

Chapter 9

The Fragmentation-Coherence Paradox in Twente

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9.1 Introduction

In this chapter, we will concentrate on the Dutch water authority of Vechtstromen, more specifically the region of Twente part of Vechtstromen. The Twente region has some 135,000 ha and about 630,000 inhabitants. Though most of the Netherlands is flat and the highly artificial system of waterways often enables to let water in from outside each region, a substantial part of the Twente region does not have this option and is thus fully dependent on rainwater and groundwater. Apart from the wetland nature areas, especially the northeast of the region is for this reason relatively vulnerable for water scarcity and droughts.

In this paper, we will first explain backgrounds of the national drought governance in the next section. In Sect. 9.3, we will discuss the regional geo-hydrological context, drought policy focus and the measures taken, mostly in the framework of the DROP project. Thereafter, we will analyse and assess the supportive quality of the governance context for the implementation of these measures in Sect. 9.4. Section 9.5 concludes with a number of case-specific recommendations to reduce the restrictions and make optimal use of the strengths of the governance context.

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9.2 Dutch Drought Policy and the Needs of the “High and Sandy” Eastern Netherlands

In this section, we will describe a number of issues regarding drought governance in the Netherlands. Hereby, we will concentrate on what is relevant for the kind of drought and water scarcity problems that are typical for the part of the country that is dependent of rain water and ground water (like most of Twente) and the kind of preparatory drought resilience measures that are part of the DROP pilot projects in Twente. Thus, we will not discuss the possible water shortages to flush polder water ways in the west of the country to avoid salinization. Neither will we discuss the Dutch policies on the prioritization of water needs in times of urgent water scarcity and the management of irrigation. This subject has already been discussed in the previous chapter on the Dutch Salland region.

During the 1980s, the major environmental policy themes were mentioned in Dutch government white papers. This was the first time that drought was recognized in Dutch policy as a major issue, labelled as the theme of “desiccation”. The emphasis was completely on the decrease in vitality of inland wetlands. The recognition of the problem at a national policy level did, however, not result in effective measures that solved or even stopped the gradual worsening of the problem. Furthermore, the more extreme weather conditions that are related to climate change are further increasing the vulnerability. Nevertheless, until recently almost all attention went to the risks of floods, not so much the risk of droughts and water scarcity. Perhaps not strange in a country where 55 % of the land is in principle flood prone. It is only recently that the already ongoing damages caused by drought receive more widespread attention.

In the white paper that started the reassessment of Dutch water management, the report by the Delta Committee of 2008 (Deltacommissie 2008: Samen werken met water, p. 71), there was just half a page of attention for the problematic of the “higher sand grounds”. The committee plead for increasing use efficiency and more buffering of (rain) water and points to two investment programmes to enable this. While in the beginning the water authorities in the east and south of the country felt that their problematic did not receive sufficient attention, they cooperated to develop a “Deltaplan for the higher sand grounds” and organized a major conference with hundreds of people in 2012 issuing a manifesto “Water op de hoogte” (Water at the high level). Thereafter, attention for drought issues increased.

It was in June 2012 that the water authorities in Rhine East, together with their colleagues in the south of the Netherlands organized a big symposium Hoog en Droog (“High and Dry”) where some six hundred people from involved governments, consultancies, business and NGO’s participated, including the Delta Commissioner that steers the Delta Programming process. Here, a manifesto was presented in which attention for the special water management problematic of the higher parts of the delta was asked and further efforts and collaboration of all water authorities, provinces, municipalities and other societal organizations involved were announced. This impressive meeting had a real impact on the Delta Programming

process and thereafter drought resilience was firmly positioned on the agenda. Until then “water shortage” was to a large extent seen in relation to the huge need for freshwater in the polder areas in the west of the Netherlands, which regularly need to be flushed to prevent intrusion of salinity. The manifesto a/o. stated that 45 % of Dutch agricultural value is in fact produced on the higher grounds.

In response to an invited advice from the national Advisory Committee on Water on freshwater supply, by 2013 the responsible Minister of Infrastructure and Environment emphasized that the system that supplies and distributes the water from source to user extends from the estuaries of big rivers all the way back to the capillaries of the regional water system. The steering of the fresh water supply should take place at all levels and scales: from the cross-boundary international river catchments up and to the local scale of individual users of stakeholder organizations. The main question is not at which level steering needs to take place, but which responsibilities are at which level and whether between those levels there is good collaboration.

In the Netherlands the implementation of drought policy is thus seen as a matter of needed cooperation between various organizations, both public and private, at various levels. This is in fact not just the case with drought policies but with other water policies as well. Perhaps it is typically Dutch to interpret the necessary coherence as a matter of cooperation rather than coordination by a powerful central actor (compare OECD 2014). However, the complexity and dynamics of the water system itself make a governance context that facilitates good cooperation by all stakeholders with their various interests very valuable. Also there is a need for productive boundary spanning between an inspiring long-term vision and short-term opportunities to realize parts of it.

While the Netherlands has been recalibrating its water policies in an enormous multi-stakeholder exercise called the Dutch Delta Programme, “fresh water supply” has become one of the main issues (sub-programmes). Droughts and water scarcity issues are not the same problem but they are actually highly related, while the water scarcity issues typically become most urgent in periods of drought. In the partial Delta programming on “Fresh water supply”, the present and future policies are developed and implementation guided.

