

*A scenario study of the
future land use and landscape
for family dairy farms
in Noordoost-Twente*



MSc Thesis Report
Brigit Pegge

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Colophon

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Privacy statement

For this study the personal information of 20 farmers is conducted. The author handled this dataset with care. This data is exclusively used for this study. No names are mentioned in this report and the farmers are not traceable throughout the document.

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Abstract

Scale enlargements, more attention towards nature and biodiversity, upcoming tourism and the missing awareness from citizens towards farming models of a farm, and farmers awareness towards the citizens perspective, all influence the life on a family dairy farm. This thesis studies the possible development models for Noordoost-Twente in 2030. Through interviews and questionnaires the social expectation of farmers based on Jan Douwe van der Ploegs 'New peasantry theory' is researched. Social expectation forms the basis for farm viability and for farmer's attitudes towards future farm development. Together this forms the input for an experimental exercise in agent based modelling using scenarios for decreasing and rising milk prices. The output is compared with the social expectation of the most important stakeholders in the area. The majority of the farmers and stakeholders expect an entrepreneurial farming mode in combination with a peasant farming mode. Besides, many farmers also expect a purely peasant farming mode, although there is only one stakeholder who expects a peasant farming mode. The Agent Based Modelling exercise shows that there a small change of only one key factor – for example a low milk price several years on row – may lead to a tipping point in landscape development. As a conclusion the study describes three potential development models; a multifunctional model "D'r is van alles te doan", a neutral development model "Twente zo as 't is" and to conclude a model focused on production "'t is oal om melk".

Key words: Dairy family farms, Noordoost-Twente, Land Use Change, New peasantries, Agent based modelling

English summary

Lack of successors, increasing awareness for biodiversity and nature, more tourism and scale enlargement in the agricultural sector. All of these developments influence the Dutch dairy sector. This study will look at the future landscape and land use of family dairy farms in Noordoost-Twente in 2030 under different milk price scenarios.

By interviewing 20 representative farmers in four different municipalities of Noordoost-Twente the social expectation of farmers for the area has been researched. What do farmers think of the land use of 2030 and what is the role of the family dairy farm? With the 'New Peasantries' theory of Jan Douwe van der Ploeg the social expectation per farmer is designated in different farming modes; capital farming mode, entrepreneurial farming mode and peasant farming mode.

For each farmer, the viability of his farm and the farmers attitude towards several aspects has been investigated. This has been done by taking interviews in combination with a questionnaire in the same farmer sample. The farm viability and score per attitude together, is the starting point for the different pathways. These pathways are: side activity towards tourism, side activity towards nature, biological farming, intensification or to quit. The pathways can be linked to the three main purposes of the rural areas according to John Holmes' 'transition theory' (production, protection and consumption). According to Holmes, there is a shift from a production landscape towards a mix of production, protection and consumption. However, the farmers show with their starting points of the pathways that Noordoost-Twente is still mainly a production area.

In an experimental exercise with Agent Based Modelling the starting points of the pathways are transformed into scenarios. In these scenarios the development of the pathways of the farmers are shown under rising and falling milk price scenarios. With a rising milk price the intensification of the farm is the most attractive pathway, followed by the switch towards biological farming. A side activity towards tourism or nature is the most attractive pathway with a falling milk price. If the milk price is falling several years in sequence, it becomes in the end the most attractive to stop with the agricultural part of their business.

However, there are more land users in Noordoost-Twente. Other stakeholders who can influence the landscape in a different way have also been interviewed. These stakeholders set the framework in which a farmer is acting. In the most ideal situation, the social expectation of the stakeholders matches with the social expectation of the farmers. In both groups there is a large majority that expects a combination of entrepreneurial farming with peasant farming. The family dairy farm sets great store in this pathway and scale enlargement does occur. These entrepreneurial / peasant farmers want to develop their farm, for example by automating their farm.

There is, however, also a remarkable difference in the social expectation of the farmers and stakeholders. While there are a lot of farmers who expect a peasant farming mode, there is only one stakeholder who expect this farming mode for 2030. Concluding the scenarios do show that there is only one small change needed that can cause a tipping point in the land use and landscape development. When this tipping point is needed crucial changes for the landscape and land use can occur. In this study the milk price is used as independent key factor. Think of several years in sequence with a bad milk price that can cause major changes in the landscape. There are also other key factors; these key factors do influence the eventual development model of the farmer and the landscape. In this study the consequences of a mainly multifunctional model "D'r is van alles te doan", a neutral model "Twente zo as 't is" and a model that focuses on production "'t is oal om melk" will be looked into.

Nederlandse samenvatting

Gebrek aan opvolging, toenemende aandacht voor natuur en biodiversiteit, opkomend toerisme en schaalvergroting van de agrarische sector. Het zijn stuk voor stuk ontwikkelingen die invloed uitoefenen op de melkveehouderijsector in Nederland. In dit onderzoek wordt gekeken naar het toekomstig landgebruik en landschap met daarin gezinsbedrijven met melkvee in Noordoost-Twente met het oog op verschillende melkprijsscenario's in 2030.

Door interviews af te nemen bij twintig verschillende representatieve boeren verspreid over de vier gemeenten in Noordoost-Twente is er gekeken naar de maatschappelijke verwachting van de boeren voor het landgebruik van Noordoost-Twente. Hoe verwachten de boeren dat het landgebruik eruit zal zien in 2030 en welke plek heeft het gezinsbedrijf hierin? Aan de hand van de 'New peasantries' theorie van Jan Douwe van der Ploeg is de maatschappelijke verwachting per boer ingedeeld in verschillende vormen van boeren, namelijk; kapitalistisch boeren, ondernemend boeren en het traditionele boeren.

Met behulp van de interviews in combinatie met een enquête die is afgenomen bij dezelfde groep boeren is een levensvatbaarheid en attitude per boer, ten opzichte van verschillende aspecten opgesteld. De levensvatbaarheid en scores per attitude tezamen vormt het startpunt voor verschillende wegen die boeren kunnen inslaan. Deze wegen, ook wel ontwikkeltrajecten genoemd zijn als volgt: nevenactiviteit richting toerisme, nevenactiviteit richting natuur, omschakeling naar biologisch boeren, intensiveren of stoppen. Deze ontwikkeltrajecten zijn te linken aan de drie basisdoelen van het landelijk gebied opgesteld in John Holmes' 'transitie theorie' (productie, protectie en consumptie). Volgens Holmes zit er een verschuiving van een voornamelijk productie landschap naar een variabele mix tussen productie, protectie en consumptie. Echter laten de boeren zien met de startpunten van hun huidige ontwikkeltrajecten dat Noordoost-Twente voornamelijk nog een productielandschap is.

In een experimentele oefening met Agent Based Modelling zijn deze startpunten van ontwikkeltrajecten omgezet naar scenario's. Hierin wordt aangetoond hoe de startpunten van de boeren zich ontwikkelen onder de invloed van stijgende en dalende melkprijzen. Bij een stijgende melkprijs is het intensiveren van de boerderij het meest aantrekkelijk, gevolgd door het omschakelen naar biologisch boeren. Een nevenactiviteit richting toerisme of natuur is het meest aantrekkelijk bij een dalende melkprijs. Bij een lang genoeg dalende melkprijs is het uiteindelijk het meest aantrekkelijk om te stoppen met de agrarische tak van het bedrijf.

Noordoost-Twente kent meer landgebruikers dan alleen boeren. Daarom zijn er diverse organisaties geïnterviewd die allen op een andere manier invloed hebben op het landschap. Zij bepalen het kader, het raamwerk, waarin de boer werkt. Idealiter zou de maatschappelijke verwachting van de boeren overeenkomen met de verwachting van de stakeholders. Deels is dit het geval; bij beide groepen verwacht een ruime meerderheid een toekomst met het traditionele boeren in combinatie met het ondernemend boeren. Hierin staat het gezinsbedrijf hoog in het vaandel waarbij enige schaalvergroting gewenst is. De boeren willen net zoals ondernemers wel graag vooruit, bijvoorbeeld door automatisering. Echter komt er ook een opmerkelijk verschil boven tussen de verwachting van boeren en de organisaties. Het traditionele boeren waarin het gezinsbedrijf floreert wordt in de maatschappelijke verwachting van de boeren aanzienlijk meer verwacht ten opzichte van de maatschappelijke verwachting van de organisaties. De organisaties verwachten deze vorm van boeren eigenlijk amper. Tot slot blijkt uit dat de scenario's dat er maar één enkele kleine verandering nodig is die zorgt voor het kantelpunt.

Het bereiken van dit kantelpunt kan grote gevolgen hebben voor het landgebruik en daarmee het landschap. In dit onderzoek is de melkprijs gebruikt als onafhankelijke sleutel factor. Denk hierbij aan jaren achtereenvolgend een slechte melkprijs waardoor de gevolgen voor het landgebruik groot zijn, er zouden misschien zelfs gronden braak kunnen komen te liggen ondanks de ontzettend hoge gronddruk die men nu ondervindt. Naast de melkprijs zijn er meerdere sleutelfactoren te benoemen. Deze sleutelfactoren hebben invloed op, de hoofdvraag, het uiteindelijke ontwikkelingsmodel van de boer en het landschap. In dit onderzoek worden de gevolgen van een multifunctioneel "D'r is van alles te doen", een neutraal ontwikkelingsmodel "Twente zo as 't is" en tot slot een model gericht op productie "'t is oal om melk" behandeld.

Tweantse saam'nvatting

Gin opvolger, meer andacht veur natuur en biodiversiteit, meer toerisme, gröttere boer'nbedriev'n. Dit bunt allemoal ontwikkeling'n dee invloed hebt op beestebedriev'n in Nederland. In dit onderzoek wördt ekek'n noar de effect'n van verschillende melkpries-scenario's op 't laandgebroek en laandschap met doarin gezinsbedriev'n met beeste in Noordoost-Tweante.

Deur vrag'nliest'n oaf te nemm'n bie twintig verschill'nde, representatieve, bedriev'n verspreid oawer de veer gemeent'n van Noordoost-Tweante is ekekk'n noar de maatschappelijke verwachting van de boer'n veur 't laandgebroek van Noordoost-Tweante. Hoo denkt de boer'n dat 't laandgebroek d'r in 2030 oet zal zeen en wat is de plaatse van gezinsbedriev'n hierin? Met behulp van de "New peasantries" theorie van Jan Douwe van der Ploeg is de maatschappelijke verwoachting per boer in-edeeld in verschill'nde vorm'n van boer'n, te wett'n kapitalistisch boer'n, ondernemm'nd boer'n en boer'n zo-as 't aaltied is ewes.

Met behulp van de vrag'nliest'n en de enquete dee oaf-enomm'n is bie dezelfde groep boer'n is nen leav'nsvatbaarheid en holding per boer ten opzichte van verschill'nde aspect'n op-esteld. De leav'nsvatbaarheid en scores veur de holding met mekaar vorm't 't startpunt veur verschill'nde weag'n dee boer'n in köntt sloan. Disse weag'n, ok wal ontwikkeltraject'n eneumd, but as volgt: verbreding richting toerisme, natuur, umschakel'n noar biologisch boer'n, intensiveer'n of stopp'n. Disse ontwikkeltraject'n bunt te link'n an de drie basisdoel'n van 't plattelaand op-esteld in John Holmes "transitie theorie" (productie, protectie en consumptie). Volg'ns Holmes zit d'r nen verschoeving van nen veurnamelijk productielaandschap noar nen variabele mix tusker'n productie, protectie en consumptie. De boer'n loat echter zeen met de startpunt'n van hun ontwikkeltraject'n dat Noordoost-Tweante veurnamelijk nog nen productielaandschap is.

In nen experimentele oefening met Agent Based Modelling bunt disse startpunt'n van ontwikkelingstraject'n um-ezet noar scenario's. Hierin wördt loat'n zeen hoo de startpunt'n van de boer'n zich ontwikkelt oonder de invloed van stijg'nde en daal'nde melkprieze. Bie nen stijg'nde melkpries is 't aantrekkelijk um 't bedrijf te intensiveer'n, evolgd deur umschaakel'n noar biologisch boer'n. Verbreding richting tourisme of natuur is 't meest antrekkelijk bie nen daal'nde melkpries. As de melkpries lang genog blif daal'n is 't oeteindelijk 't meest antrekkelijk um te stopp'n met de agrarische tak van 't bedrijf.

D'r bunt in Noordoost-Tweante echter meerdere laandgebroekers dan allen moar boer'n. Doarum bunt d'r verschill'nde organisaties bevroagd dee allemoal op nen bepaalde manier effect hebt op 't laandschap. Zee bepaalt 't kader (of raamwerk) waarin de boer warkt. 't Zol 't allermooiste wean dat de maatschappelijke verwachting van de boer'n oawer-een kommt met de verwachting van de betrokken leu. Dit is veur nen deel zo, bie beare groep'n verwoacht nen grote mearderheid nen toekomst met 't traditionele boer'n in combinatie met ondernemm'nd boer'n. Hierin steet 't gezinsbedrijf hoog in 't vaandel waarbie schaalvergrötting gewenst is. De boer'n wilt net zo-as de ondernemmers wa geerne veuroet, zo-as deur verdere automatisering.

D'r is echter ok nen opmerkelijk verschil tusker'n de verwoachting van de boer'n en de organisaties. 't Traditionele boer'n waarbie 't gezinsbedrijf 't best gedijt wördt in de maatschappelijke verwoachting van de boer'n aanzienlijk meer verwoacht ten opzichte van de maatschappelijke verwoachting van de organisaties. De organisaties verwoacht disse vorm van boer'n eigenlijk amper. Tot slot blik oet de scenario's dat d'r eig'nlijk moar een kleane verandering neudig is dee zorgt veur 't kaantelpunt. 't Bereik'n van dit kaantelpunt kan grote gevolg'n hebb'm veur 't laandgebroek en doarmet 't laandschap. In dit onderzoek is de melkpries e-broekt as onafhaankelijke slöttelfactor. Deank hierbie an joar'n aneen nen slechte melkpries woardeur de gevolg'n veur 't laandgebroek groot bunt. D'r zal wellicht zelfs grond braak könn'n komm'n ligg'n ondanks de onzett'nd hoge grondddruk dee noe oondervun'n wördt. Noast de melkpries bunt meerdere slöttelfactoor'n te beneum'n. Disse slöttelfactoor'n hebt invloed op, de heufdvraag, 't oeteindelijke oontwikkelingsmodel van de boer en 't laandschap. In dit onderzeuk wördt de gevolg'n van nen multifunctioneel "D'r is van alles te doan", nen neutraal oontwikkelingsmodel "Twente zo as 't is" en tot slot nen model e-richt op productie "'t is oal um melk" behandeld.

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Wageningen, 12th of June 2018

Brigit Pegge

Chapter 1 · Introduction

The world is changing, everywhere and on every scale. The world for the farmers is also changing, especially for the dairy farmers. There are various developments going which will influence the farmers' life. First of all the problem with successors, due to bad financial circumstances it is not attractive to become a farmer (NOS, 2013), even if you want to become a farmer it is hard to start a farm. Besides, nowadays we are higher educated and there is less interest in becoming a farmer (RTV Oost, 2017). In former times the usual case was that the son would take over the farm from his father, but nowadays only 1.250 young farmers will do that, while there are 65.000 farms in the Netherlands (Wittenberg, 2016). That, and the fact that families are getting fewer children (RTV Oost, 2017) results in a shortage of successors, especially for the small farms (NOS, 2013). According to Centraal Bureau voor de Statistiek, 70% of the big farms does have a successor, just 48% of the average-sized farms, and 27% of the small farms has a successor (Centraal Bureau voor de Statistiek, 2016). But for the agriculture itself it is not that bad that there are less farms. The decrease in farmers does not have big consequences for the production of food. Or even better, the production will grow (RTV Oost, 2017). Due to this trend, the remaining farmers will get more space to grow. Another development that results in enlargement of farms is the abolished milk quota. The milk quota was a "ceiling" for milk production and farmers were not allowed to produce more milk then they had rights for. While the milk quota was gone, farmers could grow a lot. A replacement for the milk quota was announced in the form of a phosphate control. A plan that was brought into life to cope with the Paris climate agreement, farmers were obligated to reduce their amount of cows (Boerderij, 2017). This set of unclear rules resulted in upset farmers, court cases and slaughtered cows (Nieuwsuur, 2017).

All these trends for and by farmers are not the only developments that occur. There is also a lot going on in the field of agriculture, tourism and nature as earlier discovered in an essay for the course 'Governance for Forest, Nature and Biodiversity'; (Pegge, 2017). Biodiversity has

been decreasing for years now (Regiegroep Natura 2000, 2017), to protect our flora and fauna we need cross-border action. The growing amount of cows is one of the reasons of the increasing amount of ammonia; too much ammonia in surface water results in blue algae and dead animals and plants (De Nederlandse Mesthoop, 2018). A method to protect our wildlife is Natura 2000, an European network to protect flora and fauna, figure 1 shows a map of Natura 2000 areas in Noordoost-Twente (Regiegroep Natura 2000, 2017).

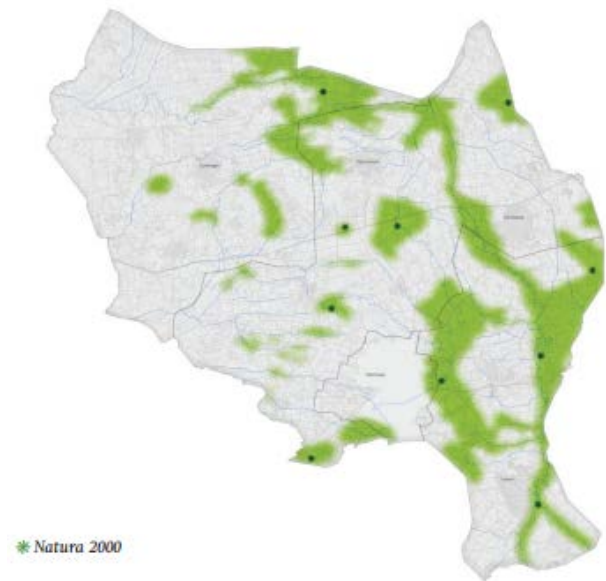


Figure 1 - Natura 2000 areas in Noordoost-Twente
(Programmasecretariaat Gebiedsontwikkeling Noordoost-Twente, 2012)

But the Netherlands is just a small country, so we have to divide the land wisely. Alterra, the research centre of Wageningen University, stated that the Netherlands has become "locked-down", because there are no developments possible anymore (Arnouts & Kistenkas, 2011). Developments would clash with nature policies (Beunen, et al., n.d.). There is a huge discussion going on whether we should use our land for nature or agriculture. This is especially the case in Twente, a region in the east part of the Netherlands. Due to all the aforementioned developments the pressure on land is very high. And then there is also the problem of generating green energy, using agricultural fields for solar panels. But this is mainly the case in Groningen, Friesland and Drenthe (Algemeen Dagblad, 2018).

So, there are several developments of which farmers have some concern. All these developments threaten the traditional family dairy farms.

And it is this farmer who gives the idyllic scenery that is loved so much, especially tourists. The tourists appreciate the landscape that is shaped by farmers, tourism is increasing in Twente (Staal, 2017). As a result of this Twente profiled herself as the “Estate of the Netherlands” and a lot of people visit it for its nature (Twente, 2017). The farmer, as a manager and owner of nature and landscape definitely plays a role in how our landscape looks (Boeren voor Natuur Twente, 2013). Growing crops and grazing cattle all contributes to the landscape. What also contributes to the idyllic view of the landscape are the farms themselves, small scale farms who are often owned by family dairy farmers. Agriculture is seen as a threat as well as a caretaker of the landscape as cultural heritage (Daugstad, et al., 2006). There are a lot of farmers who have secondary activities on recreational level such as camping’s. When it comes to the secondary activities farmers are happy with tourists, but sometimes they clash with each other (Boerderij, 2013).

Tourists like the landscape, the landscape that is so beautiful that we want to protect it with for example Natura 2000. But Natura 2000 may lock-down the entrepreneurs and farmers of the area. And if the farmers will leave, who is going to maintain the landscape?

