

## CASE STUDY

### **"BOER BIER WATER – FARMER, BEER AND WATER", THE NETHERLANDS**

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## 1 Introduction: What is the case study about?

The case Farmer, Beer and Water is located in the south of the Netherlands, in the province of North-Brabant (see Figure 1). It is a regional/local case dealing with local ground and surface water resources in the municipality of Laarbeek, and in particular in the catchment area of the small river Goorloop. The case concerns one brewery (Bavaria), a network of about 70 farmers, and other stakeholders like the regional water board, municipality, and the province of North-Brabant. In other areas in the Netherlands, there are comparable cases on the management of freshwater resources.



**Figure 1** Location of the case Farmer, Beer and Water in the Netherlands.

The ultimate goal of this case is to maintain a sufficient quality and quantity of groundwater in the area. As such, it focusses on groundwater extraction by farmers for irrigation and the Bavaria Brewery for its production process. Bavaria Brewery extracts each year 2.5 million m<sup>3</sup> of groundwater for its brewing process. This water is extracted from the area near its factory. This extraction affects the farmers in the neighbourhood because they use water in case of droughts in the summer period. At the same time about 1.5 million m<sup>3</sup> rinse water per year is discharged into the Goorloop and finally leaves the area. The Brewery is obliged by the province of North-Brabant to reduce the discharge of nutrients (phosphates).



The common interest among the brewery and farmers is in conserving the public resource of groundwater, sustainable use of soils, and creating an image towards sustainability. Until now, farmers have been financially compensated by the Brewery in case of droughts. The idea behind this case is that water authorities, local agrarians and Bavaria Brewery find alternative (and sustainable) solutions for (looming) water risks in agriculture. Together they cooperate to diminish effects of drought for agrarians by reusing the process water of the brewery on the one hand, and increase water quality by the deployment of new technologies on the other. The initiative in this project is primarily taken by the private stakeholders.

Farmer, Beer and Water can be characterised as a social innovation. The various stakeholders constitute a social platform that addresses local sustainability issues – issues that go well beyond the individual, and require collaboration with multiple actors in the area. As a social platform, Farmer, Beer and Water initiates sustainability projects aimed at conserving groundwater resources in the long run, soil management, plant protection, and production of local barley. The platform started in 2011 at the initiative of the Bavaria Brewery, and launched its first project in 2013 (which had a duration of three years).

Relevant stakeholders and actors are amongst others:

- Bavaria Brewery
- Local farmers and the regional farmers Union (ZLTO)
- The municipality of Laarbeek
- The province of North-Brabant
- The regional water board Aa en Maas
- The national ministry of Infrastructure and the Environment (in particular *Rijkswaterstaat*, which is responsible for the design, construction, management and maintenance of the main infrastructure facilities in the Netherlands)

Based on Annex 1 of Deliverable 1.2, the ESBOs provided in this case are:

- a) Water quality: maintaining a good chemical status of groundwater, i.e. low contamination levels.
- b) Water availability: maintaining the capacity to ensure regular flows of water supply and discharge, i.e. avoiding water scarcity and discharge peaks.
- c) Soil functionality and soil protection: maintaining good biological and geochemical conditions of soil, and maintaining minimisation of soil degradation.
- d) Species and habitats: achieving or maintaining the presence of diverse and sufficiently plentiful species and habitats (ecological diversity).
- e) Maintaining or restoring a high level of landscape character and cultural heritage.
- f) Outdoor recreation: achieving or maintaining a good level of public access to the countryside to ensure public outdoor recreation and enjoyment.
- g) Rural vitality and social cohesion: achieving or maintaining active and socially resilient rural communities and social rehabilitation activities in relation to farming.

