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Mariculture for Tomorrow's Food Security

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Editorial

Population explosion is about to knockout 9 billion by 21st century, which will entail a huge ultimatum for food security. This hike in population could be one of the limiting factors for agriculture in land, where the demand for space and clean water will be on mammoth mandate. Being 3/4th of the earth is water, which paves way to aquaculture- the future for food security. The UN 2030 agenda for sustainable development and its 17 sustainable development goals (SDG's) aim to shift the world to a path where no one is left behind. According to FAO [1] total fish production in 2016 was 171 million tons, where 88% was meant for direct human consumption. The aquaculture contribution was 47% while it reached 53% including non-food sources. Looking at few decades from 1961 to 2016, annual growth in global fish consumption was 3.2% outpaced population growth of 1.6%.

In a few decades time, the production from freshwater sources will attain its peak and further growth will be slowed down. At the same time, the vast marine waters will be underutilized, giving way to many research opportunities. Some of them include diversification of species (finfishes and shellfishes), sustainable intensive farming, etc. At present, there are 598 species items recorded for aquaculture comprising 369 finfishes, 109 molluscs, 64 crustaceans, 7 amphibians and reptiles, 9 aquatic invertebrates and 40 algae. So further research must focus on the increased production from these species or new species (upon demand), with least expenditure per unit effort. Sustainable intensive production can be defined specifically with maximized production with least environmental contamination. Monitoring of farming systems is to be made compulsory to avoid the farming errors such as over feeding, over exploitation of the stock, etc.

Marine aquaculture or mariculture is the culturing of aquatic organisms in the marine environment. It ranges from the open ocean cages to coastal waters. The coastal aquaculture can be defined more towards the practices completely or partially in human made structures in areas adjacent to sea. The water quality parameters show various patterns based on rainfall, run off and location. To be precise, FAO recorded 28.7 million tons production combining both mariculture and coastal aquaculture in 2016. Interestingly, the marine aquaculture or mariculture with foodfish production in 2011 was 23.2 million tons, increased to 28.7 million tons in 2016 which was about 19.16% growth in 5 years. This shows the steady growth of aquaculture sector and their future potential to support the huge demand. The increasing population and demand for the quality protein source can be met by the sole sustainable source is aquaculture, specifically mariculture.

One of the thrust areas of sustainable aquaculture is to be responsible for reducing the ecological impact. Culture of extractive species such as bivalves (preparing the organic matter for growth) and seaweeds (photosynthesis by absorbing dissolved nutrients) is one area which accounted total production of 49.5% of the total world aquaculture production in 2016. Thus the dissolved and solid wastes coming out of aquaculture (nutrients) can be utilized effectively by co-culturing with fed species- waste utilization.

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Total world coastline is around 350,000 km giving enormous chance for coastal aquaculture. The land area on planet earth accounts to 29.1% only, while the total area covering all five oceans account to 335.3 million square kilometer. Moreover, 97% of the water is marine, thus again giving the prospects for mariculture. The roughness of the marine waters is one major reason restricting the development in the field. As high as 10-20 m waves are seriously devastating to the efficient utilization, paving way to research at theoretical modeling as well as field trials. Yet practical solutions are to be developed.

At present the research to expand the mariculture through blue revolution is obligatory. The limiting factors include the safety of the stock due to environmental issues as well as human intervention. The environmental issues thus need to be addressed in detail, and several research focuses are to be on protection devices, chiefly on wave breakers. Wave breakers must be multi-dimensional, wide (to withstand movement) and depth (absorb the pressure) can be built with several floating structures with enough strength to withstand the strong waves, wind, etc. [2]. Thus the fish stock and structures can be perpetually saved from the environmental issues.

Policy making is another area which needs to be highlighted in near future. It must be made compulsory that sustainability is assured in all systems, including the management practices, co-culturing of the extractive species (ratio to self-clean the system), and etc. implementation agency. Blue revolution with sustainable applications is the goal for the increased production to support the human demand for cheap as well as quality protein.

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