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Guidelines to meet insurance and other risk management needs in developing aquaculture in Asia

Cover photo:
Seabass (*Lates calcarifer*) broodstocks mass mortality due to an accident – the outlet water pipe of a concrete broodstock tank was severely damaged after a strong wave hit the farm. Situbondo, East Java, Indonesia. Courtesy of NACA/Sih Yang Sim.

Guidelines to meet insurance and other risk management needs in developing aquaculture in Asia

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by
Philip A.D. Secretan
Aquaculture Underwriting Management Services Ltd
United Kingdom of Great Britain and Northern Ireland

Pedro B. Bueno
Adviser, Network of Aquaculture Centres in Asia-Pacific
Bangkok, Thailand

Raymon van Anrooy
Fishery Officer
FAO Sub-Regional Office for Central Asia
Ankara, Turkey

Susana V. Siar
Fishery Industry Officer
FAO Fisheries and Aquaculture Department
Rome, Italy

Åke Olofsson
Rural Finance Officer
FAO Agriculture and Consumer Protection Department
Rome, Italy

Melba G. Bondad-Reantaso
Fishery Resources Officer
FAO Fisheries and Aquaculture Department
Rome, Italy

Simon Funge-Smith
Aquaculture Officer
FAO Regional Office for Asia and the Pacific
Bangkok, Thailand

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Preparation of this document

This document contains the *Guidelines for action to meet insurance and other risk management needs in developing aquaculture in Asia* (Part 1); the *Report of the Regional Workshop on the Promotion of Aquaculture Insurance in Asia*, which was held in Bali, Indonesia, from 30 April to 2 May 2007, where these guidelines were discussed and finalized (Part 2); and two background papers for the Regional Workshop. The first is a general background paper on aquaculture insurance (Part 3), while the second is on the role of better management practices (BMP) in aquaculture insurance (Part 4).

The preparation of this document was a joint effort by Philip A.D. Secretan, Aquaculture Underwriting Management Services Ltd (AUMS Ltd); Pedro B. Bueno of the Network of Aquaculture Centres in Asia-Pacific (NACA); and Raymon van Anrooy, Fishery Officer for Central Asia; Susana V. Siar, Fishery Industry Officer, Melba Bondad-Reantaso, Fishery Resources Officer (Aquaculture); and Simon Funge-Smith, Aquaculture Officer for Asia and the Pacific, all from the FAO Fisheries and Aquaculture Department; and Ake Olofsson, Rural Finance Officer, Agricultural Support Systems Division. The Regional Workshop and background documentation were funded by the Fisheries and Aquaculture Economics and Policy Division (FIE) of the FAO Fisheries and Aquaculture Department. The Regional Workshop was a collaborative effort of FAO, NACA and the Asia-Pacific Rural and Agricultural Credit Association (APRACA) and their members, and was hosted by the Directorate General for Aquaculture of Indonesia.

Abstract

With the aim of alleviating poverty, the Food and Agriculture Organization (FAO) of the United Nations and the Network of Aquaculture Centres in Asia-Pacific (NACA) identified a need among governments, non-governmental organizations (NGOs) and donor organizations for insurance and risk management facilities to be made available to developing aquaculture in Asia. In response to this need, a Regional Workshop on the Promotion of Aquaculture Insurance in Asia was held in Bali, Indonesia, from 30 April to 2 May 2007. At the workshop, the proposals for addressing the needs were presented, discussed and finalized as the *Guidelines for action to meet insurance and risk management needs in developing aquaculture in Asia*.

This document has four chapters. Chapter 1 contains the *Guidelines for action to meet insurance and risk management needs in developing aquaculture in Asia*. These Guidelines are an attempt to devise practical ways of reconciling two widely differing aims – that of the insurance sector to make a profit, and that of governments, NGOs and donor organizations to provide altruistic compensation programmes to the less sophisticated and developing sectors of Asian aquaculture. These programmes need to meet social needs in the face of natural and human-induced disasters and other hazards, and must be risk management-led.

The Guidelines recognize that the insurance sector can meet the insurance needs of both small- and large-scale aquaculture enterprises, and being profit-driven, it has an obligation to its shareholders to use its resources to make profits on their behalf. The Regional Workshop endorsed the "hybrid approach" as set out in the Guidelines. This approach includes the establishment of an insurance market facility, formerly called the Asian Aquaculture Insurance Pool (AAIP). The insurance sector, its risk management experts and loss adjusters would provide risk management input and coverage for the risks and perils that they can cover, at rates, terms and conditions that are compatible with their obligations to their shareholders. The hybrid approach also proposes that public bodies use their resources to provide social coverage, but on a basis that is coordinated and compatible with the insurance sector's approach and that follows its information gathering, inspection and survey, and loss adjusting processes.

Moreover, the hybrid approach proposes ways to reduce administrative and operational costs of providing insurance services to widespread small-scale aquaculture farmers and to decrease and better manage aquaculture-related risks at the farm level. In the Guidelines, it is recognized that the hybrid approach might benefit from the involvement of rural credit and microfinance institutions. By teaming up with or developing partnerships with the insurance sector, these institutions would benefit from the combined knowledge of both, and might address the insurance needs of small-scale aquaculture farmers in a more cost-effective manner. The Guidelines also provide some practical examples on how the aquaculture insurance sector could be enabled to answer to the demands of small-scale farmers.

Chapter 2 contains the *Report of the Regional Workshop on the Promotion of Aquaculture Insurance in Asia.* The Regional Workshop concluded that aquaculture insurance is likely to be attractive to farmers whose aquaculture operations are their principal form of livelihood and where they have invested significant livelihood assets such as time, labour, infrastructure and funds. It was noted that aquaculture insurance schemes in Asia do not currently cover small-scale aquaculture. At present, there is

high uncertainty over the viability of aquaculture insurance in this sector. In this regard, the workshop concluded that the hybrid approach involving partnerships between governments, insurers, and private and public sector organizations, as detailed in the *Guidelines*, would be the most suitable approach for the region to develop schemes accessible to groups or clusters of medium- and small-scale aquaculture producers.

The Regional Workshop encouraged governments in the region to: (i) contribute to the establishment of aquaculture insurance schemes in Asia by providing an enabling environment (legal and policy frameworks) and by considering appropriate social coverage for risks that cannot be covered by the insurance sector; (ii) engage with the insurance industry, other public and private bodies, and clusters/groups of small-scale farmers in the development and implementation of the hybrid approach, which is considered suitable for aquaculture insurance development in support of small-scale aquaculture in the region; (iii) continue to provide an enabling environment for increasing the degree of adoption of Better Management Practices (BMPs) in aquaculture in order to facilitate sustainability and reduce production-related risks; and (iv) work closely with the aquaculture sector in quantifying risks and developing effective mechanisms for their mitigation. The Regional Workshop encouraged the insurance sector[1] to: (i) initiate the establishment of an Asian Aquaculture Insurance Pool (AAIP), which will serve as a market facility for the provision of aquaculture insurance services to the region; (ii) assist in creating awareness and facilitating capacity building for the establishment of mutuals and other insurance schemes. Such schemes would spread the risks related to "smaller" disasters that affect some, but not all, participants in the scheme; and (iii) actively work with governments in seeking ways to apply the hybrid approach to aquaculture insurance that can address the needs of medium- and small-scale aquaculture operations.

Chapter 3 consists of a background paper for the Regional Workshop, Aquaculture insurance, by Philip A.D. Secretan. This paper provides a general introduction to aquaculture insurance for the layman, including, *inter alia*: a description of development constraints and opportunities for aquaculture insurance, with a focus on aquaculture stock insurance; the processes applied in the insurance market in terms of needs and risks assessments, risk management, claim handling procedures, benefits and costs of being insured; suggestions for the development of the aquaculture insurance market; and lessons learned from recent experiences with aquaculture insurance. The background paper also contains in its annexes a glossary of insurance terminology, policy terms and conditions, example proposals and example insurance policy wordings.

Chapter 4, the final part of this document, is dedicated to another background paper prepared for the Regional Workshop, The role of Better Management Practices (BMPs) in aquaculture insurance. The paper was prepared by Pedro B. Bueno, Michael J. Phillips, C.V. Mohan, Arun Padiyar, N.R. Umesh, Koji Yamamoto and Flavio Corsin of NACA. It recognizes that there is a broader range of hazards and risks faced by small aquafarmers and their families than than those faced by most agricultural farmers: these hazards and risks impact on lives, assets and livelihoods. The paper notes that risks to farming activities are generally addressed by a combination of approaches, such as mitigation by using BMPs, and risk transfer through financial instruments such as insurance. The paper further shows that BMPs can be a tool to help small and poor aquafarmers acquire the capacity to access financial products. Recognizing that the objective of BMPs is to enable small aquafarmers to produce more and in a sustainable manner, the paper acknowledges that a large part of that capacity comes from

[1] The sector comprises, among others, direct insurers, reinsurers, brokers, risk management experts and loss adjusters.

knowledge and skills to manage on- and off-farm risks. This capacity improves the chances for a successful crop, which makes the farmer insurance- and credit-worthy. Finally, the paper makes a case for insurance as a tool to encourage farmers to take up BMPs and to get organized so that insurance would truly become a risk management tool and also a part of the total service support system for small farmers.

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We would like to express our gratitude to the institutions and organizations that hosted and contributed to the Regional Workshop: the Network of Aquaculture Centres in Asia-Pacific (NACA); the Asia-Pacific Rural and Agricultural Credit Association (APRACA); the Directorate General for Aquaculture of Indonesia; and FAO. Thanks also go to many members of these institutions, as well as active private entrepreneurs in the aquaculture and insurance sectors, who have attended the workshop and contributed with their knowledge, information and advice to the development and finalization of the guidelines.

The financial contribution to the Regional Workshop and background documentation preparation by the Fisheries and Aquaculture Economics and Policy Division (FIE) of the FAO Fisheries and Aquaculture Department is also acknowledged with appreciation.

Acronyms and abbreviations

APRACA	Asia Pacific Rural and Agricultural Credit Association
BMPs	Better management practices[1]
CCRF	Code of Conduct for Responsible Fisheries
DoF	Department of Fisheries
FAO	Food and Agriculture Organization of the United Nations
FIE	FAO Fisheries and Aquaculture Economics and Policy Division
FIMA	FAO Aquaculture Management and Conservation Service
FIIT	FAO Fishing Technology Service
GAP	Good aquaculture practice
GDP	Gross domestic product
MFI	Microfinance institution
NACA	Network of Aquaculture Centres in Asia-Pacific
NABARD	National Bank for Agriculture and Rural Development
NGO	Non-governmental organization
UN	United Nations
US$	United States dollar

[1] A note on the use of "better" rather than "best" management practices. The Consortium on Shrimp Aquaculture and the Environment, composed of FAO, NACA, the United Nations Environmental Programme (UNEP), the World Bank (WB), and the World Wide Fund for Nature (WWF), have agreed on the use of "better" in the consideration that what is "better" today will become the norm tomorrow. It thus implies that the practice is the best at the present time.

Executive summary

The Food and Agriculture Organization of the United Nations (FAO) and the Network of Aquaculture Centres in Asia-Pacific (NACA) recognize the need to support the development and application of insurance and other risk management tools for small- and medium-scale aquaculture farms in Asia as a means to develop the sector and to improve food security in the region. Governments, non-governmental organizations (NGOs), donors and technical assistance agencies, as well as the private sector, each have their specific roles to play in this endeavour. In response to this need, FAO and NACA, in collaboration with the Government of Indonesia, organized a Regional Workshop on the Promotion of Aquaculture Insurance in Asia, held in Bali, Indonesia from 30 April to 2 May 2007. Draft proposals for strategies aiming at addressing the risk in the aquaculture sector were presented and discussed during this workshop. The present document, *Guidelines for action to meet insurance and other risk management needs in developing aquaculture in Asia* presents the strategy that the workshop participants endorsed as the most promising.

These Guidelines are an attempt to devise practical ways of bringing together the insurance sector, which is driven by commercial interests, and governments, NGOs and donor organizations, which are eager to provide altruistic compensation programmes to the less sophisticated and developing sectors of Asian aquaculture in the event of natural and human-induced disasters.

Although the insurance industry has the capacity and ability to meet the insurance needs of both small- and large-scale aquaculture enterprises, its obligation towards its shareholders to use resources in a profitable manner and the high-risk profile of the aquaculture sector cause the industry to exercise a certain caution.

The approach set out in the Guidelines foresees the establishment of an insurance market facility, first called the Asian Aquaculture Insurance Pool (AAIP). It is built around a layered risk management strategy whose core is formed by mutual insurance schemes among well-established groups of fish farmers. It envisages that the insurance sector, with its risk management experts and loss adjusters, would provide coverage for some risks and perils, at rates, terms and conditions that are in line with its obligations towards its shareholders. Further, the approach proposes that the public sector use its resources to provide "social" coverage in a manner that is well-managed, coordinated and compatible with the insurance sector's interest.

Moreover, the approach proposes ways to reduce administrative and operational costs of providing insurance services to widespread small-scale aquaculture farmers and to decrease and better manage aquaculture-related risks at the farm level. An example is the use of the networks of rural and microfinance institutions for premium collection and indemnity payments.

The approach also suggests that on-farm risk management instruments, i.e. Better Management Practices (BMPs), are crucial and would have to be developed in parallel in order to complement the above-described financially-based risk management mechanism.

How these Guidelines could work is discussed with some practical examples on how the aquaculture insurance sector could be enabled to provide the necessary services.

Guidelines for action to meet insurance and other risk management needs in developing aquaculture in Asia

1. A ROLE FOR INSURANCE IN DEVELOPING AQUACULTURE AND ALLEVIATING POVERTY IN ASIA

Recently, guidelines have been produced for meeting micro-credit and microfinance needs in aquaculture and inland and capture fisheries development in Asia. They were the result of participatory processes involving rural credit and microfinance institutions, aquafarmers, fishers, governments and international development agencies. These guidelines have since contributed to generating productive self-employment by providing access to seed capital to people living in poverty. They have also helped increase participation in society's mainstream economic and political processes.

Aquaculture is increasingly acknowledged as an important sector in rural development, and consequently, more small-scale aquafarmers need to access lines of microcredit and microfinance. While the sector faces similar challenges and difficulties to those of agriculture and fishing, it has its own particularities and differences, because aquaculture is conducted in a water environment that may be open to exceptional and unusual risks and hazards. Insurance and risk management are vitally important inputs to successful, long-term, sustainable aquaculture production, but there are no micro-insurance schemes for small-scale aquafarmers;[1] they are deprived of the benefits of being insured. Credit and insurance share the same goals: the sustainability of the fish farming enterprise, on the one hand, and increased resilience of the fish farming household, on the other.

The Food and Agriculture Organization of the United Nations (FAO), the Asia-Pacific Rural and Agricultural Credit Association (APRACA),[2] the Network of Aquaculture Centres in Asia-Pacific (NACA)[3] and some governments, NGOs and donor organizations aim, *inter alia*, to encourage the provision of insurance to the aquaculture sector, and particularly, to small-scale producers, enabling them to obtain access to this service, which is essential to the sustainable development of the sector. Achieving this requires an understanding of the position of the insurance sector, on the one hand, and of small-scale farmers, governments, NGOs and donor organizations, on the other.

2. EVOLUTION OF THE AQUACULTURE INSURANCE MARKET

Aquaculture insurance has been available to advanced subsectors of the aquaculture sector for over 30 years. During this period, an experienced insurance market for this class of insurance has evolved and has developed a wide range of techniques for evaluating and managing aquaculture's risks.

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[1] For the purpose of this document, small-scale farms are defined as farms with small-scale operations, typically family-owned, vulnerable, often not formalized into business operations, and generally with a small turnover.

[2] www.apraca.th.com/index.asp

[3] www.enaca.org

Insurance has largely been limited to producers using sophisticated and generally high-cost management systems and techniques that employ substantial capital expenditure. This is usually provided by banks or raised on stock markets, mainly because the producers concerned are able to buy insurance.

Historically, salmon farming has constituted the area of greatest insurance and risk management activity. Although insurers have widened their activities to cover other species and growing methods, the broadening process has been very slow and cautious. Growth in the insurance of aquaculture has been slow because adverse loss experience is often suffered with each new species, growing system and production area insured.

For commercial reasons, the insurance sector is generally unwilling to provide statistics on the profitability or otherwise of its business. However, there is considerable evidence, anecdotal and empirical, that aquaculture has not been a profitable class for insurers and reinsurers in the past. In addition to well-publicized fish kills,[4] a consistent turnover of participating insurance companies indicates that losses were unsustainable for the insurance companies venturing into the sector. However, a recent FAO study, *Review of the current state of world aquaculture insurance* (Van Anrooy *et al.,* 2006) showed that profitability is improving.

To overcome this adverse claims experience and achieve underwriting profitability, insurers have developed sophisticated underwriting techniques. Their approach is very selective, demanding high standards of management. The extensive application of risk management is mandatory. This risk management-led approach generates substantial underwriting expenses, which, together with large and frequent losses, are reflected in the high premiums that the sector pays for its insurance.

Accordingly, comprehensive underwriting information must be gathered on every production unit proposed for insurance and critically assessed by an underwriter. Insured production units must be regularly inspected, with inspection results often requiring further evaluation by underwriters and the instigation of actions of various types.

The nature of aquaculture also demands that any disease or incident that threatens or actually causes fish to die or be lost has to be individually assessed by insurers, who take a direct interest in seeing that effective mitigating measures are taken. This approach is advantageous to insureds because they benefit considerably from the experience that their insurers gain through solving problems in other areas. As such, it is a significant component of a risk management-led approach to insuring aquaculture.

