

Chapter 8

Drought Awareness Through Agricultural Policy: Multi-level Action in Salland, The Netherlands

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8.1 Introduction

This chapter focuses on the Salland region of the Netherlands and presents our analysis regarding the role of governance context on the new irrigation policy of the Water Authority of Groot Salland (*Waterschap Groot Salland*—WGS). The irrigation policy was adopted in early 2013 by the five water authorities in the eastern Netherlands.¹ Given the drought conditions in this region, the policy is concerned with finding a balance between the use of groundwater and surface water by farmers and the water needs of vulnerable nature areas.

The outline of the chapter is as follows: In Sect. 8.2, an overview of the water management system in the Netherlands is provided. Section 8.3 presents the case study background, starting with the national policies and mechanisms that are related to the irrigation policy, continuing with the historical and political background of the irrigation policy. Then, in Sect. 8.4, a brief description of the water system of the Salland Region and the pilot measures that have been carried out in the Salland Region are described. In Sect. 8.5, findings from the application of the governance assessment tool on four qualities and five dimensions are discussed. Finally, in Sect. 8.6, the overall conclusion and a set of recommendations regarding the governance context of Groot Salland are presented, which can be useful for improving drought resilience in the region.

8.2 Water Management in the Netherlands

The Dutch water system is characterized by a complicated organizational structure that has been developed over the centuries of experience with collaborative and participatory approaches to water management. The current water management system involves various organizations that function at the local, regional and national levels. The major tasks related to water management, the responsible organizations and the financing mechanisms are summarized in Table 8.1.

The management of water resources and services is a public responsibility and comes under the public law. Four types of governmental organizations can be discerned regarding the management of water resources, namely central government, provinces, municipalities and water authorities. Water-related tasks that these organizations fulfil are financed by central funds from the government or from decentralized taxes. Additionally, (publicly owned) private companies manage the drinking water supplies at the regional level, which often implies serving for more than one provinces, and cover their costs under private law, while operating under the regulatory rule of the central government.

¹These water authorities are Groot Salland, Regge en Dinkel, Velt en Vecht, Reest en Wieden and Rijn en IJssel. In January 2014, Regge en Dinkel and Velt en Vecht merged to form the water authority of “Vechtstromen” and in January 2016, Groot Salland and Reest en Wieden merged to form the water authority of “Drents Overijsselse Delta”.

Table 8.1 Tasks, organizations and financing mechanisms of the Dutch water management system

Task	Organization	Financing
Flood protection, water quantity and water quality (main system)	Central government	General resources, pollution levy on national waters
Groundwater	Provinces	Regional tax
Flood protection, water quantity and water quality (regional)	Water authorities (public)	Regional tax
Wastewater treatment	Water authorities (public)	Regional tax
Drinking water supply	Drinking water companies (semi-public)	Price
Sewerage	Municipalities	Local tax

Source Dutch Water Authorities (2015)

Regarding legal provisions, the European Water Framework Directive and its daughter directives provide the overarching legal principles. The main legislation that incorporates the national needs is the “Water Act”, which integrated various acts related to water and is in force since 22 December 2009. Several other legislations, such as the Water Supply Act and the Water Authorities Act, regulate the specificities of different sub-sectors of water.

Given the fact that the Netherlands is a delta country, the governance of water towards managing floods and protecting the society and the environment against flood damages, hence the “dry feet” policy, has been the ultimate priority of the Dutch water managers. Central government and water authorities are the two key actors that share the responsibility for flood protection. Despite the high priority on flood protection, the goals and priorities of the Dutch water management are quite diversified. This diversification can be attributed to the increasing pressure from the weather extremes associated with climate change as well as other relevant concerns such as the provision of sufficient drinking and irrigation water; protecting the quality of water resources; managing the level and quality of groundwater; and managing the complex web of waterways. The increasing attention for drought resilience, the core subject of this book, is a good example of this diversification.

8.3 From National Mechanisms to Regional Policies: Agricultural Needs and the Effects on Drought

8.3.1 National Policies and Mechanisms Related to Drought Adaptation

As outlined in the previous section, the water management system in the Netherlands involves various organizations from multiple policy sectors that

operate at multiple governance levels. This multi-level situation also applies to the drought-related policies and mechanisms that are relevant for the Salland region.

The national Delta Programme has the ambition to solve the water management and security problems in the Netherlands. However, in the western regions of the country surface water is needed for flushing the water to prevent salt intrusion from the sea, while in the eastern regions, it is mainly used for irrigation. So far it has been a challenge to address such different and conflicting priorities of different regions.

On request of the Minister for Infrastructure and Environment, the national Advisory Committee on Water has issued an advice in March 2013, about the freshwater supply in the Netherlands, partly supporting the preparation of the Delta Decision Freshwater in 2015, which is part of the national Delta Programme. The committee regards it a public task to take care that there is and will be sufficient freshwater for all uses and nature, but this responsibility is bounded. When new big water users start in relatively vulnerable areas or when they demand water of a specific quality, it can be reasonable to demand also investments and co-responsibility from them. Furthermore, the country should prepare for situations in which the supply of freshwater is less self-evident. For the short run, it might be sufficient to optimize the water system. Next to that, innovations that lead to less water use and more water storage need to be furthered. Like with situations of acute flood risk, the committee also advises to have serious gaming exercises in which real decision makers and stakeholders practice with drought decision-making under stress to test for instance the efficacy of the “displacement chain” (*verdringingsreeks*).

