



SHERPA  
Rural Science-Society-Policy  
Interfaces

MAP Position Paper

# CLIMATE CHANGE AND ENVIRONMENTAL SUSTAINABILITY



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## Authors

WUR | Marianne Groot and Seerp Wigboldus

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<https://rural-interfaces.eu/maps/netherlands-gelderland/>



## Topic and headline messages

Summary of the key messages:

- Climate change adaptation (CCA) is typically something that needs to be addressed together in a region and cannot be adequately addressed by individual sectors, in this case the fruit sector, by themselves. It requires active and broad stakeholder participation.
- Regional CCA will need to be positioned in wider national policies and programmes. This may create opportunities, but will also pose challenges to regional adaptation possibilities.
- CCA also requires rethinking existing institutions, such as, in this case, the possible need for a different management of water levels by the Water Board.
- CCA is helped by technical options (e.g. water buffers, or hail nets), but awareness raising about prudent water use in the sector was found to be a major topic to be addressed.
- Finding ways forward as a sector in consultation with other stakeholders in the area can feel threatening, as the sector would prefer to be in the driver's seat rather than agreeing on compromises.
- Regulations and policies from unexpected directions may turn out to be very relevant for a region, such as the European convention on free movement of ships on the river which limits possibilities for using water from the river (especially in times of droughts).

## Problem being addressed and key questions

The fruit sector in Greenport Gelderland in the Netherlands is confronted with the impacts of climate change. This relates to both having too much and too little precipitation, as well as extreme weather events such as hail and high winds. The variety of implications makes it more difficult to adapt because needs will be different for one year/season to another. It requires agility and timely anticipation. The MAP decided to focus (initially) mainly on climate adaptation.

There is already a lot happening in terms of policy development and the development of implementation programmes related to this. Major institutions such as the Water Board, the Province, and the national Rijkswaterstaat are involved in this, and municipalities are in the process of activating this locally. However, there are many interests involved, locally, regionally, and nationally. The fruit sector in this region would ideally like to develop plans which are particularly attractive to fruit producers. However, cooperation is essential and the sector needs to not only accept this reality, but also start playing a more active role in related consultations, which also means listening to and appreciating other stakeholder interests and perspectives.

Different stakeholders have different adaptation needs and interests. They are often confronted with different types of consequences of climate change itself, and consequences of adaptation policies and programmes that are being developed. This creates a complicated situation in which government and EU subsidy programmes may help to make it more possible to find ways forward in view of those different needs.

Research needs and gaps include mapping institutional lock-ins that limit climate change adaptation options and opportunities. For example, the region of this MAP has rivers flowing through the area which in principle should create ample opportunities for addressing drought situations. However, because of national policies on water management, the water flowing through their area may not be allowed to be tapped off during times of drought because of priorities for water availability further downstream. Similar limitations are caused by treaties such as the Mannheim Convention on free traffic on the river Rhine which does not allow for infrastructure to be put in the river to enable water inlets during severe droughts.

## 1. Greenport Gelderland and challenges of climate change

### 1.1. Overview

Greenport Gelderland (GG) is the horticultural programme for the River region of the province of Gelderland in the Netherlands. This public-private network organisation stimulates innovation, sustainable development and growth of the horticultural sectors (glasshouse, fruit, nursery stock and mushroom cultivation) in the region.

Horticulture is an integral part of this River region, both socio-economically and in the landscape. This means that developments in horticulture affect the region and vice versa. This is in particular true for the fruit sector in the region. This also applies to what is and is not done in this sector in terms of climate change adaptation.

In 2020, a vision of the “Boomgaard van de Toekomst” (orchard of the future) was outlined in terms of what the fruit sector and the region may look like as a result of a variety of developments. An important challenge in this will be how to respond to climate change. In 2021, the MAP therefore decided to focus on climate adaptation, and on how this plays out in relation to water in particular.

Because of climate change, there are more droughts, more frequent periods of high temperatures, and more extreme weather occurrences such as cloudbursts and hail storms. This poses a number of different types of threats, and even in an area that has more than one river flowing through it, water can become scarce. From an overview of provinces and water boards, it shows that there is no clear data on the use of groundwater for the purpose of application in agriculture. The same applies for the region of this MAP, which is Rivierenland. An estimate for the whole of the Netherlands is that groundwater use for irrigation in agriculture amounts to 100 million m<sup>3</sup> per year on average, and in a dry year such as 2018 it may be double this amount.

