IMPACT OF TSUNAMI ON SOLOMON ISLANDS AQUACULTURE ACTIVITIES

An earthquake-generated tsunami, measuring 8.1 on the Richter scale, devastated the coastal areas of the Solomon Islands' central Western and Choiseul provinces on 2 April 2007 (see map below).

The coastal communities in these provinces depend greatly on marine resources (both farmed and wild caught) for both food and income, and the level of destruction wreaked by the tsunami has serious implications for many people. Aquaculture and related activities in these provinces include seaweed farming, culturing of ornamentals for the aquarium trade (clams, corals and various crustaceans), and small-scale pearl farming. There is also a small aquarium fish industry in the Western Province.

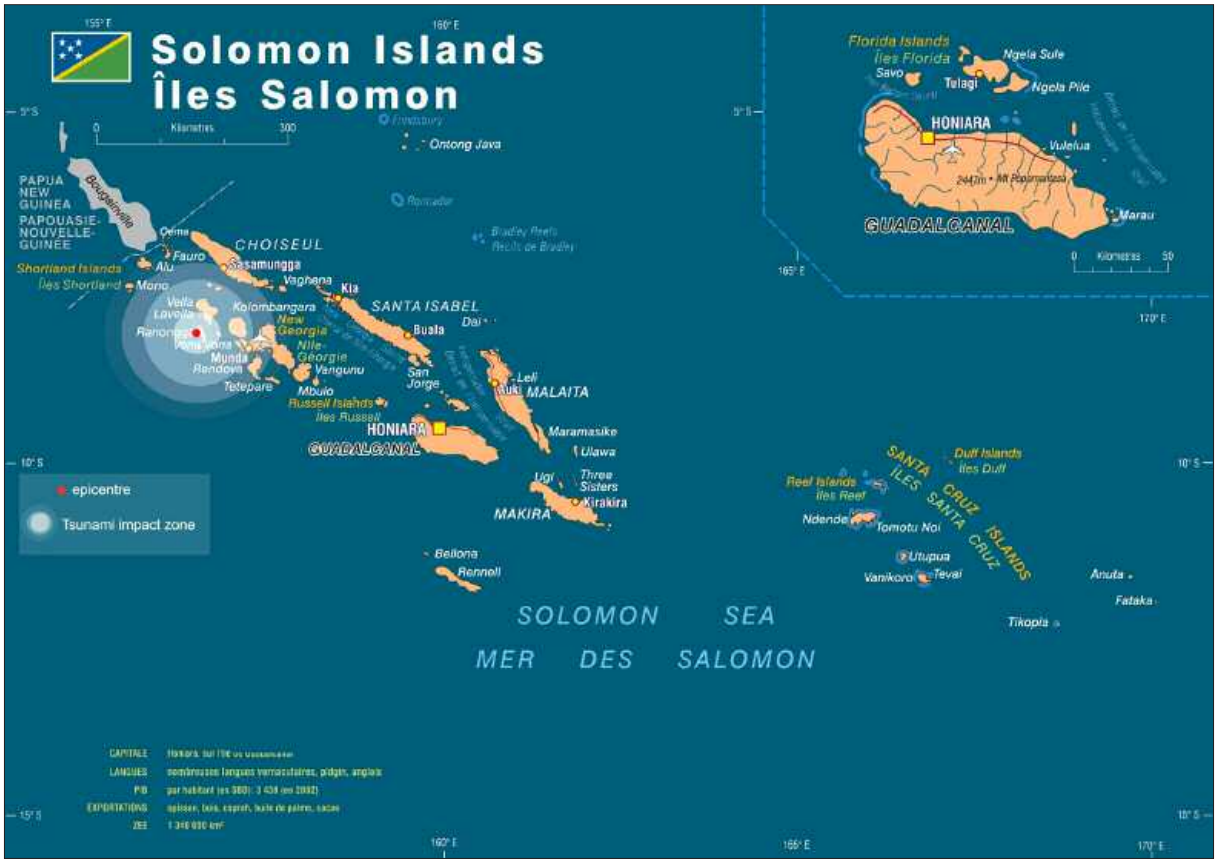
Seaweed farms in the Gizo area (capital of the Western Province) were destroyed, and an inspection of all farms determined a total loss. The only evidence remaining of farming activities are the posts and stakes used to support the seaweed at Olosana Island. There have been enquiries from some farmers in the affected areas regarding recovery programmes. The plan is to bring seeding material from Wagina Island (Western Province) to Gizo in order to re-start a nursery and at the same time supply some seed stock to those farmers wishing to begin immediately. Seed material is available from Wagina, although this island was also impacted by the tsunami.