In the Delta Decision 2015 some attention is given to the problematic of the “High Sandy Grounds”, the areas in the east and south of the Netherlands that are often not able to receive water from the main water system, and thus depend on rainfall and rain fed small rivers and creeks for fresh water supply. Drinking water companies, food industries, other industries and farmers use often deep and shallow groundwater for their production processes. It is recognized that these areas (including Twente) suffer from droughts for dozens of years and that climate change can worsen these problems further, causing dry creeks and damages to human uses and nature. The preferred strategy to combat these developments consists of the following guidelines:

1. Keep the water longer in both the ground and the surface waters. No efforts will be made to enable major water transport to these areas. In the short run, the

focus is on increasing the groundwater buffer and the moisture buffer at plant root level.

2. Saving water by more efficient water use. In the short run, by educating water users. In the medium and long-term periods of drought are unavoidable and consequently major water users should take measures themselves to avoid this from causing major damage.
3. Develop for the medium and long term some modest possibilities for extra water transport (a.o. to Twente via the Twente Canal where a brand new lock enables better to keep the level up).

All in all these guidelines show that the emphasis is on measures in the water system to increase buffer capacity both in the creeks and in the ground and on making water use more efficient. There is an own responsibility for users to decrease the potential damage from droughts.

Already before, in the document “Kansrijke strategieën voor zoet water” (Promising strategies for fresh water), September 2013, for the east of the country, including the province of Overijssel, the following measures are mentioned for the short run: smart “locking” (regulating the water levels), restructuring of the regional water system, making creek valleys wetter, increase groundwater storage and buffer water in larger nature areas. While drought resilience measures are often having spatial consequences and often deal with agricultural land and while they often take the form of renaturation of the water system, land use planning, agricultural policies (also from the EU) and nature, landscape and tourism policy sectors are very relevant.

Another relevant development is the national Administrative Agreement Water in which the state government, the provinces, the water authorities and the municipalities have stipulated the division of their tasks in water management and the way to integrate them and also agreed on the principles of cost sharing. In this framework, also the agreement has been made that the provinces and water boards will elaborate for the complete rural area the desired ground and surface water levels (GGOR). This specification can later be used as a justification for taking further measures. In the Delta Programme part on freshwater supply, emphasis is placed on the instrument of “specified level of provision”. This instrument does not necessarily entail that desired water levels are specified in a quantitative way, but is seen as sets of information on the water system and its likely developments, combined with agreements between all relevant stakeholders about measures to be taken and about how to deal with remaining drought and water scarcity risks. The ambition is to have such stipulations and agreements for all areas by 2021.

Apart from the Delta programme the new policies regarding drought and water scarcity also need to be explained in the upcoming Watermanagement Plan 2015–2021, that also needs to respond to the European Water Framework Directive. The geographical level of this plan is the subbasin of Rhine East, containing six Dutch water board areas, including that of the merged Vechtstromen, but also consisting of the relevant provinces, municipalities, drinking water company and state water agency representatives. Of special relevance for the East of the Netherlands,

including the Twente region, is that on June 27, 2014 (just before the second GT site visits to Groot Salland and Vechtstromen) the so-called ZON Declaration (ZON is an acronym representing: Freshwater supply East Netherlands) was signed by the provinces of Overijssel, Drenthe and Gelderland, the water authority of the Rhine East region, municipalities, platforms for regional cooperation, nature organizations, agricultural organizations, drinking water companies and estate owners. In this declaration they all acknowledge their co-responsibility for “an optimal availability of freshwater, a responsible use thereof, and the task to make their water system more resilient for extreme weathers”. This co-responsibility also involves the preparedness to contribute financially to the cost of the programme. One of the actions involved is the specification of the water service level that users can expect in order to “clarify the role and responsibilities of the governments and the risks and behavioural options for the water users”. The Declaration is seen as a major step forwards in the collaboration between all partners involved, but also as a “political” statement to the national political arena that the specific circumstances of the higher parts of the delta should not be underrepresented in terms of attention and funding. The declaration was successful in obtaining some funding from the national Delta programme, though less than hoped for.

9.3 Dry Creeks and Measures Taken in the Twente Region

9.3.1 *Twente’s Drought and Water Scarcity Situation*

The following overview will concentrate on the regional level of the Twente region of Vechtstromen and more specifically on the relatively higher area where all of the many local pilot projects are located, the northeast and east of Twente. These projects and other activities and measures in the same area taken together are almost completely representing the drought resilience policy of the water authority in the Twente region (Bressers et al. 2015).

In the Twente region, all the drought and water scarcity problems as expressed in the “higher sandy grounds” initiative are present. Ninety percent of the small creeks are running dry in summer (Fig. 9.1) and when nothing is done this will probably increase with climate change (in the first eight months of 2013 rainfall in the Netherlands was 37 % less than “normal”, seven of the eight months had short-ages). It causes for instance complains from both nature organizations and farmers. Flora and fauna in the creeks die, and surrounding nature is suffering. Yields can fail and in cities algae bloom can occur. Extraordinary dry years were for instance 2003, 2006, 2009, 2010 and 2013. But already before, in the period 1994–1996, for three consecutive years irrigation bans had to be announced.

