

Implementation Programme

for the Vision for the Future of Plant Protection 2030

Content

1. Introduction	4
1.1 Vision on plant protection in 2030: resilient plants and cultivation systems	4
1.2 Transition theory	8
2. Find a different way forward	10
2.1 Find a different way forward	10
2.2 Agricultural entrepreneurs are key	10
2.3 The here and now	11
2.4 The lead-up to 2030	14
3. Resilient cultivation systems	16
3.1 How do we define resilient cultivation systems?	16
3.2 IPM in relation to resilient cultivation systems	17
3.3 How to make resilient cultivation systems a reality?	18
3.4 The context for resilient cultivation systems	19
3.5 Targets	21
3.5.1 <i>Plant and cultivation systems are resilient</i>	21
3.5.2 <i>Agriculture, horticulture and nature are connected</i>	22
3.5.3 <i>Virtually no emissions</i>	23
3.5.4 <i>Virtually no residues</i>	23
4. Building blocks	24
4.1 Monitoring and an integrated approach	24
4.1.1 <i>The status of Dutch plant health</i>	24
4.1.2 <i>An integrated approach</i>	24
4.2 Prevention	25
4.2.1 <i>Resilient soil and other fertilisers</i>	25
4.2.2 <i>Fertilisation and resilience</i>	26
4.2.3 <i>Resilient species</i>	26
4.2.4 <i>Propagation material</i>	28
4.2.5 <i>Resilient cultivation concepts</i>	28
4.2.6 <i>Connecting agriculture and horticulture with nature</i>	29
4.3 Applying technical and biological measures	31
4.3.1 <i>Using beneficial organisms</i>	31
4.3.2 <i>The microbiome</i>	31
4.3.3 <i>Induced resilience</i>	32
4.3.4 <i>Technical measures</i>	32
4.4 Plant protection products	33
4.4.1 <i>The wide availability of plant protection products</i>	34
4.4.2 <i>Current issues</i>	35
4.4.3 <i>Speciality crops and minor uses</i>	37
4.4.4 <i>Biocides</i>	37
4.4.5 <i>Working conditions</i>	38

4.5 Emission reduction measures	39
4.5.1 <i>Current agreements designed to reduce emissions to virtually zero</i>	39
4.5.2 <i>Additional actions</i>	39
4.6 Residue reduction measures	40

5. The transition process for resilient cultivation systems and environmental factors **41**

5.1 Management instrument for the action perspectives of agricultural entrepreneurs	41
5.2 The connection between building blocks and resilient cultivation systems	41
5.2.1 <i>The (continued) development of resilient cultivation systems</i>	41
5.2.2 <i>The implementation of cultivation systems in the field</i>	42
5.2.3 <i>The adoption of resilient cultivation systems</i>	44
5.3 Environmental factors	45
5.3.1 <i>The chain</i>	45
5.3.2 <i>Phytosanitary import and export requirements</i>	45
5.3.3 <i>Innovations and investments</i>	46
5.3.4 <i>Integrated policy</i>	47

6. Monitoring **48**

7. Governance **49**

7.1 Principles	49
7.2 Processes	49
7.2.1 <i>The National Programme for Agricultural Soils</i>	49
7.2.2 <i>Circular agriculture</i>	50
7.2.3 <i>The Delta Plan for Restoring Biodiversity in Green Spaces in the Netherlands</i>	50
7.2.4 <i>The CAP and the National Strategic Plan</i>	50
7.2.5 <i>Reviewing manure policy</i>	50

1. Introduction

The Vision for the Future of Plant Protection 2030 and this implementation programme both elaborate on the vision put forward by the Ministry of Agriculture, Nature and Food Quality on circular agriculture: Agriculture, Nature and Food: Valuable and Connected (*Landbouw, natuur en voedsel; waardevol en verbonden*). The added value of the Vision for the Future of Plant Protection 2030 and this implementation programme is that they indicate a direction for the future and provide a joint compass to get there. The government and other relevant parties are setting to work on the vision together, creating synergy in activities designed to bring about a break from past trends. To read the full text of the Vision for the Future of Plant Protection 2030, see the text box in Subsection 1.1 below.

1.1 Vision on plant protection in 2030: resilient plants and cultivation systems

Plant protection in the social context

Effective plant protection is essential

Effective disease, pest and weed control is essential for high-quality, economically viable agricultural and horticultural production. A key pillar of this is integrated pest management (IPM), for which growers need an effective package of measures and products. Social and political concerns have arisen about the effects on people, animals and the environment of the use of certain groups of plant protection products in food and feed production and in ornamental horticulture. Biodiversity and residues in food are hot issues. The scientific approach underpinning authorisation of plant protection products, which determines whether or not statutory norms are met, has not proved sufficient to allay these concerns. In addition, new scientific insights into the effects of active substances on people, animals and the environment have led to more and in some cases stricter assessment criteria for these substances in plant protection products. As a result, there is an increasingly limited range of authorised products available. These developments are making adequate plant protection increasingly difficult, and resistance to the available products is a serious threat. For these reasons, growers are urgently in need of innovative measures and products to control diseases, pests and weeds. In the longer term, the challenge we face is to organise Dutch agriculture and horticulture in a way that ensures not only crop health but also the health of the environment. In short, a transition is needed, where the focus of our thinking shifts from plant protection to resilient plants and cultivation systems. To achieve this a paradigm change is needed.

Ambitions for sustainable plant protection

In 2030, the Netherlands will lead the world in sustainable plant protection and this will be the business model with which Dutch growers and parties in the value chain will make their mark on the international market. Central government and stakeholders will jointly commit to this ambition, so that growers and the value chain as a whole will be able to take steps forward in the coming years. Key factors are safeguarding good economic prospects for actors in the long term, as well as the availability of sufficient, effective measures and plant protection products.

Plant protection does not stand alone, but is an integral part of farm management aimed at sustainable production. There are direct links between plant protection and national and international phytosanitary regulations, soil management, manure (e.g. biostimulants), biodiversity and nature, ground and surface water and agreements already reached on them in relation to measures to tackle violations of environmental quality standards. Like the Ministry of Agriculture, Nature and Food Quality's vision on circular agriculture, this vision on plant protection takes 2030 as its target date. However, agreements have already been reached on numerous subjects that have a different target year. These agreements will remain in force. They concern, for instance, goals in the policy document Healthy Growth, Sustainable Harvest (target date 2023) and the Water Framework Directive (target date 2027). Consumers also have wishes in relation to sustainability to which the retail sector and the agriculture and horticulture sectors respond.

At international level, the Netherlands has committed to the United Nations' Sustainable Development Goals (SDGs), with ambitious and specific goals for responsible consumption and production (SDG 12), tackling climate change (SDG 13) and restoring and preserving biodiversity (SDG 15). Crop protection falls under SDG 12 on responsible consumption and production, since it aims to reduce the release of chemical pollutants and other waste to air, water and soil. Effective integrated pest management is essential to achieve every SDG. Climate change can lead to the establishment of new diseases, pests and weeds in the Netherlands. Resilient plants and cultivation systems are part of climate adaptation, since

they may prove to be more robust in the event of extreme weather conditions. For biodiversity, the goal is to protect, restore and promote ecosystems.

The aim of ensuring more sustainable plant protection is broadly supported in the Netherlands. The policy document *Healthy Growth, Sustainable Harvest* sets out goals and activities for the period between 2013 and 2023. Various stakeholders (including the Dutch Federation of Agricultural and Horticultural Organisations (LTO), the Dutch Crop Protection Association Nefyto and Agrodīs) have each identified their own ambitions and visions for 2030. And in September 2018, the Minister of Agriculture, Nature and Food Quality published the policy document *'Agriculture, nature and food: valuable and connected'*.

The *'Vision on plant protection in 2030: resilient plants and cultivation systems'*, published by the Sustainable Plant Protection Administrative Platform, builds on these documents and strengthens existing government policy as set out in, for example, the Water Framework Directive. This vision, which is shared by key stakeholders and central government, aims for economically viable, sustainable cultivation of agricultural and horticultural products, in the interests of people, animals and the environment. The added value of this shared vision is that it sets out a path for the future, and provides a compass to guide us. Both the government and stakeholders will work hard to achieve this ambition. This vision focuses specifically on sustainable plant protection, without losing sight of closely related issues.

Plant protection in 2030

By 2030, agriculture and horticulture in the Netherlands will have adopted sustainable production methods, with resilient plants and cultivation systems, so that diseases and pests have far less chance of taking hold, and the use of plant protection products is reduced to a minimum. Where plant production products are used, this is done in accordance with the principles of integrated pest management, with near-zero environmental emissions and near-zero residues. This assures the agriculture and horticulture sector of continuing, good economic prospects.

We have fleshed out the main outlines of this vision in the following three strategic goals:

1. Resilient plants and cultivation systems;
2. Close connections between agriculture, horticulture and nature;
3. Near-zero environmental emissions and near-zero residues on harvested products.

Strategic goals

1. Resilient plants and cultivation systems

Plant protection is a major production factor. By 2030 it will be based on resilience: crops will be sturdy, and cultivation systems will be largely self-regulating. Diseases and pests will have less chance of taking hold, so that the need for intervention will be brought to a minimum. Where necessary, smart adjustments – time and place-specific and as green as possible – will be made. These robust production systems, which have yet to be developed, will lead to more consistent yields and quality, and will strengthen relationships in the value chain.

Integrated pest management is already a major aim in plant production, and progress has been made. But ensuring plant health on the basis of resilience goes a step further, and calls for a paradigm change (figure 1). There is a delicate balance in the conventional, risk-driven approach, and minor changes can lead to the emergence of diseases and pests that have to be eliminated. With the new approach, the system is robust and can itself cope with minor changes.

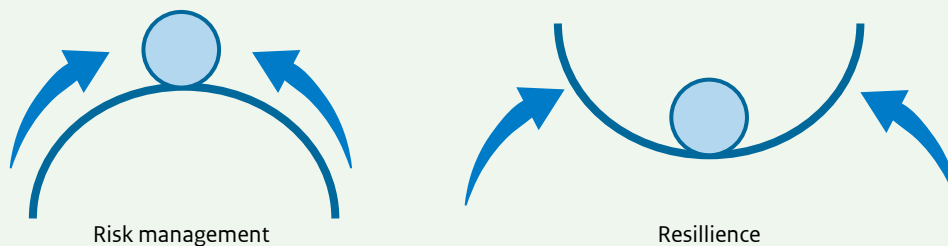


Figure 1: The difference between a risk-driven approach to plant health and one based on resilience. (from: Erisman et al., 2016. *AIMS Agriculture and Food* Volume 1, Issue 2, 157-174).

In a resilient system, the crop's natural resilience is determined by:

- **Resilient varieties:** by 2030 agriculture and horticulture will wherever possible be using robust, sturdy varieties that stay healthy in changeable conditions and despite pressure from diseases or pests. With a view to the future, varieties will be bred for important properties such as vigour, intrinsic resilience and resistance to diseases and pests. Propagation materials are clean, robust and free of diseases and pests. Using new genetic technologies resistant properties can be introduced into plant varieties more rapidly. This creates opportunities to develop more varieties that are more robust, as the pillars of a resilient system.
- **Resilient plants:** Plants with a high intrinsic or induced resilience, supported by a natural shield of microbial helpers in and around the plants and their roots. Crops will be made genetically more diverse, possibly with mixed cropping, so that from the start an optimum biological buffer is in place.
- **Resilient cultivation systems:** Soil (fertility, structure, life and moisture management) and substrata, microclimate and environment (increased biodiversity in and around farms) support plant resilience and keep diseases and pests at bay. Vice versa, crops are suited to local circumstances (soil, moisture and climate). This is boosted by preventive use of functional biological diversity at both macro and micro level (a biological 'standing army'). The resilient, robust systems are intrinsically resistant to more extreme weather events caused by climate change (drought or flooding) or are physically protected against them (covered cultivation). Farm management will be geared to maintaining optimum soil quality as this is a major basis for resilient cultivation systems.
- In setting up the cultivation system, the focus will be on strengthening natural properties and processes. At business or regional level, plant production and other types of land use (e.g. livestock farming) will complement each other, and intensity and type of cultivation will be in balance with the carrying capacity of the natural system (e.g. the soil).
- Precision farming supports the integrated approach. Even in resilient systems, diseases and pests continue to pose a threat. New technologies for precision farming (e.g. using sensors, drones, and a system approach for the purpose of diagnosis), enable crops and soils to be monitored more frequently. This, in turn, enables diseases and pests to be detected more quickly, so that decisions can be made on location-specific and time-specific interventions. Where plant protection products are needed, low-risk products are preferred and measures are taken to keep environmental emissions to a minimum.

2. Farming and nature are interconnected

To a large extent circular farming is about linking up farming and nature. This is described in the policy document 'Agriculture, nature and food: valuable and connected'. This vision on plant protection in 2030 follows on from this. This means that farmland will feature more valuable and diverse natural features by 2030, and will benefit from nature in the form of pollination, soil fertility and disease and pest prevention. An example is the circular greenhouse and the biological ecosystem in the greenhouse.

Functional agro-biodiversity (e.g. construction of buffer zones, wild plants on farmland and around greenhouses and introduction of genetic diversity in cultivated crops) supports plant protection and at the same time provides a suitable habitat for fauna and flora. Field crops are a major source of food and a suitable habitat for butterflies, bees and other pollinators and beneficial insects.

Biodiversity in and around the farm is essential, to provide cover for natural predators (biological pest control) and support use of biostimulants, for instance. Wild plants should be allowed to grow criss-cross through farmland. Another option is to ensure high biodiversity in field margins or in nature areas around farmland. Nature will thus contribute to ensuring resilient plants and cultivation systems.

3. Near-zero emissions and near-zero residues on products

Environment

Dependence on plant protection products will be drastically reduced when plants and cultivation systems are resilient (see strategic goal 1), integrated pest management is applied, and the link between farming and nature is restored (see strategic goal 2). This will also greatly reduce emissions of plant protection substances into the environment.

The goal for near-zero pesticide emissions to the environment is arrived at by extrapolating existing goals. In cases where these products are used, the sector will apply innovative, emission-reducing technologies. Precision agriculture used in combination with sophisticated formulations and adjuvants, location-specific weather forecasts (wind force and direction, precipitation) and the right soil structure will ensure that fewer plant protection products are used and only where disease, pests or weeds have been detected, while drift, evaporation and leaching will be avoided wherever possible.

Fewer applications of plant protection products with virtually no emissions will make people living in the vicinity of agricultural or horticultural businesses feel safe.

Residues on products

Food safety targets relating to residues of plant protection products will be maintained at their current high levels. Any new insights into products' safety should always lead to an assessment of whether the pre-determined level of protection is still met. Since the use of plant protection products in 2030 will be in accordance with this vision, the risk of pesticide residues in food will diminish.

Follow-up

Partly on the basis of the interim evaluation of the policy document 'Healthy Growth, Sustainable Harvest', the relevant stakeholders and the government will set up a joint implementation programme with action plans for the short, medium and long term, for which this vision will be the compass. The aim is for the implementation programme to be available before the 2019 summer recess. It is part of the wider programme implementing the policy document 'Agriculture, nature and food: valuable and connected'.

A number of leading principles underpinning the implementation programme include rewarding and supporting initiatives that make essential steps towards achievement of the vision, and optimum use of our knowledge and research infrastructure, specifically where it involves public-private cooperation and a value chain approach.

Parties will do their utmost to achieve the strategic goals. In doing so, we will be working to achieve the Netherlands' ambition to become a global frontrunner in sustainable plant protection, enabling Dutch growers and value chain parties to make their mark on national and international markets (see the paragraph under the heading 'Ambitions for sustainable plant protection', page 1). The route towards achieving this ambition will partly be determined by a number of challenges which, in their turn, will be influenced by other forces, like EU policy and market trends. The parties involved endorse the great importance of achieving this vision, and will do all they can to meet these challenges. This includes:

- Ensuring lasting economic prospects for agriculture and horticulture, with adequate financial scope (e.g. through a fair market price for sustainably produced products) for entrepreneurs to invest in sustainability and the link with nature. A level playing field within the EU is essential, with due regard for differences in national circumstances (e.g. for the Netherlands, water as a defining feature, and use of advanced agricultural knowledge and technology in the sector);
- Ensuring effective measures and plant protection products remain available to control diseases, pests and weeds during the short and long-term transition process;
- Improving the EU's market authorisation system in order to promote investment in and market access for innovative plant protection products (including low-risk products like microbiological products), through optimisation of procedures, cost reduction and risk-based product evaluation and decision-making. Authorisation of plant protection products will continue to be based on scientifically validated assessment methods, carried out by an independent authority;
- Adequate legislation and regulations and/or scope to experiment to enable application of new plant breeding technologies (e.g. CRISPR/Cas);
- Providing fundamental and applied knowledge on the development and maintenance of resilient cultivation systems;
- Safeguarding phytosanitary and safety standards for propagation materials, food and feed (e.g. mycotoxins) in connection with international trade;
- Integrated national and international approach to subjects related to plant protection, e.g. manure (regulations for biostimulants) and soil management;
- Consistent, risk-based enforcement that rewards compliance and discourages non-compliance.

The above tasks will also be addressed by the implementation programme's monitoring and evaluation system, so that adjustments can be made to enable achievement of the goals and thus of the ambitions, while new developments can be taken on board.

1.2 Transition theory

The Vision for the Future of Plant Protection 2030 describes the need for a paradigm shift. Its achievement will require a major transition, which will include a shift in perceptions, a change in underlying values and norms, the restructuring of social networks and interactions and a change in power structures and control systems. Transition theory is increasingly being used to tackle difficult social issues. These issues are characterised by a number of factors that are particularly challenging: the involvement of a large number of parties with conflicting values, for example. However, transitions are never complete and can always be improved.

Where difficult issues are concerned, there is a danger that the challenge presented by the changes required will be underestimated. The challenge underlying the Vision for the Future of Plant Protection 2030 has a number of the characteristics typical of a transition, as set out above. Given this fact, the small wins framework for transition management developed by Katrien Termeer (Wageningen University and Research (WUR)) will be drawn on in this implementation programme. Small wins are small, in-depth changes that yield tangible results for the parties directly involved. Given the visual results achieved, small wins often generate the energy necessary to carry on. Although a single small win does not – of course – constitute a transition, a series of small-scale small wins can pave the way for large-scale, in-depth transitions. Besides this, a transition requires shared leadership from all of the parties involved and the ability to think outside the box.

Transition theory

The transition theory developed by Katrien Termeer will be key to this implementation programme.¹ A control perspective for transitions has been developed on the basis of four important debates about transformations and transitions. It is based on the concept of working towards the resolution of major social issues via a number of accumulative ‘small wins’. Small wins are small, in-depth changes that yield tangible results for the parties directly involved. An accumulation of small wins can be achieved via the following three transition pathways: disperse (scale up innovation), broaden (apply innovation to other fields) or deepen (make the innovation even more radical).

Various catalysing mechanisms apply for small wins. *Energising* occurs when the visible result of a small win gives people a direct incentive.

Experimenting enables people to test their explicit and implicit assumptions. *Logic of attraction* makes it possible to visibly share successes. Where the oil stain, relate and robustness are concerned, people follow other people, which can lead to a broader movement. Although a small wins strategy is difficult to formulate, it is possible to formulate ambitions, to recognise, elicit and initiate small wins, activate catalysing mechanisms and break taboos and barriers.

The insights of Wageningen Economic Research (WECR) have been drawn on too: capability, opportunity and motivation are all essential to the achievement of change. Chain partners and the public sector must help growers by providing them with the instruments necessary to realise the transition. Therefore, efforts in this respect will not lie entirely with growers.

Capability has a lot to do with knowledge and information. How do growers familiarise themselves as much as possible with newly developed knowledge and information about the conditions and approach appropriate for the vision?

