

# Ensuring food security in Africa through Sustainable aquaculture

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## The role of Integrated Multi-Trophic Aquaculture (IMTA) systems

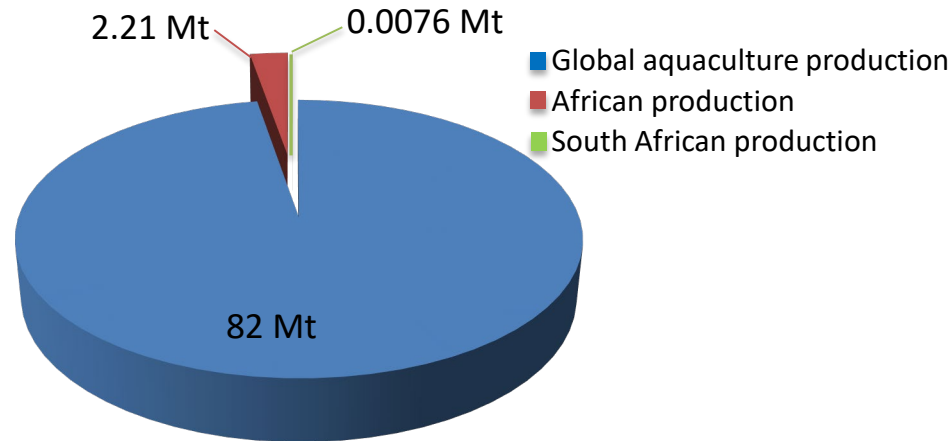


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# Aquaculture production in South Africa



- Aquaculture 54.1% of global fish production
- Africa accounts for 2.69% of global production
- South Africa only contributes towards 0.34% of Africa's production

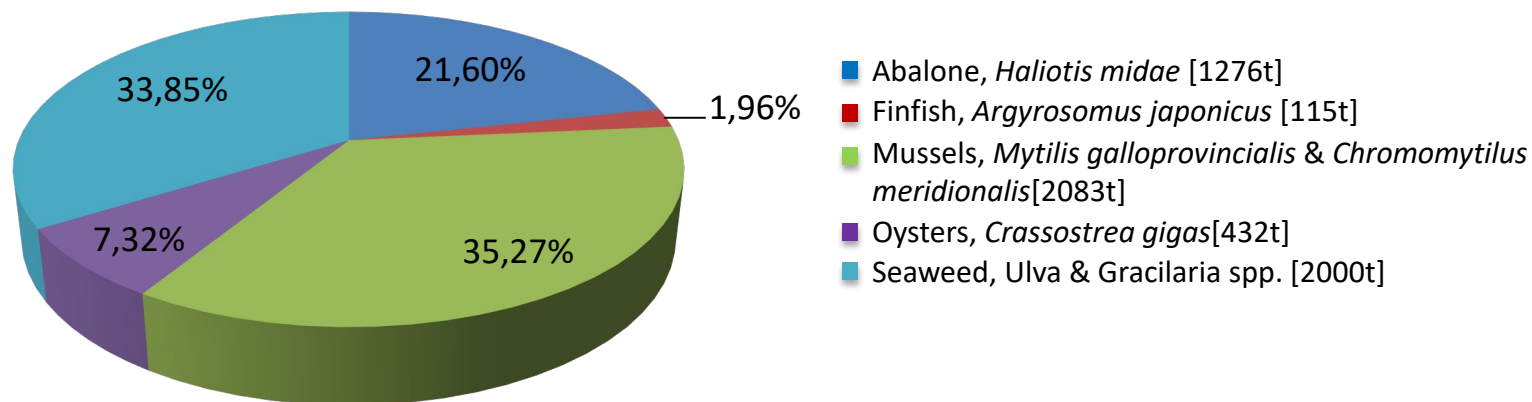
Table 1: Total number of farms recorded for South Africa's aquaculture sector in 2017.