Desiccation has a great impact on the aquatic nature. Lower groundwater levels reduce the river discharge with the impact particularly seen in spring and summer

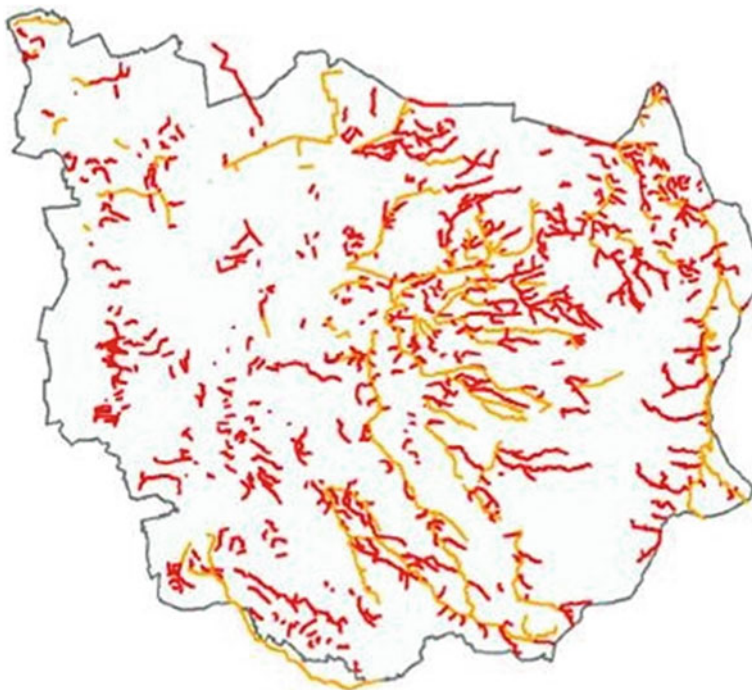


Fig. 9.1 Creeks in the Twente region that run dry each summer (*red*) or have less discharge than desired (*yellow*) (Source Website Regge and Dinkel)

periods, when precipitation is low and river levels are maintained by groundwater. Fish die and also the risk of algae bloom increases. Not only in streams and their valleys, but also on high ground in the catchment area nature will deteriorate with further desiccation in drought periods that are expected to become more frequent because of climate change. In the whole catchment area, substantial impacts are expected. Partly these problems have been aggravated by earlier measures some decades ago of the Twente water authority itself. Fighting water problems in wet periods by “improving” the drainage capacity of the water system increases vulnerability for droughts. The challenge is now to create more resilience towards both ends.

9.3.2 Implementation and Research Projects and Farm Water Management Plans Under DROP

An important report for drought policy in Twente has been “Sturen op basisafvoer” (2012, Steering for basic flow) for which the water authority cooperated with

Deltares (an important water management practice oriented research institute), the province of Overijssel, the farmers union (LTO-North), the drinking water company (Vitens) and Landscape Overijssel, the nature organization. In this report the problematic is analysed and a score of potential measures in the water system identified. The DROP pilot projects in the Twente region of Vechtstromen are related to the kind of measures proposed in the report. They consist of seven local *implementation projects* with an impact on the water system and two investigations. Also, two *research projects* were part of the activities in DROP. Finally, *water management plans* were developed with 15 farmers. The projects are carried out in the programme “Water Collective Twente”. In fact this programme is a follow-up of two similar previous programmes: “Back to the source” and “Upgrading Water Management for Agriculture”. Also in these programmes, like in the present one, collaboration and exchange with neighbouring water authorities took place.

9.3.2.1 Implementation Projects

Several implementation projects were realized in the northeast of Twente: drainage systems were removed, ditches were muted (sometimes with sand nourishment, see Fig. 9.2), streams were shoaled and water storage areas were constructed. Drainage systems are typically geared towards getting rid of the water as soon as possible. Deep ditches and creeks have a similar effect of nearby land: they extract groundwater from the shores with also some effect on ground water levels further



Fig. 9.2 Sand suppletion Snoeyinks brook

away from the water streams. Water storage basins on the contrary give surface water ample time to make it into the ground water, and additionally provide service water in dry periods. Due to these measures, it is expected that the groundwater level will rise, creating a water buffer for dry periods.

An example is the restructuring of the upper reaches of Snoeyinks brook. The project area comprises a number of small upper tributaries that flow into the Snoeyinks brook. The restoration of morphology and historical course of the river; the creation of new natural areas (hornbeam, oak woodland and poor-quality grassland); landscaping; recreational development, with access; and water management measures on farms and fields all contributed to making the area more drought resilient, while also improving the recreational and natural value of the area. The area is the property of Natuurmonumenten (“Nature Monuments”—Dutch Nature Preservation Society), farmers, and other businesses nearby.

Another example is the restructuring of the upper reaches of Springendal brook. This area is property of the State Forest Service (Staatsbosbeheer), nowadays actually more an NGO than a state agency. Here, the project consisted of making the brook bed shallower over approximately 300 m and altering its profile in combination with the restructuring of the landscape.

The selection of these projects has been done quite pragmatic. On the one hand they were identified with the help of a “desiccation map”. But this just led them to contact relevant stakeholders there. On the basis of these stakeholder contacts, they selected the plots where they could expect most support and collaboration to develop pilots, being fully aware that being able to develop collaboration is the “name of the game”. This way, nice examples are created that later act as marketing to attract other land owners to volunteer. Also it is important to look from the other side: which organizations have plans that are among others also helpful for drought resilience. Joining, supporting and modifying such plans could be a very good way to achieve goals, sometimes even better than starting with own plans.

