

## Can family farmers be understood as adaptive managers?

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### Abstract

Although farmers are often seen as the (passive) recipients of research results, this may well be a skewed 'modernist' perception underestimating the farmer's learning processes based on own experimentation. It also seems to disregard the farmer's awareness of the world as characterised by rapid and unforeseen change. Family farmers may thus focus on maintaining the adaptability of their farms through a shifting mix of on- and off-farm enterprises as well as constant experimentation and innovation so as to strengthen the adaptive flexibility and thus the resilience of their farms.

**Keywords:** adaptive management, resilience, evolutionary approach

### Efficiency-lead approach to farm management

Farm management is a research topic often studied by agricultural economists. Within the modernisation paradigm, efficient farm management came to be characterised by the continuous application of innovatory technologies aimed at increasing output and productivity. Agricultural scientists thus continuously seek more refined agricultural 'packages' which combine fertilisers, pesticides, herbicides and crop varieties; as well as more powerful (and expensive) machinery (see Morgan and Murdoch, 2000; Van der Ploeg *et al.*, 2000). The farm development trajectory inherent in this modernisation model requires the farmer to specialise, to increase the scale of her operation, and to combine this with intensified production (Van der Ploeg *et al.*, 2000). This can lead to a high level of efficiency, due to an optimal adaptation to the current social, political and economic environment. Some – mostly large-scale – farms pursue this development model (Walford, 2003; Burton, 2004).

However, should prices become unstable or the socio-political environment change in an unexpected way, the dependence on external inputs and use of expensive technologies can lead to entrapment or 'lock-in' (Van der Ploeg and Frouws, 1999). Indeed, this efficiency-lead farm management approach is best adapted to a setting where the goals are not contested, where the environment characterised by gradual and predictable changes, and where there is a high level of control over implementation.

### Long-term perspective of farm management

The assumptions underlying the approach to farm management as characterised by the modernisation paradigm differ from the evolutionary perspective with its emphasis on the fact that uncertainty about future developments cannot be reduced. An evolutionary approach takes a longer-term view of the farm and points out that making and taking decisions, solving problems, designing and re-designing systems all have to take place under a high level of complexity and uncertainty (Rosenhead and Mingers, 2001). There is no such thing as an ever stable system and farmers have always lived in changing environments – politically, socially, economically and ecologically – where surprise and structural change are inevitable. Indeed, there is an immense uncertainty surrounding any decision about long term growth

and development: there are too many factors and many of the relationships between them are unclear or in dispute (Rosenhead and Mingers, 2001).

The emphasis on the need to consider not only the complexity of the system, but also its dynamic aspects is at the heart of the concept of resilience (Holling, 2001). When considering temporal dynamics, a farm's sustainability thus depends on its ability to cope with changes in both external and internal conditions and implies the capacity to create, test and maintain this adaptive capacity (Milestad and Darnhofer, 2003). In particular, to manage a farm for long-term development requires the ability to cope with unexpected events and to juggle shifting objectives (Holling, 2001).

From an evolutionary view point, continual development and change is needed to maintain a farm's 'fitness' relative to the systems it is coevolving with. As Rammel (2003) points out, this imperative to change highlights that there can neither be any best state, nor a stable equilibrium nor an optimal path of development. Evolutionary perspectives do not relate to stability in a static sense as systems are faced with moving equilibria and the dynamics of coevolutionary interactions which cannot be foreseen *ex-ante*. As Rammel and Van den Bergh (2003:127) point out, given this permanent process of unpredictable change any kind of optimising must be understood as local and myopic. If optimality exists, it will be temporary, because through evolution, selection, innovation and environmental change it is easily transformed into a maladaptive trait. There thus seems to be a trade-off between (economic) efficiency (*i.e.* taking advantage of existing favourable conditions) and adaptability (*i.e.* the ability to sustain long-term stability by maintaining high compatibility in the face of a changing environment) (Giampietro, 1997:85).

### **Adaptability-lead approach to farm management**

As the research on farming styles led by the Wageningen School (Van der Ploeg, 2000; Commandeur, 2003) has shown, farmers have tended to be careful when faced with a 'package solution', carefully selecting the practices and technologies offered to them. Indeed, if the core objective of many family farmers is less the short-term profit maximisation than the long-term survival of their farm, risk minimizing may be a key consideration. Risk minimising, as understood here, is not based on transforming uncertainties into calculated or insured risks, but on the awareness that evolving systems are complex and can neither be understood nor controlled completely (Rammel and Van den Bergh, 2003). This understanding leads to an alternative orientation of farming strategy which shifts the weight from economic efficiency and short-term optimality to conditions fostering adaptive flexibility and long-term stability.