Farmer, Beer and Water initiates sustainability projects (mainly for farmers). As a platform, it applies for subsidies and grants that help to fund these projects. Because of the various aspects of sustainability, the platform operates in a variable and flexible composition. For in-

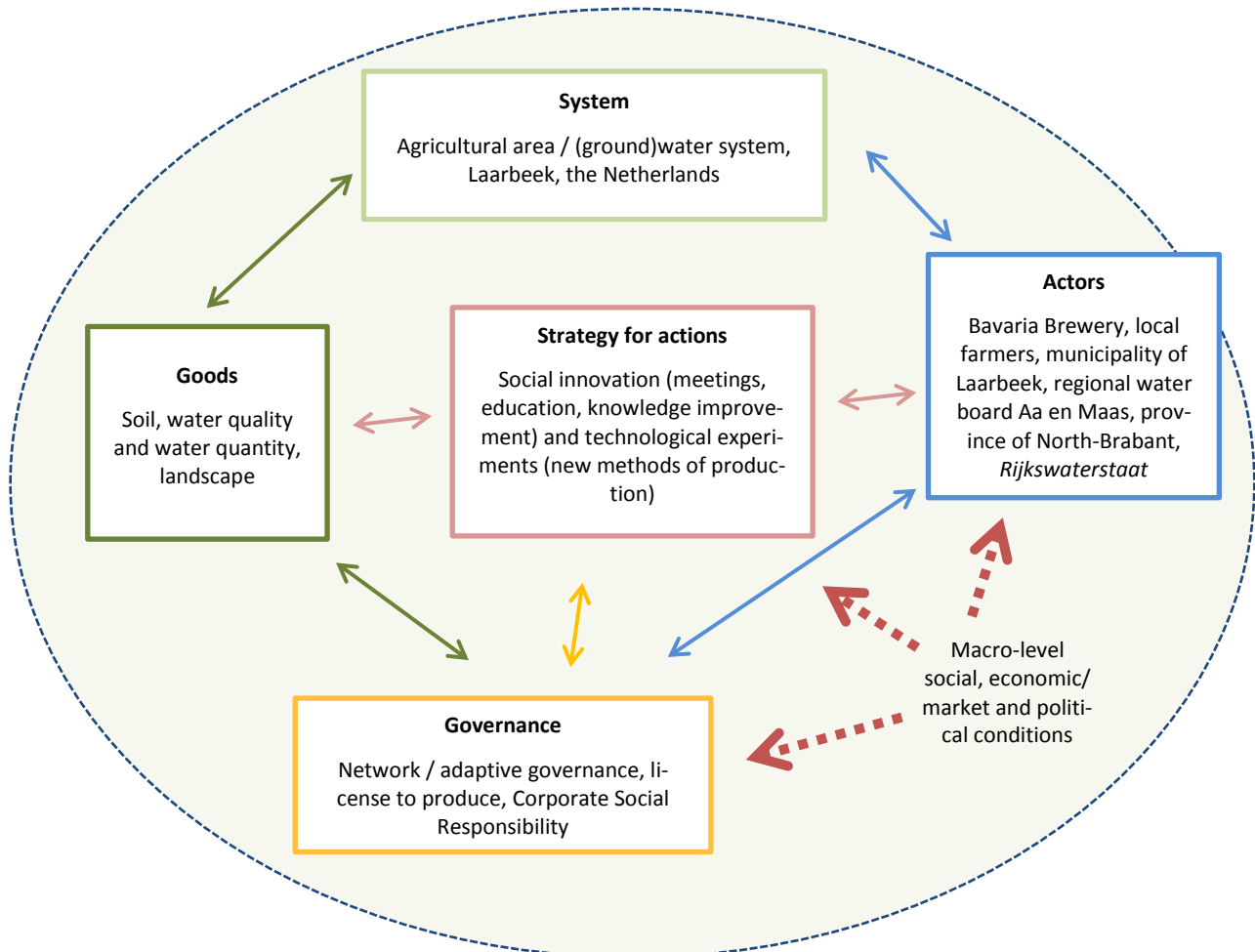


stance, issues related to, say, implementation measures to increase buffering capacity of soils are relevant for the arable farmers in the area, but less relevant for the non-soil bound vegetable farmer or for the regional water board “Aa en Maas”. This in contrast to issues that touch upon the reuse of waste water for irrigation.

The advantage of the platform is that stakeholders with different and sometimes competing interests engage and participate with each other in an inclusive, transparent and accountable manner to realise these projects and hence, to improve a sustainable use of groundwater in the area. The key institution of the governance arrangements that makes the platform work is to be a network, a form of self-organisation based on information sharing, trust and deliberation. For Bavaria Brewery, the challenge is to merge corporate governance with Corporate Social Responsibility.

