5%	3.65%
Base deductible	20% of site value	20% of site value
P1 - Pollution	0.50	0.40
P2 - Theft, malicious acts	0.20	0.25
P3- Predation	0.40	0.30
P4 – Storm, structural failure, etc.	0.90	0.80
P5 – Freezing, etc.	0.50	0.10
P6 – De-O ₂ due to biological activity, etc.	0.80	0.60
P7 – Change in water chemistry, etc.	0.50	0.50
P8 – Disease	0.75	0.70

2. ONSHORE BASE DATA

Perils insured	Salmon juveniles	Trout ponds	Intensive recirculation
Base rates	5.20%	4.40%	6.10%
Base deductible	20% of site value	15% of site value	20% of site value
P1 – Pollution	0.40	0.60	0.40
P2 – Theft, malicious acts, predators	0.20	0.70	0.20
P3 – Flood, tidal wave	0.40	0.50	0.30
P4 – Storm, structural failure	0.60	0.40	0.60
P5 – Drought, fire, etc.	0.25	0.30	0.40
P6 – Freezing, etc.	0.25	0.40	0.30
P7 – Mechanical breakdown	0.80	0.20	1.00
P8 – Electrical breakdown	0.70	0.10	0.50
P9 – De-O ₂ due to biological activity	0.40	0.50	0.50
P10 – Change in water chemistry	0.40	0.20	0.80
P11 – Disease	0.80	0.50	0.60

NOTE: The above rates are for theoretical farms with average exposure for each peril. In practice, farms are predisposed to some perils and have reduced exposures to others. Rates will vary considerably, according to Loss Record, Deductibles and the view of the underwriter.

The overall picture of the take-up of insurance across the aquaculture industry is patchy. Most of the major salmon farms appear to buy cover; most of the trout farming industry appears not to. Catfish farming appears to be completely uninsured, although this may be more due to how the business is conducted than to any other factor. It is extremely difficult for catfish farmers to meet the requirements of commercial insurance regarding proof of loss, which virtually rules them out of buying cover.

Another example of the lack of any scientifically designed rating structure in aquaculture is the tuna holding industry. This industry has developed out of the general decline of the hunted stock brought about by severe overfishing.

A practice has developed in a number of areas, from the Mediterranean to Mexico and Australia, in which relatively young tuna are caught and held in net pens where they are on-grown. The price of tuna is very high and the insurable values of the stock in these pen cage systems are accordingly also very high – so high, in fact, that the conventional aquaculture insurance market cannot cover them. It was necessary to find insurers to take up the extremely large proportion of the business that the conventional market cannot cover. As already been alluded to, aquaculture has a reputation of being

extremely high risk. Thus, the only way to attract additional underwriting markets has been to offer underwriters very high rates. Consequently, the rates being offered on this sector of the business can go as high as 6, even 8 percent, and those based on per kg values of US\$10.00 against a market value per kg, in excess of US\$30.00!

Binding coverage

Once terms and conditions are settled between the underwriter and the proposer, usually after the negotiating skills of the broker have been put to full use, insurance cover can be “bound”; i.e. coverage put into effect. Thereafter, as soon as possible, a full copy of the policy should be issued by the insurer and sent to the insured. Even before this is done, however, the insurance agent should provide the producer with a Cover Note, which clearly displays all the terms of the policy. It is vital that insureds know *exactly* what all the terms of their policy are.

Operating the policy

It will be clear to readers that aquaculture insurance is a complicated business. The one piece of advice that every producer should follow is never to put the aquaculture policy in the bottom drawer of a filing cabinet and forget about it. An aquaculture policy should be readily available all the time. Its important parts should be familiar to all employees on a farm, who should be instructed on what to do in the event of a loss.

Appendix B

Example proposal¹ forms

B.1 ONSHORE PROPOSAL FORM **Fish Farm Proposal Form (Hatchery and Land-based Sites)**

1.

Name of proposer:			
Contact name:			
Position within company:			
Mailing address:			
Postal code:	Tel.:	Fax:	
Mobile No.:	E-mail:		
Site name:			
Site address:	Postal code:		
Site location (latitude and longitude):	site licence No.:		
Tel.:	Fax:	E-mail:	

SITE MANAGEMENT PERSONNEL

First name:			
Surname:			
Date of birth:			
Position:	Manager:	Ass. Manager:	
Qualifications:			
Number of years' experience:			
Number of years at this site:			
Mobile No.:			
Total Number of production personnel:			

DATE SITE FIRST ESTABLISHED AND BY WHOM:

DATE SITE COMMENCED OPERATION UNDER PRESENT OWNERSHIP:

**DETAIL ANY KNOWN OR POTENTIAL SOURCES OF RISK, E.G. POLLUTION
AND DISEASE, AT ANY LOCATION WITHIN 5 MILES OF YOUR SITE:**

¹ Also known as "Application".

Are there any other production facilities located on this water source, and if so, where are they located?

PROVIDE INFORMATION ON THE PRIMARY WATER SOURCE IN THE TABLE BELOW:
WATER PARAMETERS

Water temperature	Min:	Max:
D.O. Levels	Min:	Max:
Ph levels	Min:	Max:
Salinity (where relevant)	Min:	Max:
Flow rate	Min:	Max:

PROVIDE INFORMATION ON THE SECONDARY WATER SOURCE IN THE TABLE BELOW:
WATER PARAMETERS

Water temperature	Min:	Max:
D.O. Levels	Min:	Max:
Ph levels	Min:	Max:
Salinity (where relevant)	Min:	Max:
Flow rate	Min:	Max:

IF THERE IS A TERTIARY WATER SOURCE, PLEASE INCLUDE DETAILS OF THIS SOURCE AT THE END OF THIS FORM.

Provide details of filtration systems used on intake:

Provide details of influent water temperature manipulation, if any:

Provide details of aeration / oxygen systems:

Is the unit subject to any form of recirculation?

Water monitoring: _____ Frequency: _____

Method:

State any water quality problems past & present:

What is the source and type of feed used?

Is food fed automatically or by hand?

2. Equipment:

Type: tanks, ponds, raceways, etc.	Dimensions	Manufacturer/Builder	Year of manufacture	Material	Number	Value

COVER REQUIRED:

YES

NO

ATTACH AN ANNOTATED PLAN OR PROVIDE A DIAGRAM OF THE SITE.

Show:

- Number & full construction details of all tanks or holding systems.
- Path of water flow, from source to discharge / recirculation.
- Details of alternative water supplies in the event of main supply failure and percentage reuse, if applicable.
- Details of pumping water (if any).
- Details of filtration and aeration (if any).
- Details of alarm systems installed (if any), including details of the factors monitored (e.g. Water temperature, water flow rate, water level, etc.) And method of signalling a system failure.
- Minimum flow rate and duration of supply at this minimum rate.
- Details of all production plant, pumps, treatment apparatus, generators, etc.
- If this system was purpose-built, please advise date of commission / construction, designer, consultants used & copy of original plans.

3. Maximum stocking density (kg/m² or kg/m³): **when this occurs:**

STOCK HEALTH RECORD (DETAIL ANY PROBLEMS DURING THE LAST 5 YEARS):

Causative agent	Date	Treatment	Frequency	Outcome

Detail disease monitoring & laboratory facilities:

On site:

Off site:

Veterinarian used (name):

Tel.:

Frequency of health checks:

By whom (name):

Qualifications:

Experience:

Security

General alarms

Guard patrol	Yes	No	24 hours guard patrol	Yes	No

Mechanical plant, including pump and alarm systems, the subject of maintenance contracts? If so, provide details:

Is the site exposed to any of the following?

Particular risks:	Yes	No	If yes, state preventative/ remedial measures
Storm			
Tsunami			
Disease			
Blooms (algal, plankton)			
Pollution			
Predation			
Water supply fluctuation			
Water quality			
Debris exposure at intake			
Theft			
Other (details)			

**4.Previous loss history during the last 10 years
(whether or not the subject of a claim)**

Stock:

Date	Cause of loss	Species	Number	Average weight	Gross loss	Net settlement

Name of present insurers:

Renewal date:

Name of any previous insurer:

In respect of the property, the subject of this proposal, has any insurer:

(A) declined:	Yes	No
(B) cancelled cover:	Yes	No
(C) imposed restricted terms or additional premiums:	Yes	No

If yes, provide details:

Please provide any other information that you feel may be relevant:

Signing this form does not bind the provider or insurer to complete the insurance, but it is agreed that this proposal shall be the basis of the insurance contract entered into with the company.

