



SUWANU
EUROPE

SWOT and PEST analyses for implementation of reuse practices in Andalusia, Spain

Contents

Socio-economic characterization of the region	2
SWOT Analysis.....	3
PEST Analysis combined with SWOT.....	15
Discussion and conclusion.....	23

Socio-economic characterization of the region

Andalusia is the most populated region in Spain and the second in terms of extension. More than eight million people live in Andalusia. The capital city is Seville and it is divided into eight provinces. The urban agglomeration around the top ten cities with more than 100,000 inhabitants (the eight provincial capitals, plus Jerez de la Frontera and Algeciras) brings together more than 50% of the Andalusian population and an even greater proportion of employment and economic activity.

Andalusia's GDP is 155.213 million Euros, representing the third largest economy in Spain by volume of GDP although the 17th GDP per capita, in 2017 was 18,470€, compared to 25,900€ of GDP per capita in Spain. The main sectors are services, followed by agriculture, construction, manufactured industry and logistics and communication.

Andalusia's climate is Mediterranean, characterised by dry and hot summers, warm winters and irregular rainfall. However, due to geographical factors, the region has some areas where the climate is diverse, you can find mountains, aridity areas or even Atlantic influenced climate areas. The water availability is also irregular, alternating droughts and rainy periods. For that reason, the water resources vary according to every year rainfall. Nowadays, 70% of water is taken from the surface, 28% is grounded and around 2% comes from alternative resources such as desalinate or reclaimed water. Alternative water resources are mainly desalinated water. There are four plants to desalinate water, three of them are situated in Almeria, the driest province of the region and one in Malaga.

Reclaimed water is already allowed in Andalusia as irrigating source. The Spanish law, RD 1620/2007 allows the use of reclaimed water for five main beneficial uses: 1) urban, 2) agricultural and landscape, 3) industrial, 4) recreational and 5) environmental. The RD 1620/2007 includes certain uses of reclaimed water that are not allowed because of the risks regarding public health and the environment 1) drinking water, 2) food industries, 3) hospitals supplies, 4) cooling in hospital facilities, 4) aquaculture of filtering seafood species, 5) bathing water, 6) water supply for cooling towers and evaporative condensers, 7) landscape fountains and ornamental lakes and 8) any other use that public health authorities may consider a source of public health risk. This prohibition contrast with the 695 treatment plants working in the region and another 27 under construction. These treatment plants benefit a population of 7,118,859 people. This data also means that 12.40% of the population in Andalusia remain unserved of appropriate treatment of their wastewater

With regards to the potential of reclaimed water reuse, Andalusia has (not for agriculture, with some exceptions) a higher average than Spain. With 27% of the more than 2,000 wastewater treatment plants (WWTP) in Spain, the country is technologically prepared to offer tertiary treatments that enable the reuse of reclaimed water and it is estimated that we already reuse more than 492 cubic hectometres per year, 10.43% of the treated wastewater. 90% of the total water reused is concentrated in the Valencian Community, Murcia, Andalusia, Canary Islands and the Balearic Islands and large cities such as Madrid or Barcelona.

Moreover, the use of reclaimed water can benefit the agrobusiness sector which is the third most important sector in the Andalusian economy, behind services and construction. More information about these issues will be detailed below.

SWOT Analysis

SuWaNu Europe's SWOT departs from the SWOT analysis developed in the previous SuWaNu project (2012). The proposal for this project adapts the different aspects identified in 2012 and reclassifies them following the three categories explained in the first part of this document: market-related, product-related and social & governance.

This section makes a description of the main findings of the SWOT. The first step in this updating process was to classify the existing aspects in the new categories and then the SWOT was sent to different experts. The aim of this step was to reconsider the suitability of the previous aspects and the identification of new ones.

The SWOT was sent to three Spanish experts, who sent it back with their comments. All the comments were discussed by the Spanish partners considering aspect by aspect. The relevance of each aspect was determined by a questionnaire. To develop the questionnaire, we depart from the translation of SuWaNu (2012) aspects into Spanish and then the partners defined the most relevant ones and add new ones if they considered. Once the aspects were identified, a questionnaire was elaborated using google forms. This questionnaire was tested by two external experts and the consortium partners in order to produce the final version. Finally, the questionnaire was sent to a group of experts and 22 answers were obtained. The questionnaire of the Spanish cluster is available in the following link: <https://forms.gle/MTXkVzN76e771Fpm7>.



To evaluate the relevance of every aspect, they were classified from 1 (not relevant) to 5 (very relevant). Then the most relevant aspects of each category of the SWOT analysis were included in the following discussion. The key actors that answered the questionnaire belong to the following groups: researchers (7), members of NGOs (5), members of utilities (4), users (2), public administration (2) and agri-food firm. Answers are described below:

Figure 1 - Questionnaire form

In the following pages, you will see the different aspects classified as internal (strengths and weaknesses) and external (opportunities and threats). The tables below show the classification of the different aspects identified by the Spanish experts, combining both the new elements and those selected in the former SuWaNu project 2012. After the tables an analysis of the relevance of the main aspects is included. Finally, the main conclusions are presented based on the questionnaire's results and graphs.

