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EXPANSION OF SEAWEED AQUACULTURE IS NOT A PANACEA: IT NEEDS ECOLOGICAL APPROACHES TO DEVELOPMENT AND AN ENLIGHTENED GOVERNANCE SYSTEM TO BE AN IMPORTANT SOLUTION TO GLOBAL FOOD SECURITY

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by Barry A. Costa-Pierce ecologicalaquaculture.org

Brendan Smith recently wrote a piece in *The Atlantic* called [The Coming Green Wave: Ocean Farming to Fight Climate Change](#) which recognized what aquaculture scientists have been saying for more than 30 years: stop spending so much money misinforming and destroying public and agency perceptions about aquaculture; join with us in our global, science-based efforts to make aquaculture the world's most sustainable form of food production; and let's work together to properly fund innovative, ecosystem approaches to aquaculture that can make expanded aquaculture fit into the fabric of revitalized working waterfronts throughout the world.

Millions of dollars have been wasted developing hundreds of seafood watch cards (approximately 200 are out there, [Roheim, 2009](#)) the majority of which preach to seafood buyers and consumers, for example, that all shrimp and salmon produced on farms should not be consumed (these are "red listed" species), but as an alternative, "wild" shrimp and salmon fisheries should be supported even while the science says, for example, that Alaska salmon fisheries are sustained each year by over a billion aquaculture-produced fish from salmon hatcheries (Knapp et al., 2007), and that shrimp trawling produces levels of bycatch that have been shown to change the very fabric of numerous nearshore marine fisheries ecosystems (Dayton et al., 2002).

It is time to understand aquaculture as nothing new, that what we are discussing is not some sort of new, "blue revolution", rather that aquaculture has evolved as a natural part of human history as the social-technological evolution from aquatic fishing to farming. Whenever the demands of seafood-eating peoples exceeded the ability of the wild fisheries ecosystems to provide for them, they developed aquaculture throughout human history (and her-story, too, as women have been an essential part of the "evolution of the blue revolution"). What IS new is that large, industrial scale aquaculture operations came into being and needed to become more sustainable, and that evolution has been happening for more than 40 years with comparatively little funding or recognition.

Seaweed aquaculture is now being seen in a new light for good reasons, but again is being viewed as yet another "new" panacea. It is neither new, nor is a panacea. Scientists have well recognized all of its advantages versus land-based farming. The development of alternative, socio-ecological approaches to

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the science and management of aquaculture has been formalized (see the [Ecosystem Approach to Aquaculture](#) by the Food and Agriculture Organization (FAO) of the United Nations). However, large scale global projections of seaweed farms of 180,000 square kilometers, the size of Washington state, and seaweeds providing enough protein for the entire world population, or setting aside 3% of the world's oceans for seaweed farming to meet world energy needs are fanciful, and get us nowhere.

The governance systems of coastal states, and of the ocean commons, are completely inadequate to handle these types of large scale seaweed aquaculture developments. China is the world's largest producer of farmed seaweed (63% of global production), but just one massive seaweed farm (located in Jiazhou Bay in Qingdao) accounts for almost half of global production (and is visible from space!). Needless to say, China has a very unique governance system that is incompatible with that of most coastal nations. Overall, the governance systems to manage the ocean commons for large scale seaweed developments do not exist (see Walljasper, 2010).

Expansion of seaweed aquaculture will be viewed by many ocean agencies and decision-makers as yet another "new" use of already crowded ocean space, and will compete for that space with increased maritime traffic, energy and mining developments, just to name a few, so rigorous spatial planning within a participatory governance system with plans for adaptive management will be needed (see examples: the [R.I. Ocean Special Area Management Plan](#) and the [Massachusetts Ocean Management Plan](#)). In many parts of the world, such participatory ocean planning and adaptive management processes do not exist, or are in their infancy.

Marine aquaculture can flourish on a crowded ocean planet only if such processes exist. If they do our greatest opportunity may be within the jurisdiction of small island states with their vast coastlines and huge exclusive economic zones (EEZs). As H.E. Mr. Peter Thomson, Permanent Representative of Fiji to the United Nations stated recently on behalf of the Alliance of Small Island States at the Rio+20 Second Preparatory Committee Meeting in New York, "We are not 'small island' nations, but 'large ocean' nations."

In order for the expansion of seaweed aquaculture to occur it will need to follow and communicate how it is advancing the guidelines of the FAO's ecosystems approach to aquaculture, plus be part of comprehensive, well planned and defined governance systems incorporating adaptive management. Incorporating marine aquaculture developments into such enlightened processes will allow the expansion of seaweed aquaculture in crowded ocean spaces plus secure [new social contracts for aquaculture](#) determined through transparent, participatory governance processes.

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