



LIFE CYCLE ASSESSMENT OF INTEGRATED MULTI-TROPHIC AQUACULTURE SYSTEMS

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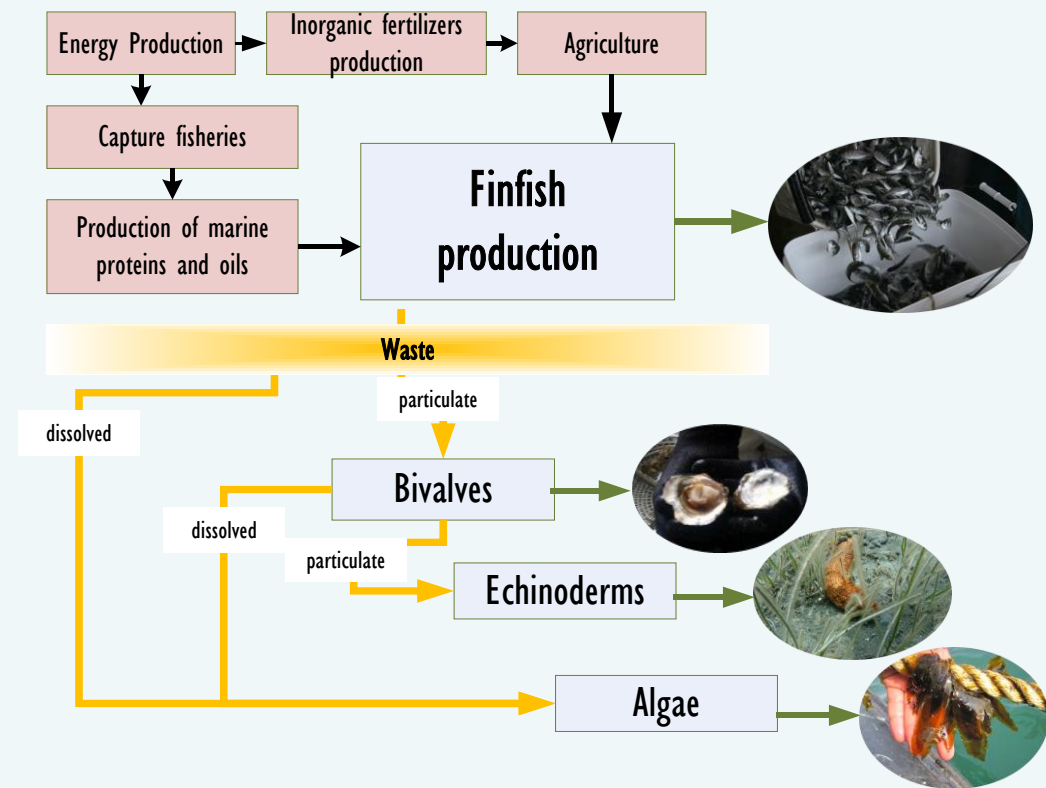


Introduction(1)

Integrated Multi-Trophic Aquaculture (IMTA):

- an environmental management concept
- can minimize the environmental impacts
- while expanding the economic base

(Price, C.S. and J.A. Morris, Jr, 2013)





Introduction(2)



The FP7 European research project IDREEM:

- Demonstrate IMTA
- Through pilot commercial-scale testing
- Apply field research and modelling
- European SMEs paired to local research institutes (SME/RTD pairings)



Life Cycle Assessment (LCA)

One of the tools applied to evaluate environmental impacts is LCA

What is LCA?