STRENGTH

General Aspects	Specific Aspects	Andalusia region
Market related	Economic aspects	S11. The lowest cost of reclaimed water is reached by processes applied by local agents (0.05-0.015 €/m ³), as compared to the cost of desalinated water (0.6-0.8 €/m ³)
		S12. Access to renewable energy sources closely located to water reclamation facilities is a determining factor for the success of water reuse in agricultural irrigation
		S13. Reclaimed water is a non-conventional natural resource of great value for the circular economy
	Water availability	S14. A high-quality reclaimed water can be produced using technologies accessible to local agents, as compared to more sophisticated technologies such as desalination
		S15. Water availability guaranteed even in drought periods
		S16. Water reclamation in coastal areas provides a net water contribution to water basins, by preventing the irrecoverable loss of fresh water discharged to the sea
		S17. Reclaimed water use mixed with other water resources (surface water, groundwater, etc)
		S18. Reclaimed water can be use as alternative resource of surface or ground water
		Markets
Product related	Technical aspects	S.20 New technologies for water reclamation are available for local reclaimed water uses
		S21. New technologies for water reclamation result in lower environmental impacts from local agents
		S22. Successful technological solutions are available for water reuse in agricultural and industrial uses

	Technological transfer	S23. The water reuse sector offers innovative solutions, within a very dynamic sector
		S24. Numerous research projects on water reuse, funded by the EU, offer a very favourable portfolio of available technologies for water reclamation
		S25. Adequate and effective information is available on the communication campaigns that have to be conducted by producers and users of reclaimed water
		S26. Technological collaboration among European actors is very favourable and effective strategy for promoting water reuse
Social & governance	Social aspects	S27. Numerous success stories are available on local water reuse projects for agricultural irrigation
		S28. The quality and safety of food crops irrigated with reclaimed water has been scientifically documented by numerous international projects
		S29. Existence of projects that promotes a better perception of using reclaimed water with the support of the health systems authorities
	Regulators	S30. National and European regulations are available to ensure the sanitary and environmental quality of reclaimed water for agricultural irrigation
	Management	S31. Irrigating with reclaimed water is considered as an environmental practice
		S32. Reclaimed water offers a much higher reliability than conventional water sources, especially in coastal Mediterranean areas
	Environmental	S33. Reclaimed water offers a more environmentally friendly water source alternative, capable of mitigating climate change effects, than other conventional or sophisticated water sources such as desalination
		S34. Reclaimed water provides a natural supply of nutrients (nitrogen and phosphorus), in a very similar way to fertirrigation.

WEAKNESSES

General Aspects	Specific Aspects	Alentejo region
Market related	Economic aspects	W11. Reclaimed water is too expensive for a significant part of the agricultural sector
		W12. Control of the energy costs involved in water reclamation is very difficult
	Water availability	W13. The distance between the water reclamation facility (normally in an urban setting) and the irrigation areas requires pumping of reclaimed water
		W14. Reclaimed water is limited in numerous agricultural areas/zones
		W15. The quality of the wastewater treated effluents (inflows to the water reclamation facility) does not comply with applicable regulatory limits (46% in Andalusia)
	Markets	W16. Local and regional water users show strong competition for water resources
		W17. Irrigation Districts are small, made up of a limited number of users
		W18. Wholesalers and vendors of agricultural food crops have a very limited knowledge about the implications and public health safety of using reclaimed water for irrigation
Product related	Technical aspects	W19. Wastewater treatment plants are very limited in certain geographical areas
		W20. Reclaimed water needs to be collected for seasonal irrigation
	Technological transfer	W21. Agricultural irrigation with reclaimed water is a small activity sector, unable to feel motivated for participating in large innovation projects
	Social & governance	Social aspects
Regulators		W23. The limited information offered to the public about the protection offered by national regulations (RD 1620/2007) and European Regulations (in approval process) has raised an unjustified uncertainty about the practice of irrigating with reclaimed water

