

Three-fold embeddedness of farm development

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Abstract

Farm development strategy is affected by, and affects, the biophysical and socio-economic context of the farm leading to agri-environmental challenges for farm development. For effective policies and support programmes it is important to understand the drivers for choices farm development. Three-fold embeddedness is used to study how farmers relate to the context in which they operate. Ideal-typical farms were constructed for three patterns of farm development found in a quantitative study of dairy farmers operating in highly comparable conditions. The patterns are 1) Milk Max: maximising total milk production; 2) Milk Balance: optimising milk production based on own resources; and 3) Milk Plus: diversified on-farm production. Their embeddedness in three sets of relations were conceptualised as: 1) value chain relations, 2) socio-cultural relations, and 3) resource relations. The extent of the embeddedness has been determined on a scale ranging from a Close to a Stretched set of relations. These ideal-typical farm types showed to have different sets of relations for the three dimensions. A set of relations that is stretched outside the everyday routine of dairy farming appears to be important for farmers' perception of options for farm development.

1. Introduction

Can we increase the understanding of the heterogeneity in farm development by looking at the embeddedness of the farm? This paper uses embeddedness of the farm(er) in the biophysical and socio-economic context to study the differences between farmers in their perception of options for farm development. In a case study of dairy farmers operating in highly comparable conditions, farmers indicated on a 5-point Likert scale their perception of the viability of a range of options for farm development. A quantitative analysis of the data showed the presence of clusters in the case study group. The clusters proved to represent coherent patterns of the perception of options for farm development, in this study called the 'perceived Room for Manoeuvre' (pRfM) (Methorst et al. 2015). The farmer as decision maker has agency and perceives or creates a room for manoeuvre within the influence of structures on the development of the farm (structuration theory (Giddens 1984)). In a follow-up study, the personal views and preferences of the farmer showed to be the most important driver to explain the differences in the pRfM of the farmers (Methorst et al. 2016). The question for the current paper is whether the embeddedness

of the farms can increase the understanding of the differences between the patterns of pRfM. For this purpose this paper studies differences in the embeddedness of the farm(er) in the biophysical and socio-economic context of the farm.

Understanding differences in farm development is important as farm development is affected by and affects the biophysical and socio-economic context in which the farm operates (Bieleman 1987; Feola et al. 2015). In the biophysical and socio-economic context of a farm, a range of stakeholders have a direct or indirect interest in farm development. An example is when farms affect vulnerable public goods, for example nature and landscape (Primdahl and Kristensen 2011; Wästfelt et al. 2012).. Decision making on farm development starts with the perception of the individual farmer and takes place in a complex system and therefore needs to be studied in an integrated way (Hansson and Ferguson 2011). The selection of a farm strategy is done by the farmer in the role as entrepreneur following an explicit or implicit farm development strategy. Entrepreneurship is not purely driven by economic parameters, it is embedded in and connected to a biophysical and socio-economic context (Welter 2011; McKeever et al. 2015). A better understanding of the embeddedness of farm(er)s is important for the design of public policies and support programmes (Korsgaard et al. 2015). Farm development is important for rural economic development and needs to be in line with sustainable land use, a key challenge for rural areas (Woods 2012).

2. Analytical framework three-fold embeddedness

Heterogeneity in farm development is based in the development of farming systems in relation to the characteristics of its surroundings (Bieleman 1987) and in the differences between farmers in the strategy to optimise and increase production (farming styles research, Ploeg and Ventura 2014). Agricultural modernisation lead to increased outputs per farm while resulting as well in a negative effect on the quality of the landscape and of biodiversity values (Marsden 2003; Wiskerke and Roep 2007). The link between the location of production and consumption became less relevant, a process described as dis-connecting, dis-embedding and dis-entwining of food production (Wiskerke 2009). In reaction, alternative farm strategies have developed emphasising the localness of food and the multi-functionality of farms based on localness of products and the characteristics of the rural context (Potter and Tilzey 2005; Oostindie 2015). In farm development this means there are various options which differ in their embeddedness in the biophysical and socio-economic context.

