# Creating a sustainable food system together

The application of the Transition Support System approach in the Dutch province of Overijssel

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## The application of the Transition Support System approach in the Dutch province of Overijssel

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# What is happening?

The world population is growing and it is causing rapid expansion of urban areas. In 2015, 54% of the world population, about 7.7 billion people, live in urban areas. Projections indicate that the world population will grow to 9.8 billion people by 2050, with 68% living in cities. The number of inhabitants in metropolitan areas on all continents will increase to more than 10 million people. In addition, climate forecasts show that extreme weather event, such as severe drought, high temperatures, and excessive rain will occur more frequently. If no action is taken, current cities will increase in density. This means that there will be more people per square kilometre, and it will be at the expense of green spaces and quality of life. The amount of green space per inhabitant will decrease and it will impact access to these spaces. In many countries, climate change and the future growth and crowding of cities will change the relationship between urban and rural areas. Feeding people in urban centres will become a more significant challenge, and it is therefore important to work towards a sustainable, affordable, reliable, and high-quality food system.

Large urban areas around the world agree on the vital importance of a food system that fulfils the requirements of a diverse and growing world population. This is expressed in the United Nations' *Sustainable Development Goals* (SDGs). Following on from those goals, four challenges for the food system can be distinguished:

- The growth of the population and today's unhealthy diets increases the demand for nutritious food: sufficient, sustainably produced, and healthy food with a focus on nutrients, such as fewer calories, more vitamins, etc. (SDGs 2 and 12).
- Climate change is putting pressure on food production: climate-adaptive and sustainable food systems (SDG 13).
- Depletion of natural resources puts pressure on the use of raw materials: the circular character of the food system and efficient use of natural resources, such as water and land (SDGs 6,14, and 15).
- Population growth and environmental problems mean that people choose their own interests first: innovation and communities joining forces (SDG17)

The questions that come with these challenges are often complex. How can we provide enough healthy food for everyone in the city in the future? How can urban areas prepare themselves for the consequences of climate change, such as severe flooding and extreme drought? How can we use our resources efficiently? These questions require an integrated approach, one that involves all stakeholders in the search for solutions. In response to this demand, Wageningen Economic Research has developed the Transition Support System (TSS) approach. This approach enables the different stakeholders to jointly explore potential future pathways towards sustainable, food-secure, and liveable environments, and to reach supported and tenable solutions. The TSS approach provides insight into the different prospective actions, and offers policy makers, the business community, and other organisations tools to change their policy and strategy.

In this brochure, we present the result of the application of the TSS approach in the Dutch province of Overijssel. The province chose the method to gain insight for themselves and their stakeholders into potential transition paths towards a sustainable food system in 2050. The objective of the province is to make the agri-food sector in the province more sustainable.

# Transition Support System approach

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Complex questions in relation to climate change, urbanisation, and quality of life require an integrated approach. In response, we developed the Transition Support System (TSS) approach. This approach assists stakeholders to achieve sustainable change together and in consultation with each other.

## What does the Transition Support System approach have to offer?

The value added of the TSS approach is the role of the stakeholders and their expertise in conjunction with decision-support methods and techniques. This approach assists stakeholders in making the correct decisions in the areas of policy and strategy for shaping a shared vision for future. Their knowledge, data, and background information are indispensable in this process. The advantage of the TSS approach is that policy and strategy are adopted and adapted in close collaboration with stakeholders. This process is supported by in-depth analyses, such as spatial insights into land use and statistical materials for specific sectors or population groups which lay the foundation for developments and effects regarding prospective actions. Extreme examples of prospective actions can be discussed and developed in further detail. During this process, the stakeholders can adjust the composition based on the prospective actions identified.

## How does the approach work?

The power of the TSS approach (see Figure 1) is:

1 The combination of the process and decision support during all phases of the transition
2 Involvement of all stakeholders in the assessment of the chosen policy
3 Calculating projections for the scenarios with unique models created by Wageningen University & Research.

For the *decision support*, a combination of different methods and techniques are used, e.g. scenario analyses of future developments such as urbanisation, and spatial analyses such as gaining insight into land use and the impact of certain policy decisions. The *process support* consists of methods and techniques that facilitate the process. The objective is to interactively involve all stakeholders, including the business community, citizens, policy makers, and researchers through dialogue and discussion (figure 2) in determining the prospective actions. For direct involvement, we use tools such as a "visioning approach" and a progressive participatory process design.

The methods and techniques can be used separately or combined with each other. The choice depends on the current context and the taken by stakeholders.