Opportunity involves facilitation – from a commercial or legal point of view, for examples. How are building blocks and incentives created for the realisation of a transition? However, *Opportunity* also involves ‘being in

¹ Termeer, Katrien et al., 2019, ‘Een small wins raamwerk voor transitie management door het ministerie van infrastructuur en waterstaat’. Wageningen University & Research | Termeer, Katrien. Expert paper ‘Het bewerkstelligen van een transitie naar kringlooplandbouw’. Wageningen University & Research.

a position to afford': if a different form of plant protection exposes a grower to more risks, they can be borne jointly, in the interest of social desirability.

Motivation also includes an intrinsic component: what makes parties want to switch to the use of resilient cultivation systems and keep the environmental impact of their activities to a minimum? How can the agro-industry, the retail sector and consumers embrace and support this on a structural, harmonised basis, so that positive control is exercised by the chain?

2. Find a different way forward

This section describes the change conditions necessary to realise a transition, after which later sections will indicate the interventions realised as a result. Both reveal the system change necessary if agricultural entrepreneurs are to move in the direction envisaged. This does not mean that this movement will be possible for all of the parties in and outside the chain to achieve without effort and leaving existing patterns behind. However, for the success of the transition in question here, it will be vital for agricultural entrepreneurs to be able to continue their business operations in an economically sustainable manner, with resilient cultivation and virtually zero emissions as the new normal.

2.1 Find a different way forward

Agricultural entrepreneurs are finding it more and more difficult to grow crops that are both healthy and profitable. There are a number of reasons for this, including a shrinking package of plant protection measures and increasing statutory and non-statutory restrictions. Biodiversity in and around agricultural land is decreasing too. For years now, agricultural entrepreneurs, agricultural contractors, farm advisers, agricultural, nature and environmental organisations, suppliers, buyers of products and the public sector have all been committed to improving the sustainability of the agricultural sector but are finding it increasingly difficult to achieve this in a commercially sound manner in the current system. The Vision for the Future of Plant Protection 2030 aims to give an extra boost to ambitions. In this implementation programme, the parties involved describe the steps necessary to realise the vision.

All of the parties involved are committed to achieving resilient plant and cultivation systems and a strong connection between agriculture, horticulture and nature by 2030. Plant protection are being used in accordance with the principles of integrated pest management (IPM), with virtually no emissions into the environment and virtually zero product residues, as set out in the Vision for the Future of Plant Protection 2030. Efforts are also being made to realise stronger, new economic prospects.

The new route envisaged does not stand alone but is part of a bigger whole. The Vision for the Future of Plant Protection 2030 builds on the passage about plant protection in the Agriculture, Nature and Food: Valuable and Connected vision document and the Healthy Growth, Sustainable Crop (*Gezonde Groei, Duurzame Oogst*) policy document and connects both of the above with the visions and ambitions published previously by sector organisations. For example, there are aspects in common with the Delta Plan for Restoring Biodiversity in Green Spaces in the Netherlands (*deltaplan biodiversiteitsherstel*), the Common Agricultural Policy (CAP), the manure policy review, the Water Framework Directive, the reduction of food waste, the Climate Agreement, the National Programme for Agricultural Soils (*nationaal programma landbouwbodems*) and the mission-driven approach set out in the Knowledge and Innovation Agenda for Agriculture, Water and Food (*kennis en innovatie agenda (KIA) Landbouw, Water en Voedsel*). The last of the above was drafted by public and private parties in the context of mission-driven knowledge and innovation policy, and includes the A2 multi-year mission-driven innovation programme (MMIP). This part of the KIA relates to the development to resilient plant and cultivation systems, which is important for the transition envisaged here. The art is for everyone to keep the integrated perspective in mind.

Citizens, parties in the chain and the government are all essential stakeholders. The success of the new route depends on these stakeholders and will enable agricultural entrepreneurs to make the transition to resilient plants and cultivation systems *with* good economic prospects.

2.2 Agricultural entrepreneurs are key

The strength of the Dutch agricultural and horticultural sectors lies in their diversity at business, sectoral and regional level; from conventional to biological, from extensive to intensive, from major to minor use of high-tech and with a strong, intricate chain and knowledge network. It will be essential to retain this strength and enhance it in the lead up to 2030. Dutch agricultural entrepreneurs have proved their ability to

continually adjust to a changing environment. Whether this be changing market demand, changing legislation or the changing availability of technology, propagation material and and/or plant protection products or their approach to changing natural conditions, for example. If we expect agricultural entrepreneurs to change how they control diseases, pests and weeds, it will be impossible to avoid considering the context as a whole. The decision to focus on agricultural entrepreneurs in this implementation programme means trying to set the sector in motion such that agricultural entrepreneurs arrive at the choices envisaged themselves, as part of their entrepreneurship. The distribution chain must make a positive contribution to the above and support and encourage the transition. Agricultural entrepreneurs must also be helped to withstand unfair competition from imported products that are grown in less sustainable conditions, as it is certainly possible that the production costs involved when growing products sustainably will be higher.

It is vital for the approach not to focus just on the direct involvement of agricultural entrepreneurs, but also on gaining the commitment of all of the various parties connected with them. For example, advisers, the retail sector, banks, local authorities, the agro-industry and producers. This is also described fittingly in a report that was published by the earning capacity task force (*Taskforce Verdienvermogen*) in October 2019: 'good farmers can't farm alone' (*Goed boeren kunnen boeren niet alleen*). Farmers cannot farm in isolation, as a number of parties work with them to create the preconditions necessary for the best agricultural, horticultural, environmental and commercial choices for farms. If each party continues to take small steps in the right direction, we will be able to achieve major change collectively. When doing this, it will be crucial to align efforts to the commercial interests of agricultural entrepreneurs, to set the transition in motion and to encourage agricultural entrepreneurs to move in the direction envisaged.

This implementation programme factors in the speed of innovation and its use by agricultural entrepreneurs and also the investment rhythm of agricultural entrepreneurs.

A transition could start with just one agricultural entrepreneur, who takes a risk and decides to use a new idea in his/her business. Agricultural entrepreneurs like this deserve help to implement innovations and to share the knowledge gained with other entrepreneurs in the same field. In this way, 'mighty oaks can from little acorns grow'.

2.3 The here and now

It will only be possible to successfully guide a transition if there is a clear picture of the here and now. Why are agricultural entrepreneurs making their current plant protection choices? How are these choices influenced by the behaviour of all of the other players around them (advisers, customers, authorisation holders, national and local government, environmental organisations, producers of propagation material, agricultural contractors and machine manufacturers and suppliers)? Answers to the questions above will make it possible to formulate building blocks for the transition, which can then be translated into concrete actions for various parties (Section 4). Section 5 describes specific measures and how they relate to the reasons that growers have for changing.

Public parties

National government

The Ministry of Agriculture, Nature and Food Quality will share responsibility for coordinating the transition to resilient plants and cultivation systems. A transition from a system perspective requires visionary, unifying and achievement-oriented leadership. A transition will require shared leadership too. Thus, the parties involved will need leadership and also the ability to think out of the box.

National government serves public interest by setting social preconditions via legislation and regulations – for the authorisation assessment of plant protection products, for example. It has a number of supervision and enforcement duties in this respect too. The government also encourages the development of strong

and innovative agriculture and horticulture, via the top sectors Agri&Food and Horticulture & Propagation Materials, for example. Added to this, government is responsible for the preservation of biodiversity and for compliance with the expectations of society. The challenge for national government will be to create a win-win situation.

The government is encouraging and facilitating the development of resilient plants and cultivation systems with a total package of cultivation and plant protection measures and plant protection products – all of which will preferably be low-risk in nature. At the same time, the government is committing itself to the realisation of the preconditions necessary to create a level playing field in the EU and – where possible - beyond too, so that agricultural entrepreneurs are able to grow healthy crops and compete in an international market. Naturally, this must be in line with the possibilities presented by European regulations. Where scope for the above is currently (too) limited, national government will be faced with the task of creating European support for the vision as well.

Provinces, water boards and drinking water companies

In the field, provinces, water boards and drinking water companies are experiencing the negative consequences of emissions from plant protection products into the soil and water. Water boards are responsible for water quality and quantity. Provinces are the competent authorities for deep groundwater and, more specifically, the groundwater used to make drinking water. Both parties have supervision, enforcement and licensing duties too. The drinking water companies rely on the protection of (surface water and groundwater) drinking water sources to be able to produce clean and safe drinking water.

To ensure that water quality is good, it is important to avoid the emission of plant protection products into groundwater and surface water and to comply with the requirements of the Water Framework Directive. This directive sets out specific objectives and quality requirements for water intended for drinking-water production. Another objective is to improve the quality of drinking-water sources, to be able to reduce the time spent on purifying water as part of the drinking water production process.

Private parties

Agricultural entrepreneurs

In today's global market, agricultural entrepreneurs mainly compete with each other on the basis of price and quality. The primary challenge is to keep the cost price per kilo of product as low as possible, while also offering the best quality possible. Specialisation and monocultures help agricultural entrepreneurs efficiently optimise the yield achieved per hectare. Avoiding the loss of quality or yield due to pests, weeds or diseases is an important top priority for entrepreneurs and even a delivery condition for some crops. Chemical plant protection products became available in the 20th century and are often a cost efficient way to control pests, weeds and diseases. This makes them key to the achievement of quality retention and harvest security and, from the perspective of agricultural entrepreneurs, a logical part of IPM. These products are sometimes needed to conserve the (biological) ecosystem too. Without a clear transition process designed to achieve the realistic and sustainable adoption of an economically profitable biological ecosystem, the IPM system will be impeded and the economic, sustainable and green position of businesses and developments put at risk. It is important to make it commercially possible and attractive to opt for resilient cultivation systems, resilient crops and products that enable agricultural entrepreneurs to control diseases, pests and weeds and keep the environmental impact to a minimum. This requires reliable, low-risk products, among other things. There are too few of these products, because of which their development needs to be accelerated. A commercial motive must be used to encourage agricultural entrepreneurs to develop their cultivation systems to have the lowest environmental impact possible.

Advisers

The pest and disease pressure has changed over the years and the availability of authorised products is changing dramatically too. Customers are expressing specific requirements as well. Agricultural entrepreneurs need their crops to continue to be profitable, because of which the formulation of an effective plant protection strategy requires knowledge of a quite specialist nature. The advisers to suppliers are an important source of information in this respect. They help agricultural entrepreneurs achieve healthy crops.

The effective integration of products and measures is increasingly being driven by the connection between the various elements. This requires more knowledge and also increased information exchange between agricultural entrepreneurs and advisers. Often, the advice provided is still designed to keep pests, weeds and diseases under control as cheaply as possible, within the framework stipulated by legislation and the market. Advisers must consider the environmental impact of product use more, with resilient cultivation systems as the determining factor.

Producers of plant protection products

The producers of plant protection products have to invest a lot of knowledge and money before gaining authorisation to sell their products in the market. These costs must then be recovered through the sale of products and advice on the best possible use of these products in an IPM setting. Producers of plant protection products are subject to complex authorisation procedures, long lead times and (discussions about the interpretation of) regulations. Because of this, a great deal of time and money are needed to launch low-risk and biological products² and new chemical products. A comprehensive knowledge of the various cultivation systems and precision monitoring and application technologies is necessary too, to be able to give the products a place in them. To encourage investment, confidence will be needed, stable regulations and predictable assessment and decision-making processes, scope for experimentation with products and a knowledge of the new resilient systems to be developed.

Plant breeders and suppliers of propagation material

This sector, which is among the best in the world, is able to produce propagation material (seeds, plants, bulbs and tubers) for resilient plant breeds and crops that are appropriate for resilient cultivation systems. The idea of a transition to resilient cultivation systems is relatively new and it is anticipated that this will result in new demands being made of species and propagation material. The plant-breeding companies and producers of propagation material will need to respond accordingly. The availability of modern technologies to accelerate plant breeding will be crucial. New products and methods will need to be developed too, to produce propagation material in a resilient cultivation system and to make the finished product (the seed and plant, etc.) more resilient. The disappearance of authorisations for products is making demand for more resilient species more urgent.

Customers and other chain parties

The buyers of plant-based products in the Netherlands are very diverse. They vary from the industrial processors of sugar beet and potatoes that are cultivated on a large scale, to local greengrocers who are the sole sales channel for special vegetables that are grown outdoors. They also vary from seed potatoes and flower bulbs that are grown subject to strict phytosanitary requirements for the export markets to greenhouse vegetables that are grown for European supermarkets. Each customer plays a different role in improving the sustainability of methods used to control diseases, pests and weeds. A seed-potato grower will particularly be required to deliver a clean and very high-quality product that is in compliance with the legislation and regulations of both the country in which it is produced and the country of destination. The retail industry is required to meet the requirements imposed on it by society (whether or not articulated by environmental organisations), which it translates into non-statutory requirements. For example, via a quality mark, or specific non-statutory restrictions for certain products. In practice, it is difficult to formulate and communicate requirements that meet the wishes of the public, particularly when requirements need to safeguard environmental benefits while also being commercially and agriculturally feasible. The additional efforts or investments (and, as such, costs) that this imposes on agricultural entrepreneurs are at odds with the cost-conscious focus of consumers to date. Buyers must support the improvement of the visibility and appreciation of agricultural entrepreneurs and their efforts to produce high-quality, environmentally friendly products.

² Biological products are of natural origin, e.g. products derived from plants, animals, microorganisms or certain minerals, or synthetic products that are identical to the natural substance and could pose a low level of risk to humans, animals, the environment and non-target organisms.

Agricultural contractors

Some agricultural entrepreneurs engage agricultural contractors to do (some) work for them, including plant protection. They use both chemical and non-chemical measures in a number of crops, intended for use as roughage and food. Given the different cultivation systems to be introduced, agricultural entrepreneurs will need to drastically change the way they sow, plant and harvest crops too. The challenge for agricultural contractors will be to transform business operations such that they are able to adjust working methods cost efficiently in consultation with the agricultural entrepreneurs in question. In practice, this will bring with it the following, among other things: the need for more scope to plan work, which they will increasingly carry out with non-chemical technical measures, low-risk products or a combination of both. When doing this, it will be essential for them to teach their employees the skills and knowledge expected of them in respect of soil and water management. It goes without saying that IPM principles will be the starting point. Some agricultural contractors test new approaches or methods in collaboration with agricultural entrepreneurs and/or on crops that they have grown themselves. With this in mind, they will need help to make this possible, both legally and financially.

Technology suppliers

Both international and Dutch companies make machines and technologies for the monitoring, detection and (preventive) use of plant protection products. The technologies in question are becoming ever more precise, and also increasingly automated. The major challenge for machine suppliers is to supply plant and place-specific detection and application systems and technologies to growers in which smart use is made of data, so that a significant reduction in the use of plant protection products is possible. Technology suppliers will be willing to invest if there is clarity about market volume and continued use in the longer term is guaranteed.

Social parties

Environmental organisations

Environmental organisations play a role in social debate on plant protection products. Biodiversity is under pressure in the highly specialised field of plant-based production, where there is often a connection between the decision on whether or not to use specific products and their effect on biodiversity and pollinating insects in particular. Calls to ban these products need to be included in the equation too. However, in practice, this leaves agricultural entrepreneurs saddled with the disease, pest or weed that the product in question was usually used to control and they will then start to use an alternative product. The environmental benefits achieved are then often far less than would have been possible in the event of more IPM and the incidental use of the specific product in question. Environmental organisations play a role in the creation of social support and appreciation for agricultural entrepreneurs that invest in sustainable production.

2.4 The lead-up to 2030

This implementation programme is a road map that shows the route to a certain dot on the horizon. The development necessary to achieve resilient cultivation systems has already started and will continue even after 2030. As such, the specific details of this programme are dynamic and geared towards the achievement of the targets described (see Subsection 3.5), also taking into consideration the objectives set previously in the Healthy Growth, Sustainable Crop document and the Water Framework Directive. The idea is for this to result in products and services that help agricultural entrepreneurs successfully complete the transition to resilient plants and cultivation systems.

The diversity of the Dutch agricultural sector means that a different approach will need to be adopted for uncovered, covered and indoor crops, for one-year and multi-annual crops and for propagation material. Developments in the sectors that are already in compliance with the Vision for the Future of Plant Protection 2030 can be drawn on as sources of knowledge and inspiration.

To ensure that the building blocks from this implementation programme reflect actual needs as much as possible, efforts will be made to achieve a tailored approach at sectoral or regional level. However, there will be an overlap in some cases, as certain crops have strong regional ties. Measures to establish connections between the agricultural and horticultural sectors and nature will also require a sectoral and regional approach, because conditions will vary from one area and crop to another. This will occur in the form of pilot projects, which will involve all of the relevant parties – including those from the chain.

The dynamic nature of this implementation programme presents the opportunity to add new actions, adjust actions or end actions. This might be prompted, for example, by the need to respond to new developments and achieve alignment with experiences in the field. Naturally, the achievement of the targets described will be key at all times.

Section 3 will look in more detail at the measures necessary in respect of the above and describe how which measure contributes to which interest.

3. Resilient cultivation systems

The resilience of plants and cultivation systems is key to the Vision for the Future of Plant Protection 2030. These crops can take a knock or two and the cultivation systems are largely self-regulating. Diseases, pests and weeds have fewer opportunities as a result, reducing the need to intervene to a minimum. If we are to achieve resilient cultivation systems, a paradigm shift will be necessary. The resilience of a system will be determined by a broad interplay of building blocks (see the text box below), the economic, biological and social context of the cultivation system and the choices that agricultural entrepreneurs make. As such, there will be a number of such resilient cultivation systems. They will consist of a number of building blocks that, taken together, form one integrated whole for a crop but are also connected to the environment in which the crop is being grown (nature for example). The principle of IPM will provide important points of reference for the transition, but the creation of resilient cultivation systems will ultimately involve more. In a resilient cultivation system, the starting point for agricultural entrepreneurs will be to cultivate strong plants in a resilient environment. This will involve a transition in thinking and action with plant protection in mind. Resilient cultivation systems are dynamic too and will continually evolve to continue to perform optimally. What is resilient in 2020 may not be in 2030. There could be a number of reasons for this. For example, changes in climate, the disease or pest burden, the market and society. The range of building blocks possible to draw from may be subject to continual shifts too - as a result of innovation, among other factors.

Building blocks

It has been decided to use the term 'building blocks' in this implementation programme. They can be defined as all of the measures, methods, systems and technologies that come together to create the integrated whole necessary for resilient cultivation. For example, the species chosen, the use of healthy propagation material, the use of functional agrobiodiversity, the use of beneficial organisms and precision technologies to apply plant protection products. Agricultural entrepreneurs are already using some of these building blocks, and new ones will be added during the course of the transition process. The building blocks may vary from one business, crop, sector and region to another. The individual agricultural entrepreneur will choose the building blocks that he/she is able to use in his/her specific business situation.

3.1 How do we define resilient cultivation systems?

Resilient cultivation systems consist of a comprehensive range of building blocks that an agricultural entrepreneur uses to make his/her plant-based production as robust and resilient as possible. This starts when choosing which crop to grow, but also includes the physical set-up, biology and technology, among other things. The building blocks of resilient cultivation systems also include elements that have remained outside the traditional field of plant protection, such as soil and fertilisation. Although it might seem that resilient cultivation systems are a question of technological optimisation at business level, the reality is far more complex. A cultivation system exists in close interaction with its physical, social, biological and economic environment, which the agricultural entrepreneur must bear in mind when deciding which cultivation system to use. This interaction presents both opportunities and challenges where the limitation of mutually adverse effects between cultivation systems and the environment is concerned.

Several decisive principles form the starting point for a resilient cultivation system. Firstly, the plants themselves. For many decades, plants have been grown with the ultimate yield in mind, because of which the genetic characteristics essential for resilience have been neglected. These characteristics come to the fore more in a resilient cultivation system. Secondly, the resilience of a plant is also determined by a variety of organisms and microorganisms with which it co-exists and by natural substances that make the plant stronger. All of these can be utilised more in a resilient cultivation system. Thirdly, the resilience of a plant is influenced by the way in which it is grown. In resilient cultivation systems, environmental factors (biodiversity, climate, soil, water and fertilisation, for example) and the needs of the plant are optimally aligned in order to strengthen its resilience further. A resilient cultivation system attracts biological pest control agents.