OPPORTUNITIES

General Aspects	Specific Aspects	Alentejo region
Market related	Economic aspects	O11. Increase of energy cost results in a reduction of the cost differences between reclaimed water and other water supply alternatives
		O12. Water reuse can be promoted by implementing economic compensations to farmers through exchanges between irrigation water rights and water uptakes for urban water supplies
		O13. The cost of reclaimed water can be jointly covered by water reclamation agencies and agricultural irrigation users
		O14. The cost of water reclamation may be lower than water abstraction from other natural water sources, such as groundwater.
	Water availability	O15. Limitations in surface water supplies for agricultural irrigation (4,500 m ³ /ha-year) can be compensated by using reclaimed water flows
		O16. Increased urban water abstractions during drought periods may limit the availability of water for irrigation
		O17. Higher water consumption in tourist areas during the peak season may limit the availability of water for agricultural irrigation
		O18. The considerable wastewater flows available in Spain (68%) for treatment and subsequent reclamation provide an important and additional source of water supply
		O19. Increasing restrictions on water supply for agricultural irrigation will raise the demand for alternative water sources such as reclaimed water
		O20. How possible do you consider the possibility to reuse the 50% of water in agriculture
	Markets	O21. The use of reclaimed water is a potential favourable feature of organic farming
		O22. Reclaimed water has a great potential for the cultivation of olive groves, whose surface area accounts to 50 % of the Andalusian agricultural land

Product related	Technical aspects	O23. Reclaimed water cost is significantly lower than that of non-conventional alternatives such as desalinated water
	Technological transfer	O24. Water reuse projects will promote the development of new consulting services in a good number of agricultural irrigation areas of Spain
		O25. Successful projects developed in other countries (e.g. Cyprus and Israel) can help in promoting and developing new irrigation projects using reclaimed water
		O26. Numerous Andalusian projects on irrigation of golf courses with reclaimed water are emblematic and successful examples of water reuse
		O27. Successful studies are available on the positive effects of reclaimed water on cultivation of food crops, such as the Rich Water Project
Social & governance	Social aspects	O28. There is growing social concern about the effects of future water droughts and scarcity episodes, associated to the weather irregularity resulting from climate change
		O29. Social concern for future water resources is promoting the development of alternative sources of water, such as reclaimed water
		O30. The growing interest in the "Zero Waste" option within the circular and green economy is stimulating the consideration of alternative water sources into the political debate
		O31. There is a growing social awareness of the need to seek alternative sources of water in view of the irregular rainfall associated to climate change.
	Regulators	O32. The new European regulation offers clear rules for irrigating with reclaimed water, on a European context, bringing security to growers and consumers
		O33. The EU is definitely interested in promoting the use of reclaimed water (Directive 91/271/ECC, art. 12, and new Regulation on irrigation with reclaimed water)
		O34. Restrictions currently applied to surface areas for specific crops (e.g. olive tree, 50 % Andalusian land) need to be taken into account
		O35. The RD 1620/2007 offers assurance to farmers and consumers on the potential public health impacts associated to the consumption of food crops irrigated with reclaimed water

		O36. Possibility to exchange fresh water license for reclaimed water ones
	Management	O37. A considerable agricultural tradition is available on how to manage and use reclaimed water for agricultural irrigation
		O38. Limited consideration has been given to the benefits of using reclaimed water for the promotion and development of organic agricultural production
	Environmental	O39. Water reuse helps to develop and promote alternative water supply sources for agriculture
		O40. The use of reclaimed water can significantly help in mitigating over-exploitation of aquifers
		O41. New alternative sources of water have to be developed to mitigate the scarcity and irregularity affecting water supplies for agricultural irrigation
		O42. Reclaimed water offers an effective solution for mitigating latent effects of climate change
		O43. Reclaimed water offers a favourable option to counteract increased salinity of groundwater
		O44. The proximity of agricultural areas to population centres (source of reclaimed water) considerably helps in promoting irrigation with reclaimed water
		O45. Reclaimed water helps in recovering degraded ecosystems by eliminating corresponding excessive surface water abstractions
		O46. Nutrients in reclaimed water help in reducing the application of synthetic fertilizers