But water is critical for the fruit sector in a number of ways, including:

- In early spring, water is needed to protect blossoms against the effects of frost in the night.
- During the growing season, water is needed for growth of the trees and for cooling the crop during periods with high temperatures. In 2018, 2019 and 2020 it became clear that also in this river region water can become scarce. This was partly because irrigation was not allowed when water levels in the rivers were particularly low combined with (very) high temperatures.
- It is used when sorting the fruit.
- Extreme weather events, such as hail, high winds, cloudbursts (with flooding), and extreme heat, can cause serious damage to the fruit trees. The expectation is that this will happen more frequently as a part of climate change.

But the fruit sector is not the only sector concerned about the effects of climate change. Provinces and water boards will need to revise their policies on groundwater and irrigation because of the experience of recent years (three dry years in a row) and what this meant in terms of water use and irrigation. This is discussed in the overview of groundwater use (January 2021, IPO en UvW<sup>1</sup>). A new balance will need to be established in the water systems in terms of groundwater replenishing and groundwater use. No longer will water be automatically available for all desired functions. Choices will need to be made and priorities defined. And it means balancing between being able to handle situations of too much water (risk of flooding) and situations of too little water (risk of damage because of drought). Though trying to limit negative impact, some residual

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<sup>1</sup> Source: <https://edepot.wur.nl/544474>

damage will need to be accepted. At the same time, this river region is in a better position than (higher) areas with sandy soils that do not have rivers nearby.

## 1.2. Relevant stakeholders in the area

Fruit farms are part of a wider environment and adjusting to climate change implications will be something that needs to be done in consultation and cooperation with other stakeholders. This is particularly true for water, which is critical to so many groups and sectors in society. Apart from the obvious fruit growers and the water board, a number of other stakeholders and their needs and interests have to be considered. The following is a brief overview of different categories of relevant stakeholders.

### Overview of stakeholders

Farmers and farmer organisations:

- Other-than-fruit agricultural sectors and their representative institutions, such as arable farming and tree nurseries.
- Livestock farmers, including their representative institutions (e.g. the Nederlandse Melkveehouders Vakbond).

Suppliers:

- There are many different types, but they are not considered directly relevant in this context.

Government at different levels:

- Municipalities: Buren, Culemborg, Maasdriel, Neder-Betuwe, West-Betuwe, West Maas en Waal, Tiel, Zaltbommel.
- The Regio Rivierenland – a collaborative initiative of different municipalities.
- The province of Gelderland.
- Waterschap Rivierenland (water board).
- Staatsbosbeheer ("state forest management") – Active in Betuwe, Bommelerwaard, Gelderse Poort, Land van Maas en Waal.
- Rijkswaterstaat (the national Department of Waterways and Public Works).

Agricultural nature associations:

- Agrarische Natuurvereniging Lingestreek.
- Agrarisch natuur- en landschapsbeheer Capreton – Bommelerwaard.
- Agrarisch natuur- en landschapsbeheer Tieler en Culemborger Waarden.
- Collectief Rivierenland.

The service sector:

- Bureau Toerisme Rivierenland.

Civil society organisations:

- Stg. Landschapsbeheer Gelderland.
- Gelders Landschap – diverse landgoederen en omliggende landen.
- Natuurmonumenten – Middelwaard, Hemelrijkse waard, Kesselse waard, Maasbommelse waard, Maasuitwaarden, Hedelse bovenwaard.

## 1.3. Summary position of Greenport Gelderland

Water is critical for the fruit sector. To be future-ready in terms of being able to secure sufficient water as well as being able to handle (temporary) flooding because of cloudbursts, something needs to change. This may relate to a number of actions ranging from reduced use of water on individual fruit farms to creating water buffers on a regional scale. The fruit sector can take the initiatives in a number of ways, but is dependent on a range of other stakeholders with whom collective arrangements will need to be made. The

MAP offers a platform for addressing such need for collectively adapting to climate change and to agree on collective actions.

