

Dutch Agriculture, European Policies and Global Food System Transitions

Preface

In the 21st century we face major global challenges crossing the borders of nations and sectors. Humanity is over-consuming nature and its natural resources, urban centres are becoming overpopulated, a major part of the population faces malnutrition and the climate is changing rapidly. The Covid-19 pandemic makes us realise even more that we are confronted with big challenges; in particular we see a rapid changing world order, a global food security crisis and rising poverty. It is clear our world needs important transitions, towards more resilient and sustainable food systems, including related public policy, business innovation and research.

I therefore welcomed the suggestion by Krijn Poppe and Ruerd Ruben to organize a symposium on the drivers and prospects for food system transformation in the Netherlands, Europe and the developing World at the occasion of their retirement from Wageningen Economic Research. An event that due to Covid-19 has to be organized as a digital symposium consisting of a series of 3 lunchtime webinars (on Monday 2, Tuesday 3 and Wednesday 4 November 2020), followed by a special session with the farewell lectures by Krijn and Ruerd and an introduction by Louise Fresco.

The symposium is a nice opportunity to match the views of experts from (inter) national organisations with those of our senior staff. I express my sincere thanks to Johan Swinnen (IFPRI), Tassos Haniotis (European Commission) and Marjolein Demmers (Natuur & Milieu) and several discussion openers for their excellent contributions.

In this publication you will find the papers that Ruerd Ruben and Krijn Poppe have written for their farewell lectures. The reflections that they share, based on a lifelong career as agricultural economists, are not only the usual rite de passage, but help us to discuss policy making, innovation priorities and research agenda's. I hope you will find them inspiring and we look forward to collaborate with you in making this world more sustainable and resilient.



Jack van der Vorst

General Director Social Sciences Group

Time for Departure

A reflection on the Dutch Food System

Krijn J. Poppe



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"Change is the law of life. And those who look only to the past or the present are certain to miss the future."

John F. Kennedy in a 1963 address in Frankfurt, Germany

"There is a time for departure, even when there is no certain place to go."

Tennessee Williams, Camino Real, 1953

Introduction

Economics studies choices. It supports decisions that give us the opportunity to choose between alternative futures. What future should we choose for the Dutch food system? That is not an easy but at least a relevant question. In recent years the future of the Dutch food system and the role of agriculture has been much discussed as different groups are not satisfied with the performance of the system [WRR, 2014; Fresco & Poppe, 2016; De Schutter, 2017; Rli, 2018]. Recently non-governmental organisations (NGOs) have successfully been taken the government to court on non-compliance of environmental laws and farmers are out in the street protesting for better incomes and less regulation.

Problems are concentrated at the consumer level and at the farm level of the food chain. Consumers are confronted with lifestyle-related diseases. Farmers feel threatened in their existence. They work in a treadmill with a strong economic incentive for scale increase that reduces cost prices, but in the end also market prices. Scale increase is partly reached by intensification of land use, which leads to negative environmental effects, regulation and a negative image. It is probably not a coincidence that the problems of the food system occur with its weakest parts. These problems can be seen as market failures or business opportunities, but increasingly need to be interpreted as system failure and a lack of transformative capacity (DG RTD, 2018).

If we are not satisfied with the performance of the food system, something is wrong with how it is organised. Some actors do not get the right incentives to do what they ideally should do. The future asks for an alternative organisation of the food system. The question is then: *Is an alternative future possible, and how do we get there?*

Even choices in revolutions or after crises depend on history and the current state of affairs

In trying to answer that question we have to realise that there is path dependency. Even choices in revolutions or after crises depend on history and the current state of affairs. For this

reason, in what will be my last essay for Wageningen Economic Research, I will first focus on some recent history of Dutch agriculture, starting in the 1960s. I see three important economic mechanisms that shaped the organisation of the food system and brought us to the current situation. I will then sketch some scenarios for the future and conclude of course with some recommendations for future research. But before starting off, let's first focus on some methodology.