9.3.2.2 Research Projects

Apart from implementation projects also research projects were part of the DROP pilot in Vechtstromen. One of these projects involved the testing of a level-dependent drainage system near a nature conservation area. Level-dependent drainage implies that the land owner or tenant can to some extent influence the water table by adjusting the drainage system. The advantage is that the table can be temporarily lowered when for instance the farmer wants to work on the land with machinery. This improves the farmer’s preparedness to accept higher water tables than they would without a system they can influence themselves.

Many water managers see level-dependent drainage as the primary means of preventing water depletion and of optimizing agricultural use of areas of land. However, this idea lacks scientific underpinning. There is only limited knowledge about the effects that level-dependent drainage has on nature. Therefore, we conducted a study in a nature area that is surrounded by water-depleted area of



Fig. 9.3 Research equipment to study surface runoff

intensive agriculture, through which we aimed to better serve both nature and agriculture during long periods of drought. Vechtstromen water authority has constructed a system of level-dependent drainage in combination with raising the drainage basis of a small water-depleted nature conservation area to be able to test the effect on nature.

Another research project has been studying surface runoff. Surface runoff in Northeast Twente is commonly observed in hilly areas, where soil layers with low permeability reach the surface (Fig. 9.3). Extreme precipitation events, together with impermeable layers at shallow depths, can result in pool formation. If precipitation events follow shortly after land fertilization, pools with high phosphate concentrations are formed. As a result, the surface water is enriched with phosphates, leading to eutrophication. Research has been carried out to estimate the potential to improve drought resilience of a number of possible measures to reduce runoff. Examples of such measures are contour ploughing and the construction of earth banks along the low parts of fields to enhance water infiltration.

9.3.2.3 Water Management Plans

Water management plans have been made together with in total 15 farmers, tailored to their specific situation. The plans include tips and tricks on how to influence the water balance by storing water, resulting in a mutual gain for the farmer and the adjacent nature areas. The aim of these plans is to work on drought adaptation on a small scale, fitting in an overall vision for the area. The intensive communication established with the farmers created awareness, and motivated other stakeholders to



Fig. 9.4 Removed drain tubes

work on drought adaptation as well. One of the measures taken in consultation with farmers is to remove drainage systems that are in fact making the land vulnerable to droughts while lowering the water table too much (Fig. 9.4). The size of the “snowball effect” has surprised the practitioners. Several farmers have already volunteered to be included in a next round. Especially the smaller traditional farmers need to see results like better crop growth at the neighbour’s plot, to get interested.

9.3.3 Drought Resilience Projects as Social Interaction Processes

All activities require a lot of stakeholder consultation and designing agreements with them. This is not only true for the water management plans that are designed together with farmers on a voluntary basis, but also for the implementation projects that are done in consultation with among others the municipalities, representatives of the provincial government, nature NGO’s and other stakeholders. Even the research projects require extensive consultation and agreement.

All in all this does imply that the challenges for the practice projects are often not only technological but for a very important part also about the management of cooperation between various public and private stakeholders. The inclusion and participation of private actors such as farmers in the execution of measures, for

instance in the level-dependent drainage approach or in the tailor-made water management plans, aids in aligning all actors on the awareness, importance and implementation of drought adaptation. It is essentially this management of cooperation in order to enable the realization of practice projects that requires a good governance context. Without a good governance context the degree of trust, openness and mutual liking is likely too low to allow for real cooperation. To what degree such a stimulating governance context is present in the Twente case, and what are the strong and weak aspects therein, will be the focus of the next section. In that section we will apply the governance assessment approach explained in the introduction.

9.4 Governance Assessment: Actor Coherence Saves the Day

The quality of the governance context and the way practitioners deal with that context is an important consideration to be taken into account when implementing measures for drought resilience. In the DROP project the governance context has been studied not only by reading relevant documents, but also by two visits of the DROP governance team. Interviews and meetings with the representatives of all relevant stakeholders during those visits, as well as studying the secondary data, provided a clear picture of the governance context. This enabled to assess it along the four governance criteria of *extent*, *coherence*, *flexibility* and *intensity*. The essence of those criteria will be repeated each time before describing the observations done in Twente region. The focus of the analysis will again depart from the perspective of the realization of the projects in the Twente region. That does not preclude that often policies and actors that operate at a higher scale will be mentioned and included in the analysis. But this is than always because of their relevance for the Twente pilot situation.

9.4.1 Extent: Are All Elements in the Five Dimensions that Are Relevant for the Sector or Project that Is Focused on Taken into Account?

The extent aspect of the governance context in Twente can mostly be regarded rather positive, but with some restrictions. It is positive in terms of the large extent of the levels and actors involved and high degree of openness of involved stakeholders, as well as awareness and increase of the visibility of the drought issues.

Regarding levels and actors involved we looked at the full range from the European level to the local pilot level. At the European level the Water Framework Directive and Natura 2000 policies make the relevance of the EU obvious.

The reform of the EU CAP¹ could be also relevant in the future. The national level seems to gradually withdraw from the process, even though at the same time the discussion on “fresh water supply” is gaining more attention. This is mainly due to the fact that the relation of water management with nature development has been severely damaged in 2011, when nature policy changes took place that almost completely cut the budget for new nature projects. This setback has never been completely restored. Other potential actors that are relatively absent are the drinking water company and the general public. Nature organizations are welcomed but are sometimes limited in their participation in decision-making due to restricted means.