## 2 Definition of the social-ecological system (SES) studied

### 2.1 Figure of the SES, using the SES Framework



### 2.2 Short characterisation of key drivers/motivations

Key drivers and motivations are first and foremost economic. Bavaria Brewery and the farmers are aware of the fact that a good quality and the availability of groundwater in the long



run is essential for running and growing their businesses, now and in the future. Collaboration offers Bavaria the potential to develop an alternative for an expensive sewage installation. Marketing aspects (a positive image) and Corporate Social Responsibility are also important drivers for the Brewery. For farmers, an important driver is to reduce the effects of droughts by recycling process water from the Brewery. Another financially-based motivation is the reduction of transaction costs. That is, working together in this case makes it easier for the various stakeholders to get in contact with each other at the appropriate level. Getting to know each other breaks down barriers, and avoids the tension of bureaucracy. So, all in all, sustainability equals cost reduction. Moreover, both Bavaria and the farmers acknowledge that a healthy natural environment is important for social wellbeing and for the economy in the area.

Beside the so-called extrinsic motivations, related to economic incentives, there are intrinsic or non-economic motivations. They are related to values such as life satisfaction and fairness but also to the desire to work for good cause. An important intrinsic motivation here is curiosity for new and innovative production techniques that reduces the use of pesticides and fertilizers (such as the implementation of remote sensing and use of foil in the fields). Another intrinsic motivation is a certain feeling of warm glow: the positive feeling that people get from doing good for the environment.

Building and fostering relationships between stakeholders through trust (see also below) is particularly important to ensure compliance with environmentally friendly production techniques. That is, compliance is on a voluntary basis. BBW will thus not actively pursue enforced compliance through administrative remedies, penalties or the power of authorities. Compliance is further enhanced by field trips, excursions, farm visits and entry of data.

### **2.3 Description of other important variables chosen**

The social, economic and political setting of the case can be characterised by multi-level governance. Water issues are dealt with by the government at different levels – national, provincial, local or municipal. The level depends on the nature and scope of the issues concerned. For example, the national ministry of Infrastructure and the Environment is responsible for the larger canals in the area which could be used a storage facility. The water board and the province are responsible for local and regional water issues. At the local scale the Brewery started to supply process water to local farmers. The SES is restricted to the municipality to maintain a strong (social) network. This local network is important for developing operational choice rules, collective choice rules, monitoring and sectional rules. Connections within the network are tight and allow for a flexible partnership.

Key to the local network is a public-private partnership in which the Brewery (agri-food supply chain), farmers, farmers union and governments from different levels participate at a local scale. To frame the water resource as local issue is crucial to safeguard the interests of all the participants in Farmer, Beer and Water (hereafter abbreviated as BBW). The total number of actors is about 50 to 60, including the farmers. The role of the actors differ, some are more active than others. A group of key actors from the farmers union (ZLTO), the Brewery and governments, together with representatives of local farmers and landholders are important for leading the case process and for innovation and entrepreneurship in BBW.



They collaborate in this setting about 5 years in which they experimented, exchanged knowledge and developed a way to retain cleaned process water in the region. They argue that it is important that the SES users are from the same area for reasons of effectiveness but also for cultural reasons ('like knows like'). There is high level of trust among BBW participants, who are all embedded in local communities and the organisations involved.

Several policy fields like the (European) Water Framework Directive (WFD) as well as requirements in the food process industry concerning the use of cleaned process water provide important (boundary) conditions for BBW (and its related activities) to operate.

#### **2.4 Discussion of the SES**

The governance in this case is based on an arrangement that facilitates and promotes participation of and a shared understanding among stakeholders and social networks. In fact, it expands adaptive management practices of environmental systems (soil, water) to address the broader social contexts that enable ecosystem-based management. The capacity of the actors to respond to ecosystem dynamics and to make sustainable use of ground water and land depends on the processes that generate learning, meaning, knowledge, and experience. Here, different types of knowledge for learning seem to be essential (e.g., field trips, information meetings, access and use of the knowledge produced by knowledge institutes). Another important item here is that farmers who decided to switch to a more sustainable production process had to be aware that they learn to live (at least more than conventional farmers) with change and uncertainty. Finally, Bavaria mentioned that in this social-ecological system, diversity is crucial, and that therefore sources of resilience for renewal and reorganization should be nurtured.

