

THE ADAPTIVENESS OF DUTCH WATER LAW PUT TO THE TEST: WATER SCARCITY IN A WATER-RICH COUNTRY

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Arguably, laws should change and become adaptive in order to facilitate adaptation to climate change. However, too much flexibility runs counter to the need for legitimacy, stability and enforceability and, therefore, a balance should be struck. Experimental laws and regulations could lead to discussion about the need for and the extent of legal adaptation to climate change. This need for experimental laws has led to analysis, comparison and assessment of two adaptation measures dealing with water scarcity in a water-rich country such as the Netherlands, in the context of their resilience. The aim was to discover whether the current Dutch legal framework enables adaptation or whether changes to national laws will be required. The applicable laws, regulations and policy documents have been analysed to select a suitable region in the Netherlands where water scarcity is commonplace (or 'structural') in order to conduct case studies to examine the effectiveness of the adaptation measures. During the course of this research it emerged that the Dutch legal system is not designed to deal with structural water scarcity. However, the cases also showed that Dutch national law does not have to change to enable adaptation to a situation of inherent water scarcity. Although Dutch water resource law does not promote all the necessary elements of an adaptive approach, it can enable adaptation through its polycentric approach, together with the discretion delegated to regional authorities to create local solutions with the assistance of the private sector if necessary.

1 INTRODUCTION

As long as climate change is surrounded by uncertainties, flexibility will be necessary to deal with the actual and potential impacts associated with its effects. Therefore, it is considered important that the law enables decision-makers to adjust or reverse decisions in a transparent and accountable way based on reliable monitoring. Problems will arise¹ if the applicable rules are too inflexible to allow management for resilience.² Arguably, laws should be changed in order to enable adaptation.³ However, laws

that are very flexible may run counter to the need for legitimacy, stability and enforceability and thus a balance should be struck.⁴ Experimental laws and regulations could lead to discussion about the need for and the extent of legal adaptation to climate change.⁵ This need for experimental laws and regulations has led to analysis, comparison and assessment of two adaptation measures dealing with water scarcity in a water-rich country such as the Netherlands, in the context of their resilience. In one case canals connect farms with an artificial freshwater lake; in another case farmers rely on a pipeline that transports water from another river basin. Such measures are rare in the Netherlands, because in general the country does not suffer from water scarcity and therefore water laws and regulations are not designed to deal with this issue.

The Netherlands has a long tradition of water management, situated as it is in a low-lying delta of four rivers. Water management is traditionally a public responsibility⁶ and this is reflected in Article 21 of the Dutch Constitution, which states that it is the duty of the authorities to ensure that the land is habitable and to protect and improve the environment. This duty resulted in development of water legislation and regulations on the reduction of flood risks from the sea and rivers, as well as proper drainage of land for agricultural use. In addition, the Dutch Government has a duty of care to ensure that water scarcity is predicted and prevented.⁷

The quantitative status of Dutch groundwater bodies is good.⁸ Water quality is generally good as well, although standards are not met for all substances and the ecological quality could be greatly improved.⁹ Since periods of drought and water shortage occur only exceptionally, the

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1 J B Ruhl 'Regulation by adaptive management: is it possible?' (2005) 7 *Minn J L Sci & Tech* 21, 39; Jonas Ebbesson 'The rule of law in governance of complex socio-ecological changes' (2010) 20 *Global Environmental Change* 414; J B Ruhl 'General design principles for resilience and adaptive capacity in legal systems: with applications to climate change adaptation' (2011) 89 *North Carol Law Rev* 1373.

2 Ahjond S Garmestani, Craig R Allen and Melinda H Benson 'Can law foster social-ecological resilience?' (2013) 18(2) *Ecology and Society* <http://www.ecologyandsociety.org/vol18/iss2/art37/>.

3 Robin Craig, J B Ruhl 'Designing administrative law for adaptive management' (2014) 67 *Vand L Rev* 1, 15; Jan McDonald, Megan C Styles 'Legal strategies for adaptive management under climate change' (2014) 26 *JEL* 1, 25.

4 Olivia O Green, A S Garmestani, H F M W van Rijswijk and A M Keessen 'EU water governance: striking the right balance between regulatory flexibility and enforcement?' (2013) 18(2) *Ecology and Society* <http://www.ecologyandsociety.org/vol18/iss2/art10/>.

5 Craig A Arnold, Lance H Gunderson 'Adaptive law and resilience' (2013) 43 *ELR* 10426, 10438.

6 Helena F M W van Rijswijk, Herman J M Havekes *European and Dutch Water Law* (Europa Law Publishing 2012) 4.

7 Wet houdende regels met betrekking tot het beheer en gebruik van watersystemen (Dutch Water Act 29 January 2009), in particular the preamble and art 1.1; Alfred Van Hall 'Artikel 21 Grondwet: Over de reikwijdte van een sociaal grondrecht' [1996] *Het Waterschap* 290; Leonard F M Besselink 'De publieke taak en de sociale grondrechten: de betrekkelijke waarde van sociale grondrechten' in Jan Willem Sap, Ben P Vermeulen and Carla M Zoethout (eds) *De publieke taak* (Kluwer 2003) 95.

8 Nationaal Waterplan 2009–2015 (Dutch National Water Plan 22 December 2009) 83.

9 Dutch Ministry of Infrastructure and the Environment 'Water in beeld 2013' (Annual report May 2014) 48 http://www.helpdeskwater.nl/publish/pages/28069/water_in_beeld_2013_def_verse.pdf.

legal system is not geared towards managing limited freshwater availability. There are only a few areas in the Netherlands where water scarcity constitutes a recurring problem.¹⁰ Climate change may exacerbate existing problems in these areas and increase the frequency of droughts in other areas.¹¹ The human factor plays a part through groundwater abstraction and drainage for agriculture.¹² This situation calls for changes in current water management practices, initially in those areas that already suffer from water scarcity.

Thus, the question arises whether the national Dutch water resource management regulations enable flexible adaptation measures or whether national laws should be changed to increase the capacity of the agricultural and other sectors to deal with water stress. The background and the essence of the national regulations will be set out in order to assess the extent to which they appear fit for the development of adaptation measures. Two selected adaptation measures will be analysed to find out which regulations were (or were not) applied, successfully or otherwise, in the two water-scarce areas and the extent to which such arrangements were created to be adaptive in the event that the water stress in the area worsened. Finally, the national laws already in place will be discussed to assess whether they are indeed fit to enable adaptation or whether these two adaptation measures indicate a need to change certain rules.

2 THE RELATION BETWEEN LAW AND ADAPTATION

Vulnerability is a well known concept to assess the need for adaptation to climate change.¹³ Frequently used vulnerability indicators are:

- projected climate change impacts with regard to heat, drought (water availability) and flood events (exposure)
- GDP
- expected mortality
- expected economic loss.

These metric indicators are useful to sketch out the situation. Their main drawback is that they only measure expected impact; after all, impact in the sense of actual reduction of vulnerability is only observable after an event.¹⁴ Another drawback is that these indicators suggest that adaptation is only a monetary issue. However, effectively addressing climate change seems far more complex than this simple approach suggests.¹⁵

10 Dutch Ministry of Transport, Public Works and Water Management 'Droogtestudie Nederland: Aard, ernst en omvang van watertekorten in Nederland' (Report 2005) RIZA-rapport 2005.016, 31–39.

