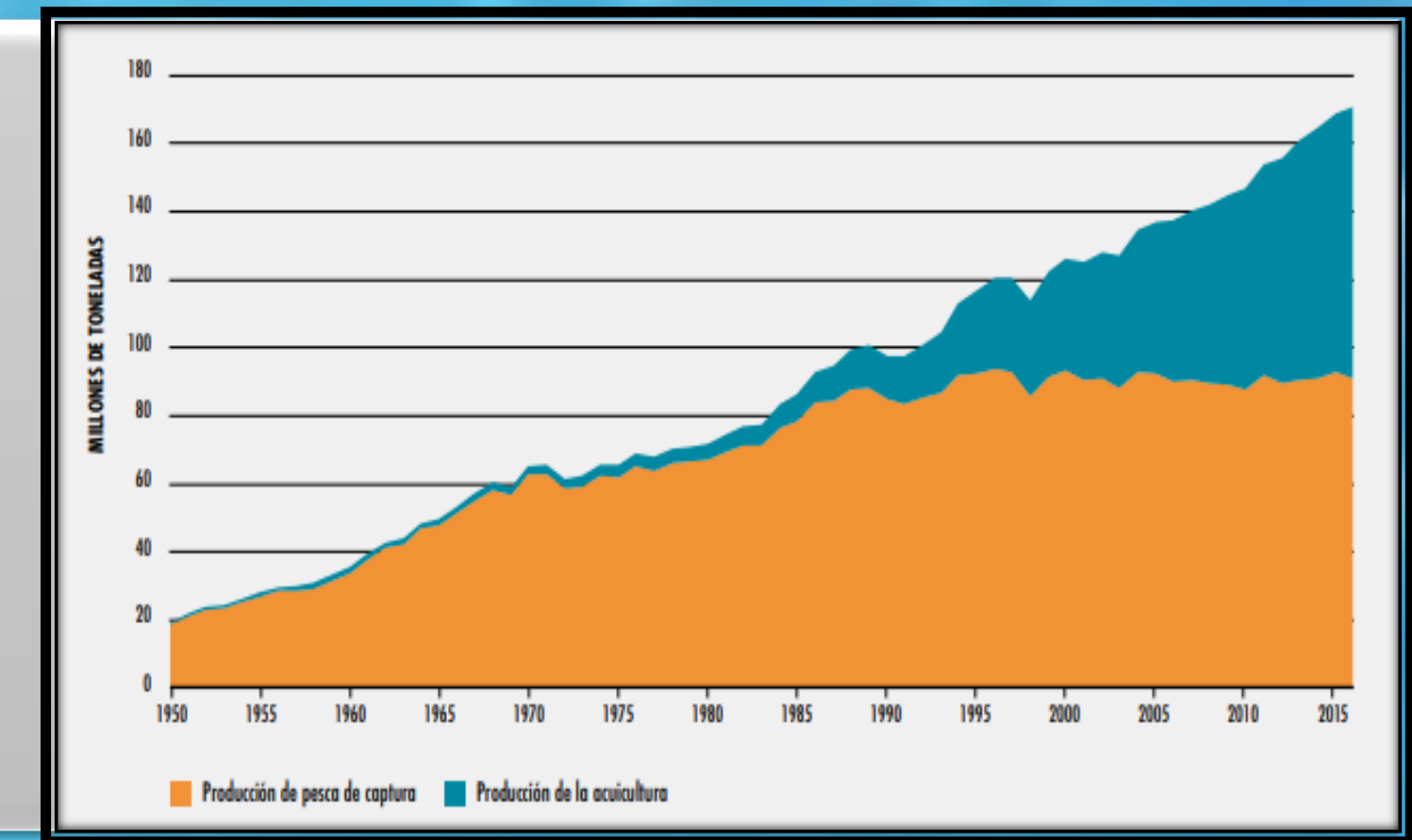


# INTEGRATED MULTI-TROPHIC ACUACULTURE (IMTA)

## Current state of world's fishing and aquaculture

The world's demand for seafood increases each year. As capture fishing has reached its maximum levels, aquaculture has grown steadily (FAO 2018).

This demand is expected to continue growing. As our planet is suffering from climate change and depletion of resources, IMTA may provide a solution to all this problems.



Integrated Multi-trophic Aquaculture (IMTA) is a practice which combines the cultivation of fed aquaculture species with organic extractive aquaculture species and inorganic extractive aquaculture species to create balanced systems for environmental sustainability, economic stability and social acceptability (Barrington et al. 2009).

