MARICULTURE AS SOLUTION TO THE PROBLEM OF OVERFISHING?

The Development of Mariculture and its Contribution to World Nutrition

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The presentation briefly covers the present and future global demand for fish in view of the current fish supply from both marine capture fisheries and aquaculture. It then focuses on the main technological, environmental, spatial and governance challenges faced by the mariculture sector. Good governance, strong political will and strengthened public-private partnership are identified as key issues in supporting sustainable development of marine aquaculture. The importance of the Asia region as a leader in this food production industry is highlighted along with a series of actions required to further support growth of the sector, while ensuring a sustainable exploitation of the world's natural resources.

The presentation demonstrates that the marine ecosystems, and the resources they provide, are increasingly threatened by land-use changes, overfishing, climate change, invasive species and other impacts of a rapidly growing human population. The twenty-first century challenge faced by the world is to feed this population which is projected to reach nine billion by 2050. With the world oceans covering approximately 72 percent of the Earth's surface and with the increasing competition for many natural resources, particularly land and freshwater, the role of oceans in supplying future nutritional needs and business opportunities to humankind is being discussed at all relevant international fora.

When it comes to food fish supplies, at present, it is generally agreed that the overall maximum sustainable potential from wild capture fisheries across all oceans has been reached. Further benefits and the sustainability of fisheries can only be achieved through more effective fisheries management, aimed at maintaining fully exploited fishery resources and recovering those that are overexploited or depleted. In 2011, the latest year available for total capture and aquaculture fisheries statistics by countries, world fishery production reached more than 156 million tonnes of which 93.5 million tonnes from capture fisheries and 63 million tonnes from aquaculture. Although the supply from some wild stocks is recovering, as a result of effective fisheries management and enforcement, the situation for these stocks remains critical. The most recent FAO analysis indicates that 30 percent of the fish stocks are overfished, depleted or recovering from depletion, 57 percent are fully exploited, at their level of maximum productivity and in compliance with the 1982 Law of the Sea, while only 13 percent of the stocks could produce more.

The aquaculture sector has been growing at annual rates between 6–7 percent, while capture fishery production from the sea has been stagnated around 90 million tonnes a year. According to recent FAO estimates, to feed the growing and wealthier global population, about 211 million tonnes of fish will be required by the year 2030. Considering the stagnant nature of marine capture fishery production and the gradually reducing rate of growth of global aquaculture, the question remains whether the aquaculture sector would be able to bridge the future supply and demand gap for aquatic food worldwide. Will the current trends in fishmeal and fish oil supplies suffice to meet the animal protein demand of the aquafeeds sector? Will production of non-fed species be a more rational option for increasing global aquatic production? These questions need careful analysis, extended debate and clear solutions.

Can farming the oceans reduce the global fish supply-demand gap? The growth of the marine aquaculture industry over the last decade has clearly demonstrated that there is a potential, however, dealing with a number of major technological, environmental, spatial and governance issues and challenges will be paramount for a sustainable expansion of mariculture. The general consensus is that a strong political will and significant investment are a must for the industry to overcome such obstacles. Concerted efforts by all stakeholders and a stronger public-private partnership will be needed at the regional and global levels for the creation of such a conducive investment environment.

From a technological point of view, the industry has developed, tested and commercialized an increasing variety of farming solutions, employing fish containment structures and, automated feeding and remote sensing solutions, which are allowing commercial operators to move further offshore, in an environment generally more dynamic, as well as, physically and economically challenging. One significant challenge in expanding food production from the oceans remains the choice of the farmed species. This choice is generally based on a series of both biological and socio-economic factors. For the former, the ability to reproduce and culture the species in captivity are two important factors, while a strong market demand for the farmed species and its market price are key economic factors that will decide the choice of the farmed candidate whether it is for food or other uses.

At present, the vast majority of the farmed marine fish (90 percent) are fed species that require compound aquafeed or fed with low-value captured fish for the farmed organism to thrive and grow. An essential and important component of these aquafeeds is fishmeal. In this regards, an important challenge is to formulate efficient feeds containing reduced levels of fishmeal and fish oil, since there is still not much choice available but fishmeal and fish oils for certain essential long-chain fatty acids in aquafeeds. Considerable success has been achieved by partly replacing marine proteins and oils with plant-derived substitutes. The research should not only continue but should be accelerated so that better alternate sources for replacing fishmeal and fish oils are found in the foreseeable future.

The availability of feed will remain one of the most important inputs if aquaculture, or more appropriately fed aquaculture, is to maintain its sustained growth to meet the challenge of increased production. As a result of this challenge, non-fed aquaculture, which includes the farming of filter feeding organisms such as a variety of bivalve species and marine microalgae and seaweeds, or farming lower trophic species, may increase in the near future, particularly as the commercial usage and consumer products derived from these farmed species are likely to increase.

While it is clear that mariculture cannot be practiced everywhere, vast coastal areas suitable for mariculture are largely unused. An estimated 44 percent of maritime nations and territories are currently not practicing any productive activities along the coastline. Those that are engaged in marine production, the produce volumes per kilometre stretch of coastline are generally well below its potential. Although farmed-food production from the seas is increasing on a yearly basis, there is a need for the governments to identify and allocate appropriate space and provide access, create and establish governance and regulatory frameworks for their territorial waters and EEZs for mariculture development, particularly addressing the strengthening of public-private partnerships.

In time, aquaculture will inevitably move further offshore if the world is to meet its growing demand for seafood, and hence, the importance in developing appropriate technologies for its sustainable expansion and in providing assistance to the private sector, particularly in developing countries, in accessing them. Although governance related to aquaculture in areas beyond national jurisdiction (ABNJ) is currently regulated under the United Nations Convention on Law of the Sea, which provides a legal framework that regulates aquaculture activities in such areas, the general demand from the commercial sector is for governments to fully acknowledge the mariculture industry as an appropriate, responsible, reasonable and rightful use of ocean space and resources, in harmony with other users.

The presentation finally summarizes and highlights a series of actions considered important for improving mariculture and increasing production, with more investment in the sector being crucial. Investment policies, sea space allocation and use policies, and institutional and legal support are considered top priority governance issues to address and thus, give confidence to the private sector in the long term. The further development of appropriate technologies and farming systems such as integrated multi-trophic aquaculture (IMTA), the increasing production of non-fed species for food security, the research programmes on disease control issues and on alternate sources for animal protein meals, and the mitigation and adaptation to climate changes are among some of the actions needed to support aquaculture expansion and intensification.

The future we should all be building on is one with fish for the generations to come by ensuring that any environmental impact as a result of progress are minimized by fully adopting an ecosystem approach to ensure sustainable development from all angles. Finally, it is worth noting that farming of selected marine organisms for non-food uses may represent a main interest for private investments in the oceans for years to come with many of these not related to food security. The question is whether investment in mariculture will benefit food or benefit economies and whether the two can live side by side.