In terms of problem perceptions about droughts, a gradually increasing number of included perspectives are observed. On a national level the problem of water scarcity is clearly addressed in the second Delta Programme, be it that the topic therein is “fresh water supply” which not necessarily leads to system adaptation to droughts. The visibility of this problem is not only present in the water and nature sectors but also gradually increases in the agricultural sector. Now, even in Spring, sometimes a few creeks and brooks run dry and more impacts on vegetation occur. This is also seen from the involvement of those sectors in the pilot area projects in the northeast and east of Twente region. The interconnection of drought and flood protection measures is increasingly recognized as having climate change as a common cause, which makes it somewhat easier for both problems to be addressed together. However, still the water authority itself in the organization where draught awareness is strongest. Already since around 2008 they have a permanent “draught team” in the organization.

A wide variety of instruments and measures is used, but as far as preventive measures are concerned they are restricted to a voluntary approach strategy. A specification of all desired water levels and tables serves as a basis for further extractions, especially in relation to Natura 2000, and as a guideline for day to day management. Around Natura 2000 areas buffer zones can be specified to protect the nature from lower water tables and chemicals used in the agriculture. A new instrument included in the ZON agreement mentioned in Sect. 9.2 is the specification on how much water farmers can expect during wet or dry periods. This should enable farmers and industries to consciously take or avoid risks for instance with high value crops. Moreover, the obligation to create a storage capacity for a 20 mm rainfall in case of a new building or new development decreases the amount of rainfall to get in the sewage system, which not only prevents flooding in the cities but also prevents the ground water level to drop. This enables more infiltration and watering the street trees by stored water in dry periods. Also, other instruments such as a ban on irrigation from surface water in certain dry periods and a ban on extraction of ground water in certain areas imply a growing awareness to increase

¹The CAP reform of 2009 introduced 2 new standards of GAEC (Good Agricultural and Environmental Condition) related to water: (a) establishment of buffer strips along water courses, (b) compliance with authorization procedures for use of water for irrigation. Retrieved from: http://ec.europa.eu/agriculture/policy-perspectives/impact-assessment/cap-towards-2020/report/annex2a_en.pdf.

drought resilience. The water authority has tried to harmonize its regulations regarding irrigation policy and permits for water extraction with the neighbouring water authorities.

Though a multiplicity of relevant responsibilities and resources resides with many stakeholders, it is mostly the water authority that clearly frames them in the view of drought resilience. Formally, the province has the responsibility to set the goals for water management. The provincial domain also includes responsibilities in relevant sectors like nature protection, nature development, landscape and tourism, regional development and agriculture. The water authority implements these, but with an own domain of taxation and thus with considerable liberties. The water board also has a lot of specialized knowledge that the other actors need for their decision-making. On the level of pilots and in the projects with farmers there is some restriction of instruments to voluntary approaches as well as lacking tax incentives for farmers as a mechanism to promote drought resilience. There is a big variety of relevant responsibilities and related resources with involved stakeholders. However, most responsibilities in relation to drought resilience are with the regional water authorities.

9.4.2 Coherence: Are the Elements in the Dimensions of Governance Reinforcing Rather than Contradicting Each Other?

The coherence aspect has a similar positive assessment, though it is more complex. At the levels and scales dimension the relationship between the levels is observed as a soft hierarchy by multilevel agreements. The unique multilevel coordination in water policy in the Netherlands is guided by so-called National Administrative Agreements on Water in which all levels from national to local and from government to (drinking water) companies mutually agree on their share of the tasks, responsibilities and funding. While the recent OECD Dutch water governance assessment speaks of the lack of “independent oversight” at the multilevel dimension, there are mechanisms such as multi-stakeholder Delta Programming and the National Administrative Agreements on Water Management with monitoring strategies. These should not be underestimated as mechanisms to provide multilevel coherence without coordination from a central power.

In a similar way in the pilot area all four local authorities, the water board and the provincial government together made an Area Vision, providing a joint perspective on desirable developments of the northeast area of Twente. Though drought resilience is included, the main focus is on tourism and recreation. Because of these collaborative efforts, nature organizations are more open than in the past for consultations and compromise. The drinking water company has regular contacts with the farmers union LTO (when trying to find new locations for wells), who reports that the collaboration with other partners, including the water board and

nature organizations, has significantly improved during the last two years. Being part of the process creates also gradually more enthusiasm among the farmers. Agricultural interests can this way become coherent with the interests of drought resilience projects that often imply forms of re-naturalization. This close collaboration of multi-stakeholders at levels of administration and project managers is a great advantage that provides coherence and enables successful implementation of measures. It can also be seen as a necessary and relatively successful adaptation to deal with an inherent rather than incoherent and fragmented governance context, labelled as the fragmentation—coherence paradox. It is called a “paradox” because, while normally fragmentation would lead to stalemates and ultimately disinterest in the topic, in a context of sufficient positive experiences with mutual cooperation it has led to a recognition that the various parties need each other and to the absence of fear that one of them will become too dominant. This “being part of the process” creates enthusiasm with farmers. Trust between farmers and the government is extremely important. Otherwise also mutual social control among farmers will turn against collaboration or even selling agricultural land to the government.

