

Overall assessment and recommendations

An innovative and productive sector that must address longstanding sustainability problems

The agriculture and food sector in the Netherlands is innovative and productive, competing in global markets on both price and quality. The sector has followed a development path common to most countries where ongoing consolidation reduces the number of farms while average farm size increases. The agriculture sector has become one of the most efficient in Europe and the world. Trade has expanded fourfold in the past 20 years and the Netherlands is the second largest agricultural exporter in the world, in part due to its role as a major trading hub for Europe. The importance of the greenhouse and horticulture sector as a share of agricultural production value is unique in Europe. The horticulture sector operates on a different model than does the rest of Dutch agriculture; it uses relatively little land, receives a small amount of support from agricultural policy and is exposed to different risks than other forms of production.

Dutch agriculture is highly efficient, and many products have relatively low emission intensity of production when compared with other countries. The environmental footprint of the sector per unit output has been steadily improving via productivity growth and technical innovation. However, increasing and intensive production is running up against environmental limits and may be beyond them in many areas. A 2019 court ruling found that past nitrogen policy was not in line with the requirements of the Birds and Habitats Directive, prompting a costly and painful adjustment of the sector to come in the next years to reduce ammonia emissions that harm sensitive landscapes. Other issues such as GHG emissions, water quality and biodiversity will also require difficult choices to address as targets in many cases remain far off.

There is a new realisation that the overall system limits are such that some readjustment of the sector is required. In particular, the need to reduce nitrogen deposition via ammonia emissions to the point where it no longer threatens sensitive nature cannot be achieved in a reasonable timeframe by technological improvements alone and not everything will be possible everywhere. This is an important turning point for the sector, and significant financial resources have been allocated to support the transition to a more sustainable agriculture.

Many of the factors affecting objectives for water quality, GHG emissions, ammonia emissions and more are rooted in livestock density, but there is no single solution that addresses all problems at once. Reducing the size of the animal herd will be necessary in many areas, and specific mitigating actions for each objective are also available. Some objectives require local solutions, such as for “peak loaders” with high emissions near Natura 2000 sites where nitrogen deposition subsequent to ammonia emissions poses a particular risk to ecosystem health. Other objectives, such as GHG emissions reductions, are not sensitive to the distribution of emissions.

As identified in the 2015 report, the strength of the agricultural innovation system is not focused on solving pressures from environmental externalities

A strong innovation system led by the private sector has been a key driver of productivity gains and is a central feature of policy, but it has not been able to solve the acute environmental problems facing the sector. Indeed, the orientation of the innovation system towards private over public objectives was a concern raised in the 2015 Innovation Review of the Netherlands. Despite some useful new programmes, the limitations of the innovation system to address environmental problems have not been fully addressed.

The 2015 Innovation Review recommended that the Netherlands strengthen the ability of agricultural policy to improve the environmental performance of agriculture, by focusing agri-environmental measures to objectives and outcomes rather than on process and meeting EU regulation constraints and revisit the balance between regulation and economic incentives in view of fostering environmentally friendly innovation. This review finds that the Netherlands has made many improvements that align with the recommendations of the 2015 review, but more remains to be done in many areas. Progress is especially notable in the agricultural education system, which effectively brings together farmers and research institutions to enable change at the farm level. This helps build a strong foundation for the future of the sector. However, the farm advisory system still has not fully adapted to the need for holistic advice regarding farm sustainability.

The circular vision for agriculture put forward in 2018 expresses the government's aspirations for the sector. This vision needs to be made more concrete and compelling to change the mindset of all actors in the sector and it needs to be more present in the policy making process if ambitious sustainability goals are to be realised. The absence of early and effective action with respect to ammonia emissions has led to the current crisis, and the lessons of this must be learned if similar situations are to be avoided in the future. There are still many areas where policy actions have been insufficient to solve environmental challenges, in particular with respect to farmland biodiversity, nutrient surpluses and water quality. The policy perspective for the sector must move away from short-term maximisation of opportunities subject to environmental constraints, to one of finding a long-term balance between agriculture and nature values. Trying to operate at the very edge of environmental limits is difficult and poses substantial risks if policy makers get the balance wrong.

Many opportunities remain for the agriculture sector in The Netherlands, and its future is bright. But that future can only come if all sustainability concerns are addressed as quickly as possible. Delay only brings higher costs, uncertainty and reduced prospects for the future. Once on a sustainable footing, the promise of innovative R&D that responds to both environmental concerns and the opportunities of new markets for knowledge intensive products can be realised.