I hereby declare that the particulars and answers given in this proposal are in every respect true and correct, and that I have not withheld any information calculated to influence the decision of the company in regard to the underwriting of the risks to which this proposal relates.

Failure to disclose all relevant facts may invalidate your policy.

Insurers should immediately be advised of all material changes or alterations of the information provided in this proposal. A material change is one that would influence the judgment of a prudent insurer in setting the terms or premiums, or determining whether to continue acceptance of the risk.

Signature:	Date (dd/mm/yy):
Print name:	Position:
Company:	
Company address:	

WE ARE GRATEFUL TO THE SUNDERLAND MARINE MUTUAL INSURANCE COMPANY FOR PROVIDING THE ABOVE EXAMPLE OF AN ONSHORE APPLICATION FORM.

B.2. OFFSHORE PROPOSAL FORM

Fish farm proposal form (Marine & Freshwater Sites)

1.

Contact name:

Position within company:

Mailing Address:

Postal code:

Tel.:

Fax:

Mobile No:

E-mail:

Site Name:

Site address:

Post code:

Site Location (Latitude and Longitude):

Site:

Licence No:

Tel.:

Fax:

E-mail:

SITE MANAGEMENT PERSONNEL

First name

Surname:

Date of birth:

Manager:

Ass. Manager:

Position:

Qualifications:

Number of years experience:

Number of years at this site:

Mobile No:

Total No. of production personnel:

FOR OFFICE USE ONLY

Observations

Received:

Reviewed:

Initiated:

Date site first established and by whom:

Date site commenced operation under present ownership:

Give name & proximity of any other fish farm within 5 miles of your site:

Is this site subject to an area management agreement?

DETAIL ANY KNOWN OR POTENTIAL SOURCES OF RISK, E.G. POLLUTION, BLOOM, DISEASE, AT ANY LOCATION WITHIN 5 MILES OF YOUR SITE:

WATER PARAMETERS

Water temperature	Min: 0	Max: 01
D.O. Levels	Min:	Max:
Ph levels	Min:	Max:
Salinity	Min:	Max:
Water current in area:	Maximum speed (in knots):	Direction (North):
Maximum fetch/exposure (in miles)		
Maximum wave height (in metres):		
Maximum wind speed (in mph):		
Normal minimum water depth at site: (in metres):		
Tidal variance of water depth at site (in metres):	Min:	Max:

WATER MONITORING:

Frequency:

Exposure to ice:

2.
STOCK – CURRENT

Species	Date of transfer	Number at transfer	Weight at transfer max./min.	Supplier	Projected mortality to harvest	Projected harvest weight	Projected harvest date

STOCK – FUTURE (WITHIN THE NEXT 12 MONTHS)

Species	Date of transfer	Number at transfer	Weight at transfer max./min.	Supplier	Projected mortality to harvest	Projected harvest weight	Projected harvest date

Overall maximum stock value (currency): _____ *Amount:* _____

**COVER REQUIRED
EQUIPMENT:**

Type: cages, feed barge/system, etc.	Size	Manufacturer	Year of manufacture	Material	Number	Value

COVER REQUIRED

Type	Depth	Manufacturer	Year of manufacture	Mesh size, E.G. 18 Mm	Twine spec. E.G. Denier/ply	Number	Tagged Yes / No	Value

**COVER REQUIRED
PREDATOR EXCLUSION:**

Predator nets (seal, bird, etc.)	Type	Age (years)	Manner of installation	Value

COVER REQUIRED
MOORINGS & ANCHORING SYSTEM:

	Concrete blocks	Anchors	Other, E.G Rock pins	Value incl. anchors, ropes, etc.
Cages				
Barges				
Feeding systems				
Other				

Designed / specified by cage manufacturer?

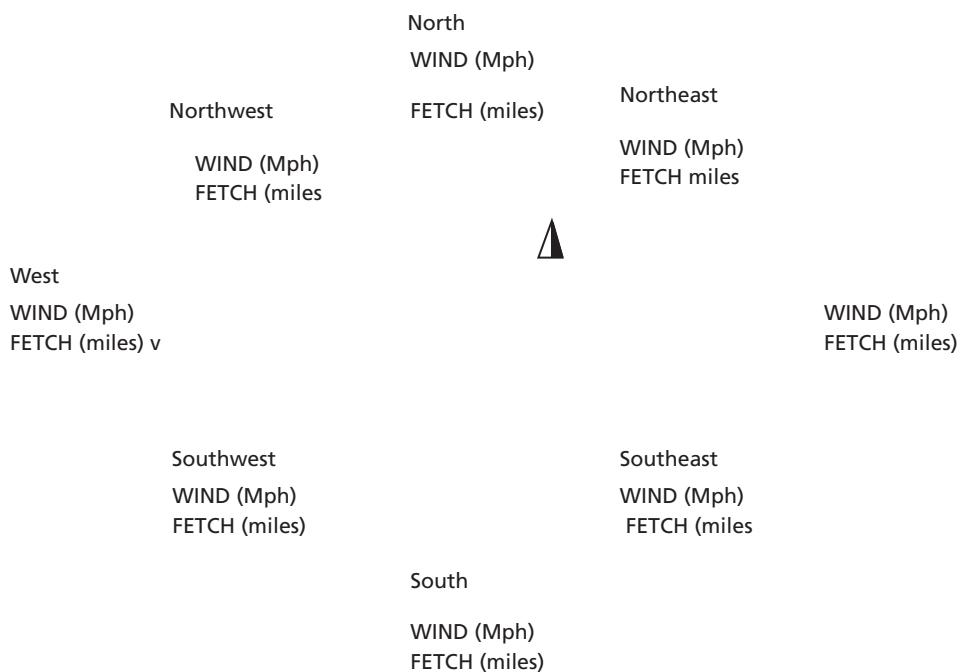
	Name	Qualifications	Experience
If not, who designed / specified			
Cages installed by whom?			

Spare mooring available on site

COVER REQUIRED:

Type	Year Built	Length	Tonnage	Construction	Value excluding engine if outboard	Outboard make	Year of manufacture	Value of outboard

SPECIFY THE MAXIMUM WIND STRENGTH & FETCH USING COMPASS ROSE



SPECIFY THE LAYOUT OF THE MOORINGS IN THE DIAGRAM BELOW

CAGES		
WATER SURFACE	Shackle, hard eyes	CONNECTION (manufacturer & specification)
↑		
↑	Chain, poly prop, poly steel, etc.	BRIDLE (length & specification)
↑		
↑	Through bar, safety chain, etc.	CUSHION FLOAT (manufacturer & specification)
↑		
↑	Shackle, hard eyes, mousing, etc.	CONNECTION (manufacturer & specification)
↑		
↑	Karak Ropes, poly steel, etc.	SCOPE ROPE (length & specification)
WATER DEPTH		
↓	Shackle, hard eyes, mousing, etc.	CONNECTION (manufacturer & specification)
↓		
↓	Stud link, plain link, long link	GROUND CHAIN (manufacturer & specification)
↓		
↓	Shackle, hard eyes, mousing, etc.	CONNECTION (manufacturer & specification)
↓		
↓	Samson, plough, block / rock pin	ANCHORS (manufacturer & specification)
↓		
SEA BED	Rock, silt, sand, etc.	DESCRIPTION OF SEABED

PROVIDE A DIAGRAM OF THE SITE USING THIS SHEET

EQUIPMENT CARE & STOCK CONTROL**FREQUENCY AND EXTENT OF MAINTENANCE**

Cages	Daily	Weekly	Monthly	Annually
-------	-------	--------	---------	----------

By whom: _____ Name _____

	Qualifications	Experience
Nets	Daily	Monthly

By whom: _____ Name _____

	Qualifications	Experience
Moorings	Daily	Monthly

By whom: _____ Name _____

	Qualifications	Experience
--	----------------	------------

NET STORAGE:- UNDERCOVER

Schedule of net changes:

Shade netting details:	None	Partial cover	Complete cover
------------------------	------	---------------	----------------

Method for mortality removal
(other than diving, as noted below)

Maximum stocking density: kg/m ² or kg/m ³	When this occurs:
---	-------------------

Dive reports recorded:	Yes	No
------------------------	-----	----

Frequency of site dives:	Summer:	Winter:

PURPOSE OF DIVES: Mort removals	Moorings inspection	Net inspection	Cage collar inspection

STOCK HEALTH RECORD
Detail any problems during the last 5 years

Causative agent	Date	Treatment	Frequency	Outcome

DETAIL DISEASE MONITORING & LABORATORY FACILITIES:

On-site:

Off-site:

Veterinarian used: name

Tel.:

Frequency of health checks:

By whom (name):

Qualifications:

Experience:

Fallowing practised:

SECURITY

General							
Alarms							
Guard patrol	Yes	No	Guard patrol 24 hours	Yes	No		
Number of units			Manufacturer				
Age of units			Power source				
Recommended coverage			Area of site				
Utilization/distribution							
System maintenance schedule							
Cage							
Emergency availability of staff on site			Proximity to site:				

IS THE SITE EXPOSED TO ANY OF THE FOLLOWING PARTICULAR RISKS:

	Yes/No	If yes, state preventative/remedial measures
Storm		
Tsunami		
Disease		
Jellyfish		
Blooms (algal,plankton)		
Pollution		
Predation		
Salinity fluctuation		
Water quality		
Debris exposure		
Shipping/boating		
Other (details)		

4.

