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Transition towards a new agricultural system as foundation for agricultural agreements

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The proposed approach to the nitrogen crisis in June 2022 has sparked a lot of discussion in the Netherlands. The political debate, both inside and outside the House of Representatives, creates (apparent) opposition between ecology, water and agriculture. Ecologists, ecological agriculturists, and environmental scientists rightly point out the challenges surrounding biodiversity and water quality, and the urgency to address the root causes of these problems. However, the debate overlooks what is really at stake: a social transition towards a new agricultural system, with a different relationship between food production and nature & environment, and a different appreciation of production and of our food. We are facing the challenge to integrate nitrogen, climate, soil, water quality, nature, and the perspective of the agricultural sector. It is not just about nitrogen. The nitrogen issue is only a symptom of a sub-optimally functioning system.

What needs to change?

Many agricultural experts, the 'eco-modernists', believe in technology. If we effectively use mechanization, ICT, genetic modification, etc., and all our knowledge, we can cleverly combine technology and ecology. We can intensify and concentrate food production, and thereby make room for nature. Without disqualifying technological innovations, which we certainly need, a technological wonderland will offer limited solutions (Miedema 2019). In 2015, the Program Approach Nitrogen (PAS) allowed investments in anticipation of promised innovations that would reduce nitrogen emissions. In 2019, the Council of State ruled that the PAS was in conflict with the European Habitat Directive (Rijksoverheid 2022b). The PAS is an example of (promised) technological solutions deployed by science, lobby, and politics to postpone or avoid truly meaningful social interventions.

The agricultural sector and the Dutch government are stuck in the agricultural (export) model (see boxes). We talk about new business models but continue to think in the same system. This will not lead to sustainable solutions. To achieve realistic social changes, we need insights from the socio-economic domain. We need new economic systems, farmers and citizens will have to relate differently to ecosystems and food, and agricultural entrepreneurs will have to learn new skills to produce in a different way.

Agriculture must change because the system has reached its boundaries. The post-war policy of Mansholt[1] led to rapid modernization and scale enlargement. However, overproduction and the resulting pressure on the environment has led to years of tinkering with laws and regulations and exploring new business models (Mansholt 2.0). In 2023, it is time for drastic changes in the economic model. We call this Mansholt 3.0.

How will we change?

Various recent reports outline and categorize transitions into intensive through innovation, extensive and alternative routes (Rijksoverheid 2022a; IRR 2022). Sustainability is key in each transition route. The extensive route is only relevant to land-based agriculture. As we further explored transitions, it became clear that we are pioneers and do not have a clear vision of the future goal. In the case of the nitrogen crisis, we also lack a clear future goal for agriculture in the Netherlands. The new government coalition agreement mentions new revenue models, but that is not the future goal. New revenue models are only the first stage of a transition. To be successful, we must establish a clearer vision of the mature stage of the transition.

Can agricultural entrepreneurs solve this problem?

No. It is unrealistic to shift the responsibility of a societal transition onto agricultural entrepreneurs who were raised, grown, and incentivized to invest within the framework of the first Mansholt plan: modernization, increased productivity, scale expansion and exports. Most agricultural entrepreneurs have limited financial capacity due to the unequal balance between revenue and capital and cannot transform their businesses into completely different circular or agricultural enterprises that meet the future's requirements before 2030. Moreover, these requirements are not concrete and are subject to changes (IRR 2022). Besides, the processing industry, trade, and retail sectors are where the larger revenues are earned.

Agricultural sector

In 2021, the Netherlands exported agricultural goods worth 104.7 billion euros, an increase of 9.4% compared to 2020. This is a combination of exports of Dutch products (75.7 billion) and the re-export of agricultural products from abroad (29.0 billion). 45% of exports go to Germany, Belgium, and France. The product groups with the highest export value in 2021 were ornamental horticulture products (12.0 billion euros), meat (9.1 billion), dairy and eggs (8.7 billion), vegetables (7.2 billion), and fruit (7.0 billion) (Government of the Netherlands 2022c).

[1] Mansholt was a reformer of agriculture, first as Dutch Minister of Agriculture, Fishing and Food Supply and later as European Commissioner for Agriculture (from 1945 to 1972).

What is the desired attitude of farmers and citizens?
Changing attitudes and behaviours is part of the societal transition. A more sustainable food system requires a new attitude from both producers and consumers. Producers must be aware that they are stewards of a (productive) ecosystem, and consumers must value the production methods, taste, and quality of food and be willing to pay for it. Currently, most consumers believe that more organic or sustainable products should be consumed, but ultimately they are limitedly willing to pay for it. This is also known as the intention-behaviour gap (Van Bussel et al. 2022).