The Netherlands uses the space in the new CAP to transfer funding from income support to sustainability and rural development objectives. Broadening who can participate can bring additional benefits.

CAP policy has emphasised making maximum use of flexibilities for environmental and social sustainability issues, and this continues to be the case in the latest CAP cycle. The CAP Strategic Plan (CSP) anticipates a substantial transfer of funds from Pillar 1 to Pillar 2, providing more targeted funding for sustainable development objectives, starting at 15% and increasing to 30% by 2027. Eco schemes in Pillar 1 will be an important part of the overall policy mix, with funding of EUR 152 million per year that is not affected by the progressively higher transfer of funds to Pillar 2. By contrast, the direct payment under Pillar 1 will be reduced from EUR 387 million in 2023 to EUR 290 million in 2027.

The Netherlands is one of only five EU Member States using a multidimensional eco-scheme that bundles all eligible interventions in one programme. Farmers can choose to implement up to 24 different eco-activities, earning a higher number of points and more compensation for greater ambition. This structure

of eco-schemes can help incentivise producers to take more ambitious actions and helps address the phenomenon observed with green direct payments in the last CAP where farmers tended to choose “productive” options that had lower biodiversity benefits.

The trajectory of the CAP orientation towards rural environment and social sustainability is expected to continue. It is likely that at some point, the existing agri-environmental scheme (AES) approach that puts voluntary action by individual farmers at the centre of policy delivery will reach its limits. The Netherlands has demonstrated through its AES for farmland birds that coordinated action through farm organisations can be more effective than individualised effort. This idea is already being extended to other AES subject areas, but it can be taken farther still.

The Local Action Groups of the LEADER programme, which are allocated EUR 67 million in the CSP, are a model that could be expanded to agri-environmental schemes. Farmers are community members connected to the social and economic fabric of rural areas. Finding ways to involve the larger community can make certain types of programmes more effective and attractive. This can be particularly relevant for agro-tourism or where farmland is at close proximity to natural areas such that joint action between farmers and community members is mutually beneficial. It can also help farmers wishing to transition from the sector by giving ex-farmers some opportunity for continued engagement

Transformative change is essential. The sector must embrace it.

The health of the sector and its prospects fundamentally depend on its capacity to produce value in the context of its environmental limits and the changing demands of the market. The 2019 Court ruling on nitrogen deposition on sensitive nature made clear that reducing the number of livestock is necessary to reduce damage to biodiversity in sensitive areas, despite resulting in painful short-term disruption. Farmers who have invested in their operations based on past and expected policy settings may be expected to resist change, but the present situation is still not sustainable and more will need to be done.

The Dutch government has allocated EUR 24.3 billion to a transition fund for the sector, on top of billions already in place to reduce emissions. The idea is a one-off adjustment that moves the sector away from the edge of its environmental limits and makes space for extensification of remaining farmers. The current approach is based on voluntary and compulsory buy-outs or investments in innovation or relocation of livestock farmers for a limited group of “peak loaders” with high emissions in sensitive areas. The pool of willing sellers will set the pace of progress in the early stages, but the evolving nature of the buyout programmes may encourage farmers to wait to see if a better deal will become available. This is recognised and reflected in recently revised policy design that provides for higher payments for early adopters, but strong uptake in the near term will remain the most important metric of success.

Current policy aims to ensure that those that remain have a secure long-term place in the sector and the economy. Giving remaining farmers a perspective is important, but should be without prejudice to the eventual size and distribution of agricultural production and should reflect the market principles that have been an important success factor for the sector to date.

It is unlikely that payments alone can bring the sector to where it needs to be. To build consensus on required actions will require moving beyond consultation and negotiation to involving the sector in data collection and analysis, agenda-setting and program design and delivery. By involving sector representatives in all important phases of the process they can better internalise the difficult choices that must be made, and solutions that they have helped to design will be seen as more legitimate.

While the sector continues to restructure in favour of fewer, larger farms, the productivity benefits of consolidation appear to be slowing

Average farm sizes have increased by 35% between 2005 and 2016, from 24 hectares to 32 hectares and there were about half as many farms in 2020 as there were in 2000. This is a result of consolidation of

smaller farms, and the number of small farms (under 5 hectares) reduced by half between 2005 and 2016. At 20%, these farms make up a smaller share of all farms than in many other EU countries.

