From farming practices towards institutional innovation: case study research on ecological capital in order to develop a promising system configuration

In this paper I present a case study on how humans and the environment mutually shape each other in locally specific contexts. Both empirically and theoretically the focus is on interaction in two or more systems (Norgaard 1981 and 1984). The research involves organisations, technologies and politics all centred on *evolving* practices, and demonstrates *´the utility of the concepts of co-evolution for furthering theoretical and empirical understanding of social phenomena´* (Rammel *et al.* 2007:116). The practices studied are farming practices that are based on ecological capital, and together form a new *´configuration´* demanding and outlining institutional innovation. All together the case study forms a beautiful and real example of how co-evolutionary theory, or theory on *co-production*, evolves. It shows how humans learn and shape both nature and society empirically. It explains how farmers *´learn to live in a complex world of interdependent systems with high uncertainties and multiple interests in society´* (Stagl, 2007:53) and *´to help establish procedures, management practices and institutions for public decision-making that support learning processes on multiple scales´* (ibid: 59). In other words, how the institutional context of farmers can develop *in line with* further unfolding promising practices.

Introduction

Post-war modernization of agricultural production represents a historic project in which modernity was externally defined (Van der Ploeg 2003). Intensification and increase of scale of agricultural production result in the deterioration of habitat conditions (Baudry *et al.* 2003). The destruction and fragmentation of foraging and nesting habitats for meadow bird species in farmers' fields for example result in a general decline in number and range of these species (Beintema *et al.* 1997, Duncan et al. 1999, BirdLife International 2004). Attempts to correct the side-effects of the modernization process do not result in higher numbers of meadow bird species (Kleijn *et al.* 2001, Berendse *et al.* 2004, Willems *et al.* 2004). However, the modernization project evolved into different models: industrialization, post-productivism and rural development (Marsden 2003). Industrialization should not replace modernisation; it rather should be considered as one of the trajectories occurring at present (Marsden 2006). Locally, different strategies regarding nature and landscape preservation are present (Swagemakers and Wiskerke 2006). Simultaneously, new institutional arrangements develop (Wiskerke *et al.* 2003), for example the territorial co-operative the "Noardelike Fryske Wâlden" in The Netherlands. Among other matters, this co-operative bridges the implementation of the management schemes for the protection of meadow bird species, in particular the Black-tailed Godwit (*Limosa limosa*), and the interests of (mainly) dairy farmers in the area (Swagemakers 2008).

Methodology

A case study approach provides a convenient context for in-depth analysis of the phenomenon under investigation (Yin 1984). The application and combination of different sources of information and several research methods in the study of the same phenomenon are known as the triangulation method (Mathison 1988, Verschuren and Doodewaard 1999). The case study research examines ecological capital as promising configuration (Rip and Kemp 1998, Van der Ploeg *et al.* 2004). Based on a subject-centred approach (Nooij 1990), the case study is useful in order to understand and order of empirical reality and complexity (Nooij 1993, Whatmore 1994).

Ecological capital
The case study is on the use and improvement of ecological capital: the whole of natural resources that a) is the result of former co-production, b) is the basis for coming cycles of co-production in such a way that c) the results of coming cycles are superior to the former ones (Toledo 1990, Van der Ploeg 1997 and 2003, Wiskerke 1997, Roep 2000, Gerritsen 2002). Thereby a specific form of co-production is concerned, namely the interaction of labor and living nature (Hebinck 2001), i.e. the whole of natural resources en specific relations between those resources. Central in using and improving ecological capital is *the way different resources are related*. To clarify the relations between resources, the case study specifically considers meadow bird management.

Ecological capital is researched on the basis of the soil-plant-animal-manure system (Verhoeven *et al.* 2003, Reijs 2007)), which by farmers in the region is extended to hedges and belts with alder trees, and meadow birds. The use of the soil and the development of the soil life is important from a farmer's perspective. It relates to the production of healthy fodder for the cows, the health of the cows, and the quality of the manure that is produced by the cows. The optimization of ecological capital in the farm business, so towards food production, goes well along with safeguarding nature. The use and development of what farmers refer to as 'improved manure' (Goede *et al.* 2003) is important. In the case study research I have looked for potentials rather then analysing the actual situation. The conceptualisation of the soil-plant-animal-manure system, setting the new configuration that promises to work, constitutes a food web (Smeding and De Snoo 2003). People manage this system. The case study shows how people learn; how new configurations that promise to work evolve in new institutional arrangements.

Meadow bird management for example enhances a complex process of fine-tuning, in which many stakeholders are involved. In order to develop promising meadow bird management, a flexible model should be used: farmers should be able to optimize the factors that are important for the survival of (young) birds, flexibly. Models should allow compensation of factors. It turns out that the expected negative impact of intensive farm businesses in practice can be compensated by having an eye for birds. The power of judgment of farmers (farmers having an eye for birds) and a high level of flexibility can compensate the negative impact of intensive farm businesses. It will be effective to go to meet farmers who are willing to take care and operate on the basis of 'adaptability' and 'flexibility' (Van Kessel 1990, Wynne 1996). Attitudes towards fitting the management of meadow birds in the farm business differ among farmers, as well as between regions. Regionally new management strategies are explored and put into practice.

Interpreting the system configuration
For understanding the significance of co-production of man and nature a transitional approach is needed: it recognizes how ecological capital enhances processes through time and is localized in space, how the state, the market, land-use patterns and farmers interact, how science has a role in the creation and development of ecological capital, and can be understood as a process driven phenomenon that generates new prospects and new possibilities and exchanges knowledge through contextualisation.

The case study shows how strengthening co-production requires new instruments, e.g. the soil-plant-animal-manure system. The innovativeness of the empirically grounded farming system results in an increase of biodiversity, improvement of animal welfare, and improved food quality. The case study on ecological capital examines an organic way of production that is sustained by self organization.

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