Insurance processes are thorough and exacting, demanding high skills from the underwriting experts. They also make considerable demands on the insureds. Yet, the pool of experienced underwriters is small, which represents a significant limitation in the ability of insurance markets to take on business. It is a further obstacle for a business that is also time-consuming and difficult to handle.

The need for high skills and extensive experience also extends to the surveyors and loss adjusters who underpin the risk management and loss adjusting processes.

The net effect of all the above factors is the denial of coverage to aquaculture production processes in many parts of Asia, and particularly, the activities of small-scale producers. Many insurers are unwilling to incur high costs and devote scarce resources to a sector that offers no or very limited financial return and that is perceived to require a great deal of effort to handle it.

[4] Super chill in Eastern Canada and the United States of America in early 2003, approximately US$12 million; loss of tuna in cages in 1997, approximately Aus$20 million; and substantial losses in salmon production from various diseases in recent years, value unknown, but many millions of US dollars.

3. THE BENEFITS OF AN INSURANCE AND A RISK MANAGEMENT-LED APPROACH

The stringent standards demanded by aquaculture insurance markets, the high costs of meeting them and high underwriting costs work directly against small, individual, household-based, artisanal aquafarmers obtaining insurance; they are too small-scale to generate significant premiums and are viewed as likely to produce high levels of losses that are expensive to adjust and pay.

If this perception could be turned around and small-scale producers organized into groups that could be handled cost-effectively and organized to take up BMPs, a significant step forward would be achieved. Such groups could take shelter in insurance arrangements taken out by their cooperatives or associations, or by specially formed mutual insurance companies. This would lead to economic improvements for insurers and reinsurers, thus widening the opportunities for providing cost-effective insurance arrangements.

The benefits to all parties would be significant. Production efficiencies of the small-scale producers in the sector would be improved, wealth created, poverty alleviated, the pool of aquaculture production that could be profitably underwritten would expand, and the market for general insurance products would grow.

But this cannot happen unless a practical mechanism is created to achieve these goals and make it profitable for insurers to become involved or at least hold out the prospect of profitability over a reasonable time period. It also cannot happen unless such a mechanism delivers benefits to governments, NGOs and donors.

4. THE PROBLEM

Unfortunately, the various stakeholders in this situation have generally incompatible and conflicting objectives with different *modus operandi*.

Governments, NGOs and donor organizations want to see risk spreading and compensation, as well as risk management techniques made available to the simplest and most unsophisticated producers. Their approach is altruistic and substantially influenced by social needs. In practice, without the basic organization referred to above, these needs will likely be met through generous compensation processes that insurers could not accept.

Insurers cannot contemplate operating on such a basis. They cannot compromise a strict underwriting approach that is beginning to earn reasonable underwriting profits after many years of losses. It is of no practical concern to them that their approach effectively disenfranchises large numbers of small producers. The same is valid for most credit and microfinance institutions.

There are a number of constraints that affect access to and availability of insurance services for small-scale aquaculture farmers in the Asian region; most of them are set out in the *Review of the current state of world aquaculture insurance*. Small-scale aquafarmers, particularly in Asia, lack understanding of insurance systems in general and the opportunities that they could provide to their businesses. In addition, they have generally limited ability to objectively assess the risks involved in their production processes. Other constraints are that: (i) property insurance may not be available for water-based structures or constructions not classified as "buildings"; (ii) farmer registration and licensing in many countries in Asia are patchy, thus limiting the "contractual" aspects of insurance because the legality of the operation can be contested; (iii) farm record keeping is extremely limited in many farms; (iv) data on risk is limited; (v) and aquatic animal disease surveillance schemes are generally weak.

Small-scale farmers' are often not able to pay premiums individually. Furthermore, the limited range of products/services that current insurance schemes offer generally causes gaps between the farmers' needs and the price at which the services are provided. Most of these constraints can be managed if aquafarmers work together in groups,

introduce and apply BMPs, and collaborate with insurers and the government towards a joint solution.

Aquafarmers currently tend to join forces in groups, clusters, organizations and associations generally established in search for profit, knowledge, information and influence. Services/products of mutual insurance companies, specially formed to handle all the insurance needs of groups, will need to be introduced. These companies offer a proven way for small operators to buy insurance. All such organizations and associations can search for appropriate and relevant services for their members in the most cost-effective way.

5. APPROACHES

In the light of these constraints, three alternative courses of action have been identified:

- The status quo would be maintained with only large-scale aquaculture enterprises having insurance service access.
- Governments, NGOs and donors, with or without aquaculturist organizations or associations, would adopt their own risk management and compensation programmes to address the needs of the sector.
- Governments, NGOs, donors and aquaculture associations/ organizations would work together with the insurance market in such a way that enables them to meet their respective objectives and satisfy the outcomes each seeks.

Maintaining the *status quo* in Alternative 1 is not desirable, for obvious reasons.

Alternative 2 may appear feasible, perhaps attractive, to the governments and agencies involved. In practice, however, this would mean that they would have to provide a full insurance service. Accordingly, they would have to go through the same learning curve that the insurance sector has undergone over the last 30 years. The costs of learning, implementation and compensation would have to come from their resources. It is an alternative that can accurately be described as "reinventing the wheel", which is never an attractive option. Nevertheless, in some European and Asian countries, except Japan (including China, India and Turkey), this alternative has been or is being tried with limited success.

Alternative 3 would appear to be the feasible choice due to its potential to meet the different aspirations of the various parties while satisfying their individual requirements and goals.

For the insurance sector, this alternative would mean providing restricted cover – possibly against catastrophe only, or against limited or named perils via restricted policy terms. Insurers would have to achieve a reasonable return for their share in covering the risks.

For governments, NGOs and donor organizations, Alternative 3 would mean gaining access to the risk management skills of the insurance sector, allowing it to shoulder specific parts of the overall risk exposure, and yet allowing these government authorities and organizations to provide any extra "socially desirable" cover that they deem necessary.

Under Alternative 3, active Asian rural credit and microfinance institutions might play an important role if they could team up with insurers and aquaculture associations/ organizations and mutual insurance companies. If the rural credit and microfinance institutions could open up and add additional services to their service portfolio (e.g. working as intermediaries to collect premiums and handle claim payments), then, through their often extensive rural networks, they could assist insurers to bring their services closer to the aquaculture sector.

Occasionally, these rural credit and microfinance institutions already have some experience in offering insurance services (life, health and crop) as intermediaries; it might be relatively easy for such institutions to widen their scope to include aquaculture.

However, it should be noted that most of these rural credit and microfinance institutions do not have much insurance knowledge and experience available in-house; nevertheless, they do have networks of rural offices and a detailed knowledge of their customer base (savings patterns, incomes, farm turnover, risks of non/late-payment, repayment schedules, etc.). They could therefore be reliable and useful partners for insurers willing to enter or develop the aquaculture insurance business, with the objective of reaching out to the majority of aquafarmers in Asia.

6. THE HYBRID INSURANCE APPROACH

The third alternative requires the development of a coordinated approach between insurers and public bodies. This could be described as a *cooperative approach*, except that the word "cooperative" implies a looser arrangement than would be required in practice.

A legal framework is required to support the selected approach. Producers would be provided with documentation (e.g. what is covered, against what, how and by whom; and the effectiveness of insurance coverage) as evidence of the protection provided by insurers and a public body.

Perhaps the best description would be "hybrid". Hybrid denotes "a mixture of incongruous/incompatible elements", which seems to describe the situation well – profit-driven companies working with altruistic public bodies.

6.1 Insurance processes

The commercial insurance sector has established ways of arranging insurance cover. A buyer (aquaculturist) would normally approach a broker; the broker would evaluate the buyer's business and decide which underwriting market to approach. Having decided, the broker would then make a presentation of the business to the chosen insurer and the insurer would offer a quotation of terms and conditions. After negotiation over exact terms, an acceptance process would be undertaken, insurance cover put into operation, and a policy issued.

The successful introduction of a hybrid approach requires an understanding by the public organizations and their employees of the insurance processes involved, and a logical sequence of developments:

1. Creation of a suitable insurance market facility – an AAIP.
2. Identification of production facilities, areas, and producer associations, etc. that would benefit from insurance.
3. Collection of information on the farming organization and risk profiles of clusters and/or farmer groups, mutual insurance company members, etc., using standard risk information-gathering processes of the aquaculture insurance industry.
4. Assessment of the information by the underwriters under the AAIP.
5. Commencement of the risk management inspection and survey processes.
6. Preparation of insurance terms by AAIP underwriters.
7. Acceptance of insurance terms by the insureds, whether they be clusters/ farmer groups or mutuals.
8. If all processes experienced positive outcomes, then normal insurance practices, such as issuance of documentation, payment of premiums and survey fees, handling of claims and renewal processes, would fall into place.

6.2 How insurance processes A-F might work in the hybrid situation

In the hybrid situation, the processes would probably operate as follows:

A. Creation of a suitable insurance market facility – the Asian Aquaculture Insurance Pool (AAIP)

In the review process for the establishment of an *insurance market facility*, it is essential that international organizations such as FAO and NACA officially support the initiative. This would assist expert insurance management companies to generate interest among international insurers, reinsurers and brokers. The broker's role is important because he/she has in-house knowledge on the establishment and running of mutual insurance schemes and can help gather information on producers and production facilities and processes involved. These include the application of BMPs, GAPs, good management practices (GMPs) certified production processes and risk reduction management procedures. This would be done by using the standard aquaculture proposal forms that have already been widely used.

By preparing case studies on the establishment and operation of mutual insurance schemes, including rules and responsibilities, procedures and planning, the insurance market can add to the knowledge base on this subject, share their experiences and thereby increase the feasibility of new mutual schemes in Asian aquaculture.

Interest and commitment from the reinsurers is probably the most important aspect in the establishment of the AAIP. The process can go to Step 2 only if both reinsurers and brokers are willing to commit themselves to the AAIP, which would indicate interest from the market. The efforts of expert insurance management companies in generating the interest of reinsurers and brokers is the key here. A "no" from the market would indicate that there is no place yet for a market facility aimed at providing insurance to small- and medium-scale aquafarmers in Asia.

B. Identification of production facilities/areas and producer associations that would benefit from insurance

This second step is likely to start with the organization of one or more missions to promising groups or clusters of aquafarmers in some countries. These missions would focus on identifying the most suitable clusters or farmer groups for introducing the hybrid approach. The role of FAO, NACA and other international organizations, in collaboration with national governments, would be to provide financial and technical assistance in making these missions possible. Participants in these missions include insurance company experts; international and national experts in insurance and BMPs; and the farmer organization.

Based on the findings of each mission, suitable farmer groups would be selected and proposed to the AAIP; selection will be carried out in a transparent manner. After having been identified by the missions, details of candidate groups of farms would be given to the specialist insurance brokers named under the facility, many of which have offices and contacts throughout Asia. They should be located locally and easily accessible.

The missions would also prepare awareness-raising and information materials during the missions. Importantly, they would work on establishing the public-private partnerships that would bring government agencies on board and initiate collaboration with the private sector.

The establishment of firm ties between the public and private partners is a prerequisite in the design phase of a market insurance facility. A public-private partnership arrangement may need to be formalized to this end. If no public-private partnership is possible in a country, the process would have to stop and later continue in a country with identified suitable clusters or farmer groups where governments are interested to get engaged in the activity.

Awareness raising on the basic concepts of insurance and mutual insurance companies and how they function should be provided by national experts with support

from FAO, NACA, APRACA members, specialist insurance and risk management companies, brokers and insurers actively interested in AAIP.

C. Information collection on the farming organization and risk profiles of clusters/ farmers groups and mutual insurance company members, using insurance industry standard processes

Having gathered all the necessary information, the next step would be for the AAIP brokers to provide the information to the underwriters on the AAIP facility.

D. Assessment of the information by the underwriters under the AAIP

E. Commencement of the risk management inspection and survey processes

Here is where risk management activities would likely begin. It is the first point at which insurers would have enough information to decide if a risk management survey needs to be carried out before a quotation can be made; whether a quotation can be made that is subject to a survey; or whether a survey would be necessary at all. This is also the point at which all other risk management considerations come into play – the type of systems involved, the equipment used and a whole range of other issues. All risk management surveys would have to be carried out, either by the insurer, an experienced loss adjuster with survey resources, or a specialist aquaculture risk management surveyor, always in close collaboration with the aquafarmers themselves, the agency involved and insurers.

A survey report will be produced, discussed and disseminated among directly interested parties. There may be reasons, including legal ones, for survey reports to remain confidential between brokers, insurers and their clients, who may be individual farmers, cooperatives or mutual insurance companies or other stakeholders.

F. Preparation of insurance terms by leading underwriters

Once the risk management approach is decided, the process begins by establishing what can be insured, under what terms and conditions, and at what cost.

In order for a hybrid approach to work, it is at this point that the involved public body will have to decide what social imperatives must be taken into consideration in designing insurance cover.

6.3 Methods of splitting cover between insurers and those covering "social" risks

There are numerous ways in which a hybrid cover could be structured between insurers and a government, for example; it is impossible to deal with them in a single document. In the worst case scenario, an extremely complicated system of sharing cover might be required – but this is not necessarily so. The arrangement of the split could be extremely simple, as seen in the following are hypothetical examples.

Every insurance policy deals with the following issues, among others:

- the value insured;
- the rate of premium applied;
- the perils insured against.

Each of these issues could be divided between insurers and public bodies through very workable formats:

(i) A valuation scenario. It is entirely feasible that the insurance sector could provide cover on a given group of producers' interests by valuing the stock on the basis of the actual value at the size when it was lost. In other words, if fingerlings were killed, the policy would pay their actual value as fingerlings or would reimburse the investment made, up to fingerling size, in terms of seed purchase, nursing, feeding, stocking, drug administration, labour, water and electricity, etc.

However, if large fish were lost, the policy would pay their actual value at that size. This is a basis of valuation that insurers are generally unwilling to follow when dealing with small producers.

In practice, however, there may be many situations in which small producers cannot buy replacement fish of the size lost because none are available. This could cause livelihood distortions (e.g. food insecurity, loss of income, loss of employment) for farmers and their families. Their government or the NGO supporting them, might decide that it wants the farmers to be paid on a "market price" basis, i.e. the farmer would be reimbursed for what the fish would have been worth if they had reached a marketable size. This could be achieved by the public organization paying the difference between the value covered by the insurance policy and the final market value.

This is a typical arrangement that could be made under a special facility of the kind currently proposed. Insurers and their loss adjusters would adjust the loss on the basis of the policy provided for, but would then release their adjuster to help the public body pay the producer on the different basis. To avoid fraud, the public body would need the details of the insurance settlement. In addition, the loss adjusters attending the case for insurers should be free to adjust the market value loss for the public body involved.

(ii) A premium scenario. In another situation, under the hybrid concept, there is nothing preventing a public body from paying a part of an insurance premium. This partial premium payment could either go towards payment of the entire commercial insurance premium or buying better terms of cover.

(iii) A "perils" scenario. The hybrid concept could be used to help bridge the gap between the perils that insurers are prepared to cover and those that would be covered by the public authority or body. A flood would be a good example.

A group of producers might be located in an area of high exposure to floods, which the insurance sector was not prepared to insure, viewing it highly probable of occurring. Public interest, on the other hand, might be best served by ensuring that the sector is sustained if a flood does occur. Coverage against flood could be provided by the public body; other coverage (such as mortality caused by red tides and diseases) could be provided by insurers.

It should be noted that in a number of Asian countries, a compensation facility is set up to provide some relief to natural disaster-affected rural households. When such a facility exists, an insurance facility would not have to cover losses caused by government-recognized disasters for which a compensation facility is active. Such situations, however, would have to be clarified and understood by insurers and built into their policy and premium calculation processes.

These examples show how public interest could be coordinated with the insurance market and thus operate effectively alongside it. This relationship could be structured in many ways if a hybrid approach could be properly applied and with the understanding between insurers and the public body involved in each case.

6.4 Insurance processes G-H

G. Acceptance of insurance terms by the insureds, be they organized in clusters and/or farmer groups, or mutual insurance companies.

The acceptance of insurance terms is a process normally conducted between the broker and the aquaculturist. However, if a hybrid process were used, the public body would have to be involved in designing cover and providing its details to the aquaculture producer association/organization. Mutual insurance companies would be capable of negotiating appropriate terms – i.e. the extent to which governments, NGOs and donors provide social cover – on behalf of their own members.

H. If all processes experienced positive outcomes, then normal insurance practices would fall into place, such as issuance of documentation, payment of premiums and survey fees, handling of claims and renewal processes.

Policy documents would need to be issued by insurers for the cover they are providing. Documents would also have to be issued, which would detail the involvement of the public body and the cover they are providing. It is very important that written terms be provided to the aquaculturist association or organization so that it would be able to know the details of the insurance policy arranged, and advise banks and lending institutions on the insurance.

The insurance sector issues policies and cover notes on all of its business transactions and would do so for its side of a hybrid arrangement. It is open to question how public bodies would arrange for cover that they would provide under their side of the arrangement.

Premiums and survey fees must be paid to underwriters and their funding might prove difficult for small-scale aquafarmers and their associations. One of the functions of the public bodies might be to fund premiums and fees until producers could successfully send their products to market. The premiums and fees could be paid to the public body when funds are available (e.g. directly after harvest). In case the individual small-scale aquafarmers do not have a bank account, the public body, together with the association/organization/mutual, could use their organizations' accounts to transfer premium fees on time to the insurer(s).