Measures and products are still important, as they keep the system in balance. Besides developing preventive resilience, building blocks enable resilient cultivation systems to reactively restore resilience when they have been thrown off balance. This aspect of the range of building blocks on offer changes continually – due to innovation, among other reasons. Agricultural entrepreneurs need a ‘box of building blocks’ that reflects the principles of IPM if they are to be able to contain diseases, pests and weeds without affecting the resilience of crops.

Bearing the environment in mind, an agricultural entrepreneur will integrate the building blocks chosen into a resilient cultivation system on the basis of knowledge and expertise. This dynamism enables the system to continually evolve and respond to changing conditions and circumstances. Because of differences in various factors, including soil type, biodiversity and climate, and differences between crops, it is not possible to develop just one cultivation system that would do justice to the great diversity of the Dutch agricultural and horticultural sectors. There are a multiplicity of possibilities that are relevant for each agricultural entrepreneur to a greater or lesser extent. The requirements to be met by resilient cultivation systems will change over time too, due to a changing climate, market developments and the emergence of new diseases, pests and weeds, for example.

3.2 IPM in relation to resilient cultivation systems

To retain and restore the balance important to resilient cultivation systems, IPM provides the frameworks necessary to weigh up appropriate measures and products and use them correctly. Therefore, IPM is one of the parts of the resilient cultivation system that is designed to prevent, contain or control harmful organisms.

The principles of IPM make it possible to establish the best way forward to eliminate the harmful organisms present in a crop and control them, if necessary. However, there is another important principle: if the principles of IPM involve the use of cultivation operations or plant protection products, they will need to be chosen such that they do not destroy the resilience of the system, but actually support it. This approach is cyclical per crop and over time and, as such, an iterative process. Growers will use cultivation operations and plant protection products at different times in the growing season, always guided by the need to maintain the resilience of their crops. At the beginning of the growing season, agricultural entrepreneurs will consider the best way to contain the harmful organisms present in their resilient cultivation systems. They will consider which measures are optimal, what risks their crops are subject to and when it will be necessary to intervene. Consideration will also need to be given to the potential action perspectives if the balance in the system needs to be restored. If the balance is disrupted unexpectedly, the steps taken during the growing season will be repeated a number of times in some cases, if different risks arise that disrupt the balance in the system (weeds on one occasion, followed by pests on another occasion, for example). At the end of the growing season, the agricultural entrepreneur can evaluate the cultivation system chosen and then improve it based on the new insights gained.

IPM

IPM is an approach that involves various methods for containing and controlling diseases, pests and weeds. In this approach, prevention, non-chemical measures, biological pest control and cultivation technique-related measures will replace chemical plant protection products as far as possible. Wherever plant protection products do remain necessary, low-risk products are preferred, while emission-abatement technologies will be used to reduce emissions into the surrounding area. The specifics of this approach will vary from one business to another. This could be due to differences in the harmful organisms that manifest themselves, crops, soil types, the distribution market and the corresponding product quality, for example.

3.3 How to make resilient cultivation systems a reality?

Agricultural entrepreneurs must be in a position to put the transition in thinking from plant protection to resilient cultivation systems in practice in their own businesses. The following three points are important in this respect:

1. The (continued) development of resilient cultivation systems;
2. The assessment and implementation of resilient cultivation systems in the field;
3. The adoption of resilient cultivation systems.

The three points above are part of an ongoing process. Consideration of the diversity of the Dutch agricultural and horticultural sectors, regional differences and the commercial aspects applicable for individual agricultural entrepreneurs are important preconditions too. The transition must be feasible and affordable and involve all of the various chain parties.

The (continued) development of resilient cultivation systems

Resilient cultivation systems may be the result of fundamental design processes (top-down) or of experimental trial and error in the field (bottom-up). Both have their advantages and disadvantages. The ideal situation will involve a co-creation process in which top-down and bottom-up approaches come together and merge. As such, it is important to invest in both routes, based on the knowledge that a 'one-size-fits-all' approach is not possible; the Dutch agricultural and horticultural sectors are very diverse. It is also essential not to lose sight of the big picture. Solutions must be found for the problems of today and answers sought to the challenges of tomorrow.

The (continued) development of resilient cultivation systems requires knowledge of expected trends and the resulting opportunities and threats in the lead up to 2030 (the emergence of new diseases, pests and weeds, for example). It will also be important to invest, to ensure the continual innovation of existing building blocks. However, it will not be necessary to start from the very beginning when developing resilient cultivation systems. Various (research) processes have been under way for a number of years now, such as the Knowledge Impulse - Green Plant Protection initiative (*kennisimpuls groene gewasbescherming*), in which resilient cultivation systems are being developed for strawberries, apples and lilies, for example. A wide range of projects are being implemented too, including via the top sectors, which are yielding building blocks for resilient cultivation systems. Agricultural entrepreneurs themselves are continually investing in new possibilities to make their cultivation systems more resilient. To achieve the targets set, it will be necessary to intensify and accelerate these developments, both in a research setting and in the field. The aim is to develop new, resilient cultivation systems for uncovered, covered and indoor crops. Greater coherence and a more integrated approach will also be required in current research on plant health.

The implementation of cultivation systems in the field

It takes time and a tailor-made approach to integrate resilient cultivation systems into an existing business. Specific knowledge and skills are often needed too. A small-scale, controlled roll-out in a region or sector will be needed to enable entrepreneurs and (farm) advisers to gain experience with a new approach. At the same time, a roll-out could be used to test cross-business preconditions (in terms of space or in the chain, for example) and implement any actions necessary as a result. The continued development to resilient cultivation systems is subject to different risks than those applicable when using plant protection products and will require more knowledge from agricultural entrepreneurs. They will be given the support they need to help them gain this knowledge.

Innovations (in product and process) are characterised by the fact that they often involve an introduction phase, during which the investments to be made by entrepreneurs are relatively high. The same applies for resilient cultivation systems. For example, although there are already robotic cultivators and drones that recognise diseases, pests and weeds, they are still too expensive for most agricultural entrepreneurs. Due to the major investments involved and crop-related uncertainties ensuing from a change in cultivation system, market certainty becomes even more important for entrepreneurs at times like this.

The adoption of resilient cultivation systems

A small-scale roll-out will have just limited reach, of course. Added to this, some agricultural entrepreneurs cannot or will not want to risk adopting an approach that is new to them. To gain the confidence of entrepreneurs and farm advisers across the board, it will be important for them to be able to see the approach with their own eyes and share their experiences with each other. Partnerships between agricultural entrepreneurs and also with farm advisers and other links in the chain must ensure that viable successes take off and are ultimately adopted by a sector. The level of knowledge required is increasing, which promotes greater specialisation, but it is also at odds with the need for an integrated approach for resilient cultivation systems. Agricultural entrepreneurs will continue to rely on the advice of advisers during the transition. With this in mind, advisers must be able to provide agricultural entrepreneurs with advice in line with the transition envisaged. The profitability of the resilient cultivation system will play a major role too. Therefore, pilot projects geared towards transition in the chain are vital too.

Attention for speciality crops

When making a break with past trends, so-called '*speciality crops*' will merit special attention. The Dutch agricultural and horticultural sectors excel in the production of high-quality, speciality crops. The Netherlands also has a wide range of research facilities and knowledge institutions and also a well-organised business sector that are able to support these speciality crops. Speciality crops are economically and socially important for the Netherlands. Crops like propagation material, vegetables and fruit make an important contribution to the export value of our country. These are products that consumers buy fresh on an almost daily basis, from a head of lettuce to a bunch of flowers. Speciality crops also set the bar high for quality and expertise. As such, they are one of the driving forces behind the Dutch knowledge system and the country enjoys a vanguard position in cultivation technology and sustainability.

However, the development of resilient cultivation systems for these crops continues to be a challenge for a number of reasons. For example, the great diversity in this segment: there are hundreds of different crops in the ornamental horticulture sector alone. Each of these crops covers just a small amount of land and are grown by a small group of entrepreneurs. These crops give rise to specific questions that require scientific research, which is expensive. However, the sectors in question lack the financial strength to initiate this specific research themselves. For commercial parties, speciality crops lack the potential necessary to invest in new products or services – to apply for authorisation for a low-risk product, for example. Extra efforts will be needed if we want to bring the achievement of the targets in the Vision for the Future of Plant Protection 2030 within hand's reach for speciality crops too – and, as such, continue to cultivate these crops in the Netherlands.

3.4 The context for resilient cultivation systems

Many of the developments involved when making the transition to resilient cultivation systems will need to be implemented in or around the businesses operated by agricultural entrepreneurs. Just like resilient cultivation systems, agricultural entrepreneurs are influenced by their interaction with the environment in which they operate. An agricultural business is just one link in a chain made up of other suppliers, customers and consumers. Some sectors have a strong focus on exports, because of which they are subject to additional import and export requirements from third countries. National and international legal frameworks and social preconditions influence the decisions made by agricultural entrepreneurs too, who also enter into financial commitments for investments and to use innovations to their businesses. It is important that these elements are also recognised as relevant by agricultural entrepreneurs when making the paradigm change from a plant protection approach to one involving resilient cultivation systems.

Chain

The market in which agricultural entrepreneurs operate is subject to a large number of quality requirements: for example, products must be tasty, attractive, clean and have a long shelf life. However, market parties are increasingly adding a number of non-statutory sustainability requirements too. For example, limitations on certain (chemical) products. It is important that these requirements do not conflict with the transition, which would present entrepreneurs with a dilemma. Agricultural entrepreneurs also supply their produce to international markets. In most cases, contacts with international customers are not established by the agricultural entrepreneurs themselves but by the buyers of their products. Entrepreneurs grow products in line with the (sum of the) strictest standards and requirements, making it possible to sell their products in any market. This practice presents agricultural entrepreneurs with a problem, as they will opt for a resilient cultivation strategy for the entire business and not for one or just several parties.

In the current system, the extra investments necessary to make the transition to resilient cultivation systems do not yield the added value required at product-price level for agricultural entrepreneurs. Steps must be taken to avoid the loss of big ambitions, energy and good intentions and a subsequent reversion to the current status quo. The discussion and removal of commercial barriers will be one of the most difficult challenges presented by the transition. It is realistic to expect customers to take more responsibility here and also for consumers to be willing to pay for the paradigm change.

Phytosanitary

The Dutch agricultural and horticultural sectors produce products for an international market. The seeds, cuttings, flowers, trees, bulbs and tubers produced in the Netherlands will be planted in soil elsewhere in the world. Other agricultural products are supplied to customers in the Netherlands and abroad. Growing conditions abroad are different to those here in the Netherlands, which determines in part the phytosanitary requirements to be met by products. These requirements may be at odds with the concept of resilience. For example, a zero tolerance policy to many organisms applies for products destined to be exported outside Europe, whereas the Dutch crop itself could actually tolerate a slight contamination with the organisms in question – in fact, they could even be desirable, as natural pest control agents.

Innovations and investments

Innovations will play an important role in the transition to resilient cultivation systems, providing new cultivation concepts, insights into the connection between agriculture and horticulture and nature, improved use options and (technical) alternatives for plant protection products. However, it is important not to focus solely on the development of new innovations but also extend attention to the implementation of current innovative technologies. Technology is becoming ever more advanced but also more expensive and more difficult for individual businesses to make profitable. The existing financial commitments that agricultural entrepreneurs have and the corresponding investment periods must be taken into consideration too. The transition must also focus on the introduction and use of the innovations available now, based in part on current pilot projects. Any new innovations that are still to be developed will not be available for immediate roll-out in the field.

Integrated policy

The (continued) development of resilient cultivation systems will rely on more than plant protection policy alone. There are strong connections and dependencies with various other policy areas, such as market forces and competition, climate, biotechnology, soil, water and biodiversity. Sometimes, the above strengthen each other and sometimes tension exists between objectives in different areas. With this in mind, it is important that integrated policy is developed to cover all of these areas, in which any tensions are recognised and clear priorities set. The 'valuable and connected' vision offers a framework for the above. Legislation and regulations must support and encourage the transition to resilient cultivation systems too. Any obstructive legislation and regulations must be subject to critical scrutiny.

3.5 Targets

The following three principles are key when developing resilient cultivation systems:

1. Plant and cultivation systems are resilient;
2. Agriculture, horticulture and nature are connected;
3. Virtually no emissions into the environment and virtually no residues on products.

The three principles above have been included as three strategic targets in the Vision for the Future of Plant Protection 2030. In this implementation programme, these strategic targets are operationalised and broken down into a number of interim targets for the short, medium and long term. By doing this, alignment is achieved with the objectives of the Healthy Growth, Sustainable Crop memorandum, the Water Framework Directive, Natura 2000 and the Vision for the Future of Plant Protection 2030. The progress being made with the transition will be monitored via a number of direct and indirect indicators that are linked to the target.

3.5.1 Plant and cultivation systems are resilient

The strategic target for 2030 is for cultivation systems to be resilient. To achieve this:

- a. building blocks must be available to contribute to the resilience of a system;
- b. these building blocks must be reasonably easy for entrepreneurs to access;
- c. entrepreneurs must have the knowledge, skills and motivation necessary to use the building blocks.

As already mentioned, resilience is a relative concept and will continue to evolve even beyond 2030.

As such, targets can only be formulated in respect of a particular reference year (to be determined at a later date). The priority will be to make resilience measurable, in terms of both input and output:

- **Input:** which action perspective does the entrepreneur have to enhance the resilience of his/her crop? Which building blocks are available? Are they sufficiently accessible and are they utilised sufficiently? The object is to gain insight into the 'box of building blocks' available to agricultural entrepreneurs. This will also make it possible to work towards the filling of this box if the action perspective is inadequate;
- **Output:** what impact is the action perspective having on the actual resilience of the cultivation system? The environmental impact of plant protection at cultivation level is one aspect of the above. A PPP project is currently under way (within top sector policy) in which an indicator for the above is being researched and developed. As part of this implementation programme, consideration will be given to how this and other instruments can improve insight into resilience.

These two sides of the coin – input and output – must become 'communicating vessels'. As such, data analysis will generate information on whether the toolkit is being used optimally and also whether there is a need for 'new' tools. Points for attention include data ownership by agricultural entrepreneurs and the avoidance of new administrative burdens. Therefore, alignment will be sought with existing systems when evaluating the objectives (the Farms Information Network (*Bedrijven Informatie Net*) for example). Naturally, the possible impact on other sustainability objectives should not be forgotten either.

To explain the transition to resilience cultivation systems properly, we distinguish between the following three levels (Figure 2):

- **Potential resilience of the system**, based on optimal utilisation of all of the building blocks available at a particular time. Insight into and knowledge of the potential resilience of a cultivation system directs research on and innovation in respect of the development of new building blocks;
- **The average resilience of the system** in a crop or sector shows the extent to which the building blocks available are reasonably being (or could reasonably be) utilised;
- **Spread within a crop or sector.** This gives entrepreneurs personal information about their own performance and can help them to continue to optimise the resilience of cultivation systems in their own businesses.

Various factors are responsible for differences between what could potentially be achieved, the average in a sector or crop and the top and bottom of the bandwidth. Differences can be explained by factors outside the sphere of influence of an individual entrepreneur, such as financial incentives, cultivation risks, legislation and regulations, but also by a lack of knowledge, routine behaviour or suboptimal cultivation advice.

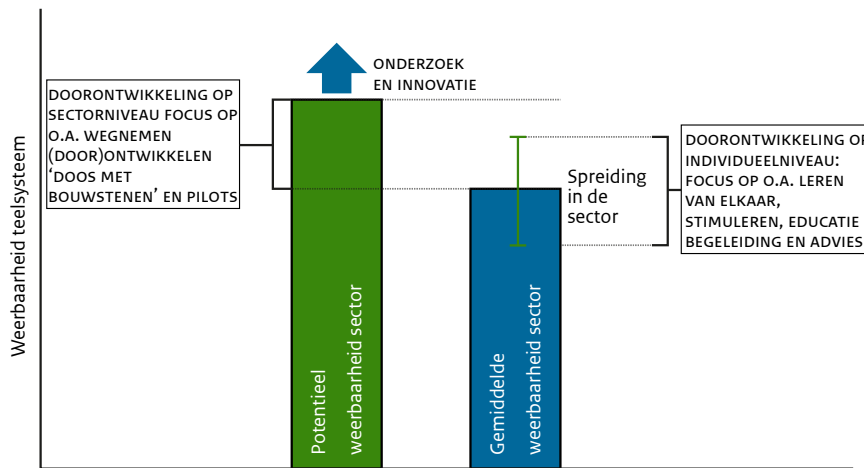


Figure 2: visual representation of resilient cultivation systems.

2021	<ul style="list-style-type: none"> • Instruments are available to agricultural entrepreneurs at business level that clarify the package of action perspectives available to strengthen resilience; • Instruments are available that provide insight into the environmental impact of plant protection products within resilience cultivation systems.
2022	<ul style="list-style-type: none"> • There is a baseline measurement of the action perspectives for the creation of resilience per sector and of the environmental impact of plant protection products in resilient cultivation systems per sector.
2023 to 2030	<ul style="list-style-type: none"> • A downward trend is evident in the environmental impact of plant protection products as a result of the (continued) development of resilient cultivation systems per sector.

3.5.2 Agriculture, horticulture and nature are connected

The first step in the process to connecting agriculture and horticulture with nature will involve the development of resilient plant and cultivation systems. This reduces the need for plant protection products, which has a positive effect on biodiversity. Biodiversity has an ecological function in resilient plant and cultivation systems too, which reinforces the strength of these cultivation systems. It is difficult to formulate specific targets and interim targets for the achievement of the 'connect agriculture and horticulture with nature' ambition, because the connection between resilient cultivation systems and biodiversity is complex and a great deal of research is still being done on this subject. An individual measure – field margin areas, for example – will not automatically mean that agriculture and horticulture are connected with nature.

Resilient cultivation systems utilise and contribute to below-ground and above-ground (agro) biodiversity, make agriculture and horticulture more resilient and increase biodiversity. Each cultivation system has a slightly different connection with biodiversity. To be able to monitor the improvement in biodiversity on agricultural land, critical performance indicators (CPI) and indicators for biodiversity are currently being developed as part of the Delta Plan for Restoring Biodiversity in Green Spaces in the Netherlands and the biodiversity monitor for arable farming (*Biodiversiteitsmonitor Akkerbouw*), among other things. This implementation programme will make an inventory of all current initiatives designed to develop biodiversity-related indicators. Consideration will then be given to the possibility of drawing from these existing projects to establish indicators for this implementation programme. If it is not possible to establish indicators yet, this implementation programme will launch an initiative to have these indicators developed. Where this is the case, relevant parties will be asked to participate. The indicators developed will then be used to formulate both agricultural targets and targets in relation to resilient cultivation systems.

We are committed to gathering the information available from research projects and pilots to aid in the formulation of targets.

2021	We have gained insight into the connection between plant-based production, plant protection and biodiversity. Indicators for the above are being used as prototypes in the field.
2025	Profitable measures that strengthen both the resilience of the cultivation system and biodiversity are being applied in the relevant regions, sectors and crops and evaluated by the chain.
2030	Profitable measures that strengthen both the resilience of the cultivation system and biodiversity are customary in the field and are evaluated by the chain, both nationally and internationally.

3.5.3 Virtually no emissions

The objectives below originate from the Healthy Growth, Sustainable Crop memorandum, the Water Framework Directive, the package of measures designed to reduce the emissions produced by plant protection products used on open-field crops (*Pakket van Maatregelen emissiereductie gewasbeschermingsmiddelen open teelten*) and the Vision for the Future of Plant Protection 2030.