This study will zoom in on dairy farming in Noordoost-Twente. A region in the north east of the Netherlands, figure 1 shows Noordoost-Twente. Noordoost-Twente is chosen as region due to the high amount of dairy farmers (De Nederlandse Zuivel Organisatie, 2016), nature values and a lot of tourists. Besides, the author has contacts, affinity and personal interest in this region of the Netherlands. Extra focus will be on Noordoost-Twente, this area consists of the municipalities Tubbergen, Dinkelland, Oldenzaal and Losser.

Problem description

The developments described in the introduction are not new, there is already some literature in the scientific field written about them. In the following paragraph the scientific side of several developments will be elaborated.

Successor

The problem with successors on farms is international, “in many developed countries there is concern over the ageing farming population” (Leonard, et al., 2017, p. 1). While the number of farmers under 40 years is decreasing, the number of older farmers is increasing. In New Zealand the dairy industry has a well-developed career structure with phased exit strategies for old farmers and opportunities to start farming for young farmers (Leonard, et al., 2017). One of the examples is share milking, up to 35% of the dairy farms in New Zealand are share farms. But one of the difficult factors is the need for a pension of sufficient income for the retiring farmer (Leonard, et al., 2017). It is also mentioned that nowadays “to get onto the share milking ladder requires 200 percent more capital than it did before. It appears the farm owner is no longer one farmer and their family, but a syndicate of investors or a corporate owner of some description. These owners have more debt than before, which means they need to retain more of the milk cheque to be viable. The end result is a young farmer starting today will likely never be able to work their way up to farm ownership” (Herud, 2017, p. 1).

Nature vs. Culture

Hammer mentions the tension between nature and culture (as in tourism). “Overcrowding of tourist destinations both degrades the experience of the tourists and residents, a social limit, but also often degrades the environment, an environmental limit, that undermines the experience of current and future tourists and residents” (Hammer, 2008, p. 179). Hammer is warning for concentrated tourist development which “degrades or destroys the very object of the tourist gaze” (Hammer, 2008, p. 179). But not only does it have an effect on the touristic highlights, also the housing price can escalate due to tourists. Local households will be affected by tourists who are looking for a (second) home and have high incomes, Hammer calls this trend “Aspenization” (Hammer, 2008). Annie Schreijer is a Dutch politician who is in the European government for environment, public health and food safety with her hometown in Twente. She mentions about Natura 2000 the following: We designated those areas because they are high quality, this high quality is made by farmers. By doing more for Natura 2000 those farmers will

get in trouble. Those strict rules from Natura 2000 should be suspended. (Natuurgebieden behouden en boeren; een lastige combinatie?, 2017)

Agriculture vs. Cultural heritage

The challenge between agriculture and cultural heritage is not only the case in Noordoost-Twente. Other places deal with the same problem, for example Norway. Daugstad et al. describes the relationship between them “The relationship between cultural heritage and agriculture is of special relevance for two reasons: The combination of agriculture as economic activity and system of land use on the one hand, and cultural heritage involving conservation and limits on use on the other hand, represents a challenge. This is not to say that agriculture is free from conservation approaches or that cultural heritage as conservation rules out use, but we need to underline the presence of diverging values and definitions” (Daugstad, et al., 2006, p. 67). She also states that agriculture can be seen as a threat to cultural heritage as a caretaker, exactly the same statement as the farmers in Twente mentioned, as stated before (Boeren voor Natuur Twente, 2013).

Farm enlargements

Farms are getting bigger and bigger. This is also the case in the Netherlands: “The number of farms with more than 250 cows has increased from 44 in 1980 to 355 in 2015. From 2011 onwards, the number of dairy farms in the Netherlands has decreased, while the number of dairy cows has increased. Thus, more cows are kept on bigger farms” (Groeneveld, et al., 2016, p. 26).

Family farming

The United Nations declared 2014 the international year of family farming, to create awareness for the important role that family farms has in agriculture (Swagemakers, 2014). It is stated that there is no future for the current family farm (Boerderij, 2014). The farms have to improve and develop. But that is not always possible among other things due to nature. So, the traditional farmer in Noordoost-Twente got stuck between nature, policies, developments and enlargements.

Due to multiple developments the future playing field for the family dairy farm is unclear. How can

one anticipate on these developments in this changing world? What will be the future perspective of family dairy farms and their land use in Noordoost-Twente?

Research objectives and research questions

Every study has an objective, in order to get to the objective, research questions are needed. The societal objective is the bigger aim of the study, the research objective is the contribution of this study to this aim. Research questions are given to be able to answer the main research question.

Societal objective: A balanced division of land use given the social expectation of a landscape where cultural heritage plays a big part.

Research objective: Assess the feasibility of a balanced division of land use given the social perception of the role of cultural heritage in the landscape.

Research questions

Which development models for family dairy farms are feasible in 2030 under different land use / landscape management scenarios in Noordoost-Twente?

Research questions:

1. What is the social expectation of the farmers for the landscape?
2. Which pathways result from the social expectations?
3. How will the rural structure change after effectuation of the scenarios?
4. What is the vision of the stakeholders for the landscape in 2030?
5. To which extent do the farmers expectations match with the expectations of the stakeholders for 2030?

Reader's guide

This report consists of eleven chapters. First, in the introduction the research problem leading to the research objectives and questions. The second chapter consists of the theoretical framework where the theories who are used in this study are explained. The third chapter is about the methods, how is the data gathered and the research conducted? Then consecutively

every research question has its own chapter, consisting about chapter 4 till chapter 8. In the end the discussion will take place in chapter 9. Followed by the conclusion in chapter 10. The concluding chapter, the bibliography will be in chapter 11.

Chapter 2 · Theoretical framework

Transition theory - John Holmes

The traditional dominant functions in the rural areas are decreasing in importance, in particular agriculture. Instead of agriculture, functions as nature- and landscape management, recreation, tourism and living became dominant (Daalhuizen, et al., 2008).

Thus there is a shift from a production use to consumption and protection use. John Holmes describes it as: "at its core, the multifunctional transition involves a radical re-ordering in the three basic purposes underlying human use of rural space, namely production, consumption and protection. The transition can be characterised as a shift from the formerly dominant production goals towards a more complex, contested, variable mix of production, consumption and protection goals." (Holmes, 2006, pp. 142-143)

Holmes talks about multifunctional transition that occurs within a mix of three basic purposes of human use of rural space; consumption (lifestyle), protection (emerged values) and production (livelihood). These three values are in a triangular relationship wherein seven modes of occupance (use of rural space) are identified (figure 2) (Holmes, 2008). These three basics have links with the forces driving the transition to multifunctional rural occupance, namely: "agricultural overcapacity (the production goal), the emergence of market-driven uses (the consumption goal) and changing societal values (the protection goal)" (Holmes, 2006, p. 143).

In figure 3 the concept of Multifunctional Agriculture Regime (MRT) is shown. It shows the provisional identification of the forces driving rural change as stated by Holmes. Holmes proposes three driving forces which contribute to multifunctionality and increasing spatial heterogeneity in the use of rural resources, these are: Agricultural overcapacity (production), the emergence of market-driven amenity-oriented uses (consumption) and changing societal values (protection) (Holmes, 2008). In the end seven generalised modes are identifiable, namely; productivist agricultural mode, rural amenity mode, pluriactive mode, peri-metropolitan mode,

marginalised agricultural mode, conservation mode and the indigenous mode.

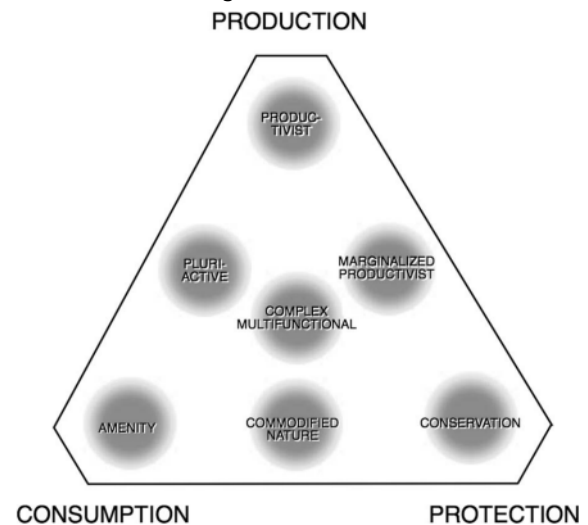


Figure 2 - Production, consumption, protection (Holmes, 2008)

Holmes' transition theory occurs on high spatial scale. It does not tell us the changes and dynamics of the agents (citizens, entrepreneurs, households and farmers) (Daalhuizen, et al., 2008): "Little wonder that, heretofore, most 'post-productivist' studies have focused on policy analysis rather than on what farmers actually do" (Argent, 2010, p. 111)

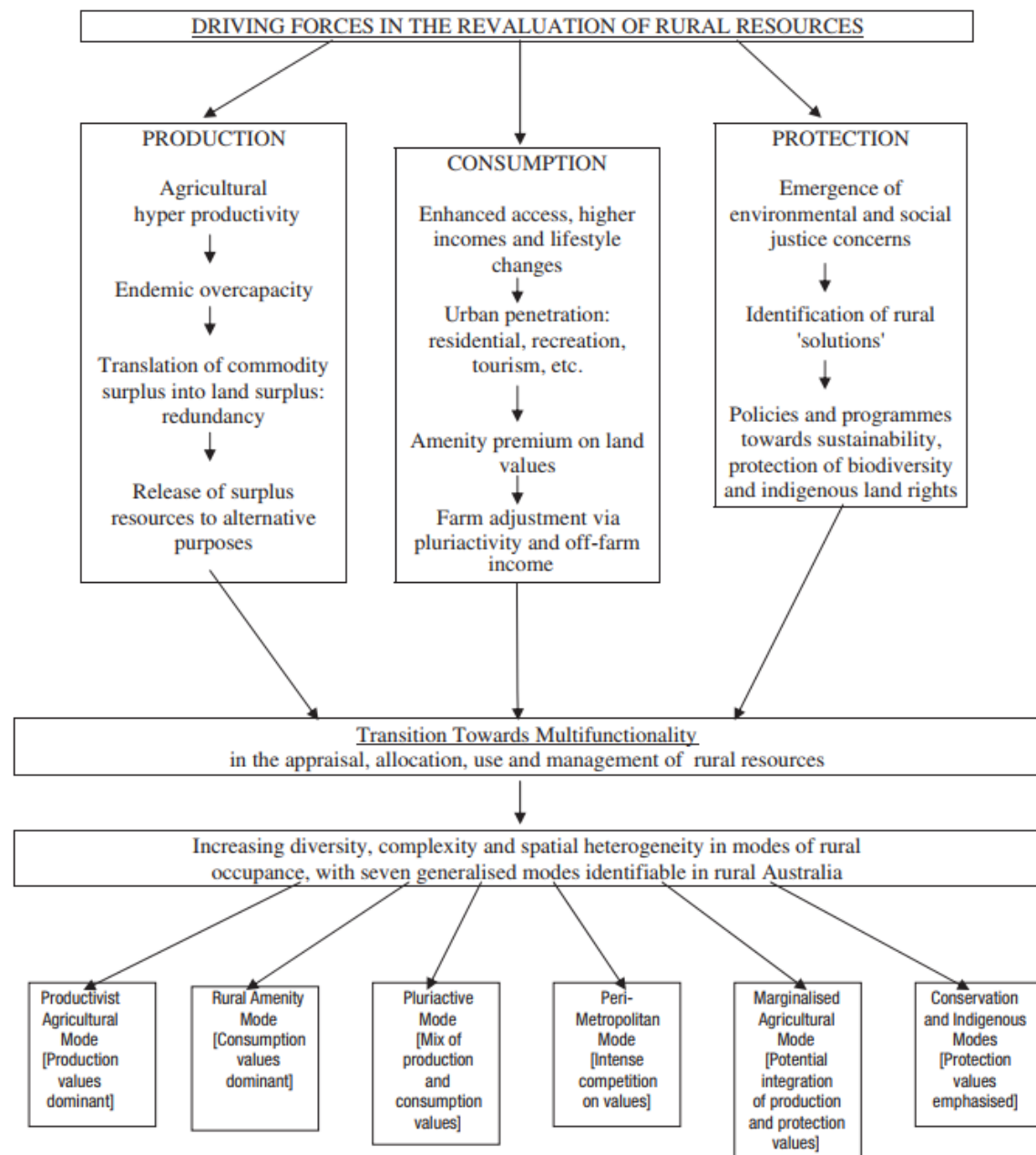


Figure 3 - Transition to multifunctional resource use of rural space in Australia (Holmes, 2006)

Transition theory - Geoff A. Wilson

Geoff A. Wilson suggests a transition theory from a social science perspective as the following: "a theoretical framework that attempts to understand and unravel socio-economic, political, cultural and environmental complexities of societal transitions (or sub-systems of society such as agriculture) from one state of organisation to another" (Wilson, 2007).

So, Holmes argues that there is a shift going on. But agriculture can be multifunctional. Wilson has a definition for multifunctional agriculture. Within this multifunctional agriculture definition, the three basic purposes of rural landscape of Holmes are addressed. Wilson refers to the following definition of multifunctional agriculture that is stated by the Organisation for Economic Cooperation and Development (OECD): "Multifunctional agriculture: Multifunctionality refers to the fact that an economic activity may have multiple outputs and, by virtue of this, may contribute to several societal objectives at once. Multifunctionality is thus an activity oriented concept that refers to specific properties of the production process and its multiple outputs. The OECD, thus, emphasized that although the primary role of agriculture is to produce food and fibre, many other functions are important such as land conservation, maintenance of landscape structure, sustainable management of natural resources, biodiversity preservation, contribution to socio-economic viability and economic vibrancy of rural areas. " (Wilson, 2007, pp. 186-187). It is clear that 'to produce food and fibre' from Wilson matches with Holmes' 'production', Wilson's land conservation, maintenance and management links to 'protection' from Holmes. And the contribution to socio-economic viability of Wilson matches with Holmes' 'consumption'.

There is not just one way of transition, in fact many different ways of transition are possible. Wilson describes six different pathways of transition, namely: Linear transition, Stepped transition, Random transition, Retrograde transition, Deleuzian Transition and Non-transition models (Wilson, 2007).

If we take a look at the six models of transition from G.A. Wilson there are two models who stand out for this study.

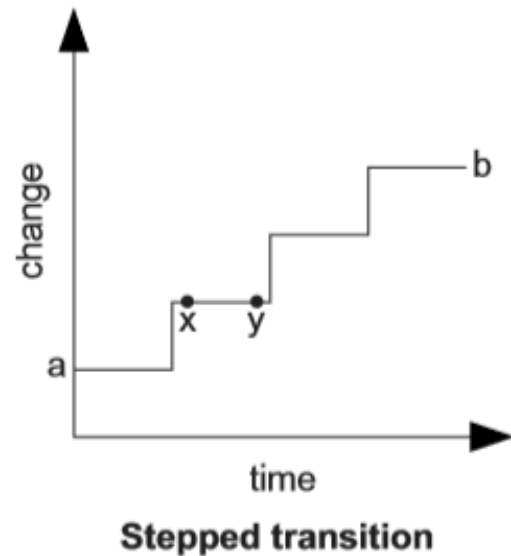


Figure 4 - Stepped transition (Wilson, 2007)

First of all the stepped transition model in figure 4. This model corresponds perfectly to the developments on farm level. The farmer makes an investment and this will lead to changes, then the farmer need to save for another investment.

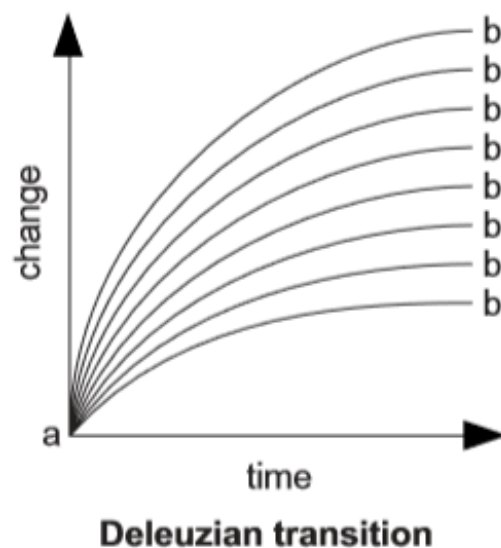


Figure 5 - Deleuzian transition (Wilson, 2007)

The Deleuzian transition model can be found in figure 5. The Deleuzian transition model is on a higher scale, namely the landscape it self. All the developments on various scales together ensures a particular transition from A to B.

New peasantry - Jan Douwe van der Ploeg

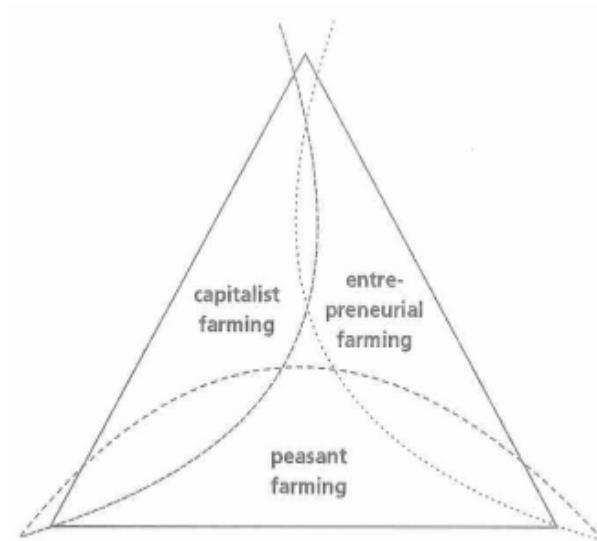


Figure 6 - Three different modes of farming (van der Ploeg, 2008)

Jan Douwe van der Ploeg mentions three different modes of farming, unequal but interrelated as shown in figure 6.

Peasant farming

Peasant farming is the sustainable use of ecological capital, with focus on peasant livelihoods. Peasant agricultural is multifunctional, labour is done by the family or the rural community. Land and other major means are family owned. The production focusses on the market and on the continuation of the farm and the family (van der Ploeg, 2008).

Entrepreneurial farming

The entrepreneurial farming mode is mainly built on financial and industrial capital. Scale enlargement is crucial and the focus is towards markets. Entrepreneurial farming often starts with programmes that are state-driven for the modernization of agriculture. Entrepreneurial farmers encourage partial industrialization of the labour process.

Capitalist farming

Then the capitalist (large scale corporate) farming mode, a widely extended web of mobile farm enterprises. Due to the land reform processes over the world this mode of farming is in a lift. The capitalist farmer is mainly based on salaried workers and the major aim is profit maximization.

Between these modes there are empirical correlations in size and scale, but the essence of the difference is "the different ways in which the social and the material are patterned" (van der Ploeg, 2008, p. 2). "This different way of patterning deeply affects the magnitude of value added and its redistribution, as well as the nature, quality and sustainability of the production process and the food resulting from it" (van der Ploeg, 2008, p. 2). So it not only depends on the size of the farm, whereas peasant farming is often seen as the smallest farm, entrepreneurial farming as an in-between farm and the capitalist farm as the biggest farm. The difference can be found in what the farmer in the end produces; a peasant farmer produces another type of product: such as fields and livestock than an entrepreneurial farmer. It is not the case that the peasant farming mode belongs to the past, all the three modes of farming are found in the present and will be in the future.

As figure 6 shows, there are no clear lines and hard boundaries between the farming modes. An in-between farming mode is possible.

Van der Ploeg distinguishes a dominant pattern in all the many ways the agrarian constellations and society at large are patterned. Namely; 'Empire' as a "a construction and reproduction of short and decentralized circuits that link the production and consumption of food, and, more generally, farming and regional society" (van der Ploeg, 2008, p. 3). Think of agribusiness groups, large retailers, state apparatuses but also in laws, scientific models, technologies, etc. They contest for hegemony, but despite becoming seemingly all-powerful, they erode or even collapse.

As Van der Ploeg mentions "through Empire the production and consumption of food are increasingly disconnected from each other, both in time and space" (van der Ploeg, 2008, p. 4). This shift reminds us of Holmes' shift from the dominant production goals towards a mix of production, consumption and protection (Holmes, 2006). But where Van der Ploeg mentions it becomes more 'Empire' and disconnected, Holmes mentions that the landscape becomes more a mix of functions.