Claims in aquaculture have to be handled carefully for many reasons, particularly the difficulty in counting mortalities and the short period before dead stock starts to decay, especially in tropical climates.

All aquaculture insurance policies contain special loss reporting clauses and the specialist insurers and their loss adjusters have a great deal of experience in dealing with claims – this is an extremely important issue in aquaculture insurance.

In a hybrid arrangement, facility insurers would insist on controlling the handling of claims, at least as far as their interests are concerned. They have the skills and the skilled loss adjusters who know how to do this difficult work. Their approach can be described as "tough but fair" and, as clearly indicated above, they do **not** make payments on the grounds of social or community need.

Ongoing availability of an AAIP facility and renewal of individual policies provided under it would become very important to insureds. They would likely become dependent on the facility, which would support better living standards and their increased participation in society's mainstream economic and political process.

6.5 Other conditions needed for a successful hybrid approach

The essence of a hybrid approach is that everyone is a winner – public bodies, farmers (their associations or organizations and mutuals) and insurers. The considerable risk management skills built up in the insurance sector would become available to the public sector – and to the networks of risk management surveyors, and importantly, the loss adjusters.

Much has been written about the insurance sector's risk management-led approach, which has helped them significantly improve their underwriting results. The approach works because it recognizes and directly confronts the peculiarities of aquaculture that often make it a high risk business and a **very** difficult one to insure.

If the hybrid concept is to flourish, however, real effort has to be made to upgrade aquaculture at its lowest levels. Much of this effort has to be made by the aquafarmers themselves and their associations/organizations/mutuals together with the public bodies. Moreover, they will need to address the following issues:

- the designation of clearly defined production areas where fundamental risks can be assessed and where adequate regulation can be applied to issues such as

licensing producers and implementing appropriate disease control measures. Disease regulations should govern effective biosecurity, including the restriction of movement based on risk analysis and compulsory slaughter, allow control of the import of non-indigenous species, and support the provision of diagnostic and veterinary resources;
- continuous adoption of the latest BMPs for the species and growing systems involved;
- promotion by public bodies in the formation of cooperatives, associations, producer organizations, small multi-producer groups and mutual insurance companies, and the adoption of standards and BMPs;
- the creation of difference in conditions (DIC) documentation by public bodies that defines the nature and extent of "social" cover that they are providing and relates it to insurance cover that insurers provide;
- the creation by public bodies of enabling conditions (legal and policy frameworks) that implement appropriate disease legislation and facilitate the formation of mutual insurance companies; and
- support needed by public bodies for the necessary training (including facilities) of the aquaculture producers and the insurance scheme administrators.

Both sides need to work together through:
- *Professional loss adjusters.* Joint loss reporting procedures will have to be devised.
- *Independent dispute resolution agents*. When public bodies provide socially desirable protection, disputes may well arise. There has to be a process – possibly a legal one, but preferably an arbitration procedure – to help avoid disputes.

6.6 Basic standards of operation

For hybridity to work, some levels of operation would not be acceptable to insurers. To be eligible for insurance, basic production conditions/situations have to meet minimum standards of operation; otherwise they could not be insured. These conditions include at least the implementation of BMPs by the aquafarmers and well as good record keeping at the farm level.

It would not be possible, for example, for the insurance sector to provide any form of cover for randomly organized and haphazardly run producer groups that employ casual growing procedures, have no knowledge of crop volumes and values and pond sizes, and are without any veterinary support. Such shortcomings would have to exclude producers from any scheme.

6.7 The role of governments, NGOs and donor organizations

These *Guidelines* are put forward to be used by public bodies, NGOs and donor organizations at the instigation of the participants in the Regional Workshop. A hybrid scheme can only work, in Asia or elsewhere, if public bodies, NGOs and donor organizations understand the processes involved and are committed to the concept and making it work. These entities can be important facilitators in the establishment and running of aquaculture insurance services. Their interest in the subject is from a different angle, but they generally understand that they can have a positive influence on the outcome of the process and that their support of the design and implementation of any insurance scheme/facility might be a key factor for its success.

It is important to note that government involvement in the development of insurance business has often been negative, e.g. by constructing market entry barriers, delaying the development of proper legislation and demanding measures from the insurance sector that add to increasing the costs and reducing the profitability of the insurance service. A more positive approach by governments towards "new" insurance services might pay off and make the service of selling and buying insurance more attractive,

to the less wealthy classes of societies such as small-scale aquafarmers. In this respect, the role of government subsidies in the initial phases of establishing and developing aquaculture insurance services could be positive for the development of the insurance business. Subsidies could either be provided directly to the insured to help pay for the premium; to associations/cooperatives/mutual insurance companies, etc. in order to help defray the high costs of serving numerous, dispersed, small-scale rural clients; or to help mutual insurance companies obtain reinsurance.

It should be noted that many governments in Asia already provide some compensation or forms of assistance to farmers for the loss of crops and household assets after large disasters such as typhoons/cyclones, flooding, tsunamis, disease outbreaks, industrial pollution/accidents and algal blooms. This kind of "social cover" never provides full compensation and is generally directed towards the provision of inputs to restart production. This social cover, as currently provided, may, however, deter farmers from seeking additional insurance services. Collaboration between governments and the insurance sector in establishing the extent and limitations of compensation arrangements would be beneficial to both and to farmers due to the added clarity.

It should also be noted that mutual insurance companies operate widely and successfully in agricultural industries in many parts of the world and therefore there is good reason to believe that their formation and operation may also be successful in aquaculture.

Governments have a clear role to play in the establishment and functioning of the hybrid approach. To facilitate easier access to insurance services, governments need to work on proper legal and policy frameworks in support of the development of the services. Insurance-friendly legislation would have to be developed (in countries where the hybrid concept would be applied). Governments could assist by: investing in the formation of aquaculture groups, associations, clusters and mutual insurance companies for easier distribution of insurance services; developing and assisting in the operational implementation of BMPs; and providing efficient services (e.g. disease diagnostic service, extension services and registration/licensing procedures/requirements). In summary, governments can contribute a great deal to the hybrid approach by creating an enabling environment for aquaculture insurance development.

NGOs in particular can be important contributors to the success of the hybrid approach as their strength lies in awareness raising, advocacy, organizing and education. NGOs may also have a role to play in the establishment and running of specific aquaculture insurance schemes for small-scale farmers; they could also function as service or business correspondents, providing cost-effective intermediary services for the insurers.

6.8 The role of self-help groups and aquaculture associations and cooperatives

Self-help groups, associations and cooperatives are good vehicles to move this kind of insurance forward and make it accessible to and available for the small- and medium-scale aquaculture producers in the region. As mentioned, overheads in aquaculture insurance provision are substantial. Working through groups of producers reduces handling, administrative and operational efforts, thus making it more cost-effective to administer and manage risk. Mutual insurance companies can also contribute.

For international insurers, it would be an ideal arrangement to insure and/or reinsure groups of farmers – via their organizations or their mutual insurance companies – with similar farming practices. These include cultivating the same species; working on similarly small-sized farms; using a similar cropping calendar; being situated in the same geographical location; having common water sources; and having standardized production systems. Examples of such groups or clusters of aquafarmers include:

- India: shrimp aquaclubs (same water, same area, similar BMPs, similar farm sizes);
- various countries: cage culture tilapia (standardized cage sizes and production methods);
- Iran: trout farming; and
- Thailand: shrimp farmers operating under a franchise scheme.

Self-help groups, clusters, associations and cooperatives are ideal vehicles for introducing, disseminating and promoting the application of BMPs in aquaculture. Their contribution to the feasibility of the hybrid approach is therefore without question.

6.9 The role of rural credit and microfinance institutions

The hybrid approach might benefit from the involvement of rural credit and microfinance institutions. By teaming up with mutual insurers and cooperatives, rural credit and microfinance institutions might have the possibility to extend their service portfolio and provide, the aquaculture insurance service to the same customer base as they already serve in addition to their current portfolio, which involves credit and savings functions.

The rural microfinance institutions might develop partnerships with the mutual insurance sector, using the available combined knowledge in a cost-effective manner to address the insurance needs of small-scale aquaculture farmers.

Since the demand for rural credit and microfinance is not growing (or not as rapidly as before) in some countries/sectors in Asia, and maintaining a network of rural area offices by rural credit and microfinance institutions in the region is costly, these institutions search for additional services to add to their portfolio, with the ultimate aim of generating profits. Teaming up with specialist insurers in aquaculture may be one of the more feasible services in this respect.

Using the current credit and microfinance channels also for insurance would be attractive to aquafarmers, since they often have already established a relationship of trust. In addition, the credit and microfinance institutions keep a track record of each client/customer and therefore, the provision of insurance services would be less of a risk for the insurers teaming up with the microfinance institutions than for new entrants in the business.

6.10 Communications and publicity

The proposed approach cannot be developed without establishing and maintaining lines of communication between public bodies and the aquaculture insurance sector.

A series of biennial conferences on aquaculture insurance and risk management over the last 20 years have been regularly attended by representatives from all sides of the aquaculture insurance market. FAO supported and supplied two speakers for the tenth Aquaculture Insurance and Risk Management Conference©[5] held in April 2006, in Vigo, Spain. Following this event, an informal liaison group was formed, the Ad Hoc Aquaculture Insurance Liaison Committee, which comprised insurance sector representatives. This group includes influential insurers, reinsurers, brokers, loss adjusters and other stakeholders interested in aquaculture insurance and risk management. It was formed to provide a means of communicating with FAO and can be used to liaise with governments, NGOs, donor organizations and other stakeholders concerning the creation of the insurance scheme proposed.

Membership of the liaison group is fluid; it is open to any professionals involved in the provision of aquaculture insurance and can be expanded as required. Copies

[5] © AUMS Ltd. Organized by AUMS Ltd. 112 Malling Street, Lewes, East Sussex, BN7 2RJ, United Kingdom See info@aums.com.

of these *Guidelines*, together with the outcomes of the Bali Workshop, have been circulated to the group, and responses obtained and conveyed as necessary.

6.11 The way forward – the Asian Aquaculture Insurance Pool (AAIP)

Guidelines such as these need to be underpinned by a practical method of implementation. One way forward is to create what is known in the insurance sector as a *market facility*, in this case, as mentioned above, an Asian Aquaculture Insurance Pool (AAIP). Such a facility would be ideal for handling small- and medium-scale aquaculture production systems and processes, and enabling insurers to cooperate with the public organizations involved in seeking insurance.

A market facility is an agreement involving all the specialists in a particular type of insurance – insurers, reinsurers and brokers. It is used to create a collaborative framework for handling difficult areas of insurance. It enables insurers to join with experienced brokers, surveyors and loss adjusters, and in order to underwrite such business.

The advantages of a market facility are many: an effective approach to the difficulties and problems of the subject sector is coordinated; the best insurance specialists in the field become involved in handling and finding solutions to these problems; and a market is automatically set up for business to be presented to it– although there is no obligation to accept the business It also allows to develop and coordinate insurance terms and conditions, and ways of dealing with various issues, from the design of policies to the handling of claims.

The establishment of an AAIP for addressing the insurance and risk management needs of small and medium-scale aquafarmers in Asia is uncertain. Much depends on the attitudes of the specialist insurers, reinsurers and brokers to the concept. The first responses from the insurance sector on the concept as set out in these *Guidelines* are, however, cautiously positive; which is viewed as a promising sign.

7. PURPOSE AND USE OF THESE GUIDELINES

These *Guidelines* are for the consideration of those authorities, institutions and organizations in Asia that seek insurance and risk management services for the small- and medium-scale aquafarmers and the wider sector. They are for the consideration of public and private institutions and agencies, including governments, NGOs, donor agencies and aquaculture insurance sector professionals.

The *Guidelines* are also intended for the consideration of users and potential users of insurance and risk management services and by important stakeholders, i.e. aquaculture and fish producer associations, organizations and cooperatives; and government departments, NGOs, donor organizations and institutions concerned with encouraging developing aquaculture as a way to reduce poverty.

8. CONCLUSION

Many questions arise from these *Guidelines* as well as many "ifs" and "buts" associated with them. Nevertheless, FAO, together with NACA, APRACA and many of their member governments and institutions, seek to boost the availability of aquaculture insurance to developing aquaculture; these *Guidelines* offer some ideas of how insurers and public bodies might work together to provide what is needed. The insurance sector appears to be able to organize itself so that it may fulfill its role in the hybrid process, but it remains to be seen whether the public bodies can do the same.

ACKNOWLEDGEMENTS

FAO, NACA and APRACA gratefully acknowledge the important work carried out by Mr Philip A.D. Secretan, Managing Director of AUMS Ltd. Aquaculture Underwriting Management Services, who created the first draft of these *Guidelines*,

devised the *hybrid approach* concept and put forward the use of a market insurance facility as a way of implementing the concept. The contributions to this draft by Raymon van Anrooy, Susana Siar, Ake Olofsson and Melba Reantaso (FAO), Mr. Pedro Bueno (NACA) and several experts from the insurance sector are greatly appreciated.

These draft *Guidelines* were presented and discussed as proposals at the Regional Workshop on the Promotion of Aquaculture Insurance in Asia, held in Bali, Indonesia, from 30 April to 2 May 2007 and finalized in their present form, which includes comments and observations received from the workshop participants and other insurance sector experts in June 2007.

Report of the Regional Workshop on the Promotion of Aquaculture Insurance in Asia

I. INTRODUCTION

1. Background

According to FAO estimates, out of approximately 11 million aquafarmers in Asia, some 4 500 are insured for their aquaculture crops, which is less than .05 percent. Only some large-scale aquaculture enterprises are currently insured; small-scale entrepreneurs have yet to access a commercial insurance service. Considering that aquaculture has been growing more rapidly than all other animal food-producing sectors, with Asia contributing more than 90 percent of world production by volume, there has been a widely felt need to strengthen the aquaculture risk management strategies and capacities in the region. Insurance is considered an important component of these strategies.

The Regional Conference on Insurance and Credit for Sustainable Fisheries Development in Asia was organized jointly by FAO, the Asia-Pacific Rural and Agricultural Credit Association (APRACA) and the National Federation of Fisheries Co-operative Association, Japan (ZENGYOREN), and held in November 1996 in Tokyo, Japan. The conference showed that insurance for inland capture fisheries and aquaculture had received little attention in the past despite the clear need expressed by inland fishers and aquaculturists in the region.

Some of the recommendations of this conference remain valid more than a decade later: (i) all parties (policy- and decision-makers, banking institutions, insurance agencies, fishers and fish farmers) must understand the benefits and obligations of the beneficiaries of fisheries insurance; (ii) the legal and policy environment of the country should be favourable to the fisheries insurance; and (iii) the management capacity of fishermen's organizations and local entities should be sufficient to sustain such initiatives.

An FAO review of world aquaculture insurance, *Review of the current state of the world aquaculture insurance* (van Anrooy *et al*., 2006) carried out in 2005-06 indicated a high demand for aquaculture insurance. One of its conclusions was that the gap between the demand for and supply of aquaculture insurance in Asia was increasing. It noted that since the start of the new millennium, underwriting experiences have been improving and aquaculture insurance is becoming profitable, but no data were obtained on Asian experiences. Other conclusions include: (i) mutual insurance schemes in aquaculture remain insignificant; (ii) a lack of enabling policy and regulatory frameworks for aquaculture and fisheries insurance; (iii) in Asia, "named perils" type policies are more common than the "all risks" type for aquaculture insurance; (iv) shrimp is difficult to insure and fish health problems are the major cause of losses in Asian aquaculture; (v) many insurers in Asia focus on a small number of traditional aquaculture species and are hesitant to include "new" species and culture systems; and (vi) few governments subsidizes insurance schemes for aquaculture in Asia.

In February 2006, in Beijing, China, FAO, Asia-Pacific Rural and Agricultural Credit Association (APRACA),[1] the China Society of Fisheries, the East China Sea Fisheries

[1] See www.apraca.th.com/index.asp.

Research Institute and the Chinese Academy of Fishery Sciences jointly organized the Regional Workshop on Guidance for Credit and Microfinance Programmes in Support of the Sustainable Use of Inland Fisheries Resources and Poverty Alleviation. The workshop recommended, among other steps, the organization of a regional workshop on the promotion of aquaculture insurance.

The response was agreement among FAO, Network of Aquaculture Centres in Asia-Pacific (NACA),[2] APRACA and the Indonesian Directorate General for Aquaculture to organize the Regional Workshop on the Promotion of Aquaculture Insurance in Asia, the first of its kind in Asia.

2. Objectives

The objectives of the workshop were to:

(i) raise awareness among policymakers on the positive aspects and limitations of insurance schemes as a risk management tool for the sustainable development of the sector as well as of other risk management tools;
(ii) present the Asian aquaculture sector to the insurance industry and illustrate its potential to become a profitable segment to insurers in search of new markets;
(iii) discuss ways and means to support aquaculture management and development through the introduction of insurance schemes as an additional risk management tool;
(iv) reach a consensus on certain guidelines for insurance in support of aquaculture development in Asia and what they should include.

3. Outputs

The workshop was expected to result in:

- increased awareness among policymakers and insurance industry stakeholders of aquaculture risks and the role of insurance in their mitigation;
- increased appreciation among policymakers and industry stakeholders of the real prospects for and limitations of aquaculture insurance;
- draft guidelines on how to develop and promote insurance and alternative/complementary risk management tools in support of aquaculture development in Asia;
- recommendations for follow-up activities by the insurance industry, governments, aquaculture entrepreneurs, and national and international development agencies.

4. Participation

There were 50 participants from 15 countries in Asia and experts from other regions. The participants involved (Annex 1) have expertise in aquaculture as well as capture fisheries, insurance and/or credit.