Farm consolidation is an almost universal phenomenon in developed countries and by itself is not a cause for concern. Economies of scale have helped drive total factor productivity (TFP) growth and kept the sector cost-competitive with other countries. However, growing farm sizes and intensification has resulted in manure surpluses. Organic nutrients have transitioned from being a valuable by-product to something that must be disposed of, often by export to other countries.

Productivity growth has until recently been an important part of output growth. Increases in productivity have been driven in the past by the exit of labour from the sector (a common phenomenon in the OECD area), production quotas that influence capital spending, and structural changes in the sector that bring economies of scale. Recent low productivity growth is concerning as it coincides with lower output growth and a reversal of past gains in the emissions efficiency of production. This may be related to the sector nearing its environmental limits. Reigniting sustainable productivity growth path will improve the future prospects of the sector, especially in the context of environmental constraints, including GHG emissions reductions commitments.

Reflecting the local situation in policy design can promote change efficiently and effectively, but the enabling conditions must be in place

The government has taken an approach to reducing ammonia emissions that considers the local situation when determining the need for emissions reduction. Part of this is identifying “peak loaders”, those farms whose emissions pose the most risk to sensitive natural areas. This is an important policy feature to ensure that emissions reductions are as cost-effective and efficient as possible. In addition, working closely with local governments and stakeholders can help to build consensus. The national government is overall responsible for setting and achieving the objectives and the Transition Fund, but responsibility for planning and implementation for emissions reductions has to an important degree been devolved to regional governments

Devolving responsibility to regional governments can help with local autonomy and anchoring of plans, but not all governments may have the policy capacity in place or the incentives to create the necessary plans in the given timeframe. There is much that the national government can do to support and accompany regional governments in their planning processes. For example, developing or deploying expert networks to support regional policy makers, creating opportunities for governments and stakeholders to share responsibilities and experiences and other logistical support can help regional partners to create plans, communicate them to their constituencies and implement them successfully.

Regional and local partners also need to be sure that the difficult decisions they make will not be undermined by backsliding or met with additional demands. If the national government can provide a stable policy setting, regional actors will be more able to plan and act with confidence.

The strong Dutch agriculture knowledge and innovation system (AKIS) will continue to be a comparative advantage, but it must prioritise environmental performance

The intensification of production is reaching environmental limits

Highly intensive dairy production is the dominant agricultural land use in the Netherlands. The country has more than four times the average European livestock density and milk yields in the Netherlands are higher than both the EU and OECD averages and amongst the highest in the world. Dutch cereal yields are also higher than both the OECD and EU averages and among the highest in the world reflecting high

productivity built on input intensity. Glasshouse horticulture area increased by 20% since the 1980s. Glasshouse horticulture farms have undergone significant structural change over the last two decades with a steady increase in farm size. However, specialisation and intensive production systems have also led to increased pressure on the sustainability performance of farms. Rebalancing the AKIS system between productivity and sustainability will help prepare the sector for long term sustainability.

The Dutch AKIS system is strong, highly developed, and efficient...

The AKIS is made up of a diverse group of actors at various levels. The main components of the systems are well developed and include vocational education systems, a three-tiered agricultural education structure, and active private sector involvement. These are supported by a proactive government that provides public services, funding, and defines innovation schemes in partnership with companies and research institutions.

The Netherlands has a world-class agricultural education system with many highly rated training institutes and universities and Dutch farmers are relatively well educated. Dutch agricultural research is internationally renowned, with WUR consistently listed as one of the top universities in the world for agricultural education and research. The *Groenpact* initiative, a national support programme for promoting education, lifelong learning and innovating professional practice in agriculture, horticulture, food and nature and the living environment, complements this system.

...based on the Top Sectors approach to public-private-research partnership where private funding plays a leading role

The AKIS system, also called the “Triple Helix” or “golden triangle”, works through cooperation between knowledge institutions, businesses and the government. The system is divided into nine leading export sectors as the “Top Sector” policy (*topsectorenbeleid*), which account for 80% of Dutch R&D. This has been a successful model for both harnessing research funding from a variety of sources and ensuring partnerships across the sector. Government funding for agricultural R&D has increased in recent years, although the private sector (through the Top Sectors) is the main contributor of funding for R&D.

Strong international collaboration and partnerships on R&D lead to success in accessing EU funds like Horizon Europe and increase the profile of Dutch researchers and their work. The Dutch government and the agro-food research sector play an active role in global agriculture initiatives, bilateral cooperation, and development cooperation actions on agriculture. Such strong collaborative efforts, particularly those assisting developing countries to improve the productivity of their agricultural systems, are a valuable contribution to the global food system.