Species	EC	FS	GP	KZN	LP	MP	NC	NW	WC	Total
Abalone	2	0	0	0	0	0	0	5	0	11
Finfish	2	0	0	2	0	0	0	0	1	5
Mussels	0	0	0	0	0	0	0	0	11*(10)	11*(10)
Oysters	2	0	0	0	0	0	1	0	3*(2)	6*(5)
Total Marine	6	0	0	2	0	0	6	0	24	38
Tilapia	3	0	24	5	18	12	1	16	2	81
Trout	0	0	1	5	0	12	0	0	24	42
Catfish	2	4	1	0	4	1	0	3	0	15
Marron Crayfish	1	0	0	0	0	0	0	0	0	1
Carp	0	0	1	0	1	0	1	0	1	4
Koi Carp	0	2	5	2	0	1	0	0	1	11
Ornamental species	2	2	4	5	1	2	0	0	2	18
Total Freshwater	8	8	36	17	24	28	2	19	30	172
Total Marine and Freshwater	14	8	36	19	24	28	8	19	54	210

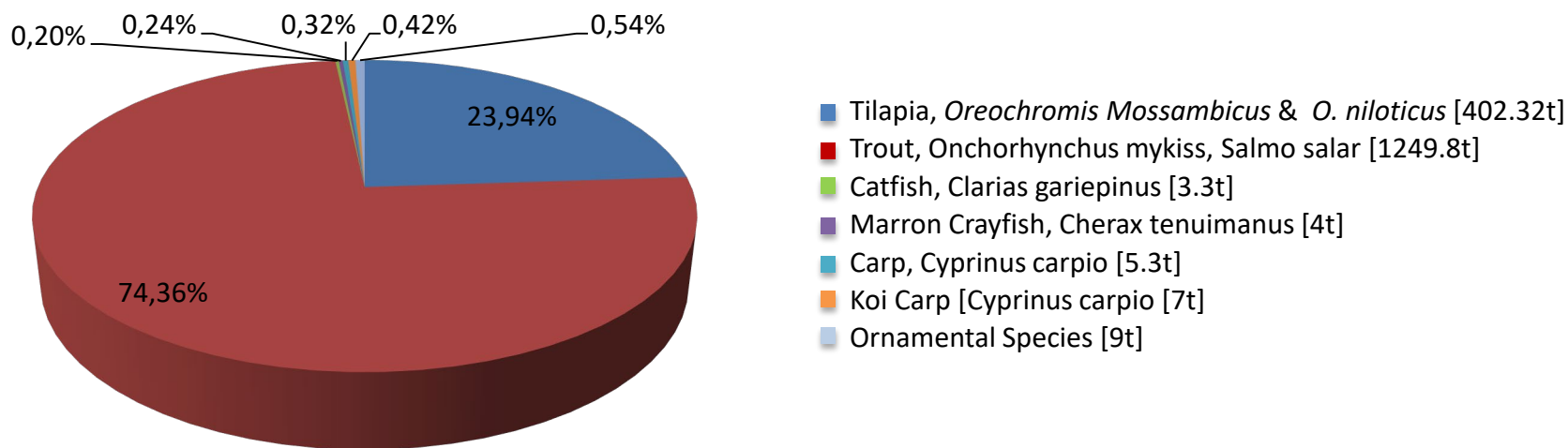
- Marine production dominated by molluscs with most farm in WC & NC
- Freshwater production dominated by trout and tilapia
  - Trout – WC and MP
  - Tilapia – GP, LP, MP & NW

EC=Eastern Cape; FS=Free State; GP=Gauteng Province; KZN=KwaZulu-Natal; LP=Limpopo  
MP=Mpumalanga Province; NC=Northern Cape; NW=North West; WC=Western Cape