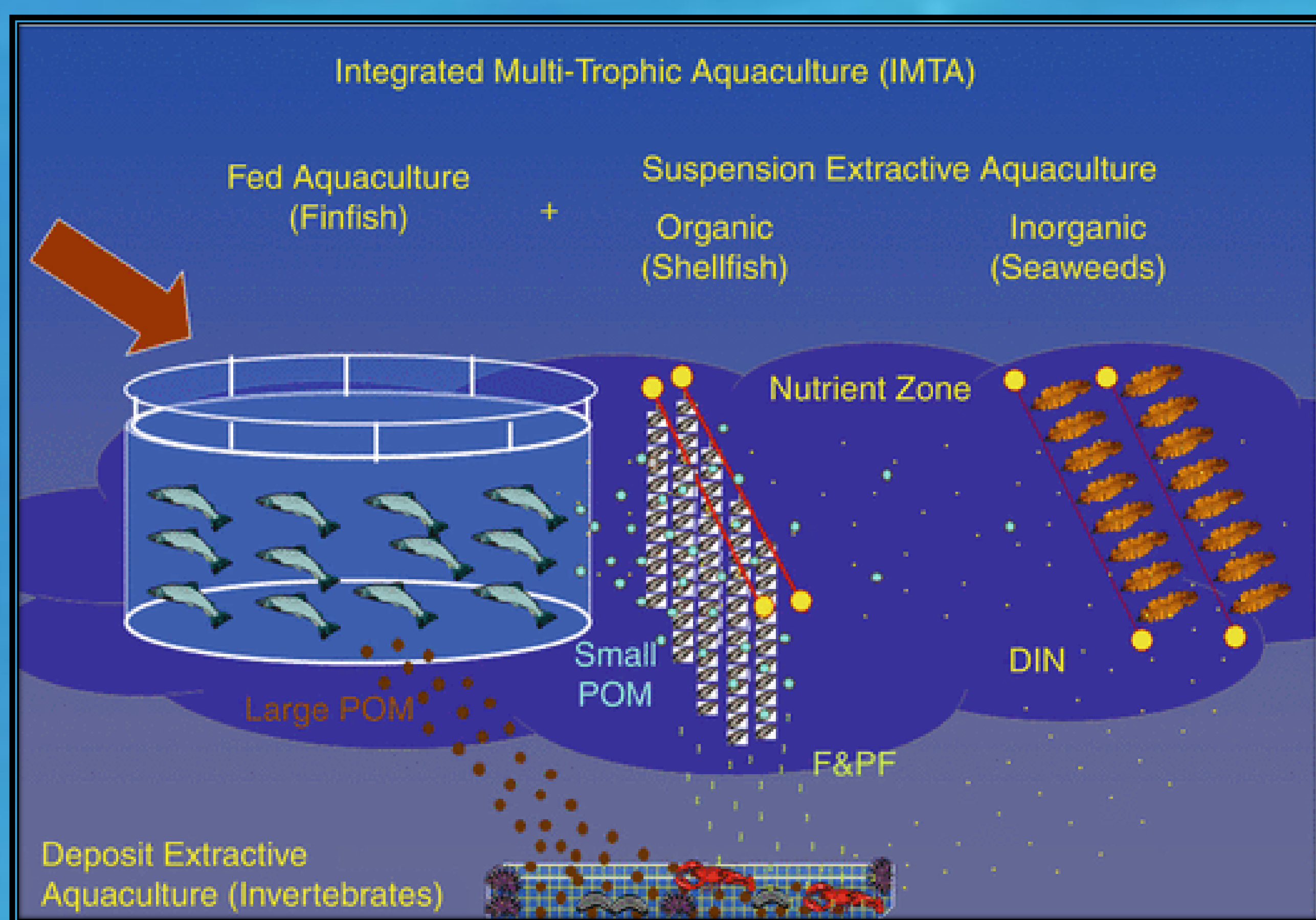


Fig. 1: Chopin T. 2014: Aquaculture, Integrated Multi-trophic (IMTA).

## Objectives of IMTA

- Provide biomitigation services to the coastal ecosystems.
- Increase profits through diversification.
- Increase social acceptability.

## What do we mean when we say...?

### → Multi-trophic?

It combines species from different trophic levels in the same system.