5. Proceedings

The workshop took place at the Inna Kuta Beach Hotel in Bali, Indonesia, from 30 April to 2 May 2007. The opening activities included the following welcoming speeches of representatives from the Government of Indonesia, FAO, APRACA and NACA.

Director General for Aquaculture, Government of Indonesia

Dr Reza Shah Pahlevi read the welcoming remarks of Dr Made Nurdjana, the Director-General for Aquaculture of Indonesia. He emphasized that aquaculture is often viewed as a high-risk business and enumerated a number of hazards and risks that aquaculture and capture fisheries face. He particularly noted that small-scale aquaculture is extremely vulnerable to risks, which can be managed with better management practices

[2] See www.enaca.org.

(BMPs), adherence to codes of practices, as well as the adoption of certification and management schemes such as HACCP, ISO, GMP, eco-labelling and others.

Dr Nurdjana also stressed that while insurance is an important measure for mitigating some of the risks, it is no substitute for good management practices. He added, however, that insurance has an important role to play, particularly as a mechanism for removing the residual risk that cannot be covered by on-farm actions. In this regard, insurance is an important tool in risk management. He noted that the insurance sector in Indonesia as a whole is underdeveloped, although there has been strong growth in recent years. One important issue in aquaculture is whether the small-scale sector can provide a significant volume of business that is attractive to insurers. He recommended that this be addressed through strong collaboration among Asia- Pacific countries and the various agencies and organizations helping small-scale aquaculturists develop. He considered the workshop an important step to this end and thanked the collaborating organizations, FAO, NACA and APRACA, for the initiative. He welcomed the participants and thanked them for finding the time to contribute their expertise and experiences to the workshop.

FAO Representative in Indonesia

Mr Man Ho So welcomed the participants on behalf of FAO. Referring to the recent disasters that struck Indonesia and other countries in Asia, such as the Tsunami in December 2004, he indicated that more recent earthquakes and recurrent floods have created enormous risks to the population. As such, they underline the extreme importance of developing and improving tools and human capacities to reduce and manage risks, mitigate their impacts and better cope with their effects. Insurance is an important tool in risk management; however, while people commonly buy insurance to cover property, such as cars, and health and life insurance, they buy insurance for agriculture and fisheries less frequently.

He briefly presented FAO activities and mentioned that FAO in Indonesia has always worked closely with the local population, the government, non-governmental organizations (NGOs) and donors in many development activities, particularly in the aftermath of the Tsunami. He broadly described the emergency assistance, rehabilitation and development initiatives that FAO has implemented following the Tsunami and other disaster events that occurred in the country. In the fisheries and aquaculture sector-related interventions, FAO provides and supports numerous staff and rehabilitation and development projects in Aceh that aim at rebuilding the livelihoods of poor coastal fishers.

Concerning the institutional participation in the workshop, he mentioned that FAO's organization of this regional workshop with regional partners is consistent with its strategy to cooperate with regional bodies and build on existing networks and programmes of its partners to more effectively address the problems and needs of developing countries and their rural populations. This workshop provides FAO with the opportunity to raise awareness on FAO initiatives in aquaculture insurance as a risk management tool among line ministries, the insurance industry and the aquaculture sector in Asia and to promote developments in areas related to supporting the implementation of the FAO Code of Conduct for Responsible Fisheries.

APRACA Representative

Mr Donato Endencia, Vice President, Land Bank of the Philippines, and representing APRACA in this event, expressed that the Association is honoured to be a partner of FAO, NACA and the Indonesian Directorate General of Aquaculture. Fisheries finance and development are included in APRACA's six-item agenda in the medium term. The Association is actively involved in supporting and documenting best practices and success cases to increase financing for this sector. Since insurance plays a

pivotal role as a credit risk management mechanism, APRACA constantly encourages its member institutions to actively collaborate with like-minded partners in pilot-testing, replicating and expanding tested schemes that show high levels of efficiency, effectiveness and sustainability. The prospects of aquaculture insurance are bright, although much more needs to be done to translate options, concepts and designs into action. He especially stressed the need for a pro-active response to small farmers' needs, which should be closely monitored, supported and eventually institutionalized. He concluded that the roles of international development organizations such as FAO and NACA are critical in nurturing these initiatives into meaningful performance.

NACA Director-General

Professor Sena De Silva, Director-General of NACA, provided a brief overview of NACA for those unfamiliar with the organization, particularly the representatives from the credit and insurance sectors. NACA is an intergovernmental organization of 17 member governments in Asia-Pacific, working closely in cooperation with FAO and many other regional and national organizations. Its primary mandate is ensuring sustainability in aquaculture and improving and safeguarding the livelihoods of small-scale farmers. He noted that aquaculture insurance in Asia is not established as much as it should be, particularly considering that over 80 percent of production comes from the region. He is pleased that the workshop provides insurers, bankers and other financial institutions to meet face-to-face with aquaculture developers and planners drawn from the governments of the region. It is the first gathering of this nature in the region. It is therefore a good opportunity for the financers and insurers to better understand the problems facing producers and the *modus operandi* of the aquaculture sector in Asia, which, he pointed out, differs in many ways from those of nations in the developed world. He believes that Asian aquaculture, consisting of many small-scale enterprises, poses different challenges to insurers and financial service providers. He expressed hope that this workshop would provide an opportunity to start the process of aquaculture insurance to small-scale farmers.

6. Methodology

Following the opening activity, there were three sessions in which resource papers were presented and discussed in plenary. The first session consisted of two background papers on the following topics: *Analysis of the aquaculture insurance industry: lessons learned and opportunities for sustainable development* and *Insurance as a risk management tool based on experiences in livestock and aquaculture insurance in developing countries*.

The second session consisted of presentations on a number of themes, including: (i) linkages between credit and insurance; (ii) the role of BMPs in aquaculture insurance; (iii) aquatic animal health and insurance; and (iv) the role of rural and microfinance institutions in developing and promoting aquaculture insurance, based on the Philippine experience.

The third session consisted of presentations from the insurance industry on their experiences in aquaculture underwriting; and the microfinance institutions, agricultural development banks and national fisheries agencies on their experiences in aquaculture insurance and its prospects.

These three sessions were followed by a discussion via three working groups focusing on the *Draft Guidelines for Action* prepared for the conference by Mr P.A.D. Secretan, Managing Director of AUMS Ltd. in collaboration with FAO staff. The paper proposed and described an approach to meet insurance and risk management needs in developing aquaculture in Asia.

The fifth and final session was dedicated to the formulation of the workshop's conclusions and recommendations, and their adoption. It preceded a short discussion

of general follow-up activities, such as communications among participants and activities at the national level envisioned by some participants.

The Workshop Programme appears as Annex 2. The presentations and the report of the working group sessions are summarized as follows:

A. Summary of overview, thematic and industry sector presentations

i. Analysis of the aquaculture insurance industry: lessons learned and opportunities for sustainable development, *by P.A.D. Secretan, Managing Director, AUMS Ltd.*

Insurance has a long history; it is important to understand its basic principles. Contrary to popular belief, the role of insurance is to spread, not to assume risk. This principle is well described in two quotations taken from a 16th century definition of insurance: " […] the spreading of the load over many shoulders" and "[…] the loss settles more easily upon many than upon a few."

The role of the insurer, also known as the "underwriter", is to calculate the right premium for all the risks in a class that will cover the cost of paying all claims and the expenses involved and will make a profit.

There are many insurance schemes that a professional aquaculturalist needs in order to protect his or her business and livelihood, most of which are readily available from insurance markets. However, the nature of aquaculture means that there are some areas in which the industry's peculiarities and risk profile come into play, making certain types of insurance difficult to handle and thus difficult for the aquaculturist to buy. The difficult kinds of insurance for aquaculture include liability insurance, especially product liability, and workman's compensation, particularly where diving is involved. The most difficult area to insure is livestock. This is the area focused on here because it is the most important insurance class to aquaculturists: in order to properly protect their businesses, they must insure their stocks of fish and shellfish.

There were some very serious losses in the early years of aquaculture insurance caused by, for instance, large fish kills from plankton blooms, super chill, diseases and storms. There were also numerous smaller losses caused by floods, bad feed, broken pipes, pollution, sabotage, theft, non-catastrophic diseases and many other perils. The companies that have survived and stayed in the business are those that have adopted and maintained a total risk management-led approach.

The fact that aquaculture insurance is risk management-led makes acquisition costs for insurers very high. Every risk has to be very carefully assessed. A great deal of information must be gathered on each farm and evaluated. The process of evaluation demands high levels of skills of insurers and brokers. Insurance policies must be very carefully constructed and when change occurs within an operation, which is frequent in most sites, new information has to be gathered and evaluated. This is a further cost to insurers. Even if the costs of adjusting losses and potential losses are excluded, insurers' costs of servicing aquaculture stock insurance are very high. Unfortunately, aquaculture insurance is just one class in a very large market. There are many other sectors with which insurers work or can work that are easier to handle and much less risky. Aquaculture insurance initially produced bad results, but things have changed recently and insurers are beginning to make money. Insurers have gained a massive amount of experience.

Across the whole of aquaculture, it is difficult for insurers to find "good business", i.e. business that is well-managed and well-financed. In many countries, the legal framework may be very difficult for insurers to operate under. This is particularly relevant where disease is concerned. Issues such as the importation of non-indigenous species; compulsory slaughter, the control or lack of control over movements of aquatic creatures can all impact adversely on insurers' ability to provide good and reliable insurance.

Shortages of skills are a key issue, particularly in Asia. Fish farm evaluation requires a high level of skill and considerable experience. Although a high level of skill in underwriting and adjusting has been built up in the aquaculture insurance market and the skills base is gradually widening and deepening, it is not wide enough to handle large numbers of small producers of the kind that is the focus of this workshop.

Equally limited are the human resources in Asia. There are numerous insurance brokers in the region as well as experienced loss adjusters, e.g. at Crawford & Co., but few skilled local brokers and surveyors.

The risk management-led standards sought by insurers work against small producers. Large well-capitalized companies employing high-grade management practices are more favourably placed to buy aquaculture stock insurance. However, this does not apply to shrimp, because the way in which they are farmed makes it difficult to determine the cause of loss. Insurers are only just starting to provide cover on shrimp production and only on an experimental basis.

Small producers generally lack the basic management skills and operational standards that insurers require to be eligible to buy cover. Size is also an issue. Insurers prefer to do business with big producers who pay substantial premiums, thus contributing an economy of scale to insurers' acquisition and servicing overheads.

For insurance to become available to small producers, their operating standards have to move towards those of the large companies – to the extent possible – and be organized into larger units, producing greater premium volumes. Insurers must be confident that the farms they are considering insuring are well managed and not exposed to unduly high risk.

Much of the information-gathering process is carried out by brokers, many of whom have developed high levels of risk management skills. Specialist surveyors have also developed aquaculture survey skills that enable them to inspect a farm and provide a reliable report to an insurer. It is also important to insurers that the tools for handling disease are in place, e.g. appropriate diagnostic facilities and background legislation restricting movements of diseased stock and enabling compulsory slaughtering of diseased stock when necessary. Since broad aquaculture insurance skills do not exist widely in Asia, they need to be developed.

Insurers cannot take on social risks, which will have to be underwritten by governments. But the all-round application of BMPs will make social risks less relevant. Insurers will become involved if they can envisage profitability.

A hybrid approach to handling risks by splitting them between governments and insurers was described and proposed for consideration.

ii. Insurance as a risk management tool in aquaculture, *by Ake Olofsson, Rural Finance Officer, FAO Rome*

Risk management can be defined as care to maintain income and avoid/reduce loss or damage to a property resulting from undesirable events. The key to determining who bears risk is finding out who will suffer a loss if something bad happens.

"Risk management practices" embrace a wide range of mechanisms that are the foundation of sound farm management, including policy issues, for example: site licensing, regulations relating to such matters as quarantine and compulsory veterinary procedures. They also include on-farm physical measures, such as attention to structural maintenance of fences, cages, racks and housing, as well as disease surveillance, and preventive and curative veterinary procedures.

Risk management can also involve financially-based mechanisms such as share-farming, farming partnerships, and Islamic-type borrowing where the lender shares the potential profit and the potential loss. Another form of risk management is the forward sale of output and other types of contractual farming arrangements. Although one of

the most often-quoted tools for risk management, the role of insurance is confined to situations where there is no other suitable risk management technique or where insurance products can be designed to be advantageously cost-effective. In addition, insurance does not and cannot obliterate risk – it spreads risk.

Risk mitigation and reduction strategies are developed prior to risk events to reduce exposure to the potential occurrence of the risk, while *risk-coping strategies* reduce the impact of a loss after the risk event has occurred. Too much emphasis on risk-coping strategies tends to prejudice risk reduction strategies, which in some cases might be more appropriate.

Steps in the insurance development process include: assessing demand; identifying key insured parties; determining the most important factor to insure and the perils against which the parties will be insured; determining the types of enterprise to be covered; and identifying the complementary roles of the private sector and government.

Much attention is given during the design of aquaculture insurance programmes to avoiding tensions between the private and public sectors. It is particularly important to ensure that any existing or new entity has a sound legal basis on which to offer insurance products, with the required level of business competence, and to clarify the government's objective in promoting insurance for livestock and aquaculture producers. A public subsidy toward the payment of an insurance premium is more of a private good; it would therefore be advisable to instead focus scarce public monies on developing the favourable conditions for the emergence of insurance markets.

Effective agricultural risk management must be seen as an "integrated layer system", which includes: on-farm, individual risk-reducing and -coping activities and strategies; informal group-based or mutual insurance schemes; formal private market insurance programmes; and government-sponsored and -financed catastrophic disaster relief programmes.

iii. Linkages between credit and insurance, *by Susana Siar, Fishery Industry Officer, FAO Rome*

Small fish farmers can contribute significantly to food security and foreign exchange earnings. In a joint FAO/INFOFISH study (2005), it was estimated that in 2003, there were 10–15 000 fish farmers in Malaysia, 90 000 in India and 30 000 in Thailand. The contribution of small farms to total output from inland culture fisheries was 100 percent in India, 10 percent in Malaysia and 69 percent in Thailand. In coastal/marine fisheries, the contribution of small farms to total landings was 95 percent in India, 5 percent in Malaysia and 45 percent in Thailand.

Small fish farmers are exposed to different sources of vulnerability, whose characteristics are:

- natural (storms, floods, drought);
- production-related (lack of access to seed and feed; disease outbreaks);
- environmental (pollution from industry and other sectors);
- ecological (introduction of non-indigenous species that may harm existing fish stocks and biodiversity);
- development-related (construction of infrastructure in the vicinity of aquaculture farms; changes in land and coastal use patterns);
- market-related (changes in prices in domestic and international markets, in consumer preferences, and in standards that affect the trade in fishery products);
- social (poaching and theft; conflict between aquaculture and capture fisheries; unclear property rights; competition with other sectors for land and water);
- political (changes in peace and order conditions); and
- personal (illness and death in the family).

Not all of the above sources of vulnerability may be addressed by insurance. However, the siting and management of aquafarms within the context of an integrated area management should be promoted by the government, as well as the legitimate ownership of aquafarmers over their operations.

While banks, microfinance institutions and insurance companies have a major role to play in providing financial services, other entities such as NGOs are also required. NGOs can assist in organizing small farmers and strengthening and building the capacity of their organizations to enable them to access financial services.

Credit and insurance can reinforce each other. Credit enables small farmers to access production inputs and invest in sustainable production technologies. Insurance gives the small farmer peace of mind, because it cushions the impact of losses and enables him or her to increase access to credit and capital because insurance reduces the risk of non-payment. Together, credit and insurance companies can conduct the following: joint needs assessment; joint marketing and promotion of services; joint agents at the village level to increase services and decrease administrative costs; joint capacity building of agents and extension officers; and a joint register of good and bad clients.

Credit and insurance share the same goals: sustainability of the fish farming enterprise and resilience of the aquafarming household. The realization of these goals would lead to a stable income for the fish farming household, food security for the population and foreign exchange earnings for the country.

Discussion

Lessons learned from insurance of small-scale capture fisheries may be transferable to the small-scale aquaculture sector. Insurance for small-scale fishers focuses more on assets insurance and life insurance for fishers related to their vulnerability at sea, and therefore may not be particularly comparable to aquaculture operations.

iv. Role of Better Management Practices (BMPS) in aquaculture insurance, *by Pedro B. Bueno of NACA*

A farmer can mitigate or reduce risks to farming activities by adopting BMPs and spreading risks through insurance. This review draws evidence from projects and experiences in India, Viet Nam and Thailand that BMPs, Good Aquaculture Practices (GAPs) and Codes of Conduct (in shrimp aquaculture) can be tools to help small and poor aquafarmers acquire the capacity to access financial products. A large part of this capacity comes from knowledge and skills to manage on- or off-farm risks. This ability improves the chances for a successful crop, its profitability and sustainability, which allow the farmer to become insurance- and credit-worthy. In turn, insurance can be a tool to encourage farmers to take up BMPs and to get organized. More than just a risk management tool, insurance may provide part of the total service support system for small-scale farmers.

Discussion

It is claimed that BMPs can assist small-scale farmers in becoming insured, but some participants questioned whether this actually occurs. In India, while BMPs are not an insurance service, the application of the BMPs did encourage the State Bank of India to provide crop production loan, without collateral, to small shrimp farmers taking up BMPs and becoming organized. The review also cited crop insurance schemes in the United States that are based on farmers adopting specific better farming practices.