To better understand how different stakeholders relate to (future/anticipated) water matters in Rivierenland, more needs to be found out about their views, interests, priorities, etc. This will make it clear who would need to be involved in the development of an action plan for the sector. Where are the opportunities for collaboration and synergy, what can be built on in terms of ongoing policy development/implementation, etc., and where could there be competing interests?

This will be further developed next year:

<b>Stakeholders</b>	<b>Interests</b> related to water and climate adaptation What core interest/focus?	<b>Policy/plan</b> related to water and climate change adaptation What relevant agendas?	<b>Actions</b> related to water and climate change adaptation What core activities in this field?
Gelderland province			
Water board Rivierenland			
Arable farming			
Livestock farming			
Nature-related organisations			
Industries/private companies			
Recreation			
etc.			

Possibly conflicting interests:

- In relation to managing water levels in spring.
- Damage to agriculture in general when irrigation is not allowed because of priorities put elsewhere.

## 2. Positioning within wider climate-change response policies and programmes in the area

### 2.1. Overview of relevant policies and programmes

The Regional climate Adaptation Strategy (RAS) is a cooperative effort of 9 municipalities, the water board of Rivierenland, the province of Gelderland, together with other stakeholders. In the RAS it states that agriculture and horticulture in 2050 will be such that it will have as few as possible problems because of the effects of flooding, drought, and heat. The focus of the RAS will be the effects of climate change in terms of higher temperatures, drier periods, more and more extreme precipitation, as well as risks of flooding<sup>2</sup>.

The Rivierenland Water Board developed a vision for 2050 in which it outlines what the region would need to look like in 2050 in order to be able to handle the challenges posed by climate change. The water board approached a variety of stakeholders to cooperate with in order to be able to create such a situation. There is also a role to play for the fruit sector in this. Circularity is a key concept: no waste of resources, water or energy and recycling whenever possible<sup>3</sup>.

<sup>2</sup> Source: <https://gemeenteraad.westbetuwe.nl/Raadsinformatie/RV2021-046-Bijlage-1-Regionale-Adaptatie-Strategie-Rivierenland-Klimaatbestendig-Samen-aan-de-slag.pdf>

<sup>3</sup> Source: <https://www.waterschaprivierenland.nl/flysystem/media/watervisie-2050-definitief-lage-resolutie.pdf>

As for the province of Gelderland, there is the Regional Water Programme 2021-2027. This is currently in the process of finalisation and the province is inviting stakeholders to contribute. This autumn it will be discussed by the Gedeputeerde Staten<sup>4</sup>.

Then there is Rijkswaterstaat<sup>5</sup>. It has developed elaborate plans to address risks of flooding and risks of water shortages and droughts. This is all about national level considerations so not specifically for Rivierenland. However, it does affect options for Rivierenland directly, especially in times of drought. In extreme cases when there is a risk of water shortages for the area west of Rivierenland, Rijkswaterstaat may decide to give priority to the west of the Netherlands in terms of water provision. The consequence for Rivierenland is then that no water from rivers can be used for the area.

Dutch water management is designed in the first place for getting rid of water. The programme of Ruimte voor de Rivier (room for the river) involves strengthening dykes and has improved ways of keeping water out of inhabited areas. As a result, this water management is less prepared for dealing with water shortages. Concerns of the fruit sector are therefore mainly in the field of ensuring water availability in times of drought. Particularly because, even though the area is situated in the midst of rivers, it may not be allowed to use it due to national priorities.

There are all sorts of committees involved in related water management in times of drought. Basically, Rivierenland will need to work with the outcome of what is decided there as a given and has little influence on what decisions are made. It can, however, anticipate what decisions will be taken because of the clear descriptions on what will be prioritised (four main levels) at those times.

The 2050 vision of the Rivierenland Water Board will be operationalised through its Water Management Programme 2022-2027 (in development). It will be operational from 22 December 2021. It looks at characteristics, challenges, and opportunities that are specific for a particular area and seeks to contextualise the broader policies of the water board. They consider it critical to work together with key parties in that area<sup>6</sup>. This involves a particular cycle of interactions to which an action plan of the fruit sector can connect: 1) an area analysis, 2) development of an area agenda, 3) an annual area plan that identifies priorities, and 4) annual monitoring in the area. This applies to four areas in Rivierenland (Figure 3).