Three-fold embeddedness

The concept embeddedness is introduced to study the social dimension of economic activity. Granovetter (1985) is widely acknowledged for revitalizing the concept in economic sociology as the incorporation of social relations into economic action (Dequech 2003). In literature the concept embeddedness appears to be used from different perspectives. Jack and Anderson (2002) focus specifically on the meaning of an individual's ties to the local social structure leaving out the other aspects of embeddedness. In literature on food networks, embeddedness is used to theorise the development of alternative food networks (Morgan et al. 2006; Akgún et al. 2010; Roep and Wiskerke 2012). In the context of food networks, embeddedness is used to study the social dimension and the ecological and cultural relationships of a food system in the territorial context of food production (Sonnino 2007). Embeddedness of food production is then seen as 'the replacement' of food and food production in its local context in response to the 'dis-embedding' forces of conventional food networks (Goodman and Goodman 2009: 208). However, this approach introduces the risk of a binary division between 'good' local-embedded and 'bad' global dis-embedded food systems (Sonnino 2007). Embedded then becomes normative as it is seen as

a 'unique, distinguishing, almost magical' attribute of alternative food strategies (Hinrichs 2000: 297). To avoid using a normative and binary approach, embeddedness can best be viewed as a dynamic process that can vary and is object of management choices (Sonnino 2007; Moragues-Faus and Sonnino 2012). The dynamic process approach places the emphasis on the agency of an actor in making choices. Resulting from a study on the different uses of embeddedness, Hess (2004: 176) states that a reconnection to the original meaning of embeddedness is needed: 'the social relationships between both economic and non-economic actors', or: 'who is embedded in what'. This view focuses on the extent of the embeddedness as opposed to a binary approach.

Hess extracts three general dimensions to be used in the study of embeddedness: 1) **Societal embeddedness** - signifies the importance of where an actor comes from, considering the societal (i.e., cultural, political, etc.) background, 2) **Network embeddedness** - describes the network of actors a person or organization is involved in, and 3) **Territorial embeddedness** - considers the extent to which an actor is 'anchored' in particular territories or places (Hess 2004: 177). These three dimensions are used in this study to study the embeddedness of the patterns of farm development. The dimensions are carefully re-conceptualised in the specific context of dairy farming to ensure a clear and meaningful understanding of each dimension. The societal embeddedness is re-conceptualised as **socio-cultural relations** of the farmer, asking how farmers view themselves as a farmer, what 'culture' of farming does the farmer 'belong' to, what is the identity in values, norms and opinions. The network embeddedness is re-conceptualised as the **value chain relations**, asking which value chain the farm is a part of or linked to, or which networks or spheres of influence affect farm development. The territorial embeddedness is re-conceptualised as the **resource relations** of the farm, asking about the origin of the resources for farm production. To measuring the extent of embeddedness each of the dimensions needs to be operationalised which will be further explained in the methodology section.

3. Methodology

The case study context

The unique value of Kampereiland (*Island of Kampen*) as case study is the highly comparable biophysical and socio-economic context for all dairy farmers allowing to focus on differences between the individual farmers. Kampereiland is a typical Dutch river delta where the landscape is influenced by centuries of farming. All 108 farms (of which 102 are dairy farms) are tenant farms using 4000 ha of agricultural land with the town of Kampen as lessor. The culture and identity of Kampereiland is influenced by its history as an island, even though the town of Kampen was less than 10 km away. The 600 people community is well organised with various activities and organisations. The former coastal areas were designated as Natura 2000 nature reserves (2011) and Kampereiland became part of a National Landscape (2005). The policies and legislation concerning Natura 2000 and the National Landscape limit the possibility of scale enlargement, the predominant strategy in Dutch dairy farming in reaction to the end of the European Milk Quota system (Meulen et al. 2012). The change in EU dairy market policies has increased price volatility while accessibility of capital for investment decreased due to the financial crisis. Dairy farming in Kampereiland is as well affected by national and supranational legislation on environment, animal health and animal welfare. Farm income in Kampereiland became worrisome in comparison to dairy farms outside Kampereiland (Duitman 2005; Methorst 2013). The lessor's policy is to take care of the 'heritage of our fathers' using four guiding principles: 1) retain property of Kampereiland, 2) obtain a reasonable financial return, 3) take care of nature and landscape values, and 4) conduct a loyal tenancy policy. A farm has on average around 45 ha in use including land owned or rented outside of Kampereiland, to buy land farmers

need to go to neighbouring areas (5+ km). Farm income in Kampereiland relies on dairy farming, often supplemented by an off-farm job. There are no organic dairy farms at the time of the survey and less than 10 farmers are engaged in diversification of their farm. The milk is delivered to (inter)nationally operating dairy organisations, mostly cooperatives.