2023	<ul style="list-style-type: none"> • A decrease in the number of breaches of the environmental quality standards for plant protection products in surface water by 90% in comparison with 2013; • A decrease in the number of breaches of the drinking water standard in surface water intended for drinking water preparation by 95% in comparison with 2013.
2027	<ul style="list-style-type: none"> • Virtually no emissions from plant protection products from the premises or buildings, when filling and cleaning spraying equipment externally, or from greenhouse horticulture; • No breaches of environmental quality standards for plant protection products in surface water; • The objectives of the Water Framework Directive apply for 2027 too. The starting point for this implementation programme is that these objectives will be achieved.
2030	<ul style="list-style-type: none"> • Virtually no emissions from plant protection products used on open-field crops.

3.5.4 Virtually no residues

The objectives below originate from the Healthy Growth, Sustainable Crop memorandum and the Vision for the Future of Plant Protection 2030.

2023	Virtually no residues in agriculture and horticulture products intended for food consumption.
2027	Virtually no residues in agriculture and horticulture products intended for food consumption.
2030	Virtually no residues in agriculture and horticulture products intended for food consumption.

4. Building blocks

The various building blocks are made up of activities that facilitate the realisation of resilient cultivation systems. For example, prevention activities and the use of technical, technological, biological and chemical measures. The object of the building blocks, taken together, is to create a 'box of building blocks' that agricultural entrepreneurs can use for resilient cultivation systems.

4.1 Monitoring and an integrated approach

It is important to monitor crops and parcels of land for diseases, pests and weeds. This will enable agricultural entrepreneurs to make prompt and targeted choices about the use of measures and resources to contain or control diseases, pests and weeds.

4.1.1 The status of Dutch plant health

It is essential not to lose sight of the big picture and to ensure that solutions are sought for the problems of today and answers for the challenges of tomorrow. This requires knowledge of expected trends and associated opportunities and threats in the lead up to 2030 (the emergence of new diseases, pests and weeds, for example) and the effects of autonomous developments (climate change, the economy and trade, social challenges, legislation and regulations, for example) on these trends. Scope to anticipate the above will vary from one sector to another.

- **Action:** the status of Dutch plant health (*staat van de Nederlandse plantgezondheid*) will be published in 2020 and every five years afterwards and will set out the state-of-art, expected trends and the challenges applicable in the lead up to 2030. The existing disease, pest and weed monitor (*monitoring ziekten, plagen en onkruiden*) will be included in this publication too. The Ministry of Agriculture, Nature and Food Quality will initiate this action;
- **Action:** based on the 'status of Dutch plant health', LTO Nederland will specify criteria and frameworks for resilient cultivation systems in 2030 and development pathways in the lead up to 2030. LTO Nederland will update the above every five years on the basis of evolving insight and developments. The ambitions and action plans that already exist in many sectors will form the starting point for any update.

4.1.2 An integrated approach

The use of a resilient cultivation system will not rule out the chance of diseases, pests and weeds. The cultivation of resilient species and crops in resilient cultivation systems is not a static process. When growing crops, agricultural entrepreneurs will constantly encounter and need to respond to new developments. Armed with the principles of IPM, agricultural entrepreneurs can decide which measures they need to prevent, contain or control pests, diseases and weeds, with a preferred choice for low-risk products.

Directive 2009/128/EC, establishing a framework for Community action to achieve the sustainable use of pesticides, sets out eight principles for IPM. The use of IPM implies that an agricultural entrepreneur is doing so consciously and will include taking preventive measures, implementing non-chemical measures and using plant protection products. In the Netherlands, this approach is safeguarded in the plant protection monitor (*gewasbeschermingsmonitor*), the format for which is currently still open. The interim evaluation of the Healthy Growth, Sustainable Crop³ memorandum showed that the possibilities of IPM are not always being utilised in the field yet. So, opportunities still exist in this respect.

³ The Netherlands Environmental Assessment Agency (*Planbureau voor de Leefomgeving*), 2019: *Geïntegreerde gewasbescherming nader beschouwd*.

- **Action:** a specific IPM step-by-step plan on the use of glyphosate products for the purpose of weed control in open-field crops (including grassland management) and for the treatment of green manures is currently being developed. LTO Nederland will initiate this action.;
- **Action:** the plant protection monitor will be developed (further) in light of this implementation programme. When doing so, consideration will be given to the possibility to use the information available to gain insight into the action perspective of agricultural entrepreneurs. The Ministry of Agriculture, Nature and Food Quality will initiate this action.

4.2 Prevention

There are a number of disease, pest and weed prevention options. For example, the use of resilient soil, resilient species, healthy propagation material, resilient cultivation concepts and the use or promotion of beneficial organisms.

4.2.1 Resilient soil and other fertilisers

Resilient soil and other fertilisers (potting soil or rockwool in covered crops, for example) have the optimal physical (airy structure, for example), chemical (the availability of nutrients or high organic matter content, for example) and biological composition (rich in organisms and microorganisms, for example) necessary to optimally support crop growth and prevent and suppress diseases and pests as much as possible. When making the transition to resilient cultivation systems, it is important to have an understanding of:

1. the connection between biodiversity and the resilience of the soil or other fertilisers for different crops;
2. organisms and microorganisms that can be used as indicators of the resilience of the soil and other fertilisers;
3. possibilities to use these indicators to steer the resilience of the soil and other fertilisers in the right direction;
4. possibilities to improve the biological composition and, by doing this, improve the resilience of the soil and other fertilisers via organic matter. For example, increasing the amount of organic matter or adding biostimulants;
5. the extent to which the possibilities above are ready for use, taking into consideration the various crops, soil types, fertilisers and regions.

Points 1 to 3 inclusive will be included for soils (including soil-based covered crops) in the National Programme for Agricultural Soils when developing the soil indicators for agricultural areas in the Netherlands (*bodemindicatoren voor landbouwgronden in Nederland (BLN)*).

For soils, Point 4 will be included in the 'smarter land use' section of the National Programme for Agricultural Soils, in which the storage of CO₂ in soils is considered.

Point 5 will be included in a number of pilot projects and public-private funded research, including the better soil management project (*Beter Bodem Beheer*).

It will be important to ensure that there continues to be a good connection between the processes involved in the National Programme for Agricultural Soils and this implementation programme for the Vision for the Future of Plant Protection 2030.

- **Action:** the Ministry of Agriculture, Nature and Food Quality will take the initiative to research the additional actions necessary to improve resilience in fertilisers other than soils. This research will focus specifically on indoor and covered crops.

4.2.2 Fertilisation and resilience

Biostimulants are part of the new European Fertiliser Regulation (2019/1009). They are products that are designed to stimulate plant nutrition processes independently of the nutrient content in the plant, with the sole aim of improving any of the plant or plant rhizosphere's nutrient use efficiency, tolerance to abiotic stress, quality and availability of confined nutrients in the soil or rhizosphere. Biostimulants play an important role in improving the tolerance of plants and cultivation systems against abiotic stress. Although just four taxonomic groups of microorganisms have been included at the current time, there are other taxonomic groups with a biostimulant effect.

- **Action:** steps will be taken to explore possibilities to expand the regulation to include other taxonomic groups in the current framework. If this is not possible within the EU regulation in the short term, consideration will be given to how this could be arranged at Dutch level. Artemis will initiate this action;
- **Action:** when implementing the EU fertiliser regulation, national fertiliser legislation will be reviewed to ascertain which product categories are currently not included in the Fertilisers Act (*Meststoffenwet*). This process will take place in 2020 and may continue on into 2021. The Ministry of Agriculture, Nature and Food Quality will initiate this action.

4.2.3 Resilient species

Besides the way in which plants are cultivated - the cultivation system - the characteristics of the plants themselves are crucial for the achievement of resilience too. It will be essential, wherever possible, to use robust species that can take a knock or two and continue to be healthy in changing conditions and under pressure from pests and diseases. As such, plant breeding should focus even more on the achievement of important characteristics like vigour, improved resistance to abiotic stress (heat, drought and salt tolerance, for example), intrinsic resilience and disease and pest resistance. New genetic techniques will make it possible to give plant species the characteristics envisaged more quickly. There will be an opportunity here to develop new species that are robust – and create the foundations for a resilient cultivation system – in a shorter space of time.

The Netherlands is a global leader in the breeding of plant species and crops. In recent decades, plant breeding has focused on improving the yield and quality of products (by adding more resistances, for example). Because a number of factors are now changing conditions for agricultural entrepreneurs – including climate change, the emergence of new diseases and pests and the range of plant protection products under pressure – the resilience of plants to external influences is gaining increasingly in importance. As such, it is essential to improve the availability of resilient species and crops for agricultural entrepreneurs and to encourage their use. This will require collaboration in the chain.

When seeking to source resilient species and crops, agricultural entrepreneurs rely on the availability of seeds and other propagation material (cuttings, bulbs, tubers and seed potatoes, for example) in the market. It is up to the plant breeding sector to focus innovation efforts on resilience and also to ensure that a diverse range of resilient species and crops are available in the market.

A major resilient-crop innovation could be achieved via new plant-breeding techniques in which the targeted 'activation' or 'deactivation' of certain genes is used to improve the resilience of existing species that have already proved their value for many decades. In time, this may be possible to achieve faster and more directly, without the need for a long plant-breeding process. This will require a far more in-depth knowledge of the gene function (resistance, resilience and immunity genes) and of the consequences of gene editing on resilience and other agronomic characteristics. A knowledge of how to edit genes still needs to be developed for many crops.

Modern plant-breeding techniques have the potential to make a strong positive contribution to the development of the resilient species on which the success of the transition depends. European debate on these techniques is complex. A new discussion about them is necessary, and should consider which crops and which modern plant-breeding techniques could make the biggest impact on the transition to resilient

cultivation systems and also the achievement of social objectives. The following considerations will play a role too: the retention of pluralism in agriculture and horticulture (both biological and sustainable conventional production), continued freedom of choice for growers and consumers, scientific decision-making about humans and the environment, social challenges - ensuring that the climate and biodiversity are not put under any further pressure, for example - and continued free access to genetic material.

It should be observed that, although plant breeding is promising, solutions will be limited in the lead up to 2030 due to the long lead times applicable. It will take a minimum of 10 to 15 years to develop new species. New plant-breeding techniques may bring this date forward by several years, but will not be possible to use these new techniques for the time being.

A more fundamental knowledge of plant breeding is needed too. Thus, resistant or resilient species form one of the building blocks for the achievement of resilient cultivation systems but are not *the* solution. After all, diseases and pests develop too and plant breeding will not be a suitable solution for every disease and pest.

- **Action:** in the near future, a description of the criteria to be met by resilient species and crops will be drawn up for plant-breeding companies, which they will be able to use as a guideline. Plantum will initiate this action;
- **Action:** the coalition agreement states that the Netherlands will commit itself in Europe to the use and authorisation of new plant-breeding technologies like CRISPR-Cas in which no species boundaries are breached. The first actions have already been taken; further to a council resolution to this end, the European Commission is to come up with research and possible follow-up proposals on the status of new plant-breeding methods in relation to the decision of the European Court of Justice. Added to this, the potential of new innovative technologies has been included in the subsection of the European Green Deal communication entitled Farm to Fork. The Ministry of Agriculture, Nature and Food Quality will initiate this action.
- **Action:** where necessary, pre-competitive research will be intensified and focus on the development of gene-editing techniques, gene functions (resistance, resilience and immunity genes), the consequences of targeted changes to resilience and other agronomic characteristics. Steps will be taken to establish demand for this research in the sector. Plantum will initiate the above;
- **Action:** methods will be developed to make it possible to establish the sensitivity and resilience of species and crops. Where necessary, pre-competitive research will be intensified and focus on the epidemiology of diseases and pests and assessment development. Steps will be taken to establish demand for this research in the sector. Plantum will initiate this action;
- **Action:** steps will be taken to identify instruments to encourage the development and marketing of genetically resilient species and crops for which there is just limited potential to recoup the original investment for a number of reasons. For example, because the crops are small or because the species are to be developed specifically for the (limited) Dutch market. Plantum will initiate this action;
- **Action:** the plant-breeding sector and the government are committed to retaining and, where necessary, improving and strengthening supporting innovation policy. For example, the protection of intellectual property via plant breeders' rights, fiscal instruments like the Research and Development (Promotion) Act (*Wet bevordering speur- en ontwikkelingswerk*) and access to genetic sources and the retention of biodiversity. Plantum will initiate this action.

When resilient species and crops are available, it is essential to notify agricultural entrepreneurs and chain parties of this fact and also to advise them on their use; agricultural entrepreneurs will only switch to other species and crops if they are aware of their advantages and know which changes they might need to make to their business operations as a result.

- **Action:** the new information system to be set up for agricultural entrepreneurs about resilient cultivation systems will include an annual inventory of the resilient species and crops available. This information will be added to the system, so that all information about both resilient cultivation systems and the species and crops appropriate for them are available to agricultural entrepreneurs in just one system. Plant-breeding companies will be encouraged to make their resilient species available and also information about these species. Plantum will initiate this action.

Just as is the case with new resilient-cultivation systems, it will be important to take the step towards the large-scale use of resilient species and crops in the field.

- **Action:** the step from innovation to actual use in the field is already part of the revenue model for plant-breeding companies and seed suppliers. As an additional impetus, alignment will be sought with the actions for resilient cultivation systems, namely proactive advice from (farm) advisers on subjects including resilient species and crops and, if necessary, the removal of commercial obstacles. Plantum will initiate this action;
- **Action:** product pilots on the subject of resilient species in which various chain partners are involved will be included in the pilot projects described in Section 5. LTO Nederland will initiate this action.

4.2.4 Propagation material

Healthy propagation material forms the basis for a good start to healthy cultivation. Growing stock needs to be clean, resilient, free from pests and diseases and strong. The current plant-health system focuses on the production of disease-free seeds and other propagation material (cuttings, seed potatoes, bulbs and tubers, for example) using a combination of chemical and biological plant-protection products and a series of other techniques, such as various seed treatment methods. To achieve a paradigm shift here too, it will be necessary to develop other methods and techniques that are sufficiently effective and also ensure that good seed, plant and seed-potato quality is retained without creating any phytosanitary barriers to the export of seeds and vegetative propagation material.

- **Action:** steps will be taken to ensure that there continue to be or are sufficient opportunities to prevent and control diseases and pests when producing propagation material. Specific consideration will also be given to the entire cultivation cycle (the stronger and cleaner the propagation material, the fewer problems there will be with the rest of the crop) and minor uses. Plantum will contribute wherever possible;
- **Action:** new plant-protection methods and techniques will be researched and developed that specifically target propagation material (new methods designed to make bulbs, tubers and seeds pathogen-free and strengthen them). Steps will be taken to establish demand for this research in the sector. Plantum will initiate this action;
- **Action:** a tailor-made approach will be developed for biological products and also methods for use on seeds, bulbs, tubers and plant-breeding and plant material, so that resilient propagation material becomes available. Artemis will initiate this action;
- **Action:** it will be necessary to develop resilient cultivation systems for the production of propagation materials too. When doing this, the aim will be to seek alignment with pilot projects launched by other parties and also, specifically, for the propagation-material sector to set up its own pilot projects to test systems in the field. Plantum will initiate this action;
- **Action:** the quality control system for clean propagation material will be improved, where necessary (if new diseases or pests emerge, for example). Plantum will initiate this action.

4.2.5 Resilient cultivation concepts

We define the term 'cultivation concepts' as the creation of a cultivation system:

- In time: for example, crop rotation in arable farming, the number of breeding cycles for flower bulbs or the length of time for which an orchard stays in production;
- In space: for example, the organisation of a plot of land, greenhouse partitioning, the choice of soil or substrate and outside or inside;
- In sector: for example, the ecosystem in a circular greenhouse.

The cultivation concept has a major effect on the resilience of a crop, because of which efforts are continually made to identify cultivation concepts that make a crop less vulnerable to diseases and pests. For example, soilless cultivation (no problems with soil pathogens), strip-tilling and covered cultivation.

Resilient cultivation concepts can be developed at business, sectoral and regional level or in a chain context. For example, propagation nurseries in the arboriculture sector or new propagation systems for flower-bulb and potato cultivation.

- **Action:** an inventory will be made of innovative cultivation concepts that are at the development stage or due to progress to the development stage. Initiatives from outside the Netherlands will be included too, if relevant. The inventory will include both the science community and the field. The Ministry of Agriculture, Nature and Food Quality will initiate this action;
- **Action:** innovative cultivation concepts will be screened for their potential contribution to a resilient cultivation system and to practical, technical and economic feasibility. A support plan will be prepared for promising cultivation concepts, focusing on the development of the knowledge necessary, implementation in the field, integration into the environment and chain and the removal of technical, economic or legal barriers. LTO Nederland will initiate this action;
- **Action:** during their (continued) development, innovative cultivation concepts will be monitored for the actual improvement of resilience, their possible side effects on other sustainability aspects and practical feasibility. This will make it possible to make any adjustments that might be necessary. LTO Nederland will initiate this action;
- **Action:** the current Knowledge Impulse (*Kennisimpuls*) will be broadened to include covered crops. It will need to be reinforced in a public-private setting and extended over a number of years, to make it possible to demonstrate the stable effect achieved. Consideration also needs to be given to the creation of a 'box of building blocks' from which growers can draw for their own business systems. Artemis will initiate this action;
- **Action:** where necessary, pre-competitive research (modelling studies) will be encouraged in this respect, with the aim of establishing the optimal mosaic of planting to achieve the most robust resilience to diseases and pests. Steps will be taken to establish demand for this research in the sector. LTO Nederland will initiate this action.

4.2.6 Connecting agriculture and horticulture with nature

Plant protection brings with it a number of opportunities to connect agriculture and horticulture (including covered crops) with nature. For example, containing and controlling diseases, pests and weeds naturally and protecting and improving biodiversity. Some ecosystem services (the services that nature contributes to the cultivation process) help to make a cultivation system more resilient by preventing or containing diseases and pests naturally. Added to this, natural barriers can help to stop or limit the extent to which residues from plant protection products are washed away from a plot of land, for example. However, nature can have a negative impact too; it is home to host plants on which diseases and pests can survive, making them a source of infection if a sensitive crop is grown on a plot of land. As such, steps must also be taken to limit any negative natural influences on a plot of land. Finally, consideration must be given to the vulnerability of nature when applying the principles of IPM. We have two objects in mind when connecting agriculture and horticulture with nature:

- To integrate ecosystem services into business operations such that they contribute optimally to the prevention, containment and control of diseases, pests and weeds and help to stop or limit the extent to which residues from plant protection products are washed away from a plot of land, among other things;
- To organise agriculture and horticulture such that any side effects on nature from the application of the principles of IPM are kept to a minimum and habitats are healthy for the organisms that the ecosystem services contribute.

Natural ecosystem services promote so-called functional agrobiodiversity, which directly supports a crop. This includes beneficial organisms and microorganisms that improve the resilience of soil and/or crops, or that make it possible to contain or control of diseases and pests. Nature supports these services too – providing a healthy habitat or foraging area for beneficial organisms outside the cultivation period, for example. This more 'indirect' functional agrobiodiversity forms a bridge to the other type of biodiversity. An optimal integration of the chain achieved by functional agrobiodiversity in and around the plot of land, the

ecosystem services provided by nature and the other natural biodiversity is vital to ensure that both the crop and nature benefit optimally from ecological buffering.

Functional agrobiodiversity

Many links between diseases, pests and weeds and measures that connect agriculture and horticulture with nature are still to be researched in more depth. However, there are a number of initiatives that could be beneficial and also a great deal of international research in which the complex factors of agricultural biodiversity, which could affect the diseases and pests present on a plot of land positively, neutrally or even negatively, have been unravelled.

- **Action:** the bringing together of knowledge and experiences gained from (international) research on the development of measures that connect agriculture and horticulture with nature will be included in the knowledge development projects (see Section 5). The Ministry of Agriculture, Nature and Food Quality will initiate this action.

