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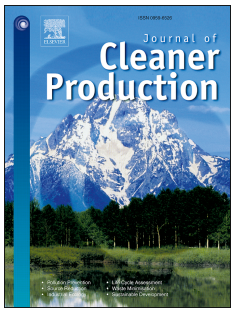

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Environmental consequences of introducing genetically modified soy feed in Sweden

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Abstract:

Most environmental assessments of soy production and trade do not distinguish between genetically modified (GM) and non-GM soy. In reality though, soybean imports to European Union maintain identity preservation through segregated supply lines. We, therefore, perform an attributional life cycle assessment (ALCA) of the global soy chain separately for the GM and non-GM imports. First a detailed mapping of the soy-feed supply chain is done, beginning from the farm in Latin America to the animal farmer in European Union. Subsequently, life cycle is assessed to calculate the environmental impacts of each supply line for 14 impact categories, including global warming potential. Since non-GM soy based compound feed is expensive, in countries such as Sweden where there is zero tolerance for genetically modified organisms, animal farmers face a higher cost of production. As a result, there exists the possibility for a policy shift towards use of only GM soy. Hence, a consequential life cycle assessment (CLCA) is performed that includes the market effects for a scenario of shifting from GM to non-GM soy. This also ensures robustness in our estimation of the differential environmental impacts. Results from ALCA reveal that there are no significant environmental gains from importing non-GM soy over GM soy. Global warming potential and freshwater ecotoxicity are very high from non-GM imports while GM soy imports have a larger effect on land uses and terrestrial eutrophication. Increased transport distances due to segregation for non-GM soy is a major contributor to the higher negative environmental effects. Results from the CLCA, however, show that GM soy has a higher negative impact in most of the impact categories including global warming potential and freshwater and terrestrial acidification. This is possible when high demand for low cost GM triggers greater production in Latin America and substitution of locally grown protein, such as rapeseed cake, in Sweden.

Key words: Soy-feed, value chains, LCA, GM policy, Sweden

Highlights:

- The supply chain of identity-preserved non-GM soy imports to EU is mapped
- ALCA and CLCA is separately performed for non-GM and GM soy imports Sweden
- No significant environmental gains from importing non-GM soy over GM soy
- If GM soy substitutes locally grown EU protein feed, environmental impacts higher