PREVIOUS LOSS HISTORY DURING THE LAST 10 YEARS (WHETHER OR NOT THE SUBJECT OF A CLAIM)

STOCK

EQUIPMENT / BOATS

Name of present insurers:

Renewal date:

Name of any previous insurer:

In respect of the property, the subject of this proposal, has any insurer:

Declined:

Cancelled cover:

Imposed restricted terms or additional premiums:

If yes, provide details:

Please provide any other information which you feel may be relevant:

SIGNING THIS FORM DOES NOT BIND THE PROVIDER OR INSURER TO COMPLETE THE INSURANCE, BUT IT IS AGREED THAT THIS PROPOSAL SHALL BE THE BASIS OF THE INSURANCE CONTRACT ENTERED INTO WITH THE COMPANY.

I HEREBY DECLARE THAT THE PARTICULARS AND ANSWERS GIVEN IN THIS PROPOSAL ARE IN EVERY RESPECT TRUE AND CORRECT AND THAT I HAVE NOT WITHHELD ANY INFORMATION CALCULATED TO INFLUENCE THE DECISION OF THE COMPANY IN REGARD TO THE UNDERWRITING OF THE RISKS TO WHICH THIS PROPOSAL RELATES.

FAILURE TO DISCLOSE ALL RELEVANT FACTS MAY INVALIDATE YOUR POLICY.

INSURERS SHOULD IMMEDIATELY BE ADVISED OF ALL MATERIAL CHANGES OR ALTERATIONS OF THE INFORMATION PROVIDED IN THIS PROPOSAL. A MATERIAL CHANGE IS ONE WHICH WOULD INFLUENCE THE JUDGEMENT OF A PRUDENT INSURER IN SETTING THE TERMS OR PREMIUMS OR DETERMINING WHETHER TO CONTINUE ACCEPTANCE OF THE RISK.

Signature:

Date:

Print name:

Position:

Company:

Company address:

Appendix C

Example policy wordings

C.1. EXAMPLE OF ALL RISKS TERMS AND CONDITIONS FOR FISH STOCK, BUT ALSO FOR COVER ON BOATS, MARINE EQUIPMENT AND ONSHORE PROPERTY

AQUACULTURE INSURANCE

CERTIFICATE OF INSURANCE

Insured:
Policy No:

This Certificate of Insurance confirms that XXXXXXXX ("the Company") has agreed to provide aquaculture insurance to the Insured named in the Schedule during the Period of Insurance also specified in the Schedule.

This document contains the Company's specific aquaculture insurance terms and conditions. It is designed to be, and requires to be, read together with the Company's General Conditions (which apply to all insurances provided by the Company including aquaculture insurance) and the Schedule, which, collectively with this document, comprise the policy documentation that governs the relationship between the Company and the Insured, and also sets out the nature and extent of the insurance provided by the Company.

All of the policy documentation is IMPORTANT. It contains terms which, under certain specified circumstances, operate to limit, suspend or remove the Insured's right to the indemnity by way of insurance which would otherwise be provided by the Company.

The Insured and any broker or other agent acting for the Insured MUST therefore read the policy documentation carefully, promptly on its receipt, to ensure that the nature and extent of the cover provided is fully understood. If any discrepancies are found, or any terms or conditions are not understood, or any of the restrictions on cover are unacceptable, then these matters must be raised with the Company's Managers ("the Managers") promptly on receipt of the policy documentation. In particular, it will not be possible to alter the terms and conditions of the Insurance after any occurrence that has given rise to, or may give rise to, a claim for indemnity.

The Company relies on the full and accurate description of the risks that it is asked to insure in order to decide whether or not to provide insurance. Errors or omissions, even if entirely accidental, in completing the Proposal Form may lead to the insurance being rescinded from its commencement date. For the purposes of this insurance, "Proposal Form" means the Company's proposal form or any other application for insurance, including the renewal of any insurance, submitted by the Insured or by any broker, intermediary or other agent acting for the Insured.

The Managers to whom all communications concerning this insurance should be directed are:

XXXXX Limited

at the following address:

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DEFINITIONS

The following terms that appear in the Aquaculture Insuring Clauses and that are identified in the text by the use of an initial capital letter are defined terms to which the following meanings are assigned:

“Deductible”	The amount (specified in the Schedule) which is to be deducted in respect of each and every loss from the indemnity payment to be made by the Company.
“Disease Period”	A period of the number of days specified in the Schedule during which the loss of Stock through death by Disease constitutes one loss for the purposes of the insurance.
“Disease”	An identifiable pathogen (including for these purposes: plankton bloom, algal bloom, jellyfish bloom, larval bloom and parasitic infestation) which is the main and a direct cause of actual mortality.
“Holding Unit”	Any single enclosure at a Site in which Stock is reared or kept, such as a net, cage, tank, pond or raceway.

“Indemnity Scale”	The scale of values in respect of Insured Stock specified in the Schedule.
“Marine Equipment”	Moveable nets and cages, pontoons and similar, and boats or other watercraft, all including all of their associated normal gear and equipment, owned or rented by the Insured, and which are used as Holding Units, or to service Holding Units or to provide moorings for Holding Units, or, in the case of boats or watercraft, as part of the outfit of a Site.
“Monthly Stock Declarations”	Reports to be supplied by the Insured to the Managers within 30 days after the end of each month during the Period of Insurance specifying the highest number and highest value in accordance with the Indemnity Scale of Stock held by or on behalf of the Insured during that month at each Site and also categorizing the Stock by generation and stating their average weight and size.
“On-Shore Property”	Buildings and their contents, and any gear or equipment, which form part of the outfit of a Site (for the avoidance of any doubt, the term On-Shore Property does not include any road-going vehicle that is licensed for use on the public highway).
“Period of Insurance”	The period of time specified in the Schedule during which an event or occurrence, giving rise to loss to the Insured of a type covered by the aquaculture insurance, shall in turn give rise to a right of indemnity subject to the terms of the insurance.
“Site”	A geographical area identified in the Schedule as a Site at which the Insured practices aquaculture, irrespective of the number of Holding Units at the Site or the number of locations within the Site at which Holding Units are placed.
“Stock”	Marine or freshwater creatures or organisms held by the Insured for aquacultural purposes and insured during the Period of Insurance by the Company, as identified initially by the Insured in the Proposal Form and subsequently in the Insured’s Monthly Stock Declarations.
“Stocking Density”	The mass of Stock (expressed in dry weight kilograms per cubic metre of water) in the Holding Unit in which the Stock is held.
“Sum Insured”	The limit stated in the Schedule of the Company’s liability to provide indemnity subject to the applicable Deductible, in respect of loss.

AQUACULTURE INSURING CLAUSES

The Company provides insurance of three separate types of risk to those engaged in aquaculture: Stock, Marine Equipment and On-Shore Property. Each coverage is available for purchase and must be purchased separately. Securing cover for one type of risk does not automatically provide cover for the others. The details of which coverages have been purchased by the Insured are recorded in the Schedule.

Stock cover

The Company will indemnify the Insured for loss of Stock through:

- death; or escape from the Holding Units in which the Stock is kept; or
- proved theft or vandalism, and by no other cause or causes whatsoever.

In the event of loss of Stock, the amount of the indemnity payable by the Company shall be **the lesser** of:

- the Indemnity Scale value of the Stock that has been lost, that value being reduced by the normal trade mortality of the Insured Stock; or
- the cost (as established by the Company after the making of reasonable enquiries) that would be incurred in physically replacing, with equivalent stock, the Stock which has been lost;
- subject always to the limit to the Insured's right to indemnity constituted by the Sum Insured and to the applicable Deductible specified in the Schedule in respect of each and every separate loss.