Data collection and processing

In a survey (February 2013) all 102 dairy farmers were asked to rate on a 5-point Likert scale the perceived viability for themselves of 15 options to generate a substantial part of farm income resulting in 79 completed questionnaires. Local experts assessed the 23 non-respondents not to deviate in their characteristics from the respondents. Using principal component analysis (Varimax with Kaiser Normalisation) three factors (dimensions) were found: diversifying, ending and maximising production. The dimensions were used in a two-stage cluster analysis leading to four clusters of farmers (Methorst et al. manuscript in preparation). The characteristics of the four clusters were determined using information from three sources: 1) the average score of each pattern for the 15 options in farm development, 2) the average production characteristics for each pattern, and 3) interviews with stakeholders of dairy farming on the characteristics of the farms. The interviews included dairy farmers (n=15, selected at random from all four clusters) and stakeholders (n=16) in advisory, supply, veterinary, the lessor and farmers' organisations. The four clusters were identified as coherent and meaningful patterns of the perception of options for farm development. The ideal-typical set of characteristics was determined for the different patterns. Ideal-types are a coherent theoretical concept that is 'formed from characteristics and elements of the given phenomena but it is not meant to correspond to all of the characteristics of any one specific case' (Soliva 2007: 63). Ideal-types can help to identify patterns of variance (Doty and Glick 1994) and to give meaning to the patterns found.

The scale to measure embeddedness

Using the ideal-typical characteristics of the different patterns, the extent of the three-fold embeddedness was determined of the farm and farmer in the function of producing dairy on the address where the farm is located. Each farm has a location with its own local supply of resources of a social, cultural, human and natural character (Casini et al. 2012: 197). To estimate the extent of the embeddedness a scale was used ranging from a 'Close' set of relations to a 'Stretched' set of relations. The results are a qualitative estimate, leading to a position on the scale between Close and Stretched. This position resembles three sliders on a sound mixing panel. The sliders can be positioned on the scales and the combined positioning represents the characteristics of the farm(er).

The following guidelines were developed to determine the extent of the embeddedness between Close or Stretched. **Socio-cultural relations** of the farm(er): to what extent do they represent an attachment to the land in use and to the direct surroundings of the farm, both physical and social. Does the farmer 'belong' to this location (Close) or could the farmer easily move to another farm in a different location (Stretched). How does the farmer position himself, as caretaker of the farm and its land (Close) or as manager of an economic activity (Stretched). **Value chain relations** of the farm: how is the relation of the farm with the market outlets of its product. Are the products part of a globalised value chain where products are marketed anywhere in or outside Europe (Stretched) or is it a value chain where products are marketed using a brand linked to the farm or the region (Close). Is the farm(er) primarily connected to the agri-industrial oriented value chain network (Stretched) or is the farm primarily connected to the agri-food oriented value chain network (Close). **Resources relations** of the farm: where do the resources come from (mainly feed and fertilizer). Is it primarily based on the agro-ecological view to be self-proficient in

producing feed (Close) or is it primarily based on agri-industrial view to use all resources available to maximise farm output (Stretched).