The displacement chain is a policy guideline that stipulates which water uses gets priority when the freshwater supply cannot satisfy the demands of all uses. In this chain, the first priority is to prevent irreparable damage to the water system, the soil (for instance peat layers) or nature. Second in line are the drinking water and energy production utilities. Third are high value agricultural and industrial production processes and last are the interests of shipping, general agriculture, nature with resilience, industry, recreation and fishery. The displacement chain is not often used, since limiting some of the last priority uses, such as the irrigation of agricultural fields and gardens and car washing, has been generally sufficient.

Another relevant mechanism is the national coordination committee for water distribution (*Landelijke Coördinatiecommissie voor de Watervedeling*, LCW). This committee consists of representatives from the ministry, including the public works agency, the Union of Water Authorities and the Interprovincial Consultation. They meet when the water level in the transnational rivers gets lower than certain values or when even without this being the case there are drought problems in several regions. Apart from proposing measures (in principle using the displacement chain, but also including fine-tuning of the water system where it can be regulated) they also issue “drought messages” to over 400 stakeholders whenever there are possible water shortage problems.

Apart from the Delta Programme, the new policies regarding drought and water scarcity need to be explained in the upcoming Water Management Plan 2015–2021, which also needs to respond to the European Water Framework Directive. The geographical level of this plan is the subbasin of Rhine-East. In the Dutch part of

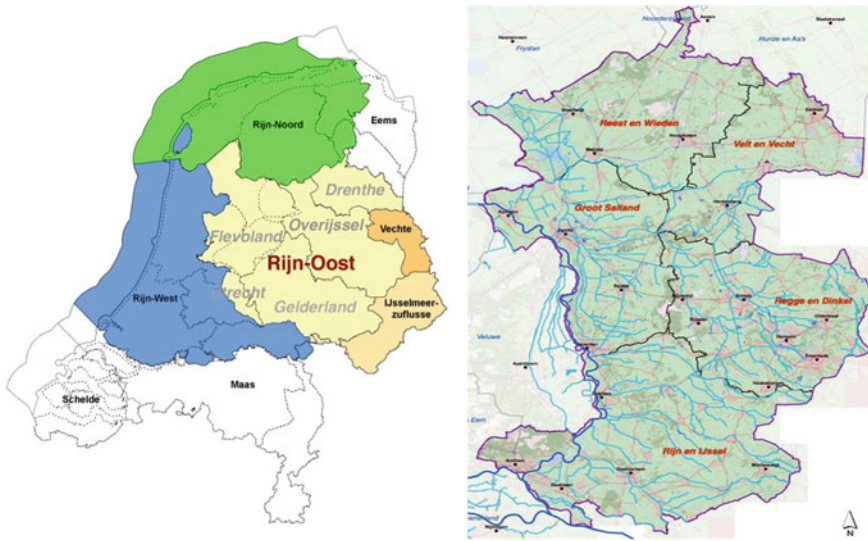


Fig. 8.1 The Dutch part of the Rhine-East Subbasin (*left*) and the five water authorities in Eastern Netherlands (*right*) (Source Anonymous 2015)

this subbasin, the management responsibility is shared among five water authorities, five provinces, Rijkswaterstaat (the national water agency) and about 95 municipalities (Anonymous 2015; see also Fig. 8.1).

As explained in Chap. 9 of this book, a manifesto was presented in June 2012 by the water authorities in the Rhine-East and the southern Netherlands, emphasizing the significant contribution of the higher parts of the Netherlands to agricultural production, and the importance of water management problems specific to these higher areas. The “ZON Declaration” (*Zoetwatervoorziening Oost-Nederland: Freshwater supply East-Netherlands*), which was signed in June 2014 as a follow up on this manifesto, brought together even a broader set of stakeholders including the provinces of Overijssel, Drenthe and Gelderland, the water authorities of the Rhine-East subbasin, municipalities, platforms for regional cooperation, nature organizations, agricultural organizations, drinking water companies and estate owners (Anonymus 2014). The ZON declaration formed a “political” statement to the national policy arena that the specific circumstances of the higher parts of the delta should not be underrepresented in terms of attention and funding.

8.3.2 Development of the Regional Irrigation Policy in the Eastern Netherlands

Agriculture has always been a key sector in the eastern Netherlands, especially after the Second World War, when feeding the increasing population emerged as a

crucial issue and the memory of the famine during the last winter of the war was still very fresh. In the 1950s, investments were made to drain the agricultural lands and to enable irrigation for sufficient food production. As the farmers also observed the positive influence of irrigation on crop yields, many of them installed pumps and sprinkler systems on their fields. Thus, agricultural irrigation became a common practice, especially during dry summers. Both groundwater and surface water were used for agricultural irrigation.

Despite the positive influence of irrigation on crop yields, problems emerged in the 1980s. Drainage and groundwater extraction caused desiccation, which damaged both the agricultural areas as well as the natural areas that were sensitive to the changes in groundwater level. Improvement works were made to decrease the drainage of water from the land. By that time, however, irrigation was considered vital particularly for grass and crop production, since groundwater extraction reduced the watertable and in some areas the soil became too poor to produce food without irrigation.

In the 1990s and 2000s, environmental conservation became an important concern, partly due to the requirements of EU directives. Therefore, during drought periods, when the water sufficiency was threatened for drinking and industrial uses and for nature areas, water authorities were authorized to ban irrigation with groundwater. These bans caused problems for farmers, particularly those growing grass and corn.