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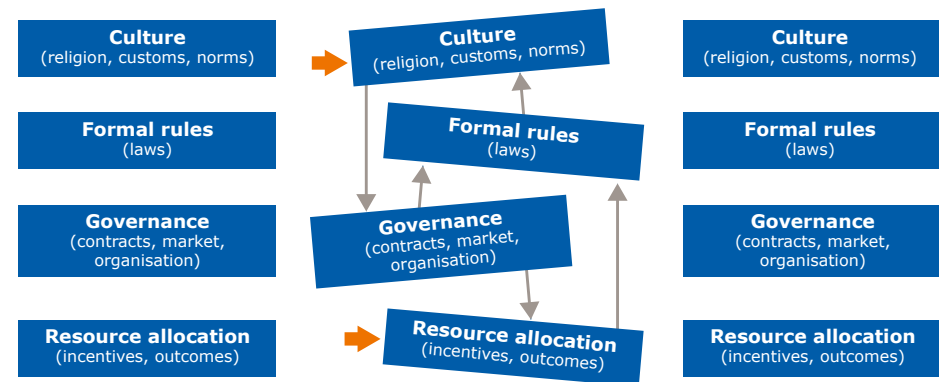
Economics of organisation

In the same way we choose between butter, margarine and olive oil, based on different aspects (price, convenience, health), we choose between forms of organisation: should we sell potatoes with a forward contract, through the future market, in a cooperative pool or in the open market? Should advice to farmers be provided by a state agency, a commercial consultancy or a farmers' cooperative? Each option has its pros and cons that depend on place and time. Institutional economics helps to explain how some institutional arrangements are

fitter for the future than others (Hazeu, 2007). Williamson (2000) distinguishes four levels. Economists are often focused on the lowest level: the prices and quantities traded in markets where resources are allocated.

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But an economist should not only explain or predict prices with the famous supply and demand curves, but explain supply and demand themselves. Then the governance structures play an important role like those in the example above on potatoes. These governance mechanisms are bounded by what the formal rules (the law and similar



Institutional economics: regulating mechanisms

© Williamson, 2000

regulations) allow. And these depend on culture and religion. Even if parts of the Middle East would have great production potential for pork meat, it will be hard to sell it. Madrid has the one of the best fish markets in the world after Tokyo, although it is far from the sea. It originates from the Middle Ages when you could prove to be a good catholic and not a Jew or Muslim by eating fish.

This example also shows that the cultural layer changes more slowly than the continuous pricing in markets. However, in a period of transition institutional arrangement can change at all levels. Changes can originate from cultural changes in norms or ideas for instance on the role of the government or international trade (some would call that Landscape changes (Geels and Schot, 2007)), but also from technical changes or developments or social experiments introduced in markets or governance mechanisms (Niche

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experiments, see Wiskerke et al., 2004; Poppe et al., 2009) or Small wins (Termeer et al., 2019a)

With this analytical frame in mind, let's have a look at Dutch agriculture: the institutional framework in the 1960s and what we experienced in the last 50 years. Of course this can only be painted with a broad brush (for more details, see: Bieleman, 2008; Termeer et al., 2019b; Oskam et al., 2010)





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Where we came from:

Back to the sixties

The main characteristic of the institutional organisation of the Dutch food system in the 1960s was that it was government-led with a modernisation paradigm. The Second World War ended in the west of the country with a hunger winter and left the Netherlands heavily damaged. Sicco Mansholt, the legendary Dutch minister for agriculture (and later the first EU Commissioner for Agriculture) warned farmers that their labour productivity was too low to be internationally competitive. Their export was needed to earn dollars and pay for imports to rebuild the country. Farmers could grow or exit and intensification of land use was one of the options. It worked wonderfully well in a Europe *sans frontières* that experienced improved incomes.

