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Social actors and unsustainability of agriculture

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Social actors can strongly affect the sustainability of agricultural operations by influencing farmers' decisions and choices. Such actors include: (1) loss-making investors who abandon farms due to low returns, (2) angry neighbours negatively affected by farming operations and engaging in silent or active conflict, (3) dissatisfied customers at the end of the value chain who reject the products and shift to alternative providers, and (4) overacting regulators who over-regulate farm activities. A higher order sustainability concept considers the ability of farms to adapt and learn from early signs of threats. A number of response paths based on policies, incentives and information supply have been developed to support learning and adjustments. Emphasis on the nested-scales relations of incremental sustainability and sustainagility, in addition to the more commonly articulated ecological threshold perspective, helps identify key indicators that characterize unsustainability processes across countries and contexts. A dynamic systems understanding also assists selection of process indicators focused on response paths that complement result-oriented approaches in current sustainability assessment frameworks.

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Introduction

The sustainability debate in agriculture arose from the perception that many agricultural systems, in various combinations of issues, are harmful to the environment, threaten farming livelihoods or damage the social fabric of rural areas. There is no shortage of sustainability assessment frameworks, most often revolving around the concept of result-oriented indicators to measure and monitor agricultural sustainability (e.g. [1–4,5•,6]). Some are framed vis-à-vis a normative (absolute) system of reference, others define threshold values within the current 'management swing potential' or relative to the difference between best and worst current practice [7•]. The debate typically follows an issue cycle [8] where cause–effect relations that play a role in early stages of the contest, are less important later on when indicators are selected for ease of assessment of compliance [9]. Indicator frameworks often focus on ecological aspects, sometimes complemented by economic indicators, and to a lesser extent by social indicators. The number of indicators varies widely, between ten or less [5•,10] to more than fifty [4,11], with indicators occasionally summarized into a single number for planet, people and profits [12••]. Given that agricultural systems are embedded in wide social institutional networks that influence their way of operating and consequently their impacts on sustainability, a truly integrative assessment of agricultural sustainability must consider potential threats emanating from social actors as an essential part of the evaluation. Thus, we first characterize unsustainability of agriculture and farming through an analysis of the diverse scales and social actors involved in agriculture and the ways in which their actions can threaten farm sustainability as part of socio-ecological systems. We then explore what feedback mechanisms are available for tackling these challenges to sustainability by influencing social actors.

Actors in agricultural landscapes whose actions can threaten farm sustainability

Lack of sustainability as reflected in existing sustainability frameworks that we reviewed can be linked to challenges to any of the various roles that agriculture and farming play (Table 1). Unsustainability can derive from the way soil, water, nutrients and biota are handled on farm [13], but it can also be expressed and voiced by social actors that are essential to the farm [14]. These actors include those affected by lateral flows that originate on farm (broadly speaking neighbours and environmental activists). They also include those providing essential inputs (including investment), and the customers of farm outputs, directly or indirectly via a value chain, with intermediate stakeholders. Beyond inputs and outputs, the farm also critically depends on the regulatory environment in which it operates. The regulatory environment is

Table 1

Aspects of farms and associated potential sources of unsustainability

Aspects of dynamic farms	Potential cause of unsustainability
Solar energy converters, linking C, N, P and water cycles and lateral flows	Loss of primary productivity, interrupted nutrient cycles and water flows, depleted soil carbon stocks, loss of soil structure and biota
Enterprises that use land, labour, knowledge, germplasm and capital in production	Loss of any of the key production factors, for which more profitable uses may arise from new economic opportunities
Starting points of value-chains that feed the world and satisfy part of its fibre and fuel requirements	Loss of demand for products, for example due to concerns over product quality and/or quality of the production process
Part of social networks	Conflict and loss of collective action
A component of larger household livelihood systems	Loss of complementarity with other parts of livelihood systems and evolving ambitions
Links in intergenerational knowledge chains that combine informal and formal science	Loss of relevance of existing knowledge under new circumstances, dominance of external, formal knowledge, loss of effective intergenerational transmission and learning
Part of landscapes	Conflicts over lateral flows such as water, nutrients, soil, organisms or fire and integral landscape functions such as perceived beauty
Agrobiodiversity management units, involved in selective reproduction of crops, livestock and trees making them drivers of inter- and intraspecific genetic diversity trends	Lack of adaptive capacity of farm-level germplasm in the face of new challenges (pests and diseases, climate change, shifting market demands), lack of access to external germplasm

itself influenced by the opinions of investors, neighbours/activists and value-chain-operators, without necessarily addressing all their concerns. Without being comprehensive in listing all actors related to farming and food systems these kinds of threats to sustainability of farm-level operations can be broadly described by considering the following four groups of social actors (Figure 1):

(1) Loss-making investors and credit providers who abandon farms due to low economic returns,
(2) Angry neighbours and environmental activists engaging in silent or active conflict, because they are negatively affected by farming activities, for example, through pesticide-contaminated water running off the farm,
(3) Dissatisfied customers at the endpoint of value chains who do not trust the quality of products or disapprove of production conditions and shift to alternative providers,
(4) Overacting regulators who over-regulate farm activities.

Many actors that fall under the categories listed above may exert both negative and positive influences on different aspects of sustainability. For example, dissatisfied customers asking for environmentally friendly products may pose an economic challenge to farms but ultimately lead to reduced environmental externalities. Yet because such demands may require farms to deviate from their traditional practices, a step that often involves substantial risks, we consider them here as potential threats to the sustainability of a farming operation.

On top of threats for farm sustainability stemming from these actors, it is well recognized that depletion of essential production resources, a common result of unsustainable practices, as well as lack of options to respond to new conditions and challenges are also major threats for farm sustainability.

According to each actor's contexts, they perceive their actions as sustainable. Hence, they influence how farmers make management decisions to negotiate immediate pressures and plan for future change. All actors' decisions and choices can render an agricultural operation unsustainable — a quality that often manifests itself in farmers failing to meet their (social and/or financial) objectives. Once other options exist in society, it can become difficult to find successors who are willing to continue with the farm, as ultimate sustainability challenge.

Characterizing unsustainability of agriculture: actor-based indicators

This analysis suggests a number of indicators that characterize unsustainability of agriculture resulting from key actors' decisions, choices and interactions with farms. Examples of such indicators which can be used across countries and contexts are found in Table 2. These indicators can facilitate review of the current state of interplay of agriculture and farming from a social actor point of view and identify major threats. For some indicators, there may be thresholds from an actor perspective (acceptable/unacceptable; 'in' versus 'out'). For others, quantitative and/or qualitative interpretation will guide learning and adaptive responses.

Different actors have their own specific interests that sometimes contrast and often compete, and they may emphasize different indicators of unsustainability for various reasons. Additionally, each actor may experience internal conflicts of interest which may result in modified preference of indicators. Likewise, some actors may be more powerful than others to lobby for their interests, and, thus, put stronger weights on different indicators.