Titiana village, a Gilbertese community in Gizo, has lost all of its farms (seaweed and coral farms). Titiana was the hardest hit community: the tsunami claimed more than a dozen lives and there are no traces or remains of any farming activities.

Similarly, Rarumana suffered total loss, not only of its seaweed, but also the farming site. It appears that the reef area, which was being farmed, has been raised as a result of the earthquake and the area is now too shallow to farm. In fact, the site dries out at low tide. There are alternative sites nearby and farming might begin as soon as seed material is available.

Other localities within the area, such as Sagheragi, have experienced similar catastrophes. This community there had established clam farms, and harvests of ornamental fish for the aquarium trade were waiting to be shipped to Honiara market when the tsunami hit.

The World Fish Center (Solomon Islands branch) and the Commercialisation of Seaweed Production in the Solomon Islands



(CoSPSI, Gizo sub-office) have had their capacity reduced (i.e. due to damages to facilities and a loss of assets) and it has taken several months for operations to return to normal. WorldFish Center and CoSPSI have been working hard to assist in the recovery of aquaculture-related activities. Other NGOs working closely with the Ministry of Fisheries and Marine Resources (MFMR) to set up marine protected areas at designated sites have also reportedly experienced a set back in their activities.

MFMR is currently working with SPC and other partners on developing an aquaculture strategic plan. The tsunami has undoubtedly modified some of the strategies described in the draft plan, but the document will remain in line with the needs for reconstruction in the Western Province. This will not disrupt strategies for developing aquaculture in other areas of the Solomon Islands. For example, the Ngella Islands of the Central Province experienced-was no effects from the tsunami, and the area was identified as a promising site for aquaculture activities given its proximity to markets in Honiara. Potential aquaculture activities include coral culture, sustainable capture and harvest of ornamental fish for the aquarium trade, clam and pearl farming.

An immediate result of the tsunami is the lifting of a one-year-old moratorium on beche-de-mer harvesting, which has partly helped people earn much needed income. However, the future of wild caught sea cucumbers cannot be anticipated with certainty. This leaves a clear and indicative mission to continue with assessing and developing an aquaculture development plan that is aimed at improving the lives of people from affected communities and the rest of the rural population that makes up 85% of the total population of the Solomon Islands.

Source: Wesley Garofe, MFMR (Ministry of Fisheries and Marine Resources), Aquaculture Officer, and Gideon Tiroba, CoSPSI (Commercialisation of Seaweed Project, Solomon Island) Manager

Gizo (left) was badly hit by the tsunami. Reefs (bottom right and left) were severely damaged

EU CHECKS ON CONTAMINANTS

This article was written by Chris Leftwich, Chief Inspector at London's wholesale Billingsgate Market, and is reprinted with permission from Seafood Processor.

Seafood products exported to the European Union must satisfy strict legislative requirements. Consignments will be checked at the point of entry and tested for a whole range of possible contaminants before being allowed free passage.

Developed societies have an increasing desire for seafood, a product that is wholesome, nutritious and has many health benefits. However, this desire cannot be satisfied by domestic sources alone and requires product to be sourced from far afield. Many developing countries are in a position to satisfy this demand as it brings much needed money into the local economies. However, they need to be careful not to cut corners as far as contaminants are concerned.

Contaminants can be separated into two main groups: chemical and microbiological. The main chemical contaminants can be further sub-divided into heavy metals, antibiotics, fungicides, sulphites, histamines, carbon monoxide, and various fish poisons such as ciguatera and puffer fish.

The two main bacterial contaminants are salmonellas and vibrios. However, it must be understood that these are by no means exclusive.