The economic ideology for Europe was the mixed economic model, in between the market-oriented USA and the command economy of the USSR, we were taught (Andriessen, 1972). Important instruments for the government were the Common Agricultural Policy (CAP), the Agricultural Knowledge and Innovation System (AKIS) as present in the Dutch triptych OVO – *Onderzoek, Voorlichting, Onderwijs*, and the land re-allotment policy (*ruilverkaveling*). The flagship of the modernisation were the new polders in Flevoland.

In the markets agriculture was governed by economic text-book mechanisms such as daily auctions, weekly cattle markets and trade exchanges (*'de beurs'*). Local cooperatives competed with private companies and organised themselves in federated, second-tier coops. The CAP provided indirect price support that supported income, production and modernisation. With an inflow of capital and an outflow of labour as a result.

As part of the AKIS, the Landbouw Economisch Instituut (Agricultural Economics Research Institute, LEI) supported this modernisation process with cost price calculations (also the basis for the pre-CAP agricultural policy), optimal farm size calculations with linear programmes, regional economic studies for the land re-allotment programmes, and a famous policy study on the 'small farm issue' (Bauwens et al., 1990).

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What we experienced:

From the 1970s onwards

In the 1970s it became clear that the modernisation paradigm of the mixed economy could run into trouble. The story can be best explained from two perspectives, a productivity and a sufficiency perspective (SCAR, 2011).

Productivity view

The modernisation process with its support for supply led to overproduction in the form of butter mountains and wine lakes. This implied high budget costs for the CAP and led at regulatory level to a major policy change: world market prices were adopted, with set aside and milk quota to restrict supply and direct payments to sustain income. Although supply was contained, environmental problems became prominent. It led to environmental legislation, direct payments were tied to greening and cross compliance. There were options for the government to cut the budget for the modernisation process by privatising the extension service and abolishing the DLG. This was in line with the ideas of new public management that followed the neo-liberal approach under president Reagan and prime-ministers Thatcher and Lubbers. Market failure was complemented with government failure. The fall of the Berlin Wall in 1989 strengthened the idea that the market economy could solve most problems. In this period farmers were labelled as Entrepreneurs and the sector became proud of its export success ('The second largest exporter that feeds the world').

The ongoing substitution of capital for labour led to a 'disappearing middle': only large farms and hobby farms survived. Economies of scale also dominated in the food chain. Food processors and retailers became large multinationals. The local cooperatives merged with each other and their second-tier cooperative, or dissolved it as in the case of Cebeco (Bijman et al., 2012) and became multinationals as well. Chain management in this agri-business complex led to more complicated governance mechanisms to exploit product differentiation, brand management and contracts with production specifications like GlobalGap to guarantee food safety.

Sufficiency view

The modernisation process of the 1950s and 1960s and its increase in income led to a counter-culture in the 1960s. Hippies that returned to the country-side found not only love and peace but also environmental problems. The damage of agro-chemicals was pointed out in *Silent Spring* in 1962 (Carson, 1962), and ten years later the Club of Rome saw limits to growth (Meadows et al., 1972) and Schumacher (1973) promoted ‘Small is beautiful’. Critical views of the farming industry and its modernisation process were also stimulated by food safety problems in several European food products (from Belgian dioxin chicken, Austrian wine, Spanish olive oil, EHEC in vegetables and BSE in beef), animal disease (Food and mouth disease, swine fever) and public health crises (Q-fever in Dutch goats). Climate change in relation to animal production is the latest but not the last issue in this row.

Formal rules followed this change in culture: environmental legislation on pesticides, manure, nitrate, etc., but also regulations on animal welfare and rules on organic farming that created a market. Contracts for nature management were offered. The environmental legislation typically started with information and extension, moved on to subsidising preferred behaviour (including cross compliance) and then started to forbid or prescribe farm practices, issue environmental quotas, or – as in the case of mink – made a farm activity illegal.