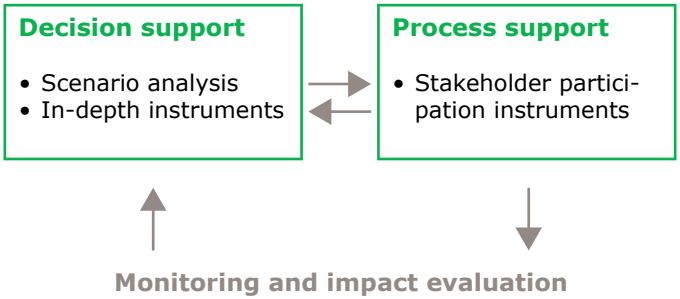


Figure 1: The two parts of the Transition Support System approach.

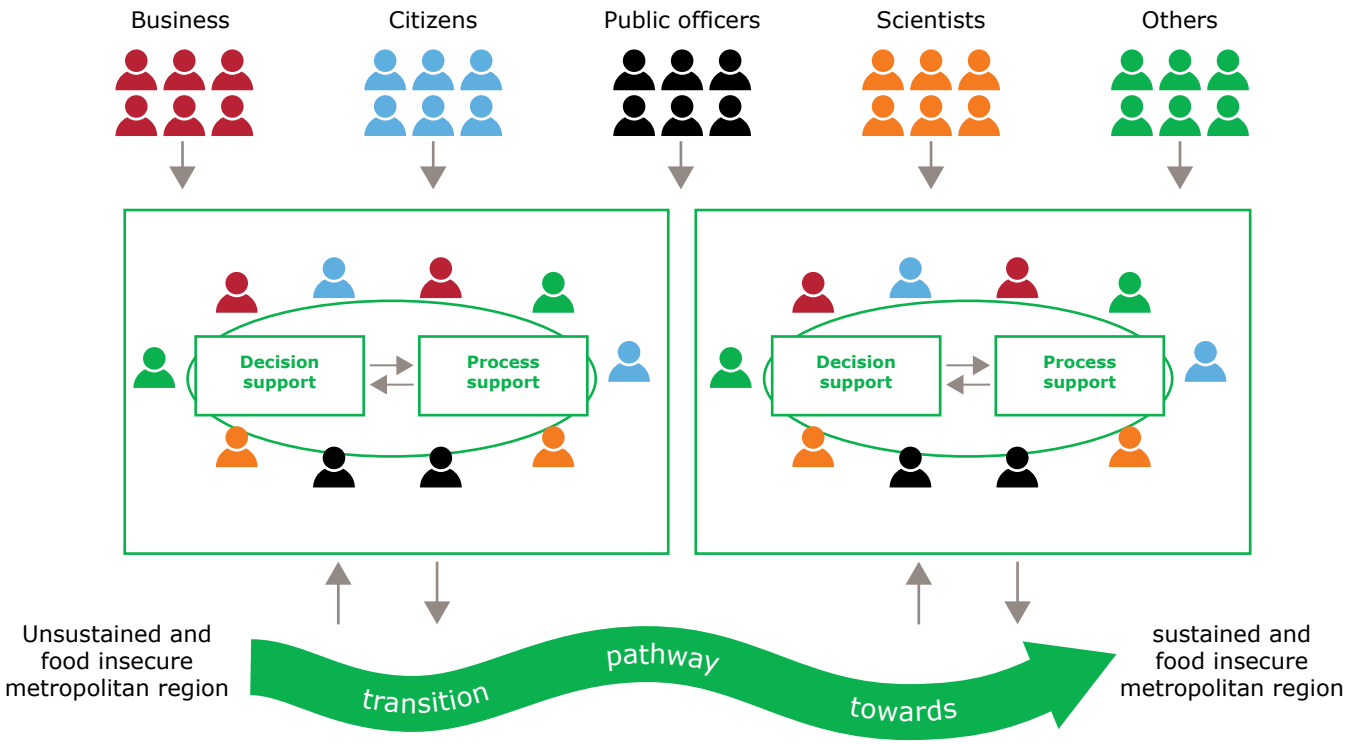


Figure 2: Overview of the Transition Support System approach. *Source: Dijkshoorn-Dekker et al. (2017).*

To achieve an optimal result with the TSS approach, the following elements are essential:

- The current context of the problem, such as policy and social trends, as a starting point for the transition process
- The composition of the group of stakeholders, which can be changed for each step of the process. People and organisations who are stakeholders or who feel a responsibility to resolve the issue are invited. This requires commitment, trust, and a shared vision.
- The design of a suitable participatory process for each step of the transition process. Relevant stakeholders are challenged to think outside the box.

Figure 3 shows the five steps of the TSS approach. Relevant stakeholders are selected for each step. The steps repeat again after step 5.

