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Fish for Thought – Fisheries in the Food Chain

By Sara Randall and Natasha Benjamin

With all the news lately on food safety, food labeling, organic versus genetically engineered foods, "Slow Food" versus fast food, and artisanal versus industrial production, meeting the demand for seafood while addressing the nation's "seafood trade deficit," has not been easy. With concern for overfishing while at the same time meeting the demands of the world's ever growing population, it may be time to think about what course fishermen should be plotting.

What is the future of fish as a food source with all these changes, new management techniques and an increase in aquaculture coupled with global climate change and ever growing human population? How do fish and fishermen fit into the global food movement? How do we promote environmentally sustainable seafood when consumers are left confused and often not knowing how their fish were caught or produced or where they are from?

The Context

The United Nations' Food & Agriculture Organization (FAO) estimates capture fisheries and aquaculture supplied the world with about 110 million tons of food fish in 2006. Overall, fish provided more than 2.9 billion people with at least 15 percent of their average per capita animal protein intake. Hundreds of millions of people rely on seafood for an essential source of nutrition, especially in coastal nations.

Moreover, fisheries and aquaculture play an essential role in the livelihoods of millions of people around the world. In 2006, an estimated 43.5 million people were directly engaged, part time or full time, in primary production of fish either in capture from the wild or in aquaculture, and a further 4 million people were engaged on an occasional basis.

The World Bank estimates the livelihoods of about 200 million people depend on fishing and associated activities. In the last three decades, employment in the primary fisheries and aquaculture sector has grown faster than the world's population and employment in traditional agriculture. That figure does not apply to the US fishing fleet, obviously.

Seafood is one of the most traded primary commodities in world. Despite the increasingly industrial models of food production and the lack of recognition for farmers and fishermen in US society, the key to our food security and food sovereignty is tied to the US' ability to produce food within it's borders and not depend on other counties for this necessary human requirement. Maintaining food production, therefore, in this country is probably even more important than maintaining "energy independence."

Food sovereignty was defined by the Declaration of Nyeleni as the the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems. It puts those who produce, distribute and consume food at the heart of food systems and policies rather than the demands of markets and corporations.

Food sovereignty promotes transparent trade that guarantees just income to all peoples and the rights of consumers to control their food and nutrition. It ensures that the rights to use and manage our lands, territories, waters, seeds, livestock and biodiversity are in the hands of those of us who produce food. Food sovereignty implies new social relations free of oppression and inequality between men and women, peoples, racial groups, social classes and generations.

The food sovereignty movement has come to be in a reaction against current industrial methods of food production.

These industrial food models have been put in place as "the most efficient" way to feed our ever growing human population. The ever growing human population - now approaching 7 billion - and the resources required to sustain it have to be addressed in any talk of our food system.

For fishing this means that overfishing is tied to consumer demand, i.e. the demand of the incessantly growing world's population to be fed and the increasingly consumptive lifestyles of developed countries. Strict management regimes, with well-enforced regulations - where they exist (most of the US) – are what stands in the way of demand creating overfishing.

Despite agricultural and food production advances by Americans and people in other developed countries, we have failed to make Americans healthier. In fact, many Americans meet the criteria to be considered malnourished. Micheal Pollan, the bestselling author food expert, has found in the developed world that a portion of the population (more than just the "foodies") have begun changing the way they eat, and more experts are recommending real, well-grown, unprocessed food and pointing out that health is directly related to what we eat.

There is a global food movement toward more sustainable food, sourced closer to the consumer, such as farmers markets, and knowing where your food comes from through labeling and direct marketing. This movement hasn't traditionally included seafood, but that is changing. Most of the recommendations on how to eat healthy include seafood. Efforts to clear up consumer confusion about what is safe and good to eat with all food, especially including seafood, are paramount.

The Threats

Overpopulation of humans is the overarching threat to all sustainability on earth, with overpopulation in mind, consider the following threats.

Structure of the Fisheries

The first question that comes to mind in talking about what kind of fisheries we envision for the future is how will they be structured? There has been a push to privatize fisheries under individual fishing quota systems (IFQs) – the notion behind the push being that all other forms of fishery management have failed and only privatization of the public resources will create the stewardship to prevent overfishing. This simply is not true.

Fisheries have long been managed successfully without dividing them up into individual transferable quotas and accepting the resultant consolidation. Moreover, some IFQ fisheries such as the New Zealand Hoki can still suffer from overfishing, because dividing up the fish into individual quotas will do nothing for conservation if the total allowable catch (TAC) is not based on accurate data or not adhered to.