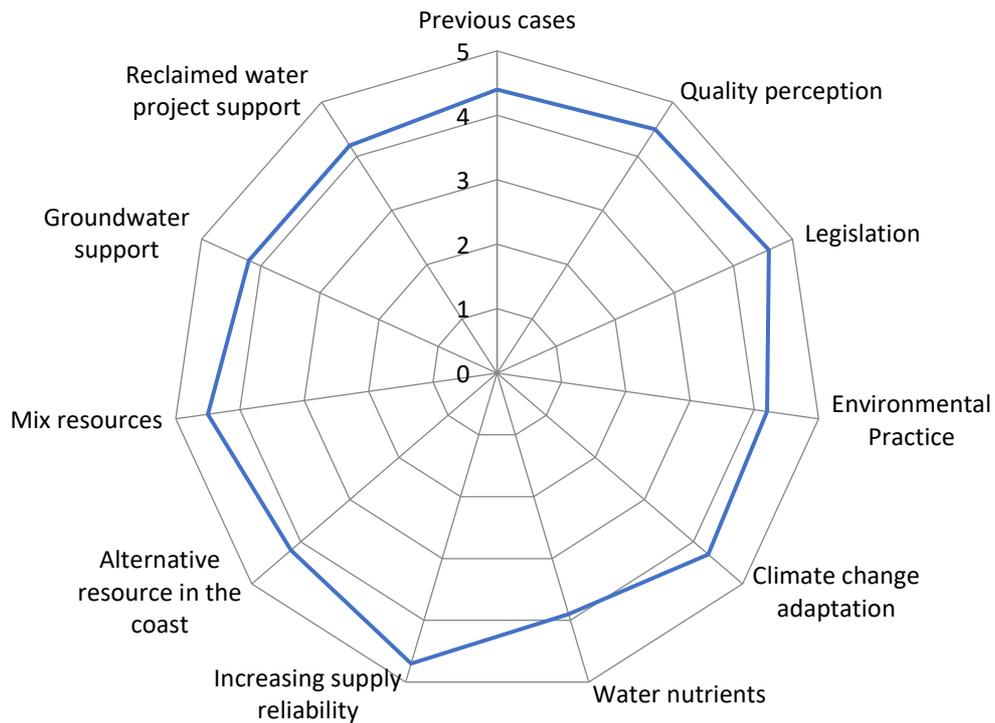
TREAHTS

General Aspects	Specific Aspects	Alentejo Region
Market related	Economic aspects	T11. Irrigation systems have an excessive cost for a significant part of the Spanish agricultural sector
		T12. The low value of agricultural products in certain areas prevents the use of reclaimed water
	Water availability	T13. Water flows required for irrigation exceed reclaimed water flows
	Markets	T14. Wholesalers of food crops reject agricultural products irrigated with reclaimed water
		T15. The use of reclaimed water can be an excuse for unfair trading of agricultural food crops
Product related	Technical aspects	T16. Irrigation with reclaimed water lacks public acceptance in Andalusia
		T17. Successful experiences are available on the use of alternative sources of water that are cheaper than the use of reclaimed water
Social & governance	Social aspects	T18. Users of reclaimed water and consumers of agricultural products lack sound and clear information on the quality of food crops irrigated by reclaimed water
	Regulators	T19. There is a clear need for regulations clearly endorsed by public health authorities concerning irrigation of agricultural products with reclaimed water
		T20. Excessive administration needed for irrigating with reclaimed water
	Management	T21. There is a significant dispersion or lack of agricultural projects available for implementing irrigation with reclaimed water
	Environmental	T22. Urban and industrial uses will become priorities for allocating available supplies of reclaimed water
		T23. Lack of political goodwill to make reforms to promote reclaim water

Strengths

Most of the items are defined as '5-Very relevant' with the exception of "Water nutrients receiving an average score over 4. The most relevant aspects identified are the possible use of reclaimed water as an alternative resource in drought periods -being the most relevant of them-, the support of the EU legislation about the use of reclaimed water for irrigation and the existence of a good perception about the quality and security of using reclaimed water.

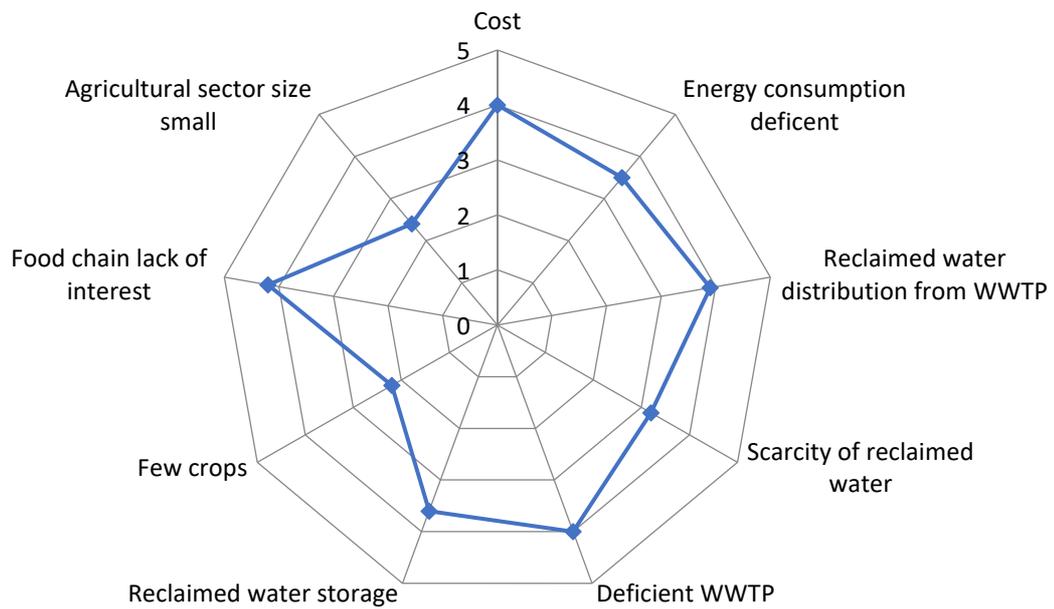
Figure 2 – Strengths relevance



Weaknesses

Experts did not identify as many aspects for these groups as they did for the other categories. However, it is interesting how the most important aspects included in this group were related to the lack of interest within the food distribution actors. Similarly, to what happened with the strengths, a social aspect is considered an important weakness, the perception or the lack of interest. The cost of using reclaimed water and the deficient situation of wastewater treatment plants is also the most relevant weaknesses identified.