The private sector also plays an important role in delivering extension services

Privatisation has changed the character of agricultural extension services. This approach is consistent with a principle of the private sector paying for private goods, which reduces the financial burden to the public and is a competitive free market approach. However, such advice is often linked to commercial interests of the providers. The government has recently been investing more in independent investment services to provide broader advice to farmers.

The innovation on the farm initiative, particularly, the SABE (*Subsidiemodule Agrarische Bedrijfsadviesing en Educatie*) vouchers to access independent impartial advice, is an effective system that helps to overcome some of the disadvantages of a largely privatised extension service system and provides independent advice without the expensive overhead of a traditional public extension service. Peer-to-peer learning systems, field labs and demonstration farms play an important role in technology transfer to and between farms. The European Innovation Partnership (EIP) innovation instrument can help to take innovations (such as co-creation, investments or monitoring) to the farm level.

Public policy has moved towards promoting competitiveness and innovation in farming systems

The Ministry of Agriculture, Food and Nature (LNV) has focused on promoting competitive and innovative farming systems. The CAP national strategic plan provides funding of EUR 183 million for innovation, knowledge dissemination and cooperation, and the Netherlands dedicates about 8% of its Pillar 2 budget to AKIS, compared with the EU average of around 2%. Despite a higher co-financing rate for research related to public-goods and externalities, these have not been the main focus as it is difficult to monetise this research. A step in the right direction is the mission-oriented innovation policy, in which the public and private Top Sector partners are engaged in the joint drafting and implementation of policy agendas in four societal challenge areas. However, the current approach mainly aims for incremental improvements that may not be sufficient for the needed transformation of the agricultural system.

The innovation system can do more to support environmental sustainability in production if the right priorities and incentives are set

Innovation has always been a key feature of Dutch agriculture but slowed progress on environmental performance suggests that this is an opportune moment to check whether the innovation system is focussed on the right issues. One of the strengths of the AKIS is the world-leading research capability of WUR and the close partnership between public institutions and private enterprises. However, private investments will naturally focus on innovations that are rewarded in the market and not on environmental externalities. This has led to relatively more emphasis on productivity improvements, and farmers engage much more readily with the AKIS for productivity innovations than for environmental performance improvements. While improved productivity has been good for the competitiveness of the sector and has reduced emissions intensity, it has not enabled an ambitious path to sustainability. This was raised as a concern in the 2015 Innovation review, which noted that the Top Sectors approach could lead to insufficient emphasis on public goods. Stronger government leadership is needed to ensure that public funds are used effectively.

The vision of circular agriculture presented in 2018 foresees a marketplace that values and rewards nature-based solutions and the sustainability characteristics of food products. While it is important to inform consumers about the implications of their food choices, changing consumer demand alone is unlikely to drive the needed environmental improvements or fix environmental externalities in a reasonable period, especially considering the importance of exports to the sector. A good policy foundation sets the stage for both public and private innovations that serve the public interest. It is up to the government to set clear conditions via legislation and rules that internalise environmental externalities and incentivise the AKIS to invest in environmental performance. This is also connected to the issue of policy certainty discussed above. Increasing the priority of environmental sustainability in the innovation system will be an important success factor for the future. The challenge is to do this without undermining the features of the Top Sector approach that make it so effective. Government leadership and funding, market signals, regulatory constraints and incentives for producers to engage more will all have a role to play.

Innovation is important for the prospects of the sector and, in the current context, there is urgency to change the incentives for the AKIS. It is critical to set a clear path to achieving environmental objectives in a reasonable timeframe that does not rely on yet-to-be developed or deployed technologies. The current plan for ammonia emissions reductions is a good example of setting a path for progress. Once environmental objectives are attained, innovation can expand the space for future productivity growth and development.

The potential benefits of digital technologies are high, especially for monitoring environmental performance

The Netherlands is well placed to reap the potential of digitalisation. More than 98% of households have fixed broadband internet access, compared with about 80% for the EU-27. But investments are still needed in digital infrastructure and the skills and services that complement digital technologies. For example, the latest digital technologies such as cloud computing require faster fibre networks and next generation 5G wireless networks. Limited data sharing and portability and lack of trust still limit the potential of digitisation for agriculture.