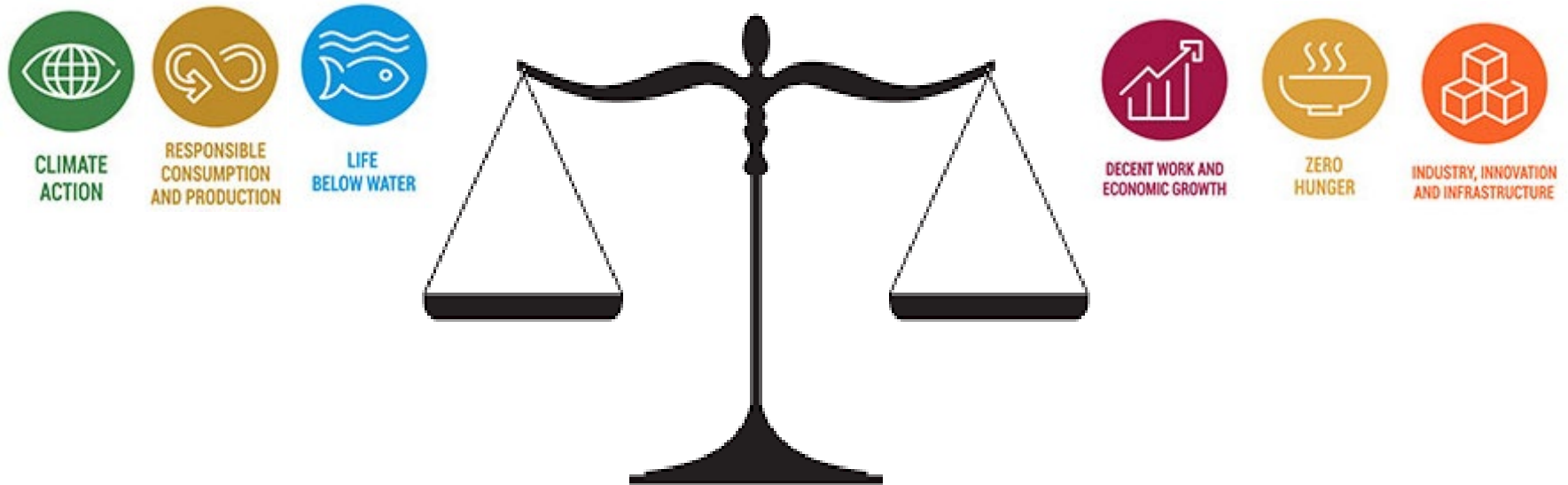
## Marine Aquaculture Production in South Africa, 2017 (total of 5907.76 tons)



## Freshwater Aquaculture Production in South Africa, 2017 (total of 1680.7 tons)



# Need to increase production, but must maintain balance between Environmental and Societal SDGs!



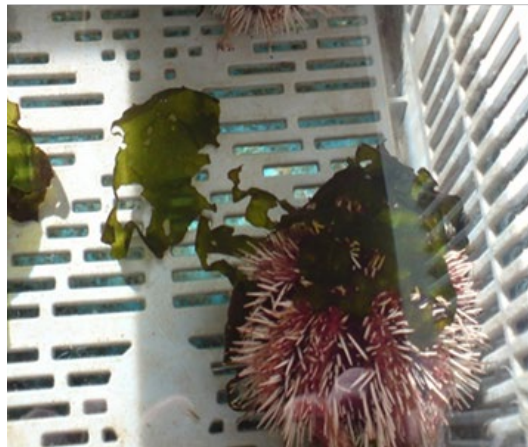
**Can be achieved through wider adoption of IMTA technologies**



# IMTA as a means to improve environmental sustainability & economic stability

“IMTA is the practice which combines, in the appropriate proportions, the cultivation of fed aquaculture species (e.g. finfish/shrimp) with organic extractive aquaculture species (e.g. shellfish/herbivorous fish) and inorganic extractive aquaculture species (e.g. seaweed) to create balanced systems for environmental sustainability (bio-mitigation), economic stability (product diversification and risk reduction) and social acceptability (better management practices) – FAO”





## Known BENFITS of IMTA

- Bioremediation of effluent water
- Energy conservation (reduced pumping costs)
- Protection against HABs (Climate change mitigation)
- Co-products, such as seaweeds, can be fed back into system:
  - Supplementary feeds
  - Feed additives (improved consumption, protein retention, improved growth & health of animals)

- Disease risk is a major argument against recirculation/IMTA systems.....