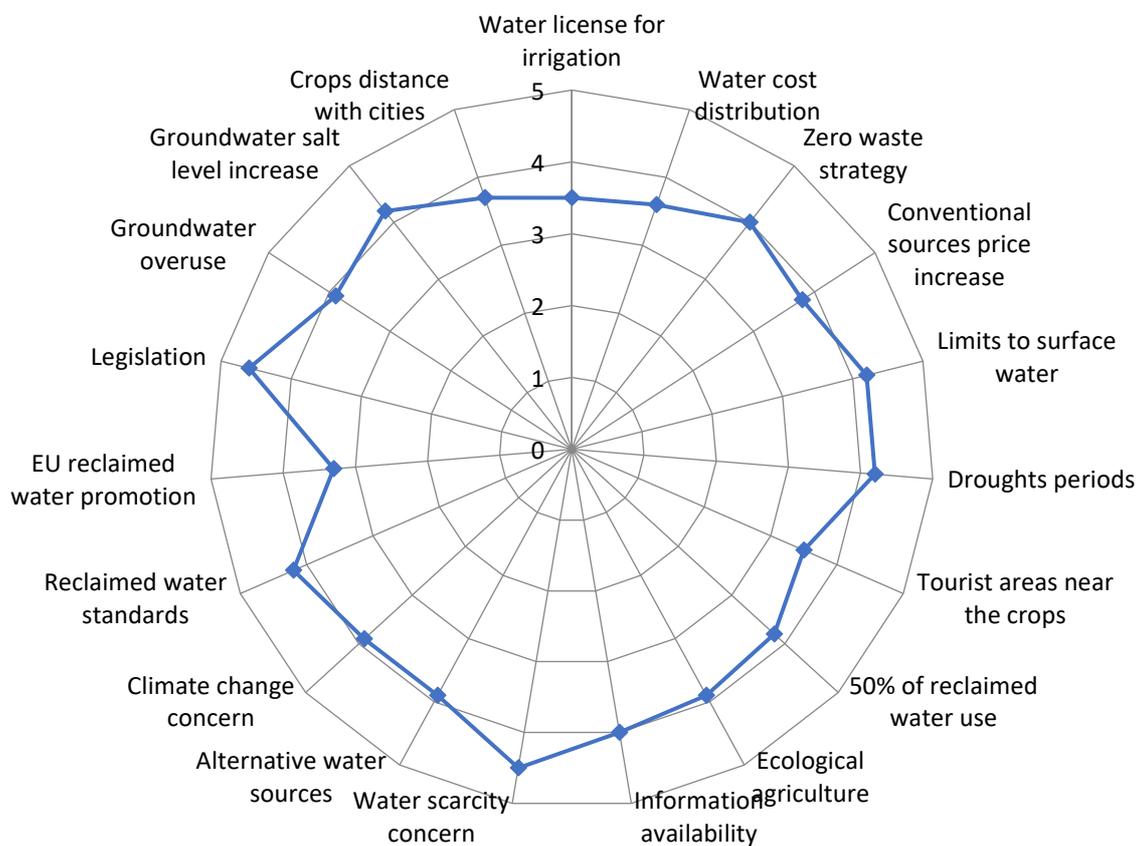
Figure 3 – Weaknesses relevance



Opportunities

This group has more numerous items and appears as the second most relevant aggregated in the average evaluation. This can reflect the potential use of reclaimed water in agriculture. The most important opportunity for reclaimed water is the existence of a European regulation that offers clear rules for irrigating with reclaimed water because could bring security to growers and consumers. Once again, one of the most important aspects identified was social, this time, the concern regarding water scarcity in the second opportunity most relevant. Other aspects, such as the limits to use surface water for irrigation, the existence of more drought periods and the existence of reclaimed water quality standards received special attention by the key actors.