4. Results

Four patterns of farmers' perception were found which were named Milk Max, Milk Balance, Milk Plus and End Milk. **Milk Max** (n=29): farms aiming to maximise total milk production using high levels of input to create a high output. Dairy farming is seen as a technical process guided by financial parameters. **Milk Balance** (n=21): farms aiming to optimise total milk production within the limits of feed produced on own land using limited additional inputs to optimise milk production. Dairy farming is seen as producing dairy while accepting the natural limitations in available resources. **Milk Plus** (n=21): farmers open for other sources of income from on-farm activities (e.g. care, recreation and nature) next to a Milk Balance strategy. The organisation of the farm aims to reduce the pressure on operational management allowing to invest time and energy on other on-farm activities. **End Milk** (n=8): farms aiming to end milk production in the coming years, either due to pension without a successor or due to the economic situation of the farm. Farmers aim not to move, the land will be transferred to other farmers and the farm facilities are taken out of (dairy) production. End Milk is not used for further analysis given the diversity of reasons to end milking and the low number of farmers. The following paragraphs will describe the three-fold embeddedness of three ideal-typical patterns, the results are summarised for all three patterns of dairy farming in Table 1.

5.1 Three-fold embeddedness of Milk Max^[MR1]

For **Value chain relations**, the farm has a primary focus on producing dairy as commodity product for the dairy industry using a high input production system. The farm is aimed to produce as much milk as possible within the legal and economic constraints and the farmer aims for farm size development. The farm functions as a production unit with economic parameters as guiding principle in decision-making. The farmers are actively related to advisory organisations in business management, both general and in the (dairy) farm sector

In the **Socio-cultural relations**, the farm is seen as an enterprise and the farmer as entrepreneur and business owner. The farmer gets satisfaction from a well-managed, smoothly running farm operation. The farmer takes pride in how they farm and positions it as their active choice to do so. The farm and the farmer' family are not necessarily connected. The farmer is interested in general business networks.

In the **Resource relations** the economic usefulness as resource for production is the main viewpoint. The decision which resources to use is the result of an economic calculation. Local surrounding is primarily seen through the lens of usefulness for production.

5.2 Threefold embeddedness of Milk Balance

For **Value chain relations** the farm is focused on the conventional dairy value chain where milk is a commodity while practising a production system based on (relative) low external inputs. Economic return is the result of all decisions and activities, not the primary goal. Participating in an added value dairy value chain is an option, e.g. organic dairy. Critical about the trend towards both scale enlargement and diversification of the farm. Does not believe in diversification of on-farm income sources, hesitates partly because investments are needed, partly because of how it will affect their farm business activities

For **Socio-cultural relations**, dairy farming is a way of life with a strong base in local culture. The farmer gets satisfaction from being part of the farming culture, working with land and animals. The

farmer can be a bit focused on doing it the way he is used to do. The farm and the farm family are connected. The farmer is open for co-operation in wider goals like sustaining landscape and nature values as long as it is not too much limiting the process of his farm. This co-operation is more seen as a co-production than as a service for which a payment is needed. The urban-rural connection is acknowledged as important, yet not seen as viable (next to dairy) for their farm

In the **Resource relations** the agro-ecological approach is leading, the farm and its natural setting is the base for production. The focus on natural parameters translates in low use of external inputs, the farm itself is the primary resource base for production. Optimisation within the resources available. The successfulness of the farm can be measured as the amount of inputs needed to maintain the productivity of the farm, less inputs is better. Additional resources are used, but with the aim of optimising production. Nature and landscape is more a constraint than resource, though they are such much appreciated. The farmer does feel connected to and part of his surroundings, the farm belongs there and is part of the heritage of farming in the area. The surroundings are in principle seen as 'outside of my farm', as a separate world that may negatively affect your farm. Farmers have been surprised by and confronted with limitations in connection to nature and landscape which makes them careful now.

5.3 Threefold embeddedness of Milk Plus

In **Value chain relations** the farm is part of more than one value chain with dairy production mostly as main income source. Next to dairy farming, the farmer operates a value chain of products and services directly addressing clients. This value chain is based on the characteristics of the farm and the appeal of the rural setting as valued by the broader society. This type of farm requires a combination of different skills and entrepreneurial competences. The successfulness of the farm cannot be measured in the same production characteristics as for Milk Balance or Milk Max due to the diversity in activities. The approach to dairy farming resembles Milk Balance, the agro-ecological approach to farming, the farm and its natural setting as base for production