If new measures have been developed, it will be important for agricultural entrepreneurs to apply them in the field. This could be achieved via a small-scale, controlled roll-out in a region or sector.

- **Action:** pilot projects will be set up to facilitate the application of agricultural and horticultural connecting measures that will benefit plant protection (and the prevention of plant protection) in the field. Various chain partners could be involved in these pilot projects. LTO Nederland will initiate this action.

Various agricultural entrepreneurs already have experience with using measures designed to connect agriculture and horticulture with nature to benefit both nature and crops. The measures taken by them have already been tested in the field. Various scientific studies on possibilities for the agricultural and horticultural sectors to use ecosystem services for the purpose of plant protection are under way too. However, both types of measures are not always available or possible to apply by or known to agricultural entrepreneurs.

- **Action:** an inventory will be made of the measures available (both in the field and in a scientific context) to facilitate a connection between agriculture and horticulture on the one hand and nature on the other. This inventory will be added to the information system for agricultural entrepreneurs and farm advisers that is announced in Subsection 5.1. The Ministry of Agriculture, Nature and Food Quality will initiate this action;
- **Action:** an inventory will be made of possibilities for the targeted use of beneficial organisms to contain and control diseases, pests and weeds. Artemis will initiate this action;
- **Action:** the identification of barriers to the use of available functional agrobiodiversity will be commissioned. The Ministry of Agriculture, Nature and Food Quality will initiate this action;
- **Action:** the development of knowledge networks with agricultural entrepreneurs, to gain and share new experiences of the use of functional agricultural biodiversity, will be encouraged. LTO Nederland will initiate this action;
- **Action:** the targeted use of beneficial organisms in the field will be encouraged. LTO Nederland will initiate this action.

In some cases, the use of indirect and direct functional agrobiodiversity will require the use of land other than that belonging to the agricultural entrepreneur (land owned by authorities or that forms part of nature reserves, for example). Where this is the case, collaboration between agricultural entrepreneurs and the other parties involved will be necessary at a regional or sectoral level.

- **Action:** the area projects designed to connect agriculture and horticulture to nature will be included in the pilot project described in Section 5. The Ministry of Agriculture, Nature and Food Quality will initiate this action.

(Side) effects on other biodiversity

Plant protection will continue to be necessary even if the optimal ecological integration of agriculture and nature is achieved. Optimal integration will be realised by applying the principles of IPM, which could have an impact (or side effects) on the natural environment. Having said this, diseases, pests and weeds are part of the natural environment too, the side effect of which is that they are a source for infection for an agricultural plot. It is important to keep both of these types of side effects to a minimum. Again, nature can help here, in the form of landscape elements like scrub or hedges, for example.

- **Action:** an instruction will be issued to identify the connection between landscape elements and any effects they might have on the application of the principles of IPM. The Ministry of Agriculture, Nature and Food Quality will initiate this action;
- **Action:** an indicator or indicators will be established to show the effect that plant-based production and plant protection have on biodiversity. The Ministry of Agriculture, Nature and Food Quality will initiate this action;

4.3 Applying technical and biological measures

The natural balance in a resilient cultivation system can be retained or restored through the targeted use of biology – beneficial organisms or microorganisms, for example. The strengthening of plant immune systems have a role to play here too. Technical innovations and the smart use of data will ensure that any intervention keeps disruption of the balance to a minimum.

4.3.1 Using beneficial organisms

Resilient cultivation concepts and the connection of agriculture and horticulture with nature promote the presence of beneficial organisms that are able to contain and control diseases, pests and weeds.

The targeted use of beneficial organisms is possible too. For example, the use of natural enemies against various pests in covered crops. The challenge is to broaden the targeted use of beneficial organisms to (other) diseases, pests and weeds in open-field, covered and indoor crops.

- **Action:** an inventory will be made of possibilities for the targeted use of beneficial organisms to contain and control diseases, pests and weeds. Artemis will initiate this action;
- **Action:** where necessary, possibilities for the targeted use of beneficial organisms in the field will be researched. Artemis will initiate this action;
- **Action:** the targeted use of beneficial organisms in the field will be encouraged. LTO Nederland will initiate this action.

4.3.2 The microbiome

The microbiome acts as a natural shield against organisms and microorganisms in and around a plant and its roots. Because of this, the microbiome plays an important role in crop growth and also promotes resilience against abiotic and biotic stress. The microbiome is very diverse (there are more than 100 million organisms and microorganisms on and in the skin of an apple, for example). The composition of the ideal microbiome for a certain crop will depend on the development stage of the crop, its genetic characteristics, the characteristics of the plot of land on which the crop is being grown and influences from the surrounding area. Advances continue to be made in scientific knowledge on this subject. The question is how this knowledge can be used to promote the resilience of a cultivation system in the field.

- **Action:** where necessary, pre-comparative research into consortia of organisms and microorganisms will be encouraged, to improve the microbiome of crops in their cultivation environment and gain insight into the products necessary to develop for this purpose. Artemis will initiate this action and wants to contribute by committing itself to product development at an early stage;
- **Action:** it would seem that consortia of organisms and microorganisms overlap in their modes of action. An inventory will be made of the overlap between consortia of organisms and microorganisms. Artemis will initiate this action and utilise the results obtained to formulate a follow-up action.

4-3-3 **Induced resilience**

Another important factor, besides resilience based on genetics and the microbiome, is induced resilience. Cultivation measures can be used to greatly increase the resilience or immune system of a plant.

- **Action:** steps will be taken to strengthen research on induced resilience and its implementation in the field. LTO Nederland will initiate this action. LTO Nederland will initiate this action.

4-3-4 **Technical measures**

A large variety of (new) technical measures will need to be used to prevent diseases, pests and weeds and to contain and control them (location, plant and time-specific), wherever necessary.

These technical measures could include:

- the physical protection of a crop, including the use of sealed greenhouses, nets and windshields when cultivating fruit;
- techniques for the organisation of and carrying out of work in cultivation systems, so that diseases, pests and weeds are not able to develop, or their development is slowed down, including variable soil preparation, sowing/planting/potting, fertilising, harvesting, strip tilling and mixed crops;
- physical techniques, including rinsing, steaming, burning, microwaves and inundation;
- mechanical techniques, including hoeing, harrowing, ridging, forcing and (drip) irrigation;
- imaging and sensor technologies for detection, diagnostics and monitoring purposes;
- precision technologies designed to achieve drift reduction, including air support, shielded fogging, shielded low-volume mist, shielded ultra low volume, droplet and spot spraying, depending on the crop, stage of growth, foliage mass and/or disease, pest or weed;
- technology used to carry out work with autonomous vehicles and aircraft, with the object of being able to effectively scout, scan and monitor a crop and control diseases, pests and weeds;
- decision support systems to facilitate appropriate action, with the object of achieving the (location, plant and time-specific) prevention, containment and/or control of diseases, pests and weeds, including systems that help the grower to cluster and analyse related information sources.

The challenge lies in making technical measures accessible and ensuring the (continued) development of new technical measures. Actions in respect of application techniques for plant protection products have been included separately, in Subsection 4.5.

Agricultural entrepreneurs will only use technical measures if they are feasible. A large group of agricultural entrepreneurs will only start to use new technology in their cultivation systems if it is more or less user-friendly. One important precondition is for entrepreneurs to be certain that they will be able to continue to use technical measures in their business operations for a commercially responsible depreciation period.

- **Action:** commission the development of a system for best available technology (BAT) for technical measures. Fedecom will initiate this action;
- **Action:** based on BAT, the market will develop effective technical measures that are appropriate for use in resilient cultivation systems. Naturally, current initiatives like the national precision agriculture programme (*nationaal programma precisielandbouw (NPPL)*) can be drawn on too. The NPPL focuses on open-field crops and needs to be extended to include covered and indoor crops. Part of the NPPL will need to be converted into targeted pilot projects with technical precision technology. Fedecom will initiate this action;
- **Action:** if gaps in knowledge and innovation are observed, the government will take on a supervisory role, to address the gaps in question in relevant programmes and agendas. The Ministry of Agriculture, Nature and Food Quality will initiate this action;
- **Action:** steps will be taken to ensure that agricultural entrepreneurs have an understanding of the observation, monitoring, detection and diagnosis technologies available and how to use them. Availability or access must be part of the information system. Fedecom will initiate this action;
- **Action:** New technologies will be tested in resilient cultivation systems, which may vary from one sector and region to another. Agricultural entrepreneurs will be able to share experiences with each other and learn whether the technologies in question are effective in the region/sector in question. Fedecom will initiate this action;

- **Action:** within the pilot projects, improved observation methods will be tested and used at a regional and sectoral level, to make it possible to recognise and respond to signs of diseases, pests and weeds at an early stage. Observations will be shared within the pilot projects themselves and also with other agricultural entrepreneurs in the same area/sector. Agricultural entrepreneurs in a particular area will jointly take control of efforts to contain pressure from pests and diseases too. One pilot project to be launched will seek to establish whether digital information systems can help agricultural entrepreneurs arrive at the specifics for a regional crop plan for their field of work. Fedecom will initiate this action;
- **Action:** agricultural entrepreneurs want to be certain that they will be able to continue to use a new technology in the long term. However, it is possible that regulations may not be ready to accommodate new technical measures yet. Prepare an overview of the obstacles in regulations that prevent the use of technical measures. For example, the use of drones and self-driving vehicles. Cumela will initiate this action;
- **Action:** a large number of agricultural entrepreneurs will only use information and decision-support systems and precision technologies if there is confidence in them and agreements have been made about aspects like data use by chain parties/third parties, security, data ownership and data sharing. LTO Nederland will initiate this action;
- **Action:** possibilities to realise a fully closed greenhouse system will be explored. LTO Nederland will initiate this action;
- **Action:** agricultural entrepreneurs will have the opportunity to try out and use technologies by investing in them themselves, investing in them together (via partnerships between agricultural entrepreneurs and existing or new cooperatives to be set up) or by hiring them from an agricultural contractor or dealer via a voucher system. This will reduce the risk of disinvestments for agricultural entrepreneurs. Cumela will initiate this action;
- **Action:** E-stewardship will be developed: digital, customised regulations for growers, focusing on cultivation and application conditions with the possibility to integrate available data. Nefyto will initiate this action;
- **Action:** plant protection products will be tracked and traced at batch level. Nefyto will initiate this action.

It is important to agricultural entrepreneurs to have access to new (precision) technologies at acceptable prices. They also want to be able to continue to use (precision) technologies for a commercially responsible depreciation period.

4.4 Plant protection products

This subsection will focus on the use of plant protection products to achieve the targeted control of diseases, pests and weeds with as few side effects as possible.

Today, plant protection products are used in every phase of the plant-based production process, to help ensure the growth of healthy, high-quality agricultural products: from seed to cutting, from growth up to and including the storage of food products and floricultural products. Over the years, it has been possible to target the use of plant protection products more and more. On the one hand, this has been achieved by developing new, more specific synthesised molecules and by developing products on the basis of natural substances and microorganisms. On the other hand, this has been facilitated by acquiring more and more knowledge about cultivation methods and diseases and the pests and weeds that could attack a plant and also new formulation types and application technologies. Authorisation policy and environmental regulations have played an important guiding role here too.

The range of plant protection products available has become increasingly less effective at controlling diseases, pests and weeds in the various crops. Due to high land prices, labour costs and the stringent quality and sustainability requirements to be met, the (economic) strength of Dutch agriculture and horticulture lies in high-quality (niche) crops. Because fewer plant protection products are already being developed for these so-called minor uses in speciality crops, these crops are coming under threat. This can have consequences for the quality and yield achieved and for opportunities to sell these products, given the

phytosanitary and market requirements applicable. The limited predictability of the range of crop protection agents available, due to changes in authorisation policy, new scientific insights and the commercial considerations of authorisation holders, also makes it difficult for agricultural entrepreneurs to anticipate changes in the range of crop protection agents available to them.

Even crops that have already become largely independent of plant protection products (pest control in greenhouse horticulture, for example) are coming under increasing threat where plant protection is concerned. The advent of biological plant protection, which has taken decades to develop, and improved climate control have made it possible to create a biological balance under controlled conditions (in greenhouses), making it more difficult for diseases and pests to establish themselves (resilient cultivation system). However, outbreaks are possible in these cultivation systems too and ought to be addressed as part of a targeted approach, preferably at an early stage and preferably also using a plant protection product that does not affect the biological system. Even products like this do not always make it through the authorisation assessment, due to the risks they pose to humans, animals or the environment.

To be able to prevent, contain and control diseases, pests and weeds in resilient cultivation systems with resilient species and crops, the use of biocides and plant protection products will continue to be necessary. If products are used, the aim will be to do so with virtually no emissions onto and leaving no residues on agricultural and horticultural products. If possible, the preference will be for the increasingly more specific and more targeted use of products and low-risk products, including so-called biological products.⁴

Regulation (EC) 1107/2009 sets out a graduated system. This can be defined as follows: the possibility to use an active substance safely in a representative European use will be assessed at European level first. If safe use is possible, an assessment will be carried out at Member State level, to establish whether a plant protection product can be used safely in the national situation and crops. In both cases, the applicant will indicate the uses for which the application is to be assessed. European harmonised guidelines will be used to assess the active substance and the plant protection product. The graduated system starts once the producer of a plant protection product submits a dossier. The regulation distinguishes between the following four groups of products:

1. Active substances that are eligible for replacement ('Candidates for substitution');
2. Active substances;
3. Low-risk substances;
4. Basic substances.

Experience to date has been that a group of biological substances (microorganisms, for example) is often possible to categorise as a low-risk substance.

4.4.1 **The wide availability of plant protection products**

To be able to support resilient cultivation systems, it is also important to agricultural entrepreneurs to have access to an effective range of plant protection products.

- **Action:** the developers of plant protection products will be asked for their continued attention to the development of low-risk substances and products. Nefyto will initiate this action;
- **Action:** there is a commitment in Europe to the introduction of an accelerated approval procedure for low-risk active substances, so that products based on these substances become available to agricultural entrepreneurs with less of a delay. The Ministry of Agriculture, Nature and Food Quality will initiate this action. This is an important point in the REFIT of Regulation (EC) 1107/2009 (see below);
- **Action:** the Ministry of Agriculture, Nature and Food Quality will draft a position paper setting out the Dutch commitment to the REFIT of Regulation (EC) 1107/2009. A risk-based approach will be the starting point here. This position paper will form the basis for Dutch efforts in negotiations in the Council further

⁴ Biological substances are: of natural origin, e.g. products derived from plants, animals, microorganisms or certain minerals or synthetic products that are identical to the natural substance and could pose a low level of risk to humans, animals, the environment and non-target organisms.

to the European Commission REFIT document, which is still to be published. The position paper will cover the following aspects: a change to the data requirements to be met to gain the approval of low-risk substances (including substances of biological origin (microorganisms, for example), consideration of the principles of IPM and risk mitigation measures in the approval and authorisation procedure, further harmonisation in respect of minor uses (definition and mutual recognitions), criteria and guidelines for cumulative exposure (of humans, animals and the environment) and neurological conditions and coherence with other relevant regulations, such as Regulation (EC) 528/2012 (biocides). The efforts above will be geared towards improving and changing implementation of the Regulation within the current frameworks, as this will be the quickest way to help advance the transition envisaged in the Vision for the Future of Plant Protection 2030. These efforts also tie in well with the findings of the October 2018 report commissioned by the European Commission and the expected reticence of the European Commission to make any changes to the regulation. However, this does not alter the fact that, even if the European Commission does propose amendments, a new situation will arise in which new considerations will be possible. The Ministry of Agriculture, Nature and Food Quality will initiate this action;

- **Action:** an overview will be prepared of potential low-risk substances that could be made available to agricultural entrepreneurs via mutual recognition or minor uses. Nefyto will initiate this action;
- **Action:** an overview will be prepared of potential basic substances that could become available to agricultural entrepreneurs. A plan to facilitate the rapid authorisation of these substances will be drafted and implemented. LTO Nederland will initiate this action;
- **Action:** steps will be taken to commit to the inclusion of innovative application technologies in the European approval procedure for active substances. The Ministry of Agriculture, Nature and Food Quality will initiate this action;
- **Action:** steps will be taken to identify and then utilise possibilities to apply the formula system, customised regulations, controlled distribution, system authorisation, exemptions and the provisional authorisation of plant protection products if related to resilient plants and cultivation systems. The Ministry of Agriculture, Nature and Food Quality will initiate this action and align it with current actions;
- **Action:** to promote the authorisation of low-risk substances and products, it will be important to gain insight into possibilities to use dossiers from (OECD) countries outside the European Union to apply for the approval of an active substance or for the authorisation of a substance. The Dutch Board for the Authorisation of Plant Protection Products and Biocides (*College voor de toelating van gewasbeschermingsmiddelen en biocides (Ctgb)*) will initiate this action;
- **Action:** a low-risk substance will not always result in the production of a low-risk product; a product will only be authorised as low-risk if it meets certain criteria. The individual Member States have their own rules on this, because of which there is no level playing field. The EU is currently working on guidelines to promote harmonisation. The Netherlands will commit itself to the rapid finalisation of these guidelines. The Dutch Board for the Authorisation of Plant Protection Products and Biocides will initiate this action;
- **Action:** steps will be taken to explore the scope of exemptions for trial purposes and pilot projects. The Ministry of Agriculture, Nature and Food Quality will initiate this action;
- **Action:** steps will be taken to improve the availability of biological substances and products, as they are a very important part of resilient plant and cultivation systems, provided they fall under the low-risk category in Regulation (EC) 1107/2009. Producers of plant protection products are striving to develop new biological substances and products that will fall in the low-risk category. Artemis will initiate this action;
- **Action:** identify how other EU countries - France, for example - launch (organisational and financial) initiatives that make it possible to cost effectively accelerate the registration of biological products for applicants and their availability to growers and ascertain whether instruments of this nature could be appropriate for the Netherlands too. Artemis will initiate this action.

4.4.2 Current issues

There may be different reasons why the range of measures and products available for a crop are no longer adequate at any given time. We refer to a situation like this as a current issue, which entails that a different way needs to be found for growers to continue to achieve good harvests without the plant protection product in question. A current issue could arise, for example, if the approval of an active substance or the authorisation of a plant protection product is not extended, because of which the plant protection product is no longer available to growers. Current issues may also arise further to the emergence of a new disease or pest or as the result of changes to application regulations, etc. Regardless of the background to a change or

new development of this nature, it is vital to agricultural entrepreneurs to be able to anticipate changes like this well in advance; this puts them in a position to make changes to their cultivation systems (for example), thus reducing the need for products, or use other, preferably low-risk, products.

- **Action:** current issues impede the achievement of the targets of the implementation programme, because of which it is important to gain insight into how the number of current issues are developing and the situations that are causing them. A system with broad-based support will be developed and used to identify current issues. When developing this system, the information sources already available, such as the European Union Minor Uses Database (EUMUDA) and the early warning system for substance renewals (see the next action), will be drawn on wherever possible. The plant-based sector organisations will initiate this action;
- **Action:** An early warning system has been developed to alert users to the possible loss of active substances as a result of European decision-making. The plant-based sector organisations will take the initiative to use this early warning system to promptly identify and resolve potential current issues;
- **Action:** if an equivalent alternative is not available when required, growers will need to be helped to bridge the time until an equivalent alternative is available. The sector, government and other relevant parties (authorisation holders, for example) will seek to identify an effective product per issue in joint consultation with each other. A so-called 'solutions plan' will be drafted and form the basis for the collaboration outlined above. The plant-based sector organisations will initiate this action. The solutions plan will include the routes that solutions could possibly take and corresponding instruments for both the short and medium term. Solutions will focus explicitly on a broad level. For example, new or additional research on alternatives, the removal of (financial, legal or other) barriers to the use of alternatives and also more short-term solutions, such as exemptions (for trial purposes) and dispensations (also see below). The priority for alternatives and solutions will be to ensure that they do not give rise to risks that are unacceptable for humans, animals and the environment;
- **Action:** the plant-based sector organisations have selected an initial 22 current issues that require urgent resolution. These specific cases will be presented to and discussed in or under the flag of the current issues working group (*werkgroep actuele vraagstukken*). The joint ambition is to find solutions for these issues in 2020, by doing which lessons can also be learned about how to address new issues in the future;
- **Action:** the effectiveness and suitability of the instruments available to resolve current issues will be evaluated and discussed with the parties concerned on a regular basis. The instruments available and their use will be optimised further, if necessary, on the basis of the above.

