



History and outlook for dairy farming in the Netherlands, based in part on six individual cases

Study for Variety to Fit the Future congress of European Dairy Farmers in the Netherlands



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Dit onderzoek is uitgevoerd door Wageningen Economic Research in opdracht van de Nederlandse afdeling van European Dairy Farmers.

Dit rapport beschrijft de ontwikkeling van de Nederlandse melkveehouderij vanuit het verleden tot nu toe en tevens een aantal eerder uitgevoerde toekomstverkenningen. Aan de hand van cases van 6 Nederlandse EDF-leden worden een aantal individuele toekomststrategieën beschreven en worden lessen hieruit getrokken. De rapportage rondt af met opties voor ontwikkelingsrichtingen voor de korte en lange termijn en meer algemene tips hoe individuele melkveehouders hun toekomstige strategie uit kunnen stippelen.

This report describes the development of Dutch dairy farming from the past to the present and also a number of previously conducted futures studies. Based on case studies of 6 Dutch EDF members, a number of individual future strategies are described and lessons learnt. The report concludes with options for development directions for the short and long terms and more general tips on how individual dairy farmers can map out their future strategy.

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P.O. Box 29703, 2502 LS The Hague, The Netherlands, T +31 (0)70 335 83 30, E communications.ssg@wur.nl, <http://www.wur.eu/economic-research>. Wageningen Economic Research is part of Wageningen University & Research.



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Preface

The Network of European Dairy Farmers is organising its congress in 2024 in the Netherlands. There have been many developments in Dutch dairy farming in recent years. This prompted the Dutch organisers of the congress to ask for an overview of past developments in dairy farming, based on studies already carried out and on 6 cases of Dutch EDF dairy farmers.

A special word of thanks goes first of all to the 6 dairy farmers who cooperated in this study by sharing the ins and outs of their strategy. In addition, a word of thanks is in order for the supervisory group of this project consisting of Henk Schoonvelde (Chairman EDF Netherlands), Frans Keurentjes, Marijn Dekkers (Rabobank) and Jan van Beekhuizen (Aeres University of Applied Sciences).



Ir. O. (Olaf) Hietbrink
Business Unit Manager Wageningen Economic Research
Wageningen University & Research



Summary

S.1 Main points from historical developments in dairy farming

Structure and size

Dairy farming in the Netherlands is characterised by a long period of gradual increases in scale and intensification. The number of farms decreases by 3-4% per year. The production from the farms that stop is so far always taken over by continuing farmers. Overall, the economic result in income per unpaid labour unit remains the same over the whole period. This means that the increase in scale has been necessary to maintain income at this level.

Sustainability and manure

Manure policy has been in play for a long time. The first application standards for animal manure and the first objective around ammonia emission reduction (-70%) were introduced more than 35 years ago. Sustainability has started to play an increasing role. In the beginning, the focus was mainly on manure (nitrogen and phosphate), later broadening to animal welfare, climate and biodiversity. In 2019, the court ruled that the policy on ammonia that was in place was not in line with EU regulation and had to be replaced by a different policy. This resulted in a lot of ambiguity for dairy farmers and tightening of the policy. The new policy included buy-out schemes to stimulate farmers to leave the sector. The new policy still needs to be fleshed out to a large extent. The gradual phasing out of the derogation from 2024 to 2026 means that many dairy farms will have to dispose of (extra) manure, which means high additional costs.

See Chapter 2

S.2 Main points from a number of future oriented studies for Dutch dairy farming

For the short term (up to 4 years), the economic effects of the loss of the derogation (lower manure application standards) and the introduction of buffer strips with the associated manure disposal costs play a very big role for many farms. For a fair number of farms, survival will be at stake in the short term. So a key question is, how do I survive this period?

For the medium term (2030-2035), several studies show that all the targets and tasks (nitrogen, climate, manure) seem impossible to achieve without shrinking the total livestock population. The extent of the shrinkage needed is not really clear. A negotiation agreement from the government with several organisations from the sector mentioned 30%. This agreement was however not finalised. The studies also show that increase in scale of dairy farms will continue. Whether farms will become more intensive or more extensive/more nature-inclusive in the medium term depends on specific incentives from policy and possibly the market. Without specific steering, (gradual) intensification will continue.

If we look at the long term and at the total food system and all its challenges, this will involve a different type of dairy farming than the current one. The principles that go with this are:

- Dairy farming is focused on utilising grass and residual streams and converting them into high-quality humane food.
- Dairy farming minimises the use of feedstuffs grown far away and/or on land that is also suitable for growing humane food.
- Dairy farming is animal dignified. This includes allowing the animal to exhibit its natural behaviour.
- Dairy farming makes a positive contribution to (restoring) biodiversity.

See Chapter 3

S.3 Main points from the strategies of 6 Dutch EDF dairy farmers

From 6 Dutch EDF farms, the strategy was portrayed. The farms are not representative of Dutch dairy farming. The 6 farms vary in size from 215 to 365 cows, while the average Dutch dairy farm has a size of about 110 dairy cows.

Table S.1 Summary of the strategy of the 6 EDF farms

Farm	Characteristics Strategies
Van der Zijl	100% focus on dairy farming, focus on good technical performance (15/20% best performing farms). Exploit opportunities from new dairy barn with solid manure production. Make farm available for research (peat oxidation and ammonia and methane emissions).
Abma	Continue the 'Keep it simple' farm management, continue combination of keeping cows indoors and high fresh grass utilisation through in barn fresh grass feeding. Further increase in scale, do what needs to be done in terms of sustainability (comply with preconditions).
Stokman	Continue combination of milk and energy production through mono manure digestion, stay ahead in terms of low environmental impact of milk, increase scale, use new technology. Seek new partnerships with colleagues and other companies.
Holtrop	Further expansion of acreage (more land-based), continue to combine dairy farming with nature management and farm recreation, focus on economic result over technical results.
Dinkelman	Maximum utilisation of mono manure digester (2024) with biogas production, manure separator and nitrogen stripper (RENURE). Further increase in scale, focus on good technical performance (top 25% best performing farms economically)
Kalmthout	Still searching for a strategy for the future. The combination of the wishes/requirements from the government, the high land prices in the region and the lack of support for technical solutions create too much uncertainty at the moment to make clear choices for the future.

Are the farms future-proof?

The farmers were asked whether they think they are ready for the future, first generally and then specifically focusing on a number of themes: derogation/extensification expiration, climate challenge, nitrogen/ammonia,

biodiversity, animal welfare/animal dignity, future market demand, economic/financial. One entrepreneur indicates that he is not yet ready for the future. The remaining five give positive answers in different variants.

How are they tackling it?

In general, these farmers are really in the lead in developing the strategy themselves. They really invest time to orientate themselves to developments in the environment. A large part of the group makes budget calculations for their plans themselves or at least makes sure they fully understand the budgets if they are made by the advisor. The focus of the majority of the group is to be among the best performers. The group also tries to look further ahead than she short term issues. For some of the farms the current high manure disposal costs are challenging, but they try to avoid this becoming a guiding factor in long-term decisions.

See Chapter 4

S.4 How do I make the right choice for the future as a dairy farmer?

Continue the line from the past?

The regular path in the past was scaling up and gradual intensification. It is important to realise that this is basically a process without end. This is also known as Cochrane's treadmill. Technology enables rise in productivity, which in turn leads to increase in scale. This is a continuous process where the strongest companies survive and the rest quits. So by definition, this path is ultimately successful for a relative small number of farms.

Short- and medium-term strategy

For many farms, short-term survival is key, especially due to high manure disposal costs. This is not necessarily the time to make big strategic decisions. A strategy that fits well in a highly uncertain environment is 'Wait & See'.

For the medium term, various studies broadly indicate the following development directions:

-
1. High-productivity/high-tech: technology is deployed to increase productivity and reduce emissions.
 2. Nature-inclusive/regenerative. Nature production plays an important role and is also part of the overall earning model. The farm is extensive, the focus is on making use of natural processes, uses as few external inputs as possible, the soil gets a lot of attention.
 3. Cooperation dairy/agriculture. Cooperation as a means to close the nutrient cycles as much as possible.
 4. Dairy farming and diversification. Dairy farming is combined with other activities such as recreation or care.

To make a choice about one's future strategy, it is essential to make a good analysis. This starts with yourself as an entrepreneur: why are you a dairy farmer and what are your skills? Next, it is important to get a good picture of the trends in the environment, both in the immediate surroundings and in the market and society. The strengths and weaknesses of your initial situation (structure and performance) help determine your options. From these building blocks, a choice of an appropriate strategy follows.

The appropriate business model for the long term

As indicated in S2, the long-term challenges call for an adjusted type of dairy farming. A dairy farming industry that operates within 'the safe and just' space. This requires a different farm model and also a different business model. It is difficult to develop this model from the existing situation; it is important to work more 'outside-in'. What are the societal demands and wishes and how can they be translated into a business and revenue model? An approach that fits this well is the approach of business model innovation.

A concrete idea that emerged during the implementation of the study was to create a platform where the demanders (citizens with wishes) and the providers (dairy farmers) can be brought together to arrive at transactions. Who will pick this up?

See Chapter 5

Samenvatting

S.1 Hoofdpunten uit historische ontwikkelingen in de melkveehouderij

Structuur en omvang

De melkveehouderij in Nederland kenmerkt zich door een lange periode van geleidelijke schaalvergroting en intensivering. Het aantal bedrijven neemt per jaar met 3-4% af. De productie die wegvalt bij de stoppende bedrijven wordt tot nu steeds door de blijvers overgenomen. Het economisch resultaat in inkomen per OAJE¹ blijft globaal bekeken over de gehele periode gelijk. Dit betekent dat de schaalvergroting nodig is geweest om het inkomen op dit niveau te houden.

Duurzaamheid en mest

Het mestbeleid speelt al gedurende lange tijd. De eerste gebruiksnormen voor dierlijke mest en de eerste doelstelling rond reductie van ammoniakemissie (-70%) zijn meer dan 35 jaren geleden geïntroduceerd. Duurzaamheid is een steeds grotere rol gaan spelen. In het begin lag de nadruk met name op mest (stikstof en fosfaat), later werd dit verbreed naar dierenwelzijn, klimaat en biodiversiteit. In 2019 is het tot dan toe ingezette beleid rond ammoniak door een rechter afgekeurd. Dit heeft geresulteerd in veel onduidelijkheid voor melkveehouders en aanscherping van het beleid. Dit houdt onder andere in dat er opkoopregelingen zijn ingesteld, het beleid moet voor een belangrijk deel nog concreet worden ingevuld. De geleidelijke afbouw van de derogatie van 2024 tot en met 2026 zorgt ervoor dat veel melkveebedrijven (extra) mest af moeten gaan zetten.

Zie hoofdstuk 2

S.2 Hoofdpunten uit een aantal toekomstverkenningen voor de melkveehouderij

Voor de korte termijn (tot 4 jaar) spelen met name de economische effecten van het vervallen van de derogatie en de invoering van bufferstroken met de bijbehorende mestafzetkosten voor veel bedrijven een zeer grote rol. Voor een behoorlijk aantal bedrijven zal het op de korte termijn om overleven gaan, hoe kom ik deze periode door?

Voor de middellange termijn (2030-2035) laten meerdere studies zien dat het geheel aan doelen en opgaven (stikstof, klimaat, mest) niet gehaald lijkt te kunnen worden zonder krimp van de veestapel. De omvang van de benodigde krimp is niet echt duidelijk. In het landbouwakkoord werd 30% genoemd. De studies laten ook zien dat de schaalvergroting door zal gaan. Of bedrijven op middellange termijn intensiever of juist extensiever/meer natuurinclusief gaan worden hangt af van de concrete prikkels vanuit het beleid en eventueel de markt. Zonder specifieke sturing gaat de (geleidelijke) intensivering door.

Als naar de lange termijn wordt gekeken en naar het totale voedselsysteem en alle opgaven die daarbij horen, dan hoort daar een aangepaste melkveehouderij. De uitgangspunten die hierbij horen zijn:

- De melkveehouderij is gericht op het benutten van gras en reststromen en zet deze om in hoogwaardige humane voeding.
- De melkveehouderij maakt zo weinig mogelijk gebruik van voedermiddelen die ver weg worden geteeld en/of op land dat ook geschikt is voor de teelt van humaan voedsel.

¹ OAJE is onbetaalde jaareenheid. Dit is de ingebrachte gezinsarbeid omgerekend naar volledige arbeidskrachten

- De melkveehouderij is dierwaardig. Dit houdt onder andere in dat het dier zijn natuurlijke gedrag kan vertonen.
- De melkveehouderij levert een positieve bijdrage aan (het herstel) van biodiversiteit.

Zie hoofdstuk 3

S.3 Hoofdpunten uit strategieën voor melkveehouders

Van 6 Nederlandse EDF-bedrijven is de strategie in beeld gebracht. De bedrijven zijn niet representatief voor de Nederlandse melkveehouderij. De 6 bedrijven variëren in omvang van 215 tot 365 koeien (zie tabel S.1), terwijl het gemiddelde Nederlandse melkveebedrijf een omvang heeft van ongeveer 110 melkkoeien.

Tabel S.1 *Samenvatting van de strategie van de 6 bedrijven*

Bedrijf	Kenmerken strategieën
Van der Zijl	100% focus op melkveehouderij, sturen op goede technische prestaties (15/20% best presterende bedrijven). Kansen van nieuwe melkveestal met vaste mestproductie gaan benutten. Bedrijf beschikbaar stellen voor onderzoek (onder andere veenoxidatie en ammoniak- en methaanemissies).
Abma	'Keep it simple'-bedrijfsvoering voortzetten, combinatie van opstallen en hoge versgrasbenutting door zomerstalvoeren voortzetten, verdere schaalvergroting, qua duurzaamheid doen wat moet (voldoen aan randvoorwaarden).
Stokman	Combinatie melk- en energieproductie door monomestvergisting voortzetten, Voor blijven lopen op gebied van lage milieu-impact van melk, schaalvergroting, inzet op nieuwe technologie. Nieuwe samenwerkingen zoeken met collega's en andere bedrijven.
Holtrop	Verdere uitbreiding areaal (meer grondgebonden), blijven combineren van melkvee met natuurbeheer en boerderijrecreatie, sturen op economisch resultaat boven technisch resultaat.
Dinkelman	Maximaal benutten van in 2024 in gebruik genomen monomestvergister met biogasproductie, mestscheider en stikstofstripper (productie RENURE). Verdere schaalvergroting melkveetak, sturen op goede technische prestaties en daarmee tot top 25% economisch best presterende bedrijven behoren.
Kalmthout	Nog zoekend naar een strategie voor de toekomst. De combinatie van de wensen/eisen vanuit de overheid, de hoge grondprijzen in de regio en het ontbreken van draagvlak voor technische oplossingen geven teveel onzekerheid op dit moment om tot duidelijke keuzes voor de toekomst te komen.

Zijn de bedrijven toekomstproof?

Aan de ondernemers is gevraagd of ze denken klaar te zijn voor de toekomst. Eerst algemeen en vervolgens specifiek ingezoomd op een aantal thema's (vervallen derogatie/extensivering, klimaatopgave, stikstof/ammoniak, biodiversiteit, dierenwelzijn/dierwaardigheid, de marktvraag van de toekomst, economisch/financieel). Één ondernemer geeft aan nog niet klaar te zijn voor de toekomst zoals uit tabel S.1 al blijkt. De overige 5 geven in verschillende varianten een positief antwoord op de vraag.

Hoe pakken ze het aan?

Over het algemeen zijn de melkveehouders echt zelf in de lead in de ontwikkeling van de strategie. Ze investeren echt tijd om zich te oriënteren op de ontwikkelingen in de omgeving, ondanks dat dit niet als echt werk wordt gezien. Een groot deel van de groep rekent zelf aan hun plannen of zorgt er in ieder geval voor het rekenwerk goed te snappen. De focus van het gros van de bedrijven richt zich op het horen bij de best presterende bedrijven. De groep probeert ook verder vooruit te kijken, de korte termijn met bijvoorbeeld de hoge mestafzetprijzen is voor meerdere bedrijven lastig, maar ze proberen te vermijden dat dit leidend wordt in de lange termijn beslissingen.