Farmers in the projects cited in the review are certainly improving their production and reducing risks. The Asian Governments' willingness to promote BMPs and expand their application yielded positive effects. The prospect of access to insurance can be used as an incentive for adopting BMPs or improved management actions by

small farmers. It was noted that regular premium payments can be problematic for aquafarmers in certain microfinance schemes, because in an aquaculture operations, income is only available at the time of harvest. This raises problems for regular savings or payments, unlike in the capture fisheries sector where income is generated on a more or less daily basis.

v. Aquatic animal health and insurance, *by Melba Reantaso, FAO Rome*

The presentation discussed the following factors contributing to the current disease situation in the Asian region:

- increased globalization in the trade of aquatic animals and their products;
- enhancement of the ornamental fish trade;
- negative interactions between cultured and wild aquatic animals;
- slow awareness on emerging diseases;
- poor biosecurity measures;
- misconception on the use of specific pathogen-free (SPF) stocks; and
- climate change; and
- human-mediated movement of aquatic species.

Health management strategies were also presented, which cover international codes, regional guidelines; national strategies on aquatic animal health; diagnostics, therapy and information technology; research and extension; biosecurity measures and risk analysis; surveillance and reporting; farm-level health management; institutional strengthening and manpower development; and emergency response to disease epizootics.

National strategies on aquatic animal health serve as a framework for the national-level implementation of the *Regional technical guidelines for the responsible movement of live aquatic animals*. These contain the government's short-, medium-, and long-term action plans to implement the provisions on a phased basis. Risk analysis was emphasized as a science-based decision-making tool that provides decision-makers with an objective, replicable and documented assessment of risks posed by a particular action.

Farm-level management and the role of the farmer are critical aspects of health management. Dealing with day-to-day situations in farms, farm health management is of prime importance in preventing, controlling and possibly eradicating serious diseases. Farmers who are well informed understand the risks to their operations and others that arise from inappropriate practices. Informed farmers tend not to use antibiotics against viral diseases, not throw dead infected fish or drain contaminated water into open waters and not trade infected fish. The FAO *Technical guidelines for responsible fisheries*, *Aquaculture development 2, Health management for responsible movement of live aquatic animals* covers various aspects of management that relate to the management and mitigation of such risks. It contains potential guidance for aquaculture insurance.

It was concluded that: (i) aquatic animal health is a key element in the overall biosecurity framework covering risks in food safety, animal health, plant health and the environment; (ii) improving aquatic animal health and biosecurity (pro-active disease risk analysis) is a major challenge – this analysis is done in a way that incorporates the best information available on aspects of husbandry, epidemiology and sound science; and (iii) aquatic animal health management is an integral theme to address current aquaculture trends towards intensification and diversification, regulation and governance of the sector through national strategies.

Pathogens are hazards and the risk elements are clearly understood; therefore, there are ways to manage and reduce the risk. Aquaculture insurance therefore plays an important role to play to support healthy aquatic production.

Discussion

It is difficult to insure against risks to production that arise from health-related losses if the health management framework is weak. In particular, continued unregulated transfers and introduction to the environment of pathogens present significant risks. Health management is one of the most important aspects of insuring stock against losses. One option available to underwriters of aquaculture insurance is to specifically exclude disease coverage, therefore making it possible to be insured without coverage for health issues.

Due to the large number of species cultured in Asia, there is a correspondingly large number of diseases. This increases unpredictability of production. On a species basis, the hazards related to diseases would be quantifiable with adequate research/analysis of risks since there is an information base on the different pathogens.

Fish kills are one of the most obvious situations for which insurance cover is desired. However, "fish kills" are not always related to health and most often result from toxic conditions (low oxygen, pollution, plankton blooms, floods and other extreme hazards). Such events could therefore be covered separately from loss from disease.

vi. The role of microfinance institutions in developing and promoting aquaculture insurance in Asia *(Aquaculture Insurance in the Philippines: Constraints and Opportunities), by Ramon C. Yedra, Deputy Executive Director, Agricultural Credit Policy Council, Philippines*

While there is limited experience in linkages between rural credit and insurance organizations in Asian countries, there is considerable experience in other insurance schemes that target small farmers and rural poor households. Banks and rural credit institutions view insurance as a credit risk reduction mechanism. In some cases, as in crop insurance, it serves as a collateral substitute that protects the banks from loss arising from loan defaults. Thus, any expansion of insurance services for their loan clients is a welcome development for banks and rural credit institutions.

The experiences of some Asian countries in linking credit with agricultural insurance and with micro-insurance provide interesting lessons. Insurance is sometimes applied as a condition for a loan. Lessons learned from the Philippines case demonstrate: 1) the difficulty in attaining the standard needed to obtain agricultural insurance, especially for small farms; 2) that where the loss ratio is too high insurance premiums constrain small farmers from buying insurance; and 3) the merits of demand-driven insurance, i.e. where there is a viable market for insurance, the private sector is attracted.

Agricultural insurance in the Philippines is implemented by a government corporation, the Philippine Crop Insurance Corporation (PCIC). The PCIC insurance programme provides protection to agricultural producers against loss of crops, livestock and agricultural assets due to natural calamities, plant pests and diseases and/or other perils. The insurance period is from planting to expected date of harvest. Loss coverage includes natural calamities, plant diseases and pest infestation. Non-covered losses include: fire, theft and robbery; avoidable risks emanating from neglect, strong wind and rain not induced by typhoon; and losses that occurred outside of the term of the coverage. Rice and corn insurance are the major product line.

There has been no insurance programme for aquaculture or capture fisheries in the Philippines. In 1998, an act mandated the PCIC to cover inland fisheries, fish cages and fish pens. In 2001, an Administrative Order was subsequently issued by the Department of Agriculture, providing the guidelines for the insurance coverage of non-harvested stock in fishponds, fish pens and fish cages, including seaweed farms and other aquaculture projects. However, the government funding commitment to PCIC indicated in this order was not provided.

The crop insurance programme has suffered a number of constraints, which may similarly be faced by an aquaculture insurance programme. These include: (a) *high overhead costs*. While PCIC achieved an average loss ratio of 0.83 over a ten-year period, overhead costs were so high that it caused the corporation a net operating loss. The high overhead costs are attributed mainly to the large field staffing requirement for claims validation; (b) *limited investment fund or capitalization*. The government's capital is only PHP905 million, thus limiting its investment earnings; and (c) *premium pricing*. The loss ratio is less than 1 when the government subsidy on premium rate is included. The government is expected to subsidize 54 percent of the total premium. Thus, without subsidy, PCIC would have claims exceeding premiums paid; PCIC's claims rate, an average of 8 percent, is well below the standard of 15 percent. On the other hand, PCIC could not raise the premium rate to be paid by farmers because they are highly sensitive to increased rates.

The commercial insurance industry in the Philippines caters largely to middle- and higher-income brackets, rarely to the poor. The demand for insurance services to the poor is fulfilled by several regulated, cooperative-owned insurance organizations and mutual-benefit associations (MBAs) and by non-regulated (or informal) insurance schemes of cooperatives and NGOs. MBAs are registered non-stock, non-profit organizations whose members are also the policyholders and are licensed by the Insurance Commission to offer insurance services to their members. As of December 2005, there are 20 licensed MBAs. PCIC has been the sole crop insurance provider to Filipino farmers for the past 25 years. Yet, the maximum number of farmers that it has serviced in any one year is less than 7 percent of the estimated 5 million smallholders. No private company has ventured into crop insurance. On the other hand, credit life insurance targeting the poor (micro-insurance) has attracted the private sector even without government subsidy. These indicate that there are merits in a market-driven insurance programme as opposed to a subsidy-dependent insurance programme run by a public body.

As concerns micro-insurance, there is a growing demand for credit life insurance among the borrowers brought about by the rapid growth of the microfinance industry. The entry of more mutual benefit associations should continue to be encouraged. This must be coupled with prudent regulation by the Insurance Commission to protect policyholders. To date, the minimum capitalization requirement for MBAs seems to be working. Over time, however, the MBAs may find merit in consolidation to achieve efficiency, but this must be their decision. They have diverse membership with different affiliations such as the cooperative sector and NGOs. Thus, even if it might be more economically profitable for them, they may not be inclined to merge. Support from donors and the government should come in the form of technical assistance and capacity building in skills such as market surveys and product design to further improve the viability of their operations.

Discussion

There are schemes such as micro-credit life insurance that work on the basis that if the borrower dies, the insurance company pays the bank according to the unpaid loan balance. There are other schemes where the life insurance pays a lump sum to settle debts, with the balance going to the surviving next of kin.

Agricultural insurance covers crop damage caused by unforeseen risks (e.g. storm damage) and some specific pests and diseases. Variation in premiums is applied to address different risk situations; those in calamity-prone areas pay higher premiums.

The *value-chain approach* can assist in identifying the best opportunities to provide insurance. The reduction of losses and risks among other actors in the value chain may be as important as among farmers. This approach is a means to identify where

insurance may be required (e.g. with transporters, middle men, etc.); however, separate insurance schemes may already be in place for this.

vii. Aquaculture in Asia and loss adjusting principles, *Mark Vos, Director, Crawford & Company (Nederland) B.V.*

The presentation focused on loss adjusting principles applied in the aquaculture insurance market. Emphasis was given to the mortality and equipment insurance policies and the accompanying need for risk management information. The latter would allow underwriters to consider the risk and their ability to provide insurance coverage.

In general, risk management information for underwriting purposes considers not only the hazards of the sites that may be exposed to losses, but in particular, the attitude and professionalism of the insured and his/her staff.

Some of the main focus areas are therefore:

- veterinary management as a whole, including a prompt response to disease and sudden rise in mortality;
- equipment quality and maintenance;
- the attitude of the insured and his/her competence;
- accounting standards, stock records and auditable quality;
- regional economic and veterinarian support and its influence on potential mandatory slaughter; and
- harvest strategies in relation to season/climate conditions.

Examples were given of the potential difference in professional administrative standards, including the application of good veterinarian practices for small- and medium-scale farmers, resulting in exclusion of insurance cover, as claims cannot be calculated on information required for underwriters' consideration. Examples were also given that fisheries departments and similar public bodies were already reacting and in control when toxic and disease issues arise, which could affect the entire market and its depending economy.

Aquaculture and related businesses need to mature in order to enable the insurance industry to become more systematically involved. Crawford & Crawford's mission being that of a global claims provider, it has expertise that FAO, NACA and aquaculture and fisheries entrepreneurs may need.

Discussion

In response to several questions on calculating the sum insured and possible limits, Mr Vos reiterated the importance of good farm record keeping for the various calculations methods applied by the insurance industry. In doing so, the loss adjuster calculates the loss and therefore does not set the insured level. The insurance company evaluates whether it is a good risk to insure. The company assesses the quality of management, equipment and bookkeeping, *inter alia*, and decides the level of the risk that it is willing to carry. A broker can be contacted to identify additional insurance companies if the first insurer is not willing to cover the entire risk.

Mr Vos supported a structured, layered risk management system such as the *hybrid insurance* model presented to the workshop for consideration, which is based on developing aquafarmer mutuals as the first level of insurer. He added that the key will be grouping fish farmers with similar features and systematically making sure that BMPs are applied. Re-insurance companies could go beyond the level that the mutuals would be able to cover themselves.

Mr. Secretan commented that one of the most important management practices is keeping accurate records of stock and that good accounting practices are required when calculating mortality.

On the topic of strengthening relations between fisheries authorities and veterinary authorities in Asia, Mr Vos underlined that a strong and correct veterinary support is crucial to the insurer.

Concerns were raised about the fact that, with few exceptions, Asia has not entered into aquaculture insurance at any significant level despite the presence of many other types of agriculture insurance programmes in the region. Mr. Secretan explained that aquaculture is a highly specialized, high-risk business. It has a long history of insurance companies entering the arena and suffering massive losses. It is important to show the insurance companies that they can actually make a profit and that it is worth their effort to transfer the facilities developed in Europe and other regions to Asia.

Mr Vos added that, for the insurer, fish farming differs greatly from livestock farming because there are many more individual animals at risk, for instance, from disease. Insurance would need to take this into serious consideration.

Mr Vos said that the government could indeed subsidize premiums, but would then need to take into consideration the wrong signals and incentives that it may send to the insured and its negative effects on establishing a commercially sustained insurance programme. He added that an alternative could be to subsidize mutuals in order to keep the funds within the insurance system/model. Fair prices of premium are important, however. The calculation of premiums is based on risk exposure and the costs for offering the insurance.

viii. Aquaculture insurance in China, *by Miao Weimin, Freshwater Fisheries Research Centre of the Chinese Academy of Fishery Sciences, Wuxi*

The presentation aimed to provide an overall picture of the present status of aquaculture insurance in China. The need to develop aquaculture insurance is clear from the analysis on the importance of the industry and risks faced by aquaculture farmers.

Current aquaculture insurance practices are pushed by government efforts to safeguard the interest of aquafarmers and promote sustainable development of the industry. Prospects of aquaculture insurance development in China are currently being analysed. It is expected that a significant expansion of insurance coverage of aquaculture will take place in the next five to ten years with strong support from the government. A holistic approach to promote the development of aquaculture insurance in China through joint efforts from the government, insurers and farmers' organizations is required. Constraints to aquaculture insurance development were identified and discussed, which include:

- high risks for commercial insurance companies caused by a relatively high loss ratio;
- affordability of insurance premium to small farmers;
- profitability of aquaculture insurance from the point view of commercial operations;
- technical complexity in loss (particularly stock) assessment; and
- lack of capable aquaculture insurance brokers and claim settling agents.

It is important that balanced strategies to promote the development of aquaculture insurance in China are developed. The government places emphasis on the protection of farmers exposed to high risk in aquaculture business, which might oppose the interests of commercial insurance providers.

ix. Aquaculture insurance in India, *by M.A. Upare, former General Manager, National Bank for Agricultural and Rural Development (NABARD)*

India ranks second to China in aquaculture production. Five public sector insurance companies in principle provide insurance for two categories of aquaculture production, shrimp and fish farming. The amount of insurance premium collected in 1990 was

US$96 000, decreasing from US$354 000 in 1994. In 1994, insurance companies incurred huge losses due to white spot disease in shrimp. As a result, insurance companies lost interest in aquaculture insurance. Risks and perils facing the aquaculture industry in India and the processes for loss adjustment and claims settlement were discussed. These negative experiences are a serious impediment to initiating new discussions with insurance companies in the country. Nonetheless, the need was seen to revive aquaculture insurance by developing appropriate insurance products and suitable mechanisms for promoting aquaculture. An international organization may consider the merits of a pilot project to test the proposed hybrid approach, as discussed during the workshop.

Discussion

Concern was raised that the insurance buyer had been ignored throughout the various presentations that focused largely on the insurance supply side. Without proper attention to the demand side and sufficient buyer interest, no insurance programme can be developed or prosper.

Mr. Secretan said that it would be practically impossible to get insurance companies interested in the sector if they cannot see any profit to be made. He added that the insurance industry cannot provide insurance for the social needs of the farmers – this is the responsibility of government. Insurance companies are selective in terms of which farmers they take on in their schemes. A mechanism is needed for bringing together insurance companies and governments; the hybrid approach to insurance might be a solution.

x. Aquaculture insurance in the Philippines: status and constraints, *by Nelson A. Lopez, Chief, Inland Fisheries and Aquaculture Division, Bureau of Fisheries & Aquatic Resources, the Philippines*

The presentation gave a historical account on how an enabling law specific for aquaculture insurance was formulated in the Philippines in 2001 through Fisheries Administrative Order No. 215. This law mandated the Philippines Crop Insurance Corporation (PCIC), in collaboration with the Bureau of Fisheries and Aquatic Resources (BFAR), to formulate guidelines for adapting insurance in aquaculture covering fishponds, fish pens and fish cages of shrimp, milkfish and tilapia, as well as seaweed farming. Fisheries Administrative Order 215 was made into law in 2001, but has not been implemented. This is due to failures in obtaining access to government funding and the lower priority given to fisheries and aquaculture than to crops and livestock because of the difficulties and complexities in accounting and the high risks to the industry from typhoons and frequent fish kills.

It is recommended to sectoral stakeholders to pursue insurance at the small-farmer level by integrating BMPs (as a prerequisite) and to provide insurance as an incentive for aquafarmers to organize into cooperatives or associations. Another recommendation is to pilot-test the programme in selected areas of the country jointly with donors such as the Asian Development Bank and the Land Bank of the Philippines and with support agencies such as Philippines Crop Insurance Corporation and the Agricultural Credit Policy Council (ACPC).

Discussion

Questions were raised on a certification/licensing system for aquafarmers in the Philippines. Mr. Lopez replied that such a system exists and that farms without licences are considered illegal. The need to have control over who farms is important; hence the obvious need for a good licensing system. Mr. Weimin informed the participants that such a system is in the process of being developed in China, but is not yet in effect.

It was observed that although most Asian countries do have a licensing system, the application of the current license system is not adhered to in many cases.

Mr. FungeSmith added that there are often similarities among countries in licensing systems and their legal basis for aquaculture; implementation and compliance with the laws and regulations are different, however. Governments need to efficiently assume full responsibility for licensing. A positive trend is that government control measures are increasingly effective.

B.Summary of plenary discussions on working group reports

Working Group 1 discussed the constraints to and opportunities for small-scale aquaculturists in implementing the *Proposal for meeting insurance and risk management needs in developing aquaculture in Asia*, which was provided as a working paper for the workshop. The discussion of Working Group 1 centered on the relevance of classifying small-scale farmers into two groups, one of which was likely to have higher demand for insurance than the other. It was agreed that the small-scale farmers who have made little or no significant investments in aquaculture may still require access as a group (i.e. clusters or cooperatives/associations) to aquaculture insurance services. Examples from Iran and Indonesia were cited in this respect.