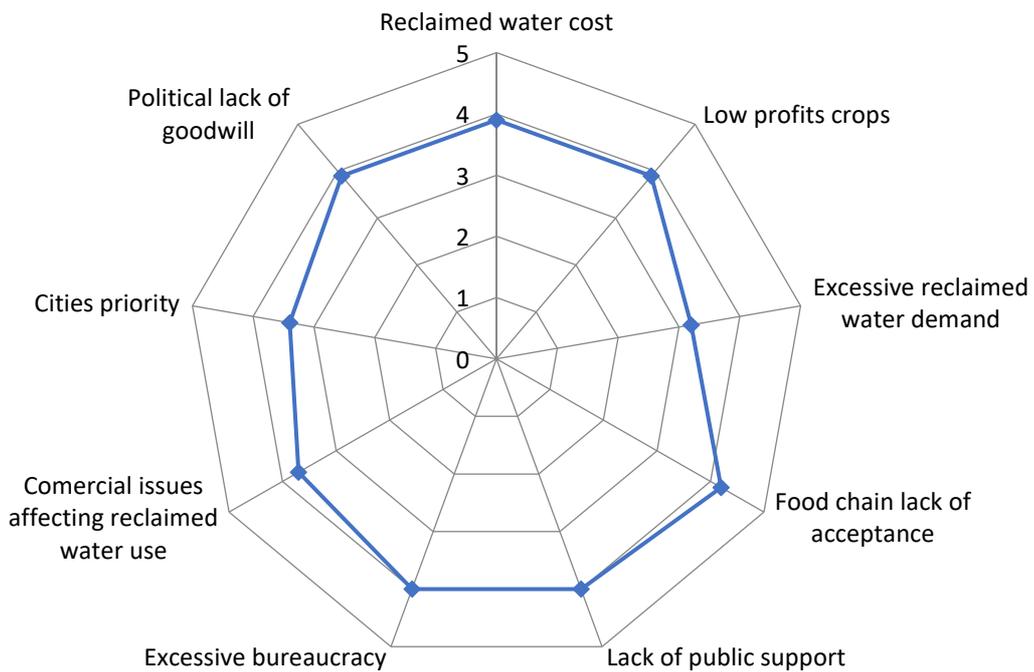
Figure 4 - Opportunities relevance



Threats

Threats received the lowest average score by the key actors. Only three aspects received a score greater than four (4.0). The most important threats were related to one of the most important weaknesses, the lack of acceptance of products irrigated with reclaimed water by distribution actors and the social aspect understood as the lack of public support to these products. Lastly, another relevant element was the ‘excessive administration’.

Figure 5 – Threats relevance



PEST Analysis combined with SWOT

Andalusia

PEST/SWOT	STRENGTH	WEAKNESSES	OPPORTUNITIES	THREATS
Political aspect (P)	<ul style="list-style-type: none"> -Water rights and management systems of potentially reusable water resources are mostly in the hands of local agents -National and European regulations are available to ensure the sanitary and environmental quality of reclaimed water for agricultural irrigation -Existence of projects that promotes a better perception of using reclaimed water with the support of the health systems authorities 	<ul style="list-style-type: none"> -The limited information offered to the public about the protection offered by national regulations (RD 1620/2007) and European Regulations (in approval process) has raised an unjustified uncertainty about the practice of irrigating with reclaimed water 	<ul style="list-style-type: none"> -Water reuse can be promoted by implementing economic compensations to farmers through exchanges between irrigation water rights and water uptakes for urban water supplies -Limitations in surface water supplies for agricultural irrigation (4,500 m³/ha-year) can be compensated by using reclaimed water flows -Increasing restrictions on water supply for agricultural irrigation will raise the demand for alternative water sources such as reclaimed water -The growing interest in the "Zero Waste" option within the circular and green economy is stimulating the consideration of alternative water sources into the political debate -The new European regulation offers clear rules for irrigating 	<ul style="list-style-type: none"> There is a clear need for regulations clearly endorsed by public health authorities concerning irrigation of agricultural products with reclaimed water -Urban and industrial uses will become priorities for allocating available supplies of reclaimed water -Lack of political goodwill to make reforms to promote reclaim water

			<p>with reclaimed water, on a European context, bringing security to growers and consumers</p> <p>-The EU is definitely interested in promoting the use of reclaimed water (Directive 91/271/ECC, art. 12, and new Regulation on irrigation with reclaimed water)</p> <p>-Restrictions currently applied to surface areas for specific crops (e.g. olive tree, 50 % Andalusian land) need to be considered</p> <p>-The RD 1620/2007 offers assurance to farmers and consumers on the potential public health impacts associated with the consumption of food crops irrigated with reclaimed water</p>	
--	--	--	---	--