Although the link between diversity and adaptability is still being debated, it seems likely that diversity can be a key element of long-term stability and even farm survival. Indeed, maintained diversity (on- and off-farm) represents a repertoire of alternative options and increases the possibility that altered conditions or new socio-economical objectives can be successfully met through pre-adaptations and further changes.

This change in perspective emphasises the importance of analysing the family farm as a whole and not separating the agricultural production from the farm family's other activities. This is all the more relevant for family farms orientated towards multifunctionality, *i.e.* engaged in a variety of para-agricultural activities. For example in Austria some 70% of farms are managed by part-time farmers (Darnhofer and Schneeberger, 2006). As the family income depends only in part on the income generated from agricultural production, farmer choices are guided not only

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by the optimal allocation of factors of production, but also by the values and preferences of various family members, the need to accommodate off-farm activities as well as the constraints and opportunities arising from the farm family life cycle. Family farmers thus seem to take an integrative, holistic look at their farm, and consider the effect of strategic choices on family cohesion and thus long-term farm survival. In Austria, this is not least linked to the fact that farms are typically inherited from forefathers, resulting in a strong bond to the land and a deeply felt responsibility to keep the farm going.

The situated change perspective (see Orlikowski, 1996) is particularly useful when turning away from the assumption of stability towards flexibility, self-organizing and learning. This perspective conceives change as endemic to practice and hence as enacted through the situated practices of farmers, as they improvise, innovate and adjust their work routines over time. In this view series of subtle but nonetheless significant changes are enacted over time as farmers appropriate a new technology into their practices and then experiment with local innovations, respond to unanticipated contingencies, initiate opportunistic shifts in structure, improvise various procedural and cognitive variations to accommodate their evolving use of the technology. Each variation of a given practice is not an abrupt or discrete event. Rather, modifications are enacted through a series of ongoing and situated accommodations, adaptations and alterations that draw on previous variations and mediate future ones. There is no deliberate orchestration of change, no technological inevitability, no dramatic discontinuity, just recurrent and reciprocal variations in practice over time. Each shift in practice creates the conditions for further improvisations, unanticipated outcomes and innovations which in their turn are responded to with more variations. And such variations are ongoing; there is no beginning or end point in this change process. Thus the transformation of farming practices emerges out of farmers' (tacit or not so tacit) accommodations to and experiments with the everyday contingencies, challenges, exceptions, opportunities and unintended consequences that they encounter.

The situated change informs the view of farmers as adaptive managers. Indeed, family farmers seem to be aware of the trade-off between efficiency and adaptability (Darnhofer, 2005). They are aware that the drive to specialisation is based on a false sense of stability and that decreasing the number of on- and off-farm activities may lock their farm into a narrow development trajectory in which the lack of alternative options goes hand in hand with increased vulnerability.

This approach to farm management aiming at maintaining diversity and fostering adaptive flexibility can be illustrated using the results of a case study on organic farmers' approach to pig husbandry, a fairly new farm enterprise serving a young market (see Darnhofer, 2005). For a growing number of farmers in the study area (the Horn district in Lower Austria) conversion to organic farming is becoming attractive, not least due to its potential to support a reorientation of farm activities from a focus on the production of agricultural commodities towards rural development activities. These cover a wide range of potential avenues, including innovations related to food quality and repositioning agriculture within the food supply chain (*e.g.* on-farm processing and direct marketing); non-agricultural activities located at the interface between society, community, landscape and biodiversity (*e.g.* agro-tourism, management of landscape and nature, energy production, provision of communal services); as well as engagement in off-farm income-generating activities (*e.g.* work in a non-farm related field, contract harvesting, organic farming inspector).

The approach of these farmers to rural development activities shows a step wise process, where long-term commitments are avoided due to the awareness of the uncertainty of future developments. For example one of the features of organic pig farming that is particularly attractive to interviewed farmers is the fact that they do not need to keep a large number of pigs and thus can venture into this enterprise without major investment in animal housing. They can adapt the available buildings using resources available on-farm (*e.g.* wood from own forests, family labour). They may thus start organic pig farming with 10 sows or 100 pigs; a number that would be considered uneconomical in conventional pig farming as it does not allow to benefit from the economies of scale. Farmers can thus venture into a new enterprise with limited commitment of financial capital and see how animal husbandry fits into their farm (*e.g.* use of manure for crop production, labour requirements), how the market develops while at the same time building their experience-based skills. Should the enterprise develop satisfactorily, they may expand it, unless a more attractive alternative use of their resources has developed. For example in the study area organic farmers have joined to invest into a biogas plant which provides electricity to the grid and digested material as fertiliser for their fields. The biogas plant project developed during a short window of opportunity opened by a law that guarantees farmers a price per kilowatt produced from renewable resources.