11 The most recent predictions include an increase in temperatures throughout the year, with an increased chance of extremes during the summer, and an increase in precipitation throughout all seasons except during the summer: see Royal Netherlands Meteorological Institute 'KNMI' 14 Klimaatscenario's voor Nederland: Leidraad voor professionals in klimaatadaptatie' (Report 2014) 10–12.

12 Dutch Ministry of Transport Public Works and Water Management (n 10) 9.

13 Jochen Hinkel 'Indicators of vulnerability and adaptive capacity: towards a clarification of the science-policy interface' (2011) 21(1) *Global Environmental Change* 198–208.

14 Hinkel (n 13).

15 Cf W Neil Adger 'Vulnerability' (2006) 16(3) *Global Environmental Change* 268–81.

Therefore, in addition to a geographical and economic vulnerability analysis, a resilience approach to adaptation is also undertaken here. Resilience can be defined in various ways. The views expressed in this article will differ from the ecological definition that resilience is the capacity of a system to absorb disturbance and reorganise whilst undergoing change, so as still to retain essentially the same function, structure, identity and feedbacks.¹⁶ However, it should not be forgotten that, in a social context, political preferences shape the possibility of achieving increased resilience. Whereas some consider that adaptation can best be left to individuals, others prefer a collective solution: that of state involvement.¹⁷ This somewhat ill-conceived view is further amplified by the various meanings that adaptation to climate change can have. Adaptation can be directed towards offering protection against climate change, retreating in the face of climate change, or accommodating climate change through transformation.¹⁸ The direction adaptation should take to increase resilience also depends, therefore, on the goals set by those who effect the changes.

The resilience literature suggests that taking an adaptive approach in terms of governance and management is particularly suitable for adaptation but, owing to the complexity and uncertainty of climate change, this is not sensible.¹⁹ Adaptive approaches are characterised by four key elements, namely scientific learning, social learning, polycentric governance systems and management at the appropriate bio-regional scale.²⁰ In order to understand the extent to which law enables, facilitates or hinders taking an adaptive approach, these key elements need to be operationalised.²¹

Scientific learning requires an iterative decision-making process, in order to enable management through experimentation, monitoring and adequate responses to the results of monitoring.²² Social learning requires meaningful involvement of stakeholders in this iterative decision-making process.²³ Interaction between participants will be

16 B Walker, C S Holling, S R Carpenter and A Kinzig 'Resilience, adaptability and transformability in social-ecological systems' (2004) 9(2) *Ecology and Society* 5 <http://www.ecologyandsociety.org/vol9/iss2/art5>.

17 A M Keessen, J M Hamer, H F M W van Rijswijk and M Wiering 'The concept of resilience from a normative perspective: examples from Dutch adaptation strategies' (2013) 18(2) *Ecology and Society* 45 <http://www.ecologyandsociety.org/vol18/iss2/art45/>.

18 F Miller, H Osbahr, E Boyd, F Thomalla, S Bharwani, G Ziervogel, B Walker, J Birkmann, S van der Leeuw, J Rockström, J Hinkel, T Downing, C Folke, and D Nelson 'Resilience and vulnerability: complementary or conflicting concepts?' (2010) 15(3) *Ecology and Society* 11 <http://www.ecologyandsociety.org/vol15/iss3/art11/>.

19 See eg G Peterson, G A De Leo, J J Hellmann, M A Janssen, A Kinzig, J R Malcolm, K L O'Brien, S E Pope, D S Rothman, E Shevliakova and R R T Tinch 'Uncertainty, climate change, and adaptive management' (1997) 1(2) *Conservation Ecology* 4 <http://www.consecol.org/vol1/iss2/art4/>; Thomas Dietz, Elinor Ostrom and Paul Stern 'The struggle to govern the commons' (2003) 302 *Science* 1907–912 <http://www.sciencemag.org/cgi/content/full/302/5652/1907>; Brian Chaffin, Hannah Gosnell and Barbara Cosens 'A decade of adaptive governance scholarship: synthesis and future directions' (2014) 19(3) *Ecology and Society* 56 <http://dx.doi.org/10.5751/ES-06824-190356>.

20 See eg Stefania Munaretto, Dave Huitema 'Adaptive co-management in the Venice lagoon? An analysis of current water and environmental management practices and prospects for change' (2012) 17(2) *Ecology and Society* 19 <http://www.ecologyandsociety.org/vol17/iss2/art19/>.

21 B Cosens 'Transboundary river governance in the face of uncertainty: resilience theory and the Columbia River Treaty' (2010) 30 *Journal of Land Resources and Environmental Law* 229; Green and others (n 4).

22 Green and others (n 4).

23 *ibid*.

analysed with the help of Arnstein's ladder.²⁴ Arnstein distinguishes different forms of participation. Omitting manipulation and therapy, which do not qualify as participation, the other six rungs on the participation ladder are: informing, consultation (asking citizens their opinion, without necessarily taking their ideas and concerns into account in the decision-making process), placation (citizens have an advisory role in the decision-making process, but no decision-making power), partnership (citizens and government(s) co-produce and share decision-making power), delegated power (citizens co-produce and have dominant decision-making authority over a plan or project) and citizen control (citizens co-produce and have full managerial power).²⁵

In a polycentric governance system, many actors are involved and administrative authority is dispersed to separately constituted bodies with overlapping jurisdictions that do not necessarily stand in a hierarchical relationship to each other.²⁶ Therefore, an analysis is undertaken here as to which actors, and in particular which authorities, are involved, what their competences are and what financial role they have. Management on the bio-regional scale requires that the object is managed at the appropriate ecological level, such as a (sub-)river basin.²⁷ Clearly, an adaptive approach is not easy to implement.²⁸ Its failure in practice can be attributed to existing governance structures, which may not allow it to function effectively,²⁹ but it is also possible that it does not fit with the management task at hand.³⁰

3 DUTCH RULES ON WATER SCARCITY AND DROUGHT MANAGEMENT

Dutch water management has a polycentric structure, in the sense that many public authorities are involved. Traditionally, water management is a public responsibility in the Netherlands.³¹ The state sets the general rules. Under the Water Act, the Dutch governmental authorities have a duty of care to prevent water shortages. The Dutch Government's starting point is that water supply and demand should be balanced with reasonable costs. Technical work ensures that water can flow to different places in dry periods, compared to where it would flow in normal times. As is true in all EU Member States, Dutch laws are subject to EU legislation.³² In addition, according to the European Court of Justice, the Water Framework Directive allows Member States to take measures to support irrigation, provided the WFD conditions can be met.³³

The principal water management tasks are implemented by a national agency for public works and water management and by 23 regional water authorities. Their territorial boundaries correspond with hydrological boundaries. Provinces supervise the regional water authorities and establish the regional water rules. Municipalities only fulfil urban water tasks, in particular the collection of waste water. Drinking water companies, whose shares are exclusively held in public hands, are responsible for the delivery of drinking water in their areas. They also deliver water to industry as a separate activity.