Neven, et al. mention only two main goals of the landscape in contrast to Holmes with three goals (+ protection). They argue that the developments from the past decennia are a change from a production landscape towards an consumption landscape. After the second world war producing food was the most important goal. Due to urbanisation a hard line between the functions emerged (Neven, et al., 2008).

Nowadays there are two contradictory processes notable in the Netherlands according to Neven et al.; on the one hand intensifying and scale enlargement wherein farmers quit farming due all the boundaries and pressure form competitors. On the other hand there is a ongoing trend looking to broaden the farm and strives for multifunctional land use. Where other sources of incomes for farmers will be found, such as biological farming or tourism (Neven, et al., 2008).

Transition theory - Geels & Schot

The third transition theory is the one from Frank Geels and Johan Schot. Geels & Schot uses the multi-level perspective where transitions are outcomes of alignments between developments at multiple levels (Geels & Schot, 2007). Figure 7 shows three levels wherein the interactions between processes of transitions takes place; Niche innovations, Socio-technical regime and Socio-technical landscape.

"Niche innovations are carried and developed by small networks of dedicated actors, often outsiders or fringe actors" (Geels & Schot, 2007, p. 400). This is the place where through learning processes, price/performance improvements and support from powerful groups take place. This is well relatable to the dairy sector as the milk price could be one of the price/performance improvements and support from powerful groups can be in the form of subsidies from interest groups or governmental organisations.

Then the socio-technical regime is the place where the changes at landscape level create pressure on the regime, think of scale

enlargement which has a huge impact on the landscape and that results in a pressure on our existing rules and regulations.

The last level is the socio-technical landscape, this "forms an exogenous environment beyond the direct influence of niche and regime actors" (Geels & Schot, 2007, p. 400). In this level the destabilisation of the regime creates a window of opportunity for niche innovations. A famous example of destabilisation is the time after the milk quota was abolished, this was a time wherein uncertainty and insecurity were prominent. But it cannot be said that the replacement of the milk quota, the phosphate law, is a niche innovation.

The transition as shown in figure 7 can be compared with a combination of the Deleuzian and Stepped transition models of Wilson (Wilson, 2007). Geels & Schot are showing a transition that is dependent on innovations just as the Stepped transition is, but in the meantime there are multiple developments and they all influence the landscape in the end, as the Deleuzian transition model shows.

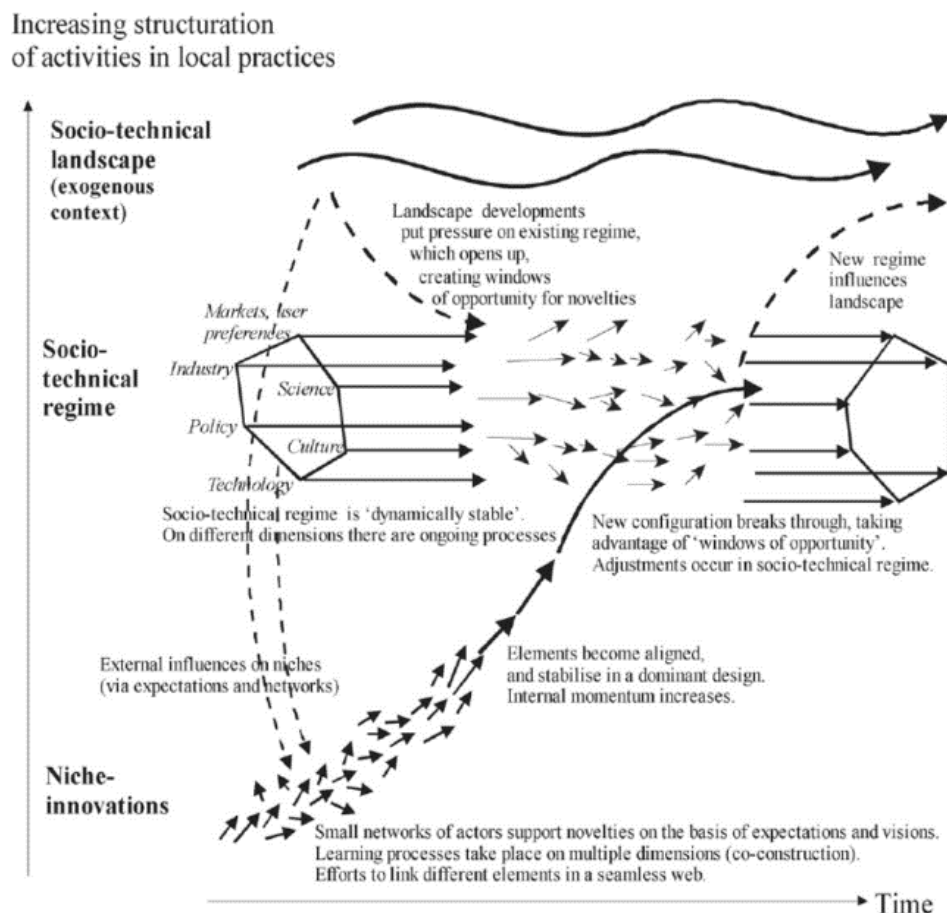


Figure 7 - Multi-level perspective on transitions

Flow Diagram Methodology

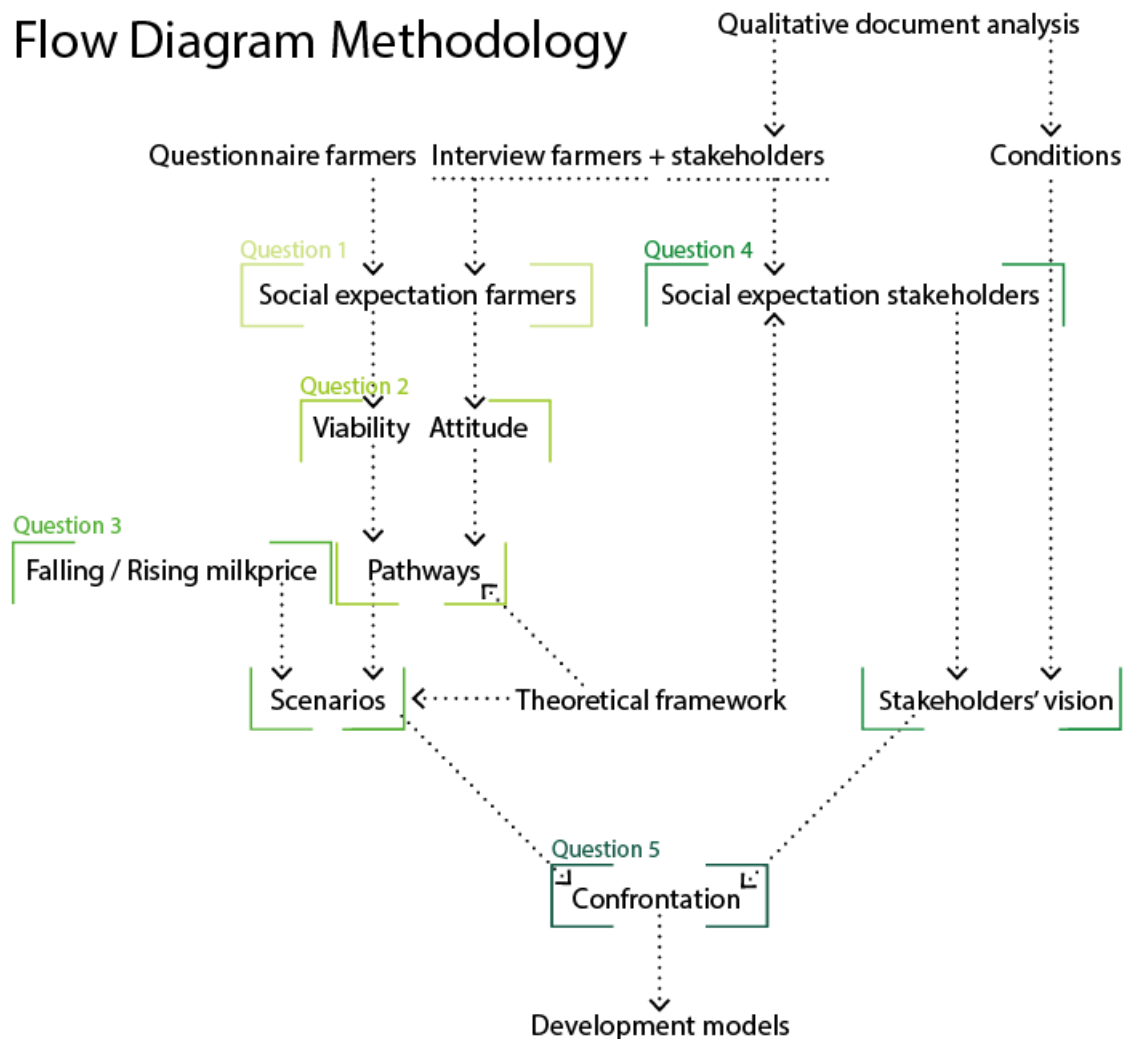


Figure 8 - Flow Diagram Methodology

In this chapter the methods of the study are clarified. The flow diagram in figure 8 shows a clear oversight of the different methods, steps and which questions are answered where. First the flow diagram will be explained afterwards there will be elaborated on the data collection. Thereafter the data analysis is stated, this will be done per research question to make it more clear. At the end the representativity of the samples will be elucidated, both the farmer sample and the stakeholder sample are discussed.

For this study several methods for data collection are used. Quantitative data is gained via the use of a questionnaire for the farmers. Additionally there is also qualitative data gained, during the interviews with farmers and stakeholders. The

farmer sample is in both data collection methods the same sample.

Due to ethical considerations these farmers are not mentioned in the study, they will be called farmer 1, 2, 3 et cetera.

Flow diagram methodology

As figure 8 shows, the study started with a qualitative document analysis, that formed the basis for the interviews with farmers and stakeholders, and the stakeholders' conditions.

The interviews with the farmers gave the opportunity to ask more in depth questions and to understand the story of the farmers. The interviews were additional to the questionnaires where the facts and figures were gathered. The social expectation, and with that the answer on

question 1 derived from the questionnaires and the interviews with the farmers.

Question 2, the pathways resulted from the social expectation. The social expectation of the farmers was indirect the input for these pathways. The social expectation derived from the questionnaires and the interviews. Viability and attitude found there basis in the social expectation, the interviews and questionnaires of the farmers was also input for the pathways. This information plus the theories of the theoretical framework, was the input for the designated pathways.

These pathways are the 'starting points' of the farmers. Their scores towards several aspects of life are based on their attitude and their viability. But these aspects change over time. In the scenarios, question 3, it is reviewed how these scores will be influenced by a falling or a rising milk price. In order to see how these scores were influenced there is made use of agent based modelling. This method will be explained later in this chapter.

At this stage we are aware of the social expectation of the farmers when it comes to the land use of Noordoost-Twente. But the farmers are not the only land users. There are multiple other land users and a few important stakeholders were interviewed. They set the framework and boundaries wherein the farmers can act.

Parallel to the farmers' social expectation, the stakeholders expectation has been researched. From the interviews with several stakeholders, enhanced with the theoretical framework, the social expectation of the stakeholders was composed. What do they think of the future land use? These stakeholders can and have set several conditions, think for instance of rules and regulations or subsidies which influence the farmers. All the conditions together with the social expectation resulted in the stakeholders' vision.

In the end, question 5, the stakeholders vision is confronted with the scenarios that resulted from the farmers. Do they expect the same? What aspects overlap and what differs? This confrontation resulted in the concluding development models.

Data collection

The data collection is conducted by various methods. The qualitative data is acquired from 20 different farmers through semi-structured interviews. These farmers were all located in the four municipalities who form together Noordoost-Twente; Municipality of Dinkelland, Tubbergen, Losser and Oldenzaal. The farmers were chosen by snowball-sampling. From all the municipalities there are 6 farmers interviewed, except for the municipality of Oldenzaal. Because Oldenzaal consists mostly out of urban areas there are just a few farmers left. Two suitable farmers who met the conditions were found and interviewed. Other qualitative data is gathered by interviewing 13 other stakeholders who are all involved in different ways with farming and / or the land use.

All the interviews are qualitative input, these are conducted in order to get more insight in the story and the motives for the future strategies of the farmers. To get more in-depth information from the farmers, than only the questionnaire consisting of facts and figures.

Quantitative data was also gathered what makes this study a mixed method study. All the 20 farmers filled in a questionnaire where characteristics, facts and figures were asked.

This questionnaire gave insight in the farm size, composition of the family, history of the farm and the use of other employees for example.

Data analysis

Question 1

The social expectation of the farmers consists of the questionnaire and qualitative interviews with the 20 farmers. The qualitative interviews are transcribed, the transcripts are verbatim/ summaries. The expectations of the farmers are classified on the basis of Jan Douwe van der Ploegs New Peasantry theory.

In the interviews it is asked what the farmers think of how the landscape will look like in 2030 and the role of the family dairy farm in it. According to these answers the farmers are divided in the three farming modes of Jan Douwe Van der Ploeg; Capitalist farming, Entrepreneurial farming and Peasant farming.

Furthermore there are a few main topics in which the farmers opinions and answers are gathered to get an oversight over the common opinion. What is the main thought, and what are the outliers?

Question 2

In question 2 the viability and attitude is formulated and they together form the input of the pathways. In order to get the viability a formula is made. This formula asks the age of the farmer, if he has a successor or not, amount of cows, amount of hectares in own property and the age of the cubicle housing. All this data is required in the questionnaire.

The attitude of the farmers is more qualitative, what is their attitude and opinion about for instance tourists and biological farming. This data is gathered in the interviews but also some the data is gathered in the questionnaires.

Then these attitudes are put together with the viability and they formed the input for the pathways. Special formulas consisting of the attitude and viability were made in order to get the starting point of the pathways. These formulas are stated in chapter 6.

Question 3

Question 3 is the part where agent based modelling is used. Agent based modelling is a method wherein the actions and interactions of autonomous agents can be viewed over time in a model. "A computational study of social agents as evolving systems of autonomous interacting agents" (Jansen, 2005, p. 1). The main agents for this study are the farmers.

Netlogo is the program that was used for agent based modelling in this study. All the 'starting points of the pathways' from the farmers are inserted. Then, with every step in time the agents will be affected and will follow the rules that are set up by the author. These rules were for example; with a rising milk price, it is more likely that a farmer will intensify. Or 'with a falling milk price, it is more like that a farmer will start a side activity in tourism'. These rules are set up and reasoned with literature.

In Netlogo there were two possibilities for scenarios; rising milk price or falling milk price. These possibilities resulted in four different scenarios. A- Rising milk price, B- Falling milk

price, C- Six years falling milk price, six years rising milk price and D- Six years rising milk price, six years falling milk price.

Question 4

In question 4 the stakeholders are interviewed instead of the farmers. As figure 8 shows the stakeholders' social expectation are parallel to that of the farmers and these will confrontate each other later on in question 5.

Question 4 consists of the social expectation of the stakeholders. This is done in the same way as the farmers expectation was collected. The opinions and answers of the stakeholders on the question "what do you expect how the landscape will look like in 2030, and what is the role of the family dairy farm in this landscape?" These answers are interpreted and classified in the three farming modes of Jan Douwe Van der ploeg.

Furthermore the opinions on the most important subjects are gathered, on the same subjects as with the farmers.

As stakeholders have more 'power' and decide the framework wherein the farmer has to act. It is important to know what this framework exactly is. Therefore all the conditions of each stakeholder were gathered during the qualitative document analysis and the interviews.

Question 5

This is the part where the confrontation between the farmers social expectation and the stakeholders social expectation takes place. By comparing the farming modes of both groups and seeing whether there are remarkable differences between them. Also the opinions on most important subjects are compared.

Sample

Farmer Sample

In this report the farmers privacy will be taken into account. By anonymising the interviewees and not refer to them / their interviews the farmer and farm will be protected. It is not necessary to mention the farmers' identity.

In order to do draw sound conclusions it is important that the sample of farmers is representative for whole Noordoost Twente. Therefore the most important characteristics of

the farmers in the sample are related to all the farmers in Noordoost-Twente. As the average numbers correspond as table 1 shows, the sample is representative.

Table 1 – Farmers sample

	Average of Noordoost- Twente	Average of research sample
	(2013)	(2017-2018)
Age	57	50-60
Hectares	37.25.31	37.92.50
Milk giving cows	73	99.7

As table 1 shows the age and amount of hectares do correspond perfectly. The average amount of milk giving cows is higher in the sample of the study compared to the average of Noordoost-Twente. As the average of Noordoost-Twente is from 2013, this difference can be explained by the abolishment of the milk quota in 2015. The abolishment of the milk quota led to an increase of milk giving cows and farm sizes (Helming & Peerlings, 2002). There was a growth from almost 10 percent between 2015 and 2016 (Centraal Bureau voor de Statistiek, 2016).

The abolishment of the milk quota does not have a direct influence on the amount of hectares, nor has it on the age of the farmers. So this table shows that the sample of twenty farmers is representative for Noordoost-Twente.

Stakeholder Sample

Thirteen different stakeholders are interviewed, their social expectations together form an indication of how the users (except the farmers) think about the future's landscape. These stakeholders together are the most influential organisations in the region it could be said that their expectation is representative for all the organisations.

In table 2 the organisations which are interviewed and the function of the interviewee are shown.

Table 2 - Stakeholders sample

Organisation	Function
Province of Overijssel	Policy officer spatial planning
Province of Overijssel	Program director leisure economy
Municipality of Tubbergen en Dinkelland (Noaberkracht)	Policy officer spatial planning
Municipality of Losser	Policy officer rural areas
Municipality of Oldenzaal	Policy officer spatial planning
Waterboard Vechtstromen	Member of Executive Committee
Landschap Overijssel	Strategic policy officer
Natuurmonumenten	Coordinator Nature conservation Twente
Overijssels Agrarisch Jongeren Kontakt	Chair man
LTO Noordoost-Twente	Chair man
Twente Marketing	Brand leader
Rabobank	Account manager Food & Agri and Manager Food & Agri
Friesland Campina	Chairman district Twente

Not only the obvious farm-related stakeholders are interviewed such as the LTO, Friesland Campina and the OAJK. As table 2 shows the organisations differ from governmental to interest groups, nature organisations but also tourist organisations. Since there are a lot of actors in the rural landscape involved it is important that the widest possible sample of organisations is included in this study.

Chapter 4 · Question 1 – Social expectation

In the fourth chapter the first research question will be answered: *'What is the social expectation of the farmers for the landscape?'* To get to this answer twenty farmers were interviewed. Their expectation is reviewed at the hand of Van der Ploeg's New Peasantry theory. In the second part of this chapter the subjects that are mentioned more often are highlighted, the farmers' opinion are analysed. Following with some other important notes which are mentioned once or twice.

Farming mode expectation – Van der Ploeg

As mentioned in the theoretical framework there are three modes of farming according to Jan Douwe van der Ploeg. A capitalist farming mode, entrepreneurial farming mode and peasant farming mode. In the interviews the farmers were asked about their social expectation for the landscape in Twente in 2030 and the role of the family dairy farms within this landscape. These qualitative interviews were reviewed and the farmers expectation was ordered per farming mode. The farmers opinion did not always match perfectly with one of the farming modes. Therefore some farmers were placed in a mixed mode; capital-entrepreneurial farming mode, entrepreneurial-peasant farming mode or the peasant-capitalist farming mode. So some farmers are classified in mixed farming mode. Figure 9 shows clearly how the farmers are divided between the farm modes.

