

Integrating nature conservation and landscape management in farming systems in the Friesian Woodlands (The Netherlands)

Paul Swagemakers[#] and Johannes S.C. Wiskerke[#]



Abstract

The future of agriculture and its role in rural areas is a topic of ongoing societal, political and scientific debate in Europe. Rural development, characterized by integrating functions such as food production, nature conservation and landscape management, can be considered a promising paradigm for the future. Based on a case study from the Friesian Woodlands (in the northern part of The Netherlands) we demonstrate that the practices of and strategies pursued by dairy farmers regarding the management of nature and landscape are considerably different. Preliminary results of the research project are presented in this paper by distinguishing three approaches of farmers – presented by means of portraits –, which differ according to the role nature and landscape management plays in the farm household strategy as a whole. Although further research on the sustainability of the different approaches at farm and regional level is required, we conclude that it is important to improve our understanding of the

[#] Rural Sociology Group, Department of Social Sciences, Wageningen University, P.O. Box 8130, 6700 EW Wageningen, The Netherlands. E-mail: paul.swagemakers@wur.nl

differential dynamics of the interaction between farming, nature and landscape to sustain the management of nature and landscapes in agricultural areas.

Keywords: rural development; environmental co-operatives; farm household strategies; multifunctional agriculture; grassland management

Introduction

This paper is an intermediate result of an ongoing research project about rural development and multifunctional agriculture. The research project is part of a Dutch-French research programme entitled ‘Multifunctional agriculture: from farm practice to farm design and institutional innovation’. In the research project four main steps can be distinguished: (i) the selection of research areas, (ii) the identification and analysis of different farm household strategies, (iii) the development of socio-economic indicators and performance assessment at farm and regional level, and (iv) the development of design methods and strategies to enhance multifunctional agriculture. In this paper we focus on the second step as applied in one of the selected research areas, i.e. the Friesian Woodlands.

Aim of this second step in the research is to describe and understand the diversity in farm household strategies regarding the combination of nature conservation, landscape management and dairy production. Therefore, we discuss how farmers manage to integrate practices for the conservation of nature (i.e. biological diversity and biological resources) and preservation of landscape (i.e. the historical landscape features as hedges and belts of alder trees) into their farming practices.

First of all we will outline the historical, societal and political context of the rural development and multifunctionality concepts. This is followed by a brief description of the case-study area. After that we will outline the research methodology, present results of qualitative research and briefly discuss the results. Finally we draw some conclusions with respect to future research activities.

Modern agriculture in crisis

After World War II agricultural development in Europe was focused on increasing productivity and production efficiency. This modernization of agricultural food production has been very successful in terms of safeguarding food supply in Europe at low prices for consumers (Tracy 1989; Brouwer and Lowe 1998). At the same time, agricultural modernization also has a set of negative side-effects. In recent years these side-effects have become so apparent that modern agriculture is said to be in crisis (Van der Ploeg 2003). This crisis is threefold:

1. An economic crisis, characterized by stagnating revenues and increasing costs of production at farm level. This has been conceptualized as the price squeeze (Van der Ploeg, Long and Banks 2002).
2. An ecological crisis, characterized by environmental pollution due to the intensive use of pesticides and (artificial) fertilizers and the deconstruction of the natural habitats and biodiversity (Baudry et al. 2003). In order to modernize agriculture, a spatial separation between agricultural production (as a production and income function) on the one hand and nature and landscape (and its aesthetic, abiotic and biotic functions) on the other hand was realized (Hendriks and Stobbelaar 2003). This resulted in a further fragmentation of heterogeneous landscapes that form habitats for plants and animals (Baudry et al. 2003), and accordingly natural values came under threat (Knickel 2001).

3. A socio-cultural crisis, characterized by distrust of consumers in food production as a result of recent food scares (e.g. BSE, foot-and-mouth disease and dioxin contamination) and a growing societal demand for rural areas with an aesthetic function for leisure and living (Frouws 1998; Marsden et al. 2001; Vanslembroeck and Van Huylenbroeck 2003).

