

Innovations in Agri-Food Systems in Europe: Pathways and Challenges to Inclusion and Sustainability [†]

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Abstract: Optimal functioning of agri-food systems is essential for food security and sustainability. In this sector, Europe faces many issues, such as promoting sustainable and healthy food production in the context of social and economic inequalities. To deal with these issues, we propose a conceptual framework relating to the idea of a regional innovation system considering power relations, called the hierarchical regional innovation system (HRIS). This framework is based on the concepts of eco-innovation, inclusive innovation, and transition as its theoretical foundations. The findings show that the framework can be helpful in European rural contexts.

Keywords: agri-food systems; inclusive innovation; sustainability; hierarchical regional innovation systems; European Union

1. Introduction

Agriculture plays a pivotal role in ensuring food security and environmental sustainability. As the primary source of food production, it holds the key to providing safe, nutritious, and ample sustenance which is necessary for healthy living. However, it also contributes significantly to global greenhouse gas (GHG) emissions, accounting for 26% of the total [1]. In light of this dual role, experts, notably the EAT-Lancet Commission [2], advocate prioritizing healthy diets and sustainable food production as fundamental planetary goals. In this way, many world institutions are striving to resolve this problem through means such as the Sustainable Development Goals—2030 Agenda/UNO, the Paris Climate Agreement/UNO, and the Intergovernmental Panel on Climate Change. Furthermore, some frameworks highlight the relevance of relationships in this field, such as the food–energy–water nexus [3], which shows the synergies and trade-offs of these three elements, as well as their social and environmental effects, and serves as guidance for cross-sectorial development policies.

In the European Union, there are many challenges in the agri-food context. For example, there is urbanisation, globalisation, individualisation of human nutrition, land grabbing, international migration affecting European agriculture, alternative protein production, and so on. However, the main question lies in searching for sustainable and healthy food systems. Failure to do so will result in a global risk to humankind [4]. It is necessary to consider the projected population growth for the upcoming decades, a predicted global burden due to unhealthy and unsustainable food production with impacts on GHG emissions, nitrogen and phosphorus pollution, biodiversity loss, and water and land resources.



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Related to the abovementioned issues, Europe faces another challenge because of the megatrends affecting food demand and production, such as emerging consumption patterns, technological change, and competition for natural resources [5]. This context leads to rising social and spatial inequalities in rural areas where many people (mainly farmers) are frustrated with the sustainable and technological policies enforced in their territory, creating large contingents of discontent [6]. Meanwhile, this is in part fed by the production and type of innovations intended for use in the agriculture sector as part of a high-tech and industrialist-centric pattern.

Addressing these imperatives demands a multifaceted approach encompassing social and technological innovations in agricultural practices. Concurrently, recent agricultural protests in Europe against specific environmental sustainability policies underscore the urgency of understanding the underlying causes of discontent within the farming community.

This study provides a conceptual framework for analysing the problems related to environmental and socioeconomic unsustainability in producing innovations in European agri-food systems, showing at the same time the troubles and solutions for different regional contexts in this sector. Drawing upon the theoretical framework of the hierarchical regional innovation system (HRIS) [7], this study endeavours to understand these complexities through the lens of economic geography and innovation studies.

2. Conceptual Framework

Studies on varieties of capitalism have established patterns and relationships between national institutional frames and forms of economic activity [8]. This approach stresses the two main types of varieties: the liberal market economies, found in countries such as the USA or UK, and the coordinated market economies, found in Germany or the Nordic countries. This national-scale framework is a regional version based on the regional innovation system approach [9]. Thus, geographers have created the entrepreneurial regional innovation system and the institutional regional innovation system, i.e., the regional variants of liberal and coordinated market economies.

However, a specific kind of variety of capitalism is relevant to this proposal: the hierarchical market economy variety [10]. Built on Latin American countries, this variety expresses realities in which social and economic inequalities are extreme. Beyond the unevenness, these nations are characterized by diversified business groups within their economies, strong participation by multinational companies, atomistic labour relations, and low educational and professional skill levels.

Based on this variety of capitalism, the HRIS approach was created to consider inequalities and power relations in the innovation process in regions [7]. It uses a concept and a perspective. On the one hand, the inclusive innovation notion defines those innovations that satisfy the needs of poor or marginalised groups [11,12]. In some cases, these groups develop social or technical innovations. On the other hand, the geography of sustainability transitions [13,14] is a territorialised approach to studying transitions. It is a robust improvement over the multi-level perspective [15], a typical approach for transition trajectories of niches, regimes, and macro-trends. Furthermore, this kind of regional innovation system incorporates the idea of eco-innovation [16], i.e., novelties that entail concerns about their environmental impacts and trying to avoid or minimise them.