- Here confined to:

Quantitative environmental Life Cycle Assessment of products

- Environmental
- Life Cycle
- Assessment
- Quantitative
- Products

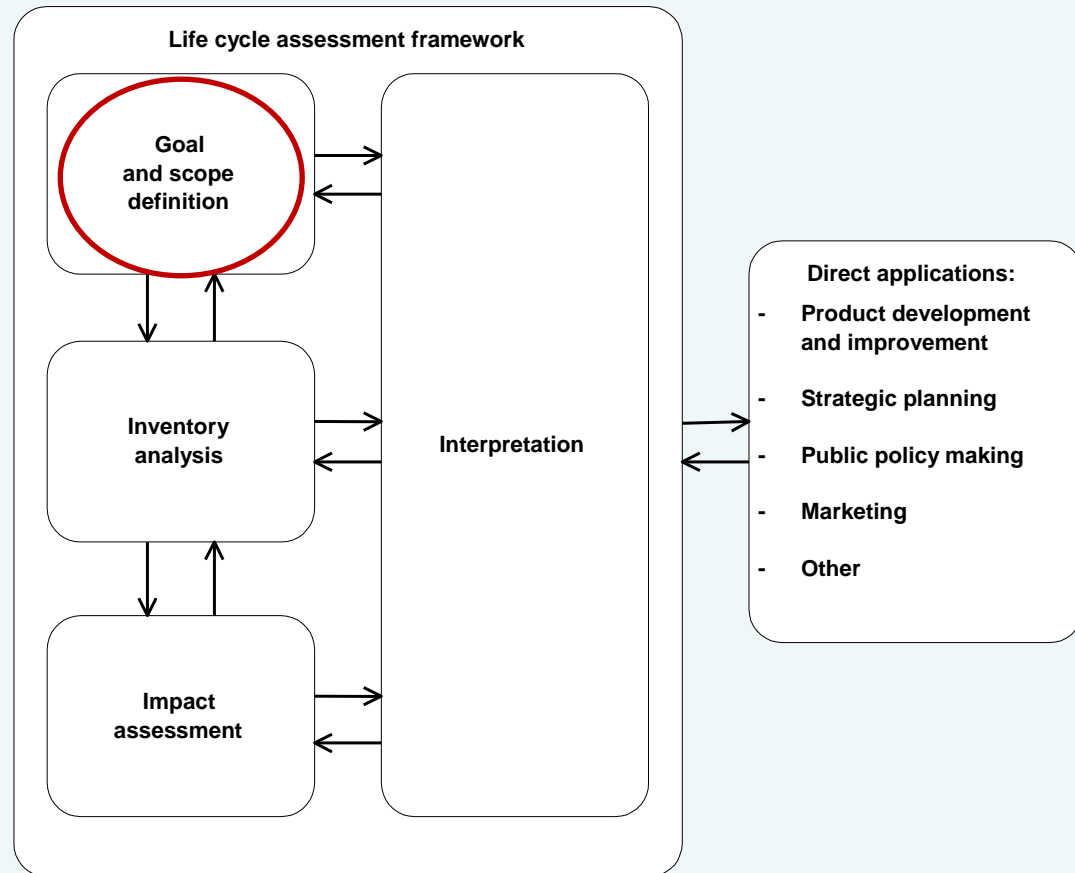




Life Cycle Assessment(2)