Specific stock exclusions

The insurance provided by the Company DOES NOT COVER loss of Stock:

- which is discovered or occurs only at harvesting (the removal alive from a Holding Unit for the purpose of slaughter or transport of some or all of the Stock kept in that Holding Unit) or grading; or
- due to cannibalism or sexual maturing; or
- by inexplicable disappearance; or
- by reason of intentional slaughter: whether by or under the order or directions of any governmental or public authority as a precaution against the spread of disease,

or otherwise;

- occurring while in transit to or from a Holding Unit; or
- due to, or contributed to by, the exceeding of the Stocking Density specified in the Schedule or (if none such is specified) a prudent stocking density appropriate to the Stock species and age.

The exclusions in 1.2.1 above apply to the Stock coverage provided by the Company in addition to the General Exclusions in the Company's General Conditions and the exclusions in 5.2 below.

Special stock provisions

The coverage for loss of Stock through death by Disease is based on loss occurring at a Site during a Disease Period of the length specified in the Schedule. In the event of an outbreak of Disease that continues to cause mortality after the expiry of the first Disease Period, and where the coverage allows for the payment of more than one loss, separate claims must be made for the losses occurring during respectively the first, the second, and each successive Disease Period, and the indemnity paid in respect of each such separate loss will be subject to the applicable Deductible specified in the Schedule.

For these purposes, a Disease Period or, where applicable, the first of a series of Disease Periods, shall begin on the date on which the Insured first notifies the Managers that Stock has been lost through death by Disease, and no indemnity will be paid in respect of any losses occurring before that date and attributable to that outbreak of Disease.

The Company will provide indemnity to the Insured for loss of Stock through death by Disease which occurs during any Disease Period which starts within the Period of Insurance. In the event, however, that a Disease Period, having started during the Period of Insurance, would extend beyond the expiry date of the insurance, coverage shall continue in respect of continuing loss until the expiry of the Disease Period or 30 days from the expiry of the insurance, whichever is the earlier.

The fact that one or more Monthly Stock Declarations might indicate that the value of the Stock at the Site concerned has been greater or less than the Sum Insured stated in the Schedule does not constitute notice to the Company of any request by the Insured

to increase or decrease the Sum Insured and does not have the effect of adjusting the Sum Insured automatically. Should the Insured wish to increase or decrease the Sum Insured, a formal application to do so must be made in writing and the Company may accept or decline that application in its absolute discretion, and if accepting, may do so on any terms that seem to it to be appropriate.

MARINE EQUIPMENT INSURANCE

Cover

The Company will indemnify the Insured for loss or destruction of or damage to the Marine Equipment identified in the Schedule through any accidental cause.

The amount of the indemnity payable by the Company following the loss or destruction of or damage to Marine Equipment shall be the lesser of:

- the immediately pre-loss realizable market value of Marine Equipment which has been lost or destroyed or so damaged as to be in the Company's reasonable opinion beyond economic repair; or
- the cost of repairing damaged Marine Equipment to its immediately pre-damage working condition or, at the Company's sole discretion, the cost of replacing it in whole or in part with equivalent Marine Equipment;
- subject always to the limit to the Insured's right to indemnity constituted by the applicable Sum Insured and also subject to the applicable Deductible in respect of each and every loss.

The liability of the Company to provide indemnity in respect of Marine Equipment shall not exceed in any one Period of Insurance:

- in the aggregate, the total Marine Equipment Sum Insured; and in respect of any particular item, its individual Sum Insured, as stated in the Schedule; or (where applicable)
- the balance of the Sum Insured remaining after deduction of any previous payment made in respect of the loss or destruction of, or damage to, Marine Equipment occurring during the same Period of Insurance, unless the Company shall have agreed in writing to re-instate any such Sum Insured and the applicable re-instatement premium has been paid.

ON-SHORE PROPERTY

Cover

The Company will indemnify the Insured for loss or destruction of or damage to On-Shore Property by: fire; lightning or explosion; storm, flood or earthquake; escape of water or other dangerous substance from tank or pipe or waterway; theft or vandalism; and by no other cause or causes whatsoever.

The amount of the indemnity payable by the Company following the loss or destruction of or damage to On-Shore Property shall be the lesser of:

- in the case of buildings, the cost of repair or, at the Company's sole discretion, replacement with equivalent structures;
- in the case of the contents of any such buildings and in the case of gear and equipment:
 - (i) the immediately pre-loss realizable market value of the item lost or destroyed or so damaged as to be in the Company's reasonable opinion beyond economic repair; or
 - (ii) the cost of repairing it to its immediately pre-damage working condition or, at the Company's sole discretion, replacing it in whole or in part with equivalent equipment.

The liability of the Company to provide indemnity in respect of On-Shore Property shall not exceed in any one Period of Insurance:

- in the aggregate, the total On-Shore Property Sum Insured; and in respect of any particular item, its individual Sum Insured, as stated in the Schedule; or (where applicable);
- the balance of the Sum Insured remaining after deduction of any previous payment made in respect of the loss or destruction of or damage to On-Shore Property occurring during the same Period of Insurance, unless the Company shall have agreed in writing to re-instate any such Sum Insured and the applicable re-instatement premium has been paid.

EXPENSES INCURRED TO MITIGATE LOSS EXCLUSIONS

The Company will indemnify the Insured in respect of reasonable expenses incurred by the Insured solely and specifically in order to minimize a loss which is occurring, or to avert the risk of an imminent loss for which loss coverage is or would be available to the Insured from the Company. The indemnity in respect of loss mitigation expenses is, however, limited to 20 percent of the sum insured and is also subject always to the application, in respect of each claim, of the Deductible applicable to the type of loss which the Insured has sought to avert or minimize. In the event that that loss does in fact occur, the indemnity payable in respect of those expenses will be paid in addition to the indemnity in respect of the loss itself, but only to the extent that the two sums combined do exceed the applicable Deductible but do not exceed the limit of the Company's liability to indemnify in respect of the primary subject matter of the insurance. For the avoidance of any doubt, insofar as such expenses may consist of labour costs, the right to indemnity extends only to justifiable additional costs and excludes the cost of employing existing staff during normal working hours. The cover also excludes the costs of routine medication and veterinary costs in respect of Stock and the costs of prudent maintenance in respect of Marine Equipment or On-Shore Property.

General exclusions

The aquaculture insurance provided by the Company to the Insured is subject to the General Exclusions set out in the Company's General Conditions as well as to the specific aquaculture insurance exclusions set out below (and to the Stock exclusions at 1.2.1 above).

The aquaculture insurance DOES NOT COVER loss of the categories set out in the remainder of this clause.

Consequential loss: by which is meant any loss, damage or expense of any kind or description, economic or otherwise, which does not itself consist simply of the physical loss of or damage to tangible property.

For the avoidance of any doubt (but without limitation), all claims for loss of use or for loss of revenue or profit, or for the consequences of business interruption, and all similar claims are encompassed in this exclusion.

Aquaculture exclusions

The aquaculture insurance is a first party property insurance. It does not cover any form of liability to any third party which the Insured may incur in any way whatsoever, even if that liability is connected with or arises from the insured Stock, Marine Equipment or On-Shore Property. For the avoidance of any doubt, "liability" includes any fines or penalties (howsoever imposed) which the Insured may incur. The only exception to this rule is that a limited third party property damage liability coverage is available to the Insured as an optional extra coverage in relation to Marine Equipment on payment of an extra premium. If the Insured has purchased and is entitled to such coverage, that fact will be noted in the Schedule and confirmed by the issue of an additional section of Policy documentation.

WARRANTIES AND UNDERTAKINGS

In addition to the warranties and undertakings given by the Insured pursuant to the Company's **General Conditions**, the following aquaculture insurance warranties and undertakings apply to Insureds engaged in aquaculture.

All Holding Units and Marine Equipment at a Site, whether themselves insured by the Company or not, shall have been installed and constructed, and shall be maintained in accordance with proper work practices and any manufacturer's or supplier's instructions and recommendations. They shall also be suitable and always intended to be used for the purpose for which they are employed. In the event that (following survey or inspection) the Company's technical advisers consider that this warranty has been breached, then (unless the Company elects immediately to terminate the insurance) all improvements and repairs required by the technical advisers to be done and communicated to the Insured or the Insured's agent shall be implemented fully and forthwith. Coverage will be suspended pending completion of the required works.