Digital technologies can provide new ways to inform farmers about their environmental performance, help governments improve the efficiency and effectiveness of existing policies and to design better ones. For instance, freely available and high-quality satellite images dramatically reduce the cost of monitoring many agricultural activities. This can allow governments to move towards more targeted policies, which pay (or penalise) farmers based on observed environmental outcomes. In addition to monitoring compliance with environmental policies, digital technologies enable automation of administrative processes for agriculture and the development of expanded government services, such as advisory services.

Focussing policy on results, supported by data and in collaboration with the sector can help avoid future crises

OECD Agri-Environmental Indicators show an environmental situation that is not improving. Nitrogen surpluses, a key challenge, have not improved meaningfully since 2008 and are well above the EU average and that of regional peers. Water stress, while low in absolute terms, is above the OECD average, rising, and sensitive to the effects of climate change. Farmland bird populations are now only 54% of 1990 levels. While relatively more spending is directed to farmland than to natural areas, the outcomes in terms of biodiversity improvements on farmland have been generally worse. The current situation, which exists despite an overall increase in spending on environmental and social objectives, seems to warrant a greater willingness to experiment with the way programmes are delivered.

The 2015 Innovation Review recommended improving the environmental performance of agricultural policy by focusing agri-environmental schemes (AES) to objectives and outcomes rather than on practices or processes to meet EU regulation constraints. It also called for revisiting the balance between regulation and economic incentives to foster environmentally friendly innovation.

Programme design is changing to address sustainability challenges. The Netherlands already has a good example of results-based AES in the form of the *Agrarisch Natuur- en Landschapsbeheer* (ANLb) system for nature and landscape management. Participants are rewarded according to results in terms of observed bird nests and other features, as well as for actions such as delayed mowing. This programme was established in 2016 and covered 92 000 hectares in 2019, so is probably not currently at a scale to solve the overall decline in farmland birds.

The ANLb is being expanded to include climate change and water issues in the new CAP. There are still several known implementation challenges with results-based approaches such as lower incentives for farmers to participate and the difficulty of collecting observational data as part of programme delivery. The valuable experience gained in implementing the ANLb gives the Netherlands a leg up in effective design and implementation of results-based approaches.

Better environmental data can help improve policies...

Result based approaches need data, especially for environmental performance. Data collection via the Farm Accountability Data Network (FADN) in the Netherlands has a relatively good sampling rate on

environment compared with other countries. However, a well-funded and ambitious data strategy covering all farms is still missing. Comprehensive farm-level data allows for better monitoring the evolution in priority areas at the regional and national level and make it easier to identify potential adjustments needed in policy measures. For instance, the new Spanish Farm Information System (SIEX) brings together information from different sources, including a new farm electronic notebook informing farmers about their environmental performance and aiding monitoring of farm practices. A data strategy can enable more comprehensive data collection by addressing concerns about the regulatory environment governing the data collected and balancing data privacy concerns with the potential benefits.

...and building capacity to think strategically is needed to successfully address upcoming challenges...

Despite substantial policy development and implementation capacity within LNV, certain situations such as declining farmland biodiversity, nutrient surpluses and less than good water quality have become chronic issues. The current situation where reducing animal numbers is required to limit ammonia emissions is an example of a longstanding problem that was well known but never definitively addressed until the situation became urgent. As recently as 2018, the strategic objectives of the Agri & Food Top Sector covered environmental issues only in general terms. In retrospect this is an oversight, especially given the fact that the weaknesses of the Integrated Approach to Nitrogen (*Programma Aanpak Stikstof*, PAS) system were already understood at that point. As stated in the Remkes Report *Wat Wel Kan*, “The current government is dealing with the legacy of years of ineffective nitrogen policy. It is now no longer possible to postpone measures”.

As mentioned earlier, a focus on results and transformative policy change is necessary, but this is not the whole story. There needs to be a greater institutional capacity to systematically identify and address long term issues. Building this capacity will require a combination of elements, including working in concert with the sector. It is difficult to imagine how a long-term policy initiative that is simply imposed on the sector could be successful. Finally, having the capacity to deploy the tools of strategic assessment and work through the implications of alternative actions is needed to enable a results-based approach.

Strategic foresight should be used to identify and resolve challenges before they can become serious. Strategic environmental assessment should be applied to evaluate the implications of policies, including their cumulative effects. Being more specific about upcoming threats and making concrete plans to address them is the best way to avoid a repeat of the current difficult situation with respect to ammonia emissions. The proposed EU Nature Restoration Law, with its focus on results-based outcomes, can help provide a structure for long-term thinking.