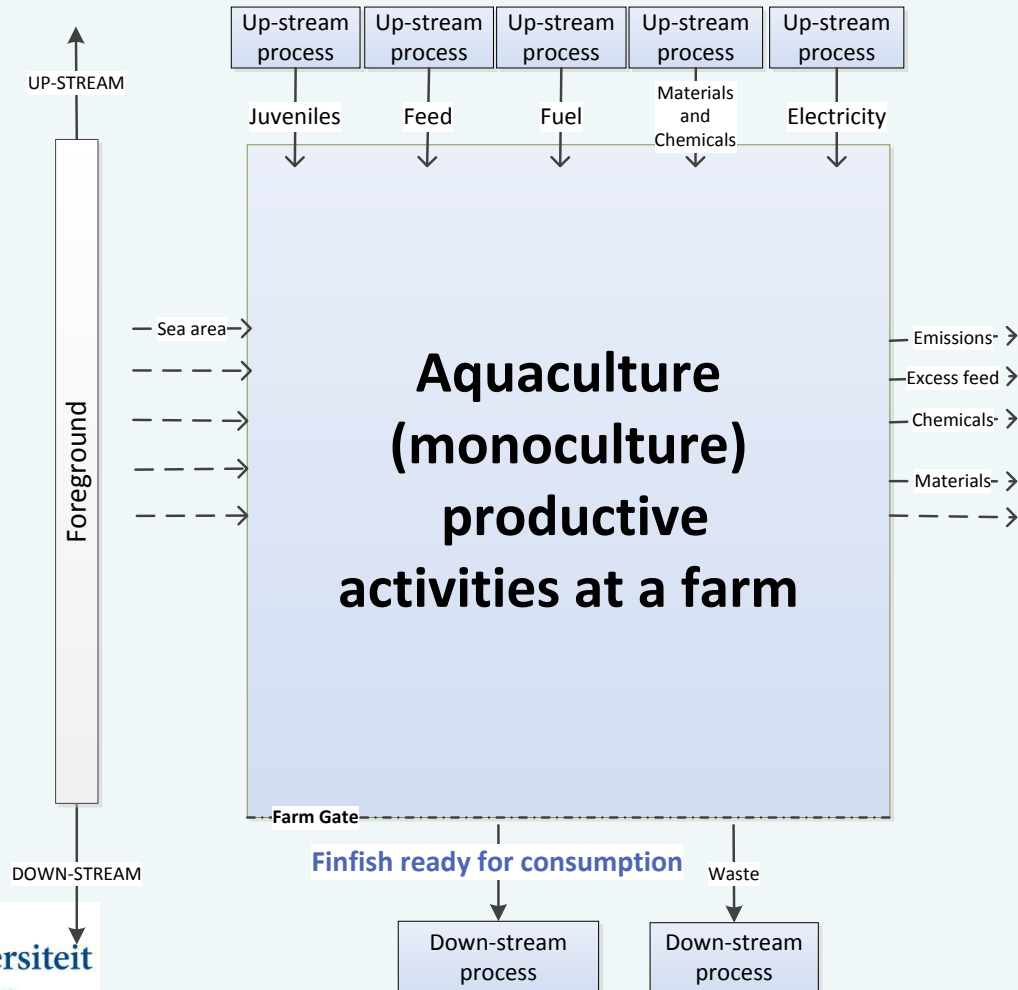
ISO-standardised procedure (ISO 14040, created in 1997-2000; revised in 2006)
Structured framework of four phases:

