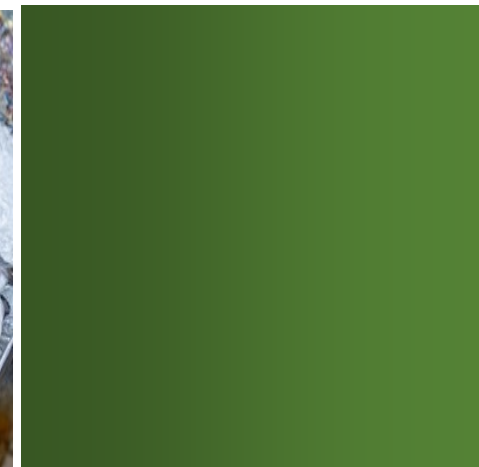
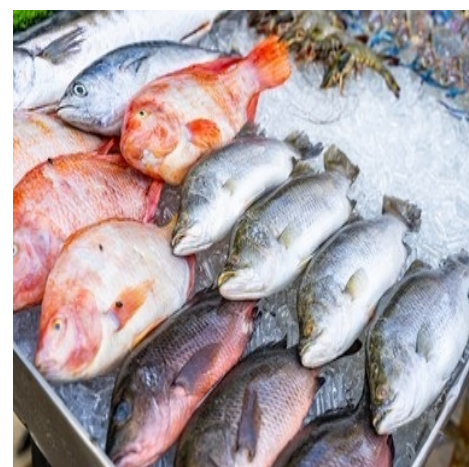
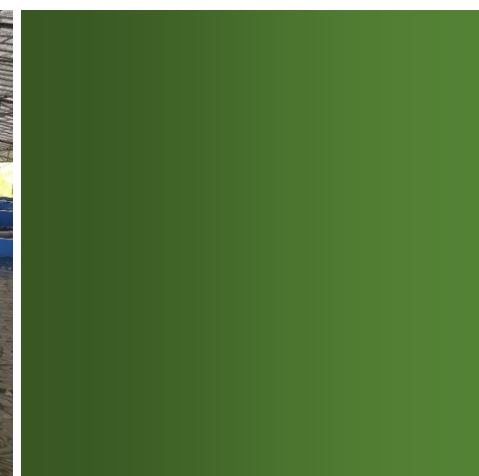


# Abstract for Aquaculture RAS Fish Farm

*This abstract reflects general technical and market aspects of fish breeding based on RAS technology*



