SUWANU
EUROPE

SWOT and PEST analyses for implementation of reuse practices Antwerp and Limburg, Belgium

Contents

Socio-economic characterisation of the region

Antwerp and Limburg are two provinces located in the northeast of Flanders (Belgium). The region includes some compact cities (Antwerp, Mechelen, and Hasselt). Highly dispersed suburban zones characterise the landscape, although some regions with dominant agriculture and forestry still prevail. Both provinces are characterised by a high (Limburg 364.5 inhabitants/km^2) to very high (Antwerp 658 inhabitants/km^2) population density. This reason, together with the relatively moderate supply of surface water, explains the area's low water availability (1.100 - 1.700 m^3 water per capita). Intensive pig and poultry farming, and dairy production are important agricultural sectors in both provinces. Furthermore, vegetable production in greenhouses prevails in the region between the cities Mechelen and Antwerp, while fruit production characterises the Southern part of the province. Pressure on the groundwater resources and deviating precipitation patterns are predicted to further increase in the future due to climate change. Today, reclaimed water is only exceptionally used in agriculture. Nevertheless, reclaimed water is considered an important alternative for the future – especially in cultures of potato and vegetables.

SWOT Analysis

The SuWaNu Europe SWOT departs from the SWOT developed in SuWaNu (2012). The proposal for this project is adapting the different aspects identified in 2012 and reclassify them following to three categories: market-related, product-related and, social & governance.

In the Belgian region, the strengths, weaknesses, opportunities and, threats were identified during a workshop with stakeholders. The stakeholders' group consisted of representatives of all actors related to the topic of reclaimed water in agriculture (policymakers, farmers' representatives, water technology companies, wastewater treatment suppliers, government institutions and research institutions from the region of Antwerp and Limburg). After a brief introduction and set out of the regional situation, the stakeholders were invited to give their insights concerning the rollout of reclaimed water for irrigation in the region. The inputs were classified according to the general framework defined with the SuWaNu EU consortium. The discussion and brainstorming in smaller groups enabled to end up with a first draft of the SWOT analysis.

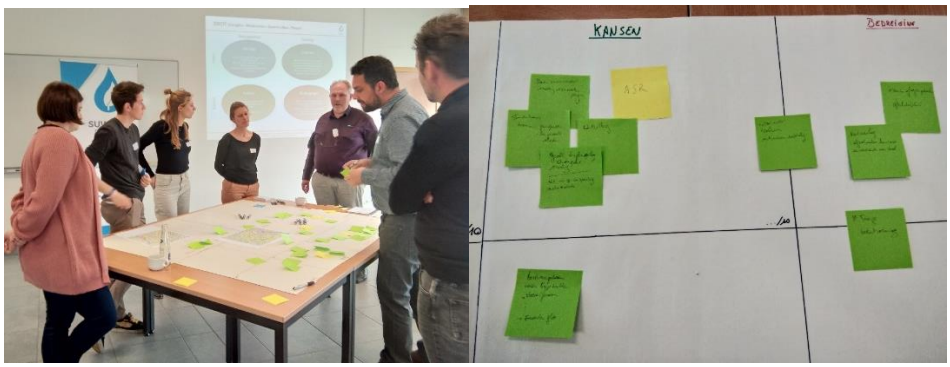


Figure 1 SWOT workshop with stakeholder group

In a second phase, the contributions were analysed, reclassified and, formulated in a clear way. The re-structured SWOT analysis was sent to the different stakeholders to score the aspects according to their relevance and give additional feedback.

The last step included the analysis and interpretation of the results.