Zie hoofdstuk 4

S.4 Hoe kom ik als melkveehouder tot de juiste keuze voor de toekomst?

Lijn uit het verleden voortzetten?

De reguliere weg in het verleden was schaalvergroting en geleidelijke intensivering. Het is belangrijk om te beseffen dat dit in feite een proces zonder eind is. Dit wordt ook wel Cochrane's treadmill genoemd. Technologie maakt stijging van productiviteit mogelijk; dat leidt weer tot schaalvergroting. Dit is een continu proces waarbij de sterkste bedrijven overleven en de rest afvalt. Deze weg is dus per definitie uiteindelijk voor weinig bedrijven weggelegd.

Strategie voor de korte en middellange termijn

Voor veel bedrijven draait het voor de korte termijn om overleven, met name door de hoge mestafzetkosten. Dit is niet per se het moment om grote

strategische beslissingen te nemen. Een strategie die goed past bij een zeer onzekere omgeving is 'Wait & See'.

Voor de middellange termijn worden in diverse onderzoeken globaal de volgende ontwikkelrichtingen aangegeven:

1. Hoogproductief/high-tech: technologie wordt ingezet om de productiviteit te verhogen en emissies te reduceren.
2. Natuurinclusief/regeneratief. Natuurproductie speelt een belangrijke rol en maakt ook deel uit van het totale verdienmodel. Het bedrijf is extensief en de focus ligt op het benutten van natuurlijke processen. Het bedrijf gebruikt zo weinig mogelijk externe inputs en de bodem krijgt veel aandacht.
3. Samenwerking melkvee/akkerbouw. Samenwerking als middel om de kringlopen zo veel mogelijk te sluiten.
4. Melkveehouderij en verbreding. De melkveehouderij wordt gecombineerd met andere activiteiten zoals recreatie of zorg.

Voor het maken van een keuze voor de eigen toekomststrategie is het essentieel een goede analyse te maken. Die begint bij je zelf als ondernemer: waarom ben je melkveehouder en wat zijn je vaardigheden? Vervolgens is het belangrijk om de trends in de omgeving goed in beeld te krijgen, zowel in de directe omgeving als in markt en maatschappij. De sterke en zwakke punten van je uitgangssituatie (structuur en prestatie) zijn mede bepalend voor je mogelijkheden. Vanuit deze bouwstenen volgt een keuze voor een passende strategie.

Het passende bedrijfsmodel voor de lange termijn

Vanuit de opgaven voor de lange termijn wordt zoals in S2 is aangegeven een andere melkveehouderij gewenst. Een melkveehouderij die opereert binnen een 'safe and just' ruimte. Dit vraagt om een ander bedrijfsmodel en ook om een ander verdienmodel. Het is lastig om dit model vanuit de bestaande situatie te ontwikkelen, het is zaak om meer van buiten naar binnen te werken (outside – in). Wat zijn de maatschappelijke eisen en wensen en hoe zijn die te vertalen naar een bedrijfs- en verdienmodel? Een aanpak die hier goed bij past is de aanpak van business model innovation.

Een concreet idee dat tijdens de uitvoering van het onderzoek naar voren kwam, was om tot een platform te komen waar de vragers (burgers met maatschappelijke wensen) en de aanbieders (melkveehouders) bij elkaar gebracht kunnen worden om zo tot transacties te komen. Wie pakt dit op?

Zie hoofdstuk 5



1 Reason for and design of the study

European Dairy Farmers organises its congress in the Netherlands in 2024. European Dairy Farmers is a network of dairy farmers from Europe, aimed at exchanging ideas experiences and knowledge from farmer to farmer. Within the network, the Netherlands has been looked at with astonishment in recent years, partly because of the images of tractors on the highway of protesting farmers. What is going on over there? And is there any future for dairy farming in the Netherlands?

This prompted the EDF Netherlands board to ask the following questions.

1. Make an analysis of developments in dairy farming from the past and (based on existing research) into the future. The aim is to get a picture of where Dutch dairy farming is coming from and what are the key challenges and opportunities for the future.
2. Inspire, stimulate and support dairy farmers and conference visitors to think carefully about a suitable development direction for their own farms.

This research is limited in scope. This means, for example, that no quantitative analyses or model calculations have been carried out. For the first question, results of previous research has been used. Past developments are presented in Chapter 2. Chapter 3 discusses a number of studies focused on the future of dairy farming in particular.

For the second question, we worked together with six dairy farmers from the Dutch EDF network. These farms differ in their current farm set-up and future strategy. From WUR, we supported these dairy farmers to get their strategy on paper in a structured way. Again, no calculations were made for this section. These 6 examples serve as inspiration and not as a blueprint. Four of them are also excursion farms during the congress, which means that congress visitors can enter into a conversation with them about the content and background of their future vision. Chapter 4 discusses the six examples, including some findings that emerged in particular from the process with these entrepreneurs. In Chapter 5, these findings are combined with results of previous research to outline a number of possible development directions and tools for dairy farmers to develop their own strategic plan.

The report focuses on dairy farming in the Netherlands. However, future developments in dairy farming cannot be viewed completely separately from other sectors and from the future development of the entire food system and developments abroad.



2 Dairy sector developments from the past

2.1 Dairy sector as part of the whole Dutch agricultural sector

Dutch agriculture consists of almost 51,000 farms. Dairy farms account for the largest share of this (13,597), followed by arable farms (12,921), other grazing livestock farms (8,238) and open-ground horticulture farms (5,689), intensive livestock farms (especially pigs and poultry: 4,880), greenhouse horticulture and mushroom farms (2,794) and combined farms (2,847). The number of farms is steadily decreasing.

The total cultivated area is 1.8m ha, of which 1.1m ha is grassland and cut maize. The cultivated area is decreasing by about 0.3% per year. The Netherlands has a total of 3.8m cattle, of which 1.57m are dairy cows and 0.98m are young cattle for milk production. The rest are beef and pasture cattle (0.2m) and veal calves (1.0m). In addition, there are 11.2m pigs and 97.5m chickens ([Staat van landbouw, Natuur en Voedsel](#), 2023). The combination of animal numbers and the area of cultivated land makes the Netherlands an intensive country. On average, the Netherlands comes out at 3.4 livestock units per ha. The average for the EU as a whole is 0.7. Belgium ranks 3rd in terms of intensity with 3.2 and Denmark 5th with 1.6 LU/ha ([EU Eurostat](#)), the other countries in the top 5 are small countries such as Malta.

Overall, the agrocomplex contributes about 6.7% to gross domestic product with an added value of 57bn euros. Part of the activities of the overall agrocomplex are related to the processing of imported agricultural raw materials, such as cocoa, cereals, soy and tobacco. The value added of the agrocomplex based on the processing of foreign agricultural raw materials is around 2.8% of GDP; that of the agrocomplex based on domestic agricultural raw materials has been around 4% for the last five years and reached 3.9% (around 33bn euros) in 2021 ([Staat van landbouw, Natuur en Voedsel](#), 2023).

2.2 Development until 2019: from focus on productivity to increasing preconditions around manure and sustainability

To properly place the current situation in dairy farming, it is useful to look back; how has the sector developed and what were important milestones that influenced its direction of development. The development up to 2019 is outlined, followed by a more detailed of the last five years. The overview is by no means complete.

After World War II, policy focused on improving agricultural productivity. This was done first at the national level and later from the European Union. This had several goals: securing the national and European food supply, improving incomes in agriculture and, more generally, improving the economy and prosperity by increasing labour productivity in agriculture to free up labour for other sectors of the economy. Introduction of a protected market and technology (cubicle stalls, cutting maize, breeding) combined with supportive subsidies led to specialisation and economies of scale.

In the 1970s, it became clear that this development was going to lead to a number of bottlenecks. The cost of EU pricing policy was rising too high and environmental impacts were also increasingly coming into focus. In 1984, the European Union introduced milk quotas. In 1987, the Animal fertiliser Use Decree set rules for the use of animal manure through phosphate. Relative to

current standards, these were still high.² In the Agricultural Structure Memorandum (Structuurnota Landbouw, 1989), the concept of sustainable agriculture was introduced. This memorandum and the Nature Policy Plan (Natuurbeleidsplan, 1989) included concrete targets for emission reductions (including -70% ammonia) and for nature to be realised (50,000 ha) and areas of agriculture with management agreements (100,000 ha).

In 1991, the EU Nitrates Directive was introduced. The aim of the directive is to reduce nitrogen losses to groundwater and surface water. The starting point is that the use of animal manure for vulnerable areas is in principle limited to 170 kg N per ha, deviation from this is possible with good justification. From 2006, the Netherlands has been using such a derogation which allowed the use of up to 250 kg N from animal manure on grassland. In 2000, the EU Water Framework Directive came into force, aimed at improving water quality in Europe. The directive contains agreements to ensure that by 2027 at the latest, water in all European countries is sufficiently clean and healthy (EU, 2017).

From around 2000, there has been a clear broadening of sustainability themes in dairy farming. This is not only initiated by the government but also from in the chains and partly through a collective approach of Sustainable Dairy Chain (Duurzame Zuivelketen). One component of this collective approach is that data is exchanged and streamlined within the sector. This has resulted in all dairy farms in the Netherlands having insight into their mineral cycle, nitrogen and phosphate surpluses and their carbon footprint.

As of 1 April 2015, the milk quota system ended. On 2 July 2015, the introduction of a system of phosphate rights was announced because the Netherlands was going to exceed the phosphate ceiling. In effect, this replaced the milk quota with phosphate quota. Also in 2015, the Programmatic Approach Nitrogen (PAS) was launched as the basis for ammonia policy. Briefly, the idea was that space for activities that cause nitrogen deposition (including dairy farming) could be issued because emission-reducing measures were taken in parallel to ensure that, overall, deposition was reduced.

² For grassland 250 kg phosphate and for maize land 350 kg phosphate per ha from animal manure, the current standards are 75 and 40 kg phosphate respectively for soil phosphate state high.

2.3 2019-2024: Starting with climate agreement and from nitrogen crisis to manure crisis

In May 2019, the Council of State states that the Programmatic Approach to Nitrogen violates the EU Habitats Directive. This resulted in the nitrogen crisis. Dairy farmers who had used this approach for their permit (so-called PAS reporters) saw the basis under that permit expire. In practice, this means that activities must be shown not to cause (additional) nitrogen deposition on a nature reserve. This applies to a dairy farm, but also to other activities, such as house construction, which involve nitrogen emissions. For dairy farming, low-emission floor systems play an important role in reducing nitrogen deposition. However, a court ruling concluded that there is insufficient evidence that these low-emission floor systems actually result in lower emissions in practice.

In July 2021, the Nitrogen Reduction and Nature Improvement Act came into force. As an objective, this act states that by 2035, 74% of the nitrogen-sensitive Natura 2000 areas must be brought below the critical deposition value (KDW). The implementation of this law takes shape in the Nitrogen Reduction and Nature Improvement Programme and the National Programme for Rural Areas (NPLG). The NPLG is not only about nitrogen/ammonia, but here several goals come together including goals from the Water Framework Directive, the Nitrates Directive and climate policy. Broadly speaking, the approach consists of (1) buy-back schemes, (2) incentivising emission-reducing measures and (3) conversion/innovation.

These announcements led to great unrest and large farmers' protests. Following those protests, former minister Johan Remkes was appointed as discussion leader. This led to a number of recommendations to the government.

In the manure policy, the government states that it aims for land-based dairy farming (2021, 2022). This land-based dairy farming should be achieved within 10 years and is translated into that all manure produced can be placed on the own farm or nearby. The 7th action programme (2021, with a supplement in early 2022) included several additional measures, including the establishment

of buffer strips of 2-5 metres along water bodies. Specifically for stream valleys on sandy soils, the establishment of 100-250-metre-wide buffer strips was suggested.

In September 2022, it was announced that the derogation will be phased out in the period from 2023 to 2026. This means that the use of animal manure will go back from a maximum of 250 kg N per ha to a maximum of 170 kg N per ha.

In June 2019, the climate agreement was concluded. The central goal of the climate agreement was to reduce national greenhouse gas emissions by 49% by 2030 and to be climate neutral by 2050. In June 2022, the level of ambition was raised to 55% as a minimum and 60% emission reduction as a target. This also included specific targets for agriculture. Specifically, the climate agreement refers to the peat meadow area, where a target has been agreed for 1m tonnes of CO₂ emissions less. This will have to be achieved mainly by increasing water table levels. The Netherlands has also committed to the global methane pledge, with a target reduction of 30%.

In November 2022, the Minister of Agriculture, Nature and Food Quality indicated that he wanted to reach an agricultural agreement (landbouwakkoord) with all parties involved, partly based on the advice of the Remkes Committee. The agricultural agreement did not eventually materialise, but the negotiations were well advanced and are expected to help guide future policy. The draft agreement indicates that it is a choice between innovation, extensification, conversion, widening, relocation or abandonment. In terms of approach, there is much emphasis on accountable target management (via a KPI system to an Accountable Substance Balance at farm level). In addition, efforts would be made to secure technology and farmers and market gardeners would have access to long-term independent guidance. Budget was also available for this approach, part specifically for buyouts (6.7bn euros, of which 5bn for dairy cattle) and over 6bn for subsidies, innovation and research and guidance. Additional budget was also available for 200,000 ha of additional ANLb (nature) budget (0.6bn). In total, the indicative budget came to 13.5bn euros.

The draft agricultural agreement provides an overview of a number of challenges ahead, including those related to ammonia (41% reduction of ammonia emissions in 2030 compared to 2019), climate (both for emissions and storage), water and biodiversity. The earning model also receives attention

within the draft agreement; here, among other things, it is discussed that ecosystem services, for which farmers are rewarded, should be considered a structural part of the earning model. In terms of measures, the draft agreement talks about management measures, technological measures and ecosystem services. This is in addition to system innovation and reducing the number of livestock whether or not in combination with land depreciation. The agreement talks about 25-30% shrinkage, partly by buy-out schemes and partly through skimming phosphate right transactions.

In November 2023, there were elections to the Dutch parliament. A new outline cabinet agreement was agreed in May 2024. Among other things, this agreement states that it aims to adjust a number of European directives, including the removal of the maximum amount of nitrogen from livestock manure of 170 kg/ha and the reduction of buffer strips.

2.4 Structure and economy dairy sector

In the 1970s and early 1980s, the number of cows increased steadily to over 2.5m in 1984. With the introduction of milk quotas, the number of dairy cows initially decreased rapidly and later gradually to about 1.4m in 2007. With the gradual widening of the milk quota and its eventual abolition in 2015, the number of cows first gradually and then relatively quickly increased to 1.7m in 2016.

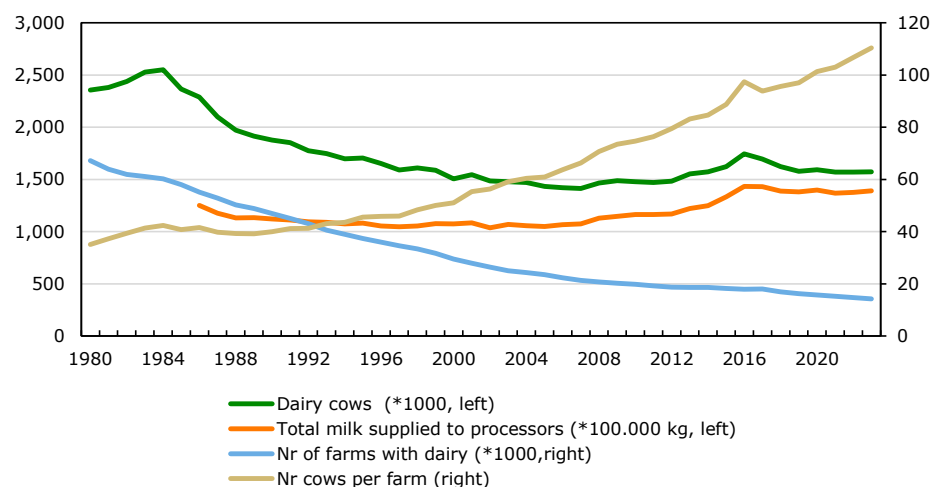


Figure 2.1 Development of the number of farms with dairy cows, number of cows total, number of cows per farm and total milk supplied to processors
Source: CBS³.