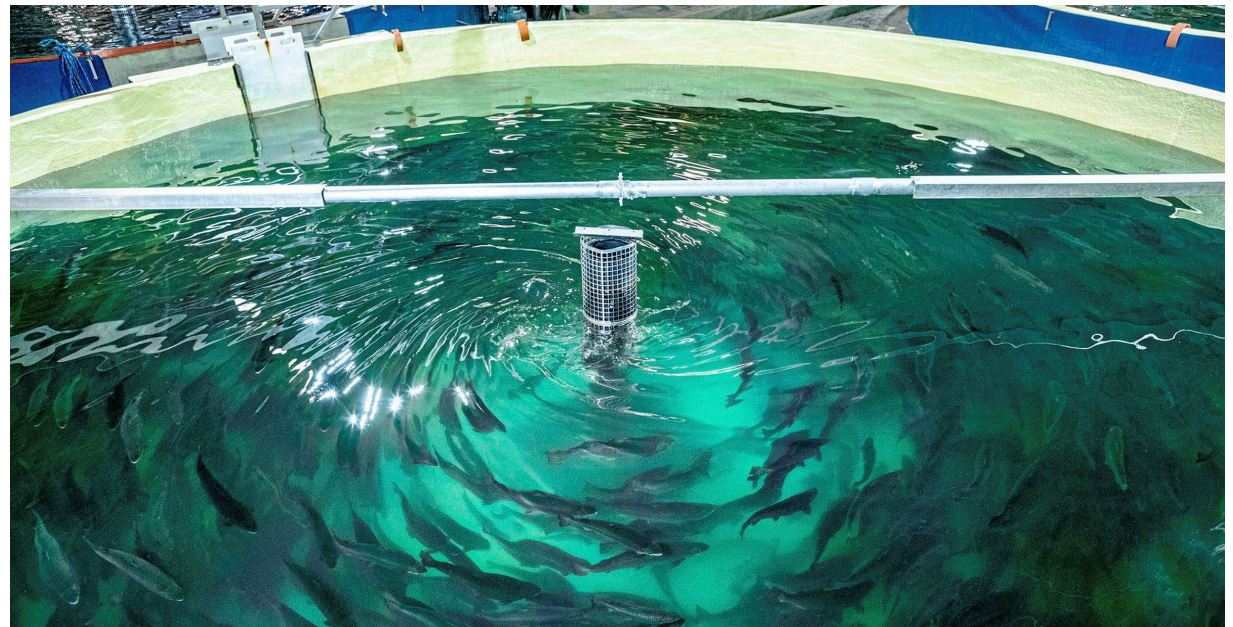
# INTRODUCTION OF FISH BREEDING

Although many fish have been captured from the wild traditionally, there has been an increasing trend towards captive breeding over the past twenty years. Indeed, as many as 90% of sold freshwater fish are farmed nowadays.

Aquaculture, also known as aquafarming, is the farming of fish, crustaceans, mollusks, aquatic plants, algae, and other organisms. The “Food and Agriculture Organization” describes aquaculture as one of the industries most directly affected by climate change and its impacts. Some forms of aquaculture like pond breeding have negative impacts on the environment, such as through nutrient pollution or disease transfer to wild populations.

RAS (Recirculating Aquaculture Systems; usually tanks or containment structures with engineering to circulate water and control its quality) offers an alternative to the most common farming techniques

like ponds, raceways and net cages. The high capital costs of RAS implies that the system is operated to the closest maximum efficiency to generate a sufficient income which will cover the initial costs.