Strength

General Aspects	Specific Aspects	Antwerp and Limburg region
Market-related	**Economic aspects**	
	Price	S1. The cost of treated waste water is cheap (not considering extra treatment, transport, storage...).
	Water availability	
	Land use	S2. No on-farm buffering needed (compared to water basins for rainwater).
	Supply of water resource	S3. Even in periods of droughts, there is a supply of treated wastewater.
	Enhances water availability	S4. By reusing water, it reduces pressure on groundwater and surface water resources in the region
	Water quality	
	Constant water quality of water resource	S5. The water quality of effluent water of large-scale WWTP stays constant (predictable).
	Markets	
	Market Demand	S6. Farmers show interest in the use of this water resource (positive attitude of farmers).
Product related	**Technical aspects**	
	Knowledge/technology	S7. The knowledge and technology for further treatment of this water source to reach the set quality parameters is available.
Social & governance	**Regulators**	
	Legislation	S.8 The water quality of reclaimed water complies with current legislation/policy
	Sector standards	S9. Water quality complies with current water quality standards from the sector (vegaplan, globalgap..).
	Environmental	
	Enhances environmental quality	S10. Using reclaimed water during droughts decreases nitrate leaching. Less N and P from effluent in water streams.

Weakness

General aspects	Specific aspects	Antwerp and Limburg region
Market-related	**Economic aspects**	
	Cost	W1. The price of the "classic" water resources is still very cheap, while the cost of treated waste water is expensive (considering extra treatment, transport, storage, ...).
	Water availability	
	Buffering of water	W2. At the 'effluent source,' there should be a buffer to take up the water.
	Water resource distribution	W3. No distribution net available for water reuse (the cost of distribution network is expensive) and road transport not optimal.
	Water quality	
	Variable quality of water resource	W4. Small-scale WWTP deliver variable quality of effluent
	Markets	
	Competition	W5. Competition with the industry for the reuse of water (they need water the entire year, have more capital for investments, less risks for food security or environmental contamination …)
	Demand for water	W6. Farmers will use reclaimed water only in periods of drought.
Product related	**Technical aspects**	
	Water resource distribution	W7. No distribution net available for water reuse (the cost of distribution network is expensive) and road transport not optimal.
	Treatment intensity	W8. Extra treatment to ensure low Na concentration (for greenhouses), low heavy metal, pesticide,... concentration (although these are not necessarily required from a legal perspective)
Social & governance	**Regulators**	
	Legislation	W9. The legal framework restricts use of this water source (or only in cases of severe drought). It is unclear about the implementation of reclaimed water in the Manure decree (MAP)

	Sector standards	W10. Limited information available for users on the water quality
	Environmental	
	Ecology	W11. The use of reclaimed water will reduce the discharges in rivers and affecting the ecology. Risk for soil contamination with heavy metals,….
	Energy consumption	W12. High energy consumption to deliver water resource

Opportunities

General aspects	Specific aspects	Antwerp and Limburg region
Market-related	**Water availability**	
	Inventory of (local) water needs	O1. Have a precise view on the local (and regional) water needs and supplies.
	Markets	
	Market demand	O2. Demand of agricultural sector for the use of reclaimed water can lead to economies of scale.
Product related	**Technical aspects**	
	ASR	O3. Aquifer Storage and Recovery
	New and cheap technologies	O4. The development of new and cheap technologies might enhance the cost-effectiveness and implementation
	Business model development	O5. Investigation concerning cost-effective implementation (technologies/distribution/…) of reclaimed water possibilities
	Technology transfer	
	Technology transfer	O6. Learn from other countries with implemented practices (Spain, Cyprus, Israel,….). Initiatives like SuWaNu Europe and Operational Groups (Awair) will increase knowledge transfer from outside Flanders/Belgium to the Flemish agricultural sector.
Social & governance	**Social aspects**	
	Positive public opinion	O7. Positive attitude of consumers

	Regulators	
	Legislation	O8. Upcoming regulation on reuse of water for irrigation at both the EU and Flemish offers framework for the use of reclaimed water : certainty on water quality , WWTP responsibility, standards,…
	Political vision	O9. Willingness to implement reclaimed water as a structural resource.
	Strategical water priority plan (“afschakelplan”)	O10. The "water priority plan" might give the agricultural sector less access to 'classic water resources' . This will enhance the need for alternative water sources such as reclaimed water.
	Management	
	Set up of "water committees"	O11. To have good agreements between farmers (and WWTP) to distribute water
	Environmental	
	Drought occurrence	O12. Increased drought occurrence will affect the urgency for reclaimed water sources.