Various authorities are involved in the regulation of water use. The provinces issue permits for large groundwater or surface water abstractions on a first come, first served basis.³⁴ Smaller abstractions (for agricultural and other purposes) are subject to general rules and a notification or a permit requirement, all of which are regulated by the regional water authorities. The provinces and regional water authorities collect a handling fee from the applicants for the administrative costs incurred. Under the Water Act, provinces were entitled to impose and collect a groundwater abstraction tax, although this tax has been recently abolished. Currently, regional water authorities finance groundwater management through a general water management tax imposed on all their constituents.

In case of a severe drought, the provinces and the regional water authorities are entitled to prohibit or restrict intake, in particular for irrigation purposes. The authorities then determine the public allocation of surface water through the use of a national list of priorities that ranks certain water uses over others (Article 2.1 of the Water Decree). Agriculture has a low position in this list, as is also the case for other economic activities. The courts have held that the authorities are allowed to make policy choices within the limits of the national list of priorities and on the basis of their water management plans.³⁵ Thus, in cases of water scarcity, farmers face crop yield losses owing to governmental intervention in favour of other water uses. Since economic activities such as agriculture have such a low position in the list of priorities, it is obvious that this system is only meant for emergency situations and not for the management of exceptional and unanticipated water scarcity.

The legal framework does not imply the involvement of private parties in water resource management, apart from the obligation to enable public participation in planning and decision-making.³⁶ The consent of private parties, including land owners, is not necessary in water resource management because water is a *res nullius* managed by the state. According to Article 5:20(c) of the Civil Code, water can be owned if the owner of the land brings groundwater to the surface through a spring, well or pump. Groundwater that has come to the surface and surface water can subsequently only be owned when it is kept in a pond or basin on private property, which does

24 Sherry R Arnstein 'A ladder of citizen participation' (1969) 35 *Journal of the American Planning Association* 216; Munaretto and Huitema (n 20).

25 Arnstein (n 24) 217.

26 Chris Skelcher 'Jurisdictional integrity, polycentrism, and the design of democratic governance' (2005) 18 *Governance* 89.

27 See for instance D Huitema, E Mostert, W Egas, S Moellenkamp, C Pahl-Wostl and R Yalcin 'Adaptive water governance: assessing the institutional prescriptions of adaptive co-management from a governance perspective and defining a research agenda' (2009) 14(1) *Ecology and Society* <http://www.ecologyandsociety.org/proxy.library.uu.nl/vol14/iss1/art26/>.

28 M W van Buuren, A Keessen, C W G J van Leeuwen, J Eshuis and G-J Ellen 'Flexible arrangements for climate adaptation in the Netherlands' *Ecology and Society* (2015) in press.

29 Munaretto and Huitema 2012 (n 20).

30 Arnold and Gunderson (n 5); Van Buuren et al (n 28).

31 Van Rijswijk and Havekes (n 5) 4.

32 EU Commission Communication 'Addressing the challenge of water scarcity and droughts in the European Union' COM(2007) 414 final (18 July 2007).

33 Case C-43/10 *Nomarchiaki Aftodioikisi Aitolokarnanias and Others v Ypourgos Perivallontos, Chorotaxias kai Dimosion ergon and Others* [2012] ECR I-0000 paras 48–69.

34 H F M W van Rijswijk 'Mechanisms for water allocation and water rights in Europe and the Netherlands: lessons from a general public law perspective' (2015) 24 (3/4) *Journal of Water Law* 141–149.

35 Van Rijswijk and Havekes (n 5) 364–66.

36 J H Behagel *The Politics of Democratic Governance: The Implementation of the Water Framework Directive in the Netherlands* PhD thesis (Wageningen University 2012); Andrea Keessen, Lexa van Daalen and Arwin van Buuren 'Participatie in watermanagement: goed voorbeeld doet volgen?' (2014) 89(30) *Nederlands Juristenblad* 2117.

not have an open connection with water on someone else's private property.³⁷ This means that anyone who wants to abstract large amounts of surface water or groundwater only needs a permit. Such persons do not need the permission of an owner (as there is no owner), even when the groundwater originates from the land of other owners. The state only regulates water use, but does not request payment. The lack of payment for the abstraction of water could be an infringement of Article 9 of the European Water Framework Directive (WFD), which demands that households, industry and agriculture pay a fair share of the costs of water services.³⁸ However, the ECJ held in *Commission v Germany* that this does not constitute an infringement.³⁹

Development of the general water resource management policy is ongoing. For a long time, the drainage of excess water was paramount in order to facilitate the agricultural use of the land. This approach was abandoned in 2003, the year with the hottest summer on record in Europe. The new approach is to retain water as long as possible in the water system. The current slogan is 'retention, storage and drainage'.⁴⁰ This new approach was implemented together with a policy of taking advantage of the natural dimension of water management (building with nature) and making use of spatial measures, such as creating more space for rivers, rather than relying exclusively on technical solutions.⁴¹

Thus, with regard to national law, polycentricity is the strongest element of the adaptive approach, whereas social learning (ie stakeholder participation) might be weak.⁴² This will now be illustrated in two cases from the province of Zeeland, where the characteristics of the national legal framework impact upon the management of the increasing occurrence of water scarcity.

4 THE CASES

In order to assess whether Dutch national laws on water resource management enable adaptive adaptation measures, it was necessary to find an area with periodic water scarcity. The province of Zeeland, in the delta of the rivers Scheldt, Meuse and Rhine, is such an area. It consists of

several islands and peninsulas and is part of the mainland in the south (Zeeuws-Vlaanderen). It has around 380,000 inhabitants. The social economic picture reveals that the agricultural sector is a defining element for the regional landscape, as 75 per cent of the land is in agricultural use.⁴³ However, agriculture, fisheries and forestry together make up about 6 per cent of all (part-time) jobs in the province of Zeeland and agro/fisheries sector together make up only 2.9 per cent of the province's gross product.⁴⁴

Almost the entire province (293,000 ha) consists of low-lying polders prone to flooding and standing water.⁴⁵ In the wake of the great flood of 1953, the state constructed the Delta Works as a long-lasting flood defence system between the 1960s and the 1990s. The construction of the Delta Works seriously affected the estuarine dynamics of the delta. Several surface waters that were previously saline or brackish changed into freshwater after closure from the sea.⁴⁶ In addition to the sea defences a series of inland barriers was erected, which changed the water supply from the rivers. The interference with the estuarine dynamics prompted a seaward change of the fresh/salt border in the eastern part of the province's groundwater.⁴⁷ Today, although local variations occur, the groundwater in the islands of the province can be characterised as a fresh 'lens' of up to several meters on top of saline or brackish groundwater.⁴⁸ These lenses are replenished by rainfall. Estimated climate change effects for Zeeland include further salinisation of groundwater, caused by a sea level rise, increasingly irregular precipitation patterns and temporary lower levels of water supply through rivers.⁴⁹

Thus, two projects in the province of Zeeland have been identified, both of which aim to secure a fresh water supply for agriculture. These two projects will be assessed, first, as to the situation from a vulnerability perspective, describing the adaptation measures required to give an indication of the importance of those adaptation measures and, secondly, to compare these cases from a resilience perspective. Their similarities and differences allow for an effective illustration of the extent of flexibility in the legal framework for adaptation measures to water scarcity.