The HRIS can predominantly highlight two development trajectories underpinned in (ex)inclusion processes (Figure 1). First, it prioritizes inclusivity at its core. Here, inclusion is fundamental to addressing innovations through sustainable and inclusive processes based on more equal terms. The second, in contrast, does not consider inclusion to be central; rather, growth has a strong profit direction. Both trajectories are established in a context of (in)justice and (in)equality defined by power relations and groups engaged in confrontation.

Nevertheless, these settings can lead to some trade-offs or contradictions in themselves. Meanwhile, a more expressive economic dimension (profit-driven) can drive uneven development. On the contrary, a more just process can lead to lower economic growth (because of a non-economic rationale). Thus, this problem can be solved by combining market and embedded relations (economic plus social dimension).

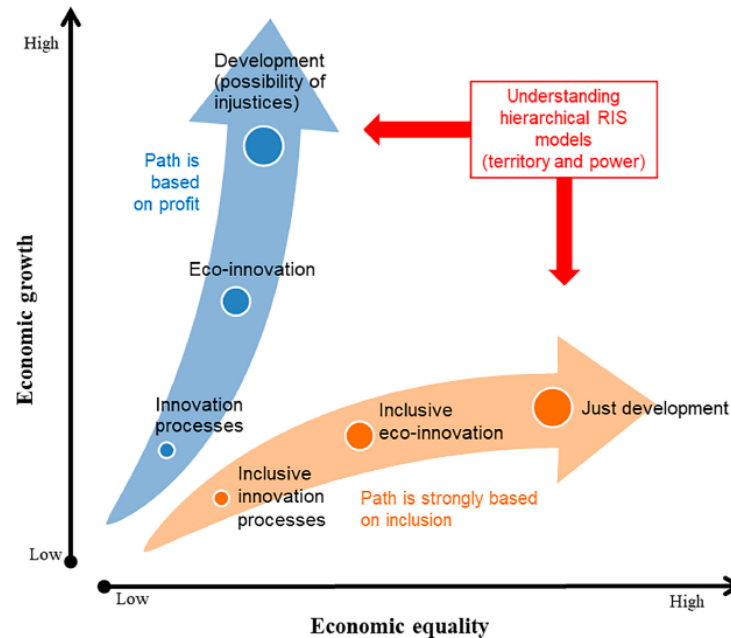


Figure 1. Two development paths that are differentiated by the effectiveness of inclusion [7] (p. 7).

The three main concepts—inclusive innovation, eco-innovation, and territory (HRIS)—are interconnected. First, inclusive innovations underline the differing inclusion levels in the trajectory, from a simple intention to a change in society’s mindset (pro-inclusion). Second, the notion of eco-innovation can show, in the context of innovation, niches where entrepreneurs connect resources and business opportunities to sustainable transitions. Third, the HRIS has the role of uncovering relations and place-specific powers that can stimulate or hinder transitions in sustainability.

3. Discussion and Conclusions

The approach presented here can benefit the European agri-food sector. Our findings reveal a deepening rift characterized by economic and technological exclusion, particularly among European family farmers. This exclusionary trend exacerbates rural discontent and has broader societal ramifications, including the proliferation of anti-environmental populism in urban centres [17]. Spatially, rural regions are increasingly experiencing destructuring through processes of territorialization, deterritorialization, and reterritorialization [18].

One major cause of these issues is the focus on technological innovations in Europe, where social and economic inclusion is often overlooked in both private and public sectors, despite community policies such as the New Green Deal and the Smart Specialization platform, which aim to foster a smarter, more inclusive, and greener Europe.

Thus, the HRIS framework is suitable for addressing rural problems. Farmers often remain outside the scope of innovations from multinationals, not only in agriculture but also in commercialization, transportation, and other areas. Additionally, the average farmer has a lower education and skill level compared to urban workers. Therefore, inclusive development processes are fundamental to improving economic competition conditions for these populations, leveraging their specific cognitive assets for social and technical

innovations. This study highlights the importance of understanding regional innovation systems, especially regarding inclusion in less innovative regions in both developing and developed countries [19]. Consequently, this understanding can inform and improve policies that leverage regional assets more effectively.

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