# Other IMTA considerations....

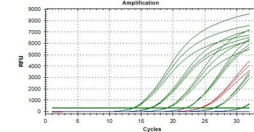
“A thorough understanding of the biological, biochemical, hydrographic, oceanographic, seasonal and climatic processes, and their interactions, experienced at each IMTA site by the selected species/strains is crucial for management (FAO Fisheries and Aquaculture Technical Paper. No. 529. Rome, FAO. 2009)”



# Research & Development Topics



Microbiome research



Molecular diagnostics



Probiotics & Immuno-stimulants

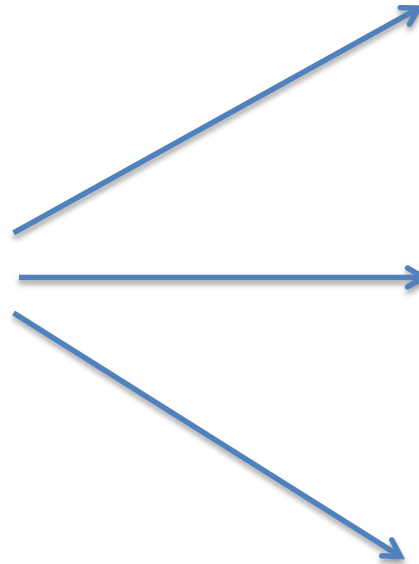


Vaccine technologies

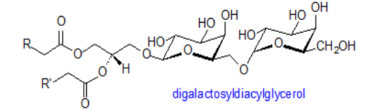
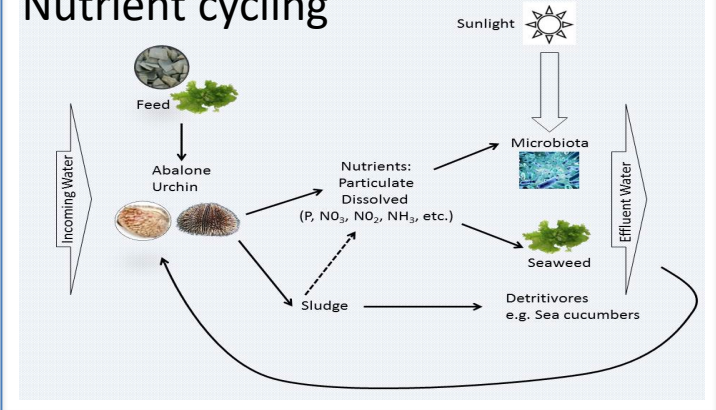
Preventative Measures