Both projects are situated in close proximity to one another, namely in the Rhine-Scheldt-Meuse delta, and they are both chosen with the aim of safeguarding freshwater supply for agriculture. They differ in their legal approach and hence in their arrangements. In Tholen, a dam established to prevent coastal flooding created a freshwater lake, after which the regional water authority

37 Burgerlijk Wetboek (Dutch Civil Code) 1992.

38 Petra E Lindhout 'A wider notion of the scope of water services in EU water law: boosting payment for water-related ecosystem services to ensure sustainable water management?' (2012) 8(3) *ULR* 86 <http://www.utrechtlawreview.org/index.php/ulr/article/view/207>. See also EU Commission Communication 'Pricing policies for enhancing the sustainability of water resources' COM(2000) 477 final (26 July 2000); Working group 2.6 WATECO 'Common Implementation strategy for the Water Framework Directive (2000/60/EC): Guidance document No 1 Economics and the Environment: the Implementation challenge of the Water Framework Directive' (2003).

39 Case C-525/12 *Commission v Germany* [2014] ECR I-0000; P E Lindhout, H F M W van Rijswijk 'The effectiveness of the principle of recovery of the costs of water services jeopardized by the European Court of Justice: annotations on the judgment in Case C-525/12 *European Commission v Federal Republic of Germany* of 11 September 2014' (2015) 12 *Journal for European Environmental and Planning Law* 78-92.

40 Nationaal Bestuursakkoord Water (Dutch National Policy Agreement on Water Management, 2 July 2003) 35.

41 Commissie Waterbeheer 21^e eeuw 'Waterbeleid voor de 21^e eeuw: Geef water de ruimte en aandacht die het verdient' (Report 31 August 2000) <http://publicaties.minienm.nl/download-bijlage/8607/advies-commissie-waterbeheer-21ste-eeuw.pdf>.

42 Keessen, van Daalen and van Buuren 'Participatie in water management: goed voorbeeld doet volgen?' (n 36) 2117-24.

43 Centraal Bureau voor de Statistiek (CBS) 'Bodemgebruik: uitgebreide gebruiksvorm, per gemeente' (Official data on land use in the Netherlands 2010) <http://www.cbs.nl/nl-NL/menu/themas/natuur-milieu/cijfers/kern-cijfers/bodemgebruik-kc.htm>.

44 Provincie Zeeland 'Versterken, Vernieuwen, Verbinden: Sociaal-Economische Schets Zeeland, januari 2011' (Report January 2011) 12-13.

45 CBS 'Bodemgebruik: uitgebreide gebruiksvorm, per gemeente' (n 43).

46 Notable conversions include Lake Grevelingen and Lake Volkerak Zoom.

47 Stuurgroep Zuidwestelijke Delta 'Zoet Water Zuidwestelijke Delta: Een voorstel voor een regionale zoetwatervoorziening' (Report June 2009) 17.

48 Kennis voor Klimaat 'Zoetwater verhelderd: Maatregelen voor zoetwater zelfvoorzienendheid in beeld' (Report 2013) KVK 90/2013 at 10.

49 *ibid*.

Table 1: relevant stakeholders per case study

<i>Stakeholders in Zuid-Beveland</i>	<i>Stakeholders in Tholen</i>
Province of Zeeland	Province of Zeeland
Regional water authority Scheldestromen	Regional water authority Scheldestromen
Farmer branch association ZLTO	Farmer branch association ZLTO
Evides Industriewater	

chose to manage irrigation canals to transport fresh water to local farmers. In Zuid-Beveland, a water company transports fresh water from one river basin through a pipeline to farmers in another river basin.

Adaptive governance and management theories emphasise the importance of inclusion of stakeholders' interests in the decision-making process. Therefore, special attention has been paid in this article to the cooperation between the primary stakeholders in each project⁵⁰ (Table 1).

4.1 Water for agriculture on Zuid-Beveland

Zuid-Beveland is a former island located on the southernmost peninsula of the province of Zeeland. It lies next to the Westerschelde estuary and the Oosterschelde estuary. Approximately 1600 ha on Zuid-Beveland are used as fruit orchards, pears and apples being the principal fruits. These fruits require water with low salinity, which can generally be acquired through natural precipitation. Occasionally, however, additional water is needed. Both in periods of drought and in early spring, when night frost threatens blossoming trees, farmers need large quantities of water which are not available from local sources. The water is transported through a pipeline from the Biesbosch basin. The Biesbosch basin is located in a wetland of the same name, about 70 km northeast of the orchards on Zuid-Beveland, in the province of South Holland and outside the Scheldt river basin (the Biesbosch lies in the Meuse river basin, which is interdependent with the Rhine river basin).⁵¹

The pipeline was requested by local farmers (and their branch organisation ZLTO) and constructed with provincial funding in the early 1990s.⁵² It was subsequently exploited by the predecessor of Evides Industriewater BV (EIW), a daughter company of the private drinking water company Evides NV,⁵³ which is publicly owned. It sup-

plies freshwater to the industrial and agricultural sectors. The pipeline initially transported water from the Spui canal in the East of Zeeland. However, owing to seasonal mass blooming of cyanobacteria in Lake Volkerak Zoom, which is the water source of the Spui canal, the piping near the end users became clogged and could no longer be used for irrigation. For this reason, EIW connected the pipeline to the already existing drinking and industrial water pipeline to the Biesbosch, to which it remains connected to this day.⁵⁴

Local users have signed a contract with EIW. As those contracts are private, their exact terms and conditions are unknown. In general, Dutch consumers must pay a fixed charge for the delivery of drinking water, next to a variable component that reflects their water use (price per m³).⁵⁵ Such a charge, in the case of non-household (ie industrial) users is also not uncommon and is usually coupled with the capacity of the connection. The larger the capacity, the higher the fixed charge will be.⁵⁶ The general conditions of EIW for the delivery of water to industrial users do indeed incorporate such a fixed charge.⁵⁷ However, it is known that the farmers on Zuid-Beveland are exempted therefrom and only pay a tariff per m³ used, which was around €0.60 in 2013.⁵⁸ That tariff is indexed annually to stay in line with market developments regarding, inter alia, energy, labour and investment costs. In return, EIW takes all reasonable measures to ensure the delivery of water to farmers.⁵⁹

Agricultural water demand is irregular and, in case it peaks, up to 25 per cent of the available water from the Biesbosch pipeline may be delivered to the end users on Zuid-Beveland.⁶⁰ The prospect of such a peak in demand requires a reservation of part of the capacity of the pipeline. During the drought of 2006, the peak in demand exceeded the capacity of the pipeline and led to the purchase and delivery of water from abroad (from Antwerp, Belgium) by EIW.⁶¹ The encroachment of the capacity does not arise incidentally. A structural issue is that more farmers wish to be connected to the pipeline, in addition to current clients that wish to enlarge their irrigated fields.⁶² The situation is such that agricultural choices are

drinkwatervoorziening (Dutch Drinking Water Act 18 July 2009) Article 1(1) on 'gekwalificeerde rechtspersoon' (a qualified legal entity) and art 15. Shareholders of Evides NV are the provinces of Zeeland and South Holland, as well as local municipalities in those provinces.

54 Stuurgroep Zuidwestelijke Delta 'Zoet Water Zuidwestelijke Delta: Een voorstel voor een regionale zoetwatervoorziening' (n 47) 17.