One of the problems with IFQ systems is that unless they are very carefully crafted (e.g., the North Pacific halibut and sablefish IQ systems) they can lead to massive consolidation of the fleet and put the ownership of the fisheries in very few hands, be it an absentee armchair quota owner or a multinational corporation. Consolidation means fewer jobs in fishing, fewer boats, the loss of fishing infrastructure, and the loss of access to the fish by some fishing communities.

Unless ownership of quotas is restricted to those actually engaged in fishing aboard a vessel, the fishermen end up having to lease the quota or work under a fish processors' or some absentee quota owner's shares. (For more on this see the previous FN article, *March On*, August 2009). IFQs do not necessarily increase stewardship. As individuals' quotas are bought up by banks or multinational corporations that do not have a stake in local sustainability, the less stewardship incentive there is and the more safety of the fishermen is likely to be compromised.

A second form of catch shares has arisen, coming from largely overlooked language in the Limited Access Privilege Programs (LAPPs) provisions incorporated into of the Magnuson-Stevens Fishery Conservation & Management Act during the last reauthorization. That language provides for regional fishing associations as well as community fishing associations (CFAs). CFAs hold out the promise for maintaining the infrastructure of fishing ports and access to fisheries by allowing it to be structured in a way to fit local circumstances.

A community association in some fishing communities could be used primarily to market fish, while in another it could be used to acquire fishing quota in order to maintain a small scale port-based fleet and local fishery. See PCFFA's March 2009 FN article for more information on the potentials of CFAs (www.pcffa.org/fn-mar09.htm).

Bio-Engineering of Food

The release of genetically engineered fish through ocean aquaculture operations is a very real threat that has the potential to create devastating impacts to the environment and human health. There has not been a chance for long term safety testing of these genetically engineered products.

Human health implications potentially include: toxins created by unexpected mutations in an organism, allergic reactions and other side effects, and potential decreased nutritional value. Furthermore, any problems emerging from genetically engineered foods will not be able to be traced due to lack of labels and unclear chains of custody.

Potential enivironmental hazards include gene pollution. Once genetically engineered organisms, bacteria and viruses are released into the environment it is impossible to contain them, and they may do damage to natural ecology systems. A 2001 National Academy of Sciences report states that the release of genetically engineered fish into the environment may threaten the survival of wild species.

Furthermore, a 2004 Purdue University research study contains experimental data that strengthens the

plausibility of the "Trojan gene" effect. Researchers named this effect the Trojan gene because it at first deceptively appears like a good thing. In this study the «good thing» were fish altered with human growth hormone. Modified indivisuals sexually mature and grow faster than their natural counterparts and attract more mates, but the study found that only two-thirds of the offspring of the fish survived. Thus, the spread of fish modified with the human growth hormone could actually cause the wild fish to go extinct.

Researchers are currently in the process of developing more than 35 species of genetically engineered fish. At least one company, AquaBounty, has requested approval from the FDA to market an engineered salmon that grows twice as fast as normal salmon. In 2009, 12 years after they started developing genetically engineered salmon, they completed their submission of all studies for the FDA application for AquAdvantage® Salmon. According to the AquaBounty website, the FDA is expected to complete its internal review before the end of the year, and they expect to receive approval to commence sales of genetically engineered salmon eggs.

Along with the commercial advantage of faster growing fish, AquaBounty claims its altered fish may also provide some environmental benefits over conventional fish, by consuming less feed and contributing less waste from farming pens. Additionally, according to its website, the company will market only sterile, all-female hybrid salmon that cannot reproduce with native salmon populations; breeding with wild fish is a major concern when farmed fish escape their pens, and further studies are needed to predict the unknown consequences of GE fish on wild populations. But contrary to industry claims, sterilization of GE fish will not be 100 percent effective in a commercial situation, and will not prevent all crossbreeding between GE fish and wild fish.

During the last days of the Bush Administration, on January 15, 2009, the Food & Drug Administration (FDA) released its Final Guidelines on Regulation of Genetically Engineered Animals. The guidance explains the process by which FDA is regulating GE animals and provides a set of recommendations to producers of GE animals to help them meet their obligations and responsibilities under the law. While the guidance is intended for industry, FDA believes it may also help the public gain a better understanding of this «important and developing area.»

However, the FDA's new guidance wouldn't require GE food to be labeled, unless it has, for example, a different nutritional profile from conventional food. That's because the guidance would enable engineered-food to be sold according to the same type of requirements that apply to conventionally bred animals treated with drugs, which don't require labeling. The end result: consumers would have no way of knowing if they are buying GE food. This policy is in contrast to the European Union, as public concern there led to limits on the marketing of GE food, and any such product that does get approved for sale must be labeled.