The market share of organic products in Dutch supermarkets was 3.26% in 2020 (EU leader Denmark 12.1%). The share of organic agricultural land in the Netherlands was 4.1% in 2020 (EU leader Austria 26%) (Bionext 2020). The share of products with a kind of sustainable label in the total food turnover in supermarkets was 21% in 2021 and is increasing annually (VVI 2022). So there seems to be room to motivate more consumers to purchase more sustainable products.

Meat

In 2020, the Netherlands was the largest meat exporter in the EU, both in value (€8.8 billion) and weight (3.6 billion kg). Of this, 85% is meat produced or processed in the Netherlands. The rest is re-export or transit. 60% of the total Dutch earnings from meat sales are earned through meat exports, and 40% through domestic meat sales (CBS 2021).

How can societal transitions be financed?
A new financial agricultural system is needed for a true transition. We see two important building blocks:

1. Sustainability bank
2. Sustainability levy

The system must remain affordable for farmers, consumers, and the government. It must stimulate new entrepreneurship where food production and sustainability go hand in hand and are valued. In recent years, there have been many projects with ecosystem services, where agricultural entrepreneurs were rewarded for measures such as improving biodiversity or water quality. Ultimately, there was often only temporary or insufficient funding to scale this up to large areas.

This can be different if more and structural resources are available. The new system must generate sufficient income through a combination of production and services. Lower income from production as a result of transitions should be compensated for by income from services.

How does a Sustainability Bank work?

A Sustainability Bank that incorporates different ecosystem services and new entrepreneurship is central to social transitions. A new Sustainability Bank could play a coordinating role in relation to:

1. Income from carbon sequestration (carbon credits)
2. Income from environmental taxes
3. Income from entrepreneurship and "red for green" initiatives
4. Expenditures on ecosystem services

For example, a Sustainability Bank could generate revenue at the regional or provincial level. The bank could trade carbon credits resulting from biomass sequestration on public and private lands or from the reduction of peat oxidation. The profits would then be made available for a sustainable ecosystem in the form of ecosystem services. Valuing carbon sequestration may even be a game-changer for the new agricultural system. On the one hand, there will be increasing top-down obligations (from the European Commission via the European Trading System). Currently, there is no mandatory carbon credits market for agriculture, but it may be included in the future along with air travel. On the other hand, voluntary participation in carbon credit trading would be encouraged: those who do not participate would have a competitive disadvantage (not being green is not efficient). In addition, the carbon credit market is becoming increasingly liquid (with better tradability and measurement methodologies via accredited agencies), which will only help to accelerate its use.

Money can also flow into the Sustainability Bank through a levy. For example, an Environmental Levy could be set up at the provincial level, similar to a sewerage levy at the municipal level.

There is also ample potential for generating a revenue stream through "red for green" entrepreneurship. We already have "red for green" arrangements in several provinces, and it would be good to scale these up. In the Netherlands, we still need to build 900,000 homes in the coming years. If we link development profits to this green challenge, we can lay a solid foundation for a new sustainable financial system. A portion of the development profit from a wind turbine (park), solar park, residential landscape, etc., would fall under this category. The money would be made available for a sustainable ecosystem or ecosystem services.

How does a Sustainability Levy work?

Consumers will not automatically pay significantly more for sustainable products. A financial incentive is needed for that. The prices of sustainable and non-sustainable products could be made more equal. This can be achieved, for example, by blending sustainable or organic milk into regular milk (IRR 2022), while the price difference between organic and regular milk remains intact for the dairy farmer. It is highly likely that demand for sustainable and organic products will increase as a result. You can also impose a levy on non-sustainable products and pay that extra amount to sustainable products. This rewards a farmer who produces sustainably and avoids being forced to produce a lot per hectare.

A Sustainability Levy may not be immediately embraced abroad. Let us first focus on the Dutch market. See the sidebar.

How would a Sustainability Levy work?

Currently, a litre of regular milk in the supermarket costs 1.20-1.40 euros and organic milk costs 1.50-2.00 euros (AH October 2022). In the future, they will cost the same because, for example, an extra 20 cents levy will be added to regular milk. The levy will be available for milk with a sustainability label or ecosystem services. We may work with two levels of sustainability so that the farmer can choose what fits their business operations. If the system is stable, simple, and powerful, Europe may possibly follow. The system with many sustainability labels is currently too complex. Each processor has one or more labels, which is not recognizable to the consumer.