55 Vereniging van waterbedrijven in Nederland 'Tarievenoverzicht drinkwater 2013' (Report January 2013) 2013/116/6259 at 5.

56 The business tariffs of other drinking water companies also include a fixed charge; see for instance those of Vitens <http://www.vitens.nl/zakelijk/paginas/tarieven-zakelijk.aspx>; or those of PWN <http://www.pwn.nl/zakelijk/klantenservice/Paginas/tarieven.aspx>.

57 EIW 'Algemene Leveringsvoorwaarden Industriewater' (General Conditions 2009) Provision 1.7.

58 Interview with the proposal engineer EIW (Utrecht 31 July 2013).

59 EIW 'Algemene Leveringsvoorwaarden Industriewater' (n 57) Provisions 10.1, 10.2.

60 Interview EIW (n 58). The introduction of a fixed charge has for a long time been the subject of debate between EIW and the users of the pipeline on Zuid-Beveland. EIW argues that its service consists not only of delivering water, but also of keeping the required capacity available at any time. It is argued that for the latter service the additional fixed charge would be reasonable as the maintenance costs of the infrastructure are structural, regardless of use.

61 Evides NV 'Jaarverslag 2006' (Annual Report 19 April 2007) 15.

62 De Werkgroep 'Duurzame Watervoorziening Fruitteelt: Eindrapportage' (Report October 2012) 22.

50 The legal and policy research undertaken in writing this article has been supplemented by conducting interviews with the stakeholders' representatives in each case study in order better to understand their preferences within the specific fresh water supply project. The interviews were used to supplement the written documentation on the organisation and functioning of the projects. The sources of data are thus the legal and policy documents of the relevant government authorities, research reports that emanated from these authorities, and statements of these authorities and other stakeholders during (reported) public meetings which were attended or during interviews. Interviews (on file with authors) were held from December 2012 to November 2013.

51 A Gilbert, M Schaafsma 'Case study report Rhine: Subbasin Rhine-West, Netherlands' (Report IVM 2007) 1.

52 Deltares *Drage kost: innoveren op droogte en watertekort* (Deltares 2011) 79.

53 The shares of Evides NV are entirely in public hands, as sanctioned by the Wet houdende nieuwe bepalingen met betrekking tot de productie en distributie van drinkwater en de organisatie van de openbare

restricted. Rainwater reliance instead of pipe water reliance basically means less water intensive – hence less valuable – crops and limited possibilities to engage in contracts because a timely delivery of the crops cannot be guaranteed.

Unless current users reduce their water consumption, any extension requires investment to increase the capacity of the pipeline. It is unlikely that EIW will receive funding from the province of Zeeland. The province has declared that it supports initiatives to increase local availability but not a new pipeline, because freshwater supply is seen as the responsibility of the agricultural sector itself.⁶³ This does not necessarily mean, however, that the province will not support investments by EIW in its capacity as one of EIW's shareholders.⁶⁴ The current payment scheme for agricultural water to Zuid-Beveland does not provide a viable business case for extension, however. Although exact numbers are lacking, statements from, inter alia, EIW, imply that the operation is not profitable.⁶⁵ Perhaps owing to its public shareholders, the company is interested in more than simply profits.⁶⁶ From that perspective one can understand the somewhat lenient attitude towards the current price of water and the (resulting) net loss on the operation for EIW.

Cross-subsidisation, which means that public service revenues (from EIW's sister company Evides Drinkwater BV) are used for market activities, is explicitly forbidden in Article 7(4) of the Drinking Water Act. A consequence of the operational loss on Zuid-Beveland is that it needs to be made up by profits from other EIW clients. This means that other industrial clients of EIW could pay a lower price if the Zuid-Beveland operations would run cost-efficiently. In a healthy market environment, a water supply company in a similar situation would see its clients leaving for a competitor with a sharper price. Although drinking water companies have a legally sanctioned regional monopoly in the field of private water supply, there are no legal rules barring competition in the field of commercial water supply. The government-funded installation of the pipeline and the net loss from the current payments scheme on Zuid-Beveland, however, do hint at a considerable cost burden, which makes a viable market solution unlikely. This, in turn, makes it improbable that a competitor will appear in the same region, which makes all commercial clients de facto bound to the services of EIW.

4.2 Water for agriculture on Tholen

The former island of Tholen (including St Philipsland) lies about 20 km northeast of Zuid-Beveland, on the north-eastern border of the province of Zeeland. It lies next to Lake Volkerak Zoom, the Oosterschelde estuary and the Scheldt Rhine canal. As is the case in Zeeland in general,

the greater part of Tholen (86 per cent) is used for agriculture.⁶⁷ Similar to the situation on Zuid-Beveland, the supply of freshwater by precipitation or available groundwater is not sufficient for the current and anticipated agricultural demands – especially with regard to different sorts of capital-intensive crops cultivated there. Prior to the construction of the Delta Works the island of Tholen lay seawards of the fresh/saltwater line. After the realisation of the Delta Works, the groundwater chloride levels decreased but remained inadequate for irrigation purposes.

In 1987 a plan was drafted to allow for irrigation to the plots of agricultural land on Tholen. The regional water authority would take care of the primary ditches (the basic plan) and the landowners would be responsible for the irrigation of secondary ditches to individual plots of land (the refining plan). Water would be let in from the artificial fresh water Lake Volkerak Zoom. Although the water inlet points lie in the Scheldt river basin, the lake lies in both the Scheldt and the Meuse river basins. Both the regional water authority and the farmers, however, could not or did not want to come up with the required funding, after which the project was cancelled. The basic plan was eventually executed by the predecessor of the current regional water authority Scheldestromen (then called Zeeuwse Eilanden) as it allowed the regional water authority to control the water levels in the ditches and the surrounding lands of the island of Tholen, which is part of its water management task.⁶⁸ Because of the focus on water quantity management, the delivery of freshwater of a certain quality to secondary ditches was not taken into account, but farmers who could directly tap into the primary ditches for irrigation purposes were allowed to do so without charge, after having obtained a permit.⁶⁹

Agricultural businesses seek certainty concerning their water supply to enable engagement in contract cultivation, as that requires timely deliveries of crops. Therefore, the Tholen branch of the farmers' association ZLTO lobbied on behalf of the local farmers to improve freshwater supply with the ultimate aim of achieving water security for agriculture. In response, the regional water authority decided in 2001 to initiate a 'pilot' scheme to let in more freshwater from Lake Volkerak Zoom in order to flush the saline water from local ditches and to provide the farmers with higher quality freshwater, which could then be used for irrigation. It was clear from the outset that the 1000 ha project in the eastern part of Tholen would increase the availability of freshwater for agriculture, but would not offer water security.⁷⁰

Therefore, the farmers' association continued to lobby for an improved and more structural arrangement. After a series of talks and negotiations, the regional water

63 Provincie Zeeland 'Omgevingsplan Zeeland 2012–2018: Beleid voor ruimte, milieu, water en natuur' (Provincial Land Use, Environment, Water and Nature Policy, 28 September 2012) 72.

64 According to Evides NV, less than 50% of its shares are in the hands of the province of Zeeland http://www.evides.nl/over-evides/Publishing/Images/aandeelhouders_groter.gif.