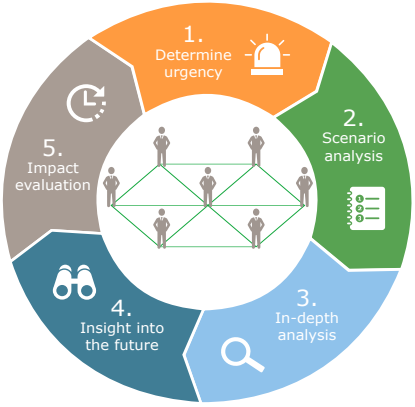


Figure 3 The five steps of the TSS approach

*Step 1: Urgency*

The TSS approach begins with raising awareness of urgencies , such as climate change, population growth in cities, and food security. One or more organisations, such as government agencies or the business community, can address this urgency. The associated questions often vary significantly: How can we consistently provide enough healthy food for everyone in the future? How can urban areas prepare themselves for severe flooding and extreme drought? How can we utilise our resources efficiently?

In order to answer these questions, a policy evaluation and analysis of relevant social trends and stakeholders, as well as their positions within the transition process, is required. Using this as a basis, it is possible to compose a group of stakeholders.

*Step 2: Scenario analysis*

Based on the urgency, we provide insights into several future scenarios. We use scenario analyses such as IPCC's Shared Socioeconomic Pathways (SSP). In this context, the group of relevant stakeholders will determine the desired future scenario. The group will also identify which prospective actions (policy, strategy, etc.) they want to implement to achieve this.

*Step 3: In-depth analysis*

In the third step, the question at hand is used to further develop the consequences of the prospective actions with the aid of spatial/statistical insights into the landscape, natural setting, citizen groups, geographical locations, or economic sectors. In order to do this, we use a combination of qualitative and quantitative methods and techniques. These provide insight into the various future scenarios, such as in the case of population growth over a defined period of time with regard to food production, food demand, pricing, and trade.

*Step 4: Insight into future directions (selected strategy and policy)*

During this stage, we provide insight in the impact of various prospective actions. The stakeholders discuss the basic principles and impact together, and they discuss whether effects are desirable or whether a different course of action would be better. This may lead to the joint identification of new prospective actions and changes to the basic principles, or the collection of additional data to be used in the calculations.

*Step 5: Impact evaluation*

Finally, each implemented strategy/policy is evaluated based on the realised impact compared to the desired impact. Based upon the feedback we then determine which step to take next: clarifying the objectives (step 1), new or additional insights from the scenarios (step 2), new or additional in-depth analyses (step 3), or changing the prospective pathway (step 4) (see Figure 3). This also involves reviewing which stakeholders should be involved at that time. The insights enable strategies and policy to be adapted.

# A joint perspective for Overijssel

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Overijssel is known for its agricultural landscape. Over 70% of the rural area has some connection to agriculture. The agri-food sector, including agriculture and processing, sales and the distribution of food, represents 10% of the Gross Domestic Product (GDP) and 6.8% of employment in the economy of Overijssel. By managing the landscape, agriculture also makes an important contribution to the quality of the landscape and the possibilities for developing the countryside. The agri-food sector will also have to comply with the requirements of a low-carbon economy: it has to contribute to reducing greenhouse gas emissions. The transition to a sustainable food system will put pressure on the competitiveness of the agri-food sector in Overijssel.

In its vision of the future, "*Beken kleur 2030*" ("Take a stand 2030"), the Province of Overijssel highlighted the importance and the challenges of a sustainable food system for 2030. The impact of climate change also requires action to continue safe and sustainable provision of food, and to ensure that the city remains a good place to live.

As a starting point in the transition process, stakeholders need to have insight in the context of the problem including the policy and socioeconomic trends. Based on the contextual information collected, it is possible to design the process.

In a collaboration with the Province of Overijssel, we have established the initial group of relevant stakeholders representing different actors in the food chain ranging from food producers, processors, caterers, retail, to consumers. At the end of each step, the composition of the group was evaluated and changed as required.

During the conversations with stakeholders, it became clear that it is difficult to persuade the people of Overijssel to adopt a healthy diet in the current age of unhealthy food. The stakeholders wanted to promote a healthier lifestyle on the one hand, and to decrease the environmental pressure of the current diet within and beyond the borders of the Province of Overijssel on the other. Stakeholders expected that citizens will become more aware of the nutrients and the environmental footprint of their diet, which means that they will know more about what they eat, how much they eat, where the food comes from, and the impact it has on the environment and the landscape.