...and develop a vision and an ambitious agricultural innovation strategy that puts the environment in the front and induces innovation towards concrete progress on sustainability

For many years, Dutch agricultural policy aimed for continued expansion of the agricultural sector while reducing over time its environmental impact through technological change and innovation. Indeed, great progress has been made at reducing the environmental footprint of the sector per unit output since the 1990s. This path of technological improvement is far from being exhausted, despite slower progress or reversals in some environmental indicators in recent years. The Netherlands is a leader in technology development and its agriculture sector is one of the most productive in Europe.

The 2015 Innovation Review pointed to the need for a long vision for the sector which recognises the need to improve environmental performance while maintaining productivity growth. A vision of circular agriculture was put forward in 2018 to guide Dutch policy to help the sector live within its environmental limits. Circular agriculture in the Netherlands encompasses matching input quantities to environmental carrying capacity,

circularising waste flows from the food system, reducing waste, and regionalising more of the production chain. Given the global nature of agricultural trade, those elements of circular agriculture having to do with efficient cycling of nutrient and waste flows within the Netherlands itself are the most critical for addressing current environmental challenges. This circular agricultural vision must be more specific with respect to nutrient flows and the respective roles of and incentives for government, consumers and farmers if it is to effectively guide public policy and provide the appropriate signals for private investment.

Less frequent regulatory adjustments will reduce policy uncertainty, but this requires bold action

The 2015 Innovation Review called for policy stability to encourage private investment. This continues to be an area where more work is needed. One way to help with this is to establish policy settings in a way that ensures environmental objectives are achieved with a high probability in a reasonable timeframe. This will avoid having to change the rules in mid-course. In the past, environmental legislation has been continually strengthened to improve sustainability, but this frequent revision of rules and regulations has led to a perception that inconsistent and changeable policy frameworks are a counterproductive risk to farm businesses. While even the best regulatory systems will draw complaints, frequent adjustment of environmental rules not only risks discouraging investment, it also makes it more difficult for regional and local governments to partner effectively with the national government if they have to frequently revise plans.

Policy certainty is not as easy as it might seem. Governments must balance finding opportunities for growth with concerns about sustainability. The more finely this balance is struck, the more likely that environmental limits will be exceeded and further policy tightening required. This continual adjustment to try to find the margins of sustainability leads to policy uncertainty and missed objectives. Witness the fact that the country is on its seventh Nitrogen Action Plan under the Nitrates Directive and that the Fertiliser and Nitrogen Act and Environment and Planning Act have been revised nearly every other year, yet nutrient surpluses remain an important problem. Providing policy certainty requires maximising the probability that targets will be met. This means ensuring that the sector operates well within environmental limits rather than at the edges of them.

Help give farmers perspective for the future, without relying on support payments

The government has clearly stated the objective to give a secure business model and planning certainty to farmers who choose to remain in the sector once the painful adjustments to address ammonia emissions are completed. There are many ways that the government can help accompany the sector through the changes that are to come, but relying only on payments such as for ecosystem services can inject policy risk into farmers' business models and builds an implied obligation on the part of the government with respect to farm profitability that should not be there. Entrepreneurial risk and adjustment to new market realities are normal business features.

There will be parts of the country where intensive agriculture will still be possible, and others where environmental constraints will sharply limit the form of agricultural production. Profits tend to become capitalised in fixed inputs, especially land, so that land price adjustments can in principle account for the different economic potential of each location. But land price adjustments can be disruptive in the short term, especially as land ownership is often financed by or used as collateral for bank loans. Aid with financing and restructuring of debt and finding practical ways to deal with stranded assets can help during a period of transition. Zoning of land use can help maintain agricultural production in areas where the agricultural land value is less than alternatives like residential or commercial construction.

There is a good deal of discussion regarding the need for the government to become involved in the reallocation of farmland as peak loaders either are bought out or relocate and it will be tempting to use

concessionary land prices as part of this. However, this risks short-circuiting the price function of land markets and providing arbitrary and non-transparent windfall profits to certain producers.

Policy recommendations

In the light of the above assessment, the following actions are recommended.

1. Bring down the environmental pressure of the sector quickly, while ensuring a future to remaining farmers

Quickly implement the Transition Programme to address excessive ammonia emissions

- Immediate action is required to reduce ammonia emissions and resulting nitrogen deposition on sensitive natural areas. Delay will mean higher costs and greater dislocation in the future. Targeting “peak loaders” with high emissions near sensitive areas is important for effectiveness. Reducing overall deposition should be prioritised, otherwise, the crisis will continue indefinitely.
- Buy-outs offers for peak loaders should be very generous to start and reduce significantly after the first year to incentivise early action. The government should signal the use of mandatory reductions and restrictive regulations if voluntary action is insufficient, with clearly defined thresholds of progress acting as trigger points.