Threats

General aspects	Specific aspects	Antwerp and Limburg region
Market-related	**Economic aspects**	
	Competition industry	T1. Other sectors are also interested to use reclaimed water. This might lead to increased competition.
	Markets	
	Market demand	T2. Weak interest of farmers or WWT suppliers to use reclaimed water.
Product related	**Technical aspects**	
	Technological (in)efficiency	T3. Uncertainty about effective treatment of emerging contaminants: nanoparticles, antibiotics, ….
	Treatment intensity	T4. The use of water in agriculture will need intensive treatments
Social & governance	**Social aspects**	

	Negative public opinion	T5. Negative media attention/incidents
	Regulators	
	Legislation	T6. EU legislation will imply extra treatment costs and thus a higher cost per unit of supplied water
	Political vision and fragmentation	T7. No integrated vision to implement this practice and fragmented policy (OVAM, VMM, VLM, FAVV….).
	Strategical water priority plan (“afschakelplan”)	T8. The use of reclaimed water is seen as measure to overcome droughts. It is therefore only allowed to use in specific occasions for irrigation purposes. This will negatively impact on the cost benefit for WWTP to make special investments for the agricultural sector.
	Management	
	Cooperation	T9. Disagreement between various parties (intra and extra sectoral)
	Environmental	
	Risks of increased soil (and groundwater) contamination	T10. Although legal water quality requirements are fulfilled, the use of reclaimed water might present a risk towards soil contamination.
	Risks towards public health	T11. Although legal water quality requirements are fulfilled, the use of reclaimed water might present a risk towards public health.

PEST Analysis combined with SWOT

The PEST analysis classifies the aspects according to the Political, Economic, Social, Technological, Legal and, Environmental factors. The analysis is found in the following table:

SWOT / PEST	Strength (S)	Weaknesses (W)	Opportunities (O)	Threats (T)
Political aspect (P)	• Sector standards • Legislation	• Sector standards • Legislation	• Political vision • Strategical water priority plan (“afschakelplan”) • Legislation	• Political vision and fragmentation • Strategical water priority plan (“afschakelplan”) • Legislation
Economic aspect (E)	• Price • Land use • Market Demand	• Cost • Competition • Demand for water	• Market demand • Drought occurrence	• Competition industry • Market demand
Social aspect (S)			• Positive public opinion • Set up of "water committees"	• Negative public opinion • Cooperation
Technological aspect (T)	• Constant water quality of water resource • Supply of water resource • Knowledge/technology	• Buffering of water • Variable quality of water resource • Water resource distribution • Treatment intensity • Energy consumption • Ecology	• Aquifer Storage and Recovery • New and cheap technologies • Technology transfer • Inventory of (local) water needs • Business model development	• Technological (in)efficiency • Treatment intensity

More explanation regarding the aspects can be found in the tables of the previous section.

Discussion and conclusion

The following spider graphs resume the relevance of each factor (1- not relevant to 5- very relevant) according to the stakeholders. The results are based on the answers of nine stakeholders (each from a different organisation). They have diverse background, expertise or responsibilities related to the reuse of water for irrigation as represented in the following table.

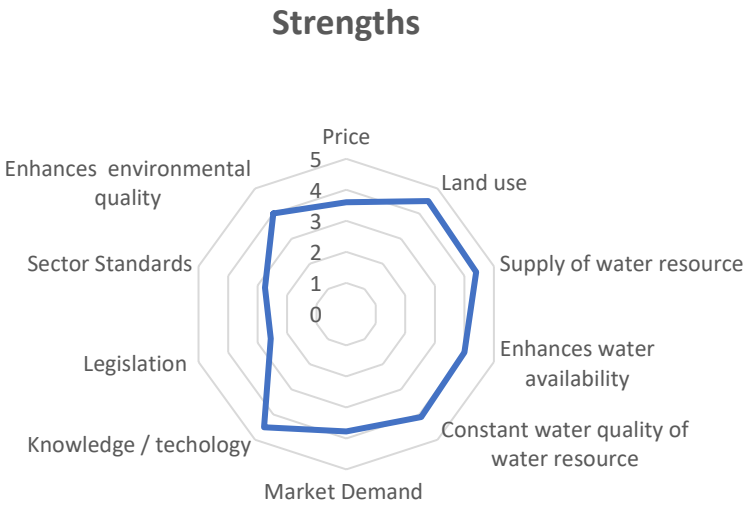
Table 1 Stakeholder organisations participating in the SWOT and PEST analysis

Farmer associations	**Boerenbond, BelOrta**
Private sector	BosAq
Drinkwater supplier	Pidpa
Wastewater supplier	Aquafin
Administration	Flemish Environmental Agency (VMM)
Province	POM, Dients Landbouw & Plattelandsbeleid
Research institution	Research station for vegetable production

The strengths and weaknesses reflect the advantages and disadvantages of using reclaimed water in the current context and compared to other water resources.