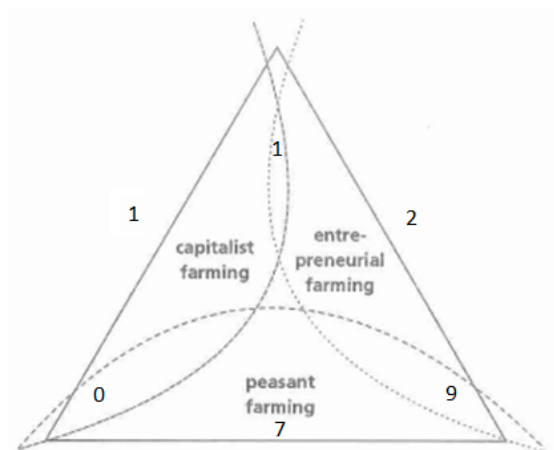


Figure 9 – Farming mode expectation farmers

One farmer is classified with a capitalist expectation for 2030. This farmer sees the future with huge farm enterprises and a lot of salaried workers, or that the farm will become part of a bigger farm enterprise. This farmer compares capitalist farming with a population of bacteria, if it becomes too big it comes to a standstill, due to the costs of hiring people. Then there is also one farmer who is classified with a capitalist-entrepreneurial farm expectation. His expectation towards the capitalist mode is not as strong. However he has also a real entrepreneurial expectation.

Only two farmers do have an explicit entrepreneurial expectation for 2030. What one of the farmers believes is that the focus of the farmer will shift towards nature management instead of farming. Nine farmers expect a combination of entrepreneurial farming with peasant farming. These farmers do believe in a family dairy farm, but also in innovating and scale enlargement. They encourage a partial industrialization of the labour process. This farming mode is the most popular expectation.

There are in total 16 farmers who believe in a peasant agricultural farming mode as their expectation for 2030. Seven farmers believe in an explicit peasant farming mode. These farmers also think innovation is important but they are more focused on the family around the farm.

Social expectation farmers

Amount of farmers

A large majority of the farmers, twelve, have expressed that they expect that the larger farmers will continue and the smaller farmers will have to quit. There are also twelve farmers (not exactly the same farmers) who expect that the amount of farmers will decrease. Some of them even mentioned that the amount of farmers in 2030 will be halved.

Scale enlargement

All the farmers, except one, have expressed that scale enlargement will continue. This one farmer thinks that the maximum is already reached.

Some farmers think that scale enlargement is possible for a few farmers, or on specific locations. Scale enlargement will be hard, especially in Twente. Due to there being more time needed to cultivate the land in the Twente,

the price to produce milk is higher. Other farmers think that Twente will be more limited compared with the rest of the Netherlands. A maximum amount of cows that is stated often, is 200 cows. But it could be that this maximum will increase with time.

One of the farmers mentioned that farm sizes should stay bounded to the amount of hectares a farmer owns.

The opinion that the sample is more limited compared with the rest of the Netherlands is debatable, five farmers believe that they are more limited in Noordoost-Twente compared to the rest of the Netherlands. Other farmers think that they are not.

Awareness

Eight out of twenty farmers mentioned the lack of understanding between farmers and citizens when it comes to farm management. A huge gap exists between the farmers and citizens, farmers mentioned that something should be done about it. Involving citizens, promoting the agricultural sector, starting with educational farms are some examples. It is also mentioned that while the farmer is the expert when it comes to farming, the citizens have more to say. The consumer is more important. Farmers would love to see that citizens have more respect for them.

Changing landscape

Six farmers have expressed that they think the landscape will not change that much compared with how it is nowadays, maybe there will be other crops on the fields. Another six farmers think that there will be (a bit) more nature. The last six farmers did not mention anything about the transformation of the landscape.

Family dairy farms

Ten farmers mentioned explicitly that they think the family dairy farm will still exist in 2030, although more automated. The other ten farmers did not mention their view on the existence of the family dairy farms in the future explicitly.

Nature manager

Five farmers expressed that they think that family dairy farms will have a more nature manager function in the future. The expectation is that the farmer will maintain the nature areas. One farmer thinks that this is because the terrain

management organisations do not have enough money to do it by themselves. Only eight out of twenty farmers make use of the subsidy 'Groen blauwe diensten'. Some farmers do want to make use of it but cannot. Others do not want to make use of it because they are afraid to lose control over these fields/landscape elements.

Other notes

In this paragraph some random visions and notes that individual farmers gave are stated. Most of them are just mentioned once, during their interviews for their expectation for Twente in 2030.

- Quitted farmers stay in their houses, but lease their land to other farmers.
- Phosphate rights are still worth money, this will lead to more quitters the coming five years.
- Dairy cooperatives do have the position to stimulate family dairy farms and their appreciation from citizens.
- The milk price should always stay higher than the price to produce milk.
- Twente has a high percentage of successors due to people feeling rooted in the area.
- There is a need to look again for the balance between land, animals and the area. This balance was lost.
- Farming will become much more individualistic, instead of asking neighbours for help, a contractor will be hired.
- Social pressure on farm management, animal welfare and sustainability of farmers gets higher and higher.
- Not everyone can become a biological farmer, the landscape in Noordoost-Twente is too small.
- Nature management is less profitable. If you want quick money it is more attractive to milk some more cows.
- Probably mandatory grazing of cows in 2030 due to a demand of the consumer. But the consumer does not know what kind of cow is in the meadow (yearling, dry cow, milk giving cow).
- More side activities, but a farmer will do this only when he wants it and has the resources to do so.
- Buying an own milk factory with a few farmers.

- Milk quality over milk quantity!
- Designated groups who maintain the landscape as the farmers do now, because in 2030 the farmer will not have time anymore to do that.
- Badly maintained nature areas. As soon as nature is realised, it does not get the attention which it should get.
- People will stay in Noordoost-Twente, despite whether they farm or not. They love the area.
- More biodiversity on farms.
- Land becomes green asphalt.

Conclusion

As shown in figure 9 nine farmers do expect a combination of entrepreneurial farming and peasant farming. The family dairy farm will remain but technological innovations and scale enlargement shall occur. There will be less farmers, this will give the remaining farmers the space to grow. The landscape does have its limitations, in the form of landscape elements that are highly appreciated by most of the farmers. This appreciation ensures the existence of these elements. The limitations will lead to a certain maximum amount of cows, that will probably be around 200 cows.

It is remarkable that farmers do not always want to apply for the subsidies they could get. For example the subsidy 'Groen blauwe diensten', farmers are too afraid that they will lose control and power over their fields.

Chapter 5 · Question 2 – Pathways

The social expectation of the farmers for the landscape is now clear. In this chapter the resulting pathways that derive from the social expectations will become clear. The following question: *'Which pathways result from the social expectations?'* is central in this chapter.

The future land use is highly dependent on her users, with the farmers as its biggest user it is important to know what their attitude towards several aspects of the landscape is. The farmers' social expectation, together with their attitude and their farm viability influences the land use and landscape strongly.

The farmers' future strategies will derive from their attitude in combination with their viability. The future strategy can also be seen as a pathway.

Farmers' attitude based on?

In this paragraph the farmers attitude will be analysed.

The characteristics and attitude of the farmers are valued with grades between 0 to 5. Where 0 is a very low score, 3 medium score and 5 a very high score.

'Rooted' is the affection a farmer has with the place where he lives. This score is based on how many generations the farm has been in the family. The longer the farm is in the family, the higher the score.

'Innovative' is if the farmer has side activities or sources of income elsewhere. The more side activities a farmer has, or / and if there are any other sources of income, the more innovative the farmer is. The more innovative a farmers is, the higher the score.

'Profit & social' reflects how many hours a farmer wants to spend on the farm. Is he willing to give up his social life and work all the time? How higher the score how more time he is willing to spend on his farm.

'Tourism' is based on the farmers' attitude towards tourism. Does he want more tourists in Twente, or certainly not? If a farmer is more or less neutral about tourists this will be scored with

a 3. The more positive the answer, the higher the score.

'Nature' is the farmers' attitude towards creating more nature in Twente. The more positive a farmer reacts on this question and thus is willing to create more nature, the higher the score. Most of the farmers scored 3, their opinion was that the ratio nature – agriculture is good at the moment.

The score for 'Biological' is based on the question if a farmer considers to become a biological farmer. Most of the farmers did not consider it at all and scored 1. Two farmers are already a biological farm and scored a 5. The higher the likeliness a farmer becomes biological, the higher the score.

'Conservative' is based on the family of the farmer. Does the family help on the farm and how frequently. Daily, sometimes or never? Also if there are any employees that will count as less conservative. A daily setting such as daily helping of family and no employees results in a higher score.

Table 3 – Farmers' attitude score

	<i>Rooted</i>	<i>Innovative</i>	<i>Profit & Social</i>	<i>Tourism</i>	<i>Nature</i>	<i>Biological</i>	<i>Conservative</i>
<i>Farmer 1</i>	3	4	3	4	3	1	4
<i>Farmer 2</i>	3	4	3	3	4	1	2
<i>Farmer 3</i>	3	5	3	4	4	5	2
<i>Farmer 4</i>	2	4	3	4	3	2	2
<i>Farmer 5</i>	3	3	4	3	3	1	4
<i>Farmer 6</i>	3	2	4	4	3	1	5
<i>Farmer 7</i>	3	2	3	3	3	1	4
<i>Farmer 8</i>	3	4	2	3	4	1	2
<i>Farmer 9</i>	4	5	3	5	3	5	3
<i>Farmer 10</i>	3	3	3	4	3	1	3
<i>Farmer 11</i>	2	4	2	5	3	1	4
<i>Farmer 12</i>	2	3	2	3	3	1	4
<i>Farmer 13</i>	4	4	3	2	3	4	4
<i>Farmer 14</i>	4	3	2	4	3	1	4
<i>Farmer 15</i>	3	4	2	4	3	1	2
<i>Farmer 16</i>	4	3	3	3	3	1	4
<i>Farmer 17</i>	3	3	2	3	4	1	2
<i>Farmer 18</i>	4	4	3	5	3	2	4
<i>Farmer 19</i>	4	3	3	2	3	1	3
<i>Farmer 20</i>	3	3	1	2	3	1	4

Results

Table 3 shows that the farmers in Noordoost-Twente do feel very rooted to their hometown and houses. Except for three of the farmers all the farmers scored 3 or higher. Most of the time the farm has been in the family for multiple generations, old characteristic farms who are iconic for the landscape. Often it takes a lot of a farmer to make the decision to move towards another place or even another country.

Furthermore the most farmers are pretty innovative. Farmers are looking for other sources of income, or just want to invest more in their farm.

'Profit & social' shows that most of the farmers do care about their social life. They do not want to spend all their time on the farm. Except for two farmers who do invest a lot of their time in their farms.

As mentioned in the introduction the sector of tourism is growing in Twente. Sometimes farmers are negative about tourism but as the scheme shows, most of the farmers are content with the amount of tourism. Or even want to increase the number of tourists. That is also of course because some of the farmers do have side activities in tourism.

The introduction shows us also that there is a huge discussion going on between nature and agriculture. Nature takes up too much of the agricultural land. But when the farmers were asked personal, none of them was really negative about the division between agricultural land and nature. The score of 3 stands for 'neutral', so the farmers where neutral, they think that the division in hectares is good as it is. Or even want to create more nature.

The first thing that becomes apparent is that there is almost no interest to become a biological farmer. Most of the farmers where negative when it came to turning into a biological farm. Except for two farmers who are already a biological farmers, they scored 5. Three farmers were less negative.

In the column 'Conservative' it can be seen that this is rather diverse. With one outlier to a score of 5. Most of the farmers do score between 2 and 4. Conservative is how concerned the family is with their farm, if they help or not and how often. Conservative is also how often and if there are employees.

Viability

For each of the 20 farmers the viability is calculated. The viability is based on the following characteristics of the farmer; successor, age, amount of milk giving cows, amount of hectares (own property), age of cubicle housing. For every aspect a farmer can get a maximum of 5 points. So the maximum score is 25 points.

Table 4 – Viability table

Score	Viability
1-9	Poor
10-15	Fair
16-17	Good
18-19	Excellent

In order to get a proportional division between the four groups, the size of the group scores differ (table 4).



5 + 5 + 5 + 5 + 5 = viability (max. 25)

Successor + age + cows + hectares + cubicle housing = viability

In this method for calculating the viability of the farmers it is chosen to only take in account the hectares in own property and not the agricultural tenancy hectares. Although agricultural leasing is for some farmers very important, it is chosen to disregarded this because it is less secure and more temporarily. Table 10 shows the result of the formula for each farmer, the whole calculation can be found in Background document 6.

The points each farmer could gain differs per characteristic. The points are giving according to the following method:

Successor

Dependent on if a farmer has a successor or not (table 5).

Table 5 – Successor points

Points	Successor
5	Yes
3	Maybe
0	No



Age

Dependent on the age of the farmer. Farmers who are 50 and older will get 0 points, farmers under the 50 get 5 points (table 6).



Table 6 - Age points

Points	Age
5	<50
0	50
0	>50

Amount of milk giving cows

Based on the average amount of milk giving cows in Noordoost-Twente = 73 (Alterra, 2013) (table 7).



Table 7 - Cow points

Points	Amount of milk giving cows
5	> 103
4	83 – 102
3	63 – 82
2	43 – 62
1	< 42

Average amount of milk giving cows in a range of 20 cows got 3 three points. The more milk giving cows, the more points.

Amount of hectares (own property)

Based on the average amount of hectares in Noordoost-Twente = 37,25,31 is 37,25 hectares (table 8).



Table 8 - Acreage points

Points	Amount of hectares
5	>52
4	42 – 51.9
3	32 – 41.9
2	22 – 31.9
1	<21.9

Average amount of hectares in a range of 10 hectares got 3 three points. The more hectares, the more points (Alterra, 2013).

Age of cubicle housing

Based on the average construction year of cubicle housing of the 20 interviewed farmers = 2002 (table 9).



Table 9 - Construction points

Points	Construction year
5	>2012
4	2006 – 2011
3	2000 – 2005
2	1994 – 1999
1	<1994

Viability

This calculation results in the following scheme with viability scores per farm. There are four different categories, from low to high; Poor, Fair, Good and Excellent. Lowest possible score is 3, highest possible score is 25.



Table 10 - Farm viability table

<i>Farm viability</i>	<i>Score</i>	<i>Score</i>
Farmer 1	8	Poor
Farmer 2	18	Excellent
Farmer 3	18	Excellent
Farmer 4	12	Fair
Farmer 5	7	Poor
Farmer 6	3	Poor
Farmer 7	17	Good
Farmer 8	10	Fair
Farmer 9	19	Excellent
Farmer 10	15	Fair
Farmer 11	17	Good
Farmer 12	20	Fair
Farmer 13	11	Good
Farmer 14	18	Excellent
Farmer 15	19	Excellent
Farmer 16	19	Excellent
Farmer 17	17	Good
Farmer 18	7	Poor
Farmer 19	18	Excellent
Farmer 20	9	Poor

FARM VIABILITY

■ Poor ■ Fair ■ Good ■ Excellent

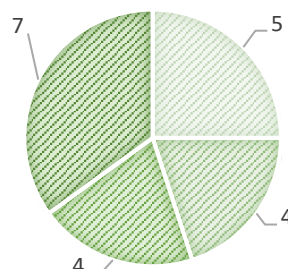


Figure 10 - Amount of farms per viability score

To make it more clear the results are presented in figure 11. The pie of figure 10 chart shows how many farmers there are per category. As the chart shows there are five farmers, ¼, who do have a 'Poor' score. They lack points when they, for example, do not have a successor. The average of all the viability scores of these 20 farmers is 14,1. Four farmers do have a 'Fair' score, together with the 'Poor' group they are almost the half of the sample. Eight farmers do score under the average score. Four of the twenty farmers do have a good score and are also well prepared for the future. The majority of the farmers do have an excellent score and are perfectly suited for the future.

FARM VIABILITY

■ Poor ■ Fair ■ Good ■ Excellent

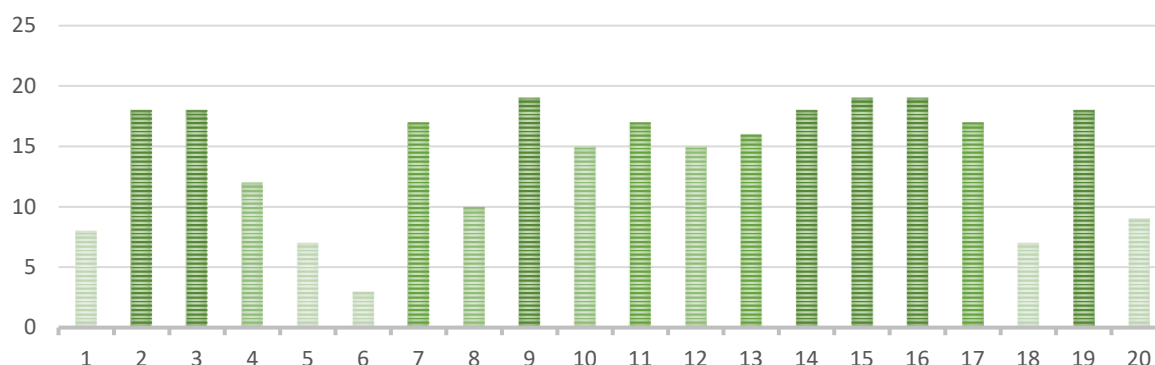


Figure 11 - Farm viability per farm

Pathways

Based on the farmers' attitude and viability the future strategies and pathways for the farmers are valued. These numbers indicate the likelihood that a farmer will change his business model towards this direction. The following pathways are formulated: side activity in tourism, side activity in nature, biological, intensification and quitting. Please note that tourism and nature are side activities and not full changes. For each pathway a different formula is formulated. In this paragraph the different formulas will be explained:

Likelihood change towards tourism = Innovation + Profit & Social + Tourism – Conservative

Likelihood change towards nature = Innovation + Profit & Social + Nature – Conservative

Likelihood change towards biological farming = Innovation + Profit & Social + Biological – Conservative

Likelihood pathway towards intensification = (total amount of points possible for tourism + nature + biological =) 15 – Tourism – Nature – Biological

Likelihood pathway to quit farming = (total amount of points possible for viability =) 25 – Viability score + Profit & Social

The score board for these formulas can be found in background document 6. The scores differ from 0 to 15, with 15 as the highest number. The higher the number, the more likely it is that a farmer will change towards this direction.

These pathways can be linked with the three basic purposes of human uses of rural space (Holmes, 2008) that are mentioned in the theoretical framework, namely; production, consumption and protection.

Production – biological and intensification

Consumption – tourism

Protection – nature

Only the pathway for quitting cannot be linked.

As each farmer tends to one of the pathways, there could be stated that each farmer tends to one of the basic purposes of human uses of rural space.

The scheme shows the differences per farmer. Some farmers tend to quit earlier than others. The scores of the pathways do not give an indication on the likelihood of quitting. Only the quitting pathway is designated is designated for this course of action.

Table 11 - Starting points pathways

	<i>Tourism</i>	<i>Nature</i>	<i>Biological</i>	<i>Intensification</i>	<i>Quit</i>
<i>Farmer 1</i>	7	6	4	7	10
<i>Farmer 2</i>	8	9	6	7	5
<i>Farmer 3</i>	10	10	11	2	5
<i>Farmer 4</i>	9	8	7	6	8
<i>Farmer 5</i>	6	6	4	8	11
<i>Farmer 6</i>	5	4	2	7	13
<i>Farmer 7</i>	4	4	2	8	6
<i>Farmer 8</i>	7	8	5	7	9
<i>Farmer 9</i>	10	8	10	2	5
<i>Farmer 10</i>	7	6	4	7	7
<i>Farmer 11</i>	7	5	3	6	5
<i>Farmer 12</i>	4	4	2	8	6
<i>Farmer 13</i>	5	6	7	6	6
<i>Farmer 14</i>	5	4	2	7	5
<i>Farmer 15</i>	8	7	5	7	4
<i>Farmer 16</i>	5	5	3	8	5
<i>Farmer 17</i>	6	7	4	7	5
<i>Farmer 18</i>	8	6	5	5	11
<i>Farmer 19</i>	5	6	4	9	5
<i>Farmer 20</i>	2	3	1	9	9
<i>Times this pathways scores highest</i>	5	3	3	8	5

As Holmes stated that we had “a formerly dominant production landscape and there is a shift towards a more complex, contested, variable mix of production, consumption and protection goals” (Holmes, 2008). According to these scores we are still in a production oriented landscape as biological and intensification together are most often the highest score of a farmer, namely $5+3=8$ times. Consumption is 5 times the highest scoring pathway of the farmers and protection only 3 times.