Working Group 2 discussed the possible alternatives to the proposed hybrid approach described in the *Proposals for meeting insurance and risk management needs in developing aquaculture in Asia*. One of the discussion points related to a recommendation to governments to encourage them to put more effort into creating an enabling environment for aquaculture insurance development. Governments should set aside funds for large-scale or extraordinary disasters that cannot be covered by private sector insurance. With regard to the role of NGOs in establishing and operating aquaculture insurance schemes for small-scale farmers, it was noted that they could also function as service or business correspondents, providing cost-effective intermediary services for the insurers, although this excluded adjusting losses, which is a highly specialized task.

Working Group 3 focused on possible implementation strategies and mechanisms required for the *hybrid approach proposal* and recommended the inclusion of a stop activity point in the process. This point would become relevant when it is clear that there is no interest in the aquaculture insurance market for the hybrid approach.

Recent developments in Japan were discussed with regard to the privatization of government-run insurance schemes for the agriculture and fisheries sector. The steps proposed by Working Group 3 with respect to the process of establishing and piloting the hybrid approach were agreed. It was also suggested that a follow-up workshop be organized in two years' time to monitor progress towards the set objectives and the recommendations made at this workshop, particularly the achievements made in the implementation of the hybrid approach in some countries in Asia.

The working group reports can be found in section III of this report.

It was agreed to incorporate the working group discussions for the Regional Workshop on the promotion of Aquaculture Insurance in Asia into the background document, *Proposals for meeting insurance and risk management needs in developing aquaculture in Asia*. The final document was entitled *Guidelines for action to meet insurance and risk management needs in developing aquaculture in Asia.*

The *Workshop conclusions and recommendations*, as detailed in the following section II of this report, were officially endorsed by workshop participants.

II. CONCLUSIONS AND RECOMMENDATIONS

With about 11 million aquaculturists, the Asian region has the largest number of aquaculture farmers in the world. Of these, the predominant operations are small- and medium-scale. In 2004, 91 percent of the world's total aquaculture production in

volume was generated in Asia. The value of Asian aquaculture production in the same year was about US$57 billion. Further, the Asian aquaculture sector showed average annual growth rates of 7.7 percent in value terms.

The Regional Workshop on the Promotion of Aquaculture Insurance in Asia, held in Bali, Indonesia from 30 April to 2 May 2007, recognized that aquaculture insurance is likely to be attractive to farmers whose aquaculture operations are their principal form of livelihood and in which the family or operator has invested significant livelihood assets (time, labour, infrastructure and funds). It was noted that the aquaculture insurance schemes in Asia do not presently cover small-scale aquaculture. There is currently high uncertainty over the viability of aquaculture insurance in the small-scale aquaculture sector. In this regard, the workshop concluded that a *hybrid approach*[3] would be the most suitable approach for the region to develop schemes accessible to groups or clusters of medium- and small-scale aquaculture producers.

In recognition of the above, the participants endorsed the following recommendations of the Regional Workshop:

Governments in the region are encouraged to:

- contribute to the establishment of aquaculture insurance schemes by providing an enabling environment (legal and policy frameworks) and to consider appropriate social coverage for risks that cannot be covered by the insurance sector;
- engage with the insurance industry, other public and private bodies, and clusters/groups of small-scale farmers in the development and implementation of a "hybrid approach", which is considered suitable for aquaculture insurance development in support of small-scale aquaculture in the region;
- continue to provide an enabling environment for increasing the degree of adoption of BMPs in aquaculture to facilitate sustainability and reduce production-related risks;
- work closely with the aquaculture sector in quantifying risks and developing effective mechanisms for their mitigation.

The insurance sector[4] is encouraged to:

- initiate the establishment of an AAIP[5], which will serve as a market facility for the provision of aquaculture insurance services to the region;
- assist in creating awareness and facilitating capacity building for the establishment of mutuals and other insurance schemes. Such schemes would spread the risks related to smaller disasters that affect some but not all participants in the scheme.
- Actively engage with governments in seeking ways to apply the "hybrid approach" to aquaculture insurance, which can address the needs of medium- and small-scale aquaculture operations.

The workshop recognized the need for FAO, intergovernmental organizations such as NACA, and other relevant international or regional agencies and development banks to continue to support, and participate and invest in the development of insurance for small-scale aquaculture in Asia.

Agreed follow-up activities

The workshop participants agreed to continue: communicating on new developments in aquaculture insurance and related issues in their countries; inform each other of legal and policy developments at the national level; consolidate information on current mutual schemes in their countries with the national insurance regulators; and

[3] The *hybrid approach* is described in detail in *Guidelines for action to meeting insurance and risk management needs in developing aquaculture in Asia*, which was produced by the Regional Workshop.

[4] The sector comprises direct- and re-insurers, brokers, risk management experts and loss adjusters, etc

[5] The nature and purpose of the A.A.I.P. is broadly discussed in *Guidelines for action to meet insurance and risk management needs in developing aquaculture in Asia*, currently being redrafted to incorporate relevant information from the workshop.

identify suitable groups or clusters of aquaculture farmers to test the hybrid approach. They also agreed to inform their supervisors and relevant national government authorities of the outcomes of the Regional Workshop and to provide feedback to the secretariat on the responses obtained. Participants from India, Nepal, Indonesia and Malaysia expressed the willingness of clusters or other groups of farmers in their country to take part in the pilot activities to test the hybrid approach; in this respect, they promised to provide the secretariat and the insurance representatives with detailed information on these groups of farmers in order to facilitate the identification process. The workshop participants also agreed to try to organize a second workshop on the same subject in approximately two years and to discuss any progress made, particularly the experiences in providing insurance to small-scale aquaculturists through the AAIP.

III. WORKING GROUP REPORTS

Following the overview and background papers, thematic presentations and industry experiences, the workshop focused on the proposal for meeting insurance and risk management needs in developing countries in Asia. The proposal was developed as a working paper for the workshop. Three issues related to the proposal were examined, namely, constraints and opportunities for small-scale aquaculturists in implementing the proposal, possible alternatives to the proposed *hybrid approach* and possible implementation strategies and mechanisms required for the proposal. To undertake the task, the participants organized into three working groups, each group taking up one of the three issues for discussion. The following are the working group conclusions and suggestions.

Working Group 1 (WG1): Constraints and Opportunities

For the purposes of the discussion, the group provided a general description of small-scale aquafarmer operations as being typically family-owned, not formalized into business operations, and having a small economic turn-over.

The group identified two sub-groups: (i) small-scale farmers with no significant investment in assets (infrastructure) or little investment of the operational-type costs (meaning mainly in labour and fish feed); who probably farm fish as one of several livelihood strategies (i.e. aquaculture not being the most significant source of livelihood or income); who are unlikely to require insurance; and whose source of assistance is restricted to government compensations; and (ii) small-scale farmers whose aquaculture operations are a principal form of livelihood in which the family/operator has invested significant livelihood assets (time, labour, infrastructure, finance), and who would likely find insurance an important risk management option.

The second issue addressed by Working Group 1 was how to make insurance products available to small-scale farmers. The discussion recognized the opportunities for using current aquaculture insurance/microfinance schemes in place and considered that insurance products might be added to the portfolio of the micro-credit programmes. It considered a group scheme as a practical implementation arrangement and suggested that farmer groups with similar farming practices could be insured, for example: groups farming similar commodities; having a homogenous scale of farm and practices; following the same cropping calendar; located in the same geographical site; having a common water source; and following a standardized production system. The Working Group identified some good examples of this situation, as follows:

- India: shrimp aquaclubs (same water, same area, implementing BMPs, similar scales);
- Cage culture of tilapia (standardized cage sizes and production methods);
- Iran: trout culture, which is more or less standardized;
- shrimp farmers operating under a franchise scheme.

TABLE 1
Constraints to aquaculture insurance and possible solutions

Constraints	Suggested approach
1. Inadequate compensation to restart or inadequate compensation. (This refers mainly to public compensation after a disaster or an extraordinary event that impacts the crop or farm.)	Replacement of inputs to restart is not enough – insurance could cover the feed and inputs crop through to its harvest; although this is not a complete compensation, it is adequate to restart and harvest the crop.
2. Lack of understanding of insurance systems and their validity (e.g. insuring the fish against fire would not be realistic!).	General awareness among farmers of the opportunities provided by insurance or demonstrated examples of how it works (pilot projects).
3. Limited ability to objectively assess risks.	Increase understanding and awareness and provide technical assistance to farmers – possible role for the government.
4. Insurance may not be available for water- based structures or constructions that are not classified as "buildings".	Insurance of infrastructure, which is relatively straightforward for farmers who have invested heavily in facilities, such as hatcheries structures, buildings, boats, land vehicles, cages or pens. Replacement costs vary greatly, sometimes according to the materials used: – pumps and equipment; – concrete tanks (area, type); – bamboo and net cages (area, fixed cost); – earth ponds (costs of reconstruction/re-excavation).
5. Farmer registration and licensing inconsistent and results unreliable – this limits contractual aspects of insurance because the legality of the operation can be contested.	Encouragement of farm registration and licensing; use of the opportunity for insurance or improved coverage/compensation as an incentive for farms to license/register; basic legal framework is a pre-requisite.
6. Farm record keeping is extremely limited in many farms.	Use of BMP approaches to encourage better record keeping; standardized production systems (using BMPs and GAPs allows a more standardized assessment; focusing on homogeneous standardized systems may be beneficial).
7. There are limited data on risks.	Need to improve predictability of farming operations, which can be achieved by standardization-type approaches as applied in many franchise farming operations; this is similar to the BMP approach; major sources of risks are mitigated or reduced through implementation of BMPs (e.g. restriction of stocking density; cropping calendar, feeding protocols; and disease diagnosis, reporting, surveillance and control).
8. There is weak disease surveillance.	Improved basic surveillance, including regular testing to enable improved risk assessment and management.
9. The range of products by insurance companies is limited.	More flexible and tailor-made services for farmers: current products and services for small producers are either not available at all or are not particularly attractive. This would likely improve as the provision of insurance widens and as competition develops.
10. Inability to pay premiums individually.	Use of group insurance under micro-insurance schemes as with crops in some countries; development of reinsurance schemes and pilot testing for wider application.

An issue related to making insurance more attractive to small-scale aquafarmers is the government's role. Working Group 1 considered that poor and small-scale farmers may not find it necessary to insure their crops with the availability of government compensation and subsidized social insurance schemes. Working Group 1 noted, however, that government compensation never covers 100 percent of the damage and compensation is generally directed at providing the inputs to restart production. This compensation might be a disincentive for farmers to buy insurance.

The group broadly identified some opportunities for insurance in situations where the government compensation is inadequate, such as natural disasters, including cyclones, floods and tsunamis; disease outbreaks; industrial pollution/accidents; and algal blooms.

The discussion on constraints to and opportunities for aquaculture insurance for small-scale farmers identified ten constraints and suggested approaches to resolve them (see Table 1).

Working Group 2 (WG2): Possible alternatives to the proposed hybrid approach

Working Group 2 considered that all three alternatives presented in the proposal make sense depending on the scale of the operation. The group did not present an alternative, but identified the following roles of stakeholders:

The roles of governments:

- Facilitate access. Governments need to work on a legal and policy framework and formulate insurance-friendly legislation.
- Set aside funds for disasters that cannot be accommodated by private sector insurance.
- Endorse insurance products through networks of societies, clubs and cooperatives.
- Invest in the formation of farmer associations or clubs for easier distribution of insurance services and for banks as a conduit through which insurance can access clients.

The role of insurance companies (private and public):

- Develop a framework for cost-effective risk and claims assessment.

The roles of cooperatives, societies and banks:

- Develop, promote and adopt BMPs.
- Aid the development of mutuals.
- Provide credit linkage, which may be required as a mandatory pre-condition.

The roles of NGOs:

- Raise awareness, provide advocacy and capacity building, and organize.
- Act as intermediary, business or service correspondents for the provision of aquaculture insurance to small-scale farmers.

Working Group 3 (WG3): Implementation strategies, mechanism and responsibilities

The group proposed eight step-by step activities, as follows:

1. **Approach the aquaculture insurance market to encourage the formation of an insurance facility, tentatively called the AAIP.**

Steps to be undertaken:

a. Support letters for proposed approach by FAO and NACA.
b. Discussion with at least four international brokers to be conducted by an appropriate agency selected by FAO and NACA.
c. Prepare feasibility study of establishing and operating a mutual insurance scheme, including drafting of rules and responsibilities, procedures and planning, the latter to be prepared with assistance from international brokers.
d. Hold discussions with re-insurers willing to partner with FAO and NACA.
e. Liaison between the agency whose tasks are "b" and "c" above, and the agency whose task is "d"; report on the results of their work to FAO and NACA.

Should the report indicate that the market is interested, proceed to Step 2. Otherwise, the process ends here.

2. **Identify production facilities/areas/producer associations that have a good chance of attaining the standards necessary to benefit from insurance.**

Steps to be undertaken:

a. Raise resources to support missions in order to identify the most suitable farmer groups and to establish their basic risk exposures and the distribution of values that need to be insured (by FAO)
b. Recruit experts (from appropriate organizations from the insurance and aquaculture sectors and from national aquaculture and financial institutions) to carry out joint missions with FAO to identify suitable clusters/farmer groups.

c. Select suitable farmer groups and preparation of awareness-raising and publicity materials.
d. Establish public-private partnerships during missions to bring government agencies on board and get collaboration started.
e. Raise awareness of the basic concept of insurance and mutual insurance companies and how they function through national experts with assistance from FAO, NACA, APRACA members, companies with expertise and insurers with interest in providing capacity building interventions for the selected clusters/ groups.

3. Collect information on the farming organization and risk profile of clusters/ farmers groups or individual farmers using insurance industry standard processes gathered by insurers and brokers.
4. Submit the information, via the specialist insurance brokers, to the AAIP underwriters.
5. Commence the risk management inspection and survey process.
   Produce survey report, discuss same and disseminate among interested parties.
6. Prepare insurance terms by leading underwriters.
7. Accept insurance terms by the insureds, whether clusters/farmer groups or mutuals.

If all processes experienced positive outcomes, then normal insurance practices, such as issuance of documentation, payment of premiums and survey fees, handling of claims and renewal processes, will fall into place.

Annex 1

List of participants

FISHERIES/AQUACULTURE SECTOR	
AUSTRALIA	
Clayton Harrington Policy Officer – Aquaculture Fisheries and Aquaculture Department of Agriculture Fisheries and Forestry GPO Box 858, Canberra ACT 2601, Australia	Tel.: (61-2) 6272 3722 Fax: (61-2) 6272 4875 E-mail: clayton.harrington@daff.gov.au
BANGLADESH	
M.A. Mazid Director General Bangladesh Fisheries Research Institute Mymensingh 2201, Bangladesh	Tel.: (880-91) 65874 Fax: (880-91) 55259 E-mail: dgbfri@bdonline.com
CHINA	
Xu Pao Director, Freshwater Fisheries Research Centre 9th East Shanshui Road, Binhu District Wuxi, Jiangsu 214081, China	Tel.: (86-510) 8555 7959 Fax: (86-510) 8555 3304 E-mail: xup@ffrc.cn
Miao Weimin Deputy Director, Freshwater Fisheries Research Centre 9th East Shanshui Road, Binhu District Wuxi, Jiangsu 214081, China	Tel.: (86-510) 8555 8719 Fax: (86-510) 8555 3304 E-mail: miaowm@ffrc.cn
INDIA	
N Sarangi Director Central Institute of Freshwater Aquaculture (CIFA - ICAR) PO Kausalyaganga, Bhubaneswar, Orissa, 751002, India	Tel.: (91-674) 246 5421/246 5446 Fax: (91-674) 246 5407 E-mail: sarangi012@yahoo.com Sarangi012@rediffmail.com
B Vishnu Bhat Director, Marine Products Export Development Authority Panampilly Avenue, PB No 4272 Panampilly, Nagar, Kochi, Kerala 682 036, India	Tel.: (91-484) 231 0223 Fax: (91-484) 234 3361; 231 4467 E-mail: vbhat@mpeda.nic.in
INDONESIA	
Reza Shah Pahlevi Head, Programming Division Directorate General of Aquaculture Ministry of Marine Affairs and Fisheries Jl Harsono Rm No 3, Gedung B Lt IV Ragunan, Jakarta 12550, Indonesia	Tel.: (62-21) 7822 2779 Fax: (62-21) 7822 2779 E-mail: pahlevir_program@yahoo.com