Climate Change

Ocean acidication occurs when CO2 dissolves in seawater and carbonic acid is formed. Scientists are predicting that the current rate of change in acidity and the predicted acidity for 2100 are outside the range experienced by the oceans for at least half a million years. This rapid change is expected to affect the growth of plankton, which will have serious consequences for the productivity and functioning of marine ecosystems. Plankton play key roles in marine food chains, ocean processes, and climate.

Phytoplankton perform two-thirds of all the Earth's photosynthesis, which is the process by which plants turn light, nutrients and carbon dioxide into food. The amount of CO2 processed by phytoplankton during photosynthesis affects concentrations of CO2 in the water, which determines how much of the greenhouse gas the oceans can absorb. Currently, each year the ocean absorbs approximately one-fourth of the CO2 emitted from human activities.

Climate change will affect land use patterns, as areas that have been arable are likely to shift and some arable lands may not be able to support food production anymore. Likewise, wild lands that we have set aside to protect some level of biodiversity will be affected and may end up being unable to support the ecosystems we initially set aside to protect.

This means a couple of things for food production on land. The Intergovernmental Panel on Climate Change has projected that increased frequency of heat stress, droughts and floods will negatively affect land food production, and that climate variability will also modify the risks of fires, pest and pathogen outbreak, negatively affecting food, fiber and forestry.

In the ocean, the full impact of ocean acidification and how it will affect marine ecosystems and fisheries remains largely unknown. Changing ocean temperatures will affect the numbers and locations of different species of fish. Scientists are currently predicting a large scale redistribution of fish species.

A current study by the Sea Around Us Project at the University of British Columbia suggests that certain regions like Norway, Greenland, Alaska and the east coast of Russia will benefit from climate change in terms of fisheries redistribution, while Indonesia, the United States (excluding Alaska and Hawaii), Chile and China can expect decreases. Current conservation and fisheries management measures do not account for climate-driven species distribution shifts.

Ocean acidification is also decreasing the ability of marine organisms such as snails to build their shells and skeletal structures. Additionally the shifting of ocean currents is expected, along with an increase in ocean dead zones.

Maintaining a domestic fishing fleet is key to main-

taining the Unites States food sovereignty in a time of changing and unpredictable climate change. Making sure that the United States maintains a small boat fleet as described in the «Artisanal vs. Industrial» section may be a key factor in ensuring the United States' adaptability to climate change as erratic weather and hostile ocean conditions could increasingly be in the forecast.

Additionally, climate change and its root cause may alter how the seafood sector does business. For example, sending our fish cross continents to China or some other country for processing may soon cease as the carbon emitted during transportation will render the practice unfeasible either due to environmental restrictions or economic impediments as the true costs of such a practice will be factored in.

Next month we'll continue our look at fisheries in the food chain, and offer some solutions.

About the Authors

Sara Randall - Born and raised in a small village on the coast of Maine, Sara has been working to promote and protect sustainable fisheries and traditional coastal communities for the past seven years. She is the Program Director for the Institute for Fisheries Resources, where she oversees the Institute's programs that establish alliances among fishing men and women, government agencies, and concerned citizens to protect fish populations and restore aquatic habitats.In 2004, after seeing fishing men and women frustrated by their lack of a national voice, Sara was inspired to help create a national coalition of fishermen, the Commercial Fishermen of America (CFA). As a national organizer for CFA, Sara works to bring fishermen together to address problems facing the fishing community. Sara was appointed to the San Francisco Food Policy Committee in 2009 and attended the Nyeleni World Forum on Food Sovereignty in 2007. Sara also serves on the Board of Directors for the SalmonAid Foundation and the Somalia Maritime Assistance Foundation.

Natasha Benjamin - Natasha has spent most of her career working on marine conservation issues including fisheries, aquaculture, sustainable seafood. She has a background in science with a degree in Marine Biology from Boston University. Then continued to get her Masters in Marine Policy form University of Miami's Rosentiel School of Marine and Atmospheric Science. Natasha then moved to California to work with the Institute for Fisheries Resources, where she was the Program Manager and Southwest Regional Director. She currently is an independent consultant and has worked for numerous marine conservation groups on fisheries issues. Natasha is also a member of the City of El Cerrito's Environmental Quality Committee. With collaboration on the aquaculture section by Cameron Jaggard, AmeriCorps Watershed Steward.