Different tools were used during this process:

- *Interviews with stakeholders*
  Through interviews, anticipated developments and the most likely future scenarios were specified.
- *Expert sessions*
  To gain a better understanding of the impact of the specified developments, three consecutive sessions with various regional experts were held during which potential and ideal future scenarios for the 2050 food system were formulated. In addition, important prospective actions were defined and their impact tested.
- *Support*
  During each expert session, a visual artist translated the discussion about the future into concrete images. Decision-supporting models and tables were used to illustrate the impact of each prospective action on both the economy and the greenhouse gas emissions. Within Wageningen University & Research, we used GlobalDetector, a geographical information system, for this step of the process. MAGNET, a global equilibrium model, was used to calculate the impact of global developments such as population growth, economic growth, and climate change, as outlined in the narrative of the Shared Socioeconomic Pathways (SSP) projections by the IPCC. MAGNET determined the food production and the food demand considering the available areas for agricultural production. The impact of the different

future scenarios on food production, food demand, prices, and trade, for example, was determined for every SSP scenario. The MAGNET results were used to describe the situation for the Netherlands and Overijssel.

## Future scenarios for Overijssel

To draft action perspectives for the agri-food sector in Overijssel, five potential future scenarios were specified based on interviews with stakeholders.

*Future scenario 1. Production of food in the region, for the region*

An increasing number of entrepreneurs in Overijssel want to be markedly closer to the end consumer of the product rather than being a bulk food producer, an anonymous cog in a large industrial chain that ultimately leads to a dead end. They are looking for more direct contact with the customer in their region through the production of products such as cheese or the certification of regional products. They are moving away from national, cost-driven industrial chains to short regional chains with added value. They hope to capitalise on the trend that consumers from the city or the village prefer food from the local region.

*Future scenario 2. Social need for a real connection with the food production system.*

There is a large gap between citizens and food producers. Citizens have hardly knowledge how and where food is produced. In addition, they are hearing more and more about in the agro-food sector in the news, such as horse meat sold as beef, animal suffering in sheds, and Q fever. Citizens have an increasing desire to be know how and where vegetables, milk, and meat are produced, and who the producers are.

*Future scenario 3. Consumer awareness of the environmental footprint when switching from animal to plant product.*

Consumers are increasingly aware of their own impact on the environment. Social debates also demand more awareness of this impact, an example is the *Voedingscentrum* (Nutrition Centre) guideline to eat less red meat (pork and beef), or to be more flexible. Among the early adopters, a movement has started to exchange animal protein for plant protein.

*Future scenario 4. The impact of climate change on the food supply*

Climate change has caused more extreme and changeable weather developments. Examples of these are drier summers, extreme rainfall, and warmer winters. This has an impact on society, the food production system, and food security for the consumer. There is an increased risk for heat stress in cities, failed harvests due to droughts and salinisation, and wildly fluctuating production circumstances for food producers. The living environment is changing, and there will be increased insecurity about the food guarantee from the region.

*Future scenario 5. Quality of life in urban areas.*

Urbanisation is a worldwide trend including in the Netherlands: certain urban centres are becoming more important, and the population density in rural areas is decreasing. The facilities in the rural areas around cities will decline. To address urbanisation, the quality of life in rural areas will also become more important by maintaining sufficient social facilities and activities in the surrounding population centres.

# Exploration of the transition paths for Overijssel

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The transition of Overijssel's agri-food sector to a sustainable sector is a complex issue. The Province used the TSS approach to explore the issue. This chapter describes the most important content and process elements of the approach required in order to move towards a self-sufficient food system for Overijssel in 2050.

## Step 1: Urgency

In its vision of the future, "*Beken kleur 2030*" ("Take a stand 2030"), the Province of Overijssel highlighted the importance and the challenges of a sustainable food system for 2030. The impact of climate change also requires action to ensure that the provision of food continues to be safe and sustainable, and that the city remains livable in the future. Overijssel's agri-food sector will also need to comply with the requirements of a low-carbon economy: reducing greenhouse gas emissions.

## Step 2: Scenario analysis

Through interviews with stakeholders, anticipated trends and the most likely climate scenarios were outlined. In this process, the five future scenarios from the IPCC, the Shared Socioeconomic Pathways (SSP), were used to describe the impact for the province. The Province of Overijssel was looking for a combination of the green scenario (SSP 1, sustainability - taking the green road), and the business-as-usual scenario (SSP 2, Middle of the road).

The characteristics of both scenarios are:

1 a population decline in Overijssel over the long term
2 increased concentration of population in the cities
3 high economic growth, in line with the national average
4 high productivity in agriculture, and
5 high environmental pressure due to food consumption, and high meat consumption in particular.

## Steps 3 and 4: In-depth analysis of the prospective actions

To gain a better understanding of the impact of the specified developments according to the SSP scenarios, sessions with various regional experts were held during which potential and ideal future scenarios for the food system for 2050 were formulated, with accompanying essential prospective actions to achieve them (Figure 4).