As mentioned earlier, flooding is not the main concern because that has always been the focus of attention. The chapters in the water management programme that are of particular interest for the fruit sector will therefore be the ones on water distribution and preparing for extreme weather.



Figure 2. The setup of the national water system. Source: Ministerie van I&W, 2021. Landelijk draaiboek waterverdeling en droogte.

<sup>4</sup> Source: <https://www.gelderland.nl/waterprogramma>

<sup>5</sup> Rijkswaterstaat is the executive agency of the Ministry of Infrastructure and Water Management, dedicated to promote safety, mobility and the quality of life in the Netherlands.

<sup>6</sup> Idem

One of the key messages from the water board to the fruit sector is that water availability will not be as automatic in the future as it used to be in the past, so learn to be more prudent in terms of water use, and that there will always be risks of some level of damage – not everything can be prevented.

Of further importance to the action plan on climate adaptation for Fruitpact, is what is called the Deltaplan Spatial Adaptation. This is the overarching national plan to which regional plans (regional spatial adaptation strategies), such as the one for Rivierenland connect. The regional strategy will be translated into executive programmes for different

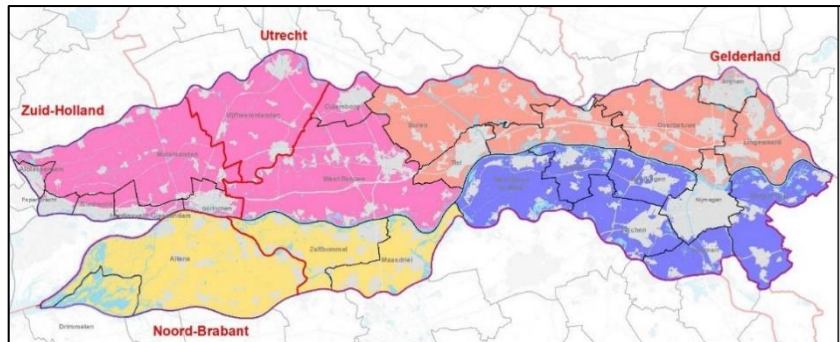


Figure 3. Areas of waterschap Rivierenland (Source: Ontwerp Waterbeheerprogramma 2022-2027)

parts of Rivierenland. Not all sub-regions of Rivierenland have done so yet. The region of Rijk van Maas en Waal (together with Rijk van Nijmegen) is ahead of the other regions. Again, this involves interactive stakeholder processes and this provides opportunities for the fruit sector to connect to and influence.



Figure 4. Map of the Spatial Adaptation Strategy of Rivierenland, indicating institutions involved in its development. Source: Riviereengebied Klimaatbestendig - Samen aan de slag! (involved institutions added on map by the municipality of West Betuwe)

And there are further specifications at municipal level (climate adaptation strategies). This is still very much in the process of development. It also involves contracted studies that are being done, such as by Arcadis for the municipality of West Betuwe regarding an analysis of implications of droughts<sup>7</sup>.

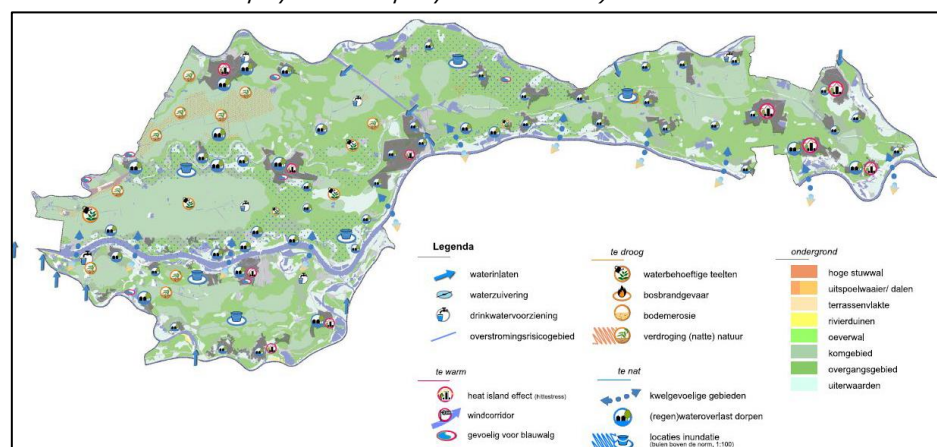


Figure 5. Map that indicates water-related conditions in Rivierenland to identify areas of key importance in climate adaptation strategies. Source: Riviereengebied Klimaatbestendig - Samen aan de Slag!

