Environmental impacts of the Japanese beef-fattening system with different feeding lengths as evaluated by a life-cycle assessment method

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Abstract
The objectives of this study were to evaluate the environmental impacts of a beef-fattening system using the life-cycle assessment (LCA) method and to investigate the effects of feeding length on the LCA results. The functional unit was defined as one animal, and the stages associated with the beef-fattening life cycle, such as feed (concentrate and rough-age) production, feed transport, animal management, animal body (i.e., biological activity of cattle), and the treatment of cattle wastes, were included in the system boundary. Our results suggest that enteric or gut CH4 emissions of cattle were the major source in the impact category of global warming (2,851 kg of CO2 equivalents), whereas NH3 emissions from cattle waste were the major source in the impact categories of acidification (35.1 kg of SO2 equivalents) and eutrophication (6.16 kg of PO4 equivalents). Feed production also contributed a great deal to all categories. A shorter feeding length resulted in lower environmental impacts in all the environmental impact categories examined in the current study, such as global warming and acidification, although there was a difference in effect of reducing environmental impacts among the categories.


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