# Research & Development Topics



## Nutrient cycling



## Development of sustainable feeds



## New species development

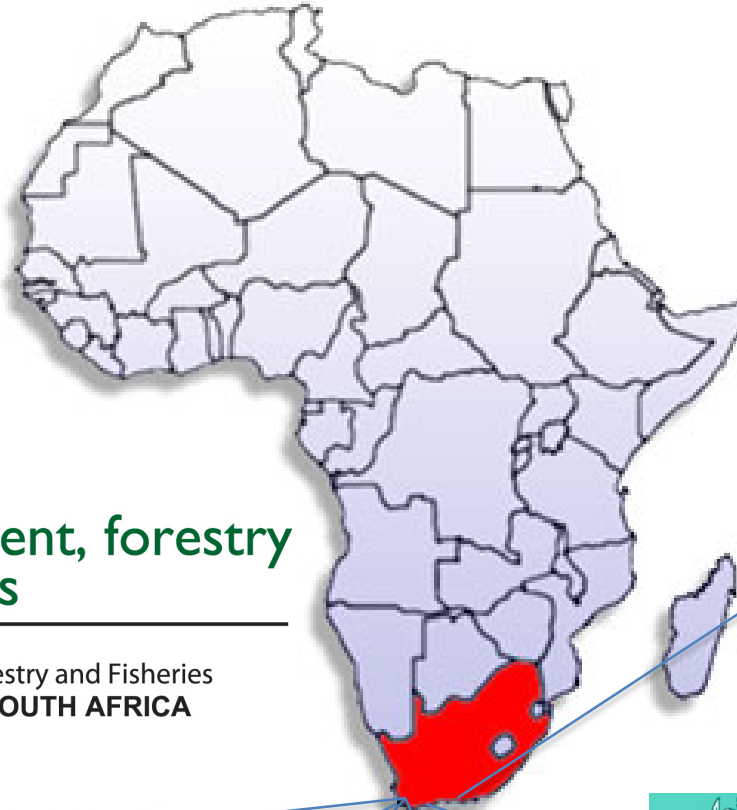


# Multi-collaborative and -disciplinary approach vital for ensuring success



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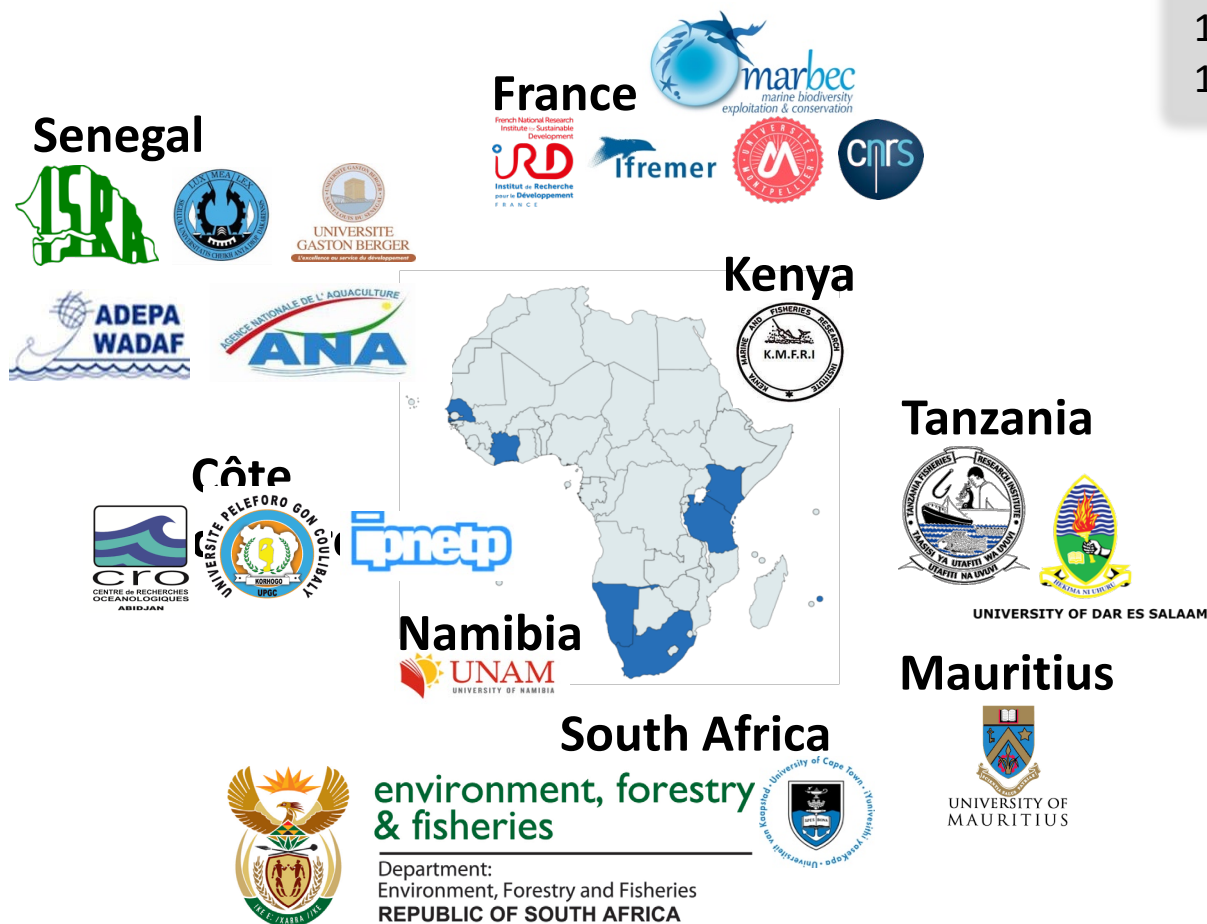
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# Research Network for Sustainable Marine Aquaculture in Africa