At the current time, there are various possibilities that could help resolve a current issue or serve as a safety net in the absence of a timely alternative or solution. The above applies to speciality crops, minor uses (see Subsection 4.4.3) and biocides (see Subsection 4.4.4) too.

- **Action:** a proposal will be drafted that sets out which possibilities there are to retain active substances that are relevant in the context of the transition at a European level; Nefyto will initiate this action;
- **Action:** the Ministry of Agriculture, Nature and Food Quality has taken the initiative to promptly involve the various parties in the process designed to identify essential applications (Regulation (EC) 1107/2009, Article 4(7)). A plan has been drafted to this end. The Ministry of Agriculture, Nature and Food Quality is also committing itself to the uniform interpretation and effective utilisation of essential applications in a European context;
- **Action:** the updated emergency authorisation plan will be used to bridge the transition period from 'old to new'. This plan includes different types of emergency authorisations. For example, an emergency authorisation that takes into account the need to maintain or promote IPM and a 'transition emergency authorisation'. An application for the latter should be submitted if the development of an alternative cannot be completed on time; this type of emergency authorisation will be granted for a maximum of three years;
- **Action:** the recently updated emergency authorisations plan includes a number of improvements to the procedure to be observed when applying for emergency authorisations. The Ministry of Agriculture, Nature and Food Quality will initiate this action. This will involve: (1) the possibility to include the Dutch Board for the Authorisation of Plant Protection Products and Biocides in the intake meeting, if necessary; (2) the consultation of an independent expert if there are any doubts about the agricultural need for

an emergency authorisation for which an application has been made; (3) the assessment of the current pricing system used by the Dutch Board for the Authorisation of Plant Protection Products and Biocides when checking emergency authorisation applications against the actual situation in the field; the starting point here will be for the pricing system to be cost effective;

- **Action:** collaboration between authorisation holders and advisers is vital if solutions are to be found to current issues. In the field, targeted discussions between these parties are sometimes absent and the possibilities open to parties in existing frameworks are utilised insufficiently. To prevent current issues as much as possible, authorisation holders will engage in discussions with the sectors in question as soon as they are able to do so. The parties will also strengthen the dialogue between them, with a view to achieving the faster and more promising resolution of problem areas. Nefyto will initiate this action;
- **Action:** mutual recognition makes it easy for products that have been authorised in other Member States to gain authorisation in the Netherlands too. To make optimal use of this possibility, it is advisable for the sector to have knowledge of all of the products that have been authorised in the EU. The European Commission is currently developing a database that will contain this information, but it is unclear when it will be ready. The Ministry of Agriculture, Nature and Food Quality will continue to remind the European Commission of the need for this database to become operational as soon as possible. The procedure to be observed when applying the 'mutual recognition' instrument will be checked too and harmonised further where necessary. This is part of the commitment to the optimisation of the assessment framework, as described in Subsection 5.3.4.;
- **Action:** the object is to achieve a follow up to the Minor Use Fund (*Fonds Kleine Toepassingen*), which will cease to exist in 2020. The outcomes ensuing from the evaluation of this fund will be taken into consideration when creating a new fund. The new fund will focus not only on facilitating the authorisation of minor uses but also on the facilitation of other effective solutions that are difficult to make available for financial reasons. For example, the approval of basic substances, the authorisation of low-risk products and possibly also the testing of measures in an experimental setting. LTO Nederland will initiate this action.

4.4.3 Speciality crops and minor uses

The Dutch agricultural and horticultural sectors are characterised by the fact that many crops are grown on a small scale in the Netherlands. The producers of plant protection products generally base an authorisation application on one or more large crops in the EU, not relatively small-scale and less lucrative crops.

- **Action:** the Minor Use Fund has been in place in the Netherlands for many years now and specialises in providing financial support for the authorisation of plant protection products and biological pest control agents for minor uses. This fund will be evaluated. The Ministry of Agriculture, Nature and Food Quality will initiate this action;
- **Action:** there are various ways to apply for minor use under Regulation (EC) 1107/2009, namely via a zonal application, mutual recognition or a national application (the so-called national extension of authorisation with minor uses solely in the Netherlands (*Nationale uitbreiding kleine toepassingen (NLKUG)*). Suboptimal use is being made of these possibilities at the current time, due to differences in interpretation between European Member States, among other things. Consideration will be given to the possibility of modifying the policy framework for the NLKUG in order to reduce the minor uses problem. The Ministry of Agriculture, Nature and Food Quality will initiate this action;
- **Action:** a trustee is in place for minor uses applications. The object of the trustee is to counteract possible liability risks for authorisation holders. LTO Nederland will elaborate the option to extend the duties of the existing trustee to include other activities (dispensations, for example).

4.4.4 Biocides

In 2017, the Dutch Board for the Authorisation of Plant Protection Products and Biocides clarified the difference between biocide applications and plant protection applications, when asked to do so by the European Commission. As a result, renewed consideration will be given to whether future new product applications and re-registrations are biocide or plant protection applications. This could lead to a situation where biocides that are currently being used for disinfection purposes in the agricultural sector (in greenhouses and for tools, for example), with the object of preventing plant diseases, will be deemed to be plant protection applications and require authorisation as plant protection products. The Netherlands aims

to achieve the use of biocides as hygiene measures, where possible given the frameworks of the European Regulation on plant protection and biocides.

- **Action:** the Ministry of Agriculture, Nature and Food Quality and the Ministry of Infrastructure and Water Management will commit themselves to gaining clarity at European level about the interpretation of the interface between biocides and the plant protection regulation;
- **Action:** the Ministry of Agriculture, Nature and Food Quality and the Ministry of Infrastructure and Water Management will engage in discussions with the sector and the Dutch Board for the Authorisation of Plant Protection Products and Biocides about specific applications that could potentially disappear as a result. The starting point for the Netherlands on this subject will be to create a level playing field in Europe and also to avoid any obstacles to the first step of IPM: prevention. If necessary, extra efforts will be made to achieve alternatives or to submit a plant protection dossier for existing biocide applications. Consideration will also be given to how to facilitate the use of studies, dossiers, assessments and authorisations for biocides and plant protection.

4.4-5 Working conditions

It is important for agricultural entrepreneurs to ensure that plant protection products are used in a manner that is safe for their employees (or for employers or self-employed individuals). Based in part on the results of the interim evaluation, it is vital to increase the level of occupational health and safety provisions in place.

- **Action:** social partners will prepare appropriate occupational health and safety catalogues for all of the agricultural sectors in which plant protection products are used. These catalogues will set out control measures for all of the risks ensuing from the use of plant protection products. These control measures will include safety regulations on the use of plant protection products, crop re-entry and the mixing of plant protection products. An occupational health and safety catalogue will be deemed to be appropriate if it has been accepted by the Inspectorate SZW (*Inspectie SZW*). Responsibility for the implementation of this action must be placed with the Ministry of Social Affairs and Employment. The Ministry of Agriculture, Nature and Food Quality will initiate this action;
- **Action:** traders, advisers and sectors will communicate information about occupational health and safety to employers and the buyers of plant protection products at an appropriate level. Among other things, this will include the risks posed by plant protection products (for vulnerable groups, among others), the choice of appropriate personal protective equipment and the correct use of personal protective equipment (during application and re-entry) and re-entry (including the re-entry period). Responsibility for the implementation of this action must be placed with the Ministry of Social Affairs and Employment. The Ministry of Agriculture, Nature and Food Quality will initiate this action;
- **Action:** employers will communicate information to individuals responsible for applying plant protection products and employees who work in crops and will do so at an appropriate level. This information will include the risks posed by plant protection products (for vulnerable groups, among others), the choice of appropriate personal protective equipment and the correct use of personal protective equipment (during application and re-entry) and re-entry (including the re-entry period). LTO Nederland will initiate this action;
- **Action:** when assessing plant protection products, a great deal of information is gathered from the Dutch Board for the Authorisation of Plant Protection Products and Biocides about the risks possible and the corresponding prevention measures. Some data that might be of interest to promote health and safety at work is not easily accessible. This impedes the action perspective of entrepreneurs and employees on the subject of safety at work. LTO Nederland will initiate this action;
- **Action:** in collaboration with the Ministry of Social Affairs and Employment and the Dutch Board for the authorisation of Plant Protection Products and Biocides, steps will be taken to explore the availability of information about the risks posed by plant protection products and also how this information could be used to inform entrepreneurs and employees better about the appropriate measures to put in place. Responsibility for the implementation of this action must be placed with the Ministry of Social Affairs and Employment. The Ministry of Agriculture, Nature and Food Quality will initiate this action;
- **Action:** the information available will be made accessible in a low-threshold and user-friendly manner, (a) to facilitate the preparation of hazard identifications and risk assessments (HI&RAs) and (b) to users,

including individuals responsible for applying products and occupational health and safety officers (in the form of an App, for example). Where possible, alignment will be sought with other actions geared towards information retrieval. Responsibility for the implementation of this action must be placed with the Ministry of Social Affairs and Employment. The Ministry of Agriculture, Nature and Food Quality will initiate this action.

4.5 Emission reduction measures

4.5.1 Current agreements designed to reduce emissions to virtually zero

As indicated in the previous subsection, the use of plant protection products will continue in 2030. However, their use must be virtually emission free. This will require the development of new, robust working methods that enable agricultural entrepreneurs to reduce emissions into the living environment to virtually zero. Agreements in this respect have already been made in the general agreement for water purification in greenhouse horticulture (*Hoofdlijnenakkoord waterzuivering glastuinbouw*)⁵ and the ‘package of measures to reduce emissions by plant protection products in open-field crops’.⁶ Both of these documents have been adopted and sent to the Lower House and are now being implemented.

4.5.2 Additional actions

The agreements referred to in Subsection 4.5.1 are the result of discussions between government parties and the organised business community and have been shared with the Dutch Lower House by the ministries. There are various parties that want to add a number of actions over and above the agreements made between the government and the business community in the actions above. With governance in mind, it is up to these parties to take up these actions in consultation with the parties involved in the agreements made.

- **Action:** steps will be taken to achieve the early identification of possible problem areas in relation to drinking water abstraction and share this information with the parties involved. Vewin will initiate this action;
- **Action:** steps will be taken to achieve the early identification of possible problem areas in relation to groundwater and share of this information with the parties involved. The Ministry of Infrastructure and Water Management will take the initiative to approach the Association of Provincial Authorities (*Interprovinciaal Overleg (IPO)*) about the implementation of this action;
- **Action:** when problem areas are identified, consideration will be given to the question of whether measures are necessary in addition to the ‘package of measures to reduce the emissions produced by plant protection products used on open-field crops’. The Ministry of Infrastructure and Water Management will take the initiative to approach the Association of Provincial Authorities about the implementation of this action;
- **Action:** pilot projects will be launched to implement new possibilities for the field to limit the emissions from plant protection products into the living environment. Fedecom will initiate this action;
- **Action:** the Association of Regional Water Authorities (*Unie van Waterschappen*) will take the initiative to develop new instruments to encourage water-conscious business practices. For example, instruments that enable agricultural engineers to measure water use and that facilitate preventive advisory enforcement, evaluation by the regulatory authority, enforcement communication and an area-based approach;
- **Action:** steps will be taken to share good examples from collaboration projects, to encourage the application by agricultural entrepreneurs of emission abatement measures in respect of sources for the production of drinking water. Vewin will initiate this action;
- **Action:** steps will be taken to share good examples from collaboration projects, to encourage the application by agricultural entrepreneurs of emission abatement measures in respect of groundwater. Vewin will initiate this action;

⁵ <https://zoek.officielebekendmakingen.nl/kst-32627-20.html> and <https://zoek.officielebekendmakingen.nl/blg-598825>.

⁶ <https://www.rijksoverheid.nl/documenten/kamerstukken/2019/04/16/kamerbrief-toekomstvisie-gewasbescherming-2030-naar-weerbare-planten-en-teeltsystemen-en-pakket-van-maatregelen-emissiereductie-gewasbescherming-open-teelten>.

- **Action:** the Rural Development Programme (*plattelandsontwikkelingsprogramma*) will be used to encourage agricultural entrepreneurs to put emission abatement measures in place in relation to surface water and groundwater. The water authorities and provinces will contribute to this financially. Where there is a connection with the quality of drinking water sources, the drinking water companies will ascertain whether a financial contribution to regional products is necessary. VEWIN will initiate this action;
- **Action:** steps will be taken to obtain information about improving the waste collection of residues and the used packaging of plant protection products, so that an even better system, with good coverage, is achieved in the Netherlands. Nefyto will initiate this action.

4.6 Residue reduction measures

Plant protection products will continue to be used on agricultural and horticultural crops in 2030. However, their use must result in almost zero residues being left on agricultural and horticultural products.

Residues on food products

The object as regards the food safety of plant protection products is to maintain the current level of protection. If new insights are gained on the safety of products, it will continue to be important to assess whether the level of protection in place still reflects the values specified previously.

The safety of a certain food product will depend on the amount of residue encountered and on the extent to which humans are exposed to the residue by consuming the food product in question. Both of the above can be used to assess whether or not the residue found poses a risk.

If plant protection products continue to be used in resilient cultivation systems in 2030, the likelihood of residues being encountered on products will decrease in comparison with the current situation. Safety margins will increase in this situation. The Food and Consumer Product Safety Authority (*Voedsel en Waren Autoriteit (NVWA)*) will keep a finger on the pulse via regulation and monitoring activities.

The extent to which consumers are exposed to residues will depend on how much of and how a food product is consumed. Therefore, besides a knowledge of the residues applicable, it will be vital to have an understanding of the consumption pattern of consumers; up-to-date consumption figures will facilitate a better estimate of the protection level. This highlights the importance of updating the food consumption survey (*Voedselconsumptiepeiling*) published by the National Institute for Public Health and Environmental Protection (*Rijksinstituut voor Volksgezondheid en Milieu (RIVM)*), which is being prepared at the current time.

Safety limits for the residues left by plant protection products (maximum residue limits) are clear and will be assessed periodically and re-assessed too if there is reason to do so. New insights into the risks presented by plant protection products could be achieved by calculating the cumulative exposure; in other words: exposure to the sum of different products with the same mechanism of action. Although legislation provides for the assessment of these cumulative risks, the calculation method to be used is still at the development stage. These risks are not entirely clear at the current time as a result (Parliamentary Papers 27858-433 and 27858-505). Calculations will be made for other organ systems in the years ahead too. If these calculations show that health-based limit values are being breached, action will be taken to increase the protection level. Also, new cultivation concepts will be assessed for the development of microorganisms that are harmful to human health; ergot, for example.

5. The transition process for resilient cultivation systems and environmental factors

Section 3 describes how the resilience of a system will be determined by a broad interplay of the building blocks available, the economic, biological and social context of the cultivation system and the choices that agricultural entrepreneurs make. Section 4 describes actions for the (continued) development of the individual building blocks that come together to form a 'box of building blocks' for resilient cultivation systems. During the transition process, it will be important for the (continued) development of these individual building blocks to occur in connection with each other too. Some processes also respond to the development of the context of the resilient cultivation system, such as the chain and commitment from authorities. Processes that connect the development of building blocks and respond to factors in the context of resilient cultivation systems are key to this section.

5.1 Management instrument for the action perspectives of agricultural entrepreneurs

When developing (or continuing the development of) the various building blocks, the outcomes must come together to offer agricultural entrepreneurs insight into their action perspective. During this process, it will also be important for different data sources to be brought together in an instrument, so that agricultural entrepreneurs can instantly gain insight into all of the possibilities there are to make a cultivation system (more) resilient. The action perspective could be made accessible per crop, enabling an individual agricultural entrepreneur to weigh up his/her actions against the range of measures available for the crop/sector. This would make it clear to an agricultural entrepreneur where opportunities exist to make his/her cultivation system more resilient.

- **Action:** instruments will be developed for agricultural entrepreneurs that clarify the range of action perspectives that strengthen resilience. LTO Nederland will initiate this action.

5.2 The connection between building blocks and resilient cultivation systems

The three points below are important to the successful transition to resilient cultivation systems:

1. The (continued) development of resilient cultivation systems;
2. The assessment and implementation of resilient cultivation systems in the field;
3. The adoption of resilient cultivation systems.

The three points above are part of an ongoing process and a good connection must be established between each of them. It will be important to consider the diversity of Dutch agriculture and horticulture and sectoral and regional differences when doing this.

5.2.1 The (continued) development of resilient cultivation systems

Resilient cultivation systems may be the result of fundamental design processes (top-down) or experimental initiatives in the field (bottom-up). Ideally, they will involve a co-creation process in which top-down and bottom-up approaches come together and merge. As such, it is important to invest in both routes.

The development of resilient cultivation systems will start with the consideration of existing research programmes, such as the knowledge and innovation agenda (KIA) for Agriculture, Water and Food 2020-2023. This includes multi-year, mission-driven innovation programmes (MMIPs) on the subject of healthy, robust soil and cultivation systems based on agro-ecology and without harmful emissions into groundwater and surface water (*Gezonde, robuuste bodem en teeltsystemen gebaseerd op agro-ecologie en zonder schadelijke emissies naar grond- en oppervlaktewater*). In these MMIPs, research, innovation, demonstration and implementation processes are used to work towards the development of knowledge on robust cultivation systems on healthy soil and substrate. The innovation challenges faced by the greenhouse horticulture sector are included in these MMIPs too.

- **Action:** an inventory will be made of current research projects on plant health (including top sectors, NWO, POP, H2020). The results of this inventory will be used to design and implement an integrated approach, which will create integrality and identify the direction to be taken. The existing Knowledge and Innovation Agenda for Agriculture, Water and Food will serve as the basis for the above, supplemented by greenhouse horticulture. The Ministry of Agriculture, Nature and Food Quality will initiate this action;
- **Action:** the Ministry of Agriculture, Nature and Food Quality will analyse whether current publicly-funded research programmes on plant protection (including plant health and breeding) are contributing to the successful realisation of the transition. This could result in the need to update research programmes or organise them differently (making them more demand-based, sectoral-based or area-based, for example) or to launch new programmes. An analysis of this nature will be repeated periodically, to ensure that the achievement of the targets set out in this implementation programme continue to be key. The Ministry of Agriculture, Nature and Food Quality will initiate this action;
- **Action:** the private parties involved will ensure that the research proposals on plant protection (including plant health and plant breeding) submitted by them in the future contribute to the achievement of the targets set out in this implementation programme;
- **Action:** the 'greenhouse as an ecosystem' (*Kas als Ecosysteem (KaEco)*) project will be implemented, utilising all of the relevant building blocks identified in Section 4. LTO Nederland will initiate this action;
- **Action:** LTO Nederland will come up with specific proposals for the (continued) development of resilient cultivation systems.

Besides investments on the part of the scientific community, significant investments in steps to make cultivation systems more resilient are being made at field level. With this in mind, entrepreneurs that want to launch initiatives themselves will be encouraged and helped to do so.

- **Action:** to support innovation at business level, criteria, frameworks and preconditions will be formulated for the term 'scope for experimentation'. The instruments currently available will then be reviewed accordingly. Where necessary, additional instruments will be developed (for low-risk products, for example). LTO Nederland will initiate this action;
- **Action:** agricultural entrepreneurs that want to (continue to) develop resilient cultivation systems in their businesses must have access to operational support in the form of knowledge, guidance, monitoring or otherwise – if they require support of this nature. An incentive framework will be developed for this purpose. Agrodis will formulate a proposal on the above.