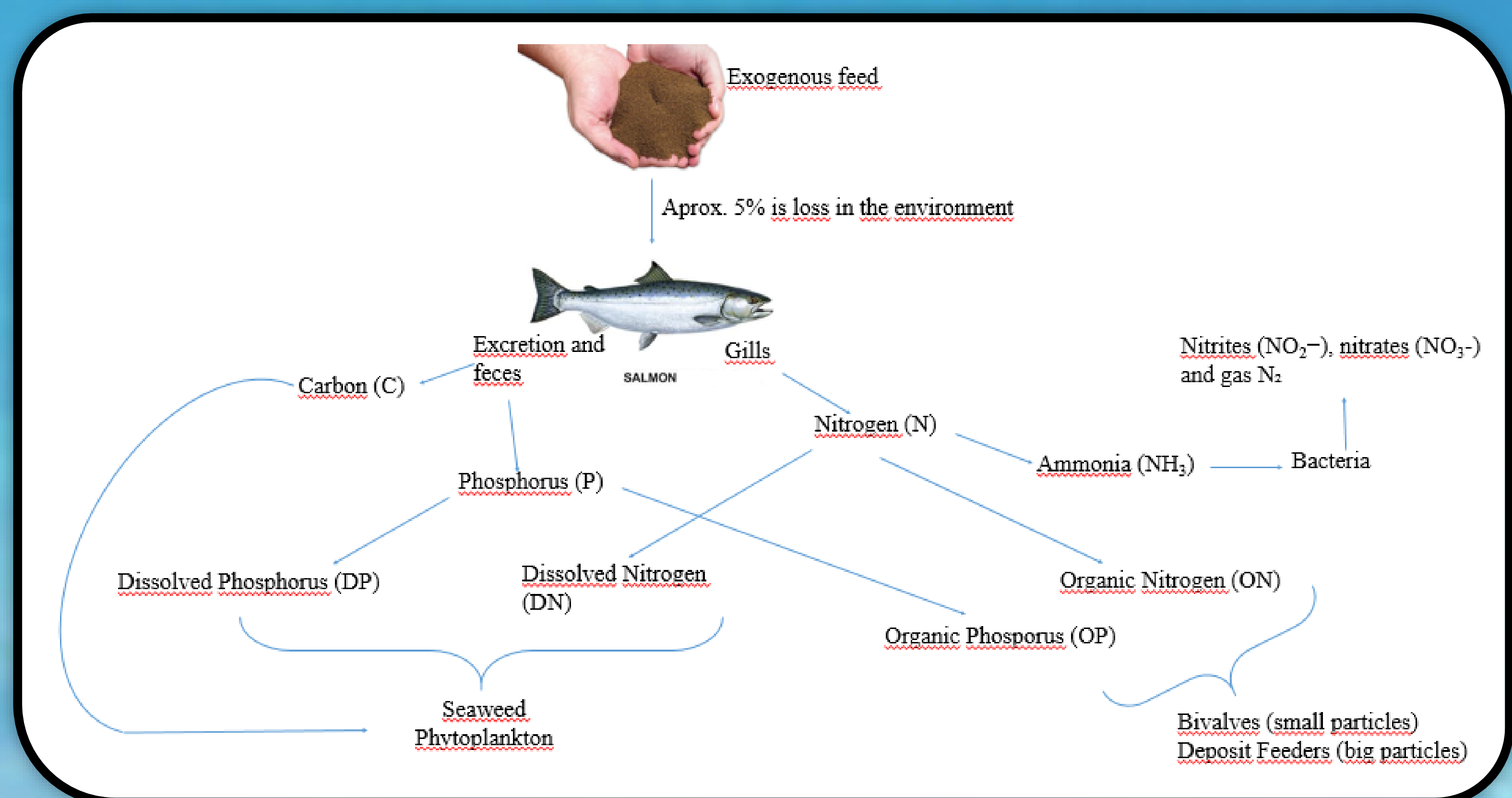
### → Integrated?

It cultivates different species in proximity, the energy and nutrients flow from one to another.

## Eutrophication



Eutrophication is the excessive accumulation of nutrients in an aquatic environment that may produce damage to biodiversity.

Nitrogen (N), Phosphorus (P) and Carbon (C) are the main responsible for eutrophication. In an IMTA system, seaweed, shellfish and deposit feeders remove this nutrients from the water and transform them into valuable biomass (Wang et al. 2012).





## Examples of species cultivated in IMTA


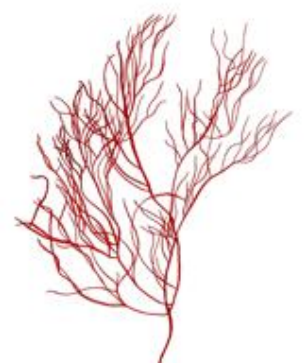
### Fed species

*Salmo salar*   
*Scophthalmus maximus* 

### Organic extractive species

*Mytilus edulis*   
Sea cucumbers 

### Inorganic extractive species

*Ulva* spp.   
*Gracilaria* spp. 

## Conclusions

IMTA is a practice that still needs further investigation projects, but may be an important opportunity for aquaculture to transform into a high sustainable and profitable industry, in which environmental, economic and social benefits can live together.

## References

- Barrington, K., Chopin, T., & Robinson, S. (2009). Integrated multi-trophic aquaculture (IMTA) in marine temperate waters. *FAO Fisheries and Aquaculture Paper*, 529(Integrated mariculture: a global review), 7–49.
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