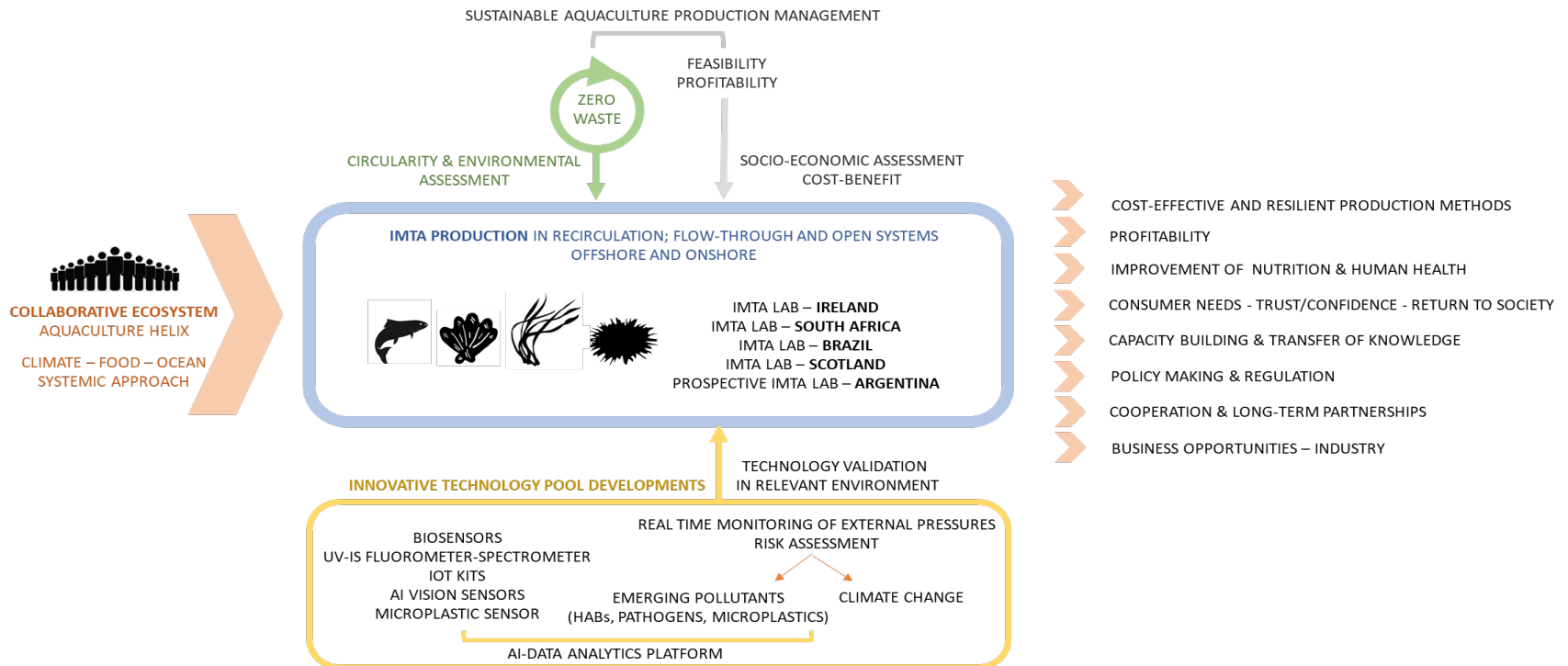
43 researchers and lecturers  
6 engineers and technicians  
14 PhD students  
12 MSc students







- European Union Horizon 2020 funded project [<https://www.astral-project.eu/>]
- **AIM:** To develop **new, sustainable, profitable** and **resilient value chains** for integrated multi-trophic aquaculture (IMTA) production within the framework of **existing, emerging** and **potential Atlantic markets**



# THANK YOU



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