The above example of an economic innovation does not mean that the nitrogen crisis is immediately solved, but it does mean that a system will be introduced to reward more sustainable production. Ultimately, this promotes a system that involves less concentrate feed and more grazing. Lowering the crude protein content from 16.5 to 15.5 in the ration hardly affects the production level while reducing ammonia emissions by 10% (Siemens interview (2020) with WUR specialist Jan Dijkstra). And there is much more to gain, as there are successful dairy farms that feed 13.5% crude protein in the ration (Erisman and Verhoeven 2019). The rest of the nitrogen reduction must be anchored in sustainability KPI's so that they have no financial consequences for the farmer.

What is the role of the government?

The above economic innovations cannot be left to the free market. The government must embrace and financially enable them. This is already happening but needs to be future proof. In addition to existing budgets, a transition fund for rural areas and nature is being established, with €24.3 billion available until 2035 to financially contribute to international obligations. The funds are specifically intended to meet the legally required national targets for nitrogen, climate, and water (Coalition Agreement 2022; Dutch Government 2022a). Part of this fund can be used to establish a Sustainability Bank, so that it can continue to exist after 2035.

Ultimately, economic measures should also contribute to a fair price for the farmer and not end up in higher margins for retailers. Here, too, the government can play a role, as we can see from the new legislation that guarantees farmers an acceptable selling price for agricultural products. For example, last year, the Macron government in France tightly regulated transparency in food prices and the selling price of farmers in the supply chain by law.

Dairy

The Netherlands is not the largest net exporter of milk in the EU in terms of kg, but it is in terms of euros (Van Hal et al. 2021). The Netherlands exports relatively expensive (processed) products and imports relatively cheap milk products (especially milk powder). Of all the milk we process in the Netherlands, about 35% remains in the country, and almost two-thirds is exported, mainly to Europe. Dutch dairy products had an export value of 7.5 billion euros in 2020 (NZO 2022).

Vegetables and fruit

In 2021, the Netherlands was a leading trader of fresh vegetables and fruit. The value of Dutch production of fresh vegetables and fruit was €3.8 billion, imports were €9.2 billion, and exports were €13.1 billion, of which a large part was re-export. The majority of all traded vegetables and fruit goes to our neighbouring countries, and 95% remain in Europe. The top 5 import products are avocado, grape, banana, blueberry, and orange; the top 5 export products are tomato, avocado, bell pepper, grape, and banana (GroentenFruit Huis 2022).

Final conclusion

A new system for food production and appreciation is needed. A system in which farmers and consumers are rewarded and incentivized to produce and consume sustainably. The basis for this lies in a Sustainability Bank, which includes funds for all kinds of ecosystem services such as through a Sustainability Levy. These are prerequisites for a transition to a future-proof agro-food chain.

To achieve this, all parties must take responsibility for change and fulfil their (new) roles. This also applies to us as a University of Applied Sciences: the place where science and practice comes together. With this paper, we want to call for action, starting with making positions clear. Who will join us?

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Niek de Boer

Niek de Boer is the Director of Research at the Leeuwarden location of Van Hall Larenstein University of Applied Sciences. He is a farmer's son with an environmental background, who has always worked at the intersection of agriculture, water, nature, and the environment. In addition to this role, he is also active in the steering group of Dairy Campus and as a board member of Fjildlab North-East Friesland. In those networks, a lot of work is done on sustainable agriculture.

Robert Baars

Robert Baars is a professor of "Climate Smart Dairy Value Chains" at Van Hall Larenstein University of Applied Sciences. He focuses on nitrogen and climate issues related to dairy farming in the Netherlands, as well as in the international context of development cooperation. Throughout his career, the interaction between research, education, and agricultural practice has been central to his work.

Rik Eweg

Rik is professor of "Territorial Transitions to Circular Agriculture" at Van Hall Larenstein University of Applied Sciences. With his research group, he focuses on the question of which innovations and transition paths are needed for the change towards a nature-inclusive circular agriculture system. As a planner, he has experience in scientific research, in public administration and in a national innovation programme.

Wiepk Voskamp

Wiepk is professor of "Sustainable Dairy Farming" at Van Hall Larenstein University of Applied Sciences. She has a background in R&D and strategic innovations in the sector. Her current practical research focuses on the current challenges facing dairy farming in the Netherlands and translating them into farm management. Grassland management, feed ration, animal health, and profitability are important pillars in her research.