Non-governmental organisations became important actors

quest for food safety and specific wishes on issues other than price also brought the auction system for vegetables to an end. On the other issues non-governmental organisations became important actors, first by lobbying the government but then also attacking or collaborating with the food industry that has vulnerable brands to protect. This led to the introduction of products that were differentiated with animal welfare or nature-friendly concepts and produced under contract.

Some farms saw opportunities for a multifunctional business concept with a broader range of products and services, with niche products for which they often had to set up new short supply chains. At this level of resource allocation,

In governance mechanisms, retail took action on the food safety problems with private inspections and tracing and tracking systems. The large retail organisations with their

tradable environmental quotas started to play an important role, and environmental outcomes became important performance indicators.

In reality the two perspectives are of course intertwined and together shaped decisions by actors at certain moments. As part of the AKIS in this period the governance of the Agricultural Economics Research Institute LEI was strongly changed. It was merged into a holding company (DLO) of agricultural research institutes, financed on output instead of input as a civil service and merged into Wageningen UR. Since the 1980s it became much more internationally oriented. The traditional farm orientation was broadened to food chains, consumer research and new developments like information and communication technology.

Economic mechanisms

Looking back, three economic mechanisms seem to describe and explain the developments in agriculture over the last fifty years. First, there is the treadmill theory of Willard Cochrane (1958). It describes that higher national income also implies higher wages in society that are an opportunity cost for agricultural labour. If labour income does not increase in farming, farm workers and potential successors leave the sector; farmers experience an income gap with the rest of society. This is a trigger for innovation that improves labour productivity, promoted by government programmes in the AKIS and a business opportunity in companies that sell machinery, chemicals and animal housing. These are technologies that in a later stage sometimes turn out to have negative environmental or animal welfare aspects. Adoption, often by larger farms with a positive cash flow, pays as it lowers their cost price. But with increased production, either per ha or by taking marginal land into production, it also lowers the market prices. The lower margins are a signal to re-allocate labour to other sectors, but most farmers prefer to stay, and if possible innovate. This treadmill contributes to a growth of the agri-business complex of suppliers and advisors, but also to relatively high marginal land prices that are an incentive to intensify land use, resulting in environmental problems.

The second economic mechanism describes the changes in chain organisation. Gereffi et al. (2005) describe 5 archetypes for chain organisation, on the basis of the analysis of several non-agricultural chains. One extreme is the classical text-book situation of a homogenous market with many buyers and many sellers. The other extreme is the fully integrated company. In between are situations with a lead company and its suppliers, where depending on the

function of the suppliers and the types of contract the situation is described as modular, relational or captive. As Boehlje (1999) explained, there is a shift in the food industry from the market type to more complex forms. Relational and captive forms seem to have increased in importance. Also at farm level we now find more complicated business forms (National Academies, 2019; Poppe and Vrolijk, 2019).

A third economic mechanism is that of agglomeration or cluster effects that create synergy. Given modern transport methods, and the fact that feed conversion ratios imply that meat weighs 25% or less than the feed needed for the animals, it does not look very attractive to transport feed from Latin America

It does not look very attractive to transport feed from Latin America or Eastern Europe to the Netherlands compared to meat

or Eastern Europe to the Netherlands compared to meat. Especially given the environmental costs and high labour costs one would expect that food processors expand in the feed growing regions, not in

the metropole of the Netherlands where they are situated for historic reasons. The disadvantage of bringing feed, immigrants and even calves to the Netherlands and shipping the meat (and dairy) out, seems to be offset by the advantages of other location factors: the availability of specialised services in the agri-business cluster with educated knowledge workers, deep labour markets, international connections (Schiphol airport), an innovative business environment and an attractive living environment for staff in the green metropole (Wolf et al., 2019). These synergies even work on a smaller scale: glasshouse horticultural complexes in e.g. Drenthe never took off, although they faced advantages in wages and land prices, and remained dependent on the Westland region.