<sup>7</sup> <https://gemeenteraad.westbetuwe.nl/Vergaderingen/Informatie-en-Ontmoeten-2-Beeldvorming/2021/02-februari/20:00/RAS-Rapportage-Analyse-naar-droogte-in-de-gemeente-West-Betuwe-D10020026.pdf>



The above brief introduction to various visions, programmes and strategies which are partly still in development show that a lot is going on at different levels in terms of climate adaptation. So far, the fruit sector has been insufficiently connected to related dynamics, such as possibilities to engage in stakeholder consultations. There are also potential opportunities for support to the fruit sector if they are serious about climate change adaptation.

## 2.2. Summary position of Greenport Gelderland

We already indicated the importance of engaging with other relevant stakeholders in Rivierenland in the previous chapter. In this chapter, we have outlined more specific stakeholder dynamics from which a clear picture emerges: The Fruitpact will need to (pro)actively connect and stay connected to the variety of policies and operational programmes that, either directly or indirectly, pertain to Rivierenland. It is too small to determine higher-level policies. However, it is a major player in the region which comes with responsibilities and with a basis for making fair requests. An action plan will need to integrate such positioning in policy contexts.

This will also involve active participation in stakeholder consultations in relation to such policy, programme, and strategy processes.

## 3. Pathways for adapting to climate change as Greenport Gelderland

### 3.1. Overview of options and opportunities

In fruit cultivation, three periods of the year are of particular importance in terms of water needs: early spring, because of possible frost in the nights, during the growing season (spring and summer) and in summer when rainfall is limited and irrigation may be needed to reduce the effects of heat (risk of "sunburn"). The risk of extreme precipitation (hail, flooding) is during the growing season and around harvest time. Climate change increases such risks and enhances the vulnerability of the sector.

In terms of adaptation pathways, there are a number of options that address such risks<sup>8</sup>:

At farm level:

- Changing water use, e.g. by using the "Flipper system" instead of full field irrigation. Also the time of the day for watering can be adapted, and there may be ways of re-using water.
- Changing water storage, e.g. by catching rain water from roofs and building water containers to store this water for later use. In this way, a farm-level buffer may be established. There are, however, limitations to this in terms of the significance of such buffers due to their capacity.



*Picture of a hail net to reduce impact of hail storms.*

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<sup>8</sup> More on this at: <https://www.fruitpact.nl/Nieuws/water+vasthouden+in+plaats+van+afvoeren>; [Vindingrijke oplossingen in zoektocht naar zoet water – Nederlandse Fruittelers Organisatie \(nfofruit.nl\)](#)

- Changing water infrastructure so as to retain water in ditches for longer, e.g. creating small dams in ditches so that it will be available in times of need. There are also clear limitations connected to this in terms of capacity.
- Changing soil management: higher percentages of organic matter translate into higher water retention capacity.
- Changing cropping systems: e.g. using hail nets above fruit trees which reduce effects of hail and reduce incidence of "sunburn".
- Changing type of fruit tree and/or cultivars, e.g. more robust types/cultivars that can handle weather extremes better.
- Changing objectives of the farm, e.g. by extensification or looking for niche markets.
- Awareness raising: e.g. about not extending the area of orchards without having a sound plan for water provision. This may also prevent problems in existing orchards facing water shortages.
- Choice of business model: considering water and energy as a cost item or as a model for generating revenues.

At regional level:

- Changing water infrastructure so that more water can be retained in the area which is then available in times of need.
- Creating large-scale water buffers (ponds, small lakes), which can have a dual role in terms of storing water, and serving as an overflow during flooding.
- Adapting spatial design of the area on the basis of water need, for example, making sure that companies/farms that need a lot of water are not located in the driest part of the area.