In terms of problem perceptions, drought resilience is not yet a fully shared priority. Instruments and strategies are not balanced and relatively fragmented in their consequences for implementation. As for responsibilities and resources, they are fragmented in a very complex way that only mutual consultations are the ways to proceed, creating the already above mentioned fragmentation—coherence paradox.

9.4.3 Flexibility: Are Multiple Roads to the Goals, Depending on Opportunities and Threats as they Arise, Permitted and Supported?

The flexibility aspect gets a moderately positive assessment with fair degree of adaptive capacity. It is for instance seen in the way how the province and the municipalities took over on the emptied role of the national level, showing a healthy degree of flexibility. The high interconnectedness character of the group has advantages to get political and financial support for projects and thus contributes to flexibility.

However, there are sometimes inflexibilities that derive from the geo-physical and landscape conditions of the small-scale Twente area, or relate to the strong Dutch local land use planning system. The Dutch planning system has lengthy decision-making procedures, like EIA, not only in the Twente region but in the whole country. For example, the creation of a new well for drinking water production has to undergo a lengthy procedure even when aiming to replace a well that has more impact on the drought resilience of an area. Also the stakeholder representation by institutionalized organizations can sometimes lead to inflexibilities. For example, not in all cases it is easy to get quick recognition as a new actor in the

process, as was reported by a farmer within a group operating independently from the farmers union LTO.

Moreover, the restriction to voluntary approaches for preventive measures also makes the governance context somewhat inflexible. The general strategy of the projects is to convince or inspire new groups of farmers to join in voluntary drought resilience projects and by that having an opportunity to avoid obstacles. Drought resilience policies should have an impact on spatial planning as Dutch local spatial plans are relatively inflexible. It is the collaborative relationships and coherence of the actor groups combined with high level of trust that enable to pool goals, instruments and resources in such a way that a reasonable positive degree of flexibility can be assessed. However, such flexibility could be restricted with the development of more specific accountability regulations in European and national subsidy schemes. This has already happened in river restoration cases in the Twente region. A restriction to the development of long-term pooling of resources is furthermore the increased emphasis on the “innovative character” of the projects proposed. This seems at the surface to promote flexibility, but in fact might turn out to prevent successful pilot measures to be developed into the implementation of large area scale projects that really make a difference.

9.4.4 Intensity: How Strongly Do the Elements in the Dimensions of Governance Urge Changes in the Status Quo or in Current Developments?

Intensity quality appears to be the weakest point of the governance context for drought resilience policies in Twente. There seems to be no political support for forceful measures, but only for voluntary ones in the preventative sphere. The budget cuts in the sectors of nature development and landscape protection contribute to that. The withdrawal of the national level in the nature policy could have had serious effects for the funding of the projects but luckily the province took over on a large part of it. The preference of the province is to concentrate on the position of Natura 2000 areas. This has implications for the funds and permissions for the projects in the pilot area as some that are closer to Natura 2000 areas are easier financed than other, even though they might be equally well serving agricultural drought resilience. Also, the WFD directive provides pressure to make water systems more resilient. These two external pressures make the overall assessment of the intensity as medium.

After the national government stopped the National Landscape programme, and thus also the northeast of Twente had no longer that official status, the provincial government kept treating the northeast Twente as one. Since most practical activities in the framework of the landscapes are related to recreation and tourism development, municipalities play often a leading role in this respect. The water

authority as well assumes co-responsibility for nature but only as far as water goals are addressed and a good water system is needed to support the nature.

Actor and network' intensity reflects the mixed priorities of these stakeholders. The realization of drought resilience is seen as a clear priority for the water authority. This makes them a lead actor, even when they involve other stakeholders as well in their initiatives. With regard to farmers, their position has considerably developed in the last few years. The farmers union LTO now wishes to improve awareness on drought issues to better educate farmers. Moreover, while the EU milk quota are lifted in 2015, it becomes worthwhile to invest in the quality and resilience of the land. Individual farmers are willing to cooperate when good projects are offered, even when the farmers union was still hesitant.

Almost all actors, except the nature organizations, share a preference for voluntary actions. For the farmers freedom of crop choice and increasing productivity are essential for their support for drought resilience measures. There is a Deltaplan Agrarian Watermanagement (LTO 2013) in which the LTO seeks to collaborate with water boards, provinces and ministries in achieving water goals, including a 2 % annual production growth among the objectives. Municipalities do also collaborate but for them often drought is not regarded as a prime problem. Municipalities experience pressure like budget cuts due to decentralization.

While broad awareness of the drought problem perception is just developing, external legal pressures stay dominant. The drought problems are taken more seriously after some recent examples of spring droughts that have more serious impacts on yields, than summer or autumn droughts. External legal pressures from Natura 2000 requirements for the designated areas provide a strong stimulus for drought prevention measures regardless the economic interests and other values, challenging the farmers to push the boundaries beyond the "business as usual".

For farmers drought problems are less visible than flood risks. There is a tendency that crop damage results in relatively higher prices so that only farmers that have been hit in an exceptional degree are disadvantaged. Nevertheless, the farmers union is now convinced that after working with individual farmers a new approach in which measures are taken in larger areas at a time is needed.