- Goal and Scope
- Inventory Analysis
- Characterization
- Interpretation





Data collection: monoculture

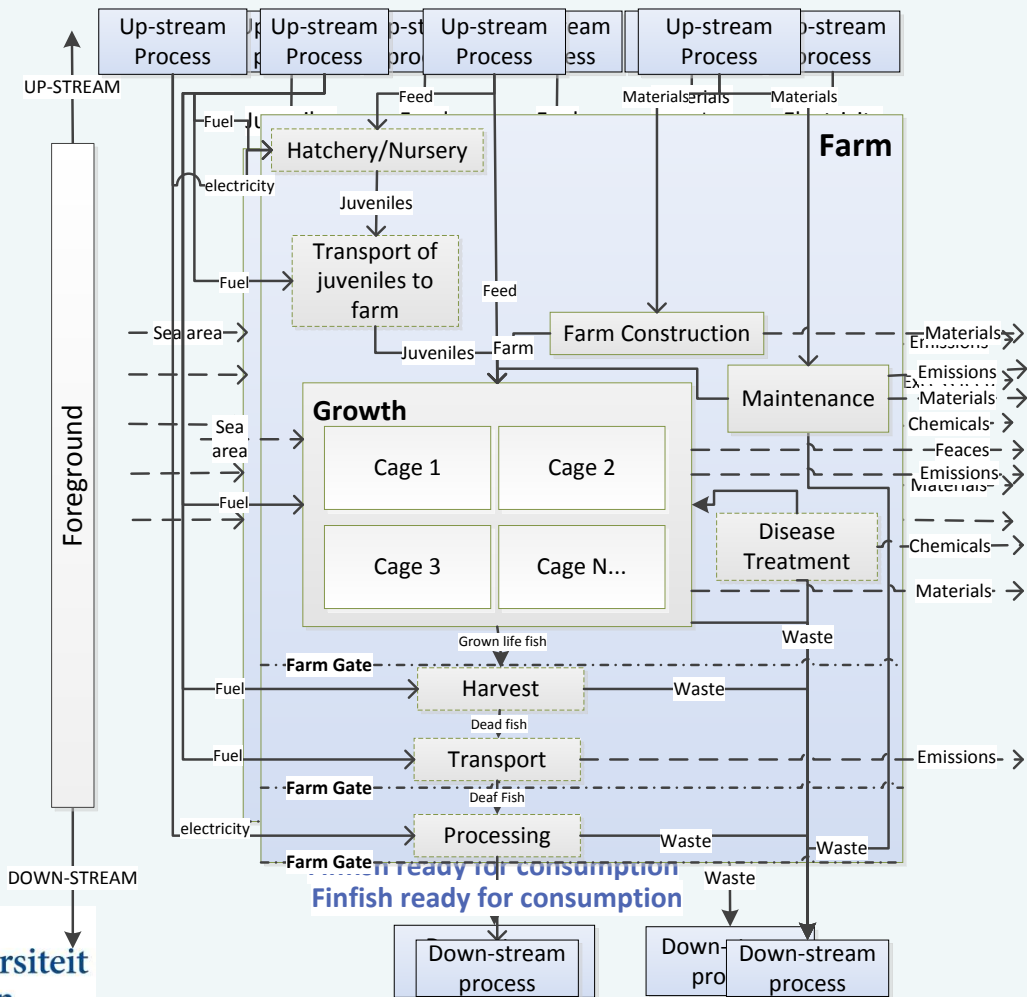


LEGEND

- Environmental Flow --->
- Economic Flow —>
- - - - Farm Gate - - - -
- Unit process not part of all SMEs core activities (dashed border)
- Unit process part of all SMEs core activities (solid border)
- Unit Process (up-stream or down-stream) (blue border)