As the water authorities started to see drought as a common problem in the region, they initiated discussions for a joint policy on the use of water in irrigation. They also had the additional objective of harmonizing their policies so that the farmers living in border areas of the water authorities would not be negatively affected of the different policies of different water authorities. It was, however, difficult to have all the water authorities on board. Some water authorities did not have problems during the major droughts, which were experienced in 2003 and 2010, so they did not want to spend time on developing an irrigation policy. Others had different priorities and they did not know where such a common policy would lead to. The water authority of Regge and Dinkel (WRD), which is now the Twente region of the water authority of Vechtstromen, was the only exception.

In 2010, WRD decided to have an irrigation policy, even if a regional policy would not be formulated. They concentrated on getting less irrigation from surface water and more from groundwater. When they spoke with the farmer organization (*Land- en Tuinbouw Organisatie*, LTO) they thought this is a solution that will have support with the farmers but this was not the case, especially because some farmers relied on surface water for irrigation. Thus, the LTO did not support the decision. Discussions lasted until the beginning of 2011, but no concrete outcome was reached. Then halfway 2011, the five water authorities decided to work together and initiated a project to formulate a policy that would address the protection of natural areas. They also involved the nature conservation organizations (NCOs), which were represented by their umbrella organization (*Natuur en Milieu Overijssel*, NMO).

In 2012 a consulting firm was hired to provide support on assessing the impact of irrigation on nature areas and defining a buffer zone around the nature conservation areas. A model was made on the influence of water extraction with respect to different soil types, extraction types and depths. The results of that model were used to decide on

the size of groundwater-sensitive areas such as peats and swamps, which would be used as focal points, and the buffer zones, within which irrigation would be regulated. Several maps were made, including alternative buffer zones of 100, 150 and 200 m, and alternative sizes of nature areas with 50, 20, 15 and 10 ha. Each option implied different consequences in terms of area categorisation. The board members decided on the 200-m buffer zones, which would be defined around the nature areas of at least 20 ha. This was in line with a more general tone in Dutch government that emphasis should be put more on protecting larger nature areas and less on the smaller fragmented areas.

After consultations among the water authorities and with the provinces, LTO and NMO, the irrigation policy was issued in the spring of 2013. Although there were several issues to be worked out, the water authorities reached a decision, which was backed by their own boards. A major issue that was raised by the NMO was the lack of up-to-date information on water extractions in the buffer zones. In 2014, the water authorities made an inventory of the existing groundwater wells in the buffer zones to also identify whether and how much water is extracted without a notification, which is issued by the water authorities to the farmers for irrigating their land. Results from the inventory showed that the extractions in the current buffer zones are relatively small. Such an inventory was not conducted before the design of the irrigation policy, since the water authorities wanted to wait for the decision of the province of Overijssel as to whether water extractions in the buffer zones can or cannot be allowed. However, the province did not make this decision yet.

8.4 Too Wet and Too Dry: The Double Needs of the Salland Water System and Measures to Address This

8.4.1 Water System of the Salland Region

The jurisdiction of the WGS lies in the western Overijssel province, which is located in the north-east of the Netherlands. It constitutes a part of the Vecht/Zwarte Water catchment within the Rhine river basin. The WGS serves to a population of 360,000 inhabitants and numerous companies within a surface area of 120,000 ha. As shown in Fig. 8.2, the territory of WGS is divided into four districts, each of which has a district office and manages one or more wastewater treatment plants (WWTPs), in addition to managing a total of 4000 km of watercourse.

The area included within the WGS terrain has a 10-m slope, starting high in the Sallandse Heuvelrug and ending at the IJssel. The major canal in the area was originally dug for shipping. Some of the water draining from the Sallandse Heuvelrug, the higher elevation area, goes into this canal and some passes by underneath it. The system contains weirs and functions in an entirely regulated way by pumping water from the IJssel River upwards in the canal from Deventer onwards and then it trickles through the ground “downhill”.



Fig. 8.2 Jurisdiction of the WGS (Source Waterschap Groot Salland 2014)

In accordance with the requirements of the Water Framework Directive, WGS has been working on a program to renew 37 watercourses before 2028. This program considers the bigger watercourses. WGS is also investigating opportunities for more extensive maintenance of watercourses to increase the robustness of the water system and hold the water as long as possible.

When the water level in the IJssel is too low for the pumps, they stop pumping (however they have lowered the pumps so this is required even less often than before). The amount of water that is permitted to be pumped is outlined in the agreement among the water authorities. Consideration is given to the levels of water required for fish in the various streams; however, there is no official requirement to do so.

Farmers have been accustomed to receiving the service of water being supplied for irrigation from the WGS. Since the WGS is responsible for determining how much water goes through the channels (due to the highly regulated nature of the system) when the channels go dry, they are ultimately responsible for having made that decision, except under extreme circumstances when higher-level regulations come into play. Thus, some farmers see it as the responsibility of the WGS to keep water in the channels. Until recently the WGS has had a general attitude of assuming such a supply-oriented role and doing their best to make sure that this was

indeed provided. The development of the irrigation policy created an arena for additional stakeholders that address the competition between the wishes of farmers and other water users as well as a broader perspective to the optimal use of water by considering the issue of drought.