2. Realign economic and regulatory incentives to ensure that negative environmental externalities of agriculture are fully internalised

Use SMART objectives combined with better data and analysis to prioritise success while reducing risk and uncertainty for farmers

- Set specific, measurable, achievable, relevant and time-bound (SMART) objectives for environmental outcomes with respect to biodiversity, air, water and soil quality at national and sub-national level. Undertake analysis to determine farm-level conditions required to meet these objectives with a high probability. Set appropriate regulations or other measures (including via the CAP) to ensure that these are met, recognising the area-specific nature of such settings. The goal is to avoid frequent changes in policy parameters by moving boldly on a path towards sustainability rather than making incremental progress where action is easier. This will reduce policy risk for farmers while providing appropriate incentives to the AKIS system to develop needed environmental technologies.
- Make better use of data, including at the farm level, to ensure success by establishing a feedback process that connects progress towards objectives with policy adjustments. Ensure that this mechanism is transparent and involves stakeholders to provide greater policy certainty to farmers.

Define clear responsibilities for regional and local governments and other stakeholders

- Regional governments have a large role to play in preserving nature and biodiversity in the Netherlands, including how to achieve national objectives on emissions reductions. How the national government accompanies its counterparts to overcome challenges on the way to achieving targets will be crucial, and careful tracking of progress until 2030 will be required to ensure that ambitious objectives are achieved. A dedicated steering committee to track progress on ammonia emissions reductions that can flag problems could be helpful in this regard.
- Clarify the responsibilities of farmers and other participants in the agro-food value chain with respect to environmental objectives, keeping in mind the polluter-pays-principle. This will help ensure a fair and appropriate burden sharing between taxpayers, consumers and stakeholders.

- Work with regional and local governments, farmers, consumers and other stakeholders to build support and consensus for regional plans to achieve emissions objectives. This could be through expert networks to support regional policy makers, creating opportunities for governments and stakeholders to share experiences and other logistical support that enables regional partners to both create plans and communicate them to their constituencies. Share responsibility for agenda-setting and management of the process with farmers and the public to ensure local anchoring of plans in the communities that will be affected by them. At the same time, do not let consultation be a cause of delay in implementation.

Build upon the success of existing innovative agri-environmental programmes to make results-based approaches a larger part of the policy framework

- Leverage the experience gained in the ANLb system to make greater use of results-based approaches to environmental challenges. The expansion of this programme to climate and water issues in the new CAP is an important step in this regard.
- The points system that will be implemented for eco-schemes under the new CAP is an improvement over past approaches that should increase the prevalence of measures with higher biodiversity and environmental benefits. The principles of results-based approaches can be applied here as well to ensure that eco-schemes deliver real benefits.

3. Develop an ambitious strategy to create a data-driven sector that can assess and monitor its economic and environmental performance

Develop a strategic vision for the sector that provides clear priorities towards an environmentally sustainable path

- Improve the capacity of LNV to carry out long term planning by placing the strategic planning group in the organisational structure such that it can influence policy development horizontally. Give this group a mandate to champion strategic thinking within LNV and operationalise the Circular Agriculture vision. Apply tools such as strategic environmental assessment to current and future policies. Use strategic foresight tools to identify trends that are likely to have significant long-term influence.
- Ensure that the lessons of the Nitrogen crisis are internalised in the LNV by creating experience-sharing opportunities within the Ministry and encouraging staff training that will help officials take advantage of those lessons as they design policy.
- Create a contact group made up of representatives of farmers, consumers and civic society to participate in data collection and analysis to build consensus on the issues facing the sector and the policies that may address them.

Use data to design and implement better policies and inform farmers regarding their environmental performance

- The results-based approaches mentioned above depend on effective data collection for their success. SMART objectives require good information to evaluate progress and adjust policies to ensure success is achieved. The Netherlands already has many of the building blocks in place and should leverage its comprehensive internet connectivity, strong technical capacity and vertically integrated innovation system to become a world leader in agri-environmental information systems.
- Create an overall data strategy to lift barriers to digital technology adoption on farm and by advisory services. A unified and clear data governance arrangement can address concerns about the regulatory environment governing the data collected and increase farmers' willingness to adopt digital solutions. Find a balance between protecting the privacy and confidentiality of data, while leveraging their potential for the sector's growth and innovation.