Conclusion

As table 11 shows, it is most likely that most of the farmers will intensify their farm. This means that our landscape will remain for the most part a production landscape. The two pathways that have an equal second score are tourism and quitting. Tourism is a very likely pathway in Twente, due the high and increasing amount of tourists. Quitting as a pathway is unfortunately insurmountable as this is a national trend that also will occur in Twente due the high average age of farmers. Fortunately the amount of successors in Twente is relatively high. Nature does not have a high score.

Chapter 6 · Question 3 – Scenarios

The sixth chapter answers the question: *‘How will the rural structure change after effectuation of the scenarios?’* In this question will be further elaborated on the pathways in scheme X. Research question 3 looks to the reaction of the farmers’ pathways with a fluctuating milk price.

The values of the pathways are the scores per farmer while this data is conducted, December 2017/January 2018, the ‘start scores’. As this study focuses on the future land use in 2030 the data should be adjusted to 2030.

Agent based modelling offers the opportunity to adjust the data to 2030. The ‘start scores’ are inserted in the model and while the model runs, it chooses the future pathways of the farmers.

How a farmer will react with a rising or falling milk price is debatable and for every individual farmer dependent on his or her situation. But in general some rules can be made. These rules are the guidelines for the farmers in agent based modelling. The rules are explained and reasoned in the following paragraph.

Rising milk price

The research from De Haan and Zijlstra shows that if the milk price is rising it is more likely that he will intensify his farm and that it is less likely that he will quit farming (De Haan & Zijlstra, 2008). The article of Teeuwen and Voskuilen shows that when the milk price is falling farmers feel compelled to start side activities. So if the milk price is rising, it is less likely that a farmer will start some touristic side activities (Teeuwen & Voskuilen, 1998).

In the research of Leneman and Schrijver it is concluded that a rising milk price has a negative impact on farmers who want do something with nature management/conservation (Leneman & Schrijver, 2008).

Farmers do need some liquidity space in order to make the switch to farm biological (Gerbrandy, 2016). So if the milk price is rising, it is more likely that a farmer will become a biological farmer.

Falling milk price

With a falling milk price it becomes less likely that a farmer will intensify their farm (De Haan & Zijlstra, 2008). When the milk price is falling, it becomes more likely that farmer (needs to) quit (de Bont, et al., 2003). If the milk price is falling, it is more likely that a farmer will find his income in side activities (Riens et al, 2003). The article of Donkers shows that side activities in tourism, health and nature are becoming more and more popular to keep up (Donkers, 1997).

It is often more difficult with a low milk price to switch to biological farming, due the liquidity is probably already low. High investments are needed to make the switch (Gerbrandy, 2016).

Besides the milk price there are many factors very important for a farmer to make decisions. Other important aspects such as location (distance to nature), neighbours, subsidies, are not included in these schemes. It is one of my limitations in Netlogo.

There are four scenarios created, there are twelve years left till 2030.

- Scenario A with a rising milk price for 12 years.
- Scenario B with a falling milk price for 12 years.
- Scenario C with the first 6 years a falling milk price, then 6 years with a rising milk price.
- Scenario D with the first 6 years a rising milk price, then 6 years a falling milk price.

Scenario A: Rising milk price

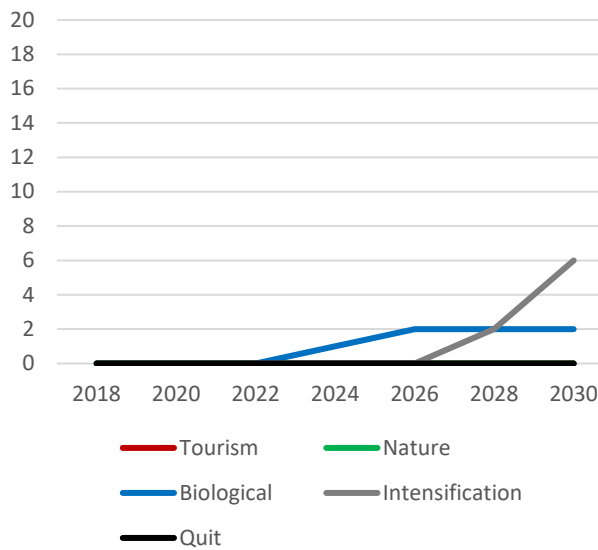


Figure 12 - Scenario A

Figure 12 with scenario A shows the situation with a rising milk price. From the twenty farmers there are six farmers who will intensify drastically. Probably other farmers will also intensify a bit, but in this method there is a 'tipping point' needed and they have not reached that tipping point yet. Two farmers will make the switch to biological farming. The other twelve farmers will continue farming as they used to do.

Scenario B: Falling milk price

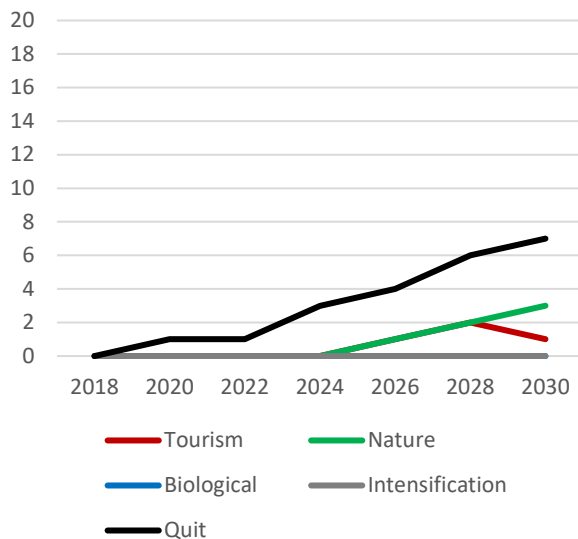


Figure 13 - Scenario B

Figure 13 shows the situation with a falling milk price. If there is a falling milk price for twelve

years in a row seven farmers will quit farming. Their viability is too weak in combination with their willingness to spent all their time at the farm. In two years the first farmer will quit, as time goes by more and more farmers will quit. After a few years farmers are more likely to look for other sources of income in nature and tourism. The decrease in tourism side activities can be explained by a switch from tourism to nature.

Scenario C: First six years falling, then rising milk price

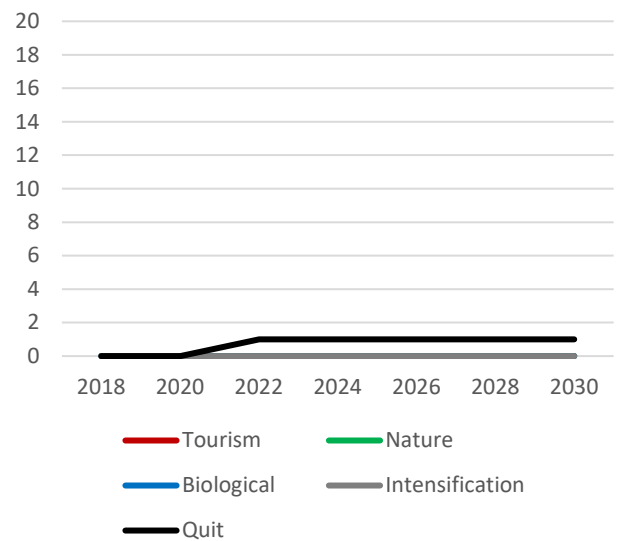


Figure 14 - Scenario C

Scenario C is shown in figure 14. Where the first six years the milk price will rise, the last six years it will fall. As the figure shows not one of the farmers reaches the tipping point that will make him change his farming strategy.

Scenario D: First 6 years rising, then falling milk price

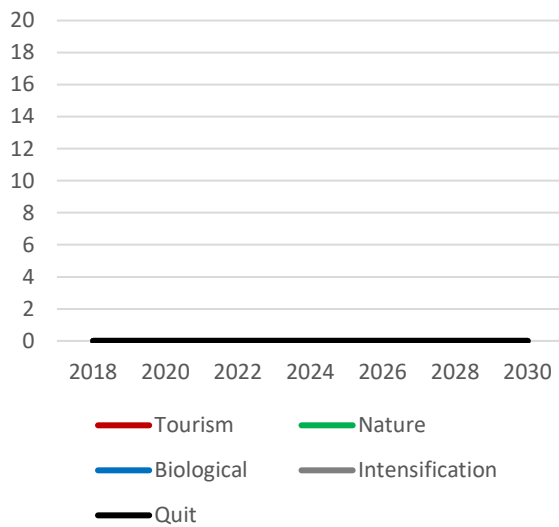


Figure 15 - Scenario D

The last scenario, where there are six years with a rising milk price and then six years with a falling milk price, is shown in figure 15. As the figure shows there is just one farmer who will quit farming in 2022. The collapse of the milk price does not have an effect during these few years.

These scenarios are created with the pathways in scheme X as a starting point. Please note that besides the attitudes and the viability of the farmers the schemes only contain the milk price variable.

Conclusion

The graphic of the different scenarios do give an insight in which pathways will be exploited by farmers. The pathway that reacts the heaviest is 'to quit' in scenario B, the falling milk price scenario, with 7 farmers that reach the tipping point. As can be expected the intensification pathway is the most popular with a rising milk price scenario (A). No side activities will be undertaken with a rising milk price. There will be side activities with a falling milk price in which nature is more popular than tourism.

Scenario C and D, with a mix of six years of a falling and rising milk price do not show interesting graphs. The tipping point in the model is too far away to be reached in only six years.

The main conclusion that can be drawn is that farmers are highly dependent on the milk price.

But of course there are more factors which farmers are dependent on in making their choices for the future. One important fact that is not included is the capital. Due to ethical and privacy circumstances this aspect could not be included but it is an important one. Another important factor is the location of the farms. The location can give opportunities or limits. That is different for every farmer, think of nature areas when one wants to practice nature management, or tourism when starting a camping. What is also an important site specific factor are the neighbours, quitting neighbours can result to opportunities for example.

But also think of what a farmer can do physically. He has to be able to undertake something if he wants to continue with a pathway. Farmers can be physically limited as there is a high dependence on their physical wellbeing, not only strength, also, for example, their eye-sight. Besides physical limitations, a farmer also has to want to make use of a pathway. The attitude is taken into account, but there are more family members that maybe have influences or have other ideas on the subjects. Furthermore subsidies influence also the future of farmers, there was once, for example, a subsidization on turning to biological farming that led to more a transition towards more biological farming.

Chapter 7 · Question 4 – Stakeholders' vision

Chapter 7 deals with the research question: *'What is the vision of the stakeholders for the landscape in 2030?'* In order to answer this question thirteen important stakeholders who influence the landscape and land use in Noordoost-Twente were interviewed. These stakeholders differ from governmental organisations to interest groups. These stakeholders are important and set the framework wherein the farmers operate. In this part the social expectations of the farmers will be confronted with the social expectations of the stakeholders. Where do they match and where do they clash?

The social expectation of the stakeholders is also inserted in the scheme from Van der Ploeg. The interviews did not show as clear a mode as the farmer interviews did. Despite that, all the stakeholders are divided. As figure 16 shows, most of the stakeholders believe in an entrepreneurial/peasant farming mode. This corresponds with the expectation of the farmers where this was also the largest group.

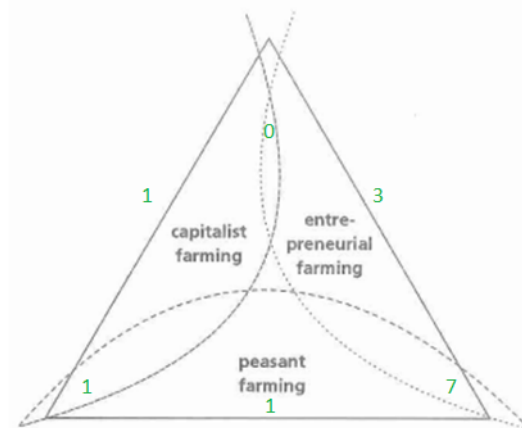


Figure 16 - Farming mode expectation of stakeholders

Social expectation stakeholders

In this part of the study the social expectations of the stakeholders will be expressed. These expectations will be compared with the social expectations of the farmers (question 1).

Amount of farmers

Only four out of thirteen stakeholders expressed that they think the amount of small farmers will decrease and larger farmers will continue.

Besides that, there are six stakeholders who think the total amount of farmers will decrease. Despite there being a successor or not or it being not possible due to financial reasons. One of the stakeholders even thinks that the demand of milk will decrease due to milk being against consumer preferences and made under bad circumstances (Provincie Overijssel, 2017).

Scale enlargement

The majority thinks that scale enlargement will continue (eight stakeholders). It is also mentioned that farmers are forced to do so, whether they want to or not. Twente is not the perfect place, there is not sufficient space, but maybe through a creative way of thinking it could be possible; for example with divided parcels.

Two stakeholders think scale enlargement will not continue, amongst others due to the farmers being bounded by laws and regulations.

Three stakeholders do not know what scale enlargement would do to Twente. Maybe only on specific locations. Every farmer should have the maximum space to develop.

Awareness

Seven out of thirteen stakeholders express the gap between farmers and citizens. They feel ashamed that farmers have such a bad image. One of the stakeholders mentions that acceptance in Twente is above average due to everybody knowing someone from a farming family. The farm is relatively close to their lives (Rabobank Noord en West Twente, 2018). The tourists and citizens do want to see, speak and hear the farmer. Farmers do miss the feeling that they are appreciated and in order to feel appreciated, they should be more open to citizens. These citizens on their turn should realize that farmers are responsible for the landscape and their food.

It is partly a task of all the stakeholders, in varying degrees, to do something about the awareness.

Changing landscape

Only three of the thirteen stakeholders express that they believe the landscape will not differ much in 2030 compared to the current situation.

Six of the stakeholders believe that there will be more nature, but in different interesting ways;

- Where in the past the farmers did maintain the nature, in the future taxes should raise the funds needed to maintain nature (Waterschap Vechtstromen, 2017).
- There will be new destinations for all the abandoned farms in 2030, forced to give it back to nature. Lands will become fallow lands. Another stakeholder thinks that fallow lands in Twente is out of the question (Provincie Overijssel, 2017).
- Farmers do search the combination with nature (Natuurmonumenten, 2017).
- When considering biodiversity, more nature is needed to sustain desirable levels (Landschap Overijssel, 2017).
- There will be more variation in crops, for example more herbs (Friesland Campina, 2017).

Two stakeholders think that there will be an increase in vacant farms.

One stakeholder mentions that for the identity of Twente, farmers are needed (Twente Marketing, 2018).

Family dairy farms

A majority of the stakeholders believe in the existence of the family dairy farm in 2030. Eight of the stakeholders think that the family dairy farm will continue. Two stakeholders hope that the family dairy farm still exist and three stakeholders do fear for the family dairy farms future.

One of the stakeholders who fears for the future mentioned that there will be a new layer of poverty of people who still want to farm at any price (Provincie Overijssel, 2017). The two other stakeholders mentioned that it will be hard for them and that the nature developments and uncertainty could have a bad influence on the family dairy farms.

The stakeholders who are more optimistic about the family dairy farms' future mention that it should be possible with 100 cows. They mention also that there is a good future perspective for the farmers, that they will remain but there will be less farms, more side activities and that the farmers will maintain the landscape. A landscape without farmers is not an option or perhaps via other constructions where farmers unite and have a main farm with smaller farms elsewhere.

Nature manager

Four of the stakeholders expressed that they see a future in a combination with nature and family dairy farms. They see beautiful opportunities for the nature areas and the farmers. Due to nature organisations not having the money anymore to maintain nature areas. Two stakeholders expresses that they miss an overarching organisation for the landscape, this should be a task for the ministry of Agriculture, Nature and Food quality (Overijssels Agrarisch Jongeren Kontakt, 2017).

Other notes

- The national government has pronounced that the Natura 2000 areas cannot enlarge. (Waterschap Vechtstromen, 2017)

- They should not make too much spatial barriers surrounding nature areas for farmers. (Waterschap Vechtstromen, 2017)

- An overarching organisation is missing, one that do not have own interests. (Waterschap Vechtstromen, 2017)

- The Netherlands cannot live without farmers. (Waterschap Vechtstromen, 2017)

- Abolishment of milk quota led to a quick growth of dairy sector. Phosphate rights ensures that scale enlargement goes more gradually. This is positive for the relative competitive position of Twente due to everybody feels the nuisance of the phosphate rights. (Rabobank Noord en West Twente, 2018)

- Tourists see crop fields as nature, he knows that the farmer put it there. For the experience of the area it doesn't matter if we have more or less nature. Creating more nature has only biodiversity and nature values benefits. (Twente Marketing, 2018)

- Municipalities fear a depopulation (of young people) the most (Twente Marketing, 2018).

- The OAJK fears vacancy, that citizens from the cities come to the rural areas and don't realize that they should adapt to the community (Overijssels Agrarisch Jongeren Kontakt, 2017).

- The landscape is also too small for biological farmers, they need a lot of land (LTO Noordoost-Twente, 2017).

- There should come an own economy for the area where local products get their own market. Sell local milk produced in Twente (Landschap Overijssel, 2017).
- There is an mortgage on the future about nature, not enough nature is recovered yet (Landschap Overijssel, 2017).
- There will be a reversal of people that are going to buy more biological products (Municipality of Oldenzaal, 2018)
- Farmers feel sorry for the loss of agricultural land for the purpose of renewable energy, they wonder if renewable energy couldn't be gained elsewhere. (Friesland Campina, 2017).
- Our leading quality of milk should be ensured to ensure our future (Municipality of Losser, 2018).
- Farmers are real entrepreneurs, highly educated (Municipality of Losser, 2018).

Conditions of stakeholders

All the stakeholders have different roles and responsibilities, therefore they have varying resources. These resources can help the farmers or limit them.

Not all the stakeholders are in the position to set limitations on farmers. What kind of limitations do the stakeholders have for the farmers? And how do the organisations help the landscape?

Waterschap Vechtstromen

The regional waterboard. Ensures quality of water and water safety.

Incentives

Blauwe diensten (Blue services) – compensation in the form of money for maintenance.

Deltaplan Agrarisch Waterbeheer (Deltaplan Agricultural Watermaintenance)– subsidy

Boundary conditions

Water Framework Directive – for the purpose of water quality farmers are not allowed to use the lock sides of parcels fully.

Rabobank Noordwest Twente

Rabobank is the bank where by origin a lot of farmers are client. Rabobank arose from the 'boerenleenbank', small banks especially for

farmers. Rabobank Noordwest Twente is the main office in the region.

Incentives

No direct active role, only helps at farm level. They do have farm advisors who help think about generating income. But it only works when the farmer wants another source of income, thinking like an entrepreneur.

Green discount – Extra discount on a loan when farming more sustainable or biological, or as a nature club. Loaning becomes more favourable. But due to the loans being dependent on parcel size, this green discount is not very popular in Noordoost-Twente. The areas are not that big.

Boundary conditions

The bank can constrain financial limitations by not bestowing loans.

Twente Marketing

Twente Marketing is the marketing organisation of Twente mainly by connecting organisations. Wants to improve the attractiveness of Twente, without a profit motive.

Incentives

No direct active role, but as sort of ambassador of the landscape. Twente Marketing addresses the importance of maintaining and investing in the landscape by other organisations. They see the landscape as Twente's Unique Selling Point.

Boundary conditions

Not applicable

Provincie Overijssel – Spatial planning

Province of Overijssel is the government on local scale. Provinces are between the national government and municipalities. This was the spatial department.

Incentives

Subsidie Natuur en Landschap / Groen blauwe diensten (Subsidy Nature and Landscape / Green Blue services) – Subsidy to stimulate land owners to ensure and maintain nature values. The subsidy nature and landscape can only be applied for as a collective. Therefore Noordoost-Twente has the 'Collective Noordoost-Twente'.

Quality team – team that advises farmers about quality impulses. Farmers have the possibility to approach this board when receiving compensation for developing aspects of the kwaliteits impuls groene omgeving is an option.

Boundary conditions

Omgevingsvisie (Regional environmental vision) – policy framework

Natura 2000 – making management plans in order to achieve nature goals.