With the introduction of the phosphate reduction plan and phosphate rights, the number of cows then decreased again to just under 1.6m in 2023.

The number of farms with dairy cattle shows a steady downward trend. Whereas in 1980 there were about 63,000 farms with dairy cattle, in 2020 there were about 14,250. The average farm size in 1980 was 35 cows, this has increased to 110 cows in 2023. Immediately after the introduction of milk quotas, the size of the average farm remained broadly the same. From around 1990, the average size gradually increased with a clear acceleration towards the end of milk quotas. The introduction of phosphate rights creates a kink in the graph. The rise in average farm size continues thereafter.

The total volume of milk delivered to the dairy fluctuated between 10 and 11bn kg for many years, eventually increasing gradually from 2008 to over 14.3bn kg in 2017 before decreasing slightly to 13.9bn kg.

³ Milk delivered to processors until 1995 estimated on the basis of number of dairy cows and milk production per cow with an adjustment for the proportion delivered to factory

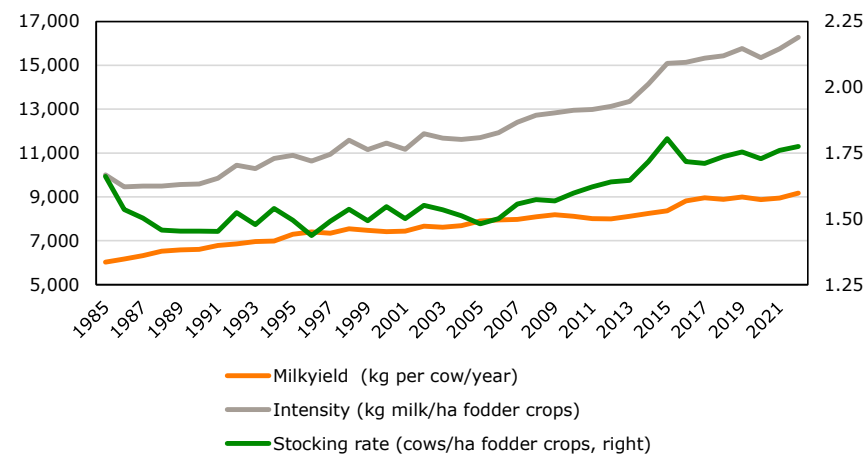


Figure 2.2 Development milk yield per cow, milk production per hectare of foddercrops and stock density in cows per hectare
Source: FADN Wageningen Economic Research.

To illustrate the development of technical results, Figure 2.2 shows the development of milk production per cow. It has increased from almost 6,020 kg per cow per year in 1985 to almost 9,200 kg per cow per year in 2023. If you compare the beginning with the end, the stocking density expressed in dairy cows per hectare of forage has remained the same (around 1.75). First, livestock density fell to around 1.5 dairy cows per ha to rise to over 1.8 towards the end of milk quotas before levelling off. Due to the rise in milk production per cow, milk production per hectare of fodder has increased over this period from almost 9,500 kg of milk per ha around 1990 to over 16,250 in 2023. Young cattle stocking rates have declined markedly since the introduction of phosphate rights.

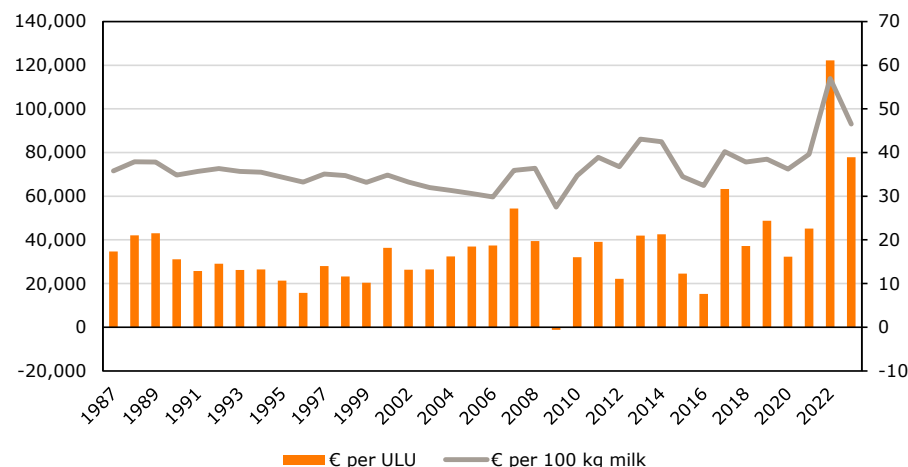


Figure 2.3 Development of milk price and income per Unpaid Labour Unit (ULU)

Source: FADN Wageningen Economic Research.

The milk price in 1987 was €35.81 per 100 kg. In 2023, the milk price was €46.50. Especially from 2006 onwards, larger fluctuations occur in the milk price. These greater fluctuations are related to changes in EU policy, which also makes the European dairy market more exposed to fluctuations in the world market.

The dairy farmer's income expressed in € per unpaid labour unit (ULU) was at a level of about € 35,000 in 1987 and showed a downward trend until about 2000. Fluctuations in milk prices are a major cause of fluctuations in income. These fluctuations are significant with a low point in 2009 with an average negative income to a peak year (2022) with an average income per ULU of around €122,000. This income is mainly based on cash flows, if we look at the operating result where the costs for all own labour and equity are included then the result becomes negative in most years over this period.

Figure 2.3 shows the average income, it is important to note that there are large differences between individual farms.

Dairy farming sustainability

In (Dutch) dairy farming, there are several themes at play. The manure policy initially focused mainly on phosphate and later more on nitrogen. For both, the underlying objectives are related to water quality and impact on nature.

Themes at play are:

- Nitrogen/phosphate (nutrients)
- Biodiversity
- Climate
- Water quality
- Animal welfare
- Land use/manure market balance
- Grazing
- Antibiotic use

2.5 Main lines developments in the past

Structure of the dairy sector

- Dairy farming in the Netherlands is characterised by a long period of gradual increases in scale and intensification. This is partly due to the availability of technology that enables the increase in scale.
- The number of farms decreases by 3-4% per year. The production that falls away from the quitting farms is so far always taken over by the stayers.
- Overall, the economic result in income per Unpaid Labour Unit remains the same over the whole period. This means that the increase in scale has been necessary to maintain income at this level.
- If all costs for own labour and capital are also taken into account, the net result is usually negative. There are apparently enough dairy farmers who are satisfied with these economic results.
- Total milk production in the Netherlands was limited by the national milk quota for a long time. The gradual widening of the milk quota resulted in more milk. The introduction of the phosphate quota resulted in dairy farmers keeping fewer young cattle and generally striving for higher milk production per cow. As a result, national milk production has increased despite the phosphate reduction plan. So far, the limiting factor in total milk production

has always been policy restrictions: until 2015 by the milk quota system and after that by the phosphate quota system.

- The area of forage crops (mainly grass and silage maize) is gradually decreasing.

Sustainability and manure

- Manure policy has been in play for a long time. The first application standards for animal manure were introduced more than 35 years ago. The first objective around ammonia emission reduction (-70%) was formulated 35 years ago.
- Sustainability has played an increasingly important role. In the beginning, the focus was mainly on manure (nitrogen and phosphate), later broadening to animal welfare, climate and biodiversity.
- Cooperation within the sector, including through Sustainable Dairy Chain, has led to all individual dairy farmers having insight into the nutrient flows and nitrogen, phosphate and ammonia losses on the farm and their carbon footprint via the Kringloopwijzer.
- At farm level, nitrogen and phosphate losses per hectare fell sharply. Nitrogen surplus per ha fell rapidly in the period from 2nd half of the 1990s until around 2003. After that, the surplus decreased only slightly. For the phosphate surplus, the decline started in the same period, but continued for longer. In recent years, the phosphate surplus has fluctuated around 0 kg per ha.
- At sector level the total nitrogen excretion from the dairy herd fell from over 380m kg of nitrogen to just under 254m in 2012, before rising again towards 270m kg. The nitrogen ceiling was 281.8m kg, this is slightly higher in 2024, but is expected to be reduced to around 258m kg in 2025. Total phosphate excretion by livestock declined from about 103m kg of phosphate to 76m in 2012 before rising again to almost 93m in 2015 and falling again to about 77m in 2022. The sector ceiling was 84.9m kg of phosphate and is getting lower, probably towards 66.3m kg in 2025 (Reijs, 2024).

- Grazing. The share of farms with outdoor grazing showed a steady downward trend until around 2015. From 2015, the share of farms with outdoor grazing increased again.
- Climate. The carbon footprint at sector level increased around the end of the milk quota system due to the growing herd.
- Climate: For several years now, the carbon footprint per kg of milk has been falling.
- In 2019, the policy on ammonia deployed up to that point was rejected by court. This has resulted in a lot of ambiguity for dairy farmers. So far, buy-out schemes have been put in place., It has been announced that emissions from (dairy) livestock farming need to be sharply reduced, the concrete details of the policy are still lacking.
- The gradual phasing out of the derogation from 2024 to 2026 means that many dairy farms will have to export (extra) manure to e.g. arable farmers.



3 Results of a number of future studies

3.1 Introduction

What does the future of dairy farming look like in the Netherlands? A number of fairly recent studies have looked at this. The studies differ in purpose and horizon. This chapter gives a brief summary of a number of studies. First, we look at two recently conducted studies that calculated the effects of the expiry of the derogation and the NPLG policy. We then turn to a number of studies focusing on the somewhat longer term (2030, 2035).

3.2 Impact of NPLG policy and loss of derogation

The report *Uitwerking bedrijfstypen voor duurzame landbouw* (Jongeneel, 2024) calculated the effects of the objectives of the National Programme for Rural Areas (NPLG) with regard to ammonia, biodiversity, water and climate action packages. The calculations were made for 9 types of farms, varying in soil type, herd size and intensity.

First, the effect of the expiry of the derogation was calculated, including the construction of buffer strips, lowering of user standards and the change in GLG allowances. At a manure disposal price of €11 per m³, the average income effect was € -26,996, ranging from - €15,916 to - €43,070.

These calculations were based on a manure disposal price of €11 per m³. This was significantly higher in the last winter (2023/2024). Therefore, additional calculations were made with manure sales prices ranging from €20 to €35 per m³. On average, this resulted in an additional average effect of about -€3,000 to -€15,000 per farm.

For the total package of measures, the effects become larger. The package of measures differs per farm type and is based on a combination of development paths (high-tech open, extensification, organic and nature-inclusive), degree of extensification (from 1.0 - 2.5 gve/ha), the implementation of extensification (shrinking animals or leasing land), dairy herd expansion (none or + 20%) and the extent to which additional measures contribute to the NPLG targets for ammonia and greenhouse gases (light, heavy). Depending on the measure package (high tech/light package, high tech/heavy package or extensification/light package, extensification heavy package), the effect on income ranges from - €20,173 to - €42,981 on average across all farm types.

The reduction in greenhouse gas emissions varies across packages from 16 to 43% and the reduction in ammonia emissions from 20 to 43%.

The following two main conclusions are drawn in the report. First, substantial additional emission reductions can be achieved with additional measure packages. The emission reductions from the measure packages are such that, when added to the reductions already achieved through the identified measures, they certainly approach (or even go beyond) what is stated as tasking. Secondly, the measure packages place a heavy burden on the incomes and profitability of dairy farms and also arable farms. For dairy farms, the income losses found (measured against income in the current situation) range from 28 to 201%. These are such that in a whole number of cases farm continuity is seriously threatened in the absence of adequate flanking policies.

3.3 Scenario study dairy sector 2030

In 2020, the study *The Dutch Dairy Farming in 2030* was carried out. This study developed a microeconomic model to calculate how the number of dairy farms, the number of dairy cows and the volume of milk in the Netherlands will develop

towards 2030. The model takes the current economic situation of individual dairy farms in the Netherlands as a starting point and calculates how Dutch dairy farms will develop under different economic and policy conditions.

The base scenario can be seen as the expected development of Dutch dairy farming at the current knowledge of intended policy (2020) and continuation of past behaviour. The basic scenario assumes that farms with a relatively young entrepreneur (<52 years in 2018) and/or successor will grow in size if all necessary obligations are met within the cash flow. Nitrogen policy has only been included in this to a limited extent; the budget for the buyout scheme, for example, is limited to €675m.

Three exploratory scenarios were then defined and calculated:

1. In scenario 1 (Nature-inclusive), the basic assumption is that a widely supported societal trend towards more nature-inclusive dairy farming with specific requirements arises. This is modelled, among other things, through the introduction of a sub-stream of nature-inclusive milk, a change from CAP premiums to payment through eco-schemes, additional revenues from private parties for nature-inclusive farming, and a requirement that growth can only take place on a land-bound basis.
2. In scenario 2 (Dedicated Free Market), just the opposite is true. The world needs reliable, cheap and efficiently produced food. Requirements for grazing and biodiversity disappear because consumers cannot and will not pay for them in a generic sense. This is modelled, among other things, via a lower yield price and the elimination of requirements for land-based growth.
3. Scenario 3 (Return on Investment And Social Demands) can be seen as a counterpart to the base scenario for how dairy farmers view their farms. In this scenario, dairy farmers start making more demands on income and returns from the farm. Some of the entrepreneurs use the investment space to invest in other branches. It also stops a group of entrepreneurs who are doing well financially on their own but see more opportunities for returns elsewhere.

Table 3.1 shows the results of the scenarios.

Table 3.1 Projected sector size, characterisation of the average farm and the financial position in 2030 under different exploratory scenarios in relation to the base case and the baseline

Reference		Initial situation 2018	Basic scenario 2030	Exploratory scenarios 2030		
				Nature Inclusive	Dedicated Free Market	Return on Investment And Social Demands
Size of the sector	Number of farms	15,987	10,659	10,115	7,508	7,776
	Milk production (bn kg)	14.08	14.58	14.25	14.19	12.74
	Number of dairy cows (million)	1.61	1.48	1.47	1.43	1.29
Characterisation of average farm	Cows per farm	101	139	145	190	165
	Milk per cow	8,748	9,851	9,718	10,139	9,907
	Cows per ha	1.85	1.98	1.79	2.39	2.02
Economy	Proportion of farms able to make all replacement investments	31	27	29	21	19

Source: Beldman (2020).

In the baseline scenario, the number of farms with dairy cows in 2030 is reduced by about 33% compared to 2018 (10,659 farms remaining) and milk production increased by 4% (14.6bn kg of milk). The total number of dairy cows is 1.48m animals in 2030 according to this scenario. The average farm has grown in size from 101 to 139 dairy cows and in intensity from 1.85 to 1.98 dairy cows per hectare. Milk production per cow has increased to an average of 9,850 kg per year.

All three exploratory scenarios lead to a further decrease in the number of farms due to more economic quitters than in the baseline scenario. In the Nature Inclusive scenario, this is mainly because the total returns from milk money and CAP do not change, but are only distributed differently across the total sector. In Dedicated Free Market, companies mainly run into problems due to the structurally lower milk price. In the more focus on Return on Investment and

Social Demands scenario, there is less available to invest due to higher withdrawals from the farm. In addition, dairy farmers make choices other than 'growing in milk' such as investing in other branches or voluntarily quitting to do something else. Under both the Dedicated Free Market scenario and Return on Investment and Social Demands scenario, there is a real chance that phosphate rights will not be fully milked and total milk production will fall because there is insufficient financial room (Dedicated Free Market) and/or need (Return on Investment and Social Demands) to grow at the sector level. All three formulated scenarios lead to larger farms on average than in the baseline.

