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Analysis

The Spanish livestock model: A coevolutionary analysis

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ABSTRACT

Coevolution is a wide theoretical framework that enables the study of socio-ecological transformations in different contexts and, specifically, in agrarian systems. This article analyses coevolutionary changes in Spanish livestock over the last 50 years, from the so-called "traditional" livestock model, in which ecological, social and economic elements co-evolve in closely interconnected relationships, to the currently dominant industrial livestock model, governed by "ecologies at a distance". Not only meat consumption grew significantly as a consequence of the change in the prevailing livestock production model, Spain also became one of the most important meat producers in the European Union. Simultaneously, dependence on imported cereals and soya increased dramatically. Nevertheless, in spite of the prevalence of industrial logics, extensive livestock farming, that follows hybrid logics incorporating features from both models, still exists in Spain and, particularly, in Andalusia (Southern Spain). This locally based model is characterised by higher environmental standards, as well as its contribution to the preservation of a singular agro-ecosystem (dehesa). However, its long-term transformation and, therefore, the social construction of more sustainable local livestock systems, must be understood as a co-evolutionary process in which agency and social selection of innovations are essential elements.

1. Introduction

Over the last 50 years, the prevalent livestock model in Spain has experienced a radical transformation. At the end of the 1950s, Spain was still a mainly agrarian country characterised by a low meat production capacity. At that point, Spanish livestock was based on native breeds adapted to traditional agro-systems with symbiotic relationships between agriculture and livestock. At the beginning of the 2000s, the physical production level of livestock had not only multiplied tenfold, its most relevant production parameters had also radically changed. It had become an industrial activity, weakening the connection with local agro-systems, based on the mass purchase of cereals and animal feed in international markets. As a consequence, the relationship between livestock activities and agro-systems was totally transformed. Spanish diet has also been dramatically transformed; meat consumption has increased continuously throughout this period, due to the higher availability and lower prices promoted by the new industrial model. Thus, average annual meat consumption per person grew from 11.7 kg in 1970 to more than 65 kg in 2005. Therefore, there has been a sharp increase in the carnivorous component of the Spanish diet, parallel to the growth in personal income.

The aim of this article is to contribute, on the one hand, to the presentation of these changes and, on the other, to the understanding of these processes, considering the interaction between ecological and socio-economic elements. For this reason, from a theoretical perspective, this research will be based on the concept of co-evolution, taking into consideration that the co-evolutionary dynamics of traditional agrarian models, characterised by close geographical interaction between socioeconomic issues, are very different to those of industrial agrarian models, based on "ecologies at a distance".

This article is divided into four main sections. Firstly, the main theoretical concepts used in this research and, in particular, the concept of coevolution, will be discussed. Secondly, the previously outlined theoretical framework will be applied to analyse changes in the Spanish livestock model between 1960 and 2005. Thirdly, a case study (organic livestock in the area of "La Janda", Andalusia), which is characterised by the relatively high degree of hybridisation of traditional and industrial logics, will be studied. Finally, the most important conclusions will be summarised.

2. The Coevolutionary Approach

Most social science analyses adhere to the western bifurcation between nature and society. The main result is the compartmentalisation of social and biophysical sciences and the creation of significant problems that adversely affect our understanding of interactions, particularly between socio-economic and ecological issues.

At the same time, this bifurcation has promoted ontological and epistemological effects on the theoretical conceptualisation of nature and society itself. One example is the so-called "nature versus culture"

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debate that deals with the topic of to what extent nature can be considered as a "pristine" entity, independent of human beings, or as a culturally-moulded social construction (Woodgate and Redclift, 1998). Similarly, the concept of social reality as independent of ecological issues is based on this bifurcation, although various attempts have been made to overcome this simplification in different academic disciplines. Thus, developments in fields like cultural anthropology (Durham, 1990), evolutionary psychology (Jackson, 2002), or sociobiology (Wilson, 2000) have promoted a broader perspective of social phenomena related to ecological and biophysical processes.

One of the most important contributions to the promotion of an integrated socio-natural approach has been coevolution (Gual and Norgaard, 2010). It was originally proposed in ecology to refer to the joint evolution of butterflies and flowering plants, parasites and their hosts, predators and their prey, etc. (Janze, 1980). It has also been evoked to characterise broad ecological processes, as well as interactions among different types of elements, for example, the explanation of interaction processes between biological and social elements, or between patterns of production and consumption (for a review, Van den Bergh and Stagl, 2003).

Norgaard (1981, 1984) was the first to explicitly use coevolution in a socio-environmental context. In Norgaard's first approximation, social and environmental sub-systems were evolving simultaneously, interacting between and among each other. Thus, some ecological elements reflected selective pressures exerted by social systems, and vice versa (Fig. 1).