- Use data to improve the awareness of farmers regarding environmental sustainability problems to help build buy-in and consensus on the need for action.
- Promote digital technologies that can help advance climate, biodiversity, and sustainability goals.

4. Keep the strengths of the innovation system while boosting its capacity to improve the sustainability of the sector

Retain the benefits of the Top Sector approach while giving the government a more active role in setting priorities for research in the public interest

- The government should prioritise environmental sustainability in the innovation system and take a more active role in determining the direction of agricultural research and innovation in the Top Sector Agri & Food. This includes shaping selection criteria, being more selective regarding projects and including more government-led proposals.
- Get the incentives right for the AKIS to invest in environmental performance by correctly reflecting environmental goals in farm-level regulations. Increase government co-funding for public-goods related research and earmarking funding for public goods in the existing research funding framework. Ensure that public funds are used effectively to deliver public goods, including CAP funding for innovation. Adjust the rate of R&D tax credits to favour sustainability projects.
- Help public-goods oriented groups such as advisors, educators and NGOs to participate in the Top Sector process by lowering co-financing requirements for priority projects connected to sustainability objectives.

Building on the vouchers programme, direct advisory services towards knowledge and adoption of environmental sustainability innovations

- Support and expand peer-to-peer learning with a focus on environmental sustainability. A cross-border exchange programme for farmers and advisory service providers could improve awareness of novel solutions. Use advisory services to provide impartial training and advice to farmers to help them address new challenges, especially for environmental sustainability.
- Encourage the development of farmers organisations with a focus on environmental sustainability taking as a model regional groups in which the most advanced farmers in terms of production techniques interact with each other (for example, in France and Argentina). Operational groups should be used to build awareness among farmers, consumers and other stakeholders.
- Increase availability and access to education and training opportunities for farm workers, including temporary and seasonal workers and immigrants with lower skills relative to their Dutch peers. Free vouchers for training temporary workers similar to the SABE approach can eliminate disadvantages and to allow them to participate fully in society, with the consequent benefit for the Netherlands in terms of attracting and integrating young workers. Given the importance of labour in horticulture, education and training programmes could be first targeted to workers of that sector.
- Increase the awareness of sustainable production systems among farmers, consumers, and all stakeholders, including organic. The organic strategy offers a timely opportunity to advance this. Reserve a proportion of SABE vouchers to support a transition to organic or nature intensive agriculture. Include content regarding sustainable agriculture in the education system to help increase awareness and demand for sustainability characteristics of food products.

Provide incentives for farmers to engage more directly with knowledge opportunities by linking on-farm environmental planning to existing support programmes

- Provide collaborative training opportunities for farmers to produce their own environmental assessment and action plan in the form of an environmental management plan for the farm. These

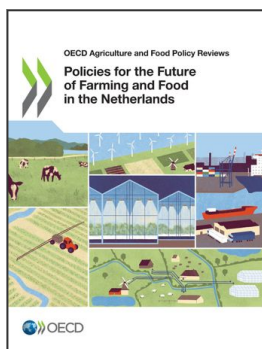
should assess all relevant dimensions of environmental impact and identify an action plan to mitigate them. This action plan should draw on solutions identified by the AKIS.

- Reward farmers who engage with the AKIS on sustainability issues in this way by making funding mechanisms such as the investment incentives provided by MIA/VAMIL (*Milieu-investeringsaftrek/Willekeurige afschrijving milieu-investeringen*) contingent on such participation by co-financing the actions identified in farmers' action plans.
- Work with the entire value chain to set the scope and priorities for the content of environmental management plans to maximise consumer benefits and market impact. Consider a certification or labelling scheme to identify products produced under an environmental management plan.

From world leader in agricultural productivity to world leader in innovation for sustainability

The Netherlands has built an agricultural sector that is a world leader in productivity and competitiveness. This was achieved in a way that assumed that innovations in technical measures and increased efficiency would ultimately solve the associated environmental pressures. But environmental challenges have grown increasingly urgent, and it is now recognised that “not everything is possible, everywhere” and the sector must fundamentally adjust to stay well within its environmental limits.

To achieve the transition to sustainable agriculture, the government has put substantial resources and effort into its transition plan. The strong innovation capacity of the sector can be a powerful engine if the government sets the right conditions to make it work for addressing the sustainability challenges. Farmers, government and other actors must work together to achieve the vision of the sector as a world leader in innovation for sustainability.



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