The above is not a full list of options. It is furthermore important to consider what combination of options would work well to create synergies, and also in terms of identifying priorities.

It is key to find out which options are already on the table in the strategy development of the water board and the provincial office.

### 3.2. Summary position of Greenport Gelderland

There are many ideas/pathways that can be considered and further explored in terms of feasibility. As noted earlier, such options may also connect to or interfere with interests of other stakeholders. So for the Fruitpact this is not a simple process of pick and choose. In many cases, it requires collaboration as well as support provided by, for example, the water board.

Another approach to identifying appropriate options and opportunities, is to look at principles/characteristics of resilience. Each of the options translates into a particular effect on (reduced) vulnerability and (enhanced) resilience. The perspective of resilience principles/characteristics can help act strategically in relation to climate change adaptation. In general, this is about the characteristics of *diversity*, *flexibility*, *redundancy*, *connectedness*, and *robustness*.

This approach also helps prevent only opting for what is easy to change, and to consider carefully what longer-term implications of the application of specific options could have. A combination of options may, for example, be a more appropriate way of supporting enhanced resilience characteristics. The following table illustrates (example only) how such assessment may be done.

	What resilience characteristics will be enhanced?				
	Diversity	Flexibility	Redundancy	Connectedness	Robustness
Options at farm level					
...	√		√		
...	√	√			
...				√	
Options at area level					
...					√
...					
...			√		

The options are about functions, e.g. water storage, or soil management. Each function may be operationalised in different ways. For example, water storage may be done through a water basin, but also a pond. Different functions together will enhance resilience characteristics.

## 4. Interventions to adapt to climate change and enhance environmental sustainability

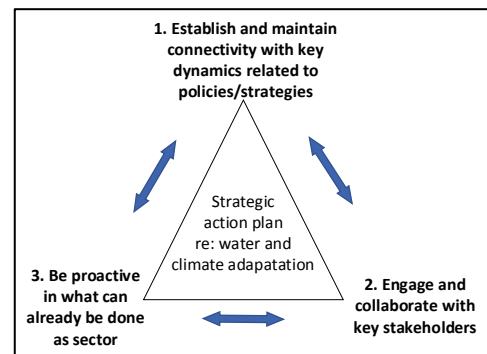
### 4.1. Outlines of an action plan

The action plan will need to be formed by a variety of insights, both in relation to what is technically possible, what is economically feasible, and certainly also what is considered socially acceptable. In the previous chapters we briefly outlined the kind of actions this involves. Close collaboration with key stakeholders such as the water board will be essential. The fruit sector needs to engage in multi-stakeholder interactions and not act from an island of its own interests and needs.

In the variety of options there will be low-hanging fruit (easy to do) and no-regret options (no negative impact for anything or anyone), but also priorities and a need to weigh the costs and benefits of various options.

Three complementary pathways have been considered in relation to the action plan:

1. Development of a strategic vision of the fruit sector regarding how it approaches climate adaptation.

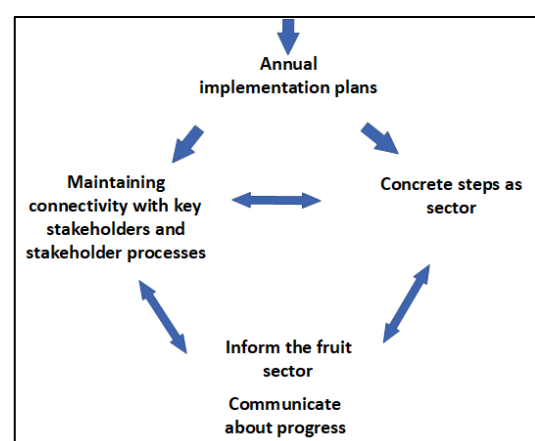


This will prevent ad-hoc planning and create more of a long-term perspective. It communicates a clear perspective on what the Fruitpact will be engaging with, both within the sector and with other stakeholders in Rivierenland. Such a vision can be translated into annual plans every year to create a clear and feasible focus.