8.4.2 Pilot Measures Implemented Within the DROP Project

The catchment area of the pumping station Streukelerzijl, located in the north-eastern part of Salland, is prone to flooding due to an insufficient drainage system and to water shortage in periods of drought. The two pilot measures that are implemented in the Salland Region contribute to the protection of this catchment area of about 18,000 ha against both flooding and drought. This requires a double-acting system that is able to drain and supply enough water under, respectively, wet and dry weather conditions, and also a water system that responds quickly and effectively to changing weather circumstances. Another challenge of the project is to generate knowledge about how to enhance cooperation with all stakeholders involved in order to come up with new projects to prevent drought-related agricultural losses.

Within the first pilot measure, a large part of the catchment area has been disconnected to form a new catchment area in order to compensate groundwater extraction by the drinking water company and to secure the water supply for farmers in the catchment area. Two weirs and two pumping stations were built to discharge water to the Vecht River and to pump water from the Vecht River into the catchment area. The additional pumping station at the Vecht River, which will be built in the future outside the DROP project, will drain and discharge the new catchment area. Until this new pumping system fully works, a temporary water inlet is used to be able to supply the new catchment area with water. This temporary water inlet is located higher upstream than the future location of the new double-acting pumping station. The water drained from the new catchment area is temporarily transported via an already existing watercourse to the north-west.

The second pilot measure is an innovative system for managing the catchment area in a more efficient manner to prevent and reduce damage to agricultural production. It involves a remote-controlled steering mechanism that is linked to weather forecasts and to manage this management system it will be placed at the pumping stations. The WGS will start testing the steering mechanism at the two smaller double-acting structures as soon as possible.

8.5 Governance Assessment: After Acknowledgement of Drought Comes Integration of Drought

In this section we apply the Governance Assessment Tool (Bressers et al. [2013a, b](#)) and present our findings regarding the four qualities of governance: Extent, coherence, flexibility and intensity.

8.5.1 Extent

The levels and scales dimension has a supportive extent, as all governance levels ranging from the local level to the EU level are relevant. However, the regional level is the most prominent, since the irrigation policy is binding for the five water authorities in the Rhine-East subbasin.

At the national level, the displacement chain, which is explained in Sect. 8.3, is implemented to balance the water supply and demand in cases of extreme water shortages. Interactions between different levels also occur for the implementation of relevant EU policies such as the Water Framework Directive and the Birds and Habitats Directives. The national level plays an enforcing role regarding the implementation of these policies. For instance, the Birds and Habitats Directives have requirements on the nature areas that are designated as Natura 2000 sites. The areas where the water level will be higher are identified in the provincial plan. Similarly, the measures that the provinces take for the nature sites are defined at the national level.

The extent is also supportive in terms of actors and networks. Many actors are involved in the decision-making processes, mainly including the province of Overijssel, the five water authorities, the LTO, the NMO and Vitens, the monopolistic drinking water company. Regarding groundwater management, the province and Vitens assume a role at the regional level. The province oversees the use and protection of groundwater by controlling the water authorities and issuing permits, whereas Vitens is interested in the influence on groundwater abstraction.

Regarding problem perceptions and goal ambitions, the extent is neutral. Many actors adopt a supply-oriented approach to water, implying that their major goal is providing the right amount and quality of water to all users. The focus on supply has been shifting since other interests became important in the past few decades. It was realized that the amount of freshwater is limited and climate change is exacerbating this issue. Drought is becoming a problem to tackle for the agricultural sector, although in many areas flood protection is still the major goal. Additionally, drought is a relatively new issue and hard to explain to the general public, although 1/3 of the country is similar to the land in the eastern Netherlands, which has dry sandy soils that are prone to drought. Farmers are affected by dry lands but do not consider this to be as important an issue in terms of “protecting their investments” that should be taken over by the water authorities through longer term and larger scale investments.

Several strategies and instruments are in place to deal with water scarcity and drought, indicating a high degree of extent. ZON is the first strategy that addresses the water problems of the East-Netherlands. It involves various measures such as using long-term climate data to demonstrate changes and engaging the relevant actors at multiple levels. The irrigation regulation is the major instrument regarding water use in irrigation. One aspect of the irrigation policy that is lacking in extent is that it only applies to new wells and not existing ones. For surface water management at the national level, the displacement chain is implemented. In terms of priorities, agriculture is the first sector that the water use is restricted through “irrigation bans”, which are decided upon by the water authorities, whereas

drinking water is the last. Permits and notifications are the main instruments to regulate water extractions (Ministerie van Verkeer en Waterstaat n.d.; Waterschap Groot Salland n.d.). The water authorities regularly monitor the groundwater levels and warn the farmers, in case of too much withdrawal.

The extent is neutral regarding the responsibilities and resources, since there is an imbalance between the large range of responsibilities, which have been assigned to various actors, and the often-limited level of financial and knowledge resources, which are decreasing for some stakeholders such as NCOs. Water authorities have the overall responsibility regarding drought adaptation. This is strongly reflected in the development of the irrigation policy. Both the water authorities and the provinces also have a responsibility for nature conservation areas, in particular the ones that are designated by the national government as Natura 2000 sites. Regarding groundwater use and protection, water authorities are responsible for shallow groundwater and the province is responsible for deep groundwater. The new irrigation regulation attributes some responsibility to farmers as well. They should notify the water authority when they will extract surface water and install a new well. While using water, they should also check the weirs and stop extracting surface water if the water does not flow over the weirs. Considering knowledge as a resource, there is a gap in the current understanding about the appropriate groundwater levels for agriculture and nature, and how they affect one another. It is also unknown how nature will adapt and how water extractions for irrigation will change under the new and developing conditions related to drought.