The Insured shall exercise due diligence at all times:

- to provide proper care and attention to and carry out regular and frequent inspections and maintenance of the Stock, Marine Equipment and On-Shore Property in accordance with a properly planned inspection and maintenance schedule.
- To protect Stock against predators, whether by water, land or air, and to protect this Stock and all Marine Equipment and On-Shore Property against thieves and vandals.
- To comply fully with all general recommendations of the Company or its technical advisers on the prevention of loss, and also to comply fully with all relevant statutory requirements, governmental or quasi-governmental regulations, and manufacturer's instructions and recommendations.
- To ensure that Stock, including seeding stock, remains in the same good health and condition, and free from any injury, physical disability or disease as at the commencement of the Period of Insurance, it being specifically warranted, unless expressly declared otherwise in the Proposal Form, that to the best of the Insured's knowledge and belief, having carried out all prudent inspection procedures, the Stock was in good health and condition at the commencement of the Period of Insurance.
- To ensure that all protective systems and warning devices existing at the beginning of the Period of Insurance, or which the Insured has agreed to install during the Period of Insurance, shall be the subject of maintenance agreements standard in the trade or properly planned maintenance schedules, and that no change shall be made to such protective systems and warning devices without the written consent of the Company, and that all such protective systems and warning devices shall be tested regularly every week and proper records of such tests shall be maintained.

In the event that the Insured breaches any of these warranties, the Company shall be entitled to terminate the insurance as at the time of the breach and to reject claims for any loss that may subsequently occur, irrespective of whether or not such loss was caused by or connected with any particular breach of any particular warranty.

The Insured also expressly gives the following undertakings to the Company:

- the Insured shall supply to the Managers a Monthly Stock Declaration;
- the Insured shall also maintain regular written stock control records which will at all reasonable times be available for inspection by the Managers or the Company's technical advisers;
- the Managers and the Company's technical advisers shall be afforded the facility at any reasonable time fully to inspect or have inspected all Stock and/or Marine Equipment and/or On-Shore Property and the rest of the outfit and any uninsured stock at a Site;

- Failure by the Insured to comply with any of these undertakings may result in indemnity payments being reduced or declined at the absolute discretion of the Company.

CLAIMS PROCEDURE

Notification and evidence

The Insured shall, if possible immediately on discovery and in any event without any avoidable delay, notify the Managers by telephone of any losses or of any event or occurrence which might give rise to a loss, and shall also take immediate action to do everything reasonably possible to minimize such loss or avert such potential loss.

Whenever loss of Stock has occurred and is continuing or may continue, the Insured shall also consult with the Company's technical advisers and comply promptly with all their recommendations.

In the event that the Insured fails to comply with 7.1.1 or 7.1.2 above, the Company will not be liable to pay more than it would have had to pay if the required action had been taken promptly and effectively.

Claim

In order to present a valid claim under this insurance, the Insured must in any event: confirm the initial notice of loss as soon as possible in writing (by e-mail or by fax); preserve evidence of the loss and of how it was caused; make such evidence available for inspection by the Managers and/or the Company's technical advisers and/or any loss adjuster appointed by or on behalf of the Company; supply such information, photographs and documents as the Managers or the technical advisers or any loss adjusters appointed by or on behalf of the Company may require; and complete and sign and submit the Company's Claim Form to the Company.

In the event of loss occurring due to theft or burglary or vandalism, the Insured shall inform the police immediately upon discovery of the loss or damage and ensure that such notification is recorded by the police.

Failure to comply with any of the provisions of 7.1 above may result in indemnity payments being reduced or declined at the absolute discretion of the Company.

Subrogation

If the Company becomes liable to make any payment under this policy in respect of any loss, the Company shall be subrogated, to the extent of such payment, to all the rights and remedies of the Insured against any party in respect of such loss, and thus shall be entitled, at its own expense, to sue in the name of the Insured in order to enforce such rights and remedies. The Insured must give to the Company, and to any of its authorized representatives, every assistance and do and concur in doing and permit to be done all such acts and things as may be necessary to enable the Company effectively to enforce such rights and remedies.

The Insured must not enter into any settlement agreements with third parties in respect of any loss which is, or may be, the subject of a claim for indemnity under the insurance without the informed express consent of the Insurers. **Doing so may result in indemnity payments being reduced or declined at the absolute discretion of the Company.**

Average

If in connection with any loss it is found that the applicable Sum Insured (or in the case of Stock, the Indemnity Scale value) is less than the actual value of the subject matter of the claim, the amount of indemnity payable by the Company shall be reduced in the same proportion as the Sum Insured bears to the actual value.

Deductible

The Insured's right of indemnity is, in respect of each and every loss, subject to the Deductible specified in the Schedule and the amount of that Deductible shall be deducted from the indemnity payment made by the Company.

In the event that the Company elects to replace the insured Marine Equipment or On-Shore Property, or part of it, the replacement will not be carried out until the Insured pays the amount of the Deductible to the Company.

Insurer in possession

The Company and any person authorized by it may (but shall not be obliged to) in the course of dealing with any loss take possession of damaged Marine Equipment or On-Shore Property and deal with the item(s) concerned for all reasonable purposes in any reasonable manner. No insured item of any description may under any circumstances or at any time be abandoned to the Company, and any attempt to do so shall for all purposes be completely ineffective.

PREMIUMS

Stock

The Insured shall pay a deposit premium as specified in the Schedule.

The actual total amount of premium finally payable in respect of the insurance provided during the Period of Insurance shall be calculated by the application of the premium rate specified in the Schedule to the "Average Value" of the stock insured, being the average over the Period of Insurance of the values derived from the Insured's Monthly Stock Declarations. The difference between the final premium and the deposit premium shall be due and payable at the end of the Period of Insurance.

If any of the Monthly Stock Declarations have not been provided within 30 days of the end of the applicable month, the Company shall have the right to use the highest declaration of value made by the Insured, either in the Proposal Form or during the Period of Insurance, instead of the Average Value in order to determine the final premium.

If during the Period of Insurance there is a loss of Stock and the Insured makes a claim for indemnity in respect of that loss, then the value (calculated in accordance with the Indemnity Scale) of that part of the Stock in relation to which such claim was made shall be added to the value of the Stock actually at the Site as shown in all subsequent Monthly Stock Declarations for the purpose of calculating the Average Value.

Marine equipment

The premium payable shall be the premium specified in the Schedule.

On-shore property

The premium payable shall be the premium specified in the Schedule.

Premium refund

The aquaculture insurance may be cancelled at any time at the request of the Insured in writing to the Managers. In the event of such cancellation, the Premium due to the Company in respect of the time during which Stock Loss coverage was extended to the Insured shall be as follows:

Up to 4 months	– 50% of the deposit premium
Up to 5 months	– 60% of the deposit premium
Up to 6 months	– 70% of the higher of the deposit or final premium
Up to 7 months	– 80% of the higher of the deposit or final premium
Up to 8 months	– 90% of the final premium
Over 8 months	– 100% of the final premium

In the case of Marine Equipment and On-Shore Property coverages, the percentages stated above shall apply to the premium specified in the Schedule.

No premium refund shall be granted if any loss has occurred during the Period of Insurance during which the Insured has given notice of cancellation whether the loss has been paid or is in the course of adjustment.

In no circumstances will any interest be paid on any premium refunded to the Insured.

Policy Documentation by Sunderland Marine Mutual Insurance Company Limited
October 2002. All Rights Reserved.

Dated:

C.2 EXAMPLE OF NAMED PERILS TERMS AND CONDITIONS

Example of a typical “Named Perils” policy wording. The wording must be read in conjunction with the schedule at the end of the wording, which lays out the details of the policy-holder:

AQUACULTURE FARM POLICY

The Assured named in the attached Schedule has made to the Underwriters a written proposal bearing the date stated, which is hereby agreed to be the basis of this contract and to be considered as incorporated herein.

The Underwriters hereby agree subject to the following terms and conditions to indemnify the Assured in respect of Mortality or loss of fish stock at the insured location(s) due to Pollution (as defined) and Perils as stated in the attached Schedule up to but not exceeding the sum insured and in accordance with the basis of indemnity stated in the Schedule or with the replacement cost of the said fish stock, whichever is the less.

Definition

Pollution shall mean the presence of any foreign substance or material of a toxic nature that causes mortality or results in total loss of market value. Such presence to be substantiated by analysis of water samples taken at the time of the loss and/or by examination of affected fish.