Heavy metals

The two main heavy metals that are causes for rejection of seafood products are cadmium and mercury. Problems related to cadmium are generally associated with industrial pollution, which can occasionally give rise to problems in shellfish. A particular concern is brown crabmeat as this can concentrate cadmium. In reality, though, problems with cadmium are isolated and do not create too much consternation.

The same cannot be said of mercury, which creates an incredible amount of adverse publicity. But is there a problem with mercury, or is it more of a perceived threat? Various authorities around the world would say there is a problem, whilst others would take the opposite view point.

Under EU law there is, of course, a legal requirement in relation to mercury with certain species of fish required to have no more than 0.5 ppm (parts per million) in the edible parts, and in other species no more than l ppm.

Furthermore, there is a lot of advice given out by various authorities. For example the Food Standards Agency in the UK states on its website that in relation to mercury people should not eat more than 140 g of shark, swordfish or marlin per week, or two portions of tuna of not more than 140 g, or 4 x 140 g of canned tuna.

The advice continues by saying that pregnant women, women intending to become pregnant, or children under the age of 16 should avoid eating shark, swordfish or marlin, but can eat two tuna steaks a week or four medium cans of tuna. Whereas the advice from the American FDA is not to eat shark, swordfish, king mackerel or tilefish. People can eat up to 12 oz (340 g) of fish and shellfish low in mercury per week. But this begs the question is the advice correct or fair.

Probably the two major pieces of evidence on the subject of mercury are studies undertaken in the Seychelles and the Faroe Islands. The Seychelles study was undertaken by a team of scientists during a 15 year period.

The scientists investigated the affects of mercury on a population that is consuming, on average, 12 portions of fish per week. The diet of the average person in the Seychelles would include plenty of fish with high levels of mercury.

The results of the study concluded that there were no adverse reactions on the population due to 'maternal' mercury. In other words, children born to mothers consuming fish contaminated with mercury were in no way affected. There were no visible outward signs of any child deformities and no less efficiency in brain capabilities.

The second study involving the Faroe Islands was on a population where fish makes up 44% of all meals and whale meat 10% of meals. This study was slightly less conclusive in that it was being done without the prior knowledge and consent of the population. Problems arose when people became aware that they were being used as unwitting guinea pigs. Once alerted to the fact they refused to cooperate further.

However, there is no evidence to suggest that the population was, or is, in any way compromised or affected by their diet.

So why are the authorities so concerned? It is probably because they tend to adopt a precautionary approach and build in huge margins for error. As problems occur when levels exceed more than 10 ppm they have built in a ten-fold margin for error.

However, this does tend to ignore the evidence that the main risks are from massive pollution events such as

Minamata and Nagato in Japan where seed was treated with mercury based products to prevent fungal damage.

It also ignores the effects of selenium. Most fish have a much higher concentration of selenium than mercury, and selenium has the ability to combine with mercury to prevent it from causing problems.

So this still leaves the question of mercury very much in the air with the authorities being extremely cautious and most of the evidence suggesting the problem is nowhere near as serious as the authorities would have us believe.

Antibiotics

There has, during the past 20 years or so, been a massive increase in intensive aquaculture around the globe. This has led, in turn, to an increase in the use of various chemicals such as antibiotics to control potential disease, and insecticides to control insects and parasites. There are permitted antibiotics that are quite legitimately used, but there are others that are banned such as nitrofurans and chloramphenicol.

The EU passed a ruling that there would be a zero tolerance policy on the use of these two substances. However, at the time of the ruling the detection capability was around 1 ppm. Technology moved on quite quickly and detection became possible at much lower levels down to parts of 1 ppb (parts per billion), which raises the question as to what is zero!

The answer being that zero becomes smaller each time technology improves. Unfortunately for developing countries their technology was not as sophisticated as in the EU, which meant they could not detect contaminants down to this level. This meant a lot of product was being rejected, which in turn meant whole consignments being destroyed. The difficulties faced by producers were that some of these substances are permitted for use in products being produced for domestic consumption.

Furthermore, it has been shown that these antibiotics have electrostatic properties, which means that minute traces would remain in the feed production mills for several batches even though none had been used. Thus a legitimate company could unwittingly introduce them into its production without realising that it had a problem.

