An operational tool for assessing sustainability of fish farming : PISC'n'TOOL

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Stake

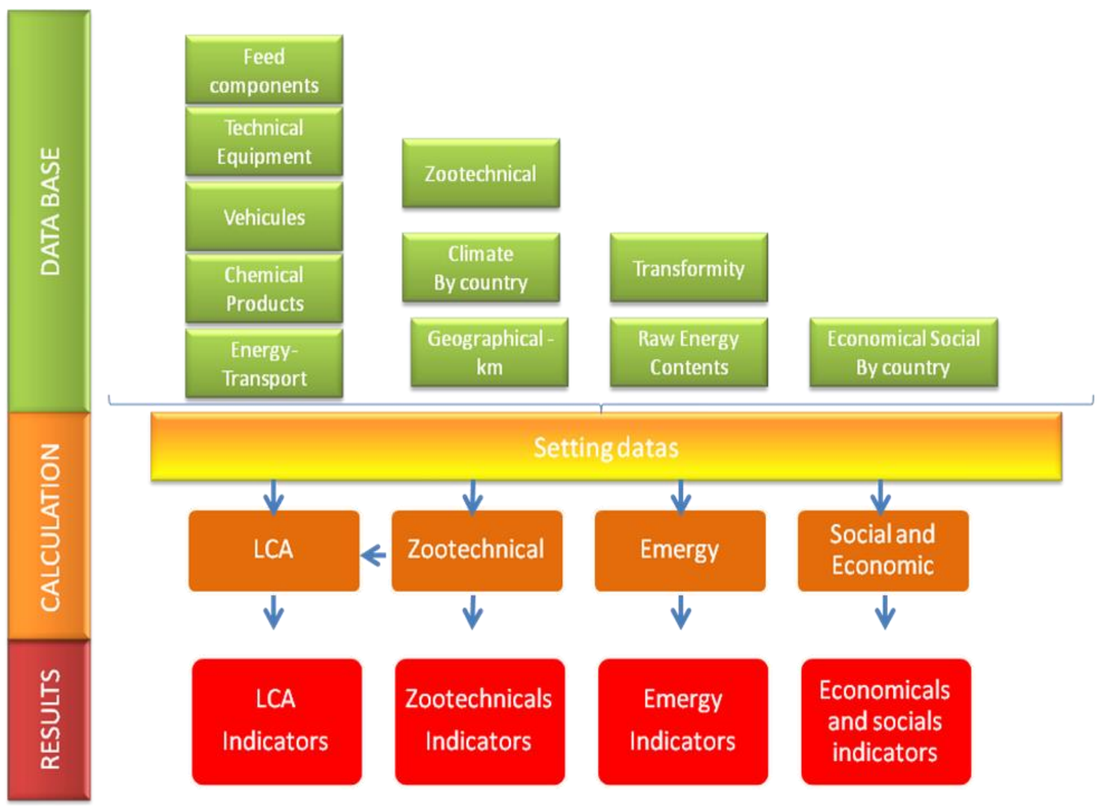
2050: 9 billiards of people on earth

- Increasing demand for aquatic products
- Decrease in wild fish stocks
- Increasing demand for more sustainable production systems and a respected environment

Challenges for future fish farming systems: **producing more with lower impacts on ecosystems, using fewer natural resources but also being acceptable and viable for farmers**

→ An operational tool to assess ecological intensification level of fish farm is needed

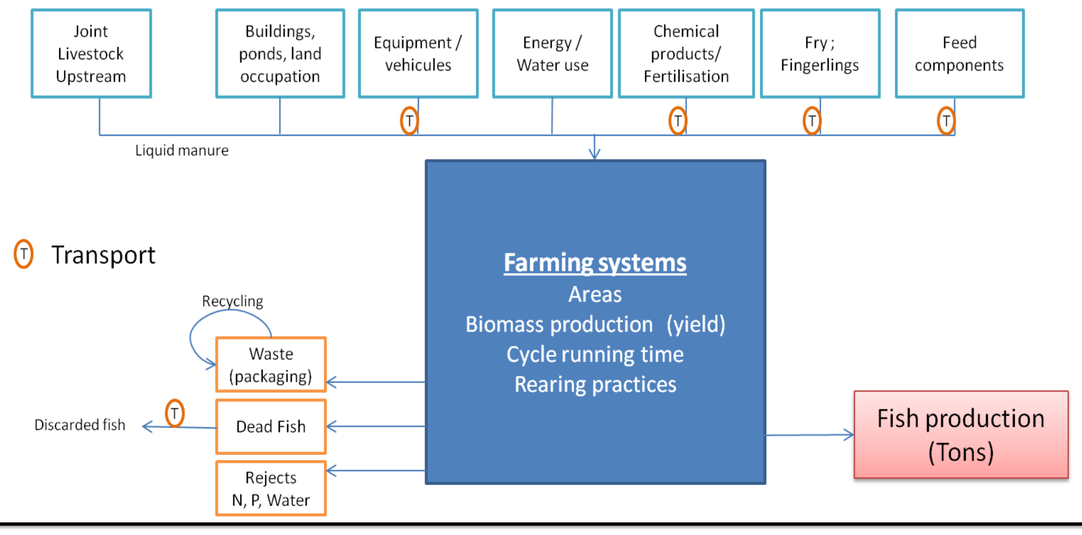
Tool's frame



Methods

- CML 2001 (v2.04) for Climate change, eutrophication, acidification, land competition
- Total cumulative energy demand (v1.05)
- Net primary production
- Recipe H Eur H/A for human health, Ecosystem and resources
- Emergy for nature energy contribution