Hardono Fisheries Business Division Directorate General of Capture Fisheries Ministry of Marine Affairs and Fisheries Jl. Medan Merdeka Timur No. 16, Jakarta, Indonesia	Tel.: (62-21) 351 9070 ext 1618 Fax: (62-21) 352 1782
Balok Budiyanto Directorate General of Capture Fisheries Ministry of Marine Affairs and Fisheries Jl. Medan Merdeka Timur No. 16, Jakarta, Indonesia	Tel.: (62-21) 352 0726 Fax: (62-21) 352 0726 E-mail:
Cornelis .J. Baay Adviser, Intensive Aquaculture Indonesia Fajar Raja EstateA3/14, Cihanjuang/Cimahi, Indonesia	Tel.: (62-22) 664 4761 Fax: (62-22) 664 3028 E-mail: maries@bdg.centrin.net.id
IRAN	
Abbas Amini Director, Aquaculture Department Iran Fisheries Organization No 250 – West Fatemi Avenue, Tehran, I.R Iran	Tel.: (98-21) 6694 3860; 6694 0692 Fax: (98-21) 6694 3870 Email amini@mail.fisheries.ir abb_amin@yahoo.com
MALAYSIA	
Ismail bin Abu Hassan Director, Aquaculture Development Division Department of Fisheries, Malaysia 1st Floor, Podium 2, 4G2, Wisma Tani Percint 4, 62628, Putrajaya, Malaysia	Tel.: (60-3) 8888 4108 Fax: (60-3) 8889 1794 E-mail: ismail@dof.gov.my
Ms Badariah Binti Mohd Ali Head, Freshwater Aquaculture Section Department of Fisheries Malaysia 2nd Floor, Podium 2, 4G2, Wisma Tani Precint 4, 62628, Putrajaya, Malaysia	Tel.: (60-3) 8870 4613 Fax: (60-3) 8889 1794 E-mail: badariah01@hotmail.com
NEPAL	
Deep Bahadur Swar Director General Department of Agriculture Ministry of Agriculture and Cooperatives Harihar Bhawan, Pulchowk, Kathmandu	Tel.: (977-1) 552 1323 Fax: (977-1) 552 4093 E-mail: deep_bahadurswar@hotmail.com
PHILIPPINES	
Nelson Lopez Chief, Inland Fisheries and Aquaculture Division Bureau of Fisheries and Aquatic Resources 2/F PCA Bldg, Elliptical Rd, Diliman Quezon City, Metro Manila 1101, Philippines	Tel.: (63-2) 929 2631 Fax: (63-2) 929 3439 E-mail: nlopez@bfar.da.gov.ph nlopez_ifad@yahoo.com
SINGAPORE	
Chen Foo Yan 630 Jurong West St 65 Singapore 640630	Tel.: (65-6794-6275) E-mail: chen_foo_yan@hotmail.com

SRI LANKA

Amarawansa Hettiarachchi
Director General
Ministry of Fisheries and Aquatic Resources
Maligawatta Secretariat, Colombo 10, Sri Lanka
Tel.: (94-11) 232 9666
(94-11) 292 5736
Fax: (94-11) 254 1184
E-mail: ahettiarachchi@fisheries.gov.lk

THAILAND

Naruepon Sukumasavin
Head of Technical Group
Inland Fisheries Research and Development Bureau
Department of Fisheries
Ministry of Agriculture and Cooperatives
Kasetsart University Campus
Ladyao, Jatujak, Bangkok 10900, Thailand
Tel.: (66-2) 579 7231
(66-85) 070 7838
Fax: (66-2) 940 6524
E-mail: naruepos@gmail.com

Ms Lila Ruangpan
Senior Expert in Marine Shrimp Aquaculture
Department of Fisheries
Ministry of Agriculture and Cooperatives
Kasetsart University Campus
Ladyao, Jatujak, Bangkok 10900, Thailand
Tel.: (66-2) 940 6526
Fax: (66-2) 562 0571
E-mail: llruangpan@yahoo.co.th

VIET NAM

Nguyen Huy Dien
Acting Director
National Fisheries Extension Centre
10 Nguyen Cong Hoan, Ba Dinh, Hanoi, Viet Nam
Tel.: (84-4) 7715294; 771 4634
Fax: (84-4) 771 6881
E-mail: nguyenhuydien@vnn.vn

Nguyen Thi Phuoc Lai
Project Assistant, IMOLA FAO Project
53 Nguyen Hue Street
Hue City, Vietnam
Tel.: (84-54) 831 387
Fax: (84-54) 831 587
E-mail: phuoclai@gmail.com

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

Raymon van Anrooy
Fishery Officer
Food and Agriculture Organization of the United Nations
Subregional Office for Central Asia (FAOSEC)
Ivedik Cad. No.55, Yenimahalle
Ankara, Turkey
Tel.: 90-312-3079520
Fax: 90-312-3271705
E-mail: raymon.vanAnrooy@fao.org

Simon Funge-Smith
Aquaculture Officer
FAO Regional Office for Asia and the Pacific
Maliwan Mansion, 39 Phra Atit Road
Bangkok 10200, Thailand
Tel.: (66-2) 697 4149
Fax: (66-2) 697 4445
E-mail: simon.fungesmith@fao.org

Ms Melba Reantaso
Fishery Resources Officer (Aquaculture)
Aquaculture Management and Conservation Service
Fisheries and Aquaculture Management Division
Food and Agriculture Organization of the United Nations
Viale delle Terme di Caracalla
00153 Rome, Italy
Tel.: (39-06) 570 54843
Fax: (39-06) 570 53020
E-mail: melba.reantaso@fao.org

FINANCE SECTOR

CAMBODIA

Rath Sovannorak
Deputy Director - Bank Supervision Department
National Bank of Cambodia
#22-24, Preah Norodom Blvd.
Phnom Penh, Cambodia

Tel.: (855-12) 200 099
Fax: (855-23) 426 117
E-mail: sovannorak@online.com.kh

INDIA

Maroti Arjuna Upare
Ex General Manager
National Bank for Agriculture and Rural Development
Consultant World Bank, UNDP
A-502 Anant Apts, Thakur Complex
Kandivili East, Mumbai-400101, India

Tel.: (91-22) 2854 8978
Fax:
E-mail: u_maroti@hotmail.com

Mahendra Dandekar
Assistant General Manager
National Bank for Agriculture and Rural Development
F-2/105 Kalpita Enclave
Sahar Road, Andheri (East)
Mumbai 400 069, India

Tel.: (91-22) 2684 2806
(91-22) 2684 8901
Fax: (92-22) 2653 0090
Email: dandekar10@yahoo.co.in

K. Sureshkumar
Assistant General Manager
National Bank for Agriculture and Rural Development
Gautam House, Upper Bazar
Ranchi 834 001, India

Tel.: (91-94) 311 02781
(91-651) 329 4045
Fax: (91-651) 220 9107
Email: sureshsithara@rediffmail.com
suresh.kumar@nabard.org

INDONESIA

Rainhard J. Manik
Manager of Food Loan Department
Program Loan Division
PT. Bank Rakyat Indonesia (Persero), Tbk
BRI 1 Building, 9th Floor, Jl. Jend. Sudirman Kav. 44-46
Jakarta 10210, Indonesia

Tel.: (62-21) 575 8921
Fax: (62-21) 250 0087
E-mail: mnk@bri.co.id

Kusumo Subagio
Director
PT Multitek Mitra Lestari
Jln Juanda III/11A
Jakarta 10120, Indonesia

Tel.: (62-21) 352 9339
(62-21) 384 6551
Fax: (62-21) 384 1596
E-mail: mml311a@centrin.net.id

Ms Siti Adimuwani
Deputy General Manager - Program Loan Division
PT. Bank Rakyat Indonesia (Persero), Tbk.
BRI 1 Building, 9th Floor, Jl. Jend. Sudirman Kav. 44-46
Jakarta 10210, Indonesia

Tel.: (62-21) 575 8905
Fax: (62-21) 250 0087
Email: Siti@bri.co.id

Arun P Padiyar Aquaculture Specialist International Finance Corporation (World Bank Group) Jln Ujung Rimba No 14 Banda Aceh 23242 NAD, Indonesia	Tel.: (62-812) 699 1697 Fax: (62-651) 635 172 E-mail: arunpadiyar@gmail.com
MYANMAR	
Daw Ni Ni Soe Manager Myanmar Agricultural Development Bank 26/42 Pansodan Street, Kyauktada Township Yangon, Myanmar	Tel.: (95-1) 373 018 Fax: (95-1) 391 342 Email: madb@mptmail.net.mn
PHILIPPINES	
Donato C. Endencia Vice-President Land Bank of the Philippines 1598 MH Del Pilar St, Malate, Manila, Philippines	Tel.: (63-2) 405 7516 Fax: E-mail: dendencia@mail.landbank.com donnycen@yahoo.com
Ramon Yedra Deputy Executive Director Agricultural Credit Policy Council 28th Floor One San Miguel Avenue Building One San Miguel Avenue corner Shaw Boulevard, Ortigas Pasig City 1600, Metro Manila, Philippines	Tel.: (63-2) 636 3392 Fax: (63-2) 634 3319 Email: rcyedra@yahoo.com
SRI LANKA	
Asanga Nanayakkara Senior Manager Seylan Bank Limited Level 14, Ceylinco Seylan Towers No 90, Galle Road, Colombo 03, Sri Lanka	Tel.: (94-11) 245 6466 Fax: (94-11) 245 2577 Email: asangan@seylan.lk
THAILAND	
Ms Apiradee Yimlamai Vice President – Management Department Bank for Agriculture and Agriculture Cooperatives 469 Nakhon Sawan Rd, Dusit Bangkok 10300, Thailand	Tel.: (66-81) 926 3617 Fax: (66-2) 629 7244 E-mail: apiradee@baac.or.th
Metha Cheirsilpa Team Leader - Aquaculture Bank for Agriculture and Agriculture Cooperatives 469 Nakhon Sawan Rd, Dusit Bangkok 10300, Thailand	Tel.: (66-2) 280 0180 ext 3219 Fax: (66-2) 281 2372 E-mail:
VIET NAM	
Nguyen Dinh Sang Vice Director of Agribank – TT Hue Province 10 Hoang Hoa Tham Street Hue City, Viet Nam	Tel.: (84-54) 829 578 Fax: (84-54) 822 883 E-mail:

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

Ake Olofsson
Rural Finance Officer – Agricultural Management, Marketing and Rural Finance Service
Rural Infrastructure and Agro-Industries Division
Food and Agriculture Organization of the United Nations
Viale delle Terme di Caracalla
00153 Rome, Italy

Tel.: (39 06) 5705 2268
Fax: (39 06) 5705 6850
E-mail: ake.olofsson@fao.org

Ms Susana V. Siar
Fishery Industry Officer
Fishing Technology Service
Fish Products and Industry Division
Food and Agriculture Organization of the United Nations
Viale delle Terme di Caracalla
00153 Rome, Italy

Tel.: (39-06) 570 56612
Fax: (39-06) 570 55188
E-mail: Susana.Siar@fao.org

INSURANCE SECTOR

AUMS LTD.

Philip Adam Secretan
Managing Director – AUMS Ltd.
Aquaculture Underwriting
Management Services
112 Malling Street, Lewes, East Sussex, BN7 2RJ, UK

Tel.: (44-1) 273 488094
Fax: (44-1) 273 479645
E-mail: secretan@aums.com

CRAWFORD & COMPANY

Mark Vos
Director
Crawford & Company (Nederland) B.V.
PO Box 626, 3000 AP Rotterdam, The Netherlands

Tel.: (31-10) 453 5533
Fax: (31-10) 452 9204
E-mail: markvos@crawco.nl

Ian Mc Donald
Director
Crawford (Hong Kong) Ltd
21 Floor On Hing Building 1 On Hing Terrace
Central Hong Kong

Tel.: (85-2) 2101 0915
Fax: (85-2) 2845 0598
E-mail: ian.mcdonald@crawco.com.hk

HANNOVER RE

Luis Pulido
Underwriter Agricultural Risks – Hannover Re
Karl-Wiechert-Allee 50
30625 Hannover, Germany

Tel.: (49-511) 5604 1667
Fax: (49-511) 5604 3667
E-mail: luis.pulido@hannover-re.com

PT Asuransi Astra Buana

Ms Trinita Situmeang
Manager,
GRHA Asuransi Astra JL TB Simatupang KAV15
Jakarta Cilandak, Barat, Jakarta 12430, Indonesia

Tel.: (62-21) 7590 0600 ext 5500
Fax: (62-21) 766 0005
Email:
trinita@asuransi.astra.co.id

SWISS RE

Ms Harini Kannan
Consultant - Environmental & Commodity Markets
Swiss RE Services India Pvt Ltd.
9th Floor, Essar House, 11 K. Khadye Marg,
Mahalaxmi, Mumbai 400034, India

Tel.: (91-22) 6661 2108
Fax: (91-22) 6661 2122
E-mail: harini_kannan@swissre.com

NETWORK OF AQUACULTURE CENTRES IN ASIA-PACIFIC

Office address
NACA, Suraswadi Bldg, Department of Fisheries
Kasetsart University Campus
Ladyao, Jatujak, Bangkok 10900 Thailand
Tel.: (66-2) 561 1728/9
Fax: (66-2) 561 1727

Mailing address
NACA, PO Box 1040
Kasetsart Post Office
Bangkok 10903, Thailand
E-mail: naca@enaca.org
Web Site: www.enaca.org

Sena De Silva	Director General	sena.desilva@enaca.org
Pedro Bueno	Adviser	pedro.bueno@enaca.org
Michael J. Phillips	Environment Specialist	michael.phillips@enaca.org
Wiratee Udomlarp	Administrative & Finance Officer	wella@enaca.org
Chomkamol Charoenrit	Administrative Staff	koy@enaca.org

Annex 2
Workshop programme

Day 1	**30 April 2007**
08.00	Registration
09.00	**Session I: Opening Ceremony** Chair: Sena de Silva (NACA) Rapporteur: Raymon van Anrooy (FAO)
	Welcome remarks: Director General for Aquaculture, Indonesia FAO Representative in Indonesia APRACA Representative Director General of NACA
	Introduction of participants
10.00	Break and group photograph of workshop participants
10.30	Background and objectives of the Workshop (Raymon van Anrooy, Fishery Officer FAOSEC)
	Session II: Background /Overview presentations Chair: Reza Shah Pahlevi (representing the Director-General, Aquaculture, Indonesia) Rapporteur: Susana Siar (FAO)
11.00	Presentation of the background paper, *Analysis of the aquaculture insurance industry: lessons learned and opportunities for sustainable development*" (P.A.D. Secretan, AUMS Ltd.)
11.30	Summary presentation of the FAO report *Livestock and aquaculture insurance in developing countries: a brief overview* (Ake Olofsson, FAO)
12.00	Lunch
13.30	Discussion and sharing of general experiences
	Session III: Thematic presentations Chair: Maroti Upare (NABARD) Rapporteur: Simon FungeSmith (FAO)
14.15	*Linkages between credit and insurance*, by Ms Susana Siar (FAO)

14.45	*Experiences on Better Management Practices (BMPs) in selected countries in Asia*, by Pedro Bueno (NACA)
15.15	Break
15.30	*Aquatic animal health and insurance*, by Melba Reantaso (FAO)
16.00	*Role of rural and micro finance institutions in developing and promoting aquaculture insurance in Asia*, by Ramon Yedra (Representative of APRACA/ Deputy Executive Director Agricultural Credit Policy Council, Philippines)
16.30	Discussion
17.30	End of Session

Day 2 **1 May 2007**

Session IV: Presentation of Insurance Industry Experiences
Chair: P.A.D. Secretan (AUMS ltd)
Rapporteur: Ake Olofsson (FAO)

09.00	Industry presentations:
	Aquaculture in Asia and loss adjusting principles, by Mark Vos (Country Manager, Netherlands, Global product coordinator aquaculture loss adjusting Crawford & Co.)
09.30	Country experiences and prospects:
	NABARD, India, by Maroti Upare (former Director-General, NABARD)
10.00	Break
10.15	Country experiences and prospects:
	China, by Miao Weimin (Freshwater Fisheries Research Centre)
	Philippines, by Nelson A. Lopez (Bureau of Fisheries and Aquatic Resources)
11.15	Discussions
11.45	Organization of Working Group tasks and reporting mechanism to plenary, by Raymon van Anrooy (FAO)
12.00	Lunch

Session V: Working group session
Chair: Mark Vos (Crawford & Co. Ltd.)
Rapporteur: Melba Reantaso (FAO)

13.30	**Working Group 1**: Discuss **constraints to and opportunities for small-scale aquaculturists** of implementing the *Proposals for meeting insurance and risk management needs in developing aquaculture in Asia*
	Working Group 2: Discuss **possible alternatives** to the proposed hybrid approach as laid out in the *Proposals for meeting insurance and risk management needs in developing aquaculture in Asia*
	Working Group 3: Discuss the possible **implementation strategies and mechanism** required for the *Proposals for meeting insurance and risk management needs in developing aquaculture in Asia*
15.30	Coffee break
16.00	Continuation of Working Group sessions
16.30	Presentation of Session V Working Group reports
17.30	Plenary discussions
18.00	Break
Day 3	**2 May 2007**
06.30–12.30	Field visit (combination of culture and aquaculture/fisheries) organized by host institution
30.30	Lunch
	Session VI: Conclusions and Recommendations Chair: Pedro B. Bueno (NACA) Rapporteur: Michael J. Phillips (NACA)
14.00	Discussion of follow-up activities to increase availability and access to insurance services for small-scale and poor aquaculturists in Asia
15.00	Workshop conclusions and recommendations
16.00	Closing activities

Annex 3
Opening speeches

Host Government
Dr Made Nurdjana
Director General for Aquaculture
Indonesia

It is a great pleasure and honour for me to deliver the Opening Address at this Regional Workshop on the Promotion of Aquaculture Insurance in Asia, jointly organized by the Food and Agriculture Organization of the United Nations (FAO), the Network of Aquaculture Centers in Asia-Pacific (NACA), Asia-Pacific Rural and Agricultural Credit Association (APRACA) and the Directorate General for Aquaculture, Indonesia. I wish to take this opportunity to congratulate FAO, NACA and APRACA for their concern in Indonesian mariculture development, and to welcome you all to Indonesia.