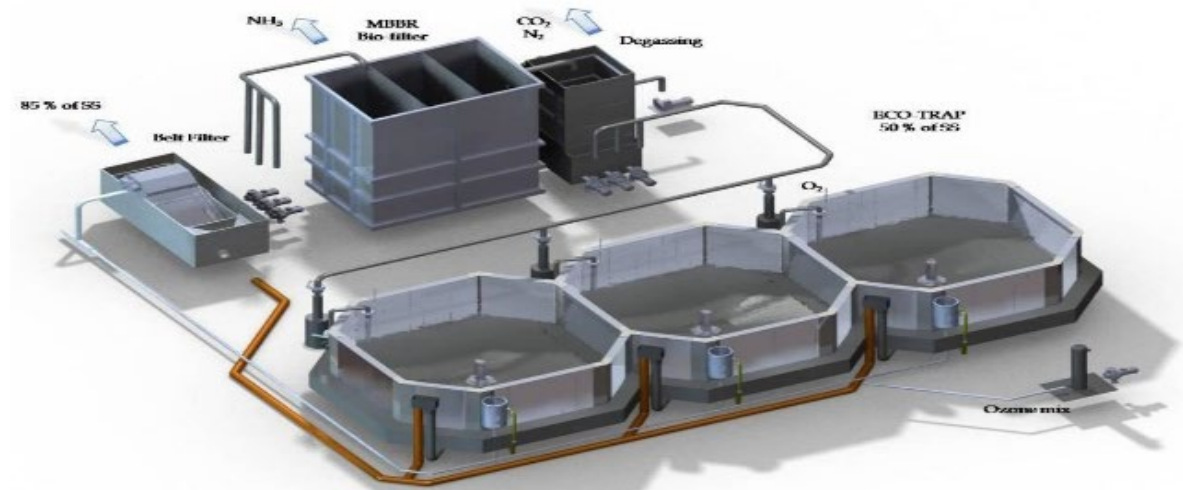
# TECHNOLOGY

## RECIRCULATING AQUACULTURE SYSTEMS (RAS)

RAS (usually tanks or containment structures with engineering to circulate water and manage its quality) offers an alternative to the most common used farming techniques like ponds, raceways, and net cages. RAS are used in home aquaria as well as for fish production where water exchange is limited and the use of biofiltration is required to reduce ammonia toxicity. Other types of filtration and environmental control are often also necessary to maintain clean water and provide a suitable habitat for fish. The main benefit of RAS is the ability to reduce the need for fresh, clean water while still maintaining a healthy environment for fish. To be operated

economically commercial RAS must have high fish stocking densities, and many researchers are currently conducting studies to determine if RAS is a viable form of intensive aquaculture. The need of individual species may vary and therefore the system has to be

optimized consequently to deliver an optimum which will assist the consistent conditions for growth. The engineering of any RAS system is difficult to maintain as good quality conditions must be ensured in order to maintain the fish and crustacean's health.



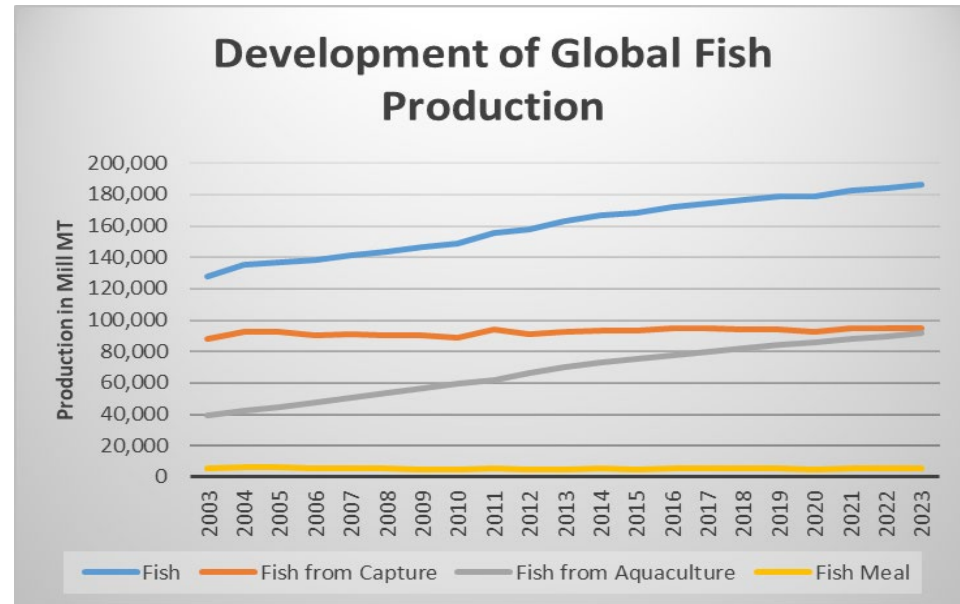
# GLOBAL FISH MARKET

World aquaculture production can be divided into inland/land-based and marine/sea-based culture. Inland aquaculture generally uses fresh water, but some production operations also use saline water (Egypt) and inland saline-alkali water (China) in inland areas.

Inland aquaculture growth has respectively outpaced marine culture growth, with average annual growth rates of 9.2 and 7.6 percent. As a result, inland aquaculture steadily increased its contribution to total farmed food fish production from 50 percent in 1980 to 63 percent in 2012. Of the 66.6 million tons of farmed food fish produced in 2012, two-thirds (44.2 million tons) were finfish species grown from inland aquaculture (38.6 million tons).

The development of aquaculture production is promising due to the development of increasing global fish production, whereas the capacity of capture-based fishery is almost constant. Additionally, because of a growing level of

urbanization (higher incomes and dietary changes) the production follows the growing demand on fish and seafood. To face this development aquacultures are a probate solution in order to close the gap.



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