Fish farming system



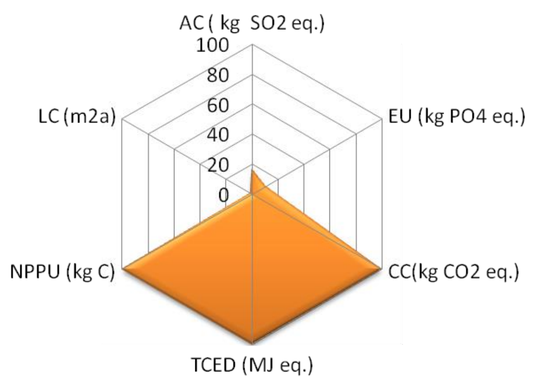
Preliminary LCA results

- **Studied systems:**
  - RAS for salmon production France
  - Extensive polyculture ponds, France
  - Integrated pig and carp polyculture ponds, Brasil
  - Intensive panga ponds Indonesia
- Calculation were made for 1 tonne of fish at the farm gate.
- Results on **r**elative environmental impacts of fish farming systems according to LCA climate change (CC), total energy demand (TCED), acidification (AC), eutrophication (EU), net primary production use (NPPU) and land competition (LC)

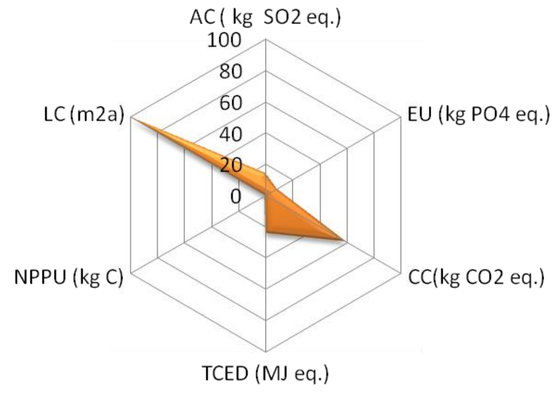
Environmental hot spots of fish farms :

- French extensive ponds show high levels on LC and moderate CC
- RAS for salmon production is dependant on high fish meal and oil diet (NPPU) and on energy consumption (TCED) for water recirculation, inducing high CC level
- Brasilian integrated ponds show high level of AC and EU due to pig manure management
- Intensive Indonesian Pangasius ponds show relatively low impacts due to feed efficiency and use of local ingredients

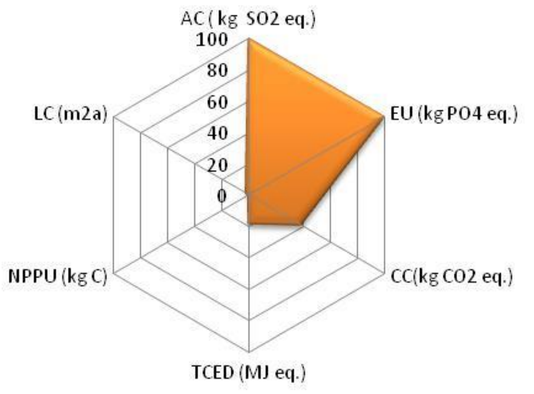
Salmon RAS, Fr



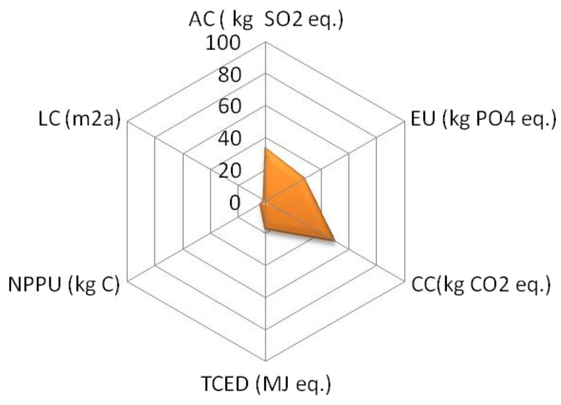
Extensive carp polyculture ponds, Fr



Integrated pig and carp polyculture ponds, Br



Intensive panga pond, Id



Conclusions

PISC'n'TOOL :

- **Is still under construction for:**
  - **Economic cost-benefit analysis**
  - **Emergy analysis (to account for renewable-energy use)**
  - **Social analysis**
- **Is still a research tool for ecological intensification characterisation.**
- **Gives interesting clues for fish farming ecodesign**

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