8.5.2 *Coherence*

Since the interdependence between different governance levels is recognized, a high degree of coherence is observed for levels and scales. However, coherence is low regarding the governance levels that are related to the environmental aspects of the irrigation policy. According to the national Nature Conservation Law (*Natuurbeschermingswet*), if someone implements a project in a Natura 2000 site, they have to prove that there is no environmental effect on the areas. In other water authorities, such as Brabant, where they have similar problems, farmers might have to take an additional permit from the province if their land is within a Natura 2000 site and have potential damage. However, the new irrigation policy does not incorporate the environmental impact assessment for Natura 2000 sites. The main reason for applying such a blanket approach is that the province had not decided yet how to deal with the extractions in the zones around the nature areas. There are 30–40 nature areas in the region, and the water authorities argue that it would take too long to consider the impact in each area. However, the EU policy would override the regional policy: If many farmers pump water to irrigate their fields and the groundwater level would drop, irrigation can be stopped according to Natura 2000 legislation.

A neutral degree of coherence is observed in terms of actors and networks. Since the numerous actors of water management have different interests and views, it is

inevitable to have disagreements regarding how to allocate the limited water resources to different uses and services. For instance, water extractions threaten the groundwater-sensitive nature areas. As a result, water authorities, farmer organizations and drinking water companies take different sides than the NCOs. The “Agriculture on Sight” (*Landbouw op Peil*) project, which was started in 2011 by the water authorities and LTO, constitutes a positive example. This project involves individual farmers and aims to increase their awareness regarding the soil and water in their farm. According to an LTO representative, the project is changing the relationship between farmers and the water authority, who became more communicative and collaborative. The increasing cooperation requirements, for instance to implement the Natura 2000, is expected to create more initiatives similar to *Landbouw op Peil*.

Problem perceptions and goal ambitions are also neutral in terms of their coherence. The water authorities and the NMO have different perspectives on how the water system works and should work. On the one hand, the NMO sees the management of the water system leaning towards the interests of agriculture and not sufficiently protecting nature areas. On the other hand, the water authorities perceive the NMO as having strict positions on nature conservation and difficult to work with. This low coherence between economic and environmental goals seems to get higher as the irrigation policy takes into account the water needs of nature areas and limits irrigation around those areas. Furthermore, before the adoption of the irrigation policy, the situation regarding the extraction of irrigation water during drought, water shortage or calamities was not clear for farmers that live at the borders of water authorities and have land at more than one water authority. There are also differences in the perception of the urgency with which the issue of drought needs to be addressed, particularly between the water authorities and the NMO.

Strategies and instruments is the only restrictive dimension regarding coherence. The national Delta Programme was initiated mainly for solving the water management and security problems in the Netherlands. However, so far the different and conflicting priorities of the eastern and western regions of the country haven't been fully incorporated. Despite its apparent emphasis on freshwater supply, the ZON project addresses drought and potential measures. Permit is the main instrument regarding the regulation of water use; so its coherence with other instruments is relevant. The water authorities do not know which notifications were given in the protection zones. However, the irrigation policy will apply only to getting permits for new wells, not the existing wells. Even if it could be applied, the water authorities would have to pay to the farmers to move them out of the zone and render the permits unusable or the notifications invalid. Such a situation can also arise when Nature 2000 measures are implemented, since the province might have to pay to buy out the land around the protection zones.

The coherence of responsibilities and resources is neutral. Each actor has some responsibility regarding certain elements of the water system. However, it is unclear whether an actor holds the responsibility to connect all the knowledge regarding different aspects and has an overview of the water situation and the water balance. This can be explained by the very nature of water management in the Netherlands, which attributes more value to involving stakeholders from all levels and sectors, who have

their own particular views about the system, and less value to assigning responsibility to a stakeholder for having a complete overview. The positions regarding the responsibility of water authorities in providing water to farmers differs between the water authorities that have sloping areas (WRD—farmers do not expect that WRD provides surface water for their fields) and those have mostly flat areas (WGS and Veld en Vecht—farmers do expect that water is provided). This situation makes the farmers in flat areas more advantaged than those in sloping areas, who have to incur extra costs to pump surface water to their fields in case they are not allowed to use the groundwater. These differences are not dealt among different water authorities.

8.5.3 Flexibility

A highly flexible governance setting is observed regarding the possibilities for upscaling and downscaling the policy issues between different levels. This results from the collaborative and participatory environment in the sector, which involves actors from different levels to elaborate on problems and solutions at multiple levels without imposing a hierarchy, unless there is a law that regulates otherwise. The development process of the irrigation policy constitutes a typical example of upscaling where the WRD scaled up the irrigation issue from the local level to the regional level, although it was not a major issue in WGS. Another example is the ZON, which downscales the national freshwater supply problem of the Netherlands to address the regional context, i.e. high sandy soil conditions.

The flexibility regarding actors and networks is assessed as neutral. Through designing an irrigation policy, the five water authorities were successful in developing a common regulation at the regional level. This process was completed without following a formal procedure and therefore it can be seen as an indication of a high degree of flexibility. However, the LTO and NMO were not able to effectively participate. There is little evidence that alternative participatory mechanisms (for instance surveys, polls, public hearings, focus groups, etc.) were applied for enabling the participation of individual or local actors in developing the policy. This aspect indicates a low degree of flexibility. Respondents from several stakeholders addressed the increasing emphasis on integrating multiple sectors, and thereby involving multiple stakeholders in projects such as *Landbouw op Peil*.