Data collection: monoculture

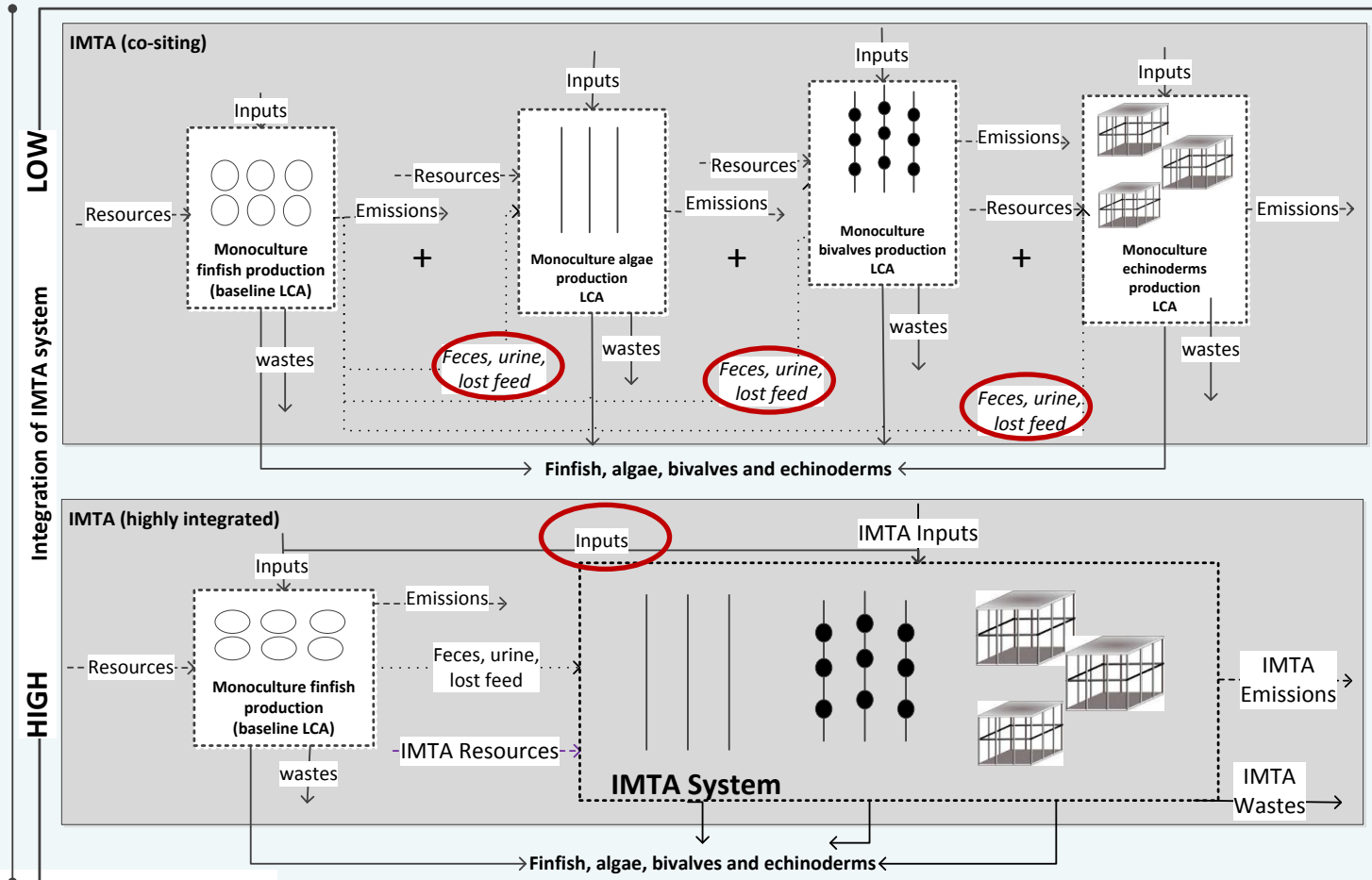


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Data collection: IMTA





Research Questions

Based on the qualitative descriptions of monoculture and IMTA systems, we formulated two questions and determined a scoping framework for each question:

Q1) What are the trade-offs for SMEs considering to move from monoculture aquaculture practice towards IMTA?

Q2) What are the trade-offs comparing IMTA products with their conventional monoculture alternatives?



Results: Scoping Framework

Question	Q1: SME perspective				Q2: Product perspective			
Before introduction of IMTA system	Finfish monoculture				Finfish monoculture			
After IMTA system	Finfish (+) bivalves (+) echinoderms (+) algae				Finfish (+) bivalves (+) echinoderms (+) algae			
Level of integration of IMTA system in Monoculture system	Low		High		Low		High	
Type of Analysis	Difference analysis	Full single-species LCA	Difference analysis	Full single-species LCA	Difference Analysis	Full single-species LCA	Difference Analysis	Full single-species LCA
Expected trade-offs monoculture vs. IMTA:	Expected to:	Q2	Expected to:	Q2	Not applicable*	Expected to:	Not applicable*	Expected to:
Produce	Increase		Increase			Increase		Increase
Nutrient discharge	Decrease		Decrease			Decrease		Decrease
LCA impacts of IMTA Infrastructure/operation	Increase		Increase/Decrease			Increase		Increase



Discussion and Conclusions

- The questions determine the type of analysis to be applied
- The type of analysis is independent of the level of integration
- The magnitude of the trade-offs between the two systems, can depend of the level of integration of productive activities of new species into those of the current monoculture system.



For more information about the IDREEM project visit our website:

www.idreem.eu



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