According to later studies by Norgaard (1994), socio-ecological systems are composed of five subsystems that interact among each other: values, knowledge, social organisation, technology and environment. These subsystems are interconnected and therefore exert and experience selective pressures. This set of interactions acts as a force that moulds the overall system and, thus, exerts a daily influence on the specific features and prevalent practices within different subsystems. Today, coevolution (as conceived by Norgaard) is a central concept in ecological economics and other environmental disciplines, such as agrarian sciences (Gliesman, 1998).

Human adaptation processes often imply interaction between, and even modification of, social and ecological aspects and, thus, must be understood within the coevolutionary theoretical framework (Berkes, 2007; Berkes and Folke, 1998; Norgaard, 1994; Toledo and Barrera-Bassols, 2008). From a coevolutionary perspective, processes of change are not deterministic. Nature is considered social because people exert selective pressures upon the environment, transforming the biosphere. Society is, in turn, natural because social subsystems are conditioned by the characteristics of their ecosystems. In this sense, the possibilities for generation, survival and evolution of social subsystems are conditioned by the characteristics of the natural environment (Berkes and Berkes, 2010; Gual and Norgaard, 2010; Kallis and Norgaard, 2010; Saifi and Drake, 2008). However, some of these concepts are difficult to develop, particularly from an empirically applied point of view. Three main points must be highlighted.

Firstly, although coevolution considers the existence of different subsystems, no consensus has been reached as to how many and exactly how they are defined. For example, as mentioned above, Norgaard (1994) identified five different subsystems (values, knowledge, organisation, technologies and environment) that interact among each other. Nevertheless, in some of his previous work (1981 and 1984) he defined coevolution in a simpler way, as a set of interactions between a social sub-system and an ecosystem (Norgaard, 1981). Although this definition is compatible with the previous one, its emphasis and relationships are different, because, in this case, four of the previously defined subsystems (values, knowledge, organisation and technologies) are merged together in a unique social subsystem.

If we analyse some of the empirical applications of Norgaard's concepts, we can also conclude that they do not concur. Some have promoted an adaptation of Norgaards five-system definition, even

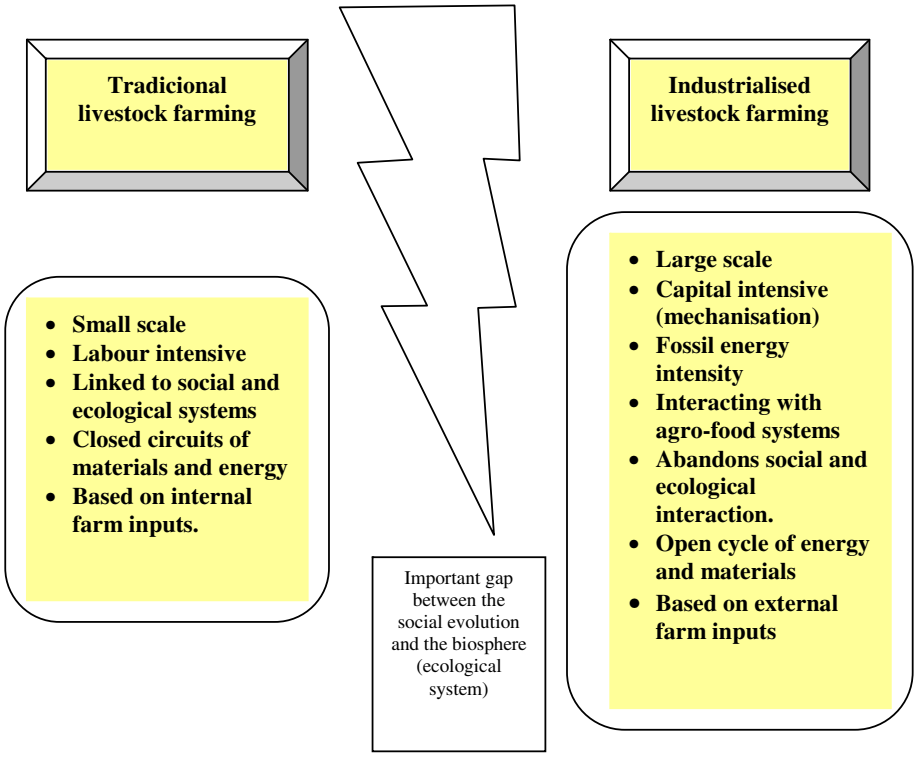

Fig. 1. Coevolution of livestock farming in Spain.
Source: Compiled by the authors based on Leal et al. (1975), Campos Palacin (1984), Campos and Naredo (1980), Domínguez (2001a), Domínguez (2001b), Naredo (2004), González de Molina and Martínez Alier (2001), Etxezarreta (2006).