Exclusions

This Policy does not cover:

1. intentional slaughter, whether by Order of official body or otherwise;
2. malicious or willful act of the Assured or any employee of the Assured;
3. mysterious and or unexplained shortages.

GENERAL EXCLUSIONS

Radioactive contamination and explosive nuclear assemblies exclusion clause

This Policy does not cover:

1. Loss or destruction of or damage to any property whatsoever or any loss or expense whatsoever resulting or arising therefrom or any consequential loss;
2. any legal liability of whatsoever nature:
 - directly or indirectly caused by or contributed to by or arising from:
 - (i) ionizing radiations or contamination by radioactivity from any nuclear fuel or from any
 - nuclear waste from the combustion of nuclear fuel;
 - (ii) the radioactive, toxic, explosive or other hazardous properties of any explosive nuclear
 - assembly or nuclear component thereof.

Electronic date recognition exclusion (EDRE)

This Policy does not cover any loss, damage, cost, claim or expense, whether preventative, remedial or otherwise, directly or indirectly arising out of or relating to:

1. the calculation, comparison, differentiation, sequencing or processing of data involving the date change to the year 2000, or any other date change, including leap year calculations, by any computer system, hardware, programme or software and/or any microchip, integrated circuit or similar device in computer

equipment or non-computer equipment, whether the property of the Assured or not; or

2. any change, alteration or modification involving the date change to the year 2000, or any other date change, including leap year calculations, to any computer system, hardware, programme or software and/or any microchip, integrated circuit or similar device in computer equipment or non-computer equipment, whether the property of the Assured or not.

This clause applies regardless of any other clause or event that contributes concurrently or in any sequence to the loss, damage, cost, claim or expense.

War exclusion clause

Notwithstanding anything to the contrary contained herein, this Policy does not cover loss, damage or liability directly or indirectly occasioned by, happening through or in consequence of war, invasion, acts of foreign enemies, hostilities (whether war be declared or not), civil war, rebellion, revolution, insurrection, military or usurped power or confiscation or nationalization or requisition or destruction of or damage to property by or under the order of any government or public or local authority.

General conditions

1. In respect of each and every loss or series of losses arising out of one event, Underwriters shall only be liable to pay in excess of an amount to be borne by the Assured for his own account. The deductible amount shall be calculated by applying the percentage stated in the Schedule to the total value at risk immediately prior to the loss.
2. On the happening of any event as a result of which a claim is or may be made under this Policy, the Assured shall at his own expense produce and furnish to the Underwriters or their representatives such books of account, stock control records and other business documents, information and other evidence as they may reasonably require for the purpose of investigating or verifying the claim.
3. If at the date of the loss there are any other insurances in force effected by or on behalf of the Assured covering such loss or any part of it, the liability of the Underwriters hereunder shall be limited to their rateable proportion of such loss.
4. In the event of Underwriters becoming liable for any loss, the sum insured shall be reduced by the amount of the loss. Underwriters may, however, at the request of the Assured, agree to reinstate the full sum insured, subject to payment of the appropriate additional premium.
5. This Policy may be cancelled at any time at the request of the Assured in writing and the premium shall be adjusted on the basis of Underwriters receiving or retaining short term premium as follows:

Risk Period up to	Percentage of Annual Premium Payable (%)
1 months	20
2 months	30
3 months	40
4 months	50
5 months	60
6 months	70
7 months	75
8 months	80
9 months	90
Over 9 months	100

This Policy may also be cancelled by or on behalf of Underwriters by thirty (30) days' notice given in writing to the Assured at his last known address and the premium shall be adjusted on the basis of Underwriters receiving or retaining pro rata premium.

6. This Policy is subject to the condition of average, i.e., if the insured fish stock shall at the time of any loss be of greater value than the sum insured at the affected location(s) stated in the Schedule and calculated in accordance with the Basis of Indemnity, the Assured shall only be entitled to recover hereunder such proportion of the said loss as the sum insured bears to the total value of the said fish stock. In the event of the application of average, the deductible amount shall be calculated thereafter.
7. In the event of Underwriters becoming liable for any loss, they shall become subrogated to all the rights and remedies of the Assured against any party in respect of and to the extent of such loss. The Assured shall give to the Underwriters all such information and assistance as they may reasonably require and at Underwriters request and expense shall execute all documents necessary to enable Underwriters to prosecute in the name of the Assured.

No claims bonus on renewal clause

In the event of no claim having been made on this Policy and the renewal of this Policy being effected under Underwriters will allow to the Assured a No Claim Bonus of 10% of the premium paid hereon, it being understood that no obligation on Underwriters or the Assured to renew is implied.

Premium adjustment clause

1. It is noted and agreed that the premium stated in the Schedule is a **minimum and/or deposit premium**, being calculated at the premium rate on the sum insured and adjustable upon expiry of this Policy on the average of monthly declarations provide by the Assured of the highest value at risk during the preceding month. In the event of any claim payments exceeding the deposit premium then the deposit premium shall become the minimum premium.
2.
 - a) In the calculation of any loss, the basis of indemnity and value(s) at risk at the time of loss shall be deemed to be those applying immediately prior to the loss, due account being taken of the growth of the fish stock and sales and mortalities since the date of the last completed monthly declaration.
 - b) In the event of the amount of the last completed monthly declaration prior to a loss being found to be less than the amount that ought to have been declared, the indemnity afforded by this Policy shall be reduced in the same proportion that the amount of the said declaration bears to the amount that ought to have been declared.
 - c) In the event of the failure of the Assured to supply monthly declarations of values at risk within a reasonable period of time of the due date, the amount declarable for premium adjustment purposes (but not in the calculation of any loss hereunder) shall be deemed to be the full sum insured stated in the Schedule.
 - d) In the event of loss, the full annual premium shall be deemed to have been earned by Underwriters in respect of the gross amount of any claim settled hereunder, without regard to sum insured.

Sue and labour clause

Notwithstanding the Assured's duties warranted under Special Condition 1, herein the Underwriters will, subject to the terms and conditions of this Policy, reimburse the Assured for certain expenses, known as Sue & Labour expenses, properly and

reasonably incurred solely for the purpose of avoiding or minimizing any actual or imminent loss hereunder.

Exclusions

This Policy extension does not cover:

1. The costs of medication, veterinary, laboratory and other specialist fees incurred in the diagnosis, treatment, prevention or containment of Disease as defined herein.
2. Overtime costs and expenses of the Assured and their employees.
3. Any amount in excess of 20% of the sum insured for each separate location stated in the Schedule.

BASIS OF INDEMNITY

Underwriters hereby agree to indemnify the Assured for 50% of the agreed expenses and without regard to the deductible stated in the Schedule. Such indemnity shall be without prejudice to either party's rights under the Policy and in particular shall not constitute a waiver of Underwriters rights hereunder of affirmation of the Policy.

SPECIAL CONDITIONS

1. It is warranted that:
 - the fish stock insured hereunder shall be in sound health and free from physical disability at the commencement of this Policy and/or at the time of delivery to the Assured holding units if delivered during the period of the insurance.
2. The Assured shall use due diligence and do and concur in doing all things reasonably practicable to avoid or diminish any loss.
3. Protection Maintenance Warranty

It is warranted that the Assured and its site managers shall maintain in complete working order unless damaged by an external cause beyond the control of the Assured such protective systems and warning devices as existed at time of attachment of the Policy or which the Assured has agreed to install, and that no change shall be made to them without Underwriters agreement. All such protective systems and warning devices shall be tested regularly every week and logged accordingly. In addition the Assured shall maintain all marine cages, nets and moorings in good order at all times.

Failure to comply with this Warranty shall render all claims hereunder null and void.
4. The Assured shall give immediate advice to Underwriters of any change in the installations or of any potential new source of pollution at the insured location and of any other material change in the risk insured. Underwriters reserve the right to amend the terms and conditions of this Policy as a result of such change.
5. It is a condition precedent to Underwriters' liability that in the event of any circumstance that could give rise to a claim hereunder immediate notice must be given by telephone or facsimile to:

The Assured is requested to **read this wording** and, if it is incorrect, return it immediately for alteration. **In all communications**, the Policy Number appearing in line one of the Schedule should be quoted.

PROCEDURE IN THE EVENT OF LOSS

1. Advise underwriters immediately via _____ and/or _____ your own insurance agent in terms of special condition 3&4 of the policy.