#### **2.5 Common aims, conflicting interests and goals**

The common aim in this case is to maintain a sufficient quality and quantity of groundwater in the area. The shared interest among the Brewery and farmers is in conserving the public resource of groundwater, sustainable use of soils, and creating an image towards sustainability. Bavaria Brewery emphasizes the local level of the case, and stresses that it should be restricted to this local level. The Brewery says: "Bavaria is committed to the project for the long run, but especially in this area. This also applies to many horticulturists and other agrarians in the area. With the project Farmer, Beer and Water we create mutual understanding and we find interesting, practical ways to work together" (Bavaria NV 2013).

Although joint benefits may be created, self-organizing to sustain groundwater resources costs time, and effort can result in a loss of short-term economic gains. As with any organization, there are farmers who do not join BBW because they believe that these costs outweigh the benefits. So, also here holds that users need to observe some advantage before they invest in self-organizational perspective of BBW.



### 3 Status of the SES and potentials

#### 3.1 Description of the SES

In short, BBW revolves around ground water extraction, soil protection and the cultivation and harvest of barley. The ultimate goal is to create an attractive and sustainable area, for long-term economic development (farming, brewing beer) but also for recreation. Participation in BBW is voluntary. The ‘desired’ outcome of BBW has never been expressed or assessed in quantitative terms. As such, it is unclear what is needed (number of farmers involved, agricultural area managed in an environmentally friendly manner, ... ) to achieve the ultimate goal of BBW (as mentioned above). In other words, the size of the necessary critical mass to produce tangible results is unknown.

Because ground water is important as a resource for the production process of farmers and the Brewery, the key-stakeholders are aiming for a sustainable use of this local resource:

- To prevent effects of droughts in agriculture (ESBO: water availability)
- To have a safe resource for brewing beer (ESBO: water quality) and good soil quality (see BBW website and Bavaria, 2014).

Participants of BBW are aware of the fact that groundwater is finite in the sense that standards of quantity and quality of ground water are not guaranteed for ever. As farmers and the Brewery are making use of the same resource in Laarbeek they have to interact and coordinate actions. Water which is discharged locally will reduce the impact of short term drought problems and partly be a resource for future brewing because after at least 25 years this water will reach the water layers where the brewery will be pumping (Bavaria, 2015).

The brewery is pumping water from the region’s aquifers for its production process (about 1,5 million m<sup>3</sup> litre per year). The basic idea is to keep the water within the area (local SES) in order to be able to produce in a sustainable way. Most water is still discharged into the North Sea via the stream Goorloop, the river Aa and the Meuse. The province of Noord-Brabant obliged the Brewery also to reduce the surface water pollution caused by the discharge of waste water (see also Dongen, 2014). Cleaned process water is used by neighbouring farmers for irrigation purposes. This is also cost saving for the Brewery because their water discharge is reduced. Currently, farmers are financially compensated by the Brewery for production losses in case of droughts.

Sustainable soil management (ESBO: soil functionality and soil protection) and reducing the use of plant protection products are important for BBW. To reduce the use of plant protection products, farmers experiment with innovative machinery and a local weather station. By use of specific and local weather forecasts and radar measured rainfall, forecasts can be tailored to fit the local conditions at a farm site. This is potentially beneficial for both farmers and the Brewery, although some techniques are experimental and have not been proven yet. As a result, it can be difficult to get funds and subsidies for these experiments.

The barley that local farmers produce is used as input for premium beer production. Besides, barley is attractive from an environmental and landscape perspective (synergy). In the area, farmers are used to produce maize (as a fodder), that tends to establish a homogeneous and





uniform landscape. Barley fields with their golden colour, on the other hand, increases the variety and attractiveness of the landscape. In 2015, 12 farmers have grown in total 30.4 ha of barley. This barley is used for a premium brand of Bavaria: *Swinckels' bier*. Not all the barley was of the required quality, however, and has been used for feeding dairy cattle by one of the farmers of BBW.