This threefold crisis of modern agriculture has led to vivid and still ongoing, scientific and political debates about the future of Europe's agriculture and rural areas (Marsden et al. 2001). According to Marsden (2003) these debates centre on three different models, which are currently competing in shaping agriculture and rural space in Europe:

1. An accelerated modernization and industrialization of agro-food production and processing (the 'agro-industrial model') characterized by high levels of production, long food supply chains, decreasing value of primary production and economies of scale.
2. The countryside increasingly becoming consumption spaces (the 'post-productivist model') in which provision of private and public rural services and landscape as consumption good is to be exploited by urban citizens. Simultaneously the role of agriculture diminishes with respect to its low share in Gross National Production.
3. Integration of agriculture, nature, biodiversity, leisure and the provision of private and public rural services (the 'sustainable rural-development model') in which the identity of farmers is enlarged again beyond food production alone.

Rural development and multifunctionality of agriculture

Recently completed research in different European countries demonstrates that the sustainable rural-development model is a very promising one as it provides an answer to the economic, ecological and socio-cultural crises of modern agriculture (Van der Ploeg, Long and Banks 2002). Rural development (Van der Ploeg et al. 2000; Durand and Van Huylenbroeck 2003) integrates agricultural food production with other functions (Banks and Marsden 2001). By combining agricultural production with other rural functions (nature, biodiversity, leisure) and activities (short food supply chains, quality production) farmers succeed to improve their income (Ventura and Milone 2000; Knickel 2001), to improve rural livelihoods (Kinsella et al. 2000; Gorman et al. 2001; Di Iacovo 2003), and to comply with new societal demands regarding the multifunctional use of rural areas (Belletti, Maescotti and Moruzzo 2003; Vanslembroeck and Van Huylenbroeck 2003). According to Brunori and Rossi (2000) the strength of the rural-development approach lies in creating synergies between different functions and activities; e.g. synergies between quality production, tourism and preservation of nature, landscape and cultural heritage.

Dairy farming in the Friesian Woodlands

The Northern-Friesian Woodlands have a rich tradition in cattle farming throughout history. Since centuries people have reclaimed and worked on the land. As a result of human interference, a heterogeneous landscape consisting of fields, hedgerows and ponds has been created (Mol, Noomen and Van der Vaart 1990) in which dairy production took place. Within the modernization paradigm, the small-scale landscape in the Friesian Woodlands increasingly became an obstacle (or 'natural handicap') for ongoing agricultural modernization. From 1984 onwards, however, policy measures took another direction: the Dutch government issued a series of environmental rules and regulations designed to reduce the environmental

impact of modern agriculture. In addition to environmental legislation, in the early 1990s the Dutch government also introduced several legal measures to counter the detrimental effects of ammonia deposition (acid rain) on ecologically valuable landscapes (Stuiver and Wiskerke 2004). By then, the government programme of nature development (known as the ecological guideline) declared that the hedges and belts of alder trees (characteristic for the Friesian Woodlands) were sensitive to acid rain. This designation implied substantial restrictions on animal husbandry in the immediate surroundings of these hedges and belts, specifically regarding manure and slurry application. At that moment the small-scaled landscape was not longer a natural blockade for modernizing agriculture, but the human-made landscape now blocked its creators from using it. The farmers in the region saw the growing body of agro-environmental and nature conservation rules and regulations as difficult to implement, badly balanced, contradicting each other and inadequate for the Friesian Woodlands (Wiskerke et al. 2003).

As a response to this situation and differently from what was proposed by national governmental regulations – restrictive legislation combined with poor economic prospects for agriculture – the dairy farmers in the Friesian Woodlands decided to maintain and develop nature and landscape collectively. For this purpose and in order to launch own policy plans the farmers (together with other stakeholders) organized themselves in ‘environmental cooperatives’. Environmental cooperatives are regional cooperations of agricultural entrepreneurs and sometimes other stakeholders (e.g. landowners, citizens, environmental groups) who aim to integrate environment, nature and landscape objectives into the farming practice (Renting and Van der Ploeg 2001). In 1992 the ‘Vereniging Eastermar’s Lânsdouwe’ (VEL: Association in the village of Eastermar and its surroundings) and the ‘Vereniging Agrarisch Natuurbeheer Achtkarspelen’ (VANLA: Association in the village of Achtkarspelen and its surroundings) were founded (see Figure 1). And thus, in return for the collective maintenance of nature and landscape, the members of VEL and VANLA proposed to the national government that the ecological guideline, specifying the above-mentioned acid-sensitive objects, would not be applied to the area. The government accepted this proposal (Wiskerke et al. 2003).