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Where we are:

Agri-business at crossroads

The developments over the last 50 years brought us to the current situation. For somebody from the 1950s it would look as a world in which the government decided not to govern and lead us to a promising future. Modernisation seems to be completed, the move to market integration finished. The CAP is non-interventionist. Market solutions with product differentiation (certified labels) and (technical) innovations are preferred options to address sustainability issues. Government is by polder-consensus, as at the climate tables, and faces a deadlock if there is no consensus like currently in the nitrogen crisis. There is a decentralisation trend in government, for instance in the environmental legislation (Omgevingswet, Regional energy strategies). In governance mechanisms contracts and labelling for product differentiation now play a big role. Agribusiness dominates value creation and markets, on sustainability issues

The majority of the income is generated with commodities that compete on cost price in international markets

checked by NGOs. There are some experiments in short supply chains, but their contribution to the income of the agri-business complex is small. The majority of the income is generated with commodities that compete on cost price in

international markets. Migrant labour helps to realise that. The environmental performance is improving but still problematic and regional in character: due to the strength of the sector the incentive to increase production is stronger here and at the same time the country is more populated than other regions. Even concerning an issue such as greenhouse gasses the challenge for dairy farming in the Netherlands could be higher than elsewhere given the releases from peat soils and competition from other sectors for the national emission quota. Land prices are very high, and as such a source of wealth for farmers, but also an incentive for intensification. Economies of scale dominate with low incomes for mid-sized producers (Vrolijk et al., 2020; Vrolijk and Poppe, 2019). At the cultural level this all leads to a fierce debate between those who want to stay with the productivity perspective of the old modernisation programme and those that see a sufficiency perspective as the new modernisation challenge. The first

group claims an important contribution to exports and global food security with efficiently made farm products that have a low sustainability impact per kg of product. Environmental legislation is judged from a level playing field view and seen as threatening to the farmers that have already a low income due to the heavy competition in markets. The second group sees the sustainability problems as an important challenge, points to the non-compliance of European environmental laws, and questions export at prices that do not compensate for environmental damage in the living environment of the citizen. Sustainability measures are not on a per kg but on a per ha basis. Some don't care much for the farm employment aspects, referring to reorganisations in other sectors, whereas others see a solution in reorganising the food system on a more local basis with higher consumer prices. These 'culture wars' also have an aspect of city versus countryside.

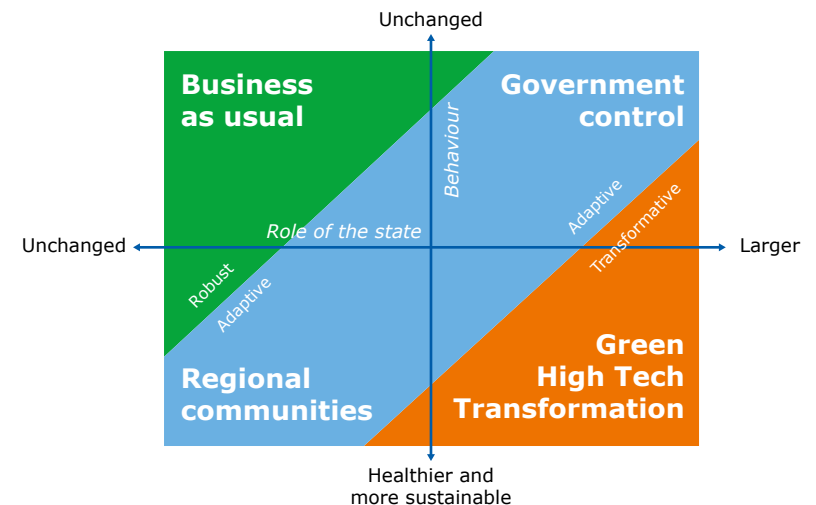
These culture wars show that the Dutch food system is at a crossroads and we therefore have to choose between alternative futures: we have to agree on the place and future of agriculture in this country. Disruptive shocks might be helpful to concentrate our minds in situations like this. I think it is relevant to look to two candidates for disruption. One is information and communication technology (ICT) that could lead to digitalisation and changes in governance and formal rules. The other is Covid-19 as an actual societal crisis.