The intensity of farms differs significantly between the scenarios. In Dedicated Free Market, farms are on average clearly the largest (190 dairy cows) and most intensive (2.4 cows per ha). In the Nature Inclusion scenario, farms increase in size more on average than in the baseline scenario because fewer farms remain and therefore the remaining farms grow faster. However, the farms are on average significantly more extensive (1.8 cows per ha) than in the baseline scenario and the share of remaining farms that can make all replacement investments is slightly higher. In this scenario, differences between farms are large.

3.4 Impact climate policy targets 2035

In the study Beleidsscenario's voor klimaatmitigatie in landbouw en landgebruik, policy scenarios were prepared that provide insight into the potential for GHG emission reductions from the agriculture and land use sector in 2035. The four scenarios are: 1) reference based on established policy, 2) government steering alone, pessimistic in terms of estimation of effectiveness and implementation, 3) government steering alone optimistic in terms of estimation of effectiveness and implementation and 4) scenario 3 with additional steering on reducing emissions and sequestering carbon by business and other societal stakeholders.

The results for livestock and acreage development are shown in Table 3.2.

Table 3.2 Overview of livestock and land use acreage development in the scenarios in 2035

	2020	Scenario 1 (2035)	Scenario 2 (2035)	Scenario 3 (2035)	Scenario 4 (2035)
Dairy cows	1.593m	-7%	-18%	-27%	-27%
Pigs	5.536m	-9%	-36%	-50%	-50%
Layers	43.437m	+1%	-26%	-43%	-43%
Broilers	44.324m	-5%	-21%	-34%	-34%
Grassland	977,538 ha	-4%	0%	+1%	+1%
Corn	195,756 ha	-10%	-32%	-41%	-44%
Arable land	641,269 ha	-5%	-5%	-4%	-3%

Source: Lesschen (2023).

The results show that emissions from agriculture and land use could decrease by 14% to 39% in 2035. If this is compared with targets derived from the cabinet's 2022 coalition agreement, that target is met in scenarios 3 and 4, noting that the cabinet targets were aimed at 2030. Another conclusion is that a climate-neutral AFOLU sector is still a long way off.

The economic consequences of the scenarios are large due to the decrease in production volume, especially in livestock farming. This has significant implications for net value added. This loss is greater in supplying and processing industries than in primary agriculture. The loss ranges from €5.4 billion to €8.5 billion per year. On the other hand, there are also benefits in the form of avoided environmental damage. This is calculated based on shadow prices and ranges from €1.6 to €2.8 billion, about 60% of which is related to lower ammonia emissions.

3.5 WUR Perspectives on Agriculture, Food and Nature

The WUR Perspectives on Agriculture, Food and Nature (WPAN) project has brought these and several other WUR studies together. One of the observations in the report is that we must move towards an agricultural and food system that operates within planetary boundaries and is based on a fair distribution of wealth ('Safe & Just Operating Space'). A well-known elaboration of this is Raworth's (2017) donut model, the essence of which is that human activities should simultaneously stay within planetary boundaries and ensure a fair distribution of wealth among current and future generations (Figure 3.1).

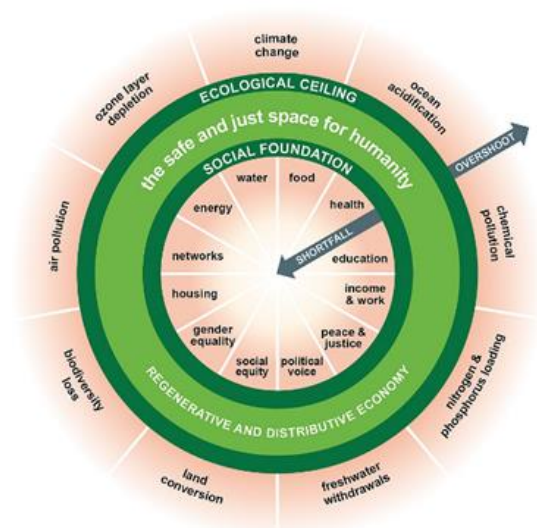


Figure 3.1 Raworth's donut model with the ecological ceiling on the outside and the socio-economic floor on the inside
Source: Raworth (2017).

Raworth plotted a number of countries in a graph on the two axes: the biophysical or planetary boundaries and the socio-economic threshold. In the

WUR report mentioned above, it is included in combination with desired or necessary directions of development (Figure 3.2).

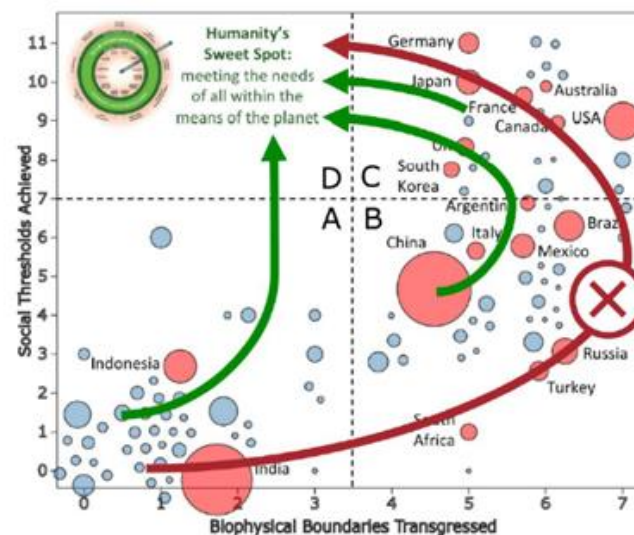


Figure 3.2 Position of different countries in relation to planetary boundaries and the socio-economic floor
Source: Figure taken from Bos et al. (2023), original figure from Raworth (2018).

As the figure shows, although industrialised countries such as Germany, the Netherlands and the United States of America have reached high levels of prosperity and well-being, this has been accompanied by a sharp overshoot of biophysical boundaries (quadrant C in the upper right). The development path we have seen in recent decades is from A, to B, to C and almost no development from C to D. This ABC path leads to increased human well-being, but also to a sharp overshoot of planetary boundaries.

One of the findings based on the analysis of several WUR studies was that a long-term vision is needed. A still growing world population will have to be fed in a sustainable way and the Netherlands can contribute to this because of good

entrepreneurship, good natural conditions (climate and soil) and a logistically favourable location. If not through primary production, then through knowledge, technology and starting materials. At the same time, we in the Netherlands are running up against the agricultural, ecological, economic and social limits of our agricultural system, which means we cannot automatically continue as before.

The researchers have identified 6 dilemmas. The choices we make as a society with regard to the dilemmas will help determine the future of agriculture, food and nature in the Netherlands.

Dilemma 1: How will the Netherlands contribute to the global food supply?

As one of the world's most innovative countries in the agriculture and horticulture sectors, and a major net exporter of agricultural and horticultural products, the Netherlands can play an important role in the global food supply. But how exactly do we want to contribute to the global food supply? Will we continue to prioritise the production and export of products, or will we become more focused on supplying propagation materials and on the export of technology, innovation, knowledge and overseas production, for example?

Dilemma 2: What is the purpose of animal husbandry in the Netherlands?

Will our animal husbandry sector continue to serve the European and global markets for high-quality proteins? Or will our animals become mere processors of grass and waste streams? In the latter scenario, we would stop importing fodder (soy, grain). This would lead to a reduction in our livestock population, and the surplus of manure would disappear. This would help us meet climate goals, but we would also need to alter our consumption patterns so that we consume less meat, and at the very least change the kind of meat we consume (see dilemma 6). Otherwise we will be exporting the climate impact.

Dilemma 3: What is the moral position of animals in our food supply?

What rights will we grant animals? To what extent may we exploit animals for our food supply, and under which conditions? What would a humane livestock sector look like?

Dilemma 4: How many of the future climate and nature goals do we want to achieve within the Netherlands?

The Netherlands has agreed to drastically reduce greenhouse gas emissions from agriculture and industry by 2050. How will the Netherlands compensate for its remaining emissions in order to become climate neutral? Furthermore, under the Biodiversity Convention, the Netherlands wants to introduce additional environmental policies, such as having 30% of its nature protected by 2030. Will the Netherlands plant lots of additional forests and designate nature reserves to meet both these goals, or will we, as a densely populated delta, trade climate and/or nature goals with other countries? For instance, it would be conceivable for the Netherlands (with its higher agricultural productivity) to trade goals with other countries in Europe or beyond (where there is more space for forests) in order to achieve climate, nature and food objectives together, at lower joint costs which can then be shared equitably. Or, given the urgency, do we just opt to maximise our own efforts to achieve climate and nature goals?

Dilemma 5: Agriculture and nature: sparing or sharing?

Separating ('sparing') land-based functions (e.g. nature reserves separate to high-yield agriculture) requires different measures and forms of spatial planning compared to integrating or 'sharing' them (nature-inclusive and regenerative agriculture), and also has different effects in terms of land use, local and global biodiversity, and productivity, for example. Should the Netherlands move towards a system where we protect nature reserves but conduct high-yield agriculture in other areas? Or are more extensive forms of agriculture combined with nature a better solution?

Dilemma 6: How do we manage consumer behaviour?

Do we continue to insist on relative freedom of choice in a market where adverse impacts on nature and the environment are not fully reflected in the price of food? Or will we restrict and influence consumer choice for the sake of nature and environmental goals while also combating social inequality and improving public health? In the latter scenario, consumers might pay a higher price for food that is bad for our health and has negative impacts on the environment and our living environment, while paying a lower price for healthy food that has positive impacts on the environment and our living environment. Would we need to make agreements on this at the EU level? And would supermarkets still be allowed to sell unsustainably produced foods? And to what

extent will we be limiting the choices available to the next generation if we do not formulate a food policy?

The dilemmas in conjunction

It is important to realise that the dilemmas are interrelated and that the room for manoeuvre for each dilemma individually is also not unlimited. International agreements, the position of the Netherlands in an economy with open borders and the many other claims on space in the Netherlands help structure which choices are more or less obvious. Based on the analysis conducted, the researchers therefore expect the following developments.

1. The Netherlands' greatest contribution to the world food supply can be made by concentrating even more than now on starting materials, technology and knowledge (dilemma 1) and placing less emphasis on production volumes.
2. It makes sense to focus livestock farming much more strongly than now on exploiting non-humane consumable raw materials and residual streams. We should make these much less dependent on primary livestock feed production on arable land in the rest of the world, than now (dilemma 2).
3. In conjunction with the previous point, active steering of our consumption pattern towards a plant-based, healthier and less polluting diet is necessary (dilemma 6).
4. Restoration of existing nature in the Netherlands follows from our international obligations, but is also in the interest of the Netherlands and agriculture.
5. In connection with the previous point, it seems wise for the Netherlands not to separate or intertwine nature and agriculture in black and white (dilemma 5).

3.6 What do these studies mean for the individual dairy farmer in the short, medium and long term?

For the short term, the economic effects of the expiry of the derogation and the introduction of buffer strips with their associated manure disposal costs play a very large role for many farms in particular. A possible imminent generic cut due

to exceeding the reduced phosphate ceiling and the intended policy around nitrogen and climate could also have very large economic effects for many farms. For a number of farms, in the short term it will be about survival - how do I get through this period?

For the medium term (2030-2035), several studies show that all the targets and tasks (nitrogen, climate, manure) seem impossible to achieve without shrinking the livestock population. The extent of the shrinkage needed is not really clear. The agriculture agreement mentioned 30%. If it is assumed that the policy goals remain intact, the size of the shrinkage will partly determine the remaining task for those staying put. Simply put: more shrinkage means a lower sustainability challenge for the stayers. Incidentally, it is important to note here that shrinkage also has significant effects on the supplying and processing companies, especially if it is realised in a very short time. The studies also show that economies of scale will continue. Whether farms will become more intensive or more extensive/more nature-inclusive in the medium term depends on specific incentives from policy and possibly the market. Without specific steering, (gradual) intensification will continue.

If we look at the long term and at the total food system and all its challenges, this will involve an adjusted type of dairy farming than the current one. The principles that go with this are:

- Dairy farming focuses on the utilisation of grass and other non-humane consumable raw materials and waste streams and converts them into high-quality human food.
- Dairy farming minimises the use of feedstuffs grown far away and/or on land that is also suitable for growing humane food.
- Dairy farming is animal dignified. This includes allowing the animal to display its natural behaviour. The essence of animal dignity is the recognition of the intrinsic value of the animal. This clearly goes beyond the 5 freedoms that are now mostly used as a starting point around animal welfare.
- Dairy farming makes a positive contribution to (restoring) biodiversity.

Incidentally, it is important to point out that much more needs to change than just dairy farming to achieve this long-term picture. This also requires changes in consumption patterns and policy, for example.

In the long term, the choices that will eventually have to be made by society as a whole around the aforementioned dilemmas will determine the desired development in the future. So it is also a good idea as a dairy farmer to delve into these dilemmas. They can also be used as a tool to check how robust your strategy is. If the choice falls one way or the other, what does that mean for your strategy. Does it fit within your strategy? And if not, do you have the room to accommodate it? In other words, how adaptive are you? The term survival of the fittest is often explained as if the fittest survives. But it actually means that the one who best fits the environment survives. So to properly define your strategy for the future, it is important to have a good understanding of what that environment looks like and will look like.



4

4 Strategies of 6 Dutch EDF dairy farms

4.1 Introduction

The previous chapters dealt with dairy farming in general. Ultimately, each dairy farmer has to make his own considerations and choices for the future. The individual consideration is different from the consideration at sector level. This also applies to the impact of, for instance, new government policy or requirements imposed by chains. The impact varies enormously per individual farm. An example is shrinkage of the livestock sector through government buyout schemes. For the sector as a whole, this leads to less milk and therefore loss of turnover and can also have major consequences for other parties in the chain (feed companies, dairy processors, etc). For the dairy farmer who was already planning to stop, a buyout scheme can be a great way to stop in a financially attractive way. For those who want to continue, it offers perspective in the sense that if there are enough quitters (and the production is not taken over by others), this leads to less pressure on the manure market and to a lower supply of milk, which in turn may lead to (somewhat) higher milk prices. This does not necessarily mean that this means there are prospects for everyone individually. For example, if you have an intensive farm in an area where there is little land for sale and the farm is surrounded by Natura 2000 areas, it is still a challenge to meet the wishes/requirements to achieve a substantial emission reduction and/or extensification.

In the coming chapters, we look at these individual strategies in particular. We do this firstly with the elaboration of the strategies of 6 Dutch dairy farms (3.2). Then, in a more general sense, we look at possible future strategies.

4.2 Strategies of 6 Dutch EDF dairy farmers

Within WUR, an approach has been developed in which an entrepreneur looks step by step at the various aspects that determine an appropriate future strategy (e.g. described in Beldman, 2013). Briefly, this involves the following elements:

- The **Entrepreneur**: what do you yourself want as an entrepreneur, what are your ambitions and what are your skills?
- The **Enterprise**: what is your starting situation, both in terms of business set-up and business performance (both financial and sustainability)?
- The **Environment**: as an entrepreneur, how do you see your environment. This is the environment in the broad sense, it concerns the immediate physical environment but also what is coming your way in terms of policy, what the market demands, what technological possibilities are coming, what your colleagues will do, etc.?