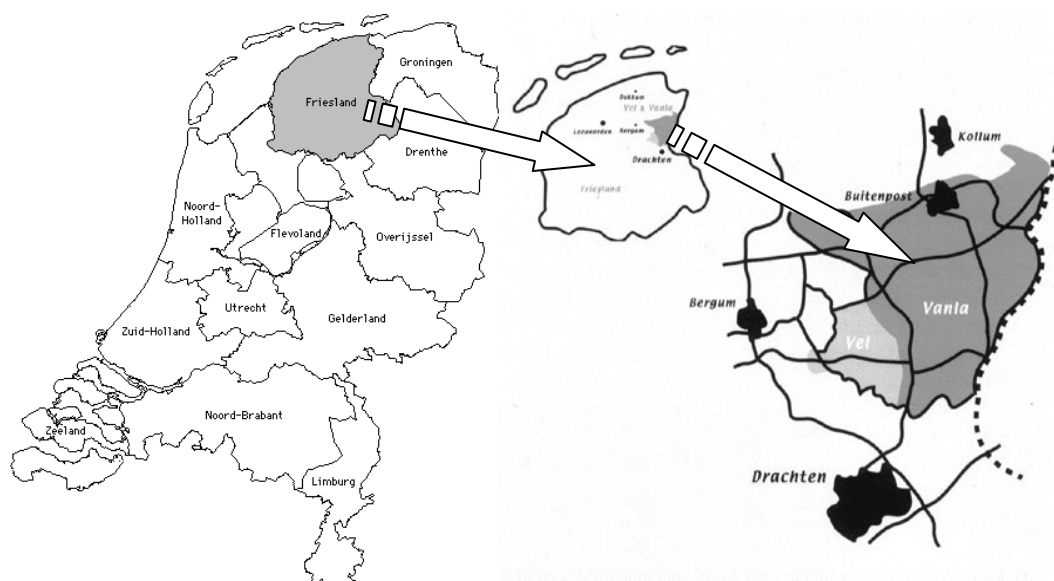


Figure 1. Location of the Friesian Woodlands and the environmental cooperatives VEL and VANLA (Source: Koeleman 2003, p. 18; own modification)

Beside management of nature and landscape, the environmental cooperatives also succeeded in reducing nitrogen surpluses at the farm level substantially (Verhoeven, Reijs and Van Der Ploeg 2003). One of the keys to this success has been the decision to tackle the challenge of nitrogen surplus reduction from a systems approach (Reijs et al. 2003). In addition to the systems approach another factor of success for reducing nutrient losses is that the environmental cooperatives have built their collective activities on differential local practices, discourses and knowledge (Verhoeven, Reijs and Van Der Ploeg 2003; Stuiver and Wiskerke 2004). This diversity, which has been conceptualized as different farming styles (Van der Ploeg 1994), is the result of different strategic priorities, norms and opinions in combination with different contexts (farm history, farm family situation, agro-ecological circumstances, etc.), constraints and possibilities.

Understanding and utilizing the existing diversity among farmers by others (i.e. scientists, politicians) is of crucial importance for the future activities of the environmental co-operatives, such as the maintenance of nature and landscape. We will describe the diversity in farm household strategies regarding the combination of nature conservation, landscape management and dairy production in the Friesian Woodlands.

Methods

For the research project, case-study research (Yin 1984) forms the core method. In this paper we present preliminary results of existing diversity regarding landscape and nature among farmers' strategies in the Friesian Woodlands. Required for the second step of the research project is to obtain a thorough understanding of the differential empirical expressions of multifunctional farming systems. To achieve this we built upon a set of well-elaborated research methods that were central to the 'farming-styles approach' (Van der Ploeg 1994) developed within the Wageningen School of Rural Sociology (Wiskerke 2004).