Digital food systems

Economic development has seen several long waves (Kondratieff cycles) in which basic inventions and innovations led to periods of frenzy, followed by an economic crisis. Such a crisis became a turning point with institutional innovation, especially in older sectors of the economy (like food and agriculture) which led to a period of synergy before markets got saturated and external effects became problematic (Perez, 2002). The last century is a nice example: the combustion engine and mass manufacturing pioneered by Henry Ford led to a boom period, a deep crisis and then after the Second World War changes in agriculture (tractors, chemicals) followed by a period of saturated markets and negative external effects in recent years. Since Gordon Moore put the computer on an Intel chip in 1971 that still halves in cost price every 18 months, the world has been transformed by ICT. This has now the potential to revolutionise the food system from retail (platforms for home delivery like Amazon or Just Eat Takeaway) to agriculture (milking robots, vertical farming etc.) (Poppe et al, 2013, 2015 and 2016).

Covid-19

Elsewhere (Poppe, 2020) I speculated with the Williamson framework in a scenario analysis on the potential effects of the current Covid-19 pandemic on the food system. I have argued that markets and governance systems will quickly adapt to new market circumstances, as they have done in the past. The uncertainties at this moment are in the layers of formal government and culture: will societal priorities change in favour of more regional production and consumption spaces and will the state become more interventionist to manage the pandemic, the economic crisis and a green recovery to make our world more resilient and prevent a climate and biodiversity crisis?



Many think tanks (e.g. Rli, 2020) recommend a green recovery with an active government to fight the economic crisis in such a way that our living environment is improved and made more resilient. The European Commission expressed a similar view in its policy proposals (Green Deal, Farm to Fork).



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Where you are going to:

The future food system in a green high-tech transformation scenario

To solve the current culture wars on the future food system, I would suggest taking inspiration from the 1950's and 1960's modernisation process and challenge the sector to become the **most innovative metropolitan business cluster for sustainable and healthy food and (landscape) services**.

Such a modernisation mission acknowledges the innovation power of Dutch agriculture, as well as current global sustainability challenges and the fact that we live in a densely populated metropole. A metropole with the unique character that it is a multi-pole with agriculture between its cities – providing a relatively pleasant place to live and run your farm or food company in this era of Covid-19.

To operationalise this mission and to restore the trust between citizens and farmers, we should concentrate on the reconstruction of the rural areas, as we did with the land re-allotment programmes. Three actions are essential to support this reconstruction and a new green deal between citizens and farmers:

- Determine the environmental boundaries that the agricultural sector has to respect in 2030 and 2050, given the international treaties and national laws and translate that to farm level in the form of tradable emission rights for nitrogen (N), phosphate (P), ammonia (NH₃) and CO₂ equivalents. This provides clarity to farmers and replaces prescriptive regulation with management by objectives with room for innovation. Where needed, quota or quota reductions could be differentiated between regions and quota trade could come with requirements like deductions. This instalment of tradeable environmental quotas reduces business risk (Poppe and Jongeneel, 2020), and will satisfy NGOs. Transparency and trust between farmers and the government is currently undermined as international targets and national quotas that are not translated to the farm level and the government play the role of farmer by prescribing specific measures (e.g. on feed).

- Full transparency by farmers on the current environmental performance and progress with an obligation for environmental reporting based on full digitalisation of the food chain. Transparency improves if farms and food processing companies have to provide full environmental accounts (corporate social responsibility reporting, Hartmann, 2011).
- Regional reconstruction processes in which the design for the rural area for the next 25 years is made and agreed upon. Based on this transparency in environmental boundaries and in sustainability performance, regions could optimise their economic system, also taking into account other regional objectives like housing construction, tourism, nature and energy production.