The EU did relax its policy slightly a couple of years ago and is now enforcing at 1 ppb as opposed to zero, which as mentioned earlier gets smaller all the time.

The problem with this standard is that the legislation does not specify what constitutes a sample, how big it should be and where it should be taken from. It is well known that in a large directorate is conducting an ongoing survey on non permitted contaminants and is still finding the odd consignment coming through. When this happens the Food Standards Agency is alerted and it, in turn, contacts the EU authorities in Brussels who put out a food alert.

What this means is that the next ten consignments from a particular source are targeted. If problems persist it could result in the EU sending out inspectors to the country in question and this could result in a ban on that country.

Conversely, if no problems are found then normal sampling is resumed.

Histamines

Of all the problems that can be experienced with regards to fish, it is possibly histamines that cause the most headaches. Although, when considering the amount of tuna now being consumed in the EU, the reality is that incidences are quite rare.

Problems occur because certain species of fish naturally contain a chemical, histidine, and if subjected to temperature abuse, bacteria can convert this into histamine. Any person who inadvertently eats the product then gets an adverse reaction commonly known as scombroid fish poisoning

This usually comes on within a few minutes to an hour of eating the fish. It has no lasting affect and will usually pass off within a few hours to about 24 hours, but is very unpleasant for the sufferer in the intervening period.

Histamine production can occur at temperatures as low as 6°C and under certain circumstances even down to 2°C, but this is extremely rare and is usually associated with high temperature abuse.

Most problems in the UK probably occur in the kitchen where the chef or housewife leaves the fish out of refrigeration for a few hours prior to cooking without realising the potential risk they are creating. The advice is to keep the product below 4° C at all times prior to cooking and the problems do not occur.

The fish that are implicated in scombroid fish poisoning are the scombroids (mackerel, tuna, kingfish, etc.), the engraulidae (anchovies), clupeidae (herring family) and the coryphaenidae (mahi mahi). However, in the UK problems are almost exclusively related to tuna.

Legislation requires nine samples to be taken from a batch and that no sample must contain more than 100 ppm of histamine. It does allow for two failures of between 100 ppm and 200 ppm, but any sample above 200 ppm will necessitate the batch being destroyed.

The problem with this standard is that the legislation does not specify what constitutes a sample, how big it should be and where it should be taken from. It is well known that in large fish such as a tuna, different levels of histamine are present in different parts of the fish, particularly if a fish has not been properly iced.

Rapid, cost effective test kits do exist, but an accurate reading of the histamine content could be expensive if it has to be obtained from a public laboratory. But it is important that anyone in the trade handling any of the fish mentioned above only purchases them from bona fide sources that can provide full traceability and temperature records.

Fungicides

Fungicides are used extensively in aquaculture to control fungal growths and parasitic infections in fish and shellfish. The two most commonly used are malachite green and its metabolite, leucomalachite green.

Both of these substances are banned for use by the American FDA, in Europe and in many other countries around the world.

However, because of the unavailability of alternatives there is still misuse of these chemicals and occasionally they can still he detected on testing of aquaculture products coming into the EU. If found the products are subject to destruction.

Sulphites

Sulphites are often used in the shellfish industry to control melanosis (black spot) in prawns and other crustaceans. This is where the shell start to blacken either because of ageing or temperature abuse.

Once melanosis starts it will spread and eventually the black penetrates into the flesh rendering it unsaleable. In order to retard this process producers often dip prawns in a solution of sodium metabisulphite. Some producers lend to use it indiscriminately and exceed the legal dose levels of 150 ppm.

Under recent EU law, which was introduced in 2005, there is now allergen legislation that makes it a requirement to label any product treated with sulphites. This is because it has been known to trigger asthmatic attacks in people.

However, I personally do not see much evidence of products being correctly labelled at the moment.

There are now other chemicals available to control melanosis, which do not require to be labelled as allergens as they are made from natural products. The drawback is that the industry still tends to go for the cheapest option and these other products are slightly more expensive.

Source: *Seafood Processor*, April 2007, pp 22–23 (http://www.seafoodprocessor.com/heighway/home.htm?site=sfp)

(Note from Ed: This article will be continued in the next issue of the SPC Fisheries Newsletter)