So, in addition to a sustainable use of groundwater and the development of sustainable on-farm soil management, BBW contributes to a diverse landscape and biodiversity (ESBO: maintaining or restoring landscape and cultural heritage and ESBO species and habitat). A touristic cycling route has been developed for showing results of BBW (ESBO: outdoor recreation). The network contributes to rural vitality and social cohesion (achieving or maintaining active and socially resilient rural communities) as will be discussed in Section 3.2.

### **3.2 Relationships between farming and forestry, and the quantity and quality of ESBOs**

As mentioned earlier, BBW focusses on groundwater extraction by farmers for irrigation and the Bavaria Brewery for its production process. In fact, it seeks to efficiently re-use clean process water, in order to enhance responsible land use and sustainability. To do so, it seeks to establish a water cycle so the process water from the Brewery (that otherwise would just be discharged into the sewage disposal) can be re-used for the region's agriculture. In order to use water more sustainable, a key element in BBW is to retain process water from the Brewery in the region for irrigation during drought periods.

Groundwater as a key ESBO is a fluid and therefore mobile, in the sense that it can move, can be transported and can leave the SES as well. The ESBO is 'finite': standards of quantity and quality of ground water are not guaranteed for ever. Water is becoming scarcer and more expensive as pressure on supply continues. Therefore, the Brewery started to supply process water to local farmers, but transportation of process water is costly. The basic idea of BBW is to use the resource in a more sustainable way by maintaining the water quality at an acceptable level for brewing beer and to keep process water within the area. The participants in BBW do understand the SES and the linkages between their efforts to achieve greater sustainability and, for instance, landscape scenery. And although the monetary value of the various natural resources (soil, ground water, landscape) for each participant was not known (and had never been expressly stated or calculated), this 'price tag' was not needed to prove the importance of these resources. That is, the participants are all aware of the economic relevance of these natural resources to them and the other participants, despite the fact that this relevance had never been expressed in monetary units.

### **3.3 Key motivational, institutional and socio-economic factors**

The key motivation factor is to use water resources in a sustainable way so that future generations are able to continue the production of beer and agricultural products. So, crucial here is that participants are either dependent on the groundwater for a substantial portion of their economic activity (farmers and the Brewery) or attach high value to the sustainability of the resource (municipality, regional water board).

Participants of BBW share a lot of information during meetings and other (social) events/occasions. However, not every farmer has the same goal and/or level of activity in





BBW, and it appears to be difficult to involve every farmer in the region. As a social platform, BBW is active in lobbying, networking, and self-organizing. Social aspects are important, and BBW strives for a practice-oriented approach, across different (agricultural) sectors. Field trips and experiments are most likely to get farmers engaged in BBW. After all: “seeing is believing” and “tangible results are key”.

Since the start of BBW, ecological performance has been improved, which motivates the participants to continue. Reduction of fertilizer and pesticide application takes place through innovative production techniques, such as the implementation of remote sensing, precision farming and use of foil in the fields. Moreover, it has been said that the local weather station has played an important role in the reduction and more precise use of pesticides. After all, advanced knowledge of weather conditions enhances the efficiency and effectiveness of fertilizer and pesticides use. The farmer can, for example, decide not to fertilize if rain is predicted.

From a more social perspective, participants consider the celebration of successes – both big and small – as an important factor for the success of BBW.

### **3.4 Levels of provision, trends and determinants**

Quantity and quality of ESBOs have hardly been assessed yet. Of course, people make use of the touristic cycling route, and birds use the artificial nest opportunities (one of the collaboration’s projects of BBW). And the level of level of landscape character can – more or less – be assessed by the area of barley (in total 30.4 ha). But it is too early to determine trends and variations in levels of ESBOs.

Moreover, the BBW receives good PR and publicity, mainly because of the various stakeholders involved and the fact that – despite the different interests – they have one common goal, namely to increase the sustainability of the area. However, not many visible and appealing results have been realised thus far. The most important results are underground, such as a first agricultural drainage system to transport the process water. Stakeholders are aware of the fact that all the publicity raises expectations and pressure.

Farmers have the feeling (not quantified yet) that BBW raises the public understanding of and appreciation for how they work and what they do. BBW makes the farm a little less of a black box that produces a nasty smell. Moreover, during the workshop it was mentioned that due to BBW, the social cohesion of the local community has been increased.