<p>Economic aspect (E)</p>	<p>The lowest cost of reclaimed water is reached by processes applied by local agents (0.05-0.015 €/m³), as compared to the cost of desalinated water (0.6-0.8 €/m³)</p> <p>-Access to renewable energy sources closely located to water reclamation facilities is a determining factor for the success of water reuse in agricultural irrigation</p>	<p>Local and regional water users show strong competition for water resources</p> <p>-Agricultural irrigation with reclaimed water is a small activity sector, unable to feel motivated for participating in large innovation projects</p>	<p>-Increase of energy cost results in a reduction of the cost differences between reclaimed water and other water supply alternatives</p> <p>-The cost of reclaimed water can be jointly covered by water reclamation agencies and agricultural irrigation users</p> <p>-The cost of water reclamation may be lower than water abstraction from other natural water sources, such as groundwater.</p> <p>-Higher water consumption in tourist areas during the peak season may limit the availability of water for agricultural irrigation</p> <p>-Reclaimed water cost is significantly lower than that of non-conventional alternatives such as desalinated water</p> <p>-The proximity of agricultural areas to population centres (source of reclaimed water) considerably helps in promoting irrigation with reclaimed water</p>	<p>Irrigation systems have an excessive cost for a significant part of the Spanish agricultural sector</p> <p>-The low value of agricultural products in certain areas prevents the use of reclaimed water</p>
-----------------------------------	---	--	--	--

<p>Social aspect (S)</p>	<ul style="list-style-type: none"> -Water reclamation in coastal areas provides a net water contribution to water basins, by preventing the irrecoverable loss of fresh water discharged to the sea -Adequate and effective information is available on the communication campaigns that have to be conducted by producers and users of reclaimed water -Numerous success stories are available on local water reuse projects for agricultural irrigation -The quality and safety of food crops irrigated with reclaimed water has been scientifically documented by numerous international projects -Water reuse for agricultural irrigation has reached a very favourable performance record in various Mediterranean areas where agriculture has a long tradition -Reclaimed water offers a more environmentally friendly water source alternative, capable of mitigating climate change 	<ul style="list-style-type: none"> -Irrigation Districts are small, made up of a limited number of users -Wholesalers and vendors of agricultural food crops have very limited knowledge about the implications and public health safety of using reclaimed water for irrigation -Certain populations groups have a very negative perception of the use of reclaimed water, especially for agricultural irrigation 	<ul style="list-style-type: none"> -The use of reclaimed water is a potential favourable feature of organic farming -Reclaimed water has a great potential for the cultivation of olive groves, whose surface area accounts to 50 % of the Andalusian agricultural land - There is growing social concern about the effects of future water droughts and scarcity episodes, associated with the weather irregularity resulting from climate change -Social concern for future water resources is promoting the development of alternative sources of water, such as reclaimed water -There is a growing social awareness of the need to seek alternative sources of water in view of the irregular rainfall associated with climate change. -A considerable agricultural tradition is available on how to manage and use reclaimed water for agricultural irrigation // Limited consideration has been given to the benefits of using reclaimed water for the 	<ul style="list-style-type: none"> -Wholesalers of food crops reject agricultural products irrigated with reclaimed water -The use of reclaimed water can be an excuse for unfair trading of agricultural food crops -Irrigation with reclaimed water lacks public acceptance in Andalusia -Users of reclaimed water and consumers of agricultural products lack sound and clear information on the quality of food crops irrigated by reclaimed water
---------------------------------	---	---	---	--

	<p>effects, than other conventional or sophisticated water sources such as desalination</p> <p>-Water availability guaranteed even in drought periods</p>		<p>promotion and development of organic agricultural production</p> <p>-Water reuse helps to develop and promote alternative water supply sources for agriculture</p>	
<p>Technological aspect (T)</p>	<p>-Reclaimed water is a non-conventional natural resource of great value for the circular economy</p> <p>-High quality reclaimed water can be produced using technologies accessible to local agents, as compared to more sophisticated technologies such as desalination</p> <p>-New technologies for water reclamation are available for local reclaimed water uses</p> <p>-New technologies for water reclamation result in lower environmental impacts from local agents</p> <p>-Successful technological solutions are available for water</p>	<p>-Wastewater treatment plants are very limited in certain geographical areas</p>	<p>Increased urban water abstractions during drought periods may limit the availability of water for irrigation</p> <p>-The considerable wastewater flows available in Spain (68%) for treatment and subsequent reclamation provides an important and additional source of water supply</p> <p>-Reclaimed water provides a natural supply of nutrients (nitrogen and phosphorus), in a very similar way to fertirrigation</p> <p>-Water reuse projects will promote the development of new consulting services in a good number of agricultural irrigation areas of Spain</p>	<p>Water flows required for irrigation exceed reclaimed water flows</p> <p>-Successful experiences are available on the use of alternative sources of water that are cheaper than the use of reclaimed water</p> <p>-There is a significant dispersion or lack of agricultural projects available for implementing irrigation with reclaimed water</p>