The skills and the enterprise are mainly about the current situation and the environment is about the future, what is coming up. The next step is the strategy. Which strategy fits the analysis you have made of the above-mentioned three Es. To facilitate this process, a tool is available with which the entrepreneur can score himself for the three Es on various aspects (self-assessment). The entrepreneur can then also enter his own score for what he thinks is the most appropriate strategy. The tool then compares the entrepreneur's score with a score calculated by the tool itself and shows where the differences are. In this way, the entrepreneur can perform another check on whether the strategy choice is appropriate. The result is an outline strategy and action plan for further elaboration and concretisation. Normally, this tool is used in a multi-day training programme with a facilitator, where both the facilitator and fellow participants critically observe and think along with the self-assessment and strategy choice. This happened earlier e.g. in the Rabobank Farm Succession training.

This approach was applied in a light form to 6 EDF dairy farms for the EDF congress. This was done without the training format, the tool was mainly used to get the strategy of the respective farms on paper in a structured way. The 6 farms were suggested by the EDF board. The approach to the selection was that there should be sufficient diversity within the group as well as that they should be sufficiently recognisable to the wider practice. The strategy is summarised in 2 pages. The participating farms are listed in Table 4.1.

Table 4.1 *The 6 EDF farms (farm characteristics from 2023)*

Farm	Location	Dairy cows (nr)	Area (ha)
Van der Zijl	Vegelinsoord	247	137
Abma	Jubbega	365	174
Stokman	Koudum	280	215
Holtrop	Delfstrahuizen	274	163
Dinkelman	Lochem	215	69
Van Kalmthout	Rucphen	341*	120*

*2022.

4.2.1 Jan and Sanne van der Zijl in Vegelinsoord

'We focus on what we do have influence over and try to do it as well as possible. That gives us job satisfaction and keeps us positive.'

Farm characteristics

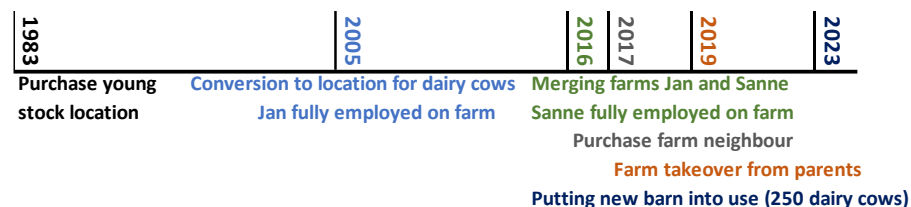
Jan and Sanne van der Zijl's farm is located on both peaty and sandy soil. The farm milks nearly 250 cows and has 137 ha of land in use. The VLOG (free of genetic engineering) milk produced is purchased by FrieslandCampina. Most of the work is done by Jan and Sanne with help from parents and casual labour from the neighbourhood. TMR is fed and a continuous grazing system (standweiden) is used. Continuous monitoring of ammonia and methane emissions takes place in the newly built barn, with primary manure separation and solid manure production.



Characteristics (2023)	Unit	Van der Zijl
Dairy cows	No.	247
Young stock < 1 year	No.	74
Young stock => 1 year	No.	68
Productive grassland	Ha	104.1
Nature grassland	Ha	5.4
Corn	Ha	23.8
Arable crops	Ha	3.2
Milk production	Kg total/farm	2,495,884
Milk production	Kg/cow	10,121
Intensity	Kg milk/ha foddercrops	18,282



Milestones



'Being a farmer is a wonderful profession! It is very versatile: being an entrepreneur, working with cows, nature and machinery and being outside a lot.'



Strengths and areas of attention

Strengths

- Family farm.
- New future-proof barn with reduction of ammonia and methane through primary manure separation and solid manure production.
- Favourable location in terms of province (Friesland is milk-rich) and large home plot.

Areas of attention

- Peat soil (peat meadow policy government).
- 1/3 of the land is leased (related to policy of land bound farming).

Entrepreneur and future strategy

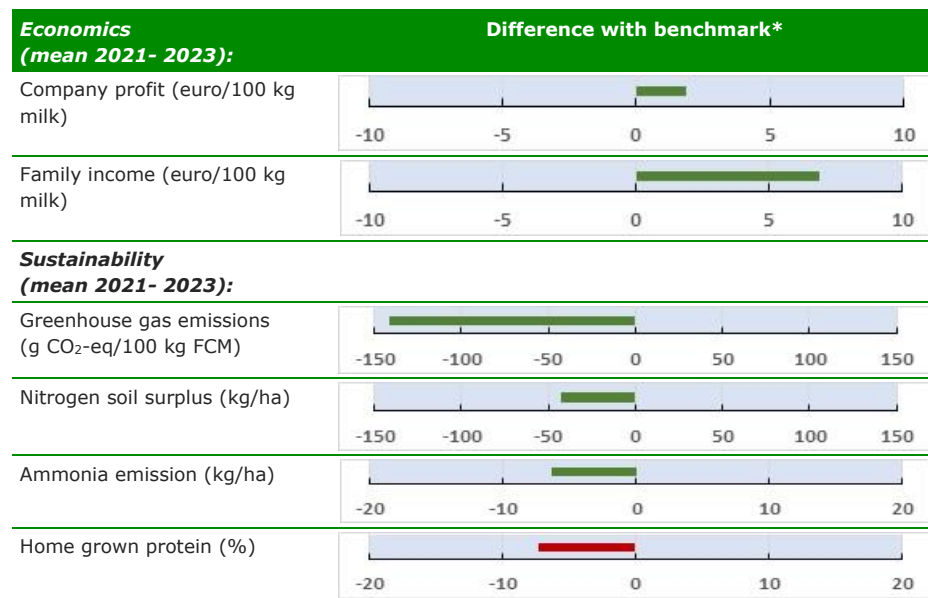
- Remain positive and enjoy working by focusing on issues where influence is possible. Keep looking and looking for the opportunities and possibilities instead of the obstacles.
- Operate technically well and therefore be among the 15-20% of farms with the best economic performance.
- 100% focus on dairy farming with the most important pillars being soil fertility, environment (emissions), animal welfare and cost price.
- Utilise the farm for research and knowledge development.

Actions in the coming period:

- New barn for 250 dairy cows in use by 2023, therefore mainly focus on optimisation on all facets of the farm.
- Realisation of new calf housing up to 6 months, taking into account a possible increase in the minimum age of calves to be removed.
- Make the farm available for research into peat oxidation and subsidence and for ammonia and methane emission measurements. In addition, research into different manure flows from the new barn and possibilities to use these as RENURE (in cooperation with WUR) to anticipate the consequences of the disappearance of derogation.

'Opportunities are created by gaining knowledge yourself. We see that we can sometimes earn more in the office than in the barn, but the work in the barn is more fun.'

Farm performance



* Benchmark economics is EDF average of the Netherlands, benchmark in sustainability is reference group (>75% peat, 17.5-20 tonnes of milk/ha) from KringloopWijzer.

4.2.2 VOF Abma Molkfeebedriuw in Jubbega

'We combine the strength of the Irish system of maximum grass utilisation, with the Danish system with all cows in stalls for efficiency to an overall keep it simple farm management.'



Farm characteristics

The farm of brothers Ruurd and Atze Abma is located in the province of Friesland. It keeps 365 dairy cows on over 167 ha of land (excluding 16 ha of natural land). The farm is characterised by a low-cost strategy, which manifests itself in a simple management where many things are left out. For example, very limited ration calculations are made and there are no concentrate feed stations or feed mixers for the dairy cows' floor. Management is based on the urea count. The herd is not grazed, but cows are given fresh grass in the barn. Many activities are done in-house. This applies, for instance, to animal-related matters such as claw care, artificial insemination and gestation checks, but also to the entire grazing and harvesting process, which is done in cooperation with another brother who runs another dairy farm. To keep a grip on the key figures, all administrative work is also done in-house.

Characteristics (2023)	Unit	Abma
Dairy cows	No.	365
Young stock < 1 year	No.	146
Young stock => 1 year	No.	151
Productive grassland	Ha	142.5
Nature grassland	Ha	16.2
Corn	Ha	24.9
Arable crops	Ha	0
Milk production	Kg total/farm	3,042,307
Milk production	Kg/cow	8,344
Intensity	Kg milk/ha fodder crops	18,174



Milestones

1988	2003	2009	2015/ 2016	2020	2023	2024
Moving farm to Jubbega 150 dairy cows	Enlarging land around the farm with 23 acres	Renting young stock location Purchase 15.2 acres		Stop renting young stock location Purchase farm Oudehorne 53 acres Splitting farm, Ruud en Atze location Jubbega, other brother location Oudehorne Farm take over location Jubbega Purchase 3,350 kg phosphate rights (2020 through 2022)	Repurchase 20 acres from lessor Purchase 12.8 acres	

'To everything we do we count and calculate ourselves. We want to get it right ourselves. This is what we base our decisions on.'



Strengths and areas of attention

Strengths

- Low costs through simple operations, doing a lot of work in-house and being sharp on all points.
- Own mechanisation in collaboration with other brother.
- High grassland production efficiently converted into milk by barn feeding.

Areas of attention

- Expensive inputs like land and production rights lead to high capital requirements.
- Available labour decreases due to phasing out father.

Entrepreneur and future strategy

Vision towards 2030:

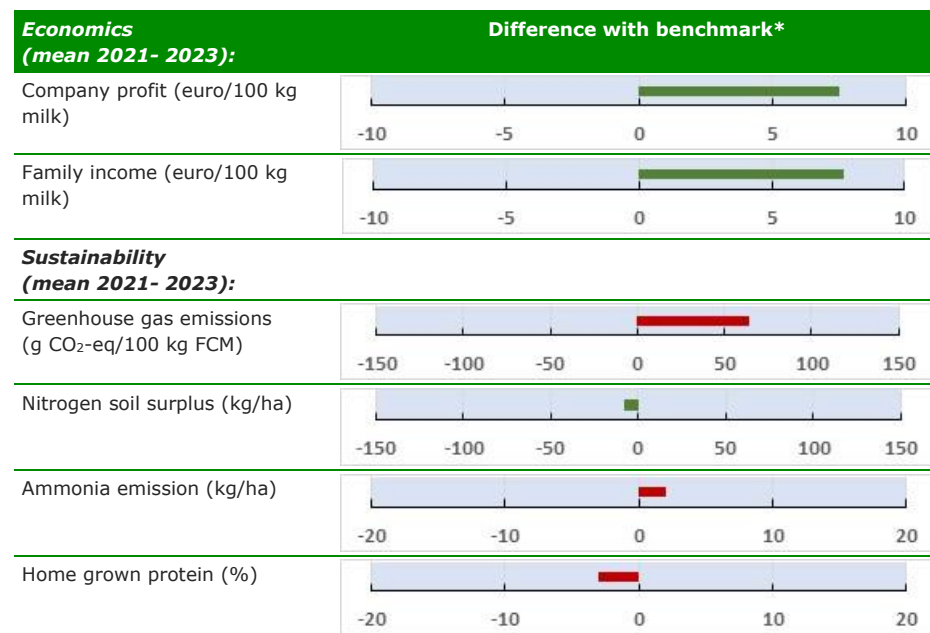
- Continuing to develop on the company's strengths.
- Trying to remain as flexible as possible.
- Monitor closely the upcoming sustainability demands and take concrete action if necessary.

Actions next period:

- Convert even more roughage into milk.
- Continuously explore developments e.g. regarding future requirements. Explore and calculate solutions for this. If the business case is correct, then implement. Exploratory studies on mono-manure fermentation and 'nitrogen crackers' have already been carried out recently.
- Explore possibilities for housing youngest calves, also in relation to possible animal welfare requirements.

'Hurry when you have time, then have time when you are in a hurry.'

Farm performance



* Benchmark economics is EDF average of the Netherlands, benchmark in sustainability is reference group from KringloopWijzer.

4.2.3 Firma Stokman in Koudum

'Discovering new opportunities takes time. As an entrepreneur, make sure you have that time and make room for this.'

Farm characteristics

The Stokman family's farm is located in the province of Friesland. For decades, the company has been continuously working on making the business more sustainable. This involves regular cooperation with other companies and organisations and the entrepreneurs are at the forefront of applying the latest technical innovations. 280 cows are kept in a self-designed integrally sustainable 'Free Choice Barn' on 215 hectares of land, of which almost 41 hectares of land with nature management by the Forestry Commission (Staatsbosbeheer). Since 2020, mono-digestion of manure has taken place and green gas is supplied to the village.



Characteristics (2023)	Unit	Stokman
Dairy cows	No.	280
Young stock < 1 year	No.	88
Young stock => 1 year	No.	80
Productive grassland	Ha	133,4
Nature grassland	Ha	40,6
Corn	Ha	37,4
Arable crops	Ha	3,8
Milk production	Kg total/farm	3,106,733
Milk production	Kg/cow	11,084
Intensity	Kg milk/ha foddercrops	14,443



Milestones

1996	2008	2013	2017	2020	2021	2022
Purchase of 2 milking robots From 80 to 120 dairy cows	Building 'Free Choice barn' with 280 cubicles Growth to 250 dairy cows in cooperation with neighbour	Purchase farm 25 acres	Purchase farm 28 acres	Building mono manure digester	Growth to 6 milking robots	Young stock back on farm

'Success is a failed failure. That success would not have been there if you had never tried anything.'



Strengths and areas of attention

Strengths

- Family business with highly motivated team.
- Integrally sustainable business with both milk and energy production.
- Entrepreneurs are broadly oriented, focused on opportunities.
- Partnerships with colleagues and other businesses.

Areas of attention

- High level of investment, including in land, puts pressure on cash flow.
- Technology and partnerships with others sometimes make them vulnerable.
- Working on many different projects simultaneously, therefore scattered attention and less opportunity to focus on one part.

Entrepreneur and future strategy

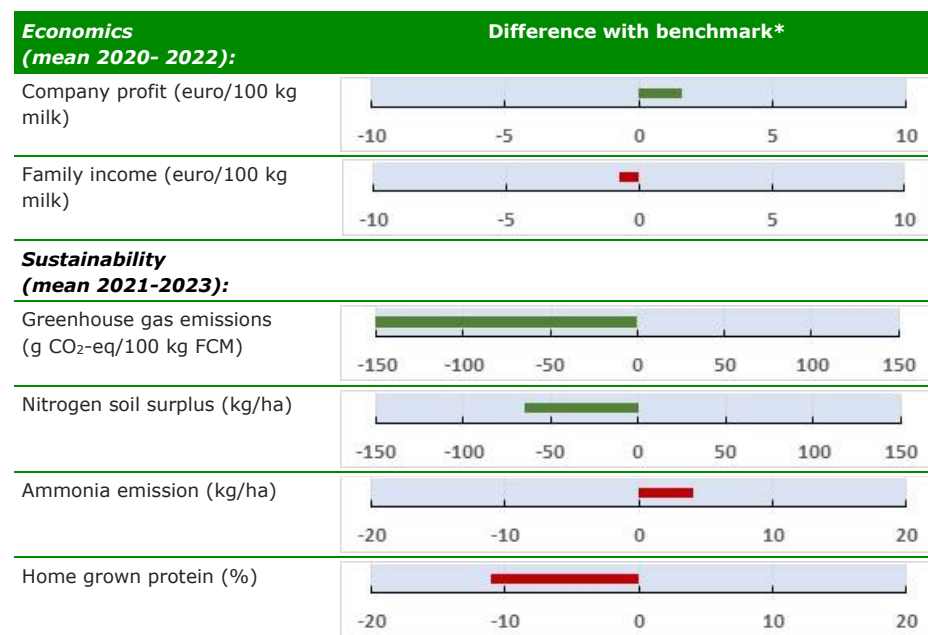
Vision towards 2030:

- Ensure positive energy and continue to enjoy being a farmer.
- Further reduce environmental impact of milk production to the lowest 5% in the world.
- Strengthen and build partnerships.

Actions in the coming period:

- Grow to 300 dairy cows.
- Increase energy production.
- Automatic fresh grass feeding in the barn with Lely Exos, which can also reduce greenhouse gas emissions.
- Explore possibilities for manure processing/production RENURE.
- Explore possibilities for new partnerships.