2. Be/become an active discussion and planning partner in policy and decision making related to climate adaptation in Rivierenland.

This involves capacity to engage – who will do this? It may be something to take up in a broader setup as Greenport Gelderland (so beyond Fruitpact). This will be about two-way traffic: it will bring in thoughts, ideas, and suggestions from the fruit sector, and it will inform the fruit sector itself in relation to what is going on in wider policy- and decision-making on climate adaptation in the region.

3. Take concrete steps as a sector (low hanging fruit and no-regret options).



This will involve awareness raising in the sector and developing more knowledge and understanding about potential (financial) support options (such as related to municipal subsidy programmes, or even EU programmes). It will also need to involve monitoring of related processes and achievements in order to, as sector, learn its way forward (what needs to be adapted, options for improvement), and for communicating to the outside world about what exactly is being achieved in the sector.

In terms of considering specific options, it will need to be clarified what the sector can do itself and what support/collaboration will be needed from/with stakeholders in the region. More information/data is needed about the sector to further position the action plan. This relates, for example, to what exactly is the ecological footprint and water footprint of the fruit sector; what is the exact use of water; what are the water needs (in dry seasons) compared to water availability; what are the key challenges; what/who will be needed exactly in relation to the variety of options, etc. And it would help to get a clearer perspective on the wider agricultural and horticultural sector in terms of water use and needs, vulnerabilities, and shared interests. For Rivierenland, it seems appropriate that the fruit sector takes a lead in this because of its size in the region.

## 4.2. Summary of position of Greenport Gelderland

The Fruitpact decided (early November 2021) to take the following steps:

1. Sort out a couple of more things in terms of information and data needed to inform the action plan. The background document developed by WUR already provides a lot of this, but there are a number of remaining gaps to be addressed (see above).
2. Translate the existing background document into something that can serve as a vision for the Fruitpact as well and as such become a reference document.
3. Establish support inside and outside the sector (notably water board, province, municipalities) for the Fruitpact approach to addressing water and climate adaptation.
4. Develop capacity to be able to appropriately engage with wider processes related to climate adaptation and spatial design in Rivierenland.
5. Make annual plan(s) that are in line with the approach.
6. And, above all, get started with concrete possibilities for action (low-hanging fruit and no-regret options).

In terms of developing a structured overview of options and opportunities, this will be done along the following lines:

	Short term	Long term
Farm level		
Area level		

In terms of collaboration, for the short term and for concrete adaptation plans, it works well, especially with the water board. The province is more suitable for discussing the long-term and the big picture issues. The fruit sector has good experiences regarding collaboration with the water board, so that provides a sound and promising basis for collaboration into the future.

## Recommendations and Conclusions

The fruit sector in Greenport Gelderland is confronted with the impacts of climate change. This relates to both having too much and too little precipitation, as well as extreme weather events such as hail and high winds. The variety of implications makes it more difficult to adapt because needs will be different for one year/season to another. It requires agility and timely anticipation. The MAP decided to focus (initially) mainly on climate adaptation.

There is already a lot happening in terms of policy development and the development of implementation programmes related to this. Major institutions such as the Water Board, the Province, and the national Rijkswaterstaat are involved in this, and municipalities are in the process of activating this locally. However, there are many interests involved, locally, regionally, and nationally. The fruit sector in this region would ideally like to develop plans which are particularly attractive to fruit production. However, cooperation is essential and the sector needs to not only accept this reality, but also start playing a more active role in related consultations, which also means listening to and appreciating other stakeholder interests and perspectives.

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- 5 Make annual plan(s) that are in line with the approach.
- 6 And, above all, get started with concrete possibilities for action (low-hanging fruit and no-regret options).

## Acknowledgements

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## References

*See footnotes in the main text.*

## **Annex 1: Structure of national deltaplan spatial adaptation being inspirational for action plan Greenport Gelderland**

The Delta plan structure for spatial adaptation may be used as a template in further development of the Fruit Pact action plan.

The Delta Plan on Spatial Adaptation is structured according to seven ambitions. Below is a brief description of each ambition. These same ambitions can also be applied specifically to the fruit sector. See a brief explanation of this per ambition.