2. Take water samples immediately, and at periodic intervals after the loss, from within and in the vicinity of the holding units.
3. Take measurements of water temperature, flow rate and dissolved oxygen levels at the time of loss, and record any other relevant parameters (e.g. pH, weather conditions).
4. Take photographs of the loss and/or damage.
5. Report the loss immediately to the responsible Local Authority, and in the event of malicious act or theft, to the Police.
6. If a disease outbreak is suspected, call your veterinary adviser immediately. Send live fish for histological examination, and arrange for samples of dead fish to be frozen and preserved for future examination.
7. Do not dispose of any dead fish until instructed to do so by Underwriters representatives. Leave it in the location where loss occurs unless this endangers any surviving fish. If you have to dispose of dead fish, numbers and weights should be certified by an independent third party.
8. In terms of General Condition 2 of the policy, carefully log the sequence of events as they unfold, recording the time and action taken by different employees. Preserve all records for subsequent examination by Underwriters representatives.

STATUTORY CONDITIONS/CONDITIONS

SCHEDULE A – (COMMON LAW)

(Fire – Statutory Conditions)
 (All Perils – Additional Conditions)

Conditions

The conditions as set out below apply to all of the perils insured by this Policy either as STATUTORY CONDITIONS or as contractual conditions as the law may require.

Statutory conditions/conditions and misrepresentation

If a person applying for Insurance falsely describes the property to the prejudice of the Insurer, or misrepresents or fraudulently omits to communicate any circumstance that is material to be made known to the Insurer in order to enable it to judge of the risk to be undertaken, the contract is void as to any property in relation to which the misrepresentation or omission is material.

Property of Others

Unless otherwise specifically stated in the contract, the Insurer is not liable for loss or damage to property by any person other than the Insured, unless the interest of the Insured therein is stated in the contract.

Change of Interest

The Insurer is liable for loss or damage occurring after an authorized assignment under the *Bankruptcy Act* or change of title by succession, by operation of law, or by death.

Material change

Any change material to the risk and within the control and knowledge of the Insured avoids the contract as to the part affected thereby, unless the change is promptly notified in writing to the Insurer or its local agent, and the Insurer when so notified may return the unearned portion, if any, of the premium paid and cancel the contract, or may notify the Insured in writing that, if he/she desires the contract to continue in force, he/she must, within 15 days of the receipt of the notice, pay to the Insurer an additional premium, and in default of such payment the contract is no longer in force and the Insurer shall return the unearned portion, if any, of the premium paid.

Termination

1. This contract may be terminated:
 - (a) by the Insurer giving to the Insured 15 days' notice of termination by registered mail or five days' written notice of termination personally delivered;
 - (b) by the Insured at any time on request.
2. Where this contract is terminated by the Insurer:
 - (a) the Insurer shall refund the excess of premium actually paid by the Insured over the pro rata premium for the expired time, but in no event shall the pro rata premium for the expired time be deemed to be less than any minimum retained premium specified; and
 - (b) the refund shall accompany the notice unless the premium is subject to adjustment or determination as to amount, in which case the refund shall be made as soon as practicable.

3. Where this contract is terminated by the Insured, the Insurer shall refund as soon as practicable the excess of the premium actually paid by the Insured over the short rate premium for the expired time, but in no event shall the short rate premium for the expired time be deemed to be less than any minimum retained premium specified.
4. The refund may be made by money, postal or express company money order or cheque payable at par.
5. The 15 days mentioned in clause (a) of subcondition 1 of this condition commences to run on the day following the receipt of the registered letter at the post office to which it is addressed.

REQUIREMENTS AFTER LOSS

1. Upon the occurrence of any loss of or damage to the insured property, the Insured shall, if the loss or damage is covered by the contract, in addition to observing the requirements of conditions 9, 10, and 11:
 - (a) forthwith give notice thereof in writing to the Insurer;
 - (b) deliver as soon as practicable to the Insurer a proof of loss verified by a statutory declaration;
 - (i) giving a complete inventory of the destroyed and damaged property and showing in detail quantities, costs, actual cash value and particulars of amount of loss claimed;
 - (ii) stating when and how the loss occurred, and if caused by fire or explosion due to ignition, how the fire or explosion originated, so far as the Insured knows or believes;
 - (iii) stating that the loss did not occur through any wilful act or neglect or the procurement, means or connivance of the Insured;
 - (iv) showing the amount of other insurances and the names of other insurers;
 - (v) showing the interest of the Insured and of all others in the property with particulars of all liens, encumbrances and other charges upon the property;
 - (vi) showing any changes in title, use, occupation, location, possession or exposures of the property since the issue of the contract;
 - (vii) showing the place where the property insured was at the time of loss;
 - (c) if required, give a complete inventory of undamaged property and showing in detail quantities, cost, actual cash value;
 - (d) if required and if practicable, produce books of account, warehouse receipts and stock lists, and furnish invoices and other vouchers verified by statutory declaration, and furnish a copy of the written portion of any other contract.
2. The evidence furnished under clauses (c) and (d) of subcondition 1 of this condition shall not be considered proofs of loss within the meaning of conditions 12 and 13.

Fraud

Any fraud or wilfully false statement in a statutory declaration in relation to any of the above particulars, vitiates the claim of the person making the declaration.

Who May Give Notice and Proof

Notice of loss may be given and proof of loss may be made by the agent of the Insured named in the contract in case of absence or inability of the Insured to give the notice or make the proof, and absence or inability being satisfactorily accounted for, or in the like case, or if the Insured refuses to do so, by a person to whom any part of the insurance money is payable.

Salvage

1. The Insured, in the event of any loss or damage to any property insured under the contract shall take all reasonable steps to prevent further damage to such property so damaged and to prevent damage to other property insured hereunder including, if necessary, its removal to prevent damage or further damage thereto.
2. The Insurer shall contribute pro rata towards any reasonable and proper expense in connection with steps taken by the Insured and required under subcondition 1 of this condition according to the respective interests of the parties.

Entry, Control, Abandonment

After loss or damage to insured property, the Insurer has an immediate right of access and entry by accredited agents sufficient to enable them to survey and examine the property, and to make an estimate of the loss or damage, and after the insured has secured the property, a further right of access and entry sufficient to enable them to make appraisement or particular estimate of the loss or damage, but the Insurer is not entitled to the control or possession of the insured property, and without the consent of the Insurer there can be no abandonment to it of insured property.

Appraisal

In the event of disagreement on the value of the property insured, the property saved or the amount of the loss, these questions shall be determined by appraisal as provided under the *Insurance Act* before there can be any recovery under this contract, whether the right to recover on the contract is disputed or not, and independently of all other questions. There shall be no right to an appraisal until a specific demand therefore is made in writing and until after proof of loss has been delivered.

When Loss Payable

The loss is payable within sixty days after completion of the proof of loss, unless the contract provides for a shorter period.

Replacement

1. The Insurer, instead of making payment, may repair, rebuild, or replace the property damaged or lost, giving written notice of its intention so to do within 30 days after receipt of the proofs of loss.
2. In that event the Insurer shall commence to so repair, rebuild, or replace the property within 45 days after receipt of the proofs of loss, and shall thereafter proceed with all due diligence to the completion thereof.

Action

Every action or proceeding against the Insurer for the recovery of any claim under or by virtue of this contract is absolutely barred unless commenced within one year next after the loss or damage occurs.

Notice

Any written notice to the Insurer may be delivered at or sent by registered mail to the chief agency or head office of the Insurer in *****. Written notice may be given to the insured named in the contract by letter personally delivered to him/her or by registered mail addressed to him/her at his latest post office address as notified to the Insurer. In this condition, the expression "registered" means registered in or outside *****.

ADDITIONAL CONDITIONS

Notice to Authorities

Where the loss is due to malicious acts, burglary, robbery, theft, or attempt thereof, or is suspected to be so due, the Insured shall give immediate notice thereof to the police or other authorities having jurisdiction.

No Benefit to Bailee

It is warranted by the Insured that this insurance shall in no way inure directly or indirectly to the benefit of any carrier or other bailee.

Pair and Set

In the case of loss of or damage to any article or articles, whether scheduled or unscheduled that are a part of a set, the measure of loss of or damage to such article or articles shall be a reasonable and fair proportion of the total value of the set, but in no event shall such loss or damage be construed to mean total loss of set.

Parts

In the case of loss of or damage to any part of the insured property, whether scheduled or unscheduled, consisting, when complete for use, of several parts, the Insurer is not liable for more than the insured value of the part lost or damaged, including the cost of installation.

