Environmental sustainability assessment of the aquaculture sector at global and national scales

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Background and context
The world population keeps increasing, and with it, the demand for food production. One of the main components of our diet is seafood, and because of the global depletion of oceanic fisheries stocks, the fishing industry has turned to aquaculture to answer the booming demand in seafood products. Fish farming production is now equal to fish capture, and it is thus important to ensure that the development of aquaculture meets sustainability requirements at both global and local scales while using processes that are limiting the antimicrobial resistance of consumers. The latter will be tackled by the Joint PhD candidate in NTU (Singapore).

In that context, my PhD aims to answer the following research questions:
• How will the fish aquaculture sector globally and nationally evolve up to 2050 with respect to the demand side and the supply side?
• How to define science-based sustainability targets for the aquaculture sector at global and national scales?
• How to assess environmental sustainability performances of aquaculture sector in the world at national, regional and global scales?

Main objectives
• Elaborate a set of impact assessment indicators that capture all relevant environmental problems caused by aquaculture in a life cycle perspective and with a sufficient regional/local differentiation to enable site-specific sustainability assessments.
• Develop science-based sustainability targets for the aquaculture sector for all relevant environmental impacts at both global and national scales.
• Perform foresight environmental sustainability assessment of aquaculture sector in a Nordic country (Denmark, Norway or Iceland) and Singapore, using scenarios developed in collaboration with the Joint PhD candidate at NTU.

Expected outcome
This work is expected to define the best methodological choices to conduct a LCA on aquaculture systems including the environmental impacts that should be prioritized in such studies. Sustainability targets will be developed for these latter, and the framework will be applied to two case studies: a Nordic country and Singapore.

New value in relation to existing knowledge
The framework developed by this PhD will improve the environmental impact assessments conducted on aquaculture systems and contribute to the development large scale, foresight LCA studies. Through the development of sustainability targets, it will also contribute to the advancement of the absolute sustainability methods and concept.

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