65 Stuurgroep Water uit de Wal 'Bijlage 4 Stuurgroep Water uit de Wal: Overzicht project Water uit de Wal' (Report Annex 21 March 2012) ZEE1200525, 4; Interview EIW (n 58).

66 Interview EIW (n 58).

67 Arjen de Vries and others 'Vraag en aanbod van zoetwater in de Zuidwestelijke Delta – een verkenning' (Report Kennis voor Klimaat 2009) 75.

68 Deltares 'Beschouwing van de effecten van een zout Volkerak-Zoommeer op het grondwatersysteem' (Report 2008) 2008-U-R0774/A, 82.

69 Jeroen A Vervaart, Judith E M Klostermann 'De rol van onzekerheid in kennis in de MER-procedure van het Volkerak-Zoommeer' (Background Report Kennis voor Klimaat 2012) 38.

70 Waterschap Zeeuwse Eilanden 'Waterbeheerplan 2010–2015: Met het water mee 2' (Regional Water Management Plan 16 December 2009) 32.

authority and the Tholen farmers' association (and, to a lesser extent, the province of Zeeland) presented a jointly drafted proposal in April 2013. They proposed a more structural arrangement, including a payment scheme, for freshwater supply from the lake. Of the 10,417 ha of local agricultural lands, farmers representing 8241 ha (nearly 80 per cent) were supportive of the proposal.⁷¹ In May 2013, the regional water authority and the Tholen farmers' association signed a declaration of intent regarding the establishment of a council of users that should function as an advisory committee to the regional water authority to participate in the management of the freshwater supply from the lake.⁷²

The measure is paid for by the 'users' through a tax regulation from the regional water authority. The system of taxation distinguishes three tariff zones, whose applicability depends on the degree to which a plot of land can be irrigated from the ditches, taking into account the quality of that water. This means that the closer a plot of land is located to a ditch with a higher water quality, the higher the tariff will be.⁷³ Tariffs are fixed for a minimum of one year but can be extended indefinitely.⁷⁴ Paying the charge does not exempt the users from needing to apply for a water permit for water abstraction from the ditches.⁷⁵ The taxation is directly related to the use of facilities owned or managed by the regional water authority,⁷⁶ which in this case are the local ditches, sluices, pumps and other facilities managed by Scheldestromen in Tholen.

Although the tax is coupled with the use of these facilities, it implies a payment for the right to use freshwater.⁷⁷ The tax is levied on all 'users' in the area, which are defined as owners and right holders of tenure of unbuilt agricultural lands on the island of Tholen.⁷⁸ They are all considered users, regardless of whether and how much they abstract from the ditches. Any differentiation between them is based on their access to good quality water.⁷⁹ The explanatory memorandum argues that the system is thus

71 Waterschap Scheldestromen 'Ontwerp-retributieverordening zoetwatervoorziening Tholen en Sint Philipsland' (Annex 5a to the proposed tax bye-law 13 November 2013).

72 Waterschap Scheldestromen 'Waterschap en ZLTO tekenen voor zoet water in Tholen en Sint Philipsland' (Press release 17 May 2013); Waterschap Scheldestromen, 'Zoetwatervoorziening Tholen en Sint-Philipsland: Streekbijeenkomst 10 december 2013' (Presentation 10 December 2013) 7 http://www.scheldestromen.nl/aspx/download.aspx?PagId=208581&File=streekbijeenkomst_tholen_10_dec_2013.pptx.

73 Interviews with a water management specialist, ZLTO (7 June 2013 and 29 November 2013); interview with a senior policy officer, Waterschap Scheldestromen (22 May 2013).

74 Statement by the General Assembly representative Luc Mangnus at the General Assembly of the regional water authority Scheldestromen (12 December 2013) http://scheldestromen.waterschapsinformatie.nl/vergadering/archief/37537/Algemene+vergadering+Waterschap+Scheldestromen_12-12-2013.

75 Waterschap Scheldestromen 'Keur watersysteem Waterschap Scheldestromen 2012' (Regional water authority bye-law 6 December 2012) art 4.8. Permits need to be requested on an annual basis, although an exception has been made for Tholen where it needs to be requested once every five years.

76 See to that end Wet houdende regels met betrekking tot de waterschappen (Dutch Regional Water Authority Act 6 June 1991) art 115(1)(a).

77 Waterschap Scheldestromen 'Retributieverordening zoetwatervoorziening Tholen en Sint Philipsland' (Regional Water Authority tax bye-law 21 December 2013) art 2; see also the explanatory memorandum to this tax bye-law.

78 *ibid* art 1.

79 The 'largely used' tariff is 55% of the full-use tariff and the 'inessential-use' tariff is 10% of the full-use tariff. See Waterschap Scheldestromen 'Retributieverordening' (n 77) art 4(2).

financed on the basis of the profit principle. Other options for taxation, such as one based on the amount of water extracted, have been considered but were impossible to apply owing to legal restrictions on this kind of taxation by the regional water authorities. It is thus not possible to be exempted from the system if a party falls under the definition of a 'user'.

The advisory council consists of users distributed geographically over all three tariffs.⁸⁰ Its agreed task is to give advice regarding: (a) the functioning of the water supply; (b) the demarcation of the different tariff zones; and (c) potential investments for the benefit of the water supply.⁸¹ If extra investments are made by the regional water authority, the costs are to be borne by the users through the taxation scheme in subsequent years. A formula, in which the total amount of hectares, the annual costs and the relative amounts of different zones are inputs, is used to calculate the tariffs.⁸² The advisory council will meet with representatives from the regional water authority at least twice a year.

The agreement does not specify what legal value can be attached to the advice from the advisory council. Its influence remains informal, as the new body is not embedded in the legal system of the regional water authority. Neither the current water management plan, which dates from 2010,⁸³ nor the retribution bye-law or its explanatory memorandum mentions an advisory committee or council of users. The explanatory memorandum reads with regard to the demarcation of tariff zones that 'practice has shown what demarcation had to be decided upon'. The council thus appears to represent 'practice', although this is not formally acknowledged.

5 COMPARISON

5.1 Bioregional approach in water management

Both cases concern areas in the province of Zeeland. The irrigated lands are located within the Scheldt river basin and the irrigated freshwater comes from another area, the Meuse river basin, thereby creating inter-basin water transfer and dependency. On Zuid-Beveland EIW transfers water from the Biesbosch (Meuse) to Zuid-Beveland (Scheldt) and on Tholen the extension of Lake Volkerak Zoom enables the regional water authority to transfer water from the Meuse to the Scheldt, as the vast majority of the surface waters of Lake Volkerak Zoom lie within the Meuse river basin. If the national government allows the salinisation of Lake Volkerak Zoom to improve its ecological quality,⁸⁴ stakeholders will desire an alternative source. An option is to rely on the Rood Vaart canal, part of the Meuse river basin and the province of North Brabant, for their freshwater supply.⁸⁵ The inter-basin

80 Interview with ZLTO on 29 November 2013 (n 73).

81 *ibid*.