Whether voluntary projects will ultimately provide sufficient incentive to enable continuous improvements in drought resilience in the pilot area and elsewhere is an open question. Due to a lack of strong political support and legal pressures from the Dutch national level, where drought issues are still just at the beginning of broad recognition, this question is not really debated. In addition there seem to be no viable alternative options given the division of responsibilities and resources.

It is hard to say whether the resources will be sufficient for the drought resilience goals. The province has decided to invest some 330 million Euro in increasing the buffer zones around Natura 2000 areas. They also took care for replacing national funding for part of the ecological network EHS and for the Area Vision for northeast Twente. The farmers union is given a privilege by the province to be the main implementer of the programme to enlarge the buffer zones around the Natura 2000 areas to increase the drought resilience. The water authority is also prepared to invest its resources. The nature organizations feel themselves very limited

financially and understaffed. They sometimes cannot participate in consultations where in principle they would be welcome to have an input. This situation has worsened over the years. To end with, it is an issue whether drought resilience policy could or should go beyond voluntary approaches.

9.4.5 Overview and Visualization of the Results of the Analysis

Figure 9.5 attempts to visualize the results of the governance context. By strongly summarizing the original assessments and their explanation above, this obviously implies the loss of a lot of nuance. Nevertheless, the figure has also an advantage, namely that it provides an overview. This shows for instance that concerning *extent* especially the “levels and scales” box is relatively weak, this being largely the result of the withdrawal of the national level from relevant policies as nature and landscape. With the criterion of *coherence* the column illustrates the “fragmentation-coherence paradox”: while fragmentation is present in all boxes but one, especially with the “responsibilities and resources for implementation”, it is the excellent (*dark green*) situation in actor coherence that saves the situation. *Flexibility* is quite good, though the low degree of alternative sources of income next to market oriented farming in the “problem perceptions and goal ambitions” box and the sometimes rigid land use planning in the “strategies and instrument” box are a bit less supportive. Finally, the *intensity* column looks most gloomy. Especially the slow integration of the drought resilience awareness and the resulting reliance on voluntary preventive measures only create the risk that the ultimate goals will be difficult to achieve.

Dimensions	Criteria			
	Extent	Coherence	Flexibility	Intensity
Levels and scales	+0	0/+	+	0/-
Actors and networks	+	+++	+	0/+
Problem perspectives and goal ambitions	+	0/+	0	0/-
Strategies and instruments	+	0	0/+	0/-
Responsibilities and resources	+	-	+	0
	Colours red : restrictive; orange : neutral, green : supportive			

Fig. 9.5 Visualization of governance context assessment conclusions (*the darker green implies intensely supportive*)

The observations described above conclude that the governance context for drought resilience policies and measures for the Twente part of the water authority of Vechtstromen can be regarded as moderately positive (supportive or at least neutral), though obviously such general conclusion is always relative to other situations and dependent on the choice of issues emphasized most.

9.4.5.1 Contextual Interaction Theory

Following Contextual Interaction Theory such a generally supportive governance context is expected to have positive consequences for the motivation, cognitions and resources of the actors involved in the process of implementing drought resilience measures. What we did observe is a varying and on average moderate, but also growing degree of draught awareness among the actors. This also positively influenced their motivation. Of course there is here a strong pre-selection effect: while all measures are taken voluntarily it is no surprise to see predominantly positive motivations. On the other hand: also with previously sceptic actors like the agricultural organization positive developments are observable. The resources of the actors made available for drought resilience measures and to push and pull to get them accepted are generally sufficient, with the exception of the withdrawal of the national government from the support for nature development and the national landscape park that has made things more difficult. On the positive side, the provincial government has compensated this loss to a large degree, indicating its preparedness to contribute. All in all this has led to an implementation process with a remarkable degree of collaboration.

When we look more specifically into the three actor characteristics of Contextual Interaction Theory we see the following. The *motivation* of the stakeholders working to act on drought is triggered to large extent by their own goals and values. In a dense country such as the Netherlands, the last remnants of nature are seen as especially precious. In addition, desiccation is considered one of the major environmental policy themes in the Dutch government for several decades now. The local water authority views cultivating drought resilience for the area as its own responsibility. Also nature organizations and more and more farmers are aware of the implications of drought and water scarcity, including loss of flora and fauna in creeks and crop losses. For the province also the external pressure of European policies is very relevant. Low self-effectiveness assessment on top-down regulation of preparatory measures limits the scope of instruments to voluntary ones.

The *cognitions* of actors are mainly driven by observations on the changes of the regional water balance. The visibility of drought issues has increased in the region, with creeks running dry as well as dry vegetation. Damages from droughts are affecting agricultural yields in rural areas. Cities and their urban infrastructure are also affected by drought, which in leads to a change in awareness and perception.

In contrast to the strong legal requirements behind nature conservation in the Netherlands there are limited *resources* for the nature organizations to combat drought issues themselves. Their key competencies are rather limited. Other actors,

such as the water authorities, have much more flexibility to take over the task of drought resilience improvement. Nevertheless, also in their case the capability to enforce resilience measures is restricted to a voluntary approach, partly because of limited legal possibilities, partly because of lack of political support for coercive action outside emergency periods.

9.5 A Tale of Preserving Voluntary Action and Upscaling Nonetheless: Conclusions and Recommendations for the Region Twente

The conclusions and specific recommendations below are partially based on comparing the Vechtstromen context with Governance Team members' knowledge of other water management systems, including a comparative analysis with the other regions studied in DROP. We will concentrate on the preventive measures for increasing drought resilience that are central stage in the most vulnerable areas of Vechtstromen like the northeast of Twente.