Problem perceptions and goal ambitions are also assessed as neutral. The way that the irrigation policy was formulated raises several concerns, in particular for the NMO, who sees the policy as incomplete and requiring changes according to the updated data on the existing permits and water withdrawals. Nevertheless, the water authorities have a strong trust in the policy-making process and are prepared to incorporate the influence of existing wells and groundwater withdrawal levels into the parameters of the policy. The same degree of flexibility applies for the concerns of the province on the incorporation of requirements by the national and EU environmental policy. In case the nature conservation policy changes and influences the irrigation policy, the water authorities are ready to amend the irrigation policy

accordingly. The board members of WGS are generally associated with different groups or parties. There may be barriers to change when they go against the interests of the various organizations.

Strategies and instruments are also assessed as neutral in flexibility. As discussed earlier, the water authorities and the NMO have different opinions on the timing of the irrigation policy. The NMO defended a policy that would integrate all concerns and knowledge from the beginning, where the water authorities opted for starting the execution of the policy and adjusting later, if necessary. The water authorities took this decision based on the argument that the 200-m zone can be changed in the coming years if it proves to be too large or too small for some nature areas. The water authorities are also open to changes that can result from the implementation of other policies such as the Natura 2000. Water authorities and the provinces have the possibility to address the necessary changes in the five-year Water Management Plan.

Finally, the flexibility of responsibilities and resources is also assessed as neutral. The line between the practical responsibilities of the water authorities and those of the province is not always as sharp as it is on paper. The national Water Act, enacted in 2009, states the actors that are responsible for the different aspects of water management and draws the boundaries of responsibilities. However, for specific cases in the field, it is sometimes unclear whether the province and/or the water authority is responsible. Regarding water use at the farm level, the new irrigation regulation enables a flexible distribution of responsibilities. Instead of general irrigation bans imposed by the water authorities, the farmers are able to control water use according to the flow of water through the weirs. However, as mentioned above, this might cause discussions between the water authorities and the farmers, in case the farmers decide to take water when the water flows from the weir. In contrast to the very high degree of flexibility in terms of responsibilities, no such flexibility is observed regarding financial freedom. Provinces and water authorities have to deal with a situation where there is less financial room to play than in the past. If they want to do big investments, the provinces and water authorities have to get backing from their provincial parliament and general board, respectively. Similarly the NMO is dependent on the limited funding from the province, and needs to allocate it according to the priorities of the province.

8.5.4 Intensity

The irrigation policy receives attention and efforts from many levels, giving it a highly intense character in terms of levels. At the provincial level, the importance of groundwater is acknowledged for both the economy (the agricultural sector) and for nature protection (the areas that are dependent on groundwater). Additionally, the EU level creates pressure on the water authorities to work together. According to the Water Framework Directive, all these water authorities are in the Rhine-East and they need to collaborate on water planning and management. The history of

good relations among the water authorities creates additional impetus regarding the enforcement of the irrigation policy. The regional approach is also reflected in the ZON declaration, which states that all parties in the East of the Netherlands will be responsible to optimise the availability and use of freshwater and to make efforts for decreasing the sensitivity of the region to extreme weather conditions.

A neutral degree of intensity is observed regarding the actors and networks. Drought is a priority issue for the five water authorities in order to cooperate at the regional level, so they communicate to find points of cooperation. Other actors, however, assign different levels of priority for several reasons. NMO cannot allocate time to projects on water since it has very limited financial and human resources. As a result, NMO cannot be proactive in terms of participation, but rather responds to the requests of the water authorities. The province has recently changed its approach to water projects. Since they have ongoing tasks and want to interfere in different policies in several sectors, they integrated water into the spatial planning sector. While they previously had a water team of 20 people, since 2012 they have a diverse team of 70 members. Finally, the LTO makes efforts to get involved in projects, although they lack the technical knowledge.

The problem perceptions and goal ambitions is the only restrictive dimension regarding intensity. The dilemma between putting the water away to prevent flood and letting it in the system to prevent drought is felt commonly by the practitioners. Furthermore discharging the excessive water is crucial, since getting the water out is more difficult than getting it in. Farmers also have higher priority for floods than droughts; they are worried when their fields are wet or when the groundwater is high, not when the land is dry. Nevertheless, drought constitutes a threat for agriculture due to the need for irrigation. Therefore, measures are taken to prevent farmers from facing water shortages. Furthermore, there is a national agreement that water from the rivers can be transferred from other regions. However, the water authorities differ in terms of the practicality and costs of transferring water. Another relevant issue is monitoring of water withdrawals. Until recently, there was no up-to-date data on the existing pumps, and thus no accurate information on where and how much water is being pumped. The provinces and water authorities use a national database to register the water users and update it once a year. But farmers usually do not comply with that rule and the water authorities do not regularly monitor the compliance, either. Water authorities need these data to manage the water flows and to monitor groundwater use. In case of water shortages, formally every farmer has to stop irrigation; otherwise, they will be misusing the water. This creates a kind of guarantee that not too much water will be withdrawn.