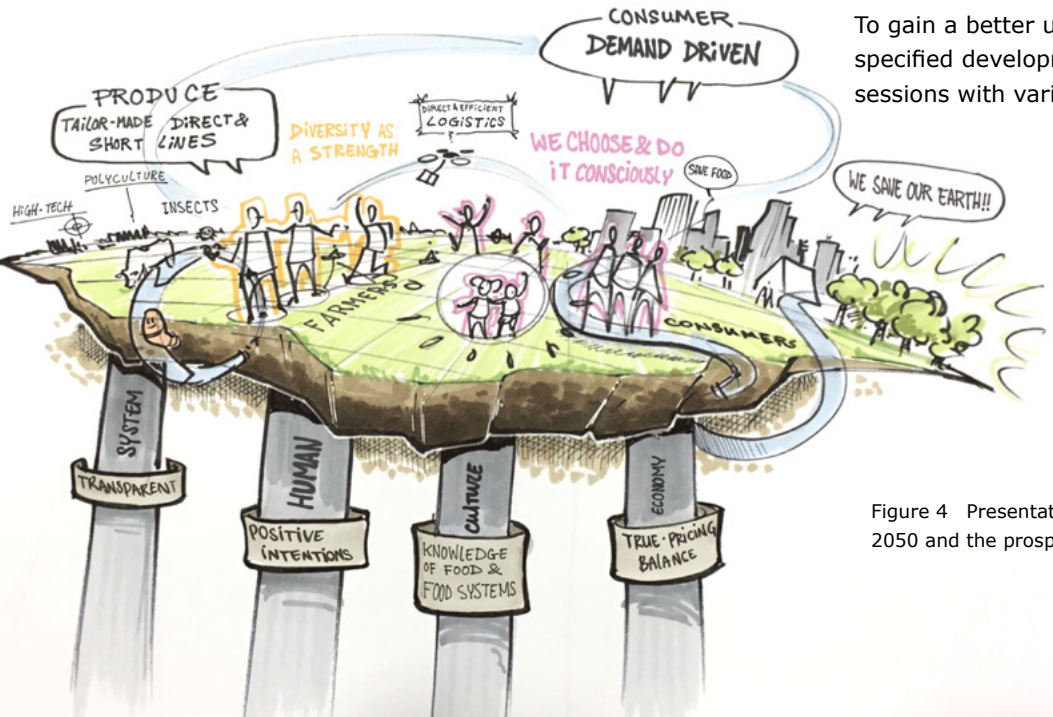



Figure 4 Presentation of the ideal future scenario for 2050 and the prospective actions to achieve it.

To illustrate, two prospective actions will be discussed here.

*Prospective action 1: Customised dairy production*

Overijssel produces more dairy products than it consumes. To reduce greenhouse gas emissions from agriculture, the cattle herd could be reduced, so that the demand for dairy products in Overijssel is fulfilled. As an example, we examine the demand for dairy products in three urban areas in Overijssel (Zwolle, Deventer, and the Twente urban area of Almelo-Hengelo-Enschede).

To what extent can Overijssel produce the dairy products that the inhabitants of the three urban areas, about half of all inhabitants of the province, consume annually? What will the economic impact be, if the production is reduced to the demand for dairy products?

Figure 5 shows the map with the number of cows around the three urban areas that can provide for the demand for dairy in the cities. The colour for each square kilometre indicates the density of cows, i.e. the number of cows per km$^2$. The map on the right is the same, but it includes a 10% population growth in the urban areas.

*Potential economic impact*

Most of the dairy products from Overijssel are exported to the rest of the Netherlands or internationally. If the dairy sector in Overijssel only produces for the three urban areas, the dairy herd could be reduced by about 80%. The required cows could then be concentrated in the vicinity of urban areas, as reflected in Figure 5. There will not be any milk production in other parts of the province. Thousands of agricultural jobs will disappear, and much of the grassland will be used differently.