Farm performance



* Benchmark economics is EDF average of the Netherlands, benchmark in sustainability is reference group from KringloopWijzer

4.2.4 Maatschap Holtrop in Delfstrahuizen

'Criticism is the most valuable thing you can get because it helps you improve and develop further. That's why I like participating in study groups, for example.'

Farm characteristics

The Holtrop family's farm is located on mostly peatland in the province of Friesland. It milks 274 cows on more than 160 ha of land. Further expansion of the land area receives plenty of attention based on the vision that land-relatedness is becoming an important theme for dairy farming. Agricultural nature management is applied on about 40% of the acreage, combining milk production and nature management. Besides the dairy branch, there is also a recreational branch with 5,000 visitors a year.



Characteristics (2023)	Unit	Holtrop
Dairy cows	No.	274
Young stock < 1 year	No.	83
Young stock => 1 year	No.	58
Productive grassland	Ha	132.5
Nature grassland	Ha	0
Corn	Ha	30.2
Arable crops	Ha	0
Milk production	Kg total/farm	2,577,082
Milk production	Kg/cow	9,409
Intensity	Kg milk/ha foddercrops	15,845

Milestones

1978	1979	2003	2009	2013	2016	2020	2021	2023
Minne (8th generation) and Geeske started, 55 dairy cows		Son Theunis (9th generation) joins the partnership		Building silage clamps				
	Opening first cubicle barn			Purchase of farm neighbour (young stock location)				
	85 dairy cows	Building cubicle barn with 150 places		45 acres rented from neighbour				
				Building of rotary milking parlour (28 places) with waiting area, redesign of barn allowing more cubicles				
				Purchase of 50 acres sandy soil				

'I consciously make time for things other than daily work. This gives me space to see and seize opportunities that are out there. As a result, this free time actually makes money.'



Strengths and areas of attention

Strengths

- There has been a lot of expansion in land in recent years (purchase 50 ha of sandy land), which has made our farm more extensive. By 2024, another 55 ha of nature management land has been leased for at least six years. As a result, the farm is self-sufficient in roughage and no manure needs to be removed yet.
- There are several financially well-functioning side branches on the farm (recreation and nature management (through ANLb and eco scheme) which makes the financial dependence on the milk price less. The side branches are not at the expense of the result of the dairy branch.
- The lifespan of cull cows is high with an average of almost 7 years and 7 months. As a result, the replacement rate is low and savings are made on rearing costs.

Areas of attention

- The location of the farm in a peat meadow area where there are issues of subsidence and greenhouse gas emissions.
- Recent substantial investments in land increase interest rate risk.

Entrepreneur and future strategy

Vision towards 2030:

- To remain among the best performing companies in terms of economic results.
- Land is and will become an even more important production factor for dairy farming.
- Being emotionally strong enough as an entrepreneur to cope with changing circumstances.

Actions in the coming period

- Optimisation of farm operations. There is always room for improvement.
- Continue to make time for and invest energy in seeing and seizing opportunities that arise.

'I think land-based farming is becoming a very important issue for dairy farming. That's why we have increased our acreage considerably in recent years and extensified considerably.'

Farm performance



* Benchmark economics is EDF average of the Netherlands, benchmark in sustainability is reference group from KringloopWijzer

4.2.5 Maatschap Dinkelman in Lochem

‘Stay positive and always be ready to seize strategic opportunities that arise.’

Farm characteristics

The Dinkelman family farm is located on sandy soil in a small-scale landscape with mainly dairy farming. In 2023, the farm was intensive with 215 cows on 68 hectares of land. By mid-summer 2024, the farm had grown further to 230 dairy cows and 70 hectares. The cows remain in the barn year-round. However, fresh grass is fed in the barn via summer stable feeding. The farm has recently invested heavily in a mono-manure digester and nitrogen stripper, among other things, with the aim of reducing greenhouse gas emissions by more than 50%.



Characteristics (2022)	Unit	Dinkelman
Dairy cows	No.	215
Young stock < 1 year	No.	68
Young stock => 1 year	No.	23
Productive grassland	Ha	55.3
Nature grassland	Ha	0
Corn	Ha	3.9
Arable crops	Ha	8.5
Milk production	Kg total/farm	2,183,804
Milk production	Kg/cow	10,148
Intensity	Kg milk/ha fodder crops	32,267

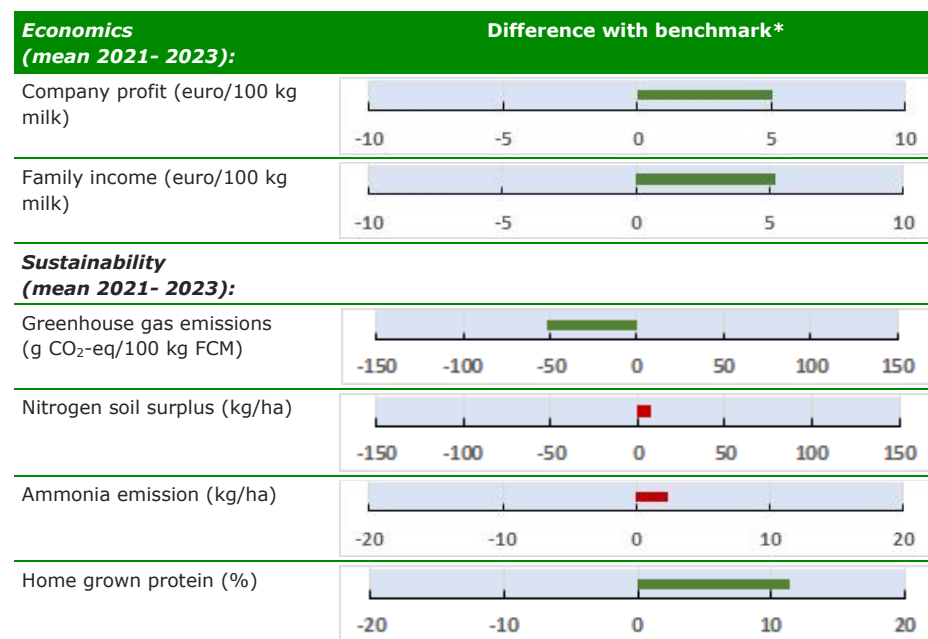
Milestones

2004	2007	2010	2012	2014	2016	2021	2022	2023
Expansion of barn to 120 dairy cows	Stop fattening pigs Building of rotary milking parlour (28 places)		Building straw barn close up cows Purchase farm with 14 acres Outsourcing young livestock rearing Scaling up to 180 dairy cows	Building young stock barn		Purchase 9 acres Initiative biogasHUB Lochem Manure digester, manure separator and nitrogen stripper installed Expansion barn		

‘I strive to always be among the top 25% of farms.’



Farm performance



* Benchmark economics is EDF average of the Netherlands, benchmark in sustainability is reference group from KringloopWijzer

Strengths and areas of attention

Strengths

- With mono manure digester reduction of methane emissions and production of green energy.
- With nitrogen stripper reduction of ammonia emissions and ready to produce RENURE, reducing the impact of abolishing derogation.
- MDV-certified barn with lower environmental impact and animal health and welfare measures.
- Despite the substantial investments made in innovations and scaling up, there is a healthy mortgage to milk pool ratio, partly thanks to the use of subsidies for applied innovations. This puts the company in a financial position to meet future challenges.

Areas of attention

- Intensive farming and therefore not land-based.
- No grazing as this is difficult to achieve.
- No specific attention to biodiversity, but focus on high crop yields.
- Farm is located in small-scale landscape.

Entrepreneur and future strategy

Vision towards 2030:

- Run technically well and thus want to be among the 25% best performing farms.
- Remain positive and always try to remain ready for opportunities that arise.
- An impending clearcut in Dutch dairy farming may also provide opportunities, such as the purchase of land that becomes available.

Actions to come:

- Single manure digester with biogas production, manure separator and nitrogen stripper commissioned in 2024 in combination with barn expansion and modification. Focus on completion of this construction phase keeping this €1.8m investment running smoothly.
- Increase herd size to 250 dairy cows.
- Taking transition and claw trimming management to a higher level now that the barn layout is set up for this purpose.

4.2.6 V.O.F. Van Kalmthout-de Groot in Rucphen

'We have always been proactive in developing and improving our farm and have built a nice farm in the process. However, the current and uncertain future rules, demands and wishes of the government and banks do not allow innovation/innovation of barns at the moment. That makes it difficult for us to make a long-term plan.'



Farm characteristics

Frans and Hermien van Kalmthout's farm is located on sandy soil in the province of North Brabant. The farm milks over 340 cows and has 120 hectares of land in use. Growth of the dairy herd has always been part of the strategic choices. Growth was not an entrepreneurial goal per se, but was applied as a means to remain a farmer. In terms of sustainability, the farm works on better utilisation of fertilisers by collecting all yard and rinse water and using it to dilute the manure with its own drag hose manure applicator, mixed with mineral concentrate. Through ice water cooling, energy is converted into ice water at times when it is cheap, which is later used to cool the milk again. We buy our feed components all separately including minerals, salt, etc and make our own premix every 5 days or so.

Characteristics (2022)	Unit	Van Kalmthout
Dairy cows	No.	341
Young stock < 1 year	No.	112
Young stock => 1 year	No.	52
Productive grassland	Ha	67.6
Nature grassland	Ha	0
Corn	Ha	34.7
Arable crops	Ha	17.2
Milk production	Kg total/farm	3,419,673
Milk production	Kg/cow	10,028
Intensity	Kg milk/ha fodder crops	28,605



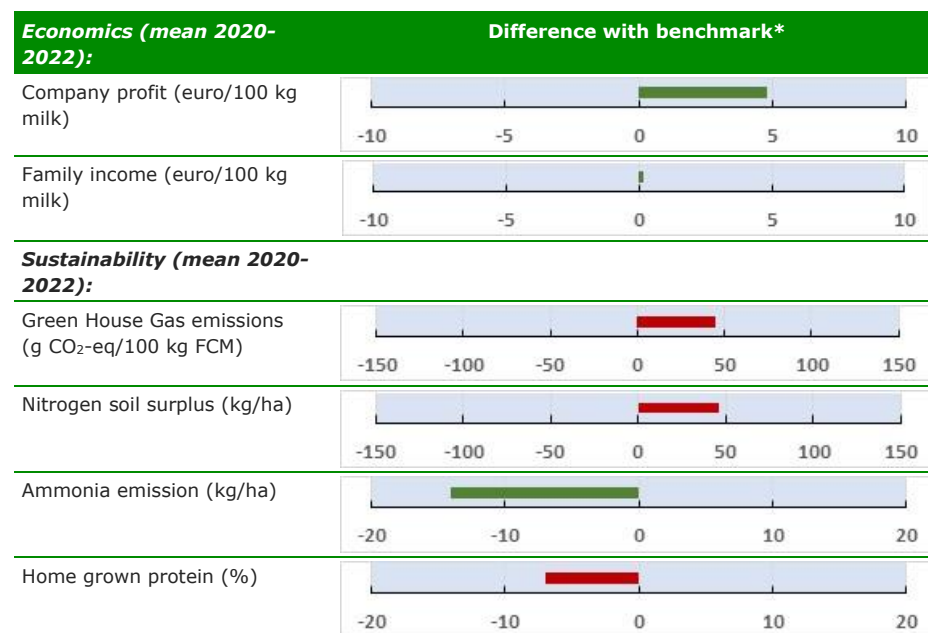
Milestones

1984	1992	1999	2008	2019
Frans starts working on farm 50 dairy cows and 80 sows	Farm take over	Stop sows, conversion to young stock 90 dairy cows	Building new barn 200 dairy cows	Purchase 17.5 acres

'Our strategy was always to milk first by buying production rights to earn money for land acquisition. The other way around doesn't work.'



Farm performance



* Benchmark economics is EDF average of the Netherlands, benchmark in sustainability is reference group from KringloopWijzer.

Strengths and areas of attention

Strengths

- Farm of sufficient size.
- Good relationship with surroundings, so almost all land could be bought or rented from neighbours/former farmers in the immediate vicinity.
- Nature Conservation Act licence in order and farm not located close to a Natura 2000 area.
- Two motivated daughters who help and want to continue with the business.
- Good availability nearby of e.g. food industry residues, press pulp, cigarette, molasses, wheat yeast concentrate, soybean meal, turnip meal, potato residues.
- Distance to arable area for manure disposal is small with less than 20 km.

Areas of attention

- Currently no possibility to renew old barns, due to licensing policy in the province.
- High manure disposal costs due to political policies, including abolition of derogation.
- High competition on the land market from other sectors (horticulture, arable farming and arboriculture).

Entrepreneur and future strategy

The entrepreneurs experience the current situation as difficult. The combination of the wishes/requirements from the government around land-based farming, among others, the high land prices in the region and the lack of support for technical solutions make making choices complicated. Therefore, there is no clear plan for the future at the moment. First, we have to wait for political developments and see the current period through.

4.3 Learnings from the 6 farms

The number of farms is obviously too small to run a statistical analysis on it. Moreover, the farms were selected by EDF from their own constituency, so it is not a representative sample for Dutch dairy farming. The findings mentioned here are based on the picture that the researchers gathered from the interviews with the entrepreneurs. However, specific attention was paid to the scores given by the entrepreneurs for the various sub-aspects of the three E's.

Enterprise

All farms are considerably larger than the Dutch average in terms of size (number of dairy cows). The 6 farms range in size from 215 to 365 cows (see Table 4.2), while the average Dutch dairy farm has a size of about 110 dairy cows. The entrepreneurs also all indicate that growth in dairy cows (scaling up) has been a strategy for them in the past to ensure the continuity of the farm.

Table 4.2 Characteristics 6 EDF farms

Farm	Dairy Cows (nr)	Area (ha)	Milk (kg)		
			Total farm	Per cow	Per ha
Van der Zijl	247	137 (incl. 5 ha nature grass)	2.495.884	10.121	18.282
Abma	365	174 (incl. 16 ha nature grass)	3.042.307	8.344	17.439
Stokman	280	215 (incl. 41 ha nature grass)	3.106.733	11.084	14.443
Holtrop	274	163	2.577.082	9.409	15.845
Dinkelman	215	69	2.183.804	10.148	32.267
Van Kalmthout ^{a)}	341	120	3.419.673	10.028	28.605

^{a)} 2022.

Source: KringloopWijzer-report from the individual farms (2023).

Entrepreneur

The farms were selected for diversity, this is reflected not only in the farm set-up but also in the self-assessments of entrepreneurial characteristics using the tool mentioned earlier. Quite large differences occur in the degree of technology

orientation (from high to almost none) and for market orientation (from very low to high). Consumer orientation scores quite low for most companies.

Environment

Quite large differences also occur for the various environment characteristics. This applies, for instance, to the score for social and political space, where a number of entrepreneurs fill in a low score (unfavourable). Others score quite high here. This higher score, in turn, has to do with the location or the strategy already deployed. This applies, for example, to a business that is relatively extensive and is committed to diversify its operations. For technological capabilities, 5 of the 6 farms score quite high.

Strategies

The strategies also differ quite a bit between the farms, but that is logical because that is partly what they were selected for. Table 4.3 summarises the strategies for each farm.