Zoetwaterprogramma Nederland (Dutch Fresh water programme) – to ensure fresh water in dry periods.

Kwaliteitsimpuls Groene Omgeving (Quality impulse Green Environment) – regulation that asks a compensation for developments in the form of quality impulses in the area.

Provincie Overijssel – Tourism

Province of Overijssel is the government on local scale. Provinces are between the national government and municipalities. This was the tourist / leisure economy department.

Incentives

Not applicable for tourism sector.

Province does buy and develop nature areas.

Province is not allowed to support individual entrepreneurs, except in agreement with European commission.

Boundary conditions

Tourist taxes – these taxes are a possibility to appreciate the farmers more for their maintenance of the landscape.

Noaberkracht (Municipality of Tubbergen and Dinkelland)

A cooperation of the commission services of the municipality of Tubbergen and Dinkelland.

Incentives

Q-team – A quality team that ensures good investments in the landscape with every expanding in the rural area. And a good landscape interface strategy.

Boundary conditions

Casco beleid (Casco policy) – policy together with other municipalities in Noordoost-Twente in order to protect the (structure of) the landscape elements.

Kapverordening (forestry ordinance) – policy to protect / or give permission to chop trees.

Zoning plan – zoning plan of the municipality.

Landscape interface strategy – municipality requires a good landscape interface strategy with every expanding in the rural area. Certain percentage of construction costs.

Overijssels Agrarisch Jongeren Kontakt (OAJK)

Overijssels Agrarisch Jongeren Kontakt is the organisation for the interests of (young) farmers.

Incentives

Workshops – organizing workshops for young farmers. Making use of the power and knowledge of young farmers. And helping young farmers to express this.

Lobbying – just like the LTO they lobby for the agricultural sector by being the contact point between farmers and government. But OAJK is more focused on young farmers.

Mineral Twente – support the farmer to be more efficient with their minerals. Project OAJK does on behalf of the province with all the municipalities.

Boundary conditions

Not applicable. Overijssel Agrarisch Jongeren Kontakt is the organisation for the interests of (young) farmers.

Natuurmonumenten

Natuurmonumenten is an organisation that protects nature. They own and buy fields and maintain them.

Incentives

Maintenance – ensures that the right maintenance is done on their fields.

Appointing – making plans for fields that are going to be converted from agriculture to nature.

Boundary conditions

Rented lands- there are more restrictions on rented lands for farmers.

LTO Noordoost-Twente

LTO Noordoost-Twente is the organisation for the interest of farmers.

Incentives

Consultative organisation – LTO is the connection between the farmers and governmental organisations as municipalities, provinces, waterboards, the national government, European union.

Boundary conditions

Not applicable. LTO Noordoost-Twente is the organisation for the interests of farmers.

Landschap Overijssel

Landschap Overijssel is a provincial organisation that wants to protect the characteristic landscape of Overijssel. They own and buy fields and maintain them.

Incentive

Projects – Landschap Overijssel has a lot of projects to protect and support the landscape. Restore wooded banks, courtyards and nature fields. But also give discounts on seed mixtures for the purpose flora biodiversity.

Groenblauwe diensten (Green blue services) – Landschap Overijssel is the executive organisation for groenblauwe diensten commissioned by Provincie Overijssel.

Connect – being the connector between collaborations in order to maintain and protect the landscape.

Boundary conditions

Natura 2000 – Landschap Overijssel participates in the Natura 2000 project in order to strengthen and expand Natura 2000 fields with their own fields.

Municipality of Oldenzaal

Municipality of Oldenzaal, the municipality is the most local government. Oldenzaal is the largest city in Noordoost-Twente.

Incentives

Due to Oldenzaal being an urban municipality they do not focus on farmers or rural areas. They join surrounding municipalities in rural policies.

Boundary conditions

Casco beleid (Casco policy) – policy together with other municipalities in Noordoost-Twente in order to protect the (structure of) the landscape elements.

Kapverordening (forestry ordinance) – policy to protect / or give permission to chop trees.

Zoning plan – zoning plan of the municipality.

Friesland Campina

Friesland Campina is an international operating dairy cooperation. The biggest processor of milk in the region.

Incentives

Friesland Campina has a development scheme where nature and landscape is inserted. Unfortunately this is not yet measurable, it should become measurable in the future.

Boundary conditions

In order to get permission to supply milk farmers need to gain certain amount of points. These points are obtainable by, among other things, nature; like herb fields. Friesland Campina expresses that the diversity of the farmer is their power, make use of this diversity.

Municipality of Losser

Municipality of Losser, the municipality is the most local government.

Incentives

Realizes the value of the landscape. Tourists only visit Twente when the quality of the landscape is good. But at the same time there is also need for space for the agricultural sector. Losser is looking for a balance between economy and valuable landscape elements.

Boundary conditions

Casco beleid (Casco policy) – policy together with other municipalities in Noordoost-Twente in order to protect the (structure of) the landscape elements.

Kapverordening (forestry ordinance) – policy to protect / or give permission to chop trees.

Zoning plan – zoning plan of the municipality.

Conclusion

The stakeholders' visions are leaning towards entrepreneurial but mainly entrepreneurial in combination with the peasantry farming mode. Although the stakeholders did not express their expectation in farming modes so clearly. A majority suggested these farming modes. There are three stakeholders who expect a capitalist, peasant or peasant/capitalist farming mode. But in comparison with the high amount of stakeholders in the entrepreneurial/peasant farming mode these are almost negligible.

A majority of stakeholders admit that awareness between farmers and citizens is missing, although there are not a lot of stakeholders who do something about this.

It is remarkable that two stakeholders expressed that they miss an overarching organisation for the landscape of Noordoost-Twente as a whole. There is an organisation who focuses on agriculture in Noordoost-Twente as a collective, namely 'Gebiedscollectief Noordoost-Twente'. They want to inform, advise and communicate between owners and users of the landscape in Noordoost-Twente. This organisation is mainly a collective to apply for the subsidy Natuur en Landschap. So maybe Noordoost-Twente does miss an organisation that emphasizes more on all the users of the landscape. As the OAJK mentioned this should be a task of the ministry, the national government. It could be argued that the national government is not local enough in order to do this. Or that it is a subject that is too fragmented. Meanwhile municipalities are too local. Is this a task for the province, given they have more power than other interest organisations?

Chapter 8 · Question 5 – Confrontation farmers & stakeholders

Parallel to the farmers' social expectation, the stakeholders expectation has been researched. In this chapter the social expectations will be confronted with each other. The research question: *'To which extent do the farmers expectations match with the expectations of the stakeholders for 2030?'* is the basis for this chapter.

The following figure shows the comparison in the division between the farmers (in black) and the stakeholders (in green). Notable is the high scoring for the entrepreneurial / peasant farming mode (9 farmers / 7 stakeholders). Remarkable is the difference in expectations about the peasant farming mode, seven farmers and only one stakeholder expects a peasant farming mode for Noordoost-Twente in 2030. This is quite a difference. How to explain this difference? Does the farmers think too brightly about the future? Maybe the farmers want to see the peasant farming mode as an optimistic bright 'fairy tale'. The farmers were more convinced that the family dairy farm still exists in 2030 compared to the stakeholders. The traditional family dairy farm matches the most with the peasant farming mode.

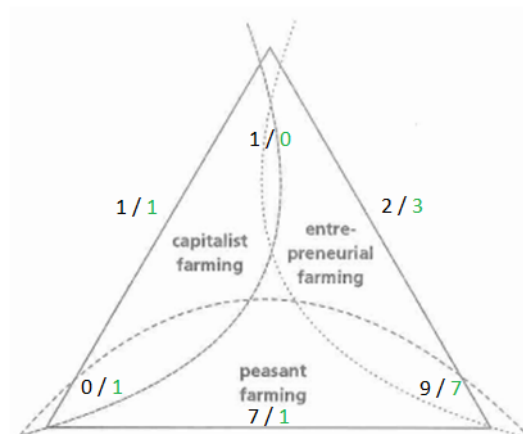


Figure 17 - Farming mode expectation farmers and stakeholders

As figure 17 shows, the combination between entrepreneurial farming and peasant farming is a popular expectation for 2030. For example the spatial department of the Province of Overijssel mentions that the entrepreneurship of farmers will be appealed. Farmers need to be able to see

the chances and capitalise them (Provincie Overijssel, 2017). In the meantime the tourist department of the Province of Overijssel mentions that the landscape is no longer convenient for the traditional farmer (peasant farming), only on a few locations it is still possible (Provincie Overijssel, 2017).

Landschap Overijssel admits that it will be hard to remain as a family dairy farm in the regular milk sector, so the peasant farming mode will be hard to continue to pursue (Landschap Overijssel, 2017).

Natuurmonumenten, the nature organisation, believes that in 2030 there will be a few very big farms without limits, but mostly rather small farms with side activities (Natuurmonumenten, 2017). Also the municipality of Losser believes that there are a few locations where farms without limits are possible (Municipality of Losser, 2018). The municipality of Oldenzaal contrarily thinks that those big farms without limits are not possible and that they will not remain. LTO Noordoost-Twente believes that farming without limits is not possible due to the more time that is needed to cultivate the land (LTO Noordoost-Twente, 2017). It is clear that the stakeholders agree that a full capitalist farming mode in Noordoost-Twente is not possible, maybe on a few locations with the right conditions.

Social expectation

In this paragraph the expectations from the farmers (chapter 4) will be compared with the stakeholders' expectation (chapter 7). This comparison will be made on the same subjects as previously in chapter 4 and 7.

Amount of farmers

Compared to the farmers' expectation, the stakeholders are much less pronounced about the fact that there will be less farmers in 2030.

Scale enlargement

The majority of the farmers and stakeholders think that scale enlargement will continue. The farmers are more convinced that scale enlargement will continue than the stakeholders. There is only one farmer who thinks it is not possible. Contrasting, in total 5 stakeholders do not know if scale enlargement will continue or are convinced that it will stop.

Awareness

On both sides, farmer and stakeholder side, a majority expressed the lack of awareness from citizens towards farmers, or contrariwise. Where the farmers want to feel appreciated, the stakeholders admits that there is also a task for them. But it has to come from both sides, the farmer also has to 'open their doors' towards the citizens. But on the other hand they cannot always open their doors due hygiene rules (Waterschap Vechtstromen, 2017).

Changing landscape

The farmers expectation is a bit more reserved and conservative they think there will not change that much in the landscape. There are six farmers who think the landscape will not change that much. Only three of the thirteen stakeholders believe the landscape will not differ much in 2030 comparing to the current situation.

Often noted is that there will be more nature based farming systems, six of the stakeholders and six farmers believe that there will be more nature.

Family dairy farms

Both a majority of the farmers and stakeholders believe that the family dairy farm will still exist in 2030. On the farmers side no one expressed the idea that the family dairy farm will not exist anymore, at the stakeholders side there were three stakeholders who fear for the future of the family dairy farm. It is likely the family dairy farm in 2030 will be more automated.

Nature manager

A small group on both sides, stakeholder and farmer, expressed this as an extra source of income for farmers. In how far this nature manager function goes is debatable, is it only for extra income or the basis of the business model of the farm?

Reaction stakeholders on scenarios

Scenario A

The first scenario, with the rising milk price, shows an increasement in intensifying farmers. Along with intensifying comes scale enlargement.

From the thirteen stakeholders there are two stakeholders who are convinced that the scale enlargement has come to an end. Eight

stakeholders do believe that scale enlargement will continue but that it is difficult in Twente. The remaining three stakeholders do not know what scale enlargement will do in Twente.

Besides scale enlargement, biological farming is also increasing in scenario A. One of the municipalities thinks indeed that there will be a tipping point where people will buy the more expensive but biological products. The LTO mentions that the landscape in Twente is too small, biological farmers do need a lot of land.

Scenario B

Six out of thirteen stakeholders expressed that they think the amount of farmers will decrease, such as this scenario shows.

Of all the stakeholders five mentioned that they see opportunities in the collaboration between agricultural function and the nature manager function. This corresponds to scenario B where 3 farmers reached the tipping point towards the Nature pathway.

Scenario C and D

In scenario C and D there does not change a lot. There is only one farmer who quits in scenario C. There are only three stakeholders who think that the landscape will not change much.

Conclusion

Generally the expectations for 2030's land use of the farmers and the stakeholders do match generally. The stakeholders do agree that a full capitalist farming mode in Noordoost-Twente is not possible, some stakeholders think it might be possible on a few locations with the right conditions. Important to remember is all farmers should not do exactly the same, or should become the same. Find the power in the diversity of farmers. When everyone is practising the same side activity it will not work. Farmers need to complement each other. A nice opportunity are the tourist taxes where maybe the farmers can find a compensation for their maintenance in the landscape. There are / were for example also subsidies for solar panels.

Impressive is the amount of stakeholders and farmers that believe in an entrepreneurial / peasant farming mode. This is by far the most popular expected farming mode.

Remarkable differences are found in the peasant farming mode. There are 7 farmers who expects a peasant farming mode. There is only 1 stakeholder who expects a peasant farming mode for 2030. How to explain this difference? The farmers are more convinced about the existence of the family dairy farm in 2030, compared with the expectation of the stakeholders. The peasant farming mode is where the traditional family dairy farms are.

The farmers and stakeholders do agree on a lot of things, except the farmers are more conservative in their thoughts. This was noticeable with their thoughts about 'changing landscape' where the farmers believed more that the landscape will remain as it is now than the stakeholders do.

Chapter 9 · Discussion

The discussion chapter consists of the results from the study in the context of the research questions and scientific objective, later the results will be confronted with the theoretical framework.

Q1. What is the social expectation of the farmers for the landscape?

The farmers expect, on the basis of Van der Ploegs' New Peasantry theory, a combination of entrepreneurial farming and peasant farming mode. The third farming mode of capitalist farming is almost not expected. Although there is one farmer who is, according to this theory, a capitalist farmer. "...a web of mobile farm enterprises in which the labour force is mainly or even exclusively based on salaried workers" (van der Ploeg, 2008, p. 2). This farmer is not explicitly a capitalist farmer. But he could be seen as a capitalist entrepreneur. In this specific case the farmer does have 8.9 fte employees. The farmer is not part of a web of mobile farm enterprises nor does he have a very big farm. But he does have a side activity wherefore he needs his employees. Do these employees make him automatically a capitalist farmer? And is there a difference if he, in his side activity, is part of a larger enterprise? This could be questioned as the side-activity part of the farm leads to this amount of fte in labour.

Besides, it could be argued if the capitalist farming mode is applicable for the Netherlands. Is the Netherlands not too small for this farming mode?

Q2. Which pathways result from the social expectations?

This question answers which pathways result from the first question. In order to know which pathways a farmer will choose, their calculated farm viability is used. This farm viability consists of successor, age, amount of milk giving cows, amount of hectares and the construction year of the cubicle housing. All very important aspects but in fact there is one factor missing that is unethical and not accessible. Namely the equity of the farmer, the capital. The equity is a huge aspect in the viability of the farmer.

Q3. How will the rural structure change after effectuation of the scenarios?

In order to get this answer agent based modelling is used. The model created with Netlogo is a first step and kind of experimental. This model shows a little of what is possible with Netlogo. In the program the possibilities where endless. This also means that the output of the model is dependent on the input and the author / programmer. So that is simultaneous a recommendation for the future. Due to computer programming is not an expertise of the author this step costed quite some time.

Besides, for this study it is decided that the tipping point of farmers is on 15. But if this would be lower, or higher, the results for 2030 would have been different. If the tipping point, for example, would be 30, it would take more time for farmers to change their future pathway. This shows that the model is highly dependent on the author and her arbitrary choices.

Q4. What is the vision of the stakeholders for the landscape in 2030?

The stakeholders expect a combination towards entrepreneurial and peasant farming for 2030. Furthermore the boundary conditions and incentives of all the stakeholders are made clear. These could be interpreted as sticks and carrots (Bemelmans-Videc, et al., 1997). Where the laws and regulations from governmental organisations, but also other directives and requirements can be seen as sticks. Sticks are also the regulatory measures. The taxes, licensing and subsidies can be seen as carrots, with economic and market interventions. Another policy instrument described by Bemelmans-Videc et al. are the sermons, such as strategies, plans, standards and voluntary agreements. It could be argued that for example Landschap Overijssel also has sermons for her volunteers. Sermons are equal to information and measures.

Q5. To which extent do the farmers expectations match with the expectations of the stakeholders for 2030?

"Empire is understood here as a mode of ordering that tends to become dominant" (van der Ploeg, 2008, pp. 3-4). Van der Ploeg mentions that the world is currently in a transition towards empire and globalization. But at the same time Empire could collapse as mentioned in the theoretical framework. "...however, through such episodes, Empire as a mode of ordering might even be strengthened" (van der Ploeg, 2008, p. 4). Van der Ploeg mentions that there is no simple relation between Empire and the three modes of farming (capitalist, entrepreneurial and peasant). "All three constellations (farming modes) interact with and are, in a way, constituted through different mechanisms that link them to wider society. However, corporate and entrepreneurial farming are mainly linked through large-scale food processing and trading companies to world consumption, while peasant agriculture is basically, though far from exclusively, grounded in short and decentralized circuits that at least escape from direct control by capital" (van der Ploeg, 2008, pp. 4-5). So, capitalist and entrepreneurial farming are most linked to Empire. This means that we are according to Van der Ploeg in an era of Empire. However, this study shows that the expectation of the farmers and stakeholders is that we will move towards a peasant/entrepreneurial farming mode, instead of capital farming and entrepreneurial farming. It could be that this is because of the people are less future minded and Van der Ploeg thinks ahead. Or maybe Van der Ploeg is wrong.

The author of this study thinks that the solution is bound to the location. The landscape of Noordoost-Twente is not comparable with the rest of the Netherlands, or the world. Noordoost-Twente has the status of National Landscape (Maas & Boers, 2010). According to Dirkx, National landscapes can be a handicap for efficient agriculture. Think of high ground water levels, small parcels and relief. This results in moderate production circumstances (Dirkx, 2007). This makes Noordoost-Twente a unique situation where Empire would be almost impossible.

MRQ. Which development models for family dairy farms are feasible in 2030 under different land use / landscape management scenarios in Noordoost-Twente?

With answering the main research question it has to be kept in mind that not every aspect is included in designating the farmers' pathways. There are other external key factors of influence who are mentioned in figure 19. For example the soil quality, in this study the quality of the soil is not directly included regarding the choice a farmer will make. But it is an indirect factor that plays a part in the future for the farm. If the soil quality is very bad, biological farming is harder.

As this study shows it is dependent on a lot of variables how the landscape will look like in 2030. In my conclusion I suggest three possible development models. However it is most important to keep in mind that the power of the landscape is in the variety of the farmers, so this has to remain. The landscape is vulnerable and there is only one small tipping point necessary that leads to a major change in the land use and landscape. Therefore it is important not to go too far in one development model. The landscape has a spectrum in which development should occur. As figure 18 shows, there is a maximum what the landscape can bare.