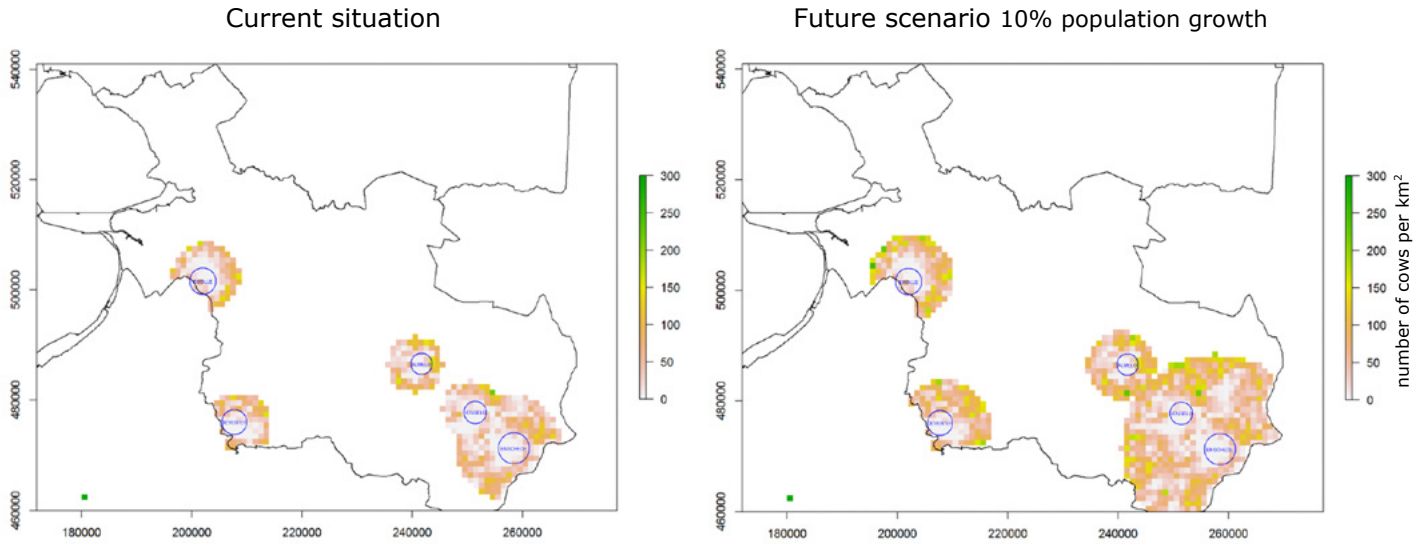



Figure 5 Required land for dairy producers around the large cities to fulfil the demand for dairy in the cities.

There will be less grassland, but the maize and grain production for animal feed will increase. The production of greenhouse gas emissions for dairy will also decrease by 80%. This means that the environmental pressure on nature will be reduced. If the animal feed for the dairy herd is also grown in Overijssel, less space will be used, and less transport (lower $CO_2$-emissions per litre of milk). Cutting back on the size of the dairy herd will also significantly reduce the production of beef.

*Changing insights*
The results provide the stakeholders with insight into the developments and relationships. The subsequent discussion changed their view with regard to three points:

- The spatial impact of agricultural $CO_2$ emissions are represented per $km^2$. This does not have any additional benefits, as the $CO_2$ emission is directly related to the agricultural activities, and $CO_2$ is volatile and not linked to a location.
- Customised production was examined separately for dairy, meat, and vegetables. It enables stakeholders to realise that an integrated approach (systems approach) is required rather than a sectoral approach, and that it needs to include the desired level of self-sufficiency.
- Customised food production is based on actual food consumption. When implementing an integrated approach to customised production and a healthy diet, an in-depth analysis needs to be based on healthy food consumption (voedingscentrum.nl guidelines).

*Prospective action 2: Customised production based on healthy consumption*
In addition to customised production, a healthy lifestyle and diet should be pursued. On average, a person eats too much meat and too little vegetables and fruits according to the guidelines of the Nutrition Centre. The Nutrition Centre has published guidelines for a healthy diet. These guidelines include:

- 500g meat per week at most, which should not exceed 200g of red meat
- at least 250-300g fruit and vegetables per day
- about 200g dairy per day

Now the question is: to what extent is Overijssel self-sufficient when the customised production is based on healthy consumption, i.e. the recommendations for a healthy diet based on the food pyramid, and not actual consumption?

Figure 6a shows the required area for vegetables based on the customised production around the urban areas at the current vegetable consumption per person at 164g. The map on the right (6b) shows the required area for vegetables around the urban areas based on the recommended vegetable consumption per person at 250g, per the Nutrition Centre guideline.

In addition to the guidelines for vegetable consumption, the combination of the guidelines for vegetables, dairy, and meat can also be taken into consideration. On the basis of the guidelines for a healthy diet, it is evident that Overijssel can be self-sufficient for dairy, vegetables, and meat if the consumption of beef is less than 200g per person.

*Potential consequences for land use*
Grassland will be greatly reduced, while more land will be used for growing feed crops and vegetable crops.