Qualitative field research

In the summer of 2004, semi-structured, approximately two hours lasting in-depth interviews (Verschuren, Doorewaard and Poper 1999) were held among 20 farmers from the region where the VEL and VANLA co-operatives are active. For tracing the 'unknown' and often unintended outcomes (habitats for special plants and species) of agriculture practices, i.e. how links between agriculture, nature and landscape in practice are constructed, 'theoretical sensitivity' (Strauss and Corbin 1990) and Weber's 'verstehende' attitude (Collins and Makowsky 1993) are crucial.

Farmers (all known through former projects in the research area) were selected on their 'expected score on multifunctional land-use'. The selection took place on the basis of suggestions and explanations of key informants (Wiskerke 1997). Key informants in this case are researchers that have been active in the region previously, a former project leader of the nutrition management projects, and local representatives of the farmers. According to the key informants the farmers differed in their willingness and capability to integrate dairy production with activities for nature conservation and landscape preservation. In other words, they were expected to have different norms and priorities regarding the management of their natural environment.

In the interviews indicative quantitative data were gathered on farm history, critical events, general indicators on farm size and management. Essence of the interviews, however, was gathering qualitative data in particular: opinions and attitudes towards

the use and management of the fields, field boundaries, and landscape elements as hedgerows, wooded banks and the occasional pond.

Searching for patterns of coherence

Interviews were recorded on tape after which full transcripts were made. Transcripts were ordered thematically and per theme (e.g. dairy production practice, income-generating strategy or soil management); differences and similarities in attitudes and practices were explored by content analyses of the transcripts (Verschuren, Doorewaard and Poper 1999). This initial search for patterns of coherence (of attitudes and practices) enabled us to construct typologies representing different farm household strategies.

In order to describe and understand the diversity of farm household strategies, building typologies is a means to order the empirical reality and complexity (Nooij 1993; Whatmore 1994). According to Whatmore (1994), the primary analytical objective of constructing typologies is on the one hand 'data sorting', i.e. ordering empirical observations, and on the other hand 'theoretical development', i.e. explaining behavioural processes and socio-economic dynamics. Based on interviews held in the summer of 2004, we constructed three typologies regarding the integration of landscape and nature in farming systems.

The construction of 'portraits'

We decided to present the preliminary results of step two in the research project as three different 'portraits'. A portrait is to be understood as a prototype of a typology (Wiskerke 1997) and accordingly portraits represent the typology as a specific story of an imaginary farmer. A portrait is, in other words, a researcher's construction based on a number of interviews. Quotes are derived from own interview material. All quotes stem from farmers or household members who are representative for that particular typology.

Together portraits characterize the diversity in nature and landscape management strategies and practices. The portraits are to be embedded in the case study on dairy farming and nature and landscape management by farmers in the Friesian Woodlands. Within the case-study research, the construction of portraits functions as searchlight for continuous exploration of the linkage between agriculture, nature and landscape.

Results

Based on qualitative research methods, so far three portraits have been constructed. Although the portraits are potentially congruent regarding their ecological and socio-cultural impact, they differ in the way an economic income for the farm household is generated.

Farmers as characterized in the first portrait, generate farm income in their practices by creating synergies between different activities, such as nature conservation, landscape management, quality production and tourism. Thereby food production and other accompanying functions are specifically embedded in characteristics of the region. For farmers in this category, subsidies on activities for nature conservation and landscape management are a precondition for other activities of the farm household.

Farmers as characterized in the second portrait, generate income out of milk production and earn an additional income out of subsidized landscape management activities. Activities for landscape management are complementary to the income out

of milk production, which is the main income source. Often farmers in this category show little affection with nature and landscape issues. Activities for landscape management are seen from a business point of view: getting compensated for loss of income out of milk production, due to restrictions for maximizing milk production set by others.

Farmers as characterized in the third portrait, generate an income solely out of milk production. Costs for milk production – especially external costs such as for buying fertilizers and pesticides – can be kept low by optimal use of natural resources. Maintenance of biodiversity (soil biodiversity in particular) is seen as precondition in order to produce at low costs. Simultaneously, conditions for nature conservation and landscape preservation are generated, although farmers in this category are not in favour of getting paid for that: they are often independent entrepreneurs earning a reasonable income out of milk production.