Landscape spectrum

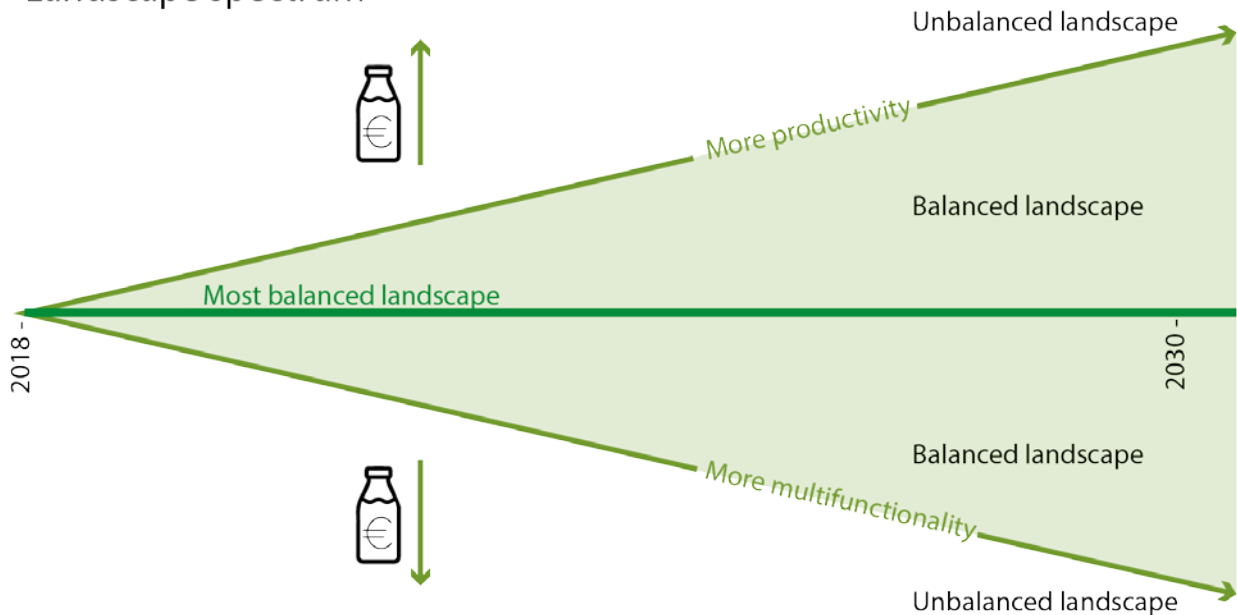


Figure 18 - Landscape spectrum

The bright green horizontal line is the perfect balance between the two different development models; multifunctionality and productivity. In this situation the landscape is most in balance, there are farmers who want to invest in their farm and farmers who look for side activities in nature and tourism for example.

In the scenarios of chapter 6 the milk price was the leading key factor, figure 18 shows what will happen with a continuous falling and rising milk price. The danger is that one of the two development models may become too popular, if everyone is going to do something with multifunctionality the landscape becomes unbalanced. It leads to a fragmented landscape that is no longer a unity. Think of biomass installations, sun parks, tree nurseries or land for grass seeds. But it is also possible that through side activities in nature and tourism, the agricultural side of the farm becomes subordinate. This can lead in the end to abandoning of the agricultural sector and maybe even in fellow lands. In this development model there are just a few investments in the agricultural sector but the amount of farms is high.

On the other hand we have the development model of productivity. In this development the farmers invest a lot in their farm and want to produce a lot of milk. In this scenario there are a lot of investments and the amount of farms is low. If there are too many farmers who are in this

development model the landscape becomes out of balance. The landscape cannot bare that amount of productivity, all the landscape elements will disappear and the well-known typical landscape of Noordoost-Twente will fade away.

A side note for this figure is that the landscape cannot be seen as a hard black / white dividing between functions. It will always remain a greyish area where the borders will be vague.

The scientific objective of this research was: Assess the feasibility of a balanced division of land use given the social perception of the role of cultural heritage in the landscape.

Figure 18 shows the importance of a balanced landscape. Where the dark green line is the most balanced option. An aspect what was still unmentioned in this study is the licence to produce. It is very important that the agricultural sector gets the 'licence to produce' from society. This licence is the social acceptation. In order to get this social acceptation and thereby the licence, the agricultural sector should gain the respect and interest of the society. The distance that is created between citizens and farmers is a negative development for the licence to produce. This discussion is exactly the Dutch debate on the agricultural sector. The citizen have to realise that they are dependent on the agricultural sector and the farmers. The goal is increase their awareness when it comes to this debate. For

example by informing the citizens about farms and the daily business on a farm. Often the citizens are interested in the farm. But the farmer also should have the possibility to show his or her farm, due to hygienical reasons this becomes more difficult.

The societal objective of this research was: A balanced division of land use given the social expectation of a landscape where cultural heritage plays a big part.

It is clear that the author of this study has a bias in the agricultural sector. Due to her roots in the area she might have a small preference for several situations. It helps a lot to already be familiar with the area, the stakeholders and the story of the agricultural sector. Of course assumptions are made as for this kind of study there could never be enough data. The Dutch debate on the agricultural sector has a huge influence on the world of a spatial planner and the spatial planning of the Netherlands. There are so many aspects that are of importance in order to advise the agricultural sector, we should ask ourselves what the role of the spatial planner is in this situation. In this study the milk price is involved, but the farmer also plays a role in the society of an area. This is also a very relevant question, but not the one for this study.

Chapter 10 · Conclusion

In this chapter the main research question will be answered. The second part will provide the limitations of this study. After the limitations come the recommendations where further researched is proposed.

Research question

The research objective was to assess the feasibility of a balanced division of land use given the social perception of the role of cultural heritage in the landscape. In order to reach this research objective the following main research question will be answered;

Which development models for family dairy farms are feasible in 2030 with different land use / landscape management scenarios in Noordoost-Twente?

The first conclusion that can be drawn is that most of the farmers expect a combination in entrepreneurial farming and peasant farming. The position of the family dairy farm remains in this farming mode with technical innovations and scale enlargement. Scale enlargement is site-specific possible due to there being less farmers in the future. Scale enlargement is only site-specific possible due to the boundaries the landscape of Noordoost-Twente has. These boundaries also results in a higher price to produce milk due to there is more time needed to cultivate the land. Nonetheless the farmers appreciate this limited landscape and cherish her landscape elements. Farmers in Noordoost – Twente do feel very connected to their houses and land what is often for multiple generations in the family. There are numerous cases that when a farmer quits, the cows will be sold, the land leased and the farmers still lives where he used to live. It depends on the attitude and viability of the farmer if he will, and is able to move. As a result of less farmers, the remaining farmers do have space to grow. The farmers expect that a growth will go on till a maximum of 200 cows per farm. The definition of a family dairy farm differed under the interviewees, and there is no fixed definition, but they agreed most of all with this maximum.

The second conclusion that can be drawn is the division of the peasant farming mode between farmers and stakeholders. The farmers were optimistic, 7 out of 20 farmers expect this

farming mode. The stakeholders did not think the same, with only 1 stakeholder out of 13 stakeholders who expects a peasant farming mode in 2030. Is a farmer too positively minded and too stubborn? There are subsidies that not all the farmers want to make use of, due to them being afraid to lose power and control over their own land, for example the subsidy 'Groen blauwe diensten'. Maybe the farmers are just scared, because their future is unknown and they feel like a governmental play ball and other big organisations. Farmers need clear rules and regulations in order to make a valid plan for the future. It is mentioned that the Dutch rules and regulations are too strict compared to the European agricultural rules.

As the scenarios in chapter 6 show, there is a high dependency on the milk price. What if there are several years consecutively with a falling milk price? Will fallow lands be the future in a bad milk price scenario? Side activities towards nature and tourism also demand land, but often not that much as agriculture. This leads us to the last conclusion that can be drawn; the scenarios show that there is only one crucial change needed in a factor that can cause a tipping point in the land use and landscape development.

This tipping point could be caused by the smallest development with, or in a key factor, this could be anything. For example a bad milk price several years in a row. As the milk price scenarios show, there is a high dependency on this milk price. The longer the milk price is rising, the more farmers will intensify. But with a falling milk price farmers are more likely to practice side activities towards nature and tourism. Nature and tourism are attractive side activities for farmers due to there are being good conditions found in Noordoost-Twente. Of course it is dependent on the willingness of farmers if he will undertake side activities. Just like the willingness of a farmer, the future of a farm is dependent on more factors except the milk price. Besides willingness, think of location, family and capital. Other factors are set by stakeholders. The stakeholders expectation do match, to a great extent with the farmers expectation. Due to the landscape is very vulnerable it is important, for example, that vacant agricultural buildings do get a new custom-made plan for the future. Due to the uniqueness of every building with her location and the demands of the area.

So, only one small tipping point is necessary for a huge change in the landscape. Where the future of farming in the Netherlands is insecure and uncertain, there are several key factors to mention who can influence different development models of the dairy sector. The milk price was in this case an example of a key factor. It is from value to know which choices one (farmer or stakeholder) should make in order to achieve an idealistic future scenario. The disclaimer what should be mentioned is that there is always a set of rules and regulations who form a framework wherein one should work. As a conclusion of this research a future hypothesis can be outlined.

Out of the scenarios in chapter 6 it could be argued that there are three main possibilities. With a rising milk price there will be a lot of intensifying farms, with a falling milk price there will be more side activities (multifunctionality). In a fluctuating milk price scenario there will not change that much. These three development models do have different effects on the landscape. In figure 19 the effects are made clear.

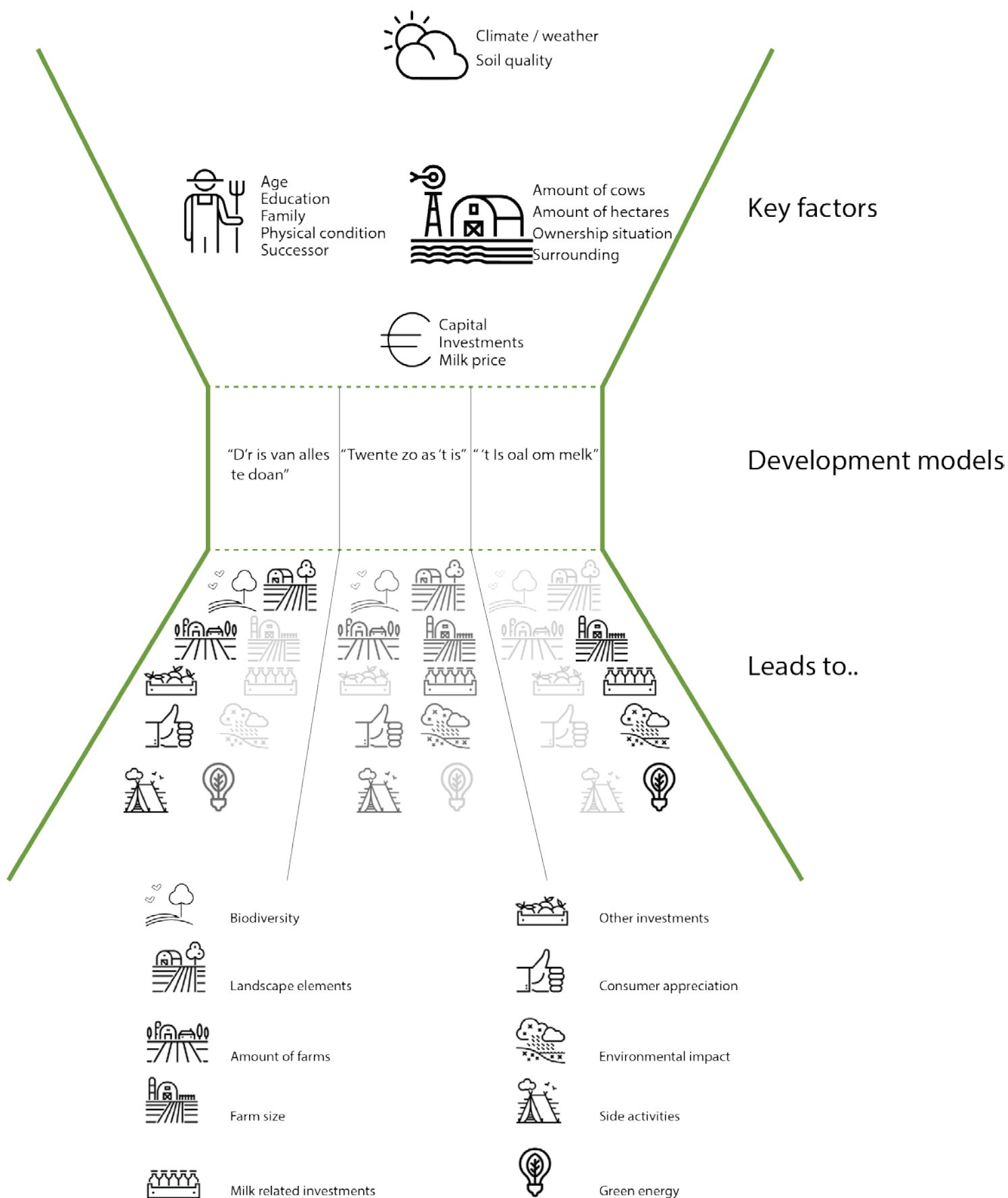


Figure 19 - Development models for Noordoost-Twente

Key factors

There are a few key factors who influence the development models of the farmer as shown in figure 19. First of all the main key factor weather, the farmers is dependent on the weather circumstances for his crops and land, cultivating grapes for wine is not possible in Noordoost-Twente for example. Besides the soil quality is very important, especially biological farmers who cannot use fertilizers are dependent on the quality of the soil for the quality of the crops.

Second main key factor is the farmer his of herself, besides that his age is important if he is going to do major investments. It is also relevant which education the farmer had, is he qualified or able to do something? Also the family of the farmer is an important key factor, whether he has a partner or not can make the difference in scale enlargement or starting a side activity. Also the physical condition of the farmer plays a role in making choices for the future. The presence of a successor is also an important key factor.

Third main key factor is the farm, the amount of cows and hectares are very important key factors and plays a role in the farm viability. The hectares can be divided in own ownership but also leased lands. Besides this the surrounding of the farm is a key factor. There is a huge dependency of farmers on their location. The location is leading when talking about side activities, but also the possible scale enlargement of the agricultural activities on the farm. If a farmer wants to intensify, it is idealistic when the Natura 2000 areas are far away as possible. If a farmer wants to do something with tourism, it is necessary that he is situated in a touristic area. If a farmer wants to do something with nature, for example for generating more income with maintaining nature areas, or making use of nature areas, it is necessary that the distance to nature areas is relatively close. Also the development models of the neighbours are important. Farmers with different side activities can strengthen each other, a farmer who sells ice creams, can have visitors if he is the neighbour of a farm with a mini-camping.

The last main key factor is money, obvious is the own capital of the farmer. But also the investments that are already made in the farm do play a role. As last, the milk price is a key factor for the future.

Development models

All these key factors can be divided in three development models, namely; "D'r is van alles te doan", "Twente zo as 't is" and "'t is oal om melk".

In the first development model "D'r is van alles te doan" there are a lot farmers and they are relatively small. It could be compared with a multifunctional scenario where farms are on peasant farm scale. Due to the smaller size there are more landscape elements what directly leads to a higher biodiversity. The investments in milk are low in contrast to the other investments, think of investments in side activities for example. Because the agricultural sector is relatively small and the consumer is closer to the farmer due to the side activities, the consumer appreciation is higher in a multifunctional development model. The landscape is attractive and there will a lot of visitors. When there are more side activities the consumer gets more often on the farm, think of beauty farms, camping or a milk / cheese shop. The environmental impact is in this development model low, there are not much emissions from the agricultural sector. On the other hand there is not that much space for green energy in the form of solar panels or wind mills.

The second development model "Twente zo as 't is", is the neutral development model where is not happening so much. It has the most in common with the entrepreneurial / peasant farming mode. Most of the outcomes are 'medium' in this development model. The biodiversity is medium, just as the amount of landscape elements, amount of farms and farm size. One could say that this development model is most in balance. There always should be developments and investments otherwise the landscape is standing still. It is not an option to do 'nothing'. In this development model the other investments is low due to there will be still a medium amount of farmers who invest in the agricultural side of the farm above the side activity side of the farm. Also the green energy is low in this development model, currently there are almost no solar panels besides on some rooftops, windmills are not allowed in Noordoost-Twente.

The third and last development model is "‘t Is oal om melk", the scenario that looks the most like entrepreneurial farming / capitalist farming. This development model is maybe too big for Noordoost-Twente, in this situation the farm size, milk related investments and environmental impact are the biggest/highest. The stakeholders do agree a full capitalist farming mode in Noordoost-Twente is not possible, some stakeholders think it might be on a few locations with the good conditions. Green energy scores the highest due to enough room on roofs of big stables and solar parks are not excluded. It is obvious that the landscape elements do suffer in this situation, as well as the biodiversity, amount of farms and side activities. Due to this scenario has the highest emissions what leads to the biggest environmental impact, plus that the tourist and citizens will not visit the landscape, the appreciation for the farmers is in this situation the lowest. Besides, a tourist sees a field with crops also as nature. Also the other investments will be low.

Concluding

So there are multiple future scenarios possible it is up to the farmers and stakeholders how Noordoost-Twente will look like in 2030. The region as a whole has to decide what they want, how do we want to look like? What is the common interest for Noordoost-Twente from all her users? Currently the functions and users in the landscape are fragmentated, everyone is feeling victimised what will results in nothing. There is need for a strong and independent overarching player who controls the landscape with her users. There are some organisations who are already very committed to the landscape. It is, by origin, the task of the ministry of Agriculture, Nature and Food quality. But maybe the task is too regional/low scaled. Besides, managing a landscape is due to all the different aspects and users very fragmentated at governmental organisations. There is a collective that focuses on agriculture in Noordoost-Twente, but they do not have the resources as the government does. But they could certainly play a role in fulfilling this task. There is need for a right balance between good incomes for farmers, nature and food(production).

But besides these three development models, one of the main conclusions that can be drawn is that the power of the farmer is in the diversity of

all the farms. Farmers need to complement each other in order to achieve a balanced division in the landscape. It is not achievable to become all biological farmers, therefore the landscape is too small. Use the power of the diversity of farmers! Not only in the diversity of side-activities, it is mentioned that farmers are more competitors instead of colleagues, or 'Noabers'. Farmers should look to their neighbours and help each other when having hard times, that is the whole idea of 'Noaberschap', that is what makes the solidarity between farmers. Solidarity can be in very small things, helping with the birth of a calf or pressing a simple button on the milk robot when the alarm goes off and the concerned farmer is on a day out with his family. The gap between farmers and citizens is often mentioned, but also the gap between farmers themselves should be pointed out. Otherwise farmers become estranged from each other, in a world who becomes more and more individualistic. Becoming aware of the gap between farmers, there is a bigger gap between citizens and farmers. Citizens do not understand the farming model of a farm. And not understanding it, makes it unknown and unloved. The community demands a better wellbeing for animals and more biodiversity, the farmers do not want anything else than this. Higher biodiversity results in better food for his cows. Better wellbeing for his cows results in a better milk production. Due to the family often farms there for ages, farmers in Noordoost-Twente do feel very connected and rooted to their houses and land. This makes that they will maintain their land carefully. They do not want to move quickly. So in fact the community and the farmers wants the same; a beautiful landscape, with healthy cows and a high biodiversity. Still there is friction between them. It cannot be that the farmers feel only victimised, it is time to do something.

It has to be mentioned that one of the fears of the region is that the area becomes abandoned. If no one can farm, or develop there company, it becomes less attractive for (agricultural) entrepreneurs. We cannot be too strict, in rules and regulations but also in the licence to produce from the community.

Limitations

It definitely influenced the study that the author originates from Noordoost-Twente. Some farmers were already known by the author what makes it easier to make the first contact. But also harder to still stay professional. It could be argued that all the interviewees felt comfortable due to the roots of the author, for example think of the dialect the people are speaking (in varying degrees). Thereby the author did already know quite some information and what is going on in the field and the area due the author is born and raised on a farm. Due to the background of the author it is likely that more data became available.

Furthermore this study focuses on Noordoost-Twente, this landscape and area is not comparable with other parts of the Netherlands due to fragmented nature, high biodiversity and the character of the inhabitants. This makes it hard to say something about the rest of the Netherlands in 2030.

The author would recommend to expand the study further, this can be done in two ways;

- Higher scale, look towards other parts of the Netherlands. What is the social expectation of farmers and stakeholders over there? Or what is the social expectation for the Netherlands in general?
- Agent based modelling / Netlogo, implement more aspects of the landscape and actors in Netlogo. This could give a more detailed oversight of the future for Noordoost Twente. Think of neighbours, distances to nature areas and subsidies.

Recommendations

The recommendation part is divided in common recommendations who are suitable for farmers, the government and the other stakeholders such as interest groups. Thereafter are the recommendations specific for the farmers. Followed by the recommendations for the farmers. As last the recommendations for the governmental organisations follow. Some recommendations are mentioned above but stated here again more specific.