*Changing insights*
From the session with the experts it became clear that this is possible if:
a systematic change takes place to shift from the use of meat and dairy to the use of vegetables.
consumers are actively encouraged to express this through their shopping habits.

a) Customised production for current demand (164g per person per day)

b) Customised production for recommended demand (250g per person per day)

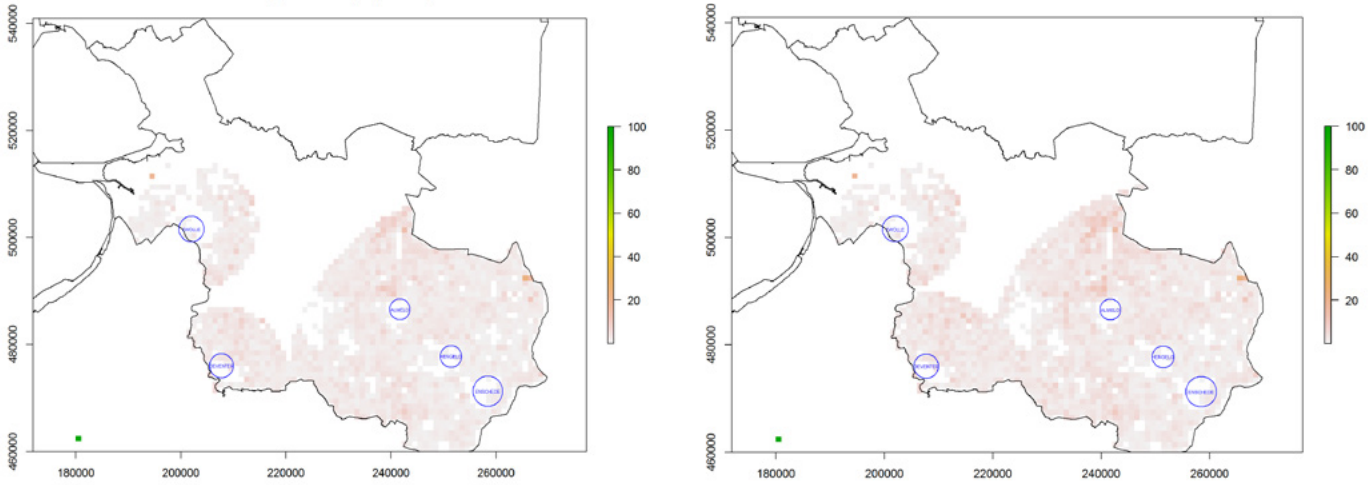



Figure 6a and 6b Required land for vegetable crops (ha per square km) around the large cities to fulfil the demand for vegetables in the cities.

## Step 5: Retrospective

When looking back on the development of the prospective actions during the sessions in Overijssel, new and additional policy questions were raised, such as:

- To what extent is the focus on how local and how self-sufficient is Overijssel?
- What local mechanisms are needed to make Overijssel self-sufficient?
- If the consumer determines the direction, how can we navigate this using policy?
- How do you create the ambition and the pride in the region to want to be self-sufficient?
- What transitions are needed in logistics and employment?
- What are the options for completely replacing the production of animal protein with vegetable protein?
- How regional is the direct impact of the food production system on the greenhouse gas emissions in Overijssel?

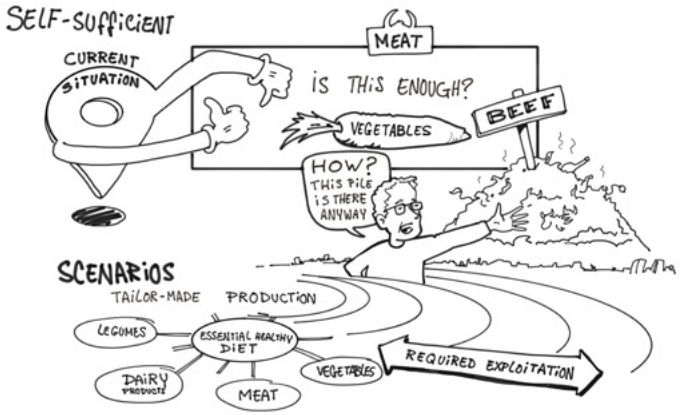
Those can be used to take another look at the urgency of making the food system in Overijssel more sustainable (step 1).