### **Visualising vulnerability**

“How vulnerable are our cities, towns and rural areas to extreme precipitation, heat, drought and flooding? Insight into this is the basis of spatial adaptation. To gain insight into these vulnerabilities, all governments had to have carried out a stress test for the four climate themes by 2019 at the latest: flooding, heat, drought and flooding.”

The same could be done specifically for the fruit sector in Rivierenland. What are the vulnerabilities in particular and how do they differ per subregion?

### **Conduct risk dialogue and formulate strategy**

“Are the stress test results available? Municipalities, water boards, provinces and Rijkswaterstaat will then start a risk dialogue per region with all relevant area partners. This dialogue has two goals: with the dialogue you increase awareness about how vulnerable your area is to climate extremes. And in the dialogue you discuss how you can reduce this vulnerability with concrete measures.”

The same could be done specifically for the fruit sector in Rivierenland. How can content be given to such a dialogue within the sector?

### **Develop implementation agenda**

Once the adaptation strategy has been developed, an implementation and investment agenda for the region will be developed. This includes agreements on who will do what.

This could also be done specifically for the fruit sector in Rivierenland and could be the focus of the short-term action plan.

### **Utilise opportunities for creating synergies**

Often it is not efficient nor effective to only ‘break open the street’ for specific spatial adaptation, especially in densely populated areas. There will be other challenges to address as well. Better to combine such implementation and interactively fine-tune related designs.

How could the fruit sector be proactive in connecting to adaptation and development programmes that are good for the sector, but also good for other interests/needs in the region?

### **Stimulate and facilitate**

Spatial adaption needs to become something self-evident for city, village, and rural areas. It is important that all involved share knowledge, tools, and experiences with each other as much as possible. This prevents situations of reinventing the wheel and spatial (and climate) adaptation can be sped up in this way.

How could the fruit sector, from its own means and from means available to municipalities, province, and water board, etc., stimulate and facilitate adaptation in the sector?

### **Regulate and secure**

According to the Deltaplan Ruimtelijke adaptatie, the whole of the Netherlands would need to be water robust and climate resilient in 2050. To achieve this, a variety of laws, visions, plans, and standards are put in place.

Something similar could be done for the fruit sector in Rivierenland. What could the sector do in terms of regulating and securing, and what is currently out of reach?

### **Acting in times of calamities**

With all good intentions and effective plans, not all damage and problems due to extreme weather can be prevented. Governmental parties want to be prepared for calamities caused by flooding, extreme heat, and droughts. Auxiliary services need to be put in place to act swiftly in response to calamities and be able to restore vital and vulnerable infrastructure in particular.

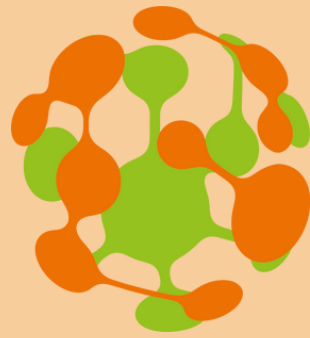
Something similar may be done specifically for the fruit sector in Rivierenland. Could this be part of an action plan in terms of clear scenarios and plans for how actors within the fruit sector will act in case of calamities? And how they could support each other within the sector?

## Annex 2: Key processes in the MAP that inform this Position Paper

To arrive at this Position Paper, the following steps were taken:

1. Exploratory discussions with key persons involved in the MAP. This provided agreement on steps to take in 2021. It was then decided that Greenport Gelderland (the Fruitpact) would work towards having an action plan on climate adaptation and water in place (May 2021).
2. Desk research and consultations. This resulted in a discussion paper that was fine-tuned to the specific focus of interest of the MAP.
3. Exploratory workshop with members of the MAP and representatives of Gelderland province and the Water Board of Rivierenland (August 2021).
4. Consultation with two stakeholder groups that were considered to be important for the action plan development process, and complementary desk research on selected themes as agreed in the workshop.
5. Adapting the Discussion Paper into a background paper (living document) to inform further processes.
6. Development of tentative outlines of the action plan.
7. A broader workshop which also involved three members of different municipal councils in the region. Discussion of the tentative outlines of the action plan and agreement on next steps (November 2021).





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