	<p>reuse in agricultural and industrial uses</p> <ul style="list-style-type: none"> -The water reuse sector offers innovative solutions, within a very dynamic sector -Numerous research projects on water reuse, funded by the EU, offer a very favourable portfolio of available technologies for water reclamation -Reclaimed water offers much higher reliability than conventional water sources, especially in coastal Mediterranean areas -Nutrients included in the reclaimed water are rich for the crops irrigated - Reclaimed water use mixed with other water resources (surface water, groundwater, etc) -Reclaimed water can be use as alternative resource of surface or ground water 		<ul style="list-style-type: none"> -Successful projects developed in other countries (e.g. Cyprus and Israel) can help in promoting and developing new irrigation projects using reclaimed water -Numerous Andalusian projects on irrigation of golf courses with reclaimed water are emblematic and successful examples of water reuse -Successful studies are available on the positive effects of reclaimed water on the cultivation of food crops, such as the Rich Water Project -The use of reclaimed water can significantly help in mitigating over-exploitation of aquifers -New alternative sources of water have to be developed to mitigate the scarcity and irregularity affecting water supplies for agricultural irrigation -Reclaimed water offers an effective solution for mitigating latent effects of climate change -Reclaimed water offers a favourable option to counteract 	
--	--	--	---	--

Deliverable 2.1: Report on SWOT & PEST for implementation of reuse practices



			<p>increased salinity of groundwater</p> <p>-Reclaimed water helps in recovering degraded ecosystems by eliminating corresponding excessive surface water abstractions</p> <p>-Nutrients in reclaimed water help in reducing the application of synthetic fertilizers</p>	
--	--	--	---	--

The combination of SWOT and PEST analysis can be supported with the following table, that shows the main elements according to their relevance. In the case of strengths, water supply reliability is the most important, followed by legislation and quality perception. Within the opportunities, legislation, water scarcity concerns and surface water limitations are the most relevant aspects. In the negative side, the reclaimed water cost, the lack of interest within the food chain actors and the deficient situation of the WWTP are the biggest weaknesses identified. Finally, the most important threats are the lack of acceptance of products irrigated with reclaimed water by both food chains and public in general, and the excessive administration.

We can identify three main groups of aspects, those connected to water scarcity; secondly, the public's and food chain actors' perception and lastly, administration, legislation or regulations issues. Therefore, the regional strategy should pay special attention to this three groups.

Strengths	Opportunities	Weaknesses	Threats
Increasing supply reliability (4.7)	Legislation (4.6)	Water cost (4.0)	Food chain lack of acceptance (4.2)
Legislation (4.6)	Water scarcity awareness (4.5)	Food chain lack of interest (4.2)	Lack of public support (4.0)
Perceived quality (4.5)	Constraints to surface water use (4.2)	Deficient WWTP number and treatment (4.0)	Excessive administration (4.0)
Mix of resources (4.5)	Droughts periods (4.2)	Reclaimed water distribution from WWTP (3.9)	Reclaimed water cost (3.9)
Previous experiences (4.4)	Reclaimed water standards (4.2)	Reclaimed water storage (3.6)	Crops low profitability (3.9)
Climate change adaptation (4.3)	Groundwater salt level increase (4.2)	High energy consumption (3.5)	Lack of political goodwill (3.9)

The PEST analysis results are in line with those of the SWOT where social aspects received an upper-level relevance. Therefore, reinforces the importance of social awareness and approval about the quality and security of products irrigated with reclaimed water. All the key actors, with no relevant differentiation between sectors, agreed about this issue and expressed the importance that should receive in the regional strategy. Thus, this strategy must develop awareness and information campaigns about the use of reclaimed water in agriculture and the quality assurance schemes for the products irrigated with it. Moreover, the campaigns could highlight the importance of reclaimed water in the fight against climate change and the development of a more sustainable agricultural sector, adequate to the circular economy paradigm.

Water scarcity and excessive administration are also aspects with special relevance for the key actors. The water scarcity, the greater perception about climate change effects, and the research of sustainable alternatives could encourage reforms to support the use of reclaimed water in

agriculture. The regional strategy can play a key role in reducing excessive administration, facilitating the use of reclaimed water with initiatives like economic compensation to farmers.

Discussion and conclusion

The SWOT analysis combined with PEST shows the perception of the use of reclaimed water by several experts and stakeholders. Various issues are remarked by the analysis, firstly legislation is perceived as a strength (existing) and an opportunity (future legislation) and the awareness of increasing resource scarcity is also classified as a strength and an opportunity. On the other hand, the food distribution system is seen as a weakness (chain lack of interest) and the as a threat (no acceptance) followed by the high cost (weakness) and the excessive administration and lack of public support is seen as a threat.

The SWOT analysis serves as a first stage in the analysis of barriers to the diffusion for reclaimed water use and indicates the main issues where future research should be focused on. For that reason, there are three main areas that received special attention from the key stakeholders:

- Water availability – The freshwater available, the increasing number of drought periods or troubles that can be founded out in tourist areas are identified as the most relevant aspects in relation to the reclaimed water use for agriculture in Andalusia.
- Social and food chain perception – According to the key actors asked, the water quality perception by the society and food chain actors are also a milestone.
- High administration - The third main aspect identified by the key actors is the excessive administration that exists in Andalusia. Process become depth and endless.