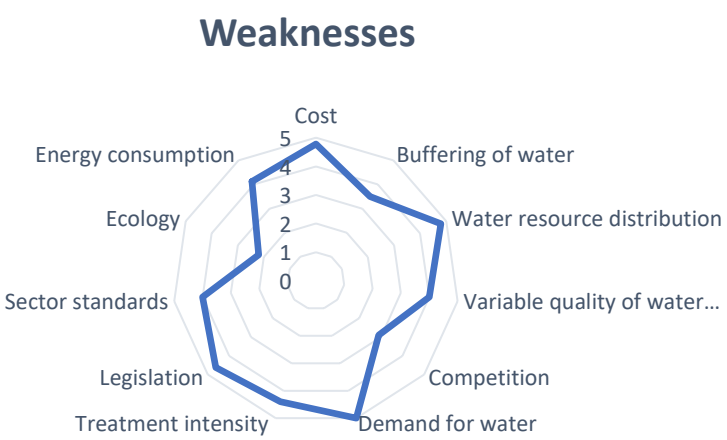
The most relevant strengths of reclaimed water compared to other water resources are :

- The **optimisation of land use**: The current most straightforward practice to ensure water supply is to build water basins. Nevertheless, this implies agricultural land losses and, therefore, often production losses. Since no on-farm water storage is needed for the use of reclaimed water, it is seen as a strength.
- The **constant supply of water**, also during periods of prolonged droughts.
- The availability of appropriate **treatment technologies assuring constant high water quality**.



The most relevant weaknesses of reclaimed water compared to other water resources are :

- The **temporal and discontinuous water demand: it is expected that the demand** of the agricultural sector **for reclaimed water will be** mainly during summer periods in dry years. This is seen as the most important weakness. The sporadic needs of reclaimed water will impede structural investment from both the farmers and the wastewater suppliers.
- The **cost** of additional treatments, storage (at the wastewater treatment plant outlet) and transport of the reclaimed water to the price of treated wastewater from the treatment plant is evaluated as a strong weakness.
- The **lack of a distribution network** is a disadvantage compared to other water resources since the water needs to be transported from the wastewater treatment plant onto the agricultural fields.
- The (current) **legislation** is seen as a weakness for the reuse of water since it restricts the use of the water resource (which is only applicable in cases of droughts). Furthermore, there is uncertainty about future regulations.



Opportunities and threats are external factors that might influence the (further) implementation. The score of the relevance for each factor reflects both the impact and the probability of occurrence.