5.2.2 **The implementation of cultivation systems in the field**

It is possible that what works well when reorganising a cultivation system in an experimental setting will fail miserably in the field. This could be because conditions are impossible or more difficult to control in the field. With this in mind, there must be sufficient scope to allow experimental ideas to mature in the field. This could be achieved in pilot projects that are implemented in demonstration businesses or in the businesses of agricultural entrepreneurs. In many regions and in the sectors themselves, initiatives have already been launched that can be characterised as demonstration businesses, or that are being implemented in the businesses of agricultural entrepreneurs. Various private parties are supporting these promising demonstration businesses or parts of them. The object is to try make the transition a reality via pilot projects as soon as possible and to learn from these projects. This can be achieved by become part of existing pilot projects and also by launching new pilot projects.

- **Action:** steps will be taken to identify sectoral and regional initiatives and assess how they tie in with and contribute to the achievement of the targets set out in this implementation programme. The Ministry of Agriculture, Nature and Food Quality will initiate this action;
- **Action:** a proposal will be drafted and implemented in respect of the implementation of pilot projects at business, sector and regional level for the achievement of the targets underlying the transition to resilient cultivation systems, the connection of agriculture and horticulture with nature and the reduction of emissions and residues to virtually zero. LTO Nederland will initiate this action;

- **Action:** a regional pilot project will be organised in the province of Drenthe (led by the province of Drenthe) in which a solution is sought to the problems experienced by local residents when agricultural entrepreneurs use plant protection products. The Ministry of Agriculture, Nature and Food Quality will facilitate the province in the above;
- **Action:** a representative network of demonstration locations for regions and sectors will be set up and maintained. At these locations, resilient cultivation systems and building blocks for these systems will be used and monitored in conditions that are encountered in the field. This network could consist of both fixed locations (trial stations, for example) and flexible locations (cultivation businesses, for example), depending on the crop or building block in question. LTO Nederland will initiate this action;
- **Action:** several pilot projects will be organised with groups of agricultural entrepreneurs; the resilience of the crops grown and of the individual business as a whole will be key. These pilot projects will focus on identifying diseases, pests and weeds and on making knowledge available to improve the resilience of crops and the business as a whole step by step. Artemis will initiate this action;
- **Action:** information and advice about (building blocks for) resilient cultivate systems will be brought together, translated into form and content that are possible for growers and advisers to understand and then made accessible in a low threshold and uniform manner. Agrodix will take the initiative to actively bring the information system to the attention of advisers and agricultural entrepreneurs;
- **Action:** growers, advisers and farm advisers will proactively join forces to learn and gain experience with resilient cultivation systems. Existing structures can be utilised to support the above. For example, the Delta Plan for Agricultural Water Management (Deltaplan Agrarisch Waterbeheer (DAW)) and the 'tailor-made knowledge' programme (*Programma Kennis op maat*). LTO Nederland will develop the specifics of this action;
- **Action:** in spring 2021, a plant protection day will be organised with a view to sharing information about the pilot projects more widely. LTO Nederland will initiate this action.

Agricultural entrepreneurs expose themselves to risks when they experiment with new cultivation systems; if a new cultivation system does not work or the – quantitative or qualitative – yield is lower than anticipated, agricultural entrepreneurs immediately lose income. The following actions will be taken to avoid the transition grinding to a halt as a result:

- **Action:** a safety net will be developed for agricultural entrepreneurs that are able to specifically identify, when starting a pilot project, where they might be subject to additional risks during the course of the project in question. This safety net will consist of possibilities to adjust for any unforeseen negative effects that arise during cultivation on the one hand and financial compensation for the loss of income due to the failure of the new system on the other hand. The Ministry of Agriculture, Nature and Food Quality will initiate this action;
- **Action:** parallel to the pilot projects, agricultural entrepreneurs will be provided with instruments to help them during a large-scale roll out and also to remove barriers that might prevent them from participating in a roll-out of this nature. Experiences from the pilot projects will provide direct input for the above. To encourage agricultural entrepreneurs, these instruments will be developed promptly and proactively. All of the parties to this implementation programme will feel responsible for this action. The Ministry of Agriculture, Nature and Food Quality will initiate this action.

Example demonstration business

Several agricultural entrepreneurs that specialise in open-field crops have taken the initiative to research the possibilities offered by precision technologies and also to test their use for arable farming and bulb cultivation purposes on a practical scale in a demonstration business they have launched to this end. Activities undertaken at this demonstration business include the implementation of pilots and the provision of information to and 'feeding' of knowledge networks. Initiatives like this exist in the greenhouse horticulture sector too. The National Living Lab for Precision Agriculture (*Nationale Proeftuin Precisielandbouw (NPPL)*) focuses on open-field crops. This focus must be extended to include greenhouse horticulture too, so that the knowledge gathered benefits all of the various sectors.

Knowledge networks

- **Action:** a knowledge network will be created in which the knowledge developed in the field or by research institutions is shared ('best practices') and then applied in the field. This will make it possible to scale up 'small wins' to 'big wins'. LTO Nederland will initiate this action. The two actions below will represent the first practical implementation of the above;
- **Action:** an explanation will be provided, in small groups of agricultural entrepreneurs per sector, of how plants and crops are becoming 'more resilient' to diseases and pests. Agricultural entrepreneurs will be given the tools they need to test the resilience of their crops and also tips about observations and measurements, which they then share with each other. LTO Nederland will initiate this action;
- **Action:** good examples and the possible directions in which solutions might lie, as revealed in collaboration projects designed to encourage agricultural entrepreneurs to use emission abatement measures in relation to the sources for drinking water production, will be shared. Vewin will initiate this action.

5.2.3

The adoption of resilient cultivation systems

It takes time and a tailor-made approach to integrate (building blocks for) a resilient cultivation method into an existing business. Naturally, the reach of a small-scale roll-out of this nature will be limited. Also, some agricultural entrepreneurs cannot or will not want to risk adopting an approach that is new to them. To gain the *confidence* of agricultural entrepreneurs and farm advisers across the board, it will be important for them to be able to see the approach with their own eyes and be able to share their experiences with each other. The knowledge available must be circulated to all relevant parties, such as advisers and agricultural entrepreneurs. The various possibilities at the disposal of this implementation programme are elaborated on below.

Knowledge distribution

- **Action:** a proposal will be prepared on the use of innovations at sectoral, regional and national level for the short, medium and long term. LTO Nederland will initiate this action;
- **Action:** steps will be taken to ensure that agricultural entrepreneurs are able to rely on the services of an adviser, who will help them to use innovations in their businesses (step-by-step). For this to be successful, it will be important for the position of the adviser to be visibly strengthened, so that each adviser is able to provide uniform advice. The aim is for this proposal to contribute to the successful completion of the transition. Agrodis will initiate this action;
- **Action:** businesses that want to embark on the transition will need tailored-made support. This will be provided in the form of transition coaches. Agrodis will put together a plan on how to put transition coaches in place;
- **Action:** existing instruments and the instruments provided for in this implementation programme for the realisation of resilient cultivation systems will be assessed for their effectiveness and accessibility for speciality crops. If these instruments fail the assessment, tailor-made and/or additional instruments will be developed. LTO Nederland will initiate this action;
- **Action:** steps will be taken to continue successful collaboration projects launched by the drinking water sector with agricultural entrepreneurs to reduce emissions produced by plant protection products in relation to drinking water sources and also explore opportunities to extend other collaboration projects in which the drinking water sector is involved – on other issues – with the object of achieving emission abatement measures. Vewin will initiate this action.

Education

(Future) agricultural entrepreneurs will attend courses and receive further training. These courses should also cover the Vision for the Future of Plant Protection 2030, so that they contribute to the achievement its targets.

- **Action:** the Ministry of Agriculture, Nature and Food Quality will engage in discussions with the Ministry of Education, Culture and Science to have the courses and training programmes provided by agricultural schools reviewed and updated, if necessary;
- **Action:** the 'package of measures to reduce emissions by plant protection products in open-field crops' will also focus on reviewing regulations on plant-protection qualification certificates. The organised business community will initiate this action.

5.3 Environmental factors

5.3.1 The chain

Current revenue models are an impediment to agricultural entrepreneurs. In the current system, the extra investments necessary to make the transition to resilient cultivation systems do not yield the added value agricultural entrepreneurs will need at product level. Entrepreneurs must be able to deliver a healthy and profitable product and be put in the financial and commercial position necessary to make the transition envisaged. The chain and the market will need to come into action for this to be possible. The discussion and removal of these commercial barriers will be an important challenge to overcome if the successful realisation of the transition is to be achieved.

- **Action:** the Ministry of Agriculture, Nature and Food Quality will initiate the organisation of discussions between the government, the agricultural business community (cultivation and processing) and the Dutch retail sector to discuss the problem of a fair price, with the object of developing models for the calculation of a fair price;
- **Action:** pilot projects for a specific product that is sold in the Dutch retail sector will be launched with the object of studying pricing in the chain, during the transition, partly in relation to the need to secure a fair price. LTO Nederland will initiate this action;
- **Action:** steps will be taken to ascertain how sustainability labels and other non-statutory requirements could impact the revenue model for both agricultural entrepreneurs and chain parties during the transition. The Ministry of Agriculture, Nature and Food Quality will initiate this action.

5.3.2 Phytosanitary import and export requirements

A significant percentage of production by agricultural businesses is sold outside the Netherlands and outside the European Union too. Additional requirements often apply when selling to so-called third countries. Some third countries only import agricultural products (including propagation material) if they are completely 'clean' and 'free of organisms'. Countries impose these phytosanitary requirements in an effort to prevent the introduction of quarantine diseases and pests. To date, these requirements have often been met through the use of plant protection products. There is a risk that it will not always be possible to meet these requirements once the new cultivation systems are in place. This would have a major impact on sales opportunities. However, this would not necessarily mean that there is an increased risk to plant health or an increased risk of the introduction of quarantine diseases and pests. It will be essential to (continue to) enter into international dialogue, to create support for the production methods used in resilient cultivation systems in respect of phytosanitary requirements and to come together to find solutions to ensure that new cultivation systems continue to meet phytosanitary requirements within the EU and beyond.

- **Action:** LTO Nederland will initiate an inventory of how current phytosanitary requirements within Europe and in third countries compare to (opportunities for) the continued development of resilient cultivation systems. Based on this inventory, specific problem areas will be identified and discussed with the parties to this implementation programme;
- **Action:** the Ministry of Agriculture, Nature and Food Quality will commit itself to gaining acceptance for the production methods used in resilient cultivation systems in countries in the European Union and beyond. The network of agricultural counsellors (within the EU and beyond) and discussions with third countries on subjects including phytosanitary market access will be used to this end. The main priority will be to safeguard plant health – there must not be any unacceptable risk of the introduction of diseases and pests, even when using resilient cultivation systems. This is essential for both the importing and exporting country. It should be recognised that the Netherlands cannot force other countries to change their phytosanitary requirements. If a country does not do so, the consequences that this will have for the transition in the Netherlands to a resilient cultivation system for the crop in question and for the achievement of the targets set out in this implementation programme will be identified and then discussed with the parties to this implementation programme.

As a trading nation, there is also a risk that the Netherlands will see the introduction of new diseases, pests and weeds into its own crops. Climate change could give rise to a different range of diseases, pests and weeds too. There is a need among agricultural entrepreneurs for knowledge to prevent, monitor, contain and control these new diseases, pests and weeds at the cultivation stage.

- **Action:** steps will be taken to ascertain whether the current system being used to review various data about new quarantine diseases, pests or weeds that manifest themselves in the Netherlands could also be used for 'regulated non-quarantine pests' and quality pests. For example, the information available about symptoms, spreading routes, detection possibilities, measures and products to contain or control diseases, pests or weeds. The Ministry of Agriculture, Nature and Food Quality will initiate this action;
- **Action:** Based on the results of the action point above, steps will be taken to ascertain how and the extent to which this (possibly modified) system could be used on 'regulated non-quarantine pests' and quality pests that are new to the Netherlands. The Ministry of Agriculture, Nature and Food Quality will initiate this action with the agricultural business sector.

5.3.3

Innovations and investments

A core element of this implementation programme is the need to put agricultural entrepreneurs in a position, both financially and commercially, to make the transition envisaged. The innovations this involves will require entrepreneurs to invest or make changes to their business operations. The existing financial commitments that these agricultural entrepreneurs have and the corresponding investment periods must be taken into consideration too.

- **Action:** a proposal will be prepared on the creation of a financial framework for agricultural entrepreneurs, so that individual entrepreneurs are encouraged to take steps towards making the transition. LTO Nederland will initiate this action;
- **Action:** instruments will be developed to reduce the investment threshold for cultivation systems, or parts of proven, effective cultivation systems that are not profitable yet. Support will be available if an implementation plan is provided that sets out the approach and timescale necessary to make the system profitable. This plan will be monitored on a regular basis. LTO Nederland will initiate this action;
- **Action:** Where proven, effective cultivation systems, or parts of these cultivation systems, are not profitable yet, steps will be taken to establish which possibilities there are to guarantee that the entrepreneurs pioneering these systems will be able to sell their products for a fair price. LTO Nederland will initiate this action.

Fiscal instruments

Agricultural entrepreneurs can use existing fiscal instruments like the Environmental Investment Credit (*milieu-investeringsaftrek (MIA)*) and the arbitrary depreciation of environmental investments (*willekeurige afschrijvingen milieu-investeringen (Vamil)*). The Environmental List specifies which operating assets are eligible for MIA and Vamil and is updated on an annual basis.

- **Action:** steps will be taken to submit a proposal to include closed greenhouse concepts – the netting off of greenhouses, for example – in the Environmental List. Nefyto will submit this proposal to RVO.nl;
- **Action:** the submission of a proposal to include closed greenhouse concepts – the netting off of greenhouses, for example – in the Environmental List. LTO Nederland will submit a proposal on the above to RVO.nl;
- **Action:** each year, Fedecom will proactively establish whether the Environmental List is to be updated in relation to the targets set out in this implementation programme. If the Environmental List is to be updated at this time, the relevant party will submit a proposal to this end to RVO.nl.

Economic incentive schemes

Economic incentives could be an effective way to bring about behavioural change and, by doing this, make an important contribution to the transition to resilient plant and cultivation systems. To date, little knowledge is available on how to use economic incentive schemes in relation to plant protection. As such, it is important to continue to explore the possibilities these schemes have to offer.

- **Action:** discussions will take place with the provinces to see whether it would be possible for the provincial subsidy schemes in place for the current rural development programme to contribute to the realisation of the transition. Greenhouse horticulture will be included in these discussions too. The Ministry of Agriculture, Nature and Food Quality will initiate this action;
- **Action:** steps will be taken to ascertain how economic incentives could help promote the transition to resilient cultivation systems with the smallest possible impact on the environment. Chain effects like the encouragement of new market introductions (development and authorisation application) of low-risk products and the development and introduction of resilient species should be taken into consideration too. The Ministry of Agriculture, Nature and Food Quality will initiate this action.

5.3.4 **Integrated policy**

Various changes to legislation and regulations at local, provincial, national and EU level are announced in this implementation programme. In general, the regulatory burden will continue to be a point for attention and legislation and – wherever possible – regulations too must be an incentive, not an impediment, to complete the transition.

- **Action:** agricultural entrepreneurs and farm advisers will report proposals on the reduction of the regulatory burden and barriers to innovation in respect of plant protection to the agricultural desk (Agroloket). The Ministry of Agriculture, Nature and Food Quality will launch an initiative to reduce the regulatory burden and remove barriers to innovations in respect of plant protection, if possible;
- **Action:** the initiators of pilot projects, etc. will report specific (possible) barriers in legislation and regulations to the relevant authority (the municipality, province or a ministry, for example). The Ministry of Agriculture, Nature and Food Quality will launch an initiative to remove plant-protection related impediments from legislation and regulations, if possible;
- **Action:** the assessment framework for plant protection products will be optimised. For example, the assessment of innovative technologies, the procedure applicable when applying the ‘mutual recognition’ instrument and the stacked use of plant protection products. The Dutch Board for the Authorisation of Plant Protection Products and Biocides will initiate this action;
- **Action:** the parties involved will ensure that an annual quick scan is carried out to ascertain whether the various instruments, such as knowledge development and transfer, financial instruments and legislation and regulations, are still appropriate for this implementation programme in the programme phase in question;
- **Action:** where the implementation of actions, or the consequences ensuing from their implementation, affect related policy areas, steps will be taken to see how the various perspectives can be included and how action can be taken with the interests of a wide range of stakeholders in mind. All of the parties will share responsibility for the above.

The National Strategic Plan

The National Strategic Plan (*Nationaal Strategisch Plan (NSP)*) will set out how the Netherlands intends to implement European regulations on the Common Agricultural Policy after 2021. It is important to consider the following in respect of the transition to resilient cultivation systems:

1. The utilisation of the funds made available for the development and field trials of new measures and methods, by agricultural entrepreneurs in collaboration with relevant partners;
2. The creation of incentives to use new measures and methods (via investment subsidies and vouchers for the hiring of external expertise, for example);
3. The creation of incentives to implement measures that connect agriculture, horticulture and nature.

The partners in question will include these points in their implementation of the NSP (see Subsection 7.3.4).

6. Monitoring

This implementation programme is a roadmap to the achievement of the (interim) targets formulated in Section 3. As such, it will be important to monitor the actual achievement of these (interim) targets throughout the implementation of this programme.

The starting point will be to annually monitor the progress being made with this implementation programme on the basis of several relevant indicators, making it possible to update or adjust this programme where necessary, whether to ensure the achievement of the (interim) targets and associated critical success factors, to gain insight into the progress being made with the various (follow-up) actions or to respond to new developments. To facilitate any adjustments required, it will also be vital to make monitoring 'lean and mean'.

The development of a robust monitoring strategy will require great care. When establishing the indicators, it will be important to bear the following criteria in mind. Indicators must:

- be representative of efforts, performance and targets;
- be sufficiently measurable (as SMART as possible);
- preferably continue to be relevant throughout the transition process;
- be feasible and involve minimal administrative costs for entrepreneurs;
- be widely supported by the stakeholders in question.

Many indicators are already available, such as use and sales figures of plant protection products and water-quality data, and a number of projects are under way in which new indicators are being developed – the Environmental Crop Indicator (*Milieu indicator gewasbescherming*), which is a public-private partnership, for example. When developing indicators for the monitoring programme, consideration will be given to indicators that are already available, that may have to be improved, that are currently being developed or that need to be developed in the future. For example, data about trends in changes in the range of products used, emission figures, environmental impact and the economic prospects of agricultural entrepreneurs. This should clarify whether or not targets have been achieved, so that any adjustments necessary can be made.

The results of the annual monitoring process will be presented in the form of a dashboard, allowing for insight into the 'lay of the land' at a national level. This dashboard could be made up of different types of indicators or a combination of them. Because further specific details will be added to several (interim) targets and/or because the transition will involve a number of changes, indicators will need to be developed and added to the dashboard during the transition process too.

- **Action:** a 'dashboard' will be developed in which the results of the annual monitoring activity are presented. The Ministry of Agriculture, Nature and Food Quality will initiate this action;
- **Action:** where necessary, indicators will be developed to facilitate the monitoring of the progress being made with this implementation programme. The Ministry of Agriculture, Nature and Food Quality will initiate this action.

7. Governance

This section sets out the starting points for the steering structure to be established for the transition process and the implementation of this implementation programme. Stakeholders will come together to create the structure when all of the parties start to implement this implementation programme.