A neutral degree of intensity is observed regarding strategies and instruments. The intensity of strategies is increasing in terms of data management on water use. The database that the water authorities have is not reliable at the farm level, since the farmers did not provide the exact level of extraction; neither did the water authorities measure it. In order to update the database and to identify the unregistered wells, the water authorities made a survey with the farmers that have a land in the buffer zones or next to nature areas. On the other hand, a low level of intensity is observed regarding the irrigation policy, since it applies only to new

wells. Although the water authorities considered banning the existing wells in the protection zones, they realized that this would be impossible, since some of the existing wells were not registered. If the existing wells would be banned, the water authorities might have to pay the cost of a new well and not irrigating the fields, as well as facing the resistance of many farmers that would want to continue using their wells. According to NMO, leaving all the old permits gives a “window dressing” character to the irrigation policy. They think that the policy is made for situations that might not so easily emerge, since the farmers are unlikely to invest in new irrigation systems due to installation and fuel costs.

The intensity of responsibilities and resources is also assessed as neutral. An increasing level of efforts is made towards the adoption of drought measures. The major indication of this increase is the ZON, which has been developed under the national Delta Programme. Within the scope of ZON, the local and regional stakeholders and the Delta Commission will contribute a significant amount of funding for implementing measures that will address both droughts and floods. The design of the ZON involves both using long-term climate data to demonstrate changes in the water system, and engaging the relevant actors at the local, regional and national level, who in the end agreed to devote resources for the realization of measures. The five water authorities have already allocated significant time to formulating the irrigation policy, and are committed to invest in implementing a metering system to monitor water use at the field level. This situation indicates a high degree of intensity. However, currently they do not have the resources to monitor or enforce the amount of water that is being taken by farmers (valid for WGS, unknown for the others). Furthermore, the influence of NMO is decreasing due to lower funds from the government and the province, while the water authorities expect NMO’s inputs. In terms of NCO representation, two critical questions are raised: *Who pays for the voice of nature conservation? What if some actors do not want any more the voice of nature conservation?* NMO organizes the NCOs into the planning process and represent them during the meetings with the water authorities. This implies that if the water authorities involve the NMO, they can reach to all nature organizations.

8.5.5 Overview of the Assessment Results

Our observations demonstrate that the Salland Region has a neutral governance context regarding its drought resilience policies and measures. As visualized in Fig. 8.3, the context involves mostly neutral aspects, with five supportive elements and two restrictive elements.

Considering the five dimensions of governance, the most supportive one is “levels and scales”, whereas the coherence of “strategies and instruments” and the

Dimension	Criteria			
	Extent	Coherence	Flexibility	Intensity
Levels and scales				
Actors and networks				
Problem perspectives and goal ambitions				
Strategies and instruments				
Responsibilities and resources				
<i>Colours red: restrictive; orange: neutral, green: supportive</i>				

Fig. 8.3 Visualization of governance assessment conclusions

intensity of “problem perspectives and goal ambitions” are the only restrictive contextual factors. Regarding the assessment criteria, extent is the most supportive criterion, since three of the governance dimensions are assessed as supportive, while a neutral level is observed for two dimensions. Coherence is identified as the relatively weaker criterion compared to other three criteria, since it is assessed as neutral on four dimensions and as restrictive on one dimension.

Regarding coherence, the restrictiveness is mainly attributed to the fact that drought measures are not integrated into the existing water use, management and governance systems, partly due to the long-term competition that exists among different water user sectors (agriculture versus industry versus nature) and among different regions (east versus west). Nevertheless, the collaborative and trust-based atmosphere, which is developed through different projects and initiatives, is seen as a solid basis to reach coherent problem and system perspectives as well as collaborative and participatory mechanisms. The increasing understanding on the risks of drought for all water users creates a collaborative environment for all the stakeholders.

Regarding the restrictiveness of the intensity, the historically grounded concern on “too much water” and thus the dominance of managing the flood risk plays a major role. This historical context makes it difficult to diversify the priorities towards combating with “too little water”. The water authorities invest time and money in improving their monitoring and enforcement systems towards better managing the system. However, actors such as NMO and LTO put relatively lower effort in such initiatives, due to a lack of financial resources and technical knowledge, respectively.

8.6 Conclusions and Recommendations for Salland: Seeking More Horizontal Integration and Awareness

Our overall conclusion is that the Salland Region is characterized by a vivid governance context. The emphasis of national and EU policies on river basin management encourages the regional water authorities to coordinate their actions. One of the regional initiatives has been the development and implementation of a common irrigation policy, which aims to balance the use of water by farmers close to natural areas. The investigation on the governance context revealed that all stakeholders involved discuss the issue of irrigation in terms of (a lack of) water supply, an approach culturally and historically firmly rooted in this region. As such, the focus of the policy shifted towards zoning, a solution that aims to reserve scarce water for nature, during periods of drought. However, the governance assessment also revealed some evidence that stakeholders on the regional level learn to treat the issue of drought as a phenomenon in itself through participating in a regional initiative, which aims to preserve and increase the freshwater reserves in the region, whereby stakeholders are willing to address drought as an issue in itself that influences the vulnerability and adaptability of their activities.

8.6.1 Influence of the Governance Context on Actor Characteristics

Looking from the actor characteristics perspective of the Contextual Interaction Theory, the relatively neutral governance context of the Salland region does not have significant positive or negative influences on the motivation, cognitions and resources of the actors that are involved in the implementation of drought adaptation. Water authorities have a thorough understanding of the drought problem as well as adaptation requirements. They support this by allocating resources and trying to mobilize all the actors. Furthermore, high degree of flexibility and intensity in terms of levels and scales enables the rescaling of the irrigation issue. However, the low degree of intensity regarding the problem perception leads to a situation that most of the actors, particularly the farmers, put much higher priority on flood protection than on drought adaptation.