Portrait 1: Creating synergies between different income-generating activities

The first portrait regards a farmer as integrating agriculture, nature, biodiversity, leisure and the provision of private and public rural services to a large extent. It all started in 1996 when the farmer became involved in an experiment, organized by the Government Service for Land and Water Management (DLG), with field margins:

“I guess that at that time DLG thought it would be better to develop nature in the margins of agricultural land instead of buying land for developing nature reserves. Usually field margins are of less importance to farmers for agricultural production, especially in the case of the Friesian Woodlands.”

According to this farmer, maintaining field margins is beneficial in a twofold way. First, due to field margins there is substantial less input of nutrients in hedgerows and wooded banks. Second, the subsidies obtained for the production of nature in field margins are higher than the revenues of agricultural production in field margins.

The farmer converted to organic dairy farming several years later. Shortly after that a campsite was started on half a hectare. Management of the hedgerows, wooded banks with alder trees and ponds was intensified to improve the quality of nature and landscape.

“Even before VEL was founded I already preserved the landscape, but in a very minimalist way. However, now I devote much more time to nature conservation and landscape management and aim to improve the quality. One should meet requirements for subsidies, but having pleasure in doing a bit more is most important to me. And it is nice for the campsite guests. You have something to show off with.”

Recently, the stable and fields are housed by beef cattle instead of milking cows. The meat is partly sold to local restaurants and in 2005 a farm shop for selling quality meat will be opened. The change from dairy to beef cattle requires a different style of grassland management.

“With the replacement of the cattle I have to sow clover in the grass. Until now, the grass contains too much protein for the beef cattle. It is not only that the breed differs in character, but also the digestion differs. Fodder

must contain less protein and more structure. That is something one has to learn. ... In autumn you should mind not having long grass in the field, not having tussocks of grass. In autumn the crane flies shelter in the lee and lay their eggs and in spring larvae of the crane flies eat the roots of the grass. But once you have birds in your wooded banks, the birds eat those larvae. And it would not surprise me if soil life eats the eggs even before the larvae have a chance to come out of the eggs. Also here knowledge is required. For farmers it often is fear for the unknown. Often farmers do not have the knowledge of the biological system as a whole.”

For this farmer a range of new activities – nature and landscape conservation, biodiversity, agro-tourism, quality production, short food supply chains – form an integral part of the farming system. As the success of one activity depends on the success of the other, creating synergies among these different activities is the core strategy for this farmer. In this strategy nature, landscape and biodiversity management is a prerequisite for sustainable beef production, agro-tourism and short food supply chains for high-quality beef.

Portrait 2: Raising an additional source of income through landscape management

The second portrait regards a farmer who specializes in dairy farming. In this approach the land has to be utilized for earning an income from dairy production. As such, ponds, dust roads, hedgerows, wooded banks and the farmyard constitute the non-productive parts of the farmland. Despite the focus on dairy farming as the primary source of income, this farmer engages in nature conservation and landscape management activities, among others through agreements for the management of field margins. The farmer does not fertilize the field margins, but mows the grass and mixes the grass with the other grass from his fields for the production of silage.

“You won’t notice the difference. We get paid for it and the grass grows a bit less. Hence, you have to weigh the pros and cons against each other. Does the subsidy compensate for the loss of grass yield? Often, with the money you get paid you can rent extra land or buy extra fodder to safeguard a high level of milk production. As long as all the loss of yield is compensated for, you contribute to nature and it does not cost money.”

For this farmer landscape management is an activity that follows logically from being a dairy farmer in this particular region:

“The landscape you work in is something you cannot ignore or deny. It belongs to farming. You might consider a farmer as having a responsibility for maintaining the landscape. Besides, I would not like to live in an open area. Anyway we have to maintain the landscape, and now we get paid for it. You won’t earn a salary out of it, but we get paid for activities we have to carry out anyway. And so you have to consider the activity as a well-paid hobby.”

For this farmer nature and landscape management plays a different role in his daily business compared to the first farmer we portrayed. In this case nature and landscape is an income-generating activity used to sustain the core business of dairy farming.

The income generated through nature and landscape management is used to compensate – by renting land or buying concentrate and silage - for the loss of milk production as a result of nature and landscape management.