7.1 Principles

To put this implementation programme in motion and implement it optimally over the next 10 years, the following starting points will apply:

- All of the participating parties⁷ will commit themselves optimally to the achievement of the Vision for the Future of Plant Protection 2030 by implementing this implementation programme;
- All of the participating parties will participate on equal footing, despite their different roles/ responsibilities, capacity and commitment;
- All of the participating parties will have a mandate from the organisations for which they work and will make sufficient capacity available for the fulfilment of their mandates;
- Guided by the monitoring indicators, all of the participating parties will steer the transition process jointly and then adjust it together where necessary;
- Each participating organisation will take responsibility for the implementation of its own actions, as stated in this implementation programme;
- When implementation starts, all of the participating parties will jointly establish which other parties need to align their actions to this implementation programme;
- When implementation starts, all of the participating parties will jointly establish which indicators are to be included in the monitoring programme;
- When implementation starts, all of the participating parties will jointly establish how to link implementation of the various actions.

7.2 Processes

Although they do not focus directly on plant protection, there are a number of contiguous projects that do cover subjects that are important for the transition to resilient cultivation systems. The most relevant of these follow below, together with a description of how they are connected with this implementation programme.

7.2.1 *The National Programme for Agricultural Soils*

Soil quality and soil biodiversity present a large number of opportunities for plant protection and resilient cultivation systems. A resilient soil/substrate will have the best physical, chemical and biological composition necessary to optimally support the growth of a crop, with as few abiotic and biotic stress factors as possible. To facilitate the transition to resilient cultivation systems, it is crucial to take the soil into consideration too. Therefore, with this and the principles of resilient cultivation systems in mind, it is important to be in alignment with the National Programme for Agricultural Soils, the objective of which is for all Dutch farmland to be managed sustainably in 2030.

Initiator: LTO Nederland will ensure that a connection is established between the National Programme for Agricultural Soils and this implementation programme.

⁷ Agrodis, Artemis, the Dutch Board for the Authorisation of Plant Protection Products and Biocides, Cumela, Fedecom, LTO Nederland, the Ministry of Agriculture, Nature and Food Quality, the Ministry of Infrastructure and Water Management, the Foundation for Nature Conservation and Environmental Protection, Nefyto, Plantum, the Association of Regional Water Authorities and Vewin.

7.2.2

Circular agriculture

The vision for circular agriculture drafted by the Minister of Agriculture, Nature and Food Quality has resulted in initiatives in a large number of policy areas. The Ministry of Agriculture, Nature and Food Quality will also work on the continued development of the vision for circular agriculture. It is vital to continue to carefully align the transition to resilient cultivation systems to this vision.

Initiator: the Ministry of Agriculture, Nature and Food Quality will ensure that a connection is achieved between the vision for circular agriculture and this implementation programme.

7.2.3

The Delta Plan for Restoring Biodiversity in Green Spaces in the Netherlands

Many opportunities exist to achieve a connection between agriculture and horticulture and nature in respect of plant protection. These opportunities will lead to the natural containment and control of diseases, pests and weeds and the protection of biodiversity. The object of the Delta Plan for Restoring Biodiversity is to make the Netherlands a country in which humans and nature alike are able to thrive. Where plant protection is concerned, it is important to follow developments closely and, where possible, make the most of initiatives to restore the biodiversity lost in the past. This will ensure that the Netherlands is able to become a good example of a densely populated delta in which biodiversity and economic development go hand in hand.

Initiator: LTO Nederland will ensure that a connection is established between the Delta Plan for Restoring Biodiversity in Green Spaces in the Netherlands and this implementation programme.

7.2.4

The CAP and the National Strategic Plan

The National Strategic Plan will set out how the Netherlands intends to implement European regulations on the Common Agricultural Policy after 2021.

Initiator: all of the parties involved will align themselves to the existing process at their own initiative.

7.2.5

Reviewing manure policy

Dutch manure policy consists of a number of legislation and regulations that are designed to protect the quality of groundwater and surface water in the Netherlands. The review announced will take place in a changing environment. This presents the opportunity to identify whether current manure policy supports these developments sufficiently and, if not, to adjust it accordingly. In the context of the transition to resilient cultivation systems, it will be important to follow developments ensuing from the review of manure policy and to benefit from initiatives if necessary.

Initiator: the Ministry of Agriculture, Nature and Food Quality will ensure that a connection is achieved between the manure policy review and this implementation programme.

Attachment 1

Response to the advice from Wageningen Economic Research (WEcR): from vulnerable to resilient; the implementation programme for the Vision for the Future of Plant Protection 2030, explained on the basis of transition theory.

The parties involved asked Wageningen Economic Research (WEcR) to perform an ex-ante evaluation of the implementation programme for the Vision of the future of plant protection 2030. These parties would like to thank WEcR for its advice, 'from vulnerable to resilient; the implementation programme for the Vision for the Future of Plant Protection 2030, explained on the basis of transition theory' (*'Van kwetsbaar naar weerbaar' Het Uitvoeringsprogramma Toekomstvisie Gewasbescherming 2030 belicht vanuit de transitietheorie*). WEcR delivered sound advice in a short space of time, for which the stakeholders are very grateful. In this document, the parties involved respond jointly to the WEcR study and indicate how they intend to act on the recommendations. Having said this, there may be differences in emphasis in how the individual parties welcome the WEcR recommendations.

The overall conclusion arrived at by WEcR is that certain parts of the implementation programme are not yet specific enough to guarantee the success of the transition. Although the document is ambitious and provocative, there is currently a lack of measurable process objectives and proper indicators. The exact nature of 'small wins'⁸ is still a little unclear, due in part to the inability to identify real 'small wins' as such at this early stage. In this respect, WEcR sees the implementation programme as a growth model, from which it will also be possible to learn from existing 'small wins' in the agricultural and horticultural sectors. The WEcR report commends the willingness and commitment of the parties involved but warns that a successful transition will involve more than just a sum total of actions: old paradigms must be abandoned and controversial issues must be faced head on. In short: the basis is there, but the whole needs time to mature. According to WEcR, 2030 must be regarded as an interim reference point: although a break with past trends must be visible by this date, a real transition will usually take 25 to 50 years to achieve.

Recommendation 1. Refine targets and sub-targets

WEcR welcomes the high level of ambition expressed in the implementation programme and the decision to opt for a paradigm change and a break from past trends. WEcR advises that the interim targets formulated in the implementation programme should be expressed more specifically. The development of indicators must make it possible to monitor the achievement of the various targets and the successful completion of the transition process.

In the implementation programme, the decision is made to elaborate further on the three ambitions specified in the Vision for the Future of Plant Protection 2030 and to break them down into a number of interim targets. Where the 'virtually no emissions' target is concerned, this has resulted in the reconfirmation of the objectives for water quality in the Healthy Growth, Sustainable Crop memorandum for 2023 and the Water Framework Directive for 2027, among other things. Added to the above, more far-reaching administrative agreements have been made in the general agreement for water purification in greenhouse horticulture and the 'package of measures to reduce the emissions produced by plant protection products used on open-field crops', including interim targets. These agreements have been included in the implementation programme and must contribute to the achievement of almost zero emissions in 2030. The progress made with these (interim) targets will be monitored annually on the basis of existing indicators.

The parties involved are aware that other targets are not as specific yet. However, it is not possible to set out the other two targets – 'resilient cultivation systems' and 'connecting agriculture and horticulture with nature' in more concrete terms at this stage due to the primarily qualitative interpretation of the concepts at this point in time and the fact that they are not quantifiably measurable yet. The priority here is to develop good indicators, on the basis of which the trends mentioned in the targets can be elaborated on further. We must also carefully consider which indicators offer insight into the transition process and how they can be made measurable. We will focus on this in 2020. The outcome will facilitate the even clearer

⁸ Small wins are small, significant steps that yield a tangible result (Page 7 of the WEcR report).

formulation of the interim targets. The concretisation of interim targets, the development of indicators and the formulation of accountable actions will all help us make the transition process more tangible. Monitoring will then take place once a year to see whether the actions proposed in the implementation programme have been achieved, whether the transition is on track and if the environmental interim targets for and preconditions of the transition are being achieved. If monitoring shows that the transition is not on track, prompt action will be taken to make the changes necessary (by making additional agreements, for example).

Recommendation 2. Keep ambition alive and focused

WEcR stresses that the provocative ambition expressed in the implementation programme connects various parties but could also create friction. WEcR is also of the view that it is not sufficient to launch this ambition solely at the beginning of the transition process. Instead, the ambition must be brought to the attention throughout the transition process and be adjusted but not weakened during the same period. The ambition must ensure that the targets to be achieved always have the pulling power necessary to encourage parties to progress towards their achievement.

The stakeholders recognise the validity of the WEcR recommendation to the effect that the ambition must be raised for consideration throughout the transition period and adjusted where necessary. The implementation programme will serve as a roadmap to the achievement of the various targets. As such, it will be important, throughout the transition process, to monitor whether interim targets and the preconditions necessary for them are actually being achieved. However, the complexity and unpredictability of a transition process make it difficult to determine what and how to monitor in advance. With this in mind, WEcR advises the adoption of a 'reflexive monitoring' approach. The implementation programme assumes that the progress being made with the implementation programme will be monitored annually, on the basis of several relevant indicators. The implementation programme has already identified a good monitoring strategy as one of the actions to be implemented. Further to the advice of WEcR, the parties involved will address this action thoroughly and with all due care in 2020, involving expertise in the field of reflexive monitoring when doing so. This ties in with the development of indicators and the tightening up of the interim targets referred to in the first recommendation.

The parties involved are aware that the transition to resilient plant and cultivation systems envisaged in the implementation programme will take a long time to complete, as a transition usually takes 25 to 30 years to achieve. However, the parties do want to adhere to the 10-year time horizon, to ensure that the urgent nature of the transition is not lost. The (interim) targets set out in the implementation programme will be an important reference point for the process and help the parties involved to continue to set priorities. The various actions will contribute to this too. It is also important to bear in mind that the actions will lead to follow-up actions and that there will be scope to respond to new developments and policy adjustments if the objectives or preconditions for the follow-up actions are not met. Objective information and scientific insights will underlie the above.

Recommendation 3. Actively seek out small wins

The implementation programme will use the concept of 'small wins' – small, in-depth changes with tangible results – to implement the transition process to resilient cultivation systems. WEcR observes that this approach has been chosen and also that the implementation programme contains various small wins and could lead to new small wins. However, these wins are not specific enough in most cases. WEcR also observes that the implementation programme does contain enough to generate small wins, but that more attention needs to be given to the broadening and deepening of small wins.

The cultivation and chain concepts that inspire the achievement of the Vision for the Future of Plant Protection 2030 are already being used in every sector of biological and conventional agriculture and horticulture. For example, innovative cultivation concepts, partnerships in the region or chain, or certain growers who are pioneering with biology and/or technology. In Appendix 1, WEcR gives examples of plant protection innovations and assesses whether they can be regarded as small wins. It is important to learn from innovations like this, to further broaden or deepen elements that are strong, remove barriers to innovations like these, promote their wider use and upscaling and work on what could or needs to be improved.

WEcR believes that it would be wise to make the small wins concept an even greater part of the implementation programme, so that it become a real catalyst for change. We agree that this would be a good idea. When starting the implementation process, we will specifically define what a small win constitutes. When doing this, we will seek out pioneers and ask them to share innovations, so that others can familiarise themselves with them and use these potential small wins in their own businesses. We will also commit ourselves to creating conditions that are favourable to the promotion, broadening, deepening and spread of existing small wins and the creation of new small wins.

Recommendation 4. Create a transition team

WEcR observes that the parties involved have invested a great deal of energy in the development of the implementation programme. If the transition process is to be successful, it will be important for this administrative energy to also be evident in the parties responsible for implementing the actions and the parties, entrepreneurs and start-ups working towards the achievement of small wins. WEcR recommends that a transition team is created and made responsible for implementing the transition and also that an independent director and implementers with close links to the field are appointed.

We will take the WEcR recommendations on the subject of a transition team, director and implementing parties to heart and include them when developing the governance structure. In the implementation programme, the development of the governance structure is identified as one starting point and another as steps to identify which other parties need to align themselves to (aspects of the implementation of) the implementation programme. Thus, armed with the recommendations of WEcR, our approach will be to target established public and private stakeholders with interests in plant protection and also to endeavour to encourage and invite outsiders to participate. Also, the idea of a transition team is a welcome addition to our consideration of the best way to give shape to the driving force behind the implementation programme. The position, remit and practical specifics of the transition team will be expanded on in consultation with the steering group as part of the governance model. A point for attention here will be for the transition team to have the powers it needs but not infringe on the joint ownership of the implementation programme by all of the stakeholders. Ultimately, good, well-structured governance will expose blind spots and strengthen communication between the chain parties and primary stakeholders.

Recommendation 5. Work towards the achievement of a targeted phasing-out policy

WEcR observes that it will be necessary to carefully phase out the existing paradigm to facilitate the transition to resilient cultivation systems. Therefore, according to WEcR, the transition to resilient plant and cultivation systems will benefit from the careful phasing out of the old paradigm. A responsible phasing-out process will ensure that the transition to the new paradigm is smoother and less painful too.

The parties involved will take this WEcR observation to heart. The WEcR perspective clearly points to the crucial necessity of an awareness of the transition as a phasing-in and phasing-out process. The basic premise of the implementation programme is that the increasing realisation of the opportunities presented by resilient plant and cultivation systems will cause demand for plant protection products to fall. While good alternatives are absent, it will be essential for emissions from plant protection products into the environment to be reduced further, so that the progress made with the targets does not stagnate.

A transition without a simultaneous and coordinated phasing-in and phasing-out process will impede improved sustainability and may even result in an increased environmental impact. Harvest security (the quality and/or quantity of a harvest) will come under pressure too. As such, steps must be taken to establish a link between phasing-in and phasing-out policy, to avoid any gaps. The stakeholders will commit themselves to the above in various ways: by establishing bridging processes from 'old to new' and making the environmental impact at crop level transparent, for example. This will require all of the partners to have the courage to take responsibility and be willing to think outside the box. The question of long-term economic prospects will be an important element in the transition to resilient plant cultivation systems. As such, the investment of time and resources and the targets to be achieved must always be in balance with each other to ensure that the transition to resilient plant cultivation systems continues to be feasible. The implementation programme will commit itself to the involvement of the distribution chain in the transition, thus making investments commercially attractive for agricultural entrepreneurs. A safety net will

be provided for entrepreneurs that are experimenting with new concepts or products, to absorb possible risks. We will also seek to ascertain whether and how economic incentives will help agricultural entrepreneurs develop and use resilient cultivation systems in the field. What would make it attractive for agricultural entrepreneurs to take the step towards resilient cultivation systems, and are well-intentioned entrepreneurs rewarded sufficiently? How can economic incentives curb or discourage practices that are not in line with the transition envisaged? The conclusions from the 'good farmers can't farm alone' (*Goed boeren kunnen boeren niet alleen*) report by the circular-agriculture earning capacity taskforce (*Taskforce Verdienvermogen Kringlooplandbouw*) will be included in considerations, as well as experiences from abroad and related domains.

The WEcR recommendation on the simultaneous and coordinated phasing-in and phasing-out policy makes it clear that there will be a need for ongoing care for and attention to existing agricultural entrepreneurs via these actions, among other things, right from the start of the implementation programme.

Recommendation 6. Work on opportunities to achieve synergy

According to WEcR, it is important for the transition to a resilient plant and cultivation system to form part of the bigger whole of the transition to circular agriculture. The transition approach and instruments will only be successful if the transition approach is consistent and in line with the approach adopted in related fields. We will take these recommendations to heart. The transition to resilient plant and cultivation systems is a part of circular agriculture. Good policy on plant protection products will reflect the other challenges faced by the agricultural and horticultural sectors, such as biodiversity, clear surface water and groundwater, vital soils and climate change. Added to this, the successful achievement of the targets will depend on developments in other policy dossiers, such as (green) biotechnology, energy and minerals. This approach is also clarified in the European Farm to Fork strategy. The vision on plant protection and the implementation programme following on from it will be decisive for the implementation of this strategy in the Netherlands in respect of plant protection.

The advantages of integrality are mutual: for example, the transition to resilient plant and cultivation systems contributes to good soils and the reduction of input on farms, while the synergy with other themes benefits the implementation programme too. The same applies for existing instruments and knowledge in the field of indicators, for example. Nevertheless, 'trade offs' will occur between different themes too. Therefore, all of the stakeholders will be responsible for considering the various perspectives in situations like this and to act with the interests of all stakeholders in mind.

The governance section of the implementation programme identifies initiators that are responsible for achieving synergy with other themes and for ensuring that developments benefit all of the themes mutually. The WEcR recommendations help offer insight into synergies with other themes and (existing) instruments and knowledge right at the start of the implementation programme. By building on or acting in line with the WEcR recommendations, implementation will get off to an even more efficient start.

Recommendation 7. Explore international partnerships

Although just a small country, the Netherlands plays a major international role in the production of and trade in plant-based products. So, the presence of a level playing field in the European Union is vital. The parties involved recognise the value of WEcR advice to use public and private diplomacy to influence the realisation of European regulations and will commit themselves to this via proposals for Farm to Fork and the biodiversity strategy, for example. Also, when implementing actions in the implementation programme, the stakeholders will commit themselves to securing a fair competitive position for Dutch growers in comparison with their colleagues in Europe and beyond.

Attachment 2

Letter of intent in respect of the Implementation programme for the Vision for the Future of Plant Protection 2030

The partners involved in the implementation programme⁹ recognise that the object of the Implementation programme for the Vision for the Future of Plant Protection 2030 is to work towards the realisation of a transition that will include a number of major challenges that will require the shared responsibility of all participating partners.

With the above in mind, the partners will act as follows during the implementation programme:

- *(recognition of nature of transition)* The partners will undertake to utilise every possibility to ensure the success of the transition envisaged. To do this, they will be willing to leave the beaten track and think outside the box;
- *(finance and funding)* To ensure the success of the transition envisaged, the partners will together ensure that sufficient funding is in place that is appropriate for their particular roles and responsibilities, throughout the course of the implementation programme. To this end, both public and private resources (manpower and/or financial resources) will be drawn on;
- *(accountability and self-reflection)* The partners will jointly report on the progress being made with the implementation programme on the basis of the annual monitoring of the process, (interim) targets and the preconditions necessary;
- *(approach)* Each year, the partners will jointly establish an annual plan, which will set out priority areas, activities, the budget and how tasks are to be allocated. The starting point for the above will be the targets, actions and other challenges set out in the implementation programme, as stated in the Vision for the Future of Plant Protection 2030, monitoring results and the capacity and products available;
- *(facilitation and provisions)* To help partners take financial and/or substantive responsibility, institutional frameworks and procedures will be adjusted, organised or re-organised where necessary and a commitment made to the modification of European legislation and regulations. With due observance of the relevant national and international legislation and regulations - European competition rules in particular - consideration will be given to how legislation and regulations can create the scope necessary for the transition;
- *(decision-making and collaboration)* All of the partners will keep each other up to date on the developments that are important to decision-making on the transition and the implementation programme. If the arrangements made in the implementation programme and the annual plans fail to take off sufficiently, or are not implemented sufficiently, and this has implications for the implementation of the programme, the partners will enter into consultation with each other in the steering group.

⁹ Vereniging Artemis, Vereniging Cultuurtechnische werken en Grondverzet, Meststoffendistributie en Loonwerken in de Agrarische sector in Nederland (Cumela), Fedecom, the Dutch Federation of Agriculture and Horticulture (Land- en tuinbouw Organisatie Nederland), the Foundation for Nature Conservation and Environmental Protection, the Dutch Crop Protection Association (Nederlandse Stichting voor Fytofarmacie (Nefyto)), Plantum NL, the Association of Regional Water Authorities, Vereniging Agrodis, the Association of Drinking Water Authorities in the Netherlands (Vereniging van waterbedrijven in Nederland (VEWIN)), the Ministry of Agriculture, Nature and Food Quality (LNV) (including NVWA, Ctgb and RVO.NL) and the Ministry of Infrastructure and Water Management.

Involved parties:



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