Scales of renewability exemplified by a case study of three Danish pig production systems - DTU Orbit (16/12/2018)

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Environmental indicators are increasingly defined and applied to estimate the human impact on nature and to evaluate human resource use. When considering the environmental impact of food production systems, there is a need to include the impact on different spatial scales. At present, emergy assessments do not, in general, consider global versus local origin of purchased goods. To provide a more detailed picture of how production systems perform with respect to different spatial scales, we expand the renewability concept with a set of indicators that categorise purchased goods according to their geographical origin being within system boundaries (on-site), from local sources, or from non-local sources. An emergy assessment of the resource use for production of pigs (measured as live weight of pigs sold) from three Danish pig production systems (organic small (OS), organic large (OL) and conventional (C)) exemplifies the use of this set of indicators. The results show that at the on-site scale the pig production systems had about the same fraction of renewable inputs of less than 0.5%. However, when the renewability fraction of inputs was accounted for at the global scale, the two organic systems were more renewable (about 20%) compared to the conventional system (13%). Further, local input represented the largest part of the input to OS (66%), while OL had the largest non-local input (74%). This demonstrates that the set of indicators is able to evaluate different strategies for purchasing goods and thus emphasises the importance of accounting for inputs from society differently depending on spatial scale.

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