In the **Socio-cultural relations**, the farmer identifies the farm and farming as more than a production location, it is as well a source of wellbeing for (local) society. The farmer values (societal) recognition for the positive effects of his work on the urban-rural relation, the farmer is very motivated to contribute to the region and add societal value. Monetary value is needed, but not the primary goal, personal life experiences may play a role, some may even risk to invest too much of themselves. The farm is a family business. The farmer is open towards non-farming socio-cultural developments and networks

In the **Resource relations**, the primary resource base for dairy farming is local and resembles the Milk Balance farmers. In addition the farmers are open for alternative use of resources in the area, the farm itself, the farming lifestyle and the rural context is seen as a resources as well. The farmers likes to see a farm that is well embedded in a landscape and that connects farming with nature and landscape. The farmer actively thinks about and connects to the surroundings. The farmer is open for and may initiate a co-operation in wider goals like sustaining landscape or nature values.

Table 1 Extent of the three-fold embeddedness for the three ideal-typical patterns of dairy farming

	Milk Max	Milk Balance	Milk Plus
Value Chain Relations	Focus on producing dairy as commodity product for dairy industry Explicit agro-productivist view, farm is production unit, focus on benefits from scale and intensity (Pro-)active related to organisations in the value chain, network oriented Explicitly refers to his position in value chain as an active choice	Focus on dairy as commodity, possibly part of added value chain (eg organic) Implicit agro-ecology view, farm is production unit, focus on benefits from optimising land assets Passive related to organisations in value chain, farm internal oriented Implicitly refers to current value chain as 'the normal thing to do'	Focus on multiple value chains: 'normal' dairy plus an extra on-farm activity Explicit agro-societal view, farm is a unit with multiple functions, focus on multiple use of assets (Pro-)active related to broader set of networks Explicitly refers to added value the farm has to offer
	Close <----- XXXXXX ->	Stretched <----- XXXXXX ->	Close <----- XXXXXX ->
Socio-Cultural Relations	Positions as dairy farmer running a business Farm and family not necessarily linked less life style farming Focus on (agri-)business networks, local relations are personal rather than farm related Explicitly refers to the socio-cultural relations using a rational approach	Positions as dairy farmer as a way of life strongly based in local culture Farm and family are connected, life style farming Focus on agricultural networks, mainly local or supplier related Implicitly refers to 'traditional farming' in the socio-cultural context	Positions as (dairy) farmer with multiple services on offer for society Farm and family are connected, the farm is seen as a family business Focus in- and outside agriculture, has interest in (developing) local and supra-local networks Explicitly refers to farm as active connector in socio-cultural relations
	Close <----- XXXXXX >	Stretched < - XXXXXX ->	Close < - XXXXXX ->
Resource Relations	Decision which resources to use is an active choice based on an economic calculation aiming to maximise output Local nature and landscape is seen as potential constraint for development Origin of resources is of secondary importance Explicitly evaluates resources on economic added value to maximise a cost effective production	Decision which resources to use is an active choice, feed from own land with added concentrated feed Local nature and landscape is valued, yet seen as possible constraint Resource base is primarily local, additional resources to optimise Explicitly evaluates resources as part of the cycle of nature	Decision which resources to use is a passive choice, feed from own land with added concentrated feed Local nature and landscape is valued as added value in the context for the farm Local resources as marketing value, additional resources to optimise Explicitly refers to the farm and context as a resource, intangible assets are valued as resources
	Close <----- XXXXXX ->	Stretched <----- XXXXXX ->	Close < - XXXXXX ->

6. Discussion, conclusions and implication

Heterogeneity in farm development is well documented in literature on farming styles (Long and Ploeg 1994; Ploeg 2003; Ploeg and Ventura 2014) and in relation to resilience of farms (Darnhofer 2010). Heterogeneity in farm development cannot be reduced to 'external' structural forces such as 'markets' or 'nature' impacting on farming, even when these are mediated by capable farmers into their every farming practices and decision making. The socio-cultural embeddedness of farmers, their shared values and norms and how they see themselves as a farmer or like to be seen, do matter significantly in explaining different farm development strategies and result in different patterns of farm development. And as this study has shown, this includes farmers' perception of options for farm development. Next to the socio-cultural embedding as an explanation for how farming is actually practiced, also the embedding in value chains and embedding in agro-ecological resources does matter. This three-fold embeddedness of farming offers a new perspective on different patterns of farm development, more specifically

