

## Merging marine eutrophication, LCA and DPSIR into a learning tool for sustainability

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# IARU Sustainability Science Congress



GLOBAL CHALLENGES:  
ACHIEVING SUSTAINABILITY

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Organised by the International Alliance of Research Universities (IARU)  
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Poster in session: Education in sustainability

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**Title: Merging marine eutrophication, LCA and DPSIR into a learning tool for sustainability**

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## *Abstract*

The Drivers-Pressure-State-Impact-Response (DPSIR) is formally an adaptive environmental management approach that integrates the environmental and human systems into a common conceptual framework. The environmental impacts from marine eutrophication may be caused by anthropogenic emissions of nitrogen from human activities, e.g. agriculture and industry. The DPSIR approach applied to marine eutrophication can help identifying the key relevant aspects when assessing and managing specific impacts arising from those emissions. At the same time, DPSIR provides a good conceptual understanding of environmental processes making it suitable for sustainability teaching and communication purposes. Life Cycle Assessment (LCA) has increasingly become a valuable tool to quantitatively assess sustainability and support decision making. The indicator for marine eutrophication in Life Cycle Impact Assessment (LCIA) is built on ecosystem processes (both biogeochemical and ecological) and applies models based on causality and effect, in a similar way to the DPSIR's approach. The inclusion of this causality chain between human activities, emissions, and impacts, integrated with environmental/ecological processes is the focus of many educational and professional training programmes. Such programmes could benefit from practical examples of applied science that intentionally integrate transversal applications. Merging the conceptual framework of DPSIR with a modelling framework from LCIA to assess the impacts from marine eutrophication seems an effective tool in environmental impact management. It may also contribute to informed decisions by producing knowledge supported by evidences from causality and valuable alternatives for management. Furthermore, the approach described here seems relevant and useful as a communication and learning tool, as it bridges science and management while promoting the sustainability of solutions in a practical and educational application.

Keywords: DPSIR, Eutrophication, LCA, Management, Tool