

A Regional Approach to Risk Assessment for Aquaculture in the Pacific Islands
Ben Ponia, Aquaculture Adviser
Secretariat of the Pacific Community, New Caledonia

The Pacific Islands

The Pacific Island region covers approximately 30 million square kilometer ocean¹. This coastal region is a hotspot of biological diversity. The Coral Triangle in the north west quadrant is a global centre of marine diversity. Below the equatorial belt the Phoenix Group atolls are considered among the most pristine reef ecosystems in the world.

The region has about 479 inhabitable island biospheres which are effectively mini-continents in respect of bio-security. In the past their remoteness was a first line of defense from invasive species. But this is no longer the case.

One of the most profound changes occurring in the Pacific is the growth in population, expected to increase in by 50 percent across the region by 2030. As populations grow the amount of fish required for food security and demand for alternative livelihoods will increase. By 2030 an additional 300 thousand tonnes per annum of fish will be needed to meet the shortfall in food security alone. Many Pacific Island governments are turning to aquaculture as one of the solutions.

Already aquaculture and/or culture based fisheries has been responsible for more than 70 percent of all aquatic introductions. The rate of trans-shipment of live aquatic organisms has increased over the past few decades due to the intensification of global commerce and international air transportation.

Aquaculture

Aquaculture is really agriculture, except that it involves farming plants or animals in water rather than on land.

With advances in and convergence of sciences such as fisheries ecology, nutrition, genetics, agronomy and agriculture engineering there has been a rapid growth in aquaculture. In the past fifty years production has gone from less than one million tonnes to 60 million tonnes with a value of US\$70 billion dollars (FAO statistics, 2004). The sector now accounts for almost 50 percent of the world's food fish and could be as much as 70 percent by 2020. Asia, especially China, dominate production.

Simply maintaining the current per capita consumption for the projected population growth over the next decade will require an additional 40 million tonnes of aquatic food by 2030. Because the world's major wild fisheries have reached a plateau, aquaculture is

¹ For the purpose of this paper I will use the twenty two Pacific Island member countries of the SPC to define the Pacific region.

viewed as making up the shortfall. Like agriculture and livestock the aquaculture sector will probably be a substantial driver behind global movement of live animal imports.

Introduced species already dominate aquaculture production and often far exceeds production in its native regions. Global production of Nile tilapia *Oreochromis niloticus* by the year 2010 is forecasted to approach 3 million tonnes per annum compared to just 200 thousand tonnes produced within its native range in 2004. The Pacific white shrimp *Litopenaeus vannamei* was introduced from Latin America after devastating losses from white-spot disease affected the Tiger shrimp *Penaeus monodon*. The global uptake was rapid and in the past few years 80 percent of Tiger shrimp production particularly in Asia shifted to white shrimp. The current production is estimated at around 2 million tonnes per annum possibly making this one of the largest and most widespread intentional introductions of aquatic species in recent times.

Production and markets in many countries is dominated by introduced species. In Latin America and the Caribbean more 65 percent of aquaculture is from introduced species. After recent advances in hatchery techniques the lucrative live-reef fish trade of grouper fishes in Hong Kong is now dominated by aquaculture imports. The Pacific is not impervious to this trend – the Government of the Republic of the Marshall Islands in the North Pacific is reviewing a serious proposal for Australian hatchery reared fish fingerlings to be on-grown in Majuro atoll and then shipped live into Asia. The operator plans to sustainably farm up to 50,000 tonnes of fish per annum.

Responsible practices for movements of live animals in the Pacific – Emphasis on invasive species

Concerns about introduced invasive species have been raised since the first SPC Fisheries meetings in the early 1950s. About this time the SPC fisheries program was itself partly responsible for introducing Mozambique tilapia *Oreochromis Mossambicus* from Africa for fish farming. The species is now widespread throughout the entire Pacific. Ironically it never served its original purpose of aquaculture and is considered a pest even in fish ponds (biological or chemical eradication is nearly impossible but genetic controls may be feasible).

One of the dichotomies of aquaculture was soon realized – that the characteristics viewed as “hardy” by aquaculturists may translate into “invasiveness” by ecologists. Thus aquaculture is often treated with suspicion by environmental agencies.

Aquaculture in the Pacific is highly diverse and involves intentional movements of live animals. This used to be under the domain of national research programs but increasingly this is being underpinned by entrepreneurs. The Pacific may become source of live exports due to the paucity of disease free broodstock, the search for new species to domestic and exports from the burgeoning marine ornamental trade. In 2003 the SPC Fisheries Meeting endorsed guiding principles for responsible movements. The SPC also began to investigate a more rigorous process such as import risk assessment (IRA).

Several model IRAs were commissioned by SPC to develop a regional template. The analysis was originally based on the Asian approach (NACA/FAO) but had to be modified towards ecological risks rather than pathogens. This is because unlike landlocked Asia, the Pacific is more concerned with species arriving *at* its border rather than diseases *within* its borders. This is work in progress as the IRA process must strike a balance so that it is not overly prescriptive and expensive for government authorities to commission themselves. A semi-qualitative analysis is the preferred approach.

Within SPC the challenge of dealing with live aquatic introductions is being addressed under the realm of “aquatic bio-security” whereby pre-import, post-import and export controls are bundled together. Doing so requires a multi-sectoral approach with specialist inputs. To get an understanding of the basic principles involved in aquatic bio-security a regional meeting of fisheries (and aquaculture), environment, quarantine and veterinarian services in the Pacific region was hosted by the SPC.

Some of the hazards involved in a risk assessment for aquaculture include ecological invasive, pathogenic, genetic, environmental and social/economic factors. It was recognized at the SPC aquatic bio-security meeting that international database on invasive species should be utilized and updated for the purpose of risk analysis.

This regional consultation identified the need for processes where managers can decide on acceptable levels of risks and manage them accordingly. A zero tolerance approach to risk is not always practical. The World Animal Health Organization (OIE) risk analysis framework is one such process which governments can adopt to fulfill their statutory responsibilities. There is an urgent need to develop the capacity to undertake risk analysis in the Pacific. Nonetheless even basic strategies such forming a national coordinating body to advice on proposed introductions is an important step forward in terms of risk management.

Moreover what is apparent is that broad scale approaches at the international level involving bodies such as the FAO, WTO, OIE, CBD and IUCN will be required if ecological risks of invasive species from aquaculture are to be addressed.