Portrait 3: Utilizing natural resources for farming economically

The third and last portrait refers to an approach that is characterized by utilizing nature and biodiversity (in particular soil flora and fauna) for low-external-input management of grassland. This approach also has been conceptualized as farming economically (Van der Ploeg 2003). This farmer is involved in landscape management, but does not receive any subsidies as the subsidy rules did not comply with his farm strategy:

“From an economic point of view we decided not to take part in landscape management schemes. We have made a plan for landscape management, but we could not reach an agreement with DLG about the rules and financial conditions. Now we manage the hedgerows ourselves, without receiving subsidies for it.”

The soil is the key resource in this approach. According to this farmer a dairy farmer should be self-sufficient in fodder production. This also enables the farmer to achieve the kind of fodder quality required for his farming system. The on-farm production of fodder is combined with putting the cows out to pasture. For this, the characteristic landscape of the Friesian Woodlands proves its function: the trees along the ditches provide shadow for the cows.

“Why we have the cows outside? You have to ask the cows. It is all about cost price. ... If we kept our cattle in the stable, you should see what costs we would face to cut and bring the grass. And we would always have losses while making silage. Even in the night cows can be outside in our farming system. And they do. With rain and strong wind they stay inside. When we mow the grass, we keep them in. Otherwise they stand in the way or you have all your fences down. You can't imitate nature. For me they can go out in the snow. ... The cow has to prove what is good.”

According to the farmer, land use in nature conservation is inflexible, as it prohibits mowing grassland before the 15th of June or later, depending on the arrangement. In addition, mowing late decreases the nutritional value of the fodder and leads to the disappearance of meadow birds:

“Mowing earlier in the year suits me better. Then the grass contains more nutritional value. And I believe it is better for the birds, because leaving the grass two weeks longer on the fields like the schemes prescribe makes the grass too high. Birds don't like that. ... We always feed low-protein silage as well. Therefore we mow some fields in June. But for having healthy fodder it is important to mow at the end of May or the beginning of June.”

The farmer has observed that different meadow birds (lapwings, black-tailed godwits, redshanks) find a habitat in the different fields that make up his farm. This causes problems when mowing the grass. Therefore the farmer leaves stripes of grass

in the field, especially for the redshank that would not survive without some help. It is a moral motivation that drives the farmer to protect the meadow birds.

“Over 30 breeding couples I have seen on the 16 hectares of land I have on the other side of the road. Five nests of the black-tailed godwits, but there have been more before the foxes caused damage. Further on there are 20 couples of lapwings and 15 couples of redshanks. ... The black-tailed godwits always have caused problems for us. To protect these birds we don't mow a field margin of four to five metres in the first cut of the season. We suspend it to the second cut and then, depending on the weather, we either make hay or silage out of it.”

Other species find habitat in the hedgerows and especially in the wooded banks. Next to a range of birds (such as tree creepers, lesser whitethroats, great tits, blackbirds, robins, chiffchaffs, garden warblers, wrens and song thrushes) lean-land plants form part of the landscape, even if not actively managed or recognized by the farmer. Apart from that, the farmer enjoys walking through his fields.

“Collecting the cows in the fields, that is beautiful. The honeysuckle and the mayflower flowering, they have a lovely scent, don't they? For having those in the land I don't need subsidies. On the one side you receive, on the other side you spend.”

For this farmer portrayed landscape, nature and biodiversity are indispensable for creating a sustainable farming system. The main strategy is to reduce the costs for external inputs. In this, the active management of biodiversity is of crucial importance. Although nature and landscape management is of the utmost importance to this farmer – i.e., his farming system even depends on it – he has chosen not to become engaged in nature and landscape management schemes. The income lost through subsidies counterbalances the flexibility in nature, landscape and grassland management.

Discussion

As the societal demand for a paradigm shift from monofunctional to multifunctional use of agricultural land and rural areas is increasing, it becomes important to understand that farmers have an important role in and impact on the forming of green-blue veins. In addition to food production, farming systems can provide ecological corridors and some of them even provide specific habitat patches as well as field boundary biodiversity (Le Coeur et al. 2002). Due to an ongoing fragmentation of heterogeneous landscapes (Baudry et al. 2003), often those functions are not very well developed within farming systems yet. Overcoming fragmentation of natural habitats, however, is of importance for biodiversity conservation (Opdam and Wiens 2002). By combining practices for nature conservation and landscape preservation in their farming practices, farmers can play an important role in maintaining or developing natural and ecological values (Baudry et al. 2000; Thenail 2002). In getting farmers involved in (re)connecting habitats, a huge potential for organisms to survive is gained by notable changes in connectivity (Baudry et al. 2003).

