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On the importance of tightening feedback loops for sustainable development of food systems

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Abstract

In the process of searching for sustainable trajectories in the food system, this paper reviews and discusses the importance of tightening feedback loops between ecosystems, actors in the food production chain and consumers. Intensification, specialization, distancing, concentration and homogenization are trends identified as major constraints for tightened feedback loops. These trends can mask or make it possible to disregard feedback signals from unhealthy ecosystems and weaken communication in the food chain. We explore possibilities for improved feedback management on local to global scales and present examples where feedback loops have been tightened. Enhanced communication between the actors in the food system and consciousness of ecological feedback, through e.g., increased reliance on local resources, are possibilities for improvement. However, where distances between resource and resource user are too large, feedback has to be directed through institutions on an overarching level, e.g., policy measures or environmental and social labelling of products.

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Introduction

All actors in the food chain can potentially play an important role in making the food system more sustainable from an environmental point of view. However, relating concerns about the quality of food and environmental risks to consumer choices or food production methods has become exceedingly difficult. Signals of unhealthy local ecosystems or production systems are in danger of being filtered out or masked as a result of the globalization of the food market. Information on environmental impacts caused by different components of the food production chain is unlikely to reach consumers, nor is feedback from consumers to producers. This is because the two have become separated both in time and space, a process enabled through for example new agricultural and transport technologies and intense trade flows of food products between distant regions. In other words, feedback loops are loose and as environmental problems broaden in scale there is a need to establish or strengthen institutions (norms and rules of society, c.f. North (1990)) for managing feedback information between the various parts of the system (Levin, 1999). In this paper we review and discuss the importance of finding ways of tightening feedback loops between ecosystems, primary production and society in the process of creating a sustainable food system. By food system we mean the whole food production sector in the economy (including farms, processing and marketing of foodstuff), as well as the consumption of food. The concept of sustainable development we base on the definition by Berkes and Folke (1998) that “sustainability implies not challenging ecological thresholds on temporal and spatial scales that will negatively affect ecological systems and social systems” combined with the objective to provide all global citizens with an adequate and sufficient diet – now and in the future. Our focus is mainly on production and consumption in Western industrial societies and their dependence on food production in other parts of the world. We give an account of some trends in the modern food system with related feedback and current examples, mainly Swedish, on different scales where feedback loops can be tightened.

Feedback signals – a theoretical framework

In a broad sense feedback can be described as an influence or message that conveys information about the outcome of a process or activity back to its source (Capra, 1996). This means that a system component can itself be influenced indirectly by the changes it has induced. Feedback loops can act as control devices in both natural and socio-economic systems. Negative loops counterbalance change and have a stabilizing effect, such as the regulation of our body temperature, while positive feedback reinforces change and amplifies rather than reverses change (Allaby, 1994). An example of a positive feedback loop is the exponential growth of a population, where new births increase the population, which further increases the number of individuals that are born.

In ecological systems feedback involves a variety of biological, chemical and physical stimuli (Simmons, 1996), while in socio-economic systems feedback can be transmitted

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