This case study shows the farmers' innovation potential and their capacity to recombine and reconfigure the resources at their disposal. Indeed, farmers are well aware of the dynamic nature of the very specific resources available on their farm, *i.e.* family labour, off-farm opportunities, policy incentives, market situations, cooperative networks, climate, financial resources, human capabilities and social networks. Flexibility and adaptability are seen as important attributes to enable the farm to co-evolve with its environment.

## **Summary and outlook**

There seems to be a divergence between the myopic optimisation strategy focusing on economic efficiency and the long-term farm sustainability strategy followed by many family farmers. Their goal is often to find a balance between securing current income and securing the farm as a viable entity, so as to be able to pass it on to the next generation. Family farmers may thus seek to foster a sound balance between short-term efficiency goals and long-term stability. Farm sustainability can be enhanced by maintaining the evolutionary potential and adaptive flexibility, *i.e.* a continuous process of adaptive learning and the possibility to initiate new development trajectories. It may be helpful to better understand to what extent and under which conditions family farmers use an adaptive approach to farm management. Also, a better understanding of the perceived advantages of a situated change approach as a strategy to secure the long-term survival of their farm might help to highlight the (perceived) shortcomings of normative, optimum-oriented management recommendations.

## **References**

- Burton, R., 2004. Seeing through the 'good farmer's' eyes: Towards developing an understanding of the social symbolic value of 'productivistic' behaviour. *Sociologia Ruralis* 44, 195-215.
- Commandeur, M., 2003. Styles of pig farming. A techno-sociological inquiry of the processes and constructions in Twente and The Achterhoek. PhD Thesis, Wageningen University.
- Darnhofer, I., 2005. Organic farming and rural development: Some evidence from Austria. *Sociologia Ruralis* 45, 308-323.
- Darnhofer, I. and W. Schneeberger, 2006. Impacts of voluntary agri-environmental measures on Austria's agriculture. *Int. J. of Agricultural Resources, Governance and Ecology* (in press).

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- Giampietro, M., 1997. Linking technology, natural resources and the socioeconomic structure of human society: A theoretical model. *Advances in Human Ecology*, 6, 75-130.
- Holling, C., 2001. Understanding the complexity of economic, ecological and social systems. *Ecosystems* 4, 390-405.
- Milestad, R. and I. Darnhofer, 2003. Building farm resilience: the prospects and challenges of organic farming. *J. of Sustainable Agriculture* 22, 81-97.
- Morgan, K. and J. Murdoch, 2000. Organic vs. conventional agriculture: knowledge, power and innovation in the food chain. *Geoforum* 31, 159-173.
- Orlikowski, W., 1996. Improvising organisational transformation over time: A situated change perspective. *Information Systems Research* 7: 63-92.
- Rammel, C., 2003. Sustainable development and innovations: Lessons from the Red Queen. *Int. J. of Sustainable Development* 6, 395-416.
- Rammel, C. and J. van den Bergh, 2003. Evolutionary policies for sustainable development: adaptive flexibilities and risk minimising. *Ecol. Econ.* 47, 121-133.
- Rosenhead, J. and J. Mingers, 2001. A new paradigm of analysis. In: J. Rosenhead and J. Mingers (eds) *Rational analysis for a problematic world revisited*. 2<sup>nd</sup> Ed. Chichester: J. Wiley & Sons, pp. 1-19.
- Van der Ploeg, J.D., 2000. Revitalizing agriculture: Farming economically as a starting ground for rural development. *Sociologia Ruralis* 40, 497-511.
- Van der Ploeg, J.D. and J. Frouws, 1999. On power and weakness, capacity and impotence: Rigidity and flexibility in food chains. *Int. Planning Studies* 4, 333-347.
- Walford, N., 2003. Productivism is allegedly dead, long live productivism. Evidence of continued productivistic attitudes and decision-making in South-East England. *J. of Rural Studies* 19, 491-502.

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