on the coherent strategic and operational decisions farmers make in line with their mix of embeddedness. Farmers do play with the 'sliders' on the scale of each dimension of three-fold embeddedness according to their views and capacities, and their perceptions of options for farm development, taking into account the dynamic setting they operate in. The three-fold perspective offers a symmetrical analysis of embeddedness and highlights the differences as gradual in contrast to a binary approach where farming is considered to be either (locally) embedded or not (locally) embedded. The results show to what extent farmers differ in their three-fold embeddedness on a scale between a Close and a Stretched set of relations. The three ideal-typical farms differ in the rationale presented by farmers in describing the characteristics of the three patterns of farm development. The findings show that no strict lines can be drawn in the demarcation of farm development strategies, the transition from one strategy into the other is not on a fixed position in three-fold embeddedness. Different levels of embeddedness may even result in similar visible farm characteristics, but in effect reflect different rationales. There is a difference between patterns how explicit the reasoning is for the positioning in three-fold embeddedness. Both Milk Max and Milk Plus are explicit in the positioning for all three dimensions. For Milk Balance, however, the positioning is only explicit for the use of resources, this positioning is in line with their emphasis on optimising the on-farm available resources and a focus on the craftsmanship of dairy farming. Milk Balance is more implicit in the positioning in the embeddedness in the value chain and socio-cultural relations, it appears that an explicit positioning is not needed as how they do it is the 'obvious' to run a dairy farm. However, an explicit reasoning not necessarily means that farmers' perception of options for farm development is voluntary or that it reflects the most preferred farm development strategy. The findings do show that farmers who perceive a Milk Max or Milk Plus strategy as viable appear to be more pro-active in their positioning in value chains than a farmer with a Milk Balance strategy. This indicates a more pro-active approach towards creating room for manoeuvre for farm development. This is likely to be in line with being active in networks outside the traditional, local oriented agriculture network.

The three-fold embeddedness focusses on and studies the different sets of relations of which farming is part of and embedded in. It thus takes a relational approach to farming and farm development (Darnhofer et al. 2016). The gradual approach of embeddedness in three dimensions allows to overcome the often binary approach found in agri-food literature (Morgan et al. 2006: 166). The three-fold embeddedness perspective allows to analyse in a symmetrical way and in depth the differences between farmers in the perception of options for farm development. These differences can then be related to differences in farm development and to dealing with pressures on farm development, e.g. protection of landscape or nature values. The range of pressures on farm development (Feola et al. 2015) make it a no-easy task for a farmer to express his agency in the farm development. Especially diversifying production (Milk Plus) is not a straightforward and easy decision, the motives for diversifying are complex and include non-economic aspects (Hansson et al. 2013). Three-fold embeddedness offers an avenue for further research on these motives for diversifying. A next step in the research can focus on agency of the farmer in creating room for manoeuvre for farm development. Does the farmer create the favourable conditions in line with the mission, strategy and goals, or does the farmer perceive the local (biophysical and socio-economic) conditions as a given situation within which the mission, strategy and goals can be defined and realised. Whether farmers are or are not able to enlarge their room for manoeuvre is of interest for both farm and regional development, especially in regions with natural and landscape values as amenities. A better understanding of how farmers are able to enlarge their agency supports the development of policies and support programs.

The results of this study are deemed to be valid for (Dutch) dairy farming in general. Kampereiland as case study is unique in the highly comparable context. However, all farmers operate in a context that affects their development options and this study aims to understand differences in dealing with the context, not the context itself. Furthermore, the patterns found in farmers' perception of options for farm development were acknowledged by farming experts as valid for dairy farming in general. The use of ideal-typical farms may create an emphasis on a combination of farm characteristics that is not clearly present as such in practice. The aim of this study is however to study patterns of variance in empirical observations which are in itself complex and diffuse (Soliva 2007: 64) for which ideal-types are as useful tool (Doty and Glick 1994). The findings need to be interpreted as a study on differences between different development patterns of farmers and not as absolute results to describe specific types of farmers.

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