Getting Our Heads Out of the Numbers: Revealing the "Invisible" Dynamics of Agroecology

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Agriculture at the Climate Nexus

Agriculture stands at the forefront of the Anthropocene's challenges. As highlighted by the IPBES (2016), it is situated at a critical nexus: it is both a primary victim of environmental decline and a major lever for mitigation. Yet, as we strive to align food systems with planetary boundaries (Rockström et al., 2009), a disconnect remains. Global directives often struggle to translate into local realities because they overlook the socio-economic and political fabric of farming territories (González de Molina et al., 2020). To address sustainability effectively, we must therefore zoom in on where the actual work happens: the organizational interactions between agricultural actors.

Adaptation vs. Transformation

AAs stakeholders gather, a consensus is emerging: agriculture must evolve radically. However, the current policy approach often falls short by treating this evolution as a mere technical "adaptation" —a checklist of adjustments (e.g., changing seeds, increasing irrigation efficiency) designed to maintain existing industrial models under new climatic conditions (Altieri & Nicholls, 2018).

We argue that this approach is insufficient. Facing radical uncertainty requires not just adaptation, but a systemic transformation of our food systems (Altieri & Nicholls, 2018). Agroecology offers this transformative potential, but only if it is understood in its multidimensional complexity: as a science, a movement, and a practice capable of reshaping social, economic, and ecological interactions (Wezel et al., 2009). Therefore, policy makers must design adaptation strategies that account for the realities of social contexts. This includes participatory planning processes, transparent communication, and support systems that lower the economic and psychological barriers to behavioural change. Adaptation becomes more effective when communities understand not only what to do but also why, how, and with whose support. Furthermore, adaptation plans should integrate local knowledge and social innovation, leveraging the capacity of residents, civil society organisations, and local governments to implement solutions tailored to regional vulnerabilities.

From KPI to on going strategy

This systemic transformation cannot be achieved in isolation. As noted by the IPBES (2016), sustainable pathways require the inclusion of diverse knowledge systems. The challenge is to make heterogeneous actors dialogue effectively to co-construct solutions (farmers, scientists, policymakers, citizens ...).

Scientific and public actors are often trying to steer this living, complex transformation with rigid,

top-down management tools designed for stability, not change. As Darnhofer (2021) argues, this approach treats resilience as a static state to be measured, rather than a dynamic process of 'becoming' to be navigated. Consequently, these actors tend to obsess over measuring and evaluating every output with standardized metrics, trapping agriculture in what Campbell (2020) calls an 'audit culture'. In this quest for the perfect Key Performance Indicator (KPI) for agroecology, they force a 'legibility' that simplifies complex local realities (Scott, 1998), often missing the meaning and relevance of the informal processes actually unfolding on the ground (Lucas & Gasselin, 2018).

The Invisible Engine: "Silent" Cooperation

Policy makers often assume that adaptation happens through formal institutions and funded programs. In reality, effective resilience is a dynamic, collective learning process that often takes place below the radar.

Research on agricultural dynamics reveals the existence of a "silent agroecology" (Lucas & Gasselin, 2018). This term describes a vibrant array of cooperative practices such as (i) peer-to-peer equipment sharing, (ii) informal seed exchanges, (iii) or local solidarity networks, that occur outside of formal statutes. These invisible interactions allow farmers to regain autonomy and experiment with resilient practices without the rigidity of official frameworks.

When policies only fund visible, formal infrastructures, they miss the actual engine of the transition. A territory's capacity to transform depends on the density and quality of these inter-organizational relationships, which help structure the profusion of local initiatives into a coherent movement (Hayder, 2022).

Organizing the Territory as a Community of Inquiry

To unlock the agroecological transition, we must shift our management paradigm. The transition is not a plan to be executed, but an ongoing and collective inquiry (Dewey, 1938). Because climate impacts vary drastically from one valley to another, solutions cannot be imported; they must be co-constructed locally.

This requires breaking down silos between diverse stakeholders, farmers, cooperatives, researchers, and local authorities (Lamine, 2017). These actors must be able to govern collective action despite their differing interests. This often takes the form of multi-stakeholder coalitions and organisations where public and private actors learn to collaborate (Ahrne & Brunsson, 2005; Saniossian et al., 2022).

Effective transformation requires specific organizational arrangements supported by organization theory:

(i) Spaces for Dialogue: Creating forums where conflicting institutional logics can be confronted and aligned. Research on meta-organizations highlights that deciding among organizations requires specific governance mechanisms to manage the partial autonomy of members (Ahrne & Brunsson, 2005;Berkowitz et al., 2020).

(ii) Collaborative Experimentation: Allowing groups to test new supply chains on a small scale. This implies designing research engineering that bridges the gap between academic knowledge and practitioner experience (Chanal et al., 2015).

(iii) Flexible Governance: Moving from control-based management to "process support. " As Lorino (2018) argues, managing complex transitions requires maintaining a continuous inquiry rather than executing a static plan, valuing the learning journey over immediate metrics.

Policy as an Enabler of Local Dynamics

The transition to agroecology requires not only regulatory mandates but also significant investment in the essential human and organizational infrastructure of our territories.

(i) Having an insider perspective: Policymakers designing and funding projects to support transformation must prioritize the local context. We suggest adopting an "insider posture" rather than a "managerial posture" (Smith & Raven, 2012). This involves an immersion in the field and taking the time to observe the "lived realities of local actors. " We strongly recommend following actors' activities and being in immersion rather than merely being a visitor.

(ii) Recognize and Fund "Silent" Cooperation: Policy frameworks must be flexible enough to support informal collectives that operate outside traditional statutes (Lucas & Gasselin, 2018). Small grants for informal groups can yield higher resilience dividends than massive subsidies for industrial equipment.

(iii) Target Transformation, Not Just Adaptation: Evaluate projects based on their capacity to redesign the system (diversification, autonomy, social equity) rather than just their short-term ability to cope with climate shocks (Altieri & Nicholls, 2018).

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