82 Scheldestromen 'Retributieverordening' (n 77) art 4; see also the explanatory memorandum to this tax bye-law.

83 Waterschap Zeeuwse Eilanden (n 70).

84 Deltaprogramma 2014 p 14 <http://www.deltacommissaris.nl/delta-programma/inhoud/publicaties>.

85 The province of Zeeland apparently anticipates the salinization of Lake Volkerak Zoom, as it has committed itself to investing €1.5 million in the renovation of the Rood Vaart canal; see 'Samenwerkingsovereenkomst Rood Vaart ondertekend' (Press Release 22 November 2013) https://www.zeeland.nl/nieuws/bericht/18821/Samenwerkingsovereenkomst_Rood_Vaart_ondertekend.

transfers create a problem with regard to management on the appropriate bio-regional scale, because crossing the boundaries of two river basins makes management less appropriate from a hydrological perspective.

From a national perspective, all measures fall within one area for which a coherent strategy for water quantity management exists. In both cases the source and the receiving area fall within the 'Southwest delta' area. The Southwest delta includes the Scheldt river basin, together with downstream sections of the Meuse and a part of the Rhine river basin areas.⁸⁶ The Southwest delta is identified as an area in both the Delta Programme and in the national water plan. This is slightly at odds with the river basin structured water management plans that, according to EU law, should offer the strategy for water management. The national water plan, however, supplements the river basin districts with various different geographical zones, which are so-called 'hotspots' for adaptation to climate change under the Delta Programme.

It is interesting to see that the 2014 Delta Programme proposes two strategies for the 'Southwest delta'. For areas that currently depend on freshwater lakes for their freshwater supply, such as Tholen, a freshwater buffer and transportation route is considered essential. For areas in the Southwest delta without such a dependency, the strategy is aimed at local self-sufficiency through innovative measures in the regional system by, inter alia, the end-users.⁸⁷ This explicit move towards the latter strategy within the Scheldt river basin is more appropriate for an effective bio-regional approach than the current National Waterplan policy. The proposed strategies are also more compatible with the province's water management policy of the past decade. The proposed strategies, however, continue to provide for government-supported inter-basin water transfers where this already occurs and allow for publicly or privately funded new pipelines.

5.2 Polycentricity

On Zuid-Beveland the request from the farmers' association was taken up politically at the provincial level in the form of a subsidy from the province of Zeeland for a pipeline. From then onwards EIW (and its legal predecessor), a private company with no water management competences whatsoever, took over in the sense that the farmers entered into a private law setting by means of individual contractual relations with EIW.⁸⁸ In doing so, the functioning of the adaptive measure – the supply of water – was no longer based on public law and was kept out of the sphere of water law except for the fact that EIW has to obtain its water according to those rules. However, the abstraction permit of EIW is issued by the province of South Holland, whereby the arrangement circumvents the regional water authorities' influence on agricultural water use and their application of the public water hierarchy in case of drought. Even if EIW is confronted with restrictions

from the province of South Holland during a drought, as a private company it is not bound by the rules on water hierarchy. When EIW had to deal with such a situation, it acquired water from elsewhere instead of reducing the supply to its customers. Hence, it can be said that on Zuid-Beveland water supply to agriculture is in private hands, regulated by the province of South Holland. However, in their capacity as shareholders of EIW, other public authorities continue to have a say.

On Tholen, the regional water authority responded to the request for water and connected the nearby lake to the local irrigation system by making use of the existing publicly managed water infrastructure. Here, water management remained in public hands. The regional water authority operates the system, although the national government plays a role in the background. The state has proposed the salinisation of Lake Volkerak Zoom to increase its ecological quality in exchange for a different but robust freshwater supply system for Tholen in the context of the Delta Programme.⁸⁹ On Tholen the adaptation measure falls within public law, under which the farmers are subject to a tax which is an instrument typically associated with a 'classical' top-down approach. The farmers have indirect influence through the representative democratic bodies and their associated competences in the management of their freshwater supply.⁹⁰ In addition, the farmers in this arrangement participate through an advisory council. Thus, the possible changes to the current arrangement show the continued relevance of polycentricity in the case of Tholen.

5.3 Scientific and social learning

The pipeline allows farmers to ignore local salinity conditions, as it offers connected farmers a high degree of water security. Since farmers do not pay the full price, the delivery of water to agriculture operates at a loss. This has an impact on the functioning of the arrangement, as it fuels demand whilst at the same time reducing incentives to improve the adaptation measure. The obligation of EIW to deliver water is an obligation of best effort, but EIW should take all reasonable measures to ensure delivery. Only in the case of force majeure is EIW no longer obliged to deliver water,⁹¹ and this does not necessarily include droughts. Thus, the arrangement appears to offer few opportunities for learning.

It is surprising to find that scientific learning is present in the arrangement on Zuid-Beveland, yet scientific learning manifests itself in the attention for demand reduction. In the period 2010–2012 a research programme was initiated to see what options exist for freshwater use optimisation, taking account of the middle to long-term regional climate change effects (KNMI scenario G+).⁹² The research involved assessments for every farmer, which laid out the opportunities for more efficient water use, the costs associated with such measures and the increase in

86 Nationaal Waterplan 2009–2015 (n 8) 174.

87 Deltaprogramma 2014 (n 84) 85. The possibility of a private pipeline has been explicitly left open: see *ibid* 59.

88 It is, however, eventually owned by a cooperation of public entities such as local municipalities and provinces. Although there is no evidence that they directly influence its operational management, it has been hinted that the fact that EIW is in public hands does influence its strategies in a general sense.

89 Deltaprogramma 2014 (n 84) 59.

90 Remco Nehmelman 'Institutional and governance aspects of water management: subsidiarity and decentralization – the secret of the Dutch approach to water management (2015) 24(3/4) *Journal of Water Law* 134.

91 EIW 'Algemene Leveringsvoorwaarden Industriewater' (n 57) Provision 10.3.

92 De Werkgroep (n 62) 8.

profits as a result. Connected farmers are relatively flexible as to when they demand additional water, but their connection has a maximum capacity and they have a limited possibility to renegotiate their terms; as a last resort, farmers can terminate their contracts.⁹³ The attention for demand reduction probably derives from the fact that the maximum capacity of the pipe has been reached and an extension is not foreseen. Therefore, clients that wish to irrigate more land depend on increased user efficiency.

Scientific learning, coupled with social learning, is an integral part of the current arrangement on Tholen. This is historically the case as the current water supply system is an updated and formalised version of a series of local pilot projects. Those, in their turn, were initiated after a public-private project for ditch optimisation in the 1990s failed to materialise. Thus, a continuous feedback process between the farmers and the regional water authority can be traced back, during which plans and projects to improve freshwater supply were drawn, criticised and ditched, or adopted. Workshops and meetings were held to create a situation where all parties could bring forth their interests and knowledge. The current arrangement on Tholen is flexible in the sense that it provides temporary water permits, which can be renewed every five years.⁹⁴

In addition, the regional water authority on Tholen continues to rely on monitoring and local experience and advice in the decision-making procedure for new investments in the system of freshwater supply. Investments are paid up front by the regional water authority and are subsequently paid for by the farmers through the retribution tax. The tax for a plot also changes if monitoring reveals that half-benefit plots may fully benefit, or that full-benefit plots turn out to be half-benefit (or even no benefit). The fact that the costs are shared by all the farmers in the area may also be an important feature for the flexibility and learning process. Individual farmers may be less willing to take risks if the costs are perceived to be too high. Sharing those costs may entice them to take steps outside the perceived 'safe zone'. In the 'pilot project' period, there were even no costs attached to experimentation as the flushing of freshwater was paid for by the regional water authority from public funds.