Table 4.3 Short description of the strategy of the 6 EDF farms

Farm	Characteristics Strategies
Van der Zijl	100% focus on dairy farming, focus on good technical performance (15/20% best performing farms). Exploit opportunities from new dairy barn with solid manure production. Make farm available for research (peat oxidation and ammonia and methane emissions).
Abma	Continue the 'Keep it simple' farm management, continue combination of keeping cows indoors and high fresh grass utilisation through in barn fresh grass feeding. Further increase in scale, do what needs to be done in terms of sustainability (comply with preconditions).
Stokman	Continue combination milk and energy production through mono manure digestion, stay ahead in terms of low environmental impact of milk, increase scale, use new technology. Seek new partnerships with colleagues and other companies.
Holtrop	Further expansion of acreage (more land-based), continue to combine dairy farming with nature management and farm recreation, focus on economic result over technical results.
Dinkelman	Maximum utilisation of mono manure digester (2024) with biogas production, manure separator and nitrogen stripper (Renure). Further increase in scale, focus on good technical performance (top 25% best performing farms economically)
Kalmthout	Still searching for a strategy for the future. The combination of the wishes/requirements from the government, the high land prices in the region and the lack of support for technical solutions create too much uncertainty at the moment to make clear choices for the future.

Are the farms future proof?

As we indicated earlier, strategies have not been calculated. We asked the entrepreneurs whether they think they are ready for the future. First generally and then specifically zoomed in on a number of themes (end of derogation/extensification, climate goals, nitrogen/ammonia, biodiversity, animal welfare/animal dignity, future market demand, economic/financial). One entrepreneur indicates that he is not yet ready for the future as already shown in the previous table. The remaining 5 give a positive answer to the question in different variants. Some entrepreneurs phrased it in the following way: "In terms of mindset, I am ready for the future." In the commentary, one of them indicates that the positive answer is not necessarily prompted by current financial or technical performance but mainly by the mental strength to deal with the challenging changing circumstances.

One entrepreneur indicates that with the recently completed new barn, the family has taken into account a lot of the aspects mentioned. The other side is that they are now also stuck with this barn with the associated investments and costs. If major changes come along that don't fit with this choice, it will be difficult. "But if you keep waiting for clarity then you will never do anything. It will always keep changing." Another entrepreneur also says he cannot foresee everything that will happen. But he has already thought through how to solve for many possible developments. For example, mono-manure digester has already been calculated. But that wasn't interesting enough yet, besides, he doesn't want to 'lock in' with such a choice yet. 'I would like to remain as flexible as possible,' he says. Another entrepreneur puts it this way: 'I have no illusion that I am 100% ready, you never are.' But he also says he has made considerable strides particularly around emissions reduction. Combined with the size of the farm, he believes he is able to respond to future challenges.

How do these entrepreneurs approach arriving at choices for the future?

From the interviews, most dairy farmers feel that they are really in the lead to develop the strategy themselves. They also invest time in it. This is visible, among other things, in their involvement in EDF. From this, they also get input for the analysis of their own situation and their own future. Also outside EDF, these entrepreneurs really invest time in orienting themselves to developments in the environment, in the broadest sense of the word. This is done by participating in (other) study groups and networks and by looking outside their

own yard in other ways. Mentioned here is also that it is useful to see how things are going in other sectors and/or abroad and what choices entrepreneurs are making there and for what reasons. At those moments, it is important that you, as an entrepreneur, are able to put current developments and perhaps worries aside for a moment. Only when you have mental space can you think freely about future possibilities. Several entrepreneurs also mention the importance of daring to ask questions. Thinking critically before a visit, for example, about what you would like to find out and what questions you therefore have, ensures that you ultimately get more information from such a visit.

Seeing opportunities is important, but at least as important is seriously exploring such an opportunity. Several entrepreneurs indicate that they consciously set aside time to delve into the opportunities that come along, for instance by hiring (extra) external labour for a half day a week so that they have time 'at the office' to focus on them while the day-to-day work continues. Also consider looking into and making use of all kinds of financially attractive opportunities (e.g. subsidies or tax-favourable investments) that are available. Despite the fact that these office hours often do not always feel like 'real work' at these times, and also that they do not always earn something immediately, several entrepreneurs indicate that they believe that these hours spent in the office are ultimately the most profitable ones.

Most entrepreneurs in this group analyse the various development opportunities themselves and also calculate their plans themselves. However, the entrepreneurs indicate that they not only consider the result of a calculation important, but also want to know and understand how that calculation is made and where the sensitivities lie. This also gives them an idea of the various factors that affect the result and how big those influences are. They take this into account when making choices. Several entrepreneurs mention that they often have several 'Excel files' open on their computers with which they gain this insight, a more modern version of the 'cigar box calculation'. Incidentally, it is not a requirement that a dairy farmer calculates everything himself; an advisor can provide important support in this. But it is still essential that, as an entrepreneur, you understand the calculations well and make your own choices.

It is also interesting that a number of entrepreneurs explicitly state that they want to be among the 10-25% best performing farms. Best performing is then mainly focused on economic results and technical key figures. Probably the fact that the farms are EDF participants, where comparing economic results and learning from them is an important goal, is a characteristic common to the farms. Farmers who are not so concerned with (economic) figures do not come across within EDF.

The stage and way of working differs among the entrepreneurs. Most entrepreneurs work from a long-term vision or a long-term picture for the development of the farm. Some work more systematically with a kind of long-term plan with concrete steps and milestones. For most, it is mainly from that long-term vision, depending on the opportunities that come along, concrete steps are taken. One entrepreneur is not quite there yet and is doing some experimenting, trying things out to see if it works and if it fits. This is not right or wrong, both approaches are more or less recognised approaches. One approach is more planned, for the other the term logical incrementalism is also used.

The participants view current policy developments (nitrogen and manure crisis) quite differently. Some dairy farmers indicate that they are less affected by them, for instance because a choice has already been made to intensify, or because they expect to be able to respond to them by, for instance, opting for a housing system with a different type of manure or for a manure digester, which, in their view, help to respond to these challenges. For one of the dairy farmers, the recent policy developments are weighing heavily on him. It feels unfair to him that he is now seen as a problem case and polluter, while he has always worked within the legal framework. The farm is intensive in an environment with expensive land due to a lot of competition in the land market from crop sectors. The feeling of unfairness, combined with the fact that a number of measures are now virtually impossible (e.g. getting a permit for a new barn, recognition of low-emission systems) combined with uncertainty about the further interpretation of policy makes it difficult for this entrepreneur to shape a concrete strategy for the future. For now, the emphasis is therefore on wait and see.

What also stands out among the group is that they are trying to look further ahead. By further, this means looking beyond current developments. So at the moment, looking beyond the crisis in the manure market. Of course you have to deal with that now, but it should not be leading in long-term decisions. The entrepreneurs generally have a picture for what they think are the long-term defining trends and base their decisions on that. That is not to say that they are always happy with those trends, but at a certain point something like that is taken as a given and they think about how you can or should respond to it.



5 As a dairy farmer, how do I arrive at the right choice for the future?

5.1 Continu the line from the past?

Until now, the regular path for most dairy farmers has been the path of scaling up and intensification. Increases in scale often in small steps (adding a few cows every year, as long as it fits in the barn) and sometimes in larger steps (when a new technology is introduced, around farm takeovers or when opportunities come along such as the end of milk quotas).

It is important to realise that this is effectively a process without end. This is also known as Cochrane's treadmill after the researcher who described it in 1958 (Cochrane, 1958). Technology is becoming available by which the productivity can be increased, this technology will usually be adopted by the larger farms first, who will earn more by applying the technology and are then able to grow in scale. They can pay the most for quota and land. The application of technology combined with economies of scale in turn results in a lower cost price and will in the end result in a lower market price. Farmers are not quick to stop and will start looking again for a way to increase productivity and bring down the cost price. This is a continuous process where the strongest (best performing) farms set the speed of the treadmill, farms that cannot keep up that pace eventually fall off the treadmill. In the Dutch situation with a quota system, those stoppers are in fact also needed to allow the remaining farmers to grow. And by selling production rights and possibly land, quitting also needs to be less of a problem financially.

The statement 'I aim to be among the 10% best performing farms' illustrates this approach. If you manage that then you are actually running at the front of the treadmill. If you are the right person for that (with the right qualities and 'fitness') then this can be a great strategy. But do realise that this is not for everyone. By definition, with the decreasing total number of dairy farmers, this group is getting smaller and smaller. So reason enough to think about alternatives.

Five of the six entrepreneurs whose strategy was presented in Chapter 4 answered (fairly) positively when asked whether they were future-proof. The entrepreneurs were asked in general terms and for specific themes (derogation/extensification expiration, climate challenge, nitrogen/ammonia, biodiversity, animal welfare/animal dignity, future market demand, economic/financial) whether they were future-proof. The entrepreneurs were not surprised by these questions, they were aware that these themes were at play and were able to answer quite concretely whether they were ready and whether they would still need to take steps and then usually roughly how they could do so.

What these entrepreneurs have in common is that they set aside time to find out about developments around them. They are invested in that. They are environmentally aware.

In terms of strategy, there is one entrepreneur who has chosen extensification and diversification (nature and recreation). For him, this is also the way to meet long-term wishes and requirements. Most of the other farms stick to the old strategy to some extent: continue to develop in size and be among the best performing farms. They respond to current wishes and demands by opting for manure fermentation or another shed system with more solid manure, for example. They assume they have the ability to adapt to the ever-changing demands and requirements.

Chapter 3 distinguishes the short-, medium- and long-term challenges facing the dairy farmer. Briefly:

- Short term: how to survive the current manure disposal crisis with high manure disposal costs for many farms and a looming generic cut due to exceeding the reduced phosphate ceiling.
- Medium term: what is an appropriate strategy for the medium term in which the market in particular demands a lower carbon footprint and the policy will

probably focus specifically on reducing ammonia emissions and there may also be requirements for land use.

- Long term: which business model suits the desire for a dairy farm focused on utilising grass and residual streams and converting them into high-quality humane food. A dairy farm that obtains its feed from its own farm and the immediate surroundings and where there is animal-worthy livestock farming in which the animal can fully exercise its natural behaviour. And a dairy farm that makes a positive contribution to (restoring) biodiversity. In short, a dairy farm that operates within 'the safe and just' space.

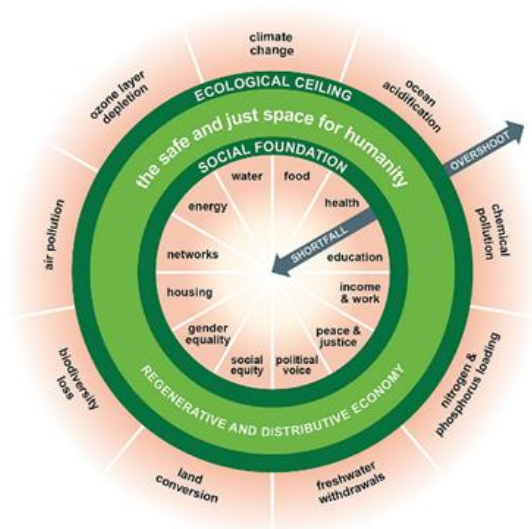


Figure 5.1 The donut with the light green circle representing the 'safe and just' space

Source: Raworth (2017).

Summarising answer to the question should farmers adapt their farm management and strategy? Yes. Certainly at the sector level things will have to change. Should it be different for each individual farm? That is the question. Probably for a large proportion of farm a change is required, especially if you look at the long term. It would really help if there was a more concrete

interpretation for the Safe and Just donut for the individual company. For the individual farm, what are the limits one has to meet?

5.2 Strategies for the short and medium term

For the short term, the main issue is: how to survive the current manure disposal crisis, especially of course for those farms with high manure disposal costs. Added to this is a looming generic cut due to an expected overshoot of the reduced phosphate ceiling. For farms affected by this, this is probably not the best time to make long-term strategic choices. Based on the outline coalition agreement, it is not yet easy to estimate how policy will be fleshed out in the coming years. The tone of the coalition agreement is different, but there is no indication that objectives will change. At least for now, the buyout schemes that were already in place will remain. For the medium term, this concrete policy does matter for the best-fit strategy. This applies in particular to the nitrogen/ammonia policy as well as to the requirements that will be set for land-based farming.

A strategy that fits well in a highly uncertain environment is 'Wait & See'. This means consciously not taking any major strategic decisions for a while, but first waiting to see how the environment develops. You can't do this forever. At some point, you really have to make choices. But you can also make good use of the time to look at the long term and what system fits in with that, and possibly already start working on it in concrete terms.

Broadly speaking, a distinction can be made between *farm development strategies* and *market strategies*. In *farm development strategies*, the current farm set-up is leading in the choice for the future. Of course, you try to respond to changes in the environment and adjust your strategy accordingly. But in general, this is more adjusting than really redirecting. Scaling up, specialisation but also development through cooperation with fellow farmers and in the chain all basically fall into this category. Diversification also often falls into this category because, for instance, e.g. subsidy contracts for nature friendly management for a part of the grassland. Own strength and resources are then leading in the strategy; this is also seen as an inside-out approach.

Various publications outline a number of more general development directions of dairy farms for the future. In principle, these are all (potential) farm development strategies

1. High-productivity/high-tech: this farm tries to produce as efficiently as possible. Technology is used to increase productivity and reduce emissions.
2. Nature-inclusive/regenerative. Nature production plays an important role and is also part of the overall earning model. The farm is extensive and makes relatively little use of external inputs such as (concentrate) feed purchases and (artificial) manure. The focus is on exploiting natural processes, soil and soil quality get a lot of attention.
3. Cooperation dairy/agriculture. Cooperation as a means to close the cycles as much as possible.
4. Combining dairy farming with other branches. Dairy farming is combined with other activities such as recreation or care.

For the majority of dairy farmers, the current business situation is leading the strategy development.

With *market strategies*, the (potential) market is leading, where are the opportunities, what are the trends and how can you respond to them? If necessary, the business set-up is adjusted accordingly. For an outside-in approach, a strategy starts with understanding the difference between what you make and what people need, which often turns out not to be the same thing.

Examples of market strategies

Broadly speaking, three market strategies are distinguished: operational excellence, product leadership and customer engagement. In the first strategy, the focus is on efficiently producing a basically non-distinctive product. Product leadership centres on product quality - you produce the best product. The third strategy revolves around close involvement with the customer, the product is developed for and with the customer.

Each strategy has its advantages and disadvantages. With operational excellence, you are basically interchangeable, so success depends mainly on how well you are able to compete with the others in terms of cost. With product leadership, the key is to remain a product leader, so continuing to develop the product is essential (non-agricultural example: Netflix).

In customer intimacy, the cost of production is less relevant because you are working closely together with the customer and also building a relationship with that customer (non-farming example: Nespresso).

It was mentioned earlier that many dairy farms focus mainly on farm development strategies. They do not have a specific market strategy in the sense of targeting a specific market or distinctive product. The bulk of dairy farms thus fall under the strategy of operational excellence. It is often individual dairy farmers who process dairy themselves who also work on product leadership. Den Elder is an example of such a strategy, as is Remeker kaas (with prices for cheese from € 27.80 up to € 54.00 per kg).

A large proportion of dairy farmers have farm development strategies, with the current business situation leading the strategy development. In terms of market strategy, it almost always revolves around operational excellence. The farms that perform well are able to acquire land and phosphate rights and develop further. The rest fall off sooner or later. This also applies to the described strategies of the 6 EDF participants, these are basically all business development strategies. They largely focus on operational excellence as a market strategy. So a significant part of these companies are walking along on Cochrane's treadmill.

How to make your own choice for the future? It is and remains essential to take a good look at the future from your own situation. First and foremost, what do you yourself want as an entrepreneur (why are you a dairy farmer)? What can you do yourself, what are you good at? Another important point is the extent to which your current business location and business set-up is leading for the future. If this is the starting point, it is important to have a clear picture of the strengths and weaknesses of your business set-up and performance. Apart from deciding whether the current business is seen as leading, it is essential to have a picture of the determining developments in the surrounding area. Finally, translating the analysis into a strategic choice is part of this?

See Appendix 1 for description of the steps involved and Appendix 2 for a more general description of current trends in and around dairy farming.