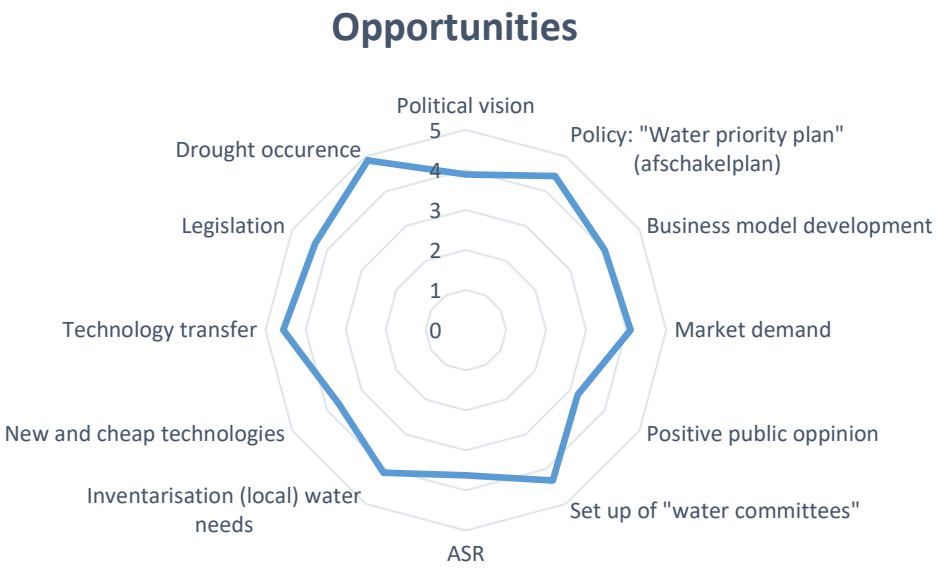
Remarkable is that the political vision, the **legislation,** and the future 'water priority plan' are both seen as an opportunity as well as a threat. This might be due to the uncertainty of future decisions at EU level and the implementation at the national level. From the results of the SWOT analysis, the legislation and policy have a significant influence on the rollout of reclaimed water in Flanders. Whether it would have a positive or negative impact is yet unclear. Concerning the regulatory aspects, GlobalGAP and Vegaplan (private standards) are currently elaborating in cooperation with the BSFA (Belgian Food Safety Agency) when which type of water can be used (and required monitoring).

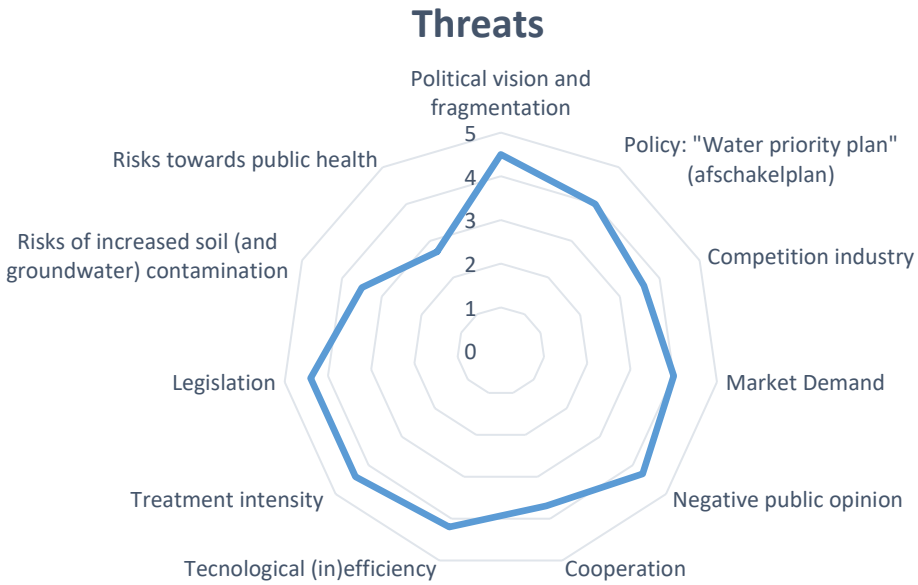
All stakeholders agreed that the **occurrence of droughts** would be the most important external factor for the rollout of reclaimed water for agriculture. Since regional climate scenarios predict more frequent droughts, it is expected to be one of the main driving factors in the future.

The stakeholders scored **technology transfer** as the second highest relevant opportunity. Countries in southern Europe, Israel and the US currently reuse water for agricultural purposes. In this perspective, initiatives as SuWaNu Europe contribute to this aspect.

Most of the stakeholders saw a high potential in the setup of 'Water communities' (among farmers and with wastewater treatment suppliers). Also, the Aquifer Storage Recovery (ASR) technology was considered as a strong opportunity. It must be noted that this option has a rather low probability of implementation in the future (due to stringent legislative limitation) although the impact of ASR would have a high impact on the reuse of water.

The impact on the environment and public health are seen as rather minor concerns since it is expected that the legislation to enforces standards to limit the risks.





The above graphs show the average scores of the respondents. A large variation across the stakeholders' answers must be considered when interpreting the results. Furthermore, the different backgrounds of the stakeholders enable them to score some aspects better according to their expertise.