Three major recommendations can be made towards improving drought resilience in the Salland Region.

8.6.2 Develop an Integrated Understanding and Approach to Managing Drought

In areas where freshwater resources are crucial both for agricultural production and for the protection of nature areas, the impacts of drought, such as low water levels and soil moistures, can be detrimental. Various policies and initiatives at multiple governance levels will have implications regarding the design and implementation of the measures for preventing and alleviating such impacts. The EU policies, such as Natura 2000, and regional initiatives, such as the ZON agreement and the irrigation policy, are at their infancy regarding the incorporation of drought adaptation and alleviation measures. The water authorities in the east and south of the Netherlands are recommended to use this opportunity for putting forward the specific context of the region in terms of drought vulnerability and intensifying their efforts for making sure that drought-related measures are sufficiently elaborated in these policies.

Another aspect that could benefit from an integrated approach is the treatment of flood and drought as separate policy issues. Despite the historic role of floods in Dutch water management, there is an emerging emphasis on the “double-goal” of managing flood and drought together. The pilot project that has been implemented by the WGS is a typical example of such an approach. Such integrated measures can be intensified when introducing other measures such as renovations in the water system and mechanisms for monitoring and evaluating the indicators on water availability and consumption. A final recommendation regarding monitoring and evaluation is the upscaling of monitoring mechanisms, for instance through creating system-level knowledge on the water budget to monitor sectorial water use (which are mainly agriculture and environment in the Salland Region) and define actions that can be taken by different actors at different levels. The complicated actor network of water management in the Netherlands makes it a big challenge to hold a single actor responsible for integrating all the knowledge regarding different aspects and for having an overview of the overall water resource situation and the water balance. However, as the pressure from drought impacts increase the competition among the water user sectors, development of such comprehensive monitoring mechanisms could be inevitable in the near future.

8.6.3 Raise Farmers' Drought Awareness Towards Creating Ownership and Drought-Sensitive Water Use

As in many other regions, farmers in the Salland Region can be key actors for reaching both economic and environmental goals. In this regard, the communication of drought-related information, particularly the drought-related risks, would be crucial. Information sharing tools that both deploy the technical knowledge and take into account the local knowledge and needs of farmers can be developed and

made accessible to the farmers by also considering the legal requirements of creating and sharing such data. For instance, providing regular information to the farmers about the hydrological situation in their plots could directly increase their awareness about the drought conditions. It is also important to establish clear rules as to when and why farmers are not allowed to withdraw groundwater and/or surface water. For instance, decreasing groundwater levels is a local phenomenon: If the groundwater level drops in a field, it goes back to normal in a few weeks when it rains. With the new irrigation policy, farmers are not allowed to pump groundwater near a nature area, as this will negatively affect the groundwater level in that area. Farmers can easily understand and agree with such rules when the reasoning behind them and their relevance is communicated. Establishment of such rules would also indirectly contribute to another governance issue, namely the balancing of supply management with demand management, given that the current functioning of the water system is dominated by a supply-oriented approach. As the impacts of climate change are likely to put pressure on the availability and accessibility of freshwater resources, the management of the water demanded by farmers would become a major concern regarding the sustainable use of water in irrigation. Effective implementation of measures, such as the monitoring of notifications for groundwater extraction and the metering of water withdrawals at the field level, could contribute to the management of farmers' water demand.

8.6.4 Enable the Active Involvement of Non-governmental Organizations Towards Creating Shared Responsibilities

Non-governmental Organizations (NGOs), such as environmental NGOs and farmer organizations have positive intentions for improving the current situation, yet they lack the mechanisms and resources for representing their interests at higher decision-making levels. For instance, the LTO lacks the technical capacity to contribute to the debates on climate change in general, and drought in particular. Similarly, the NMO represents all the local NCOs in Overijssel, but its limited capacity in terms of financial and human resources leads to underrepresentation at the regional level. Their involvement is further threatened by the cuts made in the funds allocated for directly participating in relevant projects or initiatives. Active involvement of environmental NGOs and farmer organizations can broaden the perspectives for understanding drought and create more willingness to share risks.

Despite the expected benefits of increasing the involvement of NGOs, it is also acknowledged that many questions regarding division of risks and responsibilities would need to be addressed by changing nature of the involvement of these actors. The improvement of information sharing and communication mechanisms among the actors would be recommended for facilitating a fair and clear distribution of responsibilities. Given that the water governance system is open to designing new

participatory initiatives, the ZON declaration can be instrumental for redesigning the role of NGOs in drought adaptation. The ZON declaration refers to the co-responsibility of all relevant stakeholders, while in its current form it is currently too broad to elaborate on how to share the responsibility among different stakeholders. During the process of stipulating the details and implementation mechanisms of the ZON declaration, it would be advisable to define mutually agreeable and feasible mechanisms to assign fair and clear responsibilities to all the involved stakeholders, with a particular emphasis on dissociating the level of responsibilities from the level of financial contribution.

Consequently, the main conclusions that are drawn from the Salland case and the recommendations that are made based on those conclusions pinpoint the significant role that multi-level actions play in drought adaptation.

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