In a case study on farmers' attitudes towards land use in northeast Brittany, Thenail and Baudry (2004) demonstrate the major influence of the landscape on land-use allocation on farms. As in that study, farmers in the Northern-Friesian Woodlands opt either for moving to regions more suitable for 'modern' farming or continue farming in the region by combining dairy production, in one way or the other, with nature conservation and landscape preservation. In this respect, farmers' attitudes towards land use in the Friesian Woodlands are comparable to those of farmers in northeast Brittany.

The case study of the Northern-Friesian Woodlands demonstrates that among farmers who remain farming in the research area, nature conservation and landscape management can be combined with agricultural food production. The way in which agriculture, nature and landscape are and can be integrated, however, differs among farmers. The portraits as descriptive, story-telling representations of the typologies or 'modes of ordering' (Law 1994) in the region give insight into this diversity among farmers in the region. The portraits we have discussed demonstrate that diversity in agro-ecosystem management (i.e. the complex whole of agriculture, nature and landscape) is actively constructed and builds upon the differential goals, norms, priorities and opportunities the actors involved (here: farmers) have and create.

Conclusions

In this paper we presented portraits as a means to demonstrate the different possibilities for integrating agricultural production with nature conservation and landscape management in the specific context of the Friesian Woodlands. Although the portraits are a researcher's construction based on an interpretative analysis of qualitative data (Whatmore 1994), the results so far give us insight into the dynamics and diversity of combining farming with the management of nature and landscape, and serve as searchlight for continuing the research.

Next step in the analysis is to examine, for a range of themes, statistical correlations between attitudes of farmers and their practices. For instance, to examine which dairy production practice correlates with which kind of income-generating strategy. This will be done by a twofold check on validity of the portraits. A first check on validity can be carried out among farmers and other stakeholders in the region. They can verify whether or not the typologies and their characteristics are recognizable and reflect the diversity in farm household strategies. A second check on validity can be carried out through additional quantitative research by means of representative-sample survey. Surveys can be analysed with multivariate methods (e.g. cluster analysis or principal-components analysis), which should result in a similar set of typologies of farm household strategies (Nooij 1995). The main aim of a survey in this respect would be the verification and quantification of qualitative research.

Besides the double validation of the interpretative analysis, the sustainability of the different strategies portrayed in this paper is to be examined. This implies, for instance, an analysis of a representative set of farm-economic accounts to examine (differences in) the economic sustainability of the different strategies portrayed, and an exploration of the impact on biodiversity of the different strategies to test (differences in) the ecological sustainability. Such sustainability analyses should be carried out at both farm and regional level, as certain sustainability results (e.g. indirect employment effects) may only appear at regional level (Van der Ploeg, Long and Banks 2002).

To explore further the role farmers can have in nature conservation and landscape management we also need to include other land users in the region in our research. Regarding nature conservation and landscape management, active land users as the category of non-professional farmers or hobby farmers and the category of institutionalized actors as ‘Staatsbosbeheer’ (the national forest management agency) and ‘Fryske Gea’ (the provincial agency for landscape protection) should be included in regional impact analysis.

Combining the different functions of land use (such as agricultural food production, nature conservation, landscape management, rural tourism and others) farmers can play an important role in the cost-effective management of nature and landscape (Knickel 2001). In order to measure the overall regional economic, ecological and socio-cultural impact, however, the potentials and performance of the farm household strategies as described with the portraits have to be related with the sustainability performance and potentials of the latter two categories of land users mentioned.

In order to sustain the management of nature and landscapes in agricultural areas, it is important to improve our understanding of the differential dynamics of the interaction between farming, nature and landscape. Not the least because different approaches require different forms of institutional support – which is often lacking yet.

Acknowledgements

We thank Hanneke Buurman for providing the photograph for the chapter opening.

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