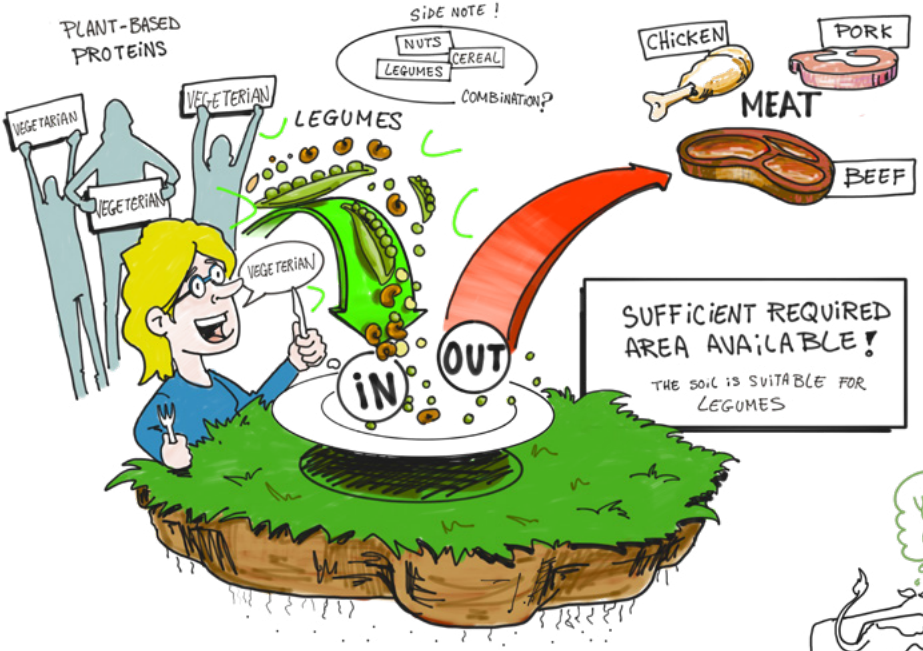
*Sound policy support*

The outline for Overijssel shows that applying global scenarios to regional areas enhances insight into regional transitions. Stakeholders appreciated that experts from different levels, from consumer to producer, were involved in the expert sessions.

Future scenarios and the impact of prospective actions were made concrete and relevant experts provided

feedback. This feedback was subsequently included in the spatial analysis, which means that there is now more insight into potential policy directions. In this process, the stakeholders' instincts were translated into concrete figures and regional outlines.




# Outsourcing the process

The Province of Overijssel has taken a unorthodox step. With the TSS approach, stakeholders were not only invited to provide input but also invited to co-decide what the next steps would be. Stakeholders all share responsibility for the future, and the government receives immediate feedback on policy options from the stakeholders and the models. This means Overijssel can develop a sustainable food system which is supported by stakeholders, which is build on trust, and which is coherent.

What did the Province of Overijssel think of this approach? Below, the province outlines why they chose this approach, what their experiences are, what the outcomes are, and how useful the approach is.

*"The Agro & Food sector is important for Overijssel and the province is proactively pursuing policies in relation to sustainability and innovation in this sector. In 2017, we had just begun exploring which policy we wanted to develop for the following years. At that point we were contacted by Wageningen Economic Research who wanted to conduct a test with a new interactive approach to policy exploration, so the timing was good.*

*Using this approach, we looked at the food system for Overijssel in 2050 in a different way. Particularly, it highlighted the importance of logistics in the food system. We were also surprised by the insights about consumption and production of our food in relation to the food pyramid. We involved several stakeholders from the Agro & Food chain in Overijssel in this exploration. In order to achieve a sustainable food system for Overijssel in 2050, several future scenarios for production and consumption were calculated and translated into land use around cities. The expertise of the stakeholders, the artist, and the data used allowed us to quickly determine whether the basic principles of certain ideas would achieve the intended effect. The approach to the process, and the addition of expertise and support provided by the data have increased the speed of our thought processes and improved tenability of our arguments.*

*The application of the TSS approach has provided us with insight into the potential impact of different future scenarios in relation to production and consumption of food in Overijssel in 2050. The approach has allowed us to solidify instinctive policy judgements of these future scenarios, which regularly led to adjustments and further refinement. The insights from the future scenarios have supported us in the Strategieontwikkeling Landelijk Gebied (Development of the Strategy for Rural Areas).*

*We think it is a very useful approach, but only if the data is there to support it. The key combination of data and stakeholders' expertise in different combinations ensures that the results can be built on during a future exploration of strategic policy."*

# Opportunities for transition

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# The Transition Support System approach: will it work for you?

Cities are growing, the climate is unstable, and the question of how we will provide sufficient and healthy food for the population in 2050 is getting more urgent. This is an issue that many policy makers of metropolitan areas around the world are facing with no standard solution. However, there is a standard approach that can be used to cultivate a widely supported vision of the future in a region: The Transition Support System approach.

With this approach, regions develop policies based on the knowledge of stakeholders, science, and models and data. Vision and action perspectives are provided with data and substantiation, and this immediately enters the discussions. Over several rounds, this method facilitates the creation of a supported perspective of the way in which a region can feed itself sustainably, and how it can achieve this.

The Transition Support System approach will enable Wageningen Economic Research to guide regions towards sustainable, reliable, and high-quality food systems. Do you want to find out if we can do the same for you? Please come and talk to us.

# Publication information

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