NEW AQUACULTURE

THE NEW APPROACH TO PRIMARY FOOD PRODUCTION AND DISTRIBUTION

FOOD 2030: CLIMATE, CIRCULARITY

Aquaculture is one of the fastest growing food sectors. Innovative systems have been developed to increase its productivity of fish and crustaceans, while reducing the environmental impacts by combining different methodologies. It is a booming sector where technological (breeding systems, vaccines, feeds) and non-technological (market standards, regulatory frameworks, organisational structures) innovation has risen, although challenges still remain for the full exploitation of its capacity.

SPECIFIC R&I BREAKTHROUGH TOPICS

Recirculating aquaculture systems (RAS): This type of advanced fish farm allows an enclosed inland system that recirculates water, reducing the quantity of clean water needed. The main challenge is the elimination of ammonia, often performed through biofiltration, although other solutions exist using aquaponics – the use of natural resources in the trophic chain, like algae.

New feeds: Aquaculture feed production requires fish meal and oil, and products from agriculture as ingredients, these each use large amounts of land, water, and energy. New alternative feeds are being explored to substitute traditional ones, including meals and oils from plants (eg soybean, canola, barley, rice, peas, lupins), fish processing waste, yeast, animal by-products, insect proteins, and seaweed.

Enclosed culture production: This type of system - called cage or pen cultures - enclose the fish, crustacean or molluscs in a wild environment under an enclosed perimeter. This innovation has long been implemented, but with the resolution of its challenges, it can provide higher productivity and better environmental impact.

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Integrated multi-trophic aquaculture (IMTA): Includes organisms from different trophic levels of an ecosystem (eg fish, shellfish, algae), so that the byproducts of one become the inputs of another. It tries to bring the principles of a circular economy into the blue footprint.

EXPECTED IMPACT

There is potential for a better exploitation of seafood resources, from the feeding system to food safety and authenticity. Innovative aquaculture systems such as a closed one - RAS and IMTA - increase production efficiencies, utilise waste water more efficiently, and reduce the amount of required fish feed.

The development of new feeds that are commercially viable as substitutes for fish meal and oil, will enable widespread alternative feeding practices that are successful in reducing dependence on marine fish resources, protecting biodiversity, maximising efficiency, and minimising waste.

MARKET OPPORTUNITIES / CHALLENGES

- The costs for the implementation of advanced aquaculture systems are often high, and entail massive energy consumption as well as dependency on complex technology.
- Wastewater fishponds might play an important role in the future for the recycling of organic wastes.
- The use of insect proteins in aqua feed paves the way to new feed markets for insect producers, feed manufacturers, and seafood farmers.
- There are still technical and social challenges to overcome that require research: From the spread of disease and the impact on environment or productivity to consumer acceptance, lack of specialised workforce or variability in the current regulations in different countries.

EXAMPLE REFERENCES

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ASSOCIATED TRENDS IN FIT4FOOD2030 (URL)

- Climate change
- Scarcity of natural resources
- Food from the sea
- Closing the loop in aquaculture
- Food waste recovery up-cycling/waste cooking.

ASSOCIATED CASES IN FIT4FOOD2030 (URL)

- GrowUp Urban farms
- Agriprotein
- CtrlAQUA
- Climefish
- Nemo's garden
- Smart floating farm
- Fishboost
- Nature Scouts Association (TR)

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