Let's explore these three actions with illustrations from the research agenda of Wageningen Economic Research that could help the realisation of the mission in a Green High Tech Transformation scenario. The first two are in relation to digitalisation and the point of transparency. The third one is on regional land development, linked to the point of regional reconstruction processes.

Digital transparency: farm sustainability data networks

About 100 years ago Dutch farms were forced to keep financial records for income tax purposes. This led to the establishment of agricultural accounting offices and, after creating cost price methodology by the founding director of the LEI (Horring, 1948), to many study groups of farmers to improve their management. We know from the PhD of another LEI director that farm management competences differ largely between identical farms (Zachariasse, 1974). In the 1990s the mineral accounting scheme (MINAS) linked mineral

balances to financial accounting to make them auditable and demonstrate that digitalisation of invoices reduced administrative burdens by what is now called 'robotic accounting' (Breembroek et al., 1996). In the FLINT project we demonstrated that

Collection of sustainability indicators is possible in different European farm systems and administrative environments

the collection of sustainability indicators is possible in different European farm systems and administrative environments (Poppe and Vrolijk, 2018) which helped the European Commission to call for a Farm Sustainability Data Network in the Farm-to-Fork strategy. Recently several recommendations to the Dutch

government have called for farm level dashboards for circular agriculture (Commissie May), key performance indicators for biodiversity recovery and eco-schemes (Deltaplan Biodiversiteitsherstel, Rli on the CAP, see Poppe and Koutstaal, 2020) or a revival of MINAS (Commissie Remkes: *afrekenbare stoffenbalans*). Just as banks are obliged under PSD2 to make their data digitally available to their clients, and companies have to invoice the government in a digital form, all actors in the food chain should be obliged to use a UBL format for invoices and product dispatch notes. Software already available in the Dutch FADN could then nearly automatically provide farmers with those dashboards and support study groups using data science results. Work has started to link that type of data with data of sensors and open data from satellites and other sources and integrate it in data lockers for farmers and to improve the monitoring and evaluation of the CAP (EU MEF4CAP and Mindstep projects). This all means that food production can be made transparent and that food processors can be incentivised to report on their improvements in more sustainable production and rewarding farmers for their contributions, like the dairy chain has started to do (see Vrolijk et al., 2020).



Consumer data platforms

A similar approach could be taken on the consumer side. Lifestyle and diet-related diseases dominate health costs and it is increasingly recognised that the consumers should be supported to tackle issues such as obesity. With progress in health research (neuro-science, microbiome, genetics) in the coming years we are also going to learn more on the relationship between food and health. Trends in ICT imply that the consumer and their environment are now much more observable than in the past: shopping behaviour from cameras, GIS data and loyalty cards, cooking behaviour from smart kitchens, lifestyle data from apps, counting steps etc., and health data (even from smart watches). It would be great if citizens could manage that data and be involved in citizen science. Large tech companies like Google and Apple would love to manage this data for you and use it to sell you advertisements, products and services. They actively work on such solutions, but it can be questioned if a fully market-based platform is here the most attractive solution. Clear formal rules for good governance could help here. In European projects like EuroDISH (Snoek et al., 2018) we have put forward proposals for a Food, Nutrition and Health Research Infrastructure that includes such a Consumer Data Platform and Wageningen Economic Research is experimenting with its Food Profiler. Given the strength in the Netherlands in ICT, agricultural and nutrition research and health research, some cities should test such a solution in their local food policy. It could provide interesting marketing data to farmers (and developers of more sustainable and healthy food and services) in short supply chains and link consumers to production and the country side.