Common recommendations:

- One of the powers of the landscape of Noordoost-Twente is the intertwining between nature and agriculture in the landscape. This is often mentioned in the interviews with stakeholders and farmers. Awareness of this power is necessary. The farmers expressed that the ratio between nature and agriculture is fine, there were even some farmers who wanted more nature. Although the current status of nature areas is debatable, farmers feel that nature areas are neglected and not well maintained. Farmers want a better quality of nature instead of more quantity. Nature organisations mention that it is their maintenance-model and that they need the hectares to connect different nature areas.
- The balance in the landscape is mentioned as important factor, balance between types of farming, functions and nature and agriculture. An abandoned landscape is the biggest fear,

Recommendations for farmers

- Do not feel victimised, do not be too cautious, do get in action! The best defence is the attack. Do not blame everything, such as Natura 2000 for her restrictions, try to see the opportunities of it. If the enthusiasm between farmers and stakeholders match, multiple interesting things can happen.
- Do not use 'schaamgroen' for fitting in the buildings in the landscape, but use characteristic Twentse measures. Such as beech hedges and fruit trees who are higher as normal.

Recommendations for other stakeholders

- Make use of the experts of the area; the farmers. Often their knowledge is unused.
- Reward farmers who maintain their land well with money or rights, for example phosphate rights.

Recommendations for governmental organisations

- A nice opportunity are the tourist taxes where maybe the farmers can find a compensation for their maintenance in the landscape. The landscape is one of the factors why a tourists visit Noordoost-Twente. Farmers are not negative towards tourists, as long as it is well organised. Often the farmer is the one who maintains this landscape, maybe the government should reward the farmers who maintain their land good. This could be in money, but also in rights, for example phosphate rights. There were also subsidies for solar panels, take this as an example. This makes that the farmer feels appreciated. Another point is the subsidy 'Groen blauwe diensten', this subsidy is not everywhere applicable. Where the landscape do have nicer spots and less nicer spots, it could be a solution to enlarge the area of this subsidy to Noordoost-Twente as a whole, so the total quality of the landscape will increase. This also helps in the unambiguity of the policies and the "spirit of the region" as a whole, less fragmentated.
- Win the trust of the farmers. Presumably farmers lost their trust in the government. Due to absence of an own ministry and sound policies. Fortunately agriculture has got its own ministry again, which is a good step forwards. Farmers are afraid and insecure about their future. This is also noticeable in the subsidy 'Groen blauwe diensten' where the farmers do not want to join out of fear or losing control and power over their own lands.
- Make use of the experts of the area; the farmers. Often their knowledge is unused.
- Stimulate parcel exchange so farmers can try to get all their parcels closer to the farm.
- Give a clear set of rules, regulations and policy
- Reward farmers who maintain their land well with money or rights, for example phosphate rights.

Chapter 11 · Bibliography

Algemeen Dagblad, 2018. *Zonnepark verdringt landbouw*. s.l.:s.n.

Alterra, 2013. *Geactualiseerd GIAB-bestand 2013 voor Nederland*, Wageningen: Alterra.

Argent, N., 2010. From Pillar to Post? In search of the post-productivist countryside in Australia. *Australian Geographer*, Volume 2010, pp. 97-114.

Arnouts, R. C. & Kistenkas, F. H., 2011. *De deur klemt*, Wageningen: Alterra Wageningen UR.

Bemelmans-Videc, M.-L., Rist, R. C. & Vedung, E. O., 1997. *Carrots, Sticks, and Sermons: Policy Instruments and Their Evaluation*. New Brunswick: Transaction Publishers.

Beunen, R., Duineveld, M. & Van Assche, K., n.d. *De performatieve macht van mislukking*, Wageningen: Wageningen UR.

Boerderij, 2013. Toerist botst met boer. *Boerderij*, 22 July.

Boerderij, 2014. Gezinsbedrijf van nu heeft geen toekomst. *Boerderij*.

Boerderij, 2017. *Bijna halvering veestapel noodzakelijk*. [Online]
Available at: <http://www.boerderij.nl/Home/Nieuws/2017/9/Bijna-halvering-veestapel-noodzakelijk-182938E/?dossier=179295&widgetid=0>

Boeren voor Natuur Twente. 2013. [Film]
Directed by Beeldtaal Filmmakers. s.l.: s.n.

Centraal Bureau voor de Statistiek, 2016. *Meer varkens en koeien per boerderij*. [Online]
Available at: <https://www.cbs.nl/nl-nl/nieuws/2016/44/meer-varkens-en-koeien-per-boerderij>
[Accessed 1 Mei 2018].

Centraal Bureau voor de Statistiek, 2016. *Op meeste boerderijen geen bedrijfsopvolger*. [Online]
Available at: <https://www.cbs.nl/nl-nl/nieuws/2016/47/op-meeste-boerderijen-geen-bedrijfsopvolger>

Daalhuizen, F., van Dam, F., Piek, M. & Sorel, N., 2008. *Plattelandsontwikkeling en de*

gevolgen voor het landschap, Rotterdam: NAI Uitgeverij.

Daugstad, K., Rønningen, K. & Skar, B., 2006. Agriculture as an upholder of cultural heritage? Conceptualizations and value judgements - A Norwegian perspective in international context. *Journal of Rural Studies*, Volume 22, pp. 67-81.

de Bont, C. et al., 2003. *De melkprijs in beweging, Gevolgen van Europese zuivelhervorming voor de melkveehouderij*, Den Haag: LEI.

De Haan, M. & Zijlstra, J., 2008. *Melkveehouders over hun strategie in de komende jaren*, Wageningen: Animal Sciences Group Wageningen UR.

De Nederlandse Mesthoop. 2018. [Film]
Nederland: Nederlandse Publieke Omroep.

De Nederlandse Zuivel Organisatie, 2016. *The Netherlands: Land of Dairy*. s.l.:s.n.

Dirkx, I. G., 2007. Landbouw in Nationale Landschappen. *Landschap*, Issue 2, pp. 89-98.

Donkers, H., 1997. Een slimme boer bedenkt iets nieuws. *Atlas van het vernieuwend platteland*, 2 Mei, pp. 2-3.

Friesland Campina, 2017. *Interview Friesland Campina* [Interview] (18 December 2017).

Geels, F. W. & Schot, J., 2007. Typology of sociotechnical transition pathways. *Elsevier*, Volume 36, pp. 399-471.

Gerbrandy, A., 2016. Biologisch boeren goede keuze voor bedrijf. *Melkvee*, Issue 7, pp. 36-38.

Groeneveld, A., Peerlings, J., Bakker, M. & Heijman, W., 2016. The effect of milk quota abolishment on farm intensity: Shifts and stability. *NJAS - Wageningen Journal of Life Sciences*, 9 April, 77(2016), pp. 22-37.

Hammer, R. B., 2008. Recreation and Rural Development in Norway Nature versus Culture. *Scandinavian Journal of Hospitality and Tourism*, 8(2), pp. 176-186.

Helming, J. & Peerlings, J., 2002. *The Impact of Milk Quota Abolishment on Dutch Agriculture and Economy: Applying an Agricultural Sector Model Integrated Into a Mixed Input-Output Model*, Wageningen: s.n.

- Herud, G., 2017. What's gone wrong with New Zealand farming?. *NZ Farmer*, 8 August.
- Holmes, J., 2006. Impulses towards a multifunctional transition in rural Australia: Gaps in the research agenda. *Journal of Rural Studies*, 22(2006), pp. 142-160.
- Holmes, J., 2008. Impulses towards a multifunctional transition in rural Australia: Interpreting regional dynamics in landscapes, lifestyles and livelihoods. *Landscape Research*, 33(2), pp. 211-223.
- Jansen, M. A., 2005. *Agent-Based Modelling*. Arizona: School of Human Evolution and Social Change and Department of Computer Science and Engineering.
- Landschap Overijssel, 2017. *Interview Landschap Overijssel* [Interview] (19 December 2017).
- Leneman, H. & Schrijver, R., 2008. *Deelnamebereidheid agrarisch natuurbeheer bij stijgende landbouwprizen*, Den Haag: LEI.
- Leonard, B. et al., 2017. Policy drivers of farm succession and inheritance. *Land Use Policy*, 2017(61), pp. 147-159.
- LTO Noordoost-Twente, 2017. *Interview LTO Noordoost-Twente* [Interview] (11 December 2017).
- Maas, G. J. & Boers, J., 2010. *Goed boeren in een Nationaal Landschap*, Wageningen: Alterra.
- Municipality of Losser, 2018. *Interview Municipality of Losser* [Interview] (5 Februari 2018).
- Municipality of Oldenzaal, 2018. *Interview Municipality of Oldenzaal* [Interview] (13 Februari 2018).
- Natuurgebieden behouden en boeren; een lastige combinatie?*. 2017. [Film] Directed by RTV Oost. s.l.: RTV Oost.
- Natuurmonumenten, 2017. *Interview Natuurmonumenten* [Interview] (13 December 2017).
- Neven, K., Sauter, M. & de Haan, H., 2008. *Wonen aan de rand van het landschap*. Wageningen - Borne: Wageningen Universiteit leerstoelgroep Sociaal-ruimtelijke Analyse - Programmabureau De Groene Poort Borne .
- Nieuwsuur, 2017. Ruim 400 boeren in verzet tegen verplichte slacht melkkoeien. *Nieuwsuur*, 12 may.
- NOS, 2013. Kleine boeren verdwijnen. *NOS*, 18 July.
- Overijssels Agrarisch Jongeren Kontakt, 2017. *Interview Overijssels Agrarisch Jongeren Kontakt* [Interview] (18 December 2017).
- Pegge, B., 2017. *Essay for FNP-24306, Governance for Forest, Nature and Biodiversity. Balancing between culture and nature*, Wageningen: Wageningen University.
- Programmasecretariaat Gebiedsontwikkeling Noordoost-Twente, 2012. *Gebiedsvisie Noordoost-Twente*, Zwolle: Provincie Overijssel.
- Provincie Overijssel, 2017. *Interview Provincie Overijssel - Leisure Economy* [Interview] (19 December 2017).
- Provincie Overijssel, 2017. *Interview Provincie Overijssel - Spatial department* [Interview] (17 December 2017).
- Regiegroep Natura 2000, 2017. *Wat is Natura 2000?*. [Online]
Available at:
<http://www.natura2000.nl/pages/wat-is-natura-2000.aspx>
- Riens et al, 2003. *Melkveehouderij op schaal; Nieuwe concepten voor grootschalige melkveehouderij*, Wageningen: Alterra.
- R. N. e. W. T., 2018. *Interview Rabobank Noord en West Twente* [Interview] (9 Januari 2018).
- RTV Oost, 2017. Landbouwsector staat onder druk, vooral veehouders in Overijssel stoppen ermee. *RTV Oost*, 20 March.
- Staal, T., 2017. Recreatieve sector in Twente zit in de lift. *Tubantia*, 25 March, p. 3.
- Swagemakers, L., 2014. Het gezinsbedrijf. *BNDR - Nederlands Agrarisch Jongeren Kontakt*, pp. 4-5.
- Teeuwen, J. & Voskuilen, M., 1998. *Agrotoerisme, goed boeren of niet?*, Den Haag: Landbouw-Economisch Instituut.
- Twente Marketing, 2018. *Interview Twente Marketing* [Interview] (10 Januari 2018).

Twente, 2017. *Dat kan dus allemaal in Twente*.
[Online]
Available at: <http://www.visittwente.nl/>

van der Ploeg, J. D., 2008. *The New Peasantries*. London: Earthscan.

Wilson, G. A., 2007. *Multifunctional Agriculture - A Transition Theory Perspective*. Wallingford: CAB International.

Wittenberg, E., 2016. Gelukkig de boer die nog een opvolger vindt. *NRC.nl*, 8 March.

W. V., 2017. *Interview Waterschap Vechtstromen* [Interview] (20 December 2017).

Appendix

Appendix 1 - Interview format (in Dutch)

Details interview	
Datum	
Tijd	
Locatie	
Details geïnterviewde	
Naam	
Functie	
Bedrijf	
Email	

Beste,

Mijn naam is Brigit, ik studeer ruimtelijke planning aan de Wageningen Universiteit. Ik schrijf mijn master thesis over het toekomstige landgebruik en de landinrichting voor het traditionele gezinsbedrijf met melkvee in Twente. Het doel van dit interview is om de maatschappelijke verwachting te achterhalen voor 2030 ten opzichte van het landgebruik en de landinrichting in Twente. Alvast bedankt voor het helpen met mijn onderzoek!

Dit interview zal ongeveer 30 minuten duren, in het begin vraag ik een paar diepgaandere vragen, daarna zal u een enquête van mij krijgen. Gaat u akkoord met het opnemen van het interview? Uw identiteit zal niet worden genoemd in het rapport, en zal anoniem blijven.

Algemene vragen:

1. Wat vindt u het meest karakteristiek aan het Twentse platteland?
2. Waarom is dit landschap zo geschikt voor melkveehouderij op basis van het gezinsbedrijf?
3. En wat zijn de nadelen?
4. Wat is uw definitie van een gezinsbedrijf?
5. Welke rol speelt uw organisatie in het beheren en behouden van het landschap?
6. En in de toekomst?
7. Welke middelen zou uw organisatie in kunnen zetten om het landschap te behouden? (subsidies, wet en regelgeving, vrijwilligers)
8. Wat denkt u van schaalvergroting in Twente?
9. Zouden waardevolle natuur en landschap meer of minder plek moeten krijgen in Twente? Waarom?
10. Zouden we moeten proberen om meer toeristen naar Twente te krijgen? Waarom?
11. Hoe denkt u dat het landschap er uit zal zien in 2030, en welke plek neemt het melkvee-gezinsbedrijf daarin in?
12. Is dat ook Uw eigen ideaalbeeld?
13. Wat denkt u dat de balans in hectares zal zijn van functies zoals natuur, landbouw en het stedelijke gebied?
14. Op welke wijze belemmeren of bevorderen wet- en regelgeving het bestaan van gezinsbedrijven in de melkveehouderij?
15. Hoe ziet u de balans in hectares in 2030 voor u?

Vragen voor boeren:

1. Hoe zal uw boerderij er uit zien in 2030? (*bedrijfstype, boerderij zelf, erf*)
2. Waarom bent u boer geworden?
3. Heeft u het gevoel dat uw bedrijf een gezinsbedrijf is?
 - a. Waarom?
4. Denkt u dat uw boerderij in de toekomst (nog) een gezinsbedrijf is?
5. Welke landschappelijke waarden van uw land vindt u het belangrijkste om te behouden voor volgende generaties?
6. Heeft u houtwallen op uw percelen?
7. Wat als een houtwal tussen uw percelen ligt?
8. Wat is het bouwjaar van uw boerderij?
 - Bouwjaar deel 1
 - Bouwjaar deel 2
 - Bouwjaar deel 3
 - Bouwjaar deel 4
 - Bouwjaar deel 5
 - Bouwjaar deel 6.....
9. Beschouwt u uw boerderij (enkel de gebouwen) als karakteristiek, en een meerwaarde voor het landschap?
10. Is een ander soort ras van uw veestapel een optie voor de toekomst? (Vleesvee in plaats van melkvee)
11. Andere veestapel: schapen, kalverhouderij, enz.?
12. Is het een optie om in de toekomst nog boer te zijn, maar geen melkveehouder?

Appendix 2 – Questionnaire farmers (in Dutch)

1. Heeft u een opvolger?
 - a. Ja
 - b. Nee
 - c. Weet ik nog niet

 2. Wat is uw leeftijd?
 - a. 20-30
 - b. 30-40
 - c. 40-50
 - d. 50-60
 - e. 60-70
 - f. 70+

 3. Heeft u alleen koeien?
 - a. Ja
 - b. Nee namelijk...

 4. Hoeveel jongvee in de leeftijd van 0 tot 1 jaar heeft u in totaal?

.....

 5. Hoeveel jongvee in de leeftijd van 1 tot 2 jaar heeft u in totaal?

.....

 6. Hoeveel jongvee ouder dan 2 jaar heeft u?

.....

 7. Hoeveel melkkoeien heeft u?

.....

 8. Hoeveel hectare heeft u in eigendom?

.....

 9. Wat is daarvan de verdeling:
 - a. Kunstweide: .. hectare
 - b. Permanent grasland: .. hectare
 - c. Mais: .. hectare
 - d. Natuur: .. hectare
 - e. Overig: .. hectare (namelijk..)

 10. Hoeveel hectare pacht u?

.....

 11. Wat is daarvan de verdeling:
 - a. Kunstweide: .. hectare
 - b. Permanent grasland: .. hectare
 - c. Mais: .. hectare
 - d. Natuur: .. hectare
 - e. Overig: .. hectare (namelijk..)
-

12. Doet u aan beweiding van de melkkoeien?
- a. Ja
 - b. Nee
13. Doet u aan beweiding van droge koeien/pinken?
- a. Ja
 - b. Nee
14. Is uw bedrijfsvoering
- a. Gangbaar
 - b. In omschakeling
 - c. Biologisch
 - d. Biologisch-dynamisch
15. Wat is uw gezinssamenstelling? (indien antwoord a, ga direct door naar vraag 17)
- a. Alleenstaand
 - b. Samenwonend zonder kinderen
 - c. Samenwonend met kinderen
 - d. Samenwonend met ouders
16. Helpt de familie mee op het bedrijf?
- a. Ja, dagelijks
 - b. Nee, nooit
 - c. Ja, soms
17. Heeft u naast uw boerderij nog andere inkomsten? (geen nevenactiviteiten)
- a. Ja, 1 gezinslid werkt elders
 - b. Ja, 2 gezinsleden werken elders
 - c. Ja, 3 gezinsleden werken elders
 - d. Nee
18. Heeft u nevenactiviteiten op uw boerderij? (Denk aan camping, open rust punt, zorgboerderij, beautyboerderij)
- a. Ja, namelijk..
 - b. Nee
19. Heeft u mensen in dienst?
- a. Nee, 0 fte
 - b. Ja, 0.5 fte
 - c. Ja, 1 fte
 - d. Ja, 1.5 fte
 - e. Ja, 2 fte
 - f. Ja, 2.5 fte
 - g. Ja, 3 fte
 - h. Ja, 3.5 fte
 - i. Ja, 4+ fte
20. Maakt U gebruik van loonwerkbedrijven?
- a. Nee
 - b. Ja voor ploegen,
 - c. Ja voor kunstmest uitrijden
 - d. Ja voor oogsten mais
 - e. Ja voor mest uitrijden
 - f. Ja, grasmaaien

- g. Ja voor grasbalen
 - h. Ja, anders
21. Hoeveel generaties zit de boerderij al in uw familie? (u bent 1 generatie)
- a. 1 generatie
 - b. 2 generaties
 - c. 3 generaties
 - d. 4 generaties
 - e. 5+ generaties
22. Hoe ver is het naar het dichtstbijzijnde gelegen Natura 2000 gebied?
- a. 0-5km
 - b. 5-10km
 - c. 10-15km
 - d. 15+
23. Welke waarden vindt u het belangrijkste?
- a. Houtwallen
 - b. Openheid van het landschap
 - c. Boerderij op zich
 - d. Verspringing in het landschap
 - e. ..
 - f. ..
 - g. ..
 - h. ..
 - i. ..
 - j. ..
24. Maakt u gebruik van groen/blauwe diensten? *(Zelf ook even goed de definitie nagaan; wat is verschil met agrarisch natuurbeheer; zie ook de vraag over beheersovereenkomsten)*
- a. Nee, ken ik niet
 - b. Nee, bewuste keuze
 - c. Nee, maar wil ik nog wel graag
 - d. Ja
25. Maakt u gebruik van een natuurgebied?
- a. Ja, hooi
 - b. Ja, weidegang jongvee
 - c. Nee
 - d. Nee, maar zou ik wel graag willen
26. Heeft u natuurbeheersovereenkomsten afgesloten voor delen van Uw land?
- a. Ja, voor xx ha, type xxx natuurbeheer
 - b. Nee
27. Maakt u gebruik van andere subsidieregelingen?
- a. Ja, namelijk..
 - b. Nee
28. Overweegt U eventueel om te schakelen op biologische productie?
- a. Nee
 - b. Ja, om economische overwegingen
 - c. Ja, om milieu- en landschapsoverwegingen
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d. Ja, andere overwegingen, namelijk