### **3.5 Relevant governance arrangements and institutional frameworks**

BBW is bottom-up project/multi-stakeholder organisation (see also Bavaria, 2014): e.g. to apply for subsidies and to operate in workgroups on different topics. The internal network consists of 50 – 60 farmers and other stakeholders. Important for governing their resources are personal contacts, opportunities to connect directly to networks of participating organizations. BBW-participants argue and demonstrate that they are practical and pragmatic, remain brief, and focus on feasible objectives. The idea is to just not talk, but to act practical



and to start to really do things – and to celebrate successes with the stakeholders (to build social capital focussing at the “human scale”).

The success of BBW is partly dependent on (i) the ability to raise subsidies to support experiments and innovative machinery; and (ii) the commitment of the larger group of less active farmers. The contributions of the participants to the network include personal time and effort, manpower, knowledge and finance. Having a budget to experiment or to exchange knowledge is crucial for the sustainable use of local resources. However, it is often time consuming and difficult to apply for grants and budget funding. Although BBW has been successful in the past, results obtained in the past are no guarantee for the future. Commitment of participating farmers is, however, also dependent on the ability to experiment or to exchange knowledge, and thus on the availability of subsidies.



## 4 Conclusions derived from analysis in Steps 1 and 2

### 4.1 Key findings on the particular SES and its potentials

The case of BBW can be characterized as a self-organizing social platform. It focuses on groundwater extraction by farmers for irrigation and the Bavaria Brewery for its production process. As such, BBW is rather unique: due to the costs of observing and managing a system, theory says that self-organization is less likely with mobile resource units, such as groundwater, than with stationary units such as trees and plants or water in a lake. The practice of BBW shows that self-organisation is possible in the case of mobile resource units.

### 4.2 Governance arrangements and institutional frameworks

Social aspects (such as personal and informal contacts) are important, and BBW strives for a practice-oriented approach, across different (agricultural) sectors (see also previous sections, for example section 3.3.). Field trips and experiments are most likely to get farmers engaged in BBW. After all: “seeing is believing” and “tangible results are key”.

### 4.3 Other enabling or limiting factors

Most of the dimensions of BBW are typically at a local scale, which has the advantage that the various participants share moral and ethical standards regarding how to behave in the self-organization they form, and thus the norms of reciprocity. This results in lower transaction costs in reaching agreements. Crucial here is that they have sufficient trust in one another to keep agreements. Moreover, due to the local scale, it appears that participants of BBW share common knowledge of relevant SES attributes and how their actions affect each other, which result in the fact that they perceive lower costs of organizing.

### 4.4 Reflections on the case study methodology used and potential improvements

By only interviewing people who are involved in BBW, there is a risk of solely hearing so-called ‘hallelujah-stories’. That is, the closer the involvement, the more enthusiastic and optimistic about the (future of the) project – like a butcher who approves his own meat, or an auditor who has to mark his own paper. Therefore we must be conscious of the risk of inward looking. The opinion of outsiders can be valuable. Hidden among critical comments and viewpoints of people outside the BBW-platform are, after all, lessons. Therefore, the major improvement in the case study methodology lies in extending the number of interviews by including non-BBW participants and ask them to reflect on the project’s successes, failures, challenges and missed opportunities.

## 5 Research and action mandate for Steps 3 and 4

### 5.1 Agreed objectives of activities to be undertaken with initiative/stakeholders

The stakeholders of Farmer, Beer and Water are keenly interested in our work and very motivated to learn from our findings and other cases as well. Therefore, we will have another meeting with the stakeholders after the summer to gather feedback on the results, and pro-



vide them with (new) ideas on the future of the case. This meeting will take place independently of whether or not BBW will be analysed more in depth in phases 3 and 4.

During the meeting with the stakeholders, we will present:

- a comparison of BBW to other cases;
- a final case-study report; and
- a translation of the findings into Dutch.

Key questions are how to sustain local networks like BBW in managing SES. It is a flexible network aimed at managing local resources. For PEGASUS, lessons learned from this type of approaches/networks will be beneficial for other regions as well. Developing approaches to experiment with sustainable production processes and exchange this knowledge are important for many regional and local SES. On the other hand, developing revenue models behind these experiments and knowledge exchange are important for networks like BBW. Transferability of approaches is therefore of great importance.