World fish supply still comes mostly from capture fisheries; however, the marine resources in many countries, including in Indonesian territorial waters, are reported to have been overexploited. The Indonesian Commission of Stock Assessment in 2002 reported that the maximum sustainable yield (MSY) of fisheries in Indonesian territorial waters has decreased from 6.18 million tonnes per year to 6.01 million tones per year. This trend threatens the sustainability of fisheries supply. Moreover, in recent years, fishing activities have been intensifying. In line with the increasing demand for animal protein from aquaculture, there are some factors to be improved to ensure its sustainability, social acceptability and human health and safety.

Furthermore, there are many other issues that potentially inhibit the growth of aquaculture. One is that aquaculture is often viewed as a high-risk business. Major risks include loss of or damage to assets such as production assets. Specific risks that affect both capture fisheries and aquaculture are: pollution of water bodies by other industries/sectors (including agriculture), illegal, unregulated and unreported (IUU) fishing practices; fish stocks and biodiversity; genetic pollution; and spread of disease (through escapes of fish from cages or ponds or introduction of a pathogen). Other risks could include conflicts with other resource users. Both modern and traditional aquaculture systems are fraught with these kinds of risks. Various forms of risk management measures include better farm management practices, the introduction of codes of practice, and certification. Risk management approaches related to processing products of the sector include HACCP, ISO, GMP and other certification schemes.

Insurance is one way of mitigating some of the risks involved, although insurance alone is no substitute for good production practices. It has an important role to play, particularly as a mechanism for removing residual risk that cannot be covered by on-farm and other actions. As such, it is widely considered an important tool in risk management; however, many areas are not covered by insurance services. At present, very few aquaculture installations (cages, ponds, raceways, etc.) and stocks are insured. Indeed, in Indonesia, the insurance sector as a whole is underdeveloped, although there has been strong growth in recent years. This picture is not uncommon across our region.

Previous events, such as the Regional Conference on Insurance and Credit for Sustainable Fisheries Development in Asia, organized in Tokyo, Japan in November 1996

and the Regional Workshop on Guidance for Credit and Microfinance Programmers in Support of the Sustainable Use of Inland Fisheries Resources and Poverty Alleviation, held in Beijing, China in February 2006, have clearly demonstrated the need to provide specific insurance products tailored to the aquaculture sector.

One important issue is whether the small-scale aquaculture sector can provide a significant volume of business that is attractive to insurers, a condition being that small aquafarms are worth insuring. This gives rise to the important question of how the status of worthiness might be attained and whether insurance itself might also be a tool to encourage small aquafarmers to take up good aquaculture practices that ensure crop success and profitability. To address the above problems, challenges and issues, strong collaboration among Asia-Pacific countries is required.

This workshop has four main goals: to raise awareness among policymakers of the positive aspects and limitations of insurance as a risk management tool, including safe and remunerative savings and deposits facilities that might be more attractive and suitable alternatives and/or complements for small-scale aquaculturists; to improve awareness regarding the aquaculture sector within the insurance industry and illustrate its potential to become a profitable business segment; to discuss ways and means of supporting aquaculture development through the use of insurance; and to reach a consensus with regard to the draft *Guidelines for insurance in support of aquaculture development in Asia*.

Important points needing further discussion include: constraints to establishing insurance programmers, such as high administration costs for the insurance companies due to small and dispersed farmers, poor infrastructure and limited ability of fish farmers to pay premiums; and ways in which insurance can contribute to improving livelihoods, an important issue in Indonesia where a key goal of the aquaculture programmers is poverty alleviation.

In addition to the *Guidelines* and other findings, and the closer relationships that I am sure will develop during this event, I hope that this workshop will also provide ideas and suggestions for further actions by all parties, at the local, national and regional levels.

I believe that this workshop will contribute towards the development of mariculture that is ecologically and socially sustainable, and will be able to make a major contribution to ensuring food security in Asia and, indeed, across the world. I hope that all participants will have the opportunity to enjoy beautiful Bali, in addition to all your hard and dedicated work during the workshop.

Once again, I would like to extend my sincere gratitude to all participants, FAO officials and NACA staff as well as the staff of the Directorate General of Aquaculture, whose contributions have made this event possible.

I hope that the cooperation, communication and good relationships between all participants, especially with FAO, NACA, and APRACA, will continue and prosper in the future.

Thank you very much for your kind attention.

FAO
Mr Man Ho So
FAO Representative to Indonesia

I am very pleased to welcome you on behalf of the Food and Agriculture Organization of the United Nations (FAO) at this Regional Workshop on the Promotion of Aquaculture Insurance in Asia. We are very grateful to the Directorate-General for Aquaculture of Indonesia and NACA for their excellent work in the preparation of this important event here on the beautiful island of Bali.

In the light of the recent disasters that struck the population of Indonesia and other countries in Asia, such as the Tsunami in December 2004, recent earthquakes and floods, it is of major importance that tools are developed and improved that will reduce risks, enable people to better cope with disasters, and allow them to better manage their risks. Insurance is an important tool in common-day risk management and is used by most of us. Many of us have car insurance, health and life insurance, sometimes property insurance and others. However, insurance is less common in agriculture and fisheries.

This Regional Workshop is aimed to increase awareness on the opportunities that insurance can provide for the sustainable development of the aquaculture sector in the region, and to bring together government officials, the insurance industry and aquaculturists to discuss and develop mechanisms to further improve the provision of insurance services to the sector.

Let me take this opportunity to briefly present to you the activities of FAO. I assume that most of you have heard of us; maybe you have come across some FAO projects in the field or you have visited our website. You might have seen the breath and depth of our FAO documents and online databases; however, FAO is more than that.

FAO is **the** organization of the United Nations with a mandate in rural development and food security. Achieving food security for all is at the heart of FAO's efforts – to make sure people have regular access to enough high-quality food to lead active, healthy lives. FAO aims to raise levels of nutrition, improve agricultural and fisheries productivity, better the lives of rural populations and contribute to the growth of the world economy.

FAO in Indonesia is working closely together with the local population, the Government, NGOs and donors towards the aims that I just mentioned. We have been active in emergency assistance, rehabilitation and development activities following the Tsunami and other disasters that hit the country, and we provide technical assistance in many sectors and subjects. Our activities in the field of Avian Influenza disease surveillance and response need special mention. In fisheries and aquaculture sector-related interventions, we have dozens of staff working in Aceh to help rebuild the livelihoods of poor coastal fishers.

FAO's Fisheries and Aquaculture Department aims to promote long-term sustainable development and utilization of the world's fisheries and aquaculture and to contribute to food security. The Department has three main pillars of work:

First – promoting responsible fisheries sector management at the global, regional and national levels, with priority given to the implementation of FAO's Code of Conduct for Responsible Fisheries, the FAO Compliance Agreement and various International Plans of Action. Particular attention is paid to the problem of excess capacity, combating Illegal, Unreported and Unregulated Fishing and providing advice for the strengthening of regional fisheries bodies.

Second – increasing the Contribution of responsible fisheries and aquaculture to world food supplies and food security.

Third – Global Monitoring and Strategic Analysis of Fisheries. Priority here is given to the gathering of fisheries data, development of databases, analysis of information and dissemination of information. I believe that all of you have found copies of some of our publications in your welcome package.

Having said this, a fair question is why FAO is organizing this Regional Workshop with regional partners. The answer is: we believe in cooperation, networks and partnerships to address together the needs of developing countries and particularly the people in rural areas that depend for their livelihoods on agriculture and fisheries, including aquaculture. This workshop provides FAO with an opportunity to increase awareness among line ministries, the insurance industry and the aquaculture sector in Asia on what the Organization is doing in the field of aquaculture insurance and

risk management, and to promote developments in areas related to supporting the implementation of the FAO Code of Conduct for Responsible Fisheries.

I should like to end this short welcome statement by thanking NACA, and particularly the assistance of Mr Pedro Bueno and Ms Wella Udomlarp, for their efforts in making this Workshop possible. I hope that the workshop will be fruitful and bring interesting new views and ideas to all of us. Enjoy the presentations and working group sessions! Thank you for your attention.

Asia-Pacific Rural and Agricultural Credit Association (APRACA)
Mr Donato Endencia
Vice President, Land Bank of the Philippines

On behalf of the Asia-Pacific Rural and Agricultural Credit Association and the Centre for Training and Research in Agricultural Banking, I am pleased to also welcome you to this Regional Workshop on Promoting Aquaculture Insurance in Asia.

APRACA is delighted and honoured to be a partner of FAO, NACA and the Indonesian Directorate General of Aquaculture of the Ministry of Marine Affairs and Fisheries. There is no doubt that aquaculture insurance is a pressing concern in the region as governments and support institutions try to intensify their collective efforts towards improving the lot of small aquaculture farmers.

Fisheries finance and development is included in APRACA's six-item agenda for the medium term. In many Asian countries, small and poor aquafarmers constitute a sizeable portion of the rural population. Poverty incidence in the sector remains at a significant level. Efforts to reach these small aquafarmers and help them improve their access to financing continue to elude policymakers and practitioners, given the usual risks and the difficult environment associated with fisheries financing. For this reason, APRACA has been actively supporting and documenting best practices and success cases to inform financing strategies for this sector. Insurance as a credit risk management mechanism plays a pivotal role. APRACA constantly encourages its member institutions to actively collaborate with like-minded partners in pilot testing, and replicating and expanding tested schemes that show high levels of efficiency, effectiveness and sustainability.

The prospects of aquaculture insurance seem bright. But much more needs to be done to translate options, concepts and designs into action with a high and positive impact. Concrete action that reflects pro-active response to small farmers' needs must be implemented on the field, closely monitored, supported and then institutionalized. The role of international development organizations such as FAO and NACA is critical in nurturing these initiatives into meaningful and significant performance.

Let us join hands in pursuing this important activity, but without forgetting to enjoy the beauty of these islands as we carry out this serious task. Good morning.

Network of Aquaculture Centres in Asia-Pacific
Prof Sena De Silva
Director General

Let me welcome you to this Regional Workshop on the Promotion of Aquaculture Insurance in Asia. With your permission, in particular for those that are not familiar with NACA, let me briefly inform you about the Network. NACA is an intergovernmental organization of 17 nations in Asia. We work very closely in cooperation with FAO and many other regional and national organizations. Our primary mandate is ensuring

sustainability in aquaculture, and improving and safeguarding the livelihoods of small-scale farmers.

Aquaculture insurance in Asia is not established as much as it should be, particularly in view of the fact that over 80 percent of production comes from the region. This workshop brings together insurers, bankers and other financial institutions face to face with aquaculture developers and planners drawn from the governments of the region. This is the first gathering of this nature in the region. This would give the opportunity for the financers and insurers to understand the problems facing producers and, it is hoped, better understand the modus operandi of the aquaculture sector in Asia, which is different from nations in the developed world. Asian aquaculture, consisting of many small-scale enterprises, I believe, presents a different challenge and set of issues to insurers and bankers. I hope that this forum will provide an opportunity to start the process of introducing aquaculture insurance to small-scale farmers; perhaps not very different to other sectors. I wish the workshop success.

I would like to thank the Indonesian Government, our own staff and FAO for making this event a reality.

Aquaculture insurance

by P.A.D. Secretan

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 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 it 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 to 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 is 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:	AGROSEGURO
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 Yamamoto[6] and Flavio Corsin[7]

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.

[1] NACA Adviser and former Director General.
[2] Environmental Specialist and Manager, Regional Programme in Research and Development Collaboration.
[3] Aquatic Animal Health Specialist and Manager, Regional Programme on Aquatic Animal Health.
[4] Former Team Leader and Supervisor, MPEDA/NACA Shrimp Aquaculture BMP Project, India; current Aquaculture Specialist, International Finance Corp (World Bank Group), Aceh, Indonesia.
[5] Supervisor, MPEDA/NACA Shrimp Aquaculture BMP Project.
[6] Research Associate (Shrimp Aquaculture and the Environment).
[7] Previously health management expert of NACA assigned to the DANIDA-assisted Support to Brackishwater and Marine Aquaculture Project in Viet Nam; currently, a freelance technical adviser on BMPs for shrimp farming with the Government of Viet Nam and together with FAO on epidemiology and control of the H5N1 virus in Viet Nam.

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 point[9] (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.

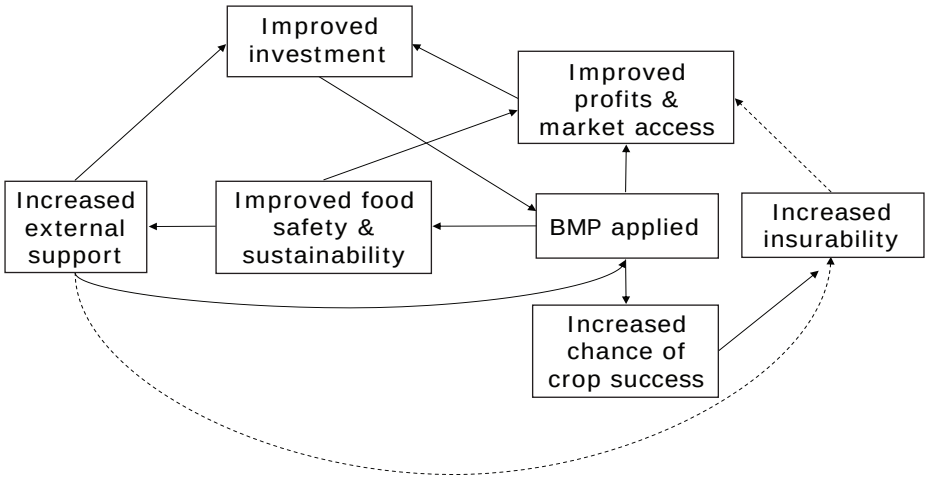
Thailand

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).

FIGURE 1
Role of Better Management Practices in relation to farmers' insurability



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.

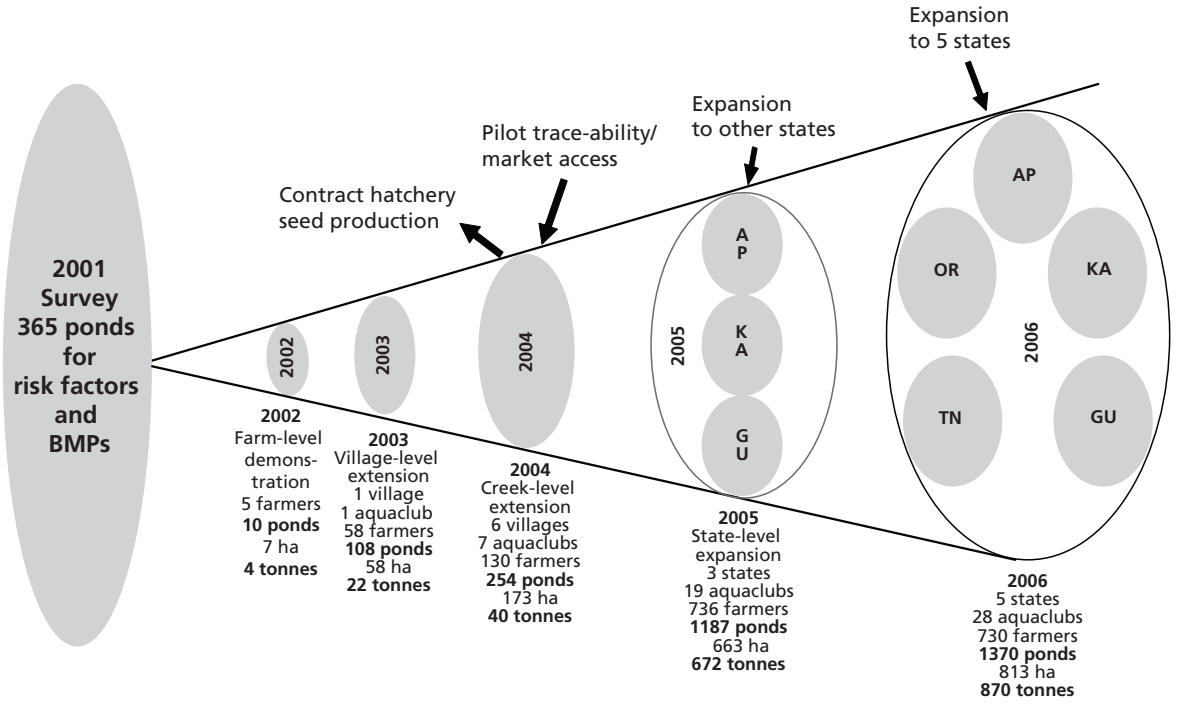
Intensive discipline, supervision and servicing characterize the operations of the Grameen Bank, which are carried out by "bicycle bankers" in branch units with considerable delegated authority. The rigorous selection of borrowers and their projects by these bank workers, the peer pressure exerted on 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%	=	$23 906.25

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
Total	$5 924 000

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

Earned premium = average monthly value x the rate:

= $475 167 x 4.25% = $20 980.08

75% Deposit premium = $23 906.25
Earned premium = $20 980.08

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 I\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 proposal[1] 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. Equipement:

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:

Position: Manager: Ass. Manager:

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

North
WIND (Mph)
FETCH (miles)

Northwest
WIND (Mph)
FETCH (miles

Northeast
WIND (Mph)
FETCH miles

West
WIND (Mph)
FETCH (miles) v

WIND (Mph)
FETCH (miles)

Southwest
WIND (Mph)
FETCH (miles)

Southeast
WIND (Mph)
FETCH (miles

South
WIND (Mph)
FETCH (miles)

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

3.

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

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

EQUIPMENT / BOATS

Date	Cause of loss	Value	Type: cage/boat	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:

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.

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. n 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 will 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 property 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)	

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.

- 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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