5.3 The fitting farm model for the long term

Earlier, the conclusion was drawn that looking at the total food system and the long-term challenges, an adjusted type of dairy farming is desirable. A model that focuses on the use of grass and residual flows and converts them into high-quality humane food. A dairy farm that obtains its feed from its own farm and the immediate surroundings and where there is animal husbandry in which the animal can fully exercise its natural behaviour. And a dairy farm that makes a positive contribution to (restoring) biodiversity. In short, a dairy farm that operates within 'the safe and just' space.

This requires a different business model and also a different revenue model. Here, therefore, it is not useful to take the farm's current initial situation as a starting point. To illustrate: if you have to buy land or dispose of livestock in order to be land-based, you won't be able to calculate that from the current model. If you really want to think about a business model that allows you to fulfil the long-term vision, you have to work more from the outside in. What are the social demands and wishes and how can they be translated into a business and revenue model?

In terms of technical content, it is possible to design farm systems that can be used to a large extent to fill in the picture. This has been done within WUR via the Reflexive Interactive Design approach (Bos, 2010), which starts with drawing up design requirements (what must the system meet) and then creates a design with the involvement of many stakeholders. The best-known example of this is the Rondeel farm for chickens.

The biggest challenge lies in developing and realising a revenue model for these systems. The earning model of the current average dairy farm is largely based on income from milk. Other income needs to be added to that. And that should be more than compensation for additional costs or lost revenues. It really has to add value.

In the execution of this study, a good example of this came along. There is a clear social desire for more biodiversity, for example. So far, there is no market for this: the government has set up a compensation system, but this is limited to compensation for additional costs or loss of yield. The question that arose

was that surely it should be possible to turn this social desire into a market. The Netherlands has an affluent population. Either we can do something with 'the wishes of all those rich people around us'. The first thought was to arrive at a platform where you bring together demanders (the rich people) and providers (dairy farmers) and thus arrive at transactions. For this, there is still a lot to be developed, but at least the idea is there.

How do you tackle this? This requires a more 'outside in' approach. Start with what is going on in the environment. What are society's wishes and what could that business system look like in concrete terms and what is needed to bring it about. You start from the future, as it were, and reason backwards from there.

It is not usual to work and think this way in dairy farming. It was also less necessary in the past. Dairy farming developed fairly consistently according to a familiar pattern, which involved adjustments but did not require major changes in direction. So there is a lack of experience. Another point that makes it difficult is that the final picture is still rather global and not yet widely shared by all major stakeholders. Therefore, it is also good to cooperate with others in this. This could be with fellow dairy farmers, but certainly also with others from inside and outside the sector.

An approach that fits with the required 'outside in' approach is the business model innovation approach. The fundament of this approach is the canvas business model (Osterwalder, 2009) a simple one pager with 9 basic elements of a business model. The value proposition is at the heart of this model. Within the approach several tools are available such as the Context Map Canvas and the Value Proposition Canvas. Examples of these canvasses can be found on the internet.

See Appendix 1 for more background information and Appendix 2 for a more general description of current trends in and around dairy farming.

A very concrete point that can be taken up is the idea mentioned to create a platform where demanders (citizens with social wishes) and suppliers (dairy farmers) can be brought together to come to transactions.

5.4 More inspiration

With the strategies of the 6 EDF farms, do we have all the possible options in view for Dutch dairy farmers? No, there are still more options. In recent years, much research has focused on various development directions, especially driven by policy.

An example of this is the report [Toekomstige voedselproductie](#) (Future Food Production), which discusses several pioneering farmers contributing to circular agriculture in the Netherlands. This report includes, for example, the Grazing Farm, an extensive dairy farm that works with a spring-calving herd and virtually without external inputs (it falls under the main direction Nature-inclusive/regenerative). Other forms of organisation also appear in this report. In Herenboeren, in fact, a group of citizens/consumers own the farm and the farmer is salaried. Another example from this report is the New Milk Farmer, a dairy farmer making the move to soy and a plant-based yoghurt alternative from Dutch soil. In the [Kracht van Koeien](#) (Power of Cows) project, four dairy farming systems were designed based on the aforementioned RIO design approach.

Another study is on [Verdienmodellen natuurinclusieve landbouw](#) (business models nature inclusive agriculture) which discusses several examples of individual dairy farms integrating nature into their operations, ranging from intensive to extensive. Another example is the report [Dairy Farm Systems North Netherlands 2030](#). Here, three areas form the starting point, including a peat meadow area. Farm systems were designed for each area, including extensive and low-input, cooperation dairy-farm, large-scale intensive and nature farm. The report [Regenerative agriculture: experiences and lessons from a community of practice](#) looks at a number of regenerative dairy farms.

In short, there is inspiration enough, perhaps too much.

Always good to look at others, but obviously check whether it fits your situation. In doing so, try to get a good understanding of how the strategy in question works and what determines its success. And see to what extent it can also be copied to your situation. Does the system fit your own preferences and interests? If you are strongly focused on productivity, how do you deal with low-productivity natural land that will also make cows give less milk? Do you have the knowledge and skills needed for the system, or can you develop or organise them. High-tech systems require different skills and knowledge than really extensive systems where everything is about turning grass into milk. Dealing with staff, or dealing with customers in the case of a short chain, again poses specific skills requirements. Is the system ready (to be made ready) for the demands of the future? And is it flexible enough to move with it as those requirements change? What is the earning model and is it achievable for you? If, for example, increased revenue from milk is essential to realise the revenue model, can you realise it?

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Appendix 1 Strategic Management and Business Model Innovation

Strategic Management approach step by step:

1. Start with the why question. Why are you a dairy farmer and what do you want to achieve for yourself?
2. (Re-)know your own qualities. What knowledge do you have and what skills? Do this seriously, invest in it e.g. by taking a well-founded entrepreneurship test or having a 'mirror conversation' with an expert. You can also start with a 360-degree reflection. Ask people around you to reflect on you as an entrepreneur with some targeted questions.
3. Make a good analysis of your company's starting situation, both in terms of structure and performance (integral!). Know your company's strengths and weaknesses. Determine for yourself whether the current location and business set-up is leading for your future strategy, or whether you want to enter the process more from the development in the environment (then the next step will clearly carry more weight).
4. Look carefully at the (future) developments in the surrounding area. Of course, this includes the market, but also policy and various other aspects. Let others feed you, but ultimately do this analysis yourself as much as possible. Orient yourself broadly and do not limit yourself to the usual sources and persons. In fact, it is a characteristic of entrepreneurship that you look at developments in the environment just a little differently, thus seeing an opportunity that others do not see.
5. Choice of strategy. Combine the previous elements into an appropriate strategic choice and work that into a concrete action plan

The business model innovation approach (BMI)

BMI is more an outside in approach. The fundament of this approach is the canvas business model (Osterwalder, 2009) a simple one pager with 9 basic elements of a business model. The value proposition is at the heart of this model.

Business model canvas.

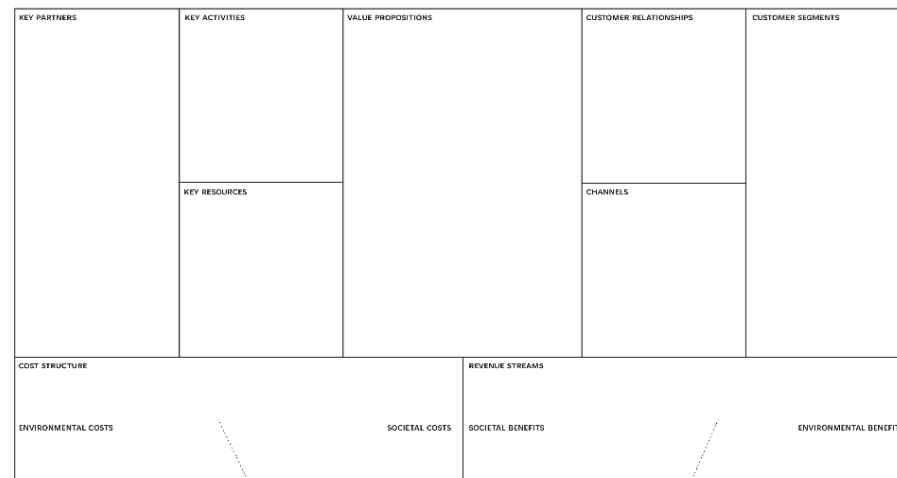


Figure 1 Example from a business model canvas, including societal costs and societal benefits

Source: *Business Models Inc.*

The BMI approach is a flexible approach, the innovation process can start at any point of the canvas model. Within the approach several tools are available such as the Context Map Canvas and the Value Proposition Canvas. The Context Map Canvas is a tool to analyse the environment in a structured way, so an important tool for the outside-in approach. Examples of these canvasses can be found [on the internet](#).

More information on difference and similarities of Interactive Strategic Management and Business Model Innovation can be found in an paper of an IFMA conference (Tomson, 2017). More information on different types of

business models in agriculture can be found on the [website](#) of Wageningen University & Research (in Dutch).

A few more general notes:

- Changes in the environment are rapid, it is important to arrive at a well-founded choice. Take your time to do so. If too much is unclear and a choice cannot be made properly, the 'Wait & See' strategy is a real alternative.
- Recently, developments have been following each other rapidly. This is expected to continue for the foreseeable future. It is currently difficult to make a detailed long-term plan with concrete steps and milestones. It seems especially important to be sufficiently flexible and adaptive. Make sure you keep as much room as possible to respond to new developments; adaptivity is almost a requirement. Especially with large investments in e.g. land or technology, it is important to look at this carefully.
- Another point is that for the future, it is not expected to be enough to be among the economically 10% best performing companies. You cannot escape scoring well on (at least some) sustainability aspects as well. It is therefore about performing well in its entirety.
- Make sure you have a good implementation plan. Developing a strategy is one thing, but actually realising and implementing it is two.

Appendix 2 Current trends in and around the dairy sector

The trends described are derived from previously conducted research and are partly based on joint sessions with researchers within Wageningen Economic Research engaged in dairy farming research.

Sector

Economies of scale continue, but are becoming less obvious. Just because mainly smaller farms are quitting, the scaling-up continues. Some farms will continue to opt for this strategy, probably increasing in the form of multiple locations. In addition, more entrepreneurs will consider other strategies: short chain, diversification, nature-inclusive, regenerative, valuing other ecosystem services, etc.

Economic margins remain narrow, no prospect of a new revenue model yet. Looking at future wishes (extensification, reducing emissions, increasing animal welfare), these wishes come with additional costs. An important question is how these can be compensated. Possibly partly from the market, however, there is currently no clear picture of what the future earnings model might look like.

Market: market demand remains, sustainability demands increase

Demand for dairy continues to rise globally, with production decreasing slightly at least in some countries in Europe. All in all, this results in a positive picture for the milk price. Large food companies in particular are starting to make more and more demands on the sustainability of products they buy. Initially, this mainly concerns climate, but it is expected that this will be broadened to, for example, biodiversity (regenerative agriculture) and animal welfare. The European CSRD directive requires companies to report on their sustainability performance, which puts pressure on sustainability.

The production and consumption of substitutes for animal products by plant-based variants or cell-based dairy are both increasing. The share in the total volume is still small, but is expected to increase, especially in Northwest Europe

and North America. This could increase considerably faster if governments e.g. start steering consumption via True Pricing.

There has been an increase in partial streams in dairy (e.g. VLOG, Better Life, Planet Proof, Better For) with price differentiation over the past decade. There is much interest in short chains, the share of dairy farmers opting for this is still relatively small (about 10% in 2023, [Staat van landbouw natuur en voedsel](#)) and it is usually also a part of total production. A previous analysis calculated that over 30% of short-chain dairy farms indicated that more than half of their total turnover comes from that short chain. The total turnover from short chains of dairy farmers.

For ecosystem services such as carbon sequestration, biodiversity, water storage and the like, markets are starting to emerge. However, the markets are still limited in size and revenues are often limited to compensation for additional costs and/or loss of yield.

Within the dairy farming sector, almost half of the farms engage in side activities. By side activities are meant the following activities: aguaculture, contract work for third parties, stabling, processing agricultural products, renewable energy, farm sales, agricultural childcare, care farming, recreation, education and agricultural nature management (<https://edepot.wur.nl/579406>).

Policy

National short-term. The initiated policy on manure and the planned policy on nitrogen put pressure on shrinkage and extensification. Nationally, buy-up schemes have been opened; further concrete implementation must largely take place at provincial level. It is unclear what the effect of the new outline agreement will be.

Long-term national policy. Chapter 2 indicated that there is no clear long-term vision and that there are still a number of dilemmas before us that determine that vision. The Ministry of LNV's latest vision was published in 2018: Agriculture, Nature and Food: Valuable and Connected which opts for a turnaround towards Closed Loop Agriculture. One of the developments emerging from this paper is the KPI-K project which explores the possibilities of steering on targets (KPIs). Particularly around nitrogen, the choice is being made to have parts of the policy implemented regionally. Provinces have been asked to develop provincial plans that should both help achieve the nitrogen targets and contribute to the climate goals set.

European policy greatly influences national policy. The trend in European policy is (also) towards more target-setting, for example around climate and biodiversity. Within the adjustments to CAP policy that took effect as of 2023, a larger part of the EU budget goes to eco-schemes. In 2020, the Farm to Fork strategy was launched. This strategy has a strong focus on (restoring) biodiversity. It contains concrete targets for reducing the use of plant protection products (-50%), antibiotic use (-50%) and the share of organic farming (to 25% of the area), among others. This strategy has yet to be translated into concrete policy.

Other environmental aspects

The climate is changing. This means that the sector has to deal more with weather extremes such as long dry periods and flooding in other periods.

Societal pressure on animal production is increasing; this is visible, among other things, in sometimes fierce campaigns by NGOs. Specifically, issues such as:

- *Climate*: dairy farming is a major contributor to greenhouse gas emissions via the production of methane by dairy cows, among other things. In addition, the peat meadow area, also a major source of greenhouse gas emissions, is mainly used for dairy farming. The energy transition is leading to an

increasing demand for green power. This offers opportunities for e.g. windmills or manure fermentation.

- *Animal welfare/worthiness*: in 2021, the Council on Animal Affairs (an important advisory body for the government) published a number of guiding principles for animal worthy livestock farming, including the recognition of intrinsic value integrity, the ability to perform natural behaviour and a positive emotional state. These guiding principles call for different livestock farming systems.
- *Biodiversity* dairy farming is an important user/manager of the rural area and thus has a major impact on both the landscape and biodiversity. This is where discussions around e.g. 'green asphalt' and the decline of meadow birds and biodiversity in general come into play.

Technology and data

Dairy farming has a good data infrastructure in place; a lot of data can be shared automatically. This ensures that all dairy farmers have had insight into, for instance, their mineral cycle and their carbon footprint for quite some time. With sensors, more and more can be measured and, combined with artificial intelligence, this offers many opportunities to better monitor and control processes. This development offers perspective to further improve and automate operations and also offers perspective to reduce emissions and secure this also with measurements.

Financing and ownership

The attitude of banks is changing around financing applications, looking more at returns and less at assets, and sustainability is weighed in the judgement. The trend is that agricultural land is increasingly bought by private investors. Part of the land is also bought by idealistic foundations that then reissue the land to e.g. organic farmers (Nieuwe Oogst).

To explore
the potential
of nature to
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quality of life



Wageningen Economic Research
P.O. Box 29703
2502 LS The Hague
The Netherlands
T +31 (0)70 335 83 30
E communications.ssg@wur.nl
wur.eu/economic-research

Wageningen Economic Research
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The mission of Wageningen University & Research is “To explore the potential of nature to improve the quality of life”. Under the banner Wageningen University & Research, Wageningen University and the specialised research institutes of the Wageningen Research Foundation have joined forces in contributing to finding solutions to important questions in the domain of healthy food and living environment. With its roughly 30 branches, 7,600 employees (6,700 fte) and 13,100 students and over 150,000 participants to WUR’s Life Long Learning, Wageningen University & Research is one of the leading organisations in its domain. The unique Wageningen approach lies in its integrated approach to issues and the collaboration between different disciplines.