Key questions for phase 3 and phase 4 will therefore be focussed on the comparison with and the search of lessons learned from other cases. For BBW this is important to make the case (more) future-proof.

## 5.2 Innovations, impact, transferability, potential risks and research bias

As we have shown in this report the approach of BBW is innovative in raising awareness, appreciation and provision of PG/ESS. In the Netherlands, there is a lot of interest from other regions to learn from the approach of BBW. The successful cooperation of BBW stimulates and inspires other regions as well (e.g. reducing plant protection products, barley production, tackling impact of droughts). As a result, BBW even won a regional award for sustainable business initiatives. The organisation succeeds to connect stakeholders in an efficient way. Bavaria and farmers are more embedded in the region (e.g. cycling tour). For residents in the area, the farm is becoming less of a black box, which only produces smelly manure, and more of a transparent and open box – due to all the PR and (local) press interest.

The stakeholders are very willing to cooperate. Even after our workshop they still supplement us with new ideas and suggestions on how to proceed. Therefore, not surprisingly, there is a desire and interest among relevant stakeholders to continue with phase 3 and phase 4.

## 6 References (including projects docs, evidence reports etc.)

### Websites and discussions

- Discussions with stakeholders: e.g. several meetings with project coordinator ZLTO (December 2015 – June 2016, a dairy farmer (May 2016), 2 horticultural farmers (May 2016), and the water board (May 2016)
- Attending meetings BBW (celebrating completing infrastructure to pump water and board meeting, March 2016 and April 2016)
- Signing in statement of intent on BBW



- Waterboard: <http://www.aaenmaas.nl/nieuws/2016/03/ondertekening-intentieovereenkomst-boer-bier-water.html>
- ZLTO (farmers union): <http://www.zlto.nl/item/15434/Restwater-krijgt-nieuwe-functie>
- General: <http://www.aaenmaas.nl/nieuws/2016/03/ondertekening-intentieovereenkomst-boer-bier-water.html>
- General: <http://duurzaam-actueel.nl/bavaria-zet-vernieuwende-stap-hergebruik-proceswater/>
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- <http://www.ad.nl/ad/nl/1012/Nederland/article/detail/4177277/2015/11/03/Water-van-Bavaria-voor-de-grond-van-boer-Wilfried.dhtml>
- <https://onsbrabantfietst.nl/projecten/boer-bier-water-fietsroute>

## Reports

- Bavaria (2015, 2014) Corporate Social Responsibility report (in Dutch), Lieshout
- Evelyne van Dongen (2014) Innovative water system governance arrangements; An evaluation of three projects in which authorities and local stakeholders cooperate, Wageningen University
- Projectgroep Boer, Bier en Water (2014) Projectdefinitie Hergebruik Proceswater Bavaria; Verdrogingsbestrijding Lieshout (in Dutch)
- Bavaria (2013/2014) Boer, Bier en Water. In: De brouwers van morgen.; Magazine Nederlandse Brouwers, edition 2013 and edition 2014 (in Dutch)
- Dagevos, H. E. de Bakker, T. Vogelzang, M. Meeusen, R. Bongers, E. van den Brink, J. Baidenmann en H. Sasburg (2015) De kunst van verbinden; Pluriforme praktijkvoorbeelden binnen en buiten de agrifoodsector. LEI Wageningen UR/Het Portaal/Isduurzaam, Den Haag (in Dutch)



## 7 ANNEX Interviews and meetings

- Bart Bardoel (farmers union (ZLTO) project leader BBW, several meetings and phone calls in period January – July 2016)
- Interview Paul Sneijers (farmer, 13 May 2016)
- Interview Leon Verbakel (farmer, 13 May 2016)
- Interview Gerard Kouwenberg (farmer, 13 May 2016)
- Interview Joost Rooijackers (waterboard Aa en Maas, 13 May 2016)
- Workshop with network BBW on first results PEGASUS (7 June 2016)
- Attending regular meeting of network (26 April 2016)
- Attending celebration of new facility for transporting process water BBW (23 March 2016)