Sue and Labour

It is the duty of the insured in the event that any property insured hereunder is lost to take all reasonable steps in and about the recovery of such property. The Insurer shall contribute pro rata towards any reasonable and proper expenses in connection with the foregoing according to the respective interests of the parties.

Basis of Settlement

Unless otherwise provided, the Insurer is not liable beyond the actual cash value of the property at the time any loss or damage occurs and the loss or damage shall be ascertained or estimated according to such actual cash value with proper deduction for depreciation, however caused, and shall in no event exceed what it would then cost to repair or replace the same with material of like kind and quality.

Subrogation

The insurer, upon making any payment or assuming liability therefore under this Policy, shall be subrogated to all rights of recovery of the Insured against any person, and may bring action in the name of the Insured to enforce such rights. Where the net amount recovered after deducting the costs of recovery is not sufficient to provide a complete indemnity for the loss or damage suffered, that amount shall be divided between the Insurer and the Insured in the proportions in which the loss or damage has been borne by them respectively.

SCHEDULE

Contract number	Policy number: Quote:
The Name and address of the Insured	
Policy Wording Ref No:	
The period of the insurance	From to both dates inclusive (local time) or until the date of slaughter or removal from the insured location, whichever shall first occur.
The species of stock insured	
The sum(s) insured Limit to any one location. Limit any one holding unit	
Basis of indemnity	As attached
The insured location(s)	
<p>Mortality or physical loss of stock caused by an Insured peril as listed in this schedule, subject to the terms, limitations, conditions, definitions, exclusions and warranties in the Insurance.</p> <ul style="list-style-type: none"> • Pollution; • Theft and malicious acts; • Predation or physical damage by predators or other aquatic organisms (but not sea lice or other ectoparasites); • Storm, lightning, tidal wave, collision, sudden and unforeseen structural failure of equipment; • Freezing, supercooling, ice damage; • Deoxygenation due to competing biological activity or to changes in the physical or chemical conditions of the water, including upwelling and high water temperature; • Any other change in concentration of the normal chemical constituents of the water, including change in pH or salinity; • Disease. 	

Glossary

Adjuster

An individual employed by an insurer to evaluate losses and settle policy-holder claims. Adjusters are independent contractors who adjust claims for different insurance companies and are sometimes used by insureds to advise them on making claims.

Aggregation of risk

Interchangeable with “accumulation of risk”. A term used to describe the grouping of insured entities.

Binding coverage

The actual implementation of a policy is often expressed as “binding cover,” or “cover was bound” at a certain point. Once cover is “bound”, a policy immediately comes into force and all its terms and conditions apply with immediate effect.

Captive company

A company wholly owned by one organization that uses it as a vehicle for handling all its insurances.

Classes of insurance

Different types of insurance and the insurance of different industries are loosely referred to as “classes.” Thus, automobile insurance is a class, as is liability insurance. Aquaculture insurance is a class of insurance as well.

Deductible

A self-insured factor deducted from claims. If a deductible of 20 percent of the total value at risk is applied, then a claim of 15 percent would not be paid; but for a claim of 30 percent, 20 percent would be deducted, leaving 10 percent to be paid. Deductibles can be structured in various ways, for example, in the form of a fixed sum, a percentage of any loss that occurs, or a percentage of the total value.

Domestic market

The insurers and brokers serving the internal insurance requirements in a country.

Exposure

The circumstance of being open to pay claims; also, the circumstance of being open to suffer loss or damage. The term is often used to refer to the insurers’ potential total financial amount at risk across a wide area or in a particular circumstance or “aggregate” exposure.

Franchise

An amount that must be exceeded before a claim is paid. If the franchise is exceeded, then the claim is paid in full. Thus, if a franchise is 75 percent of the amount at risk, a loss of 70 percent would not be paid, but a loss of 80 percent would be paid in full.

Hazard

A specific situation that increases the probability of the occurrence of loss arising from a peril or that may influence the extent of the loss. For example, accident, sickness, fire, flood, liability, burglary and explosion are deemed perils. Slippery floors, unsanitary conditions, shingled roofs, congested traffic, unguarded premises and uninspected boilers are deemed hazards.

Insurable interest

An interest that is eligible for insurance, usually because the party taking out the insurance has a financial interest.

Insurance

A device for reducing risk by transferring the risks of individuals and enterprises to an insurer who spreads the risk either internally or by reinsurance. The insurer agrees, for a premium, to pay for the losses specified in a financial amount specified in the insurance contract.

Insurance agent

Generally, a representative of an insurance company responsible for dealing with the clients of that company. In contrast to an insurance broker, the insurance agent will not go into the market to search for the best coverage for a client. Instead, the agent relies on gathering information on what the company's competition is doing and seeks to ensure that the agents' company responds to the measures taken by the competition in proper ways.

Insurance broker

An intermediary between a customer or client and an insurance company. Brokers typically search the market for coverage appropriate to a client's needs. Brokers work on commission.

Insurance cover

A synonym for insurance.

Insurance protection

The protection achieved by buying insurance.

Insurance underwriter

A term loosely used to cover the company receiving premiums and accepting responsibility for fulfilling the policy contract. Also, any company employee who decides whether the company should assume a particular risk and is able to commit the company to accept such risk.

Insured

Any person, firm or corporation, or any member thereof, specifically designated by name who is covered by an insurance policy.

Insurer

The party to an insurance arrangement who undertakes to indemnify policy-holders for losses by providing financial reimbursement. The term "insurer" is generally used in statutory law.

Market

The international insurance trade encompassing the insurance companies, brokers and agents that make up the international insurance market.

Material change

Any change that would cause an underwriter to charge an additional premium on a risk or decline to cover it. All aquaculture insurance policies contain material change clauses requiring that any changes be notified to the insurers.

Mutual company

A company that is owned by its policy-holders, who share in their profits.

Peril

A specific risk or cause of loss covered by an insurance policy; for example, fire, windstorm, flood, or theft. A Named Perils policy covers the policy-holder only for the risks named in the policy, while an All Risks policy covers all causes of loss except those specifically excluded.

Place**placing****placement**

Terms used to represent the process of putting insurance into effect.

Policy

The written contract of insurance, including all clauses, riders, endorsements, warranties and papers attached thereto and made a part thereof. It is the printed document issued to the policy-holder by the company stating the terms of the insurance arrangement.

Premium

The price of insurance protection for a specified risk for a specified period of time.

Reinsurance

Insurance purchased by insurers. A reinsurer assumes part of the risk and part of the premium originally taken by the insurer, which is known as the primary company. Reinsurance effectively increases an insurer's capital and therefore its capacity to sell more coverage. Reinsurers do not pay policy-holder claims, but instead, reimburse insurers for claims paid.

Risk

The chance of loss, but also used to label the entity that is insured.

Risk assessment

The process of analysing the risks to which an insured interest is exposed.

Risk management

Management of the varied risks to which a business firm or association might be subject. It includes analysing all exposures to gauge the likelihood of loss and choosing options to manage or minimize loss in the best possible way. These options typically include reducing and eliminating the risk with safety measures, buying insurance and self-insurance.

Self-insurance

The process of a business or individual being uninsured and thus carrying all their risks themselves.

Spreading risk

When insurance is underwritten in multiple areas to multiple policy-holders, it seeks to minimize the danger that all policy-holders will have losses at the same time. Companies therefore seek to insure perils that offer a good spread of risk.

Underwriter

A technician trained in evaluating risks and determining rates and the extent of cover that these rates can accommodate. Also, the person who has the ability to commit his or her company to provide cover.

Underwriting capacity

The ultimate financial limit that an insurance company can accept as liability through the policies that it underwrites.

Warranty

A condition in an insurance policy that must be complied with or the policy may become null and void.

This document contains the *Guidelines for action to meet insurance and other risk management needs in developing aquaculture in Asia*. These Guidelines are an outcome of a joint FAO, Network of Aquaculture Centres in Asia-Pacific (NACA) and Asia-Pacific Rural and Agricultural Credit Association (APRACA) Regional Workshop on the Promotion of Aquaculture Insurance in Asia, held in Bali, Indonesia, from 30 April to 2 May 2007.

The workshop was hosted by the Government of Indonesia, Directorate General for Aquaculture, and attended by policy-makers and international experts from the rural finance, insurance and aquaculture sectors from both the region and elsewhere.

The document also contains the Report of the Regional Workshop and two background papers produced for the workshop.

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