Clearly, a horizontal private legal relationship gives the farmers strong tools to receive water. The terms of the contract dictate that, as long as the farmers pay, EIW is obliged to deliver water (unless there is a case of force majeure). However, the farmers are dealing with a monopolist and do not have a great deal of power, which gives their relationship a more vertical character. This is particularly so because the maximum capacity of the pipe has been reached and an extension is not foreseen. Therefore, scientific learning manifests itself in seeking a demand reduction amongst farmers who want to irrigate more land. Farmers without a contract within the geographical scope of the measure are not engaged at all.

By contrast, the public system on Tholen appears to be vertical and coercive from the outset. In terms of Arnstein's ladder of participation, the continued partici-

pation of the farmers on Tholen may best be described as consultation. After all, the advisory council was established by an agreement between the regional water authority and the farmers' association to advise on the freshwater supply system and the retribution tax, but it is not included in the official procedures. Therefore, there is no guarantee that its advice will be heeded by the administration.⁹⁵ However, the history of participation in the past 20 years on Tholen (see further below) suggests that de facto the opinion of the advisory council will be influential and hence their relationship is more inclusive and horizontal.

5.5 The need for a rule change

In both cases the initiative for an adaptation measure came from the farmers. That request was then catered for by the government, but in different ways. The fact that within the current legal system, even within one province, two entirely different arrangements for freshwater supply are in place, points towards a degree of flexibility and room for experimentation at the regional level within the Dutch legal system. This is likely to persist. The Ministry of Infrastructure and the Environment has endorsed the suggestion of adopting a strategy of the facilitation of (water demanding) functions where possible, and the acceptance of scarcity when necessary.⁹⁶ The adoption of such a strategy, which is included in the 2014 Delta Programme, continues to offer flexibility at the regional level.⁹⁷

In both cases, the general financial rule – water is free – has not changed. While new costs have been associated with obtaining water and water has become more expensive, farmers do not pay for their water as such, but only for transport costs. Cost recovery for the service of water supply is therefore only partial, but it should be noted that this does not necessarily constitute an infringement of the Water Framework Directive.⁹⁸ The private arrangement appears to be the most cost recovery-oriented, as farmers pay for the transport costs of the water they actually use, although they do not pay a fixed charge for the opportunity to use water, which differentiates them from other commercial users. However, the costs are not entirely recovered, as the lack of a fixed rate causes the delivery of water to agriculture to run at a loss. The public arrangement appears to be less cost recovery-oriented; farmers pay only for the opportunity, irrespective of their use. They are permitted to use water, but have a relatively low degree of water security in the summer because of the blue-green algae in the lake.

What has changed is not the rules themselves, but the way in which freshwater supply is managed. On Zuid-Beveland, water management has become a mainly private task, as water for agriculture is supplied through a

95 Arnstein (n 24) 217.

96 Dutch Minister of Infrastructure and the Environment Letter to the Adviescommissie Water (16 April 2013) IENM/BSK-2013/70174.

97 Deltaprogramma 2014 (n 84) 56.

98 Petra Lindhout 'A wider notion of the scope of EU water services in EU water Law (n 38) 86–101; Erik Gawel 'ECJ on cost recovery for water services under Article 9 of the Water Framework Directive' (2015) 23 *Journal for European Environmental and Planning Law* 71–79; Lindhout and van Rijswijk 'The effectiveness of the principle of the recovery of the cost of water services jeopardized by the European Court of Justice (n 39) 80–94.

93 EIW 'Algemene Leveringsvoorwaarden Industriewater' (n 57) Provision 16.1(ii).

94 These instruments are generally seen as adaptive; see for instance McDonald and Styles (n 3) 51.

pipeline by a private company. The public authorities operate only in the background. The province of South Holland is responsible for the regulation of EIW's activities, the regional water authority lost its role in the regulation of agricultural water use and the province of Zeeland can only act in its capacity as a shareholder of EIW or by contributing further subsidies. Even on Tholen, where water management remained in public hands, the situation differs from that which is usual in other areas in three respects. Freshwater supply is actively managed in an apparently constructive participatory way, the authorities issued temporary permits and recover the costs through a specific tax.

6 CONCLUSIONS

This article set out to analyse how Dutch regulations on freshwater supply are applied in a water-scarce area and what could be concluded in terms of adaptiveness concerning the application of those regulations in two different arrangements in the field of freshwater supply. Clearly, the Dutch national laws offered room for two entirely different arrangements to pursue the aim of water supply. This variation is largely owing to the fact that the Dutch legal system for water management is not governed top-down from a national perspective, but offers discretion to regional authorities in a polycentric way. The national laws do not embody all elements to enable an adaptive approach. The involvement of the public is only foreseen through general participation in decision-making obligations, as water resource management is constructed as a public task under national law.

The case studies have shown, nonetheless, that private parties play an important role at the local level. The construction of a pipeline from Zuid-Beveland to a different river basin involved various public and private actors to start the process. However, following completion of the project the continued involvement of public and private actors disappeared, as it is not a necessary part of the arrangement for the operation of a pipeline. By contrast, the irrigation canals on Tholen are the result of a long-term relationship between both public and private actors, which continues under the current regime.

This arrangement was developed on the basis of pilot projects and workshops, which the regional water authority specifically arranged in order to receive feedback from the farmers. The arrangement has an ongoing feedback loop in which performance data is continuously shared with the farmers through the advisory board, which can suggest amendments. Together with the possibility to finance improvements through a specific tax, the ongoing feedback loop facilitates the creation of a new arrangement if Lake Volkerak Zoom becomes saline. Both arrangements differ considerably as regards the opportunities for continuous scientific and social learning.

These arrangements were developed to increase water availability for agricultural purposes, thus giving farmers a better position in times of drought than might be apparent from the national emergency prioritisation list. One of these arrangements can be described as adaptive and, whilst the other was developed along the lines of the adaptive approach, it did not continue along this path owing to the characteristics of the adaptation measure itself. The systematic comparison of both arrangements undertaken in this article shows that the legal system did not change to enable adaptation, despite the fact that it was not being designed to deal with structural and irregular water shortage. Even the general rule that water is free remained in place; however, arrangements were developed in which farmers pay for the delivery of water in exactly the same way as consumers do.

The crucial elements that make the legal system adaptive are its polycentric structure and the lack of national laws relating to water resource management. This offered provinces, regional water authorities and private parties considerable discretionary room to create their own regulations to deal with water scarcity as and when it occurred. It is remarkable that, in both arrangements, the apparent public dominance in water management gave way to a different reality of cooperation between the authorities and private parties. However, this is not embedded in legislation.⁹⁹ Thus, it can be concluded that, despite the lack of attention to cost recovery and social learning, the Dutch legal system has passed the test set out for it by enabling both regional and local levels to overcome these flaws and adapt.

⁹⁹ Keessen, van Daalen and van Buuren 'Participatie in water management: goed voorbeeld doet volgen?' (n 36) 2117–24.