Regional strategies

A regional approach is needed to realise national transition goals: different themes like climate, energy, circularity, biodiversity have to be integrated and linked to regional priorities and economic structure (Rli, 2019). Even within 1 theme and sector, the issues differ between regions: in dairy farming the climate issue on sandy soils in the east of the country is quite different from that on peat soils in the west. Like in the 1950s and 1960s we could start with a regional reconstruction or land development programme. In a set-up of about 100 regions it must be possible to rebuild trust between citizens and farming with round tables and coffee. The CRA (College van Rijksadviseurs) and the EO Wijers Foundation have shown how design research can inspire new approaches.

A national allocation of quotas for N, P, NH₃, CO₂ with emission levels for 2030 and 2050 would be a prerequisite and in the new CAP direct payments should be turned into payments for eco-schemes topping up private labels (Poppe and Koutstaal, 2020). Instalment of 25-year conservation contracts like in the US to underpin farm strategy would also help, as well as budgets to demolish old buildings (also to prevent criminal use), devalue land for extensive use and for early retirement. Demographics will help, as many farms will close down in the years to come. Regional stakeholders have then to decide to which extent their land and quotas are used to solve the small-farmer problem (by enlarging the remaining farms) or to satisfy declining levels of environmental quota.

Economic research is well prepared to support such a process like in the 1950s and 1960s and work with farmers and their data. Computer capacity is now large and cheap enough to calculate alternative plans for each individual farm, as is

Economic research can also support the development of the regional governance

done in the EU Mindstep project. Farmers can be supported with alternative business models based on differentiation, diversification and non-farm income strategies as illustrated by Vrolijk et al. (2020).

Economic research can also support the development of the regional governance (private and public institutional arrangements) to maximise the income flow of the region and organise collaboration between farmers, land owners and other food chain actors and with other sectors (tourism, nature, water, energy) in the region.



In conclusion

Economics studies choices. As illustrated in this essay, that concerns not only choices of products and services but also of organisational forms. And Williamson's institutional economics framework helps us to understand not only the outcome of supply and demand, but also some of the societal processes, norms and values that influence these choices. The developments in the recent

The developments in the recent history of Dutch agriculture teach us that for a resilient society we need to accept that transitions are part of life

history of Dutch agriculture teach us that for a resilient society we need to accept that transitions are part of life. And that changes in farming and the food system are driven by trends in society. The need to raise labour productivity, the need to

cut government budgets, the need to make economies more flexible to fight stagflation, the need to address sustainability challenges are some examples that have led to policy interventions, new governance mechanisms and improved performance.

To make citizens and farmers more satisfied with the performance of the food system, we have to re-organise it in such a way that actors get the right incentives to do what they ideally should do. To solve the current crisis in Dutch agricultural politics, we can build upon the recent history and its modernisation process to realise an alternative food system. Government, industry and the civil society can create the **most innovative metropolitan business cluster for sustainable and healthy food and (landscape) services** if they wish to do so. This mission can be realised with a food policy that not only addresses agricultural practices with technical regulations and direct payments, but chooses a farm-to-fork approach (Fresco and Poppe, 2016).

The weak links in the food chain, the consumer and the farmer, should be supported with digitisation for transparency and to reap the benefits of data science. That asks for new institutions in the data market, given big data ethical issues. Setting clear environmental boundaries would improve transparency and reduce business risks. They could be the basis for land development in a regional approach that bring farmers and citizens around the table.

The Agricultural Knowledge and Innovation System should be organised to support this process. Economists at Wageningen Economic Research are developing interesting tools that build on an 80-year tradition of monitoring and impact analysis and can now be regionalised and individualised based on the latest technology. Economists often lack the design capacity of engineers and landscape architects, since they have a more analytical and reflective toolkit. Given the wide range of (not always realistic) dreams or misunderstandings on topics like price incentives, property rights, commons and other economic organisation mechanisms, a bit more engagement by economists might be useful.

In this way an alternative food system can be developed that shows a more satisfying performance. What it exactly looks like, how big it is in the Netherlands and how much activities will take place under Dutch management outside our borders is uncertain. But we cannot afford a standstill, we have to create a way forward. It's time for departure.

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