9.5.1 Overall Conclusion

Nationally the recognition of the problem is still at an early phase and a water supply orientation is still dominant. Against this background there is only legitimacy for soft voluntary approaches to prevention policies and measures. Partly this approach is also rooted in the general Dutch consensual political culture (the so-called "polder model"). This forms a setting in which building and using well-functioning partnerships with as many stakeholders as possible, both allies and potential opponents, is the best way to make the most of the situation and create the best likelihood of success. We observe that the project managers of the water authority understand this very well and are doing a good job at realizing it this way.

9.5.2 Awareness and Public Agenda

Drought and fresh water shortages being still a low profile issue has the disadvantage that financial and political support for preventive measures to increase drought resilience is limited and the relative priority of such measures is weak when they compete with other objectives. A background is that the most populated parts of the Netherlands have an artificial water system that allows to manage water levels to prevent droughts by bringing water from other areas. On top of that water scarcity is often related to the prevention of saltwater intrusion by using large quantities of freshwater to flush these artificial waterways. All of this makes the

problematic of the “higher sandy soil areas” where dependency on rain water and ground water increases the risk of drought damage for both nature and agriculture. Thus, continuous efforts to get and keep this issue on the national agenda are warranted. Because large parts of the south of the country are facing exactly the same problematic, it is recommended to do this in close collaboration with not only the eastern, but also the southern water authorities.

9.5.3 Inter-collegial Exchange and Learning

As a consequence of the relatively low saliency of the drought problematic, but also related to the objective of the water authority of Vechtstromen to maximize the value of water measures for a broad range of societal goals, the drought resilience projects in the northeast of the Twente region are not regulative in character, but supportive, voluntary and consensus oriented and aiming for the integration of various sectoral goals. In our conclusions we already stated that this is given the governance context likely the most efficient way to proceed and also that the project managers are doing a good job at this. However, the period that these projects will take to increase the resilience of the whole vulnerable area might be so long that from time to time new or extra project managers will be involved. The other way around: the expertise and experience gained from the drought projects in consensual project management could also be beneficial for project managers in other water projects. For these reasons we recommend to organize venues for inter-collegial exchange and learning, for instance by regular sessions.

9.5.4 From Farm Level Approach to Full Area Level Approach

The extension of local drought resilience projects wherever good chances for realization have occurred and stakeholders could be convinced to cooperate had led to a wide array of very nice projects. The basic idea is that each generation of projects will convince other stakeholders to participate in a next round and thus create a bandwagon effect. This way many local project areas have been improved in terms of drought resilience. This approach has great virtues and should be continued. However, this will not necessarily lead to the full coverage of the water system in somewhat bigger areas, for instance watersheds of creeks and small rivers. Therefore, it might be necessary to add to the small-scale voluntary project approach a new sort of approach. In this approach somewhat bigger areas than separate farms could be the scale, for instance containing one or two dozen farms of which for instance two have been already involved in showcase projects in previous rounds, attempting to make the coverage by drought resilience measures for that area complete and create synergy between the measures.

9.5.5 *Creating a Long-Term Outlook and a Vision for Each Area*

When many stakeholders have to align in multi-purpose (but in any case also drought-related) measures, it is important that the outlook for the vulnerable region as a whole and visions of the desired status of the subareas that should be dealt with are as clear as possible. Vechtstromen has had a good experience with this way of working when long-term complex and dynamic implementation process should gradually realize a better status of the water system. An “iconic” example is the restoration of the Regge River (the main water course of the Twente region) (De Boer and Bressers 2011), but also the reconnection of large parts of the region to the Regge River by realizing a new river, de Doorbraak (the “Breakthrough”) (Bressers et al. 2010) and the present works on the Vecht river are examples. The “compass” effect of such an integrated multi-sectoral vision on both the scale of northeast Twente and more specifically subareas with their own characteristics is a proven requirement for such long-term efforts and should also be further developed in this case.

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References

- Bressers H, Hanegraaff S, Lulofs K (2010) Building a new river and boundary spanning governance. In: Hans B, Kris L (eds) Governance and complexity in water management. Edward Elgar, Cheltenham, pp 88–113
- Bressers N et al (2015) Practice measures example book DROP: a handbook for regional water authorities. Water authority Vechtstromen, Almelo
- de Boer C, Bressers H (2011) Complex and dynamic implementation processes. Analyzing the renaturalization of the Dutch Regge river. University of Twente and Water Governance Centre, Enschede, The Hague
- Deltacommissie (2008) Samen werken met water (Working together with water). The Hague
- Deltaprogramma zoetwater (2013) Kansrijke strategieën voor zoet water: Water voor economie en leefbaarheid ook in de toekomst (Promising strategies for fresh water). The Hague
- Kuijper MJM, Hendriks DMD, van Dongen RJJ, Hommes S, Waaijenberg J, Worm B (2012) Sturen op basisafvoer (steering for basic flow). Deltares, Delft, Utrecht
- LTO (2013) Deltaplan agrarisch waterbeheer (DAW) (Deltaprogramme agrarian watermanagement). LTO, Zwolle
- OECD (2014) Water governance in the Netherlands. Fit for the future? OECD, Paris