LCA of locally produced feeds for Peruvian aquaculture

Aquafeed for omnivorous and carnivorous fish

Goal and scope definition:

- Assess the contribution of various feed ingredients to the environmental impacts associated to aquafeed production.
- Investigate the specific contribution of Peruvian fishmeal to feeds for omnivorous and carnivorous cultured species.

1 ton of aquafeed:

- Suitable basis for comparison
- Reference flow: amount of ingredients and energy required to provide 1 functional unit

LCA impact categories

Typical:

- ReCiPe (midpoints and endpoints)

Additional :

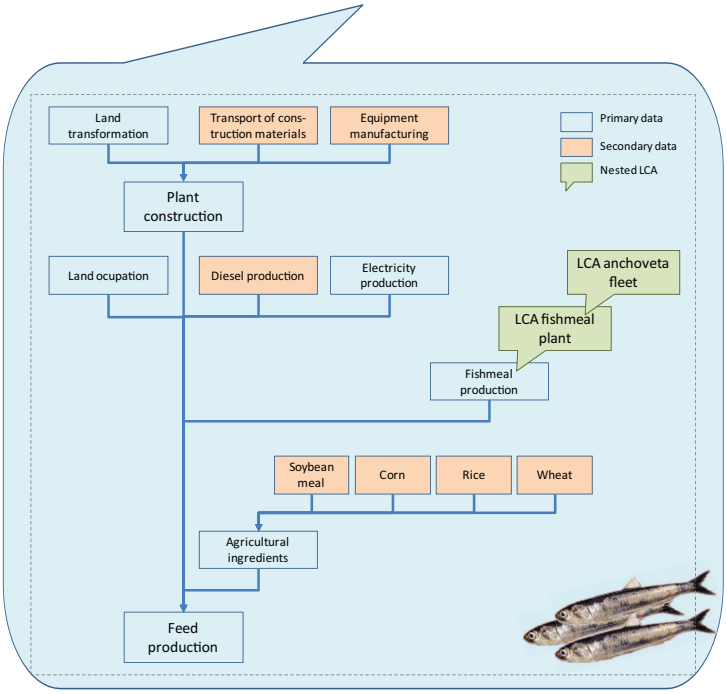
- Cumulative Energy Demand (CED)
- Biotic Resource Use (BRU, as Net Primary Production Appropriation)

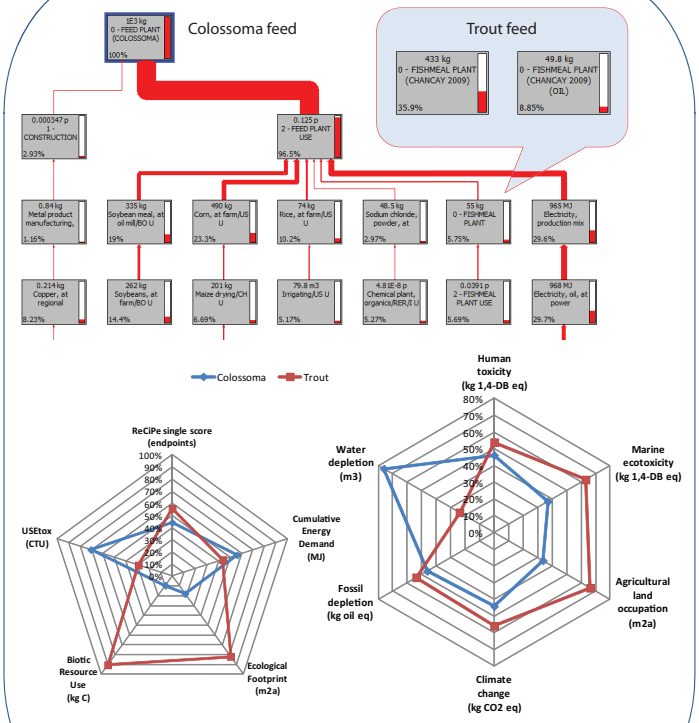
$BRU = (Mass/9) * 10^{(TL-1)}$

Sensitivity analysis:

- Comparison of various sources of soybean meal was performed, showing similar environmental performance between US and Bolivian soy, very different from Brazilian soy´s important environmental impacts due to clear-cutting of rain forest.
- The contribution of Peruvian fishmeal makes a great difference (impacts wise) between omnivorous and carnivorous feed compositions.

Goal and scope → System boundary → Functional unit → Impact categories → LCIA → Sensitivity analysis → Interpretation





Design remarks:

- Bolivian soybean meal adapted from Brazilian soybean.
- Customised Peruvian and Iquitos energy mixes.
- Proxies used for corn, wheat and rice.

Conclusions:

- Construction and maintenance of (reduction, feed) plants contribute negligibly to overall impacts
- Fuel use is the main contributor to impacts in all activities (fishing, reduction, feed processing)
- Feed provision is the main contributor to impacts in intensive Peruvian aquaculture
- The sourcing of feed ingredients is a critical factor for associated environmental impacts of feeds
  E.g. corn use for Colossoma feed is the key contributor to differences in CED, toxicity (USEtox) and water depletion.
- Use of fish products for trout feed leads to important BRU values.

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The ANCHOVETA-SC project
web: http://anchoveta-sc.wikispaces.com

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