



# Presentation on preliminary findings of the comparative analysis of treated wastewater reuse policies and approaches

Roundtable discussion

23 July 2019

New Delhi

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IEWP/GIZ ToC

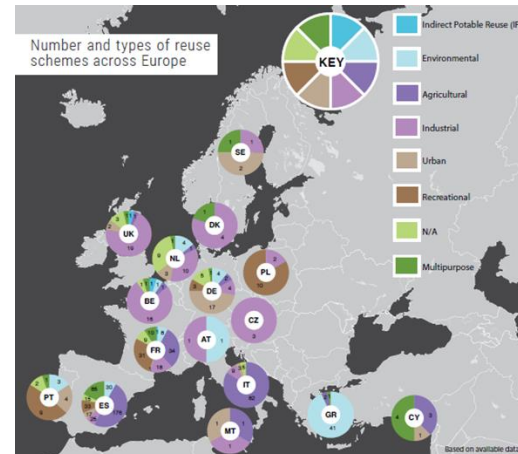


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# Structure

1. Aim, methodology & scope
2. Overview and main differences
3. Objectives
4. Implementation
5. Risks and constraints
6. Questions



## Disclaimer:

This is a presentation of a draft document only, which shall not be quoted or referred to as information source.

Images: WRE, 2018



# 1. Aim, methodology & scope

**Aim:** To understand how the different policies tackle main aspects of setting objectives, fostering implementation and overcoming risks and barriers

The **methodology** is based on a review of the corresponding policies, aiming to:

- **Identifying the elements** which have been addressed, and qualifying how they have been addressed
- **Describing details** of policy elements
- **Comparing the approaches** followed in the different policies analysed
- **Outlining the effects** which the different approaches can have on the policy overall and its implementation (to be developed at a later stage)

The report aims to reflect key policies and approaches in **Indian states and the European Union**, and this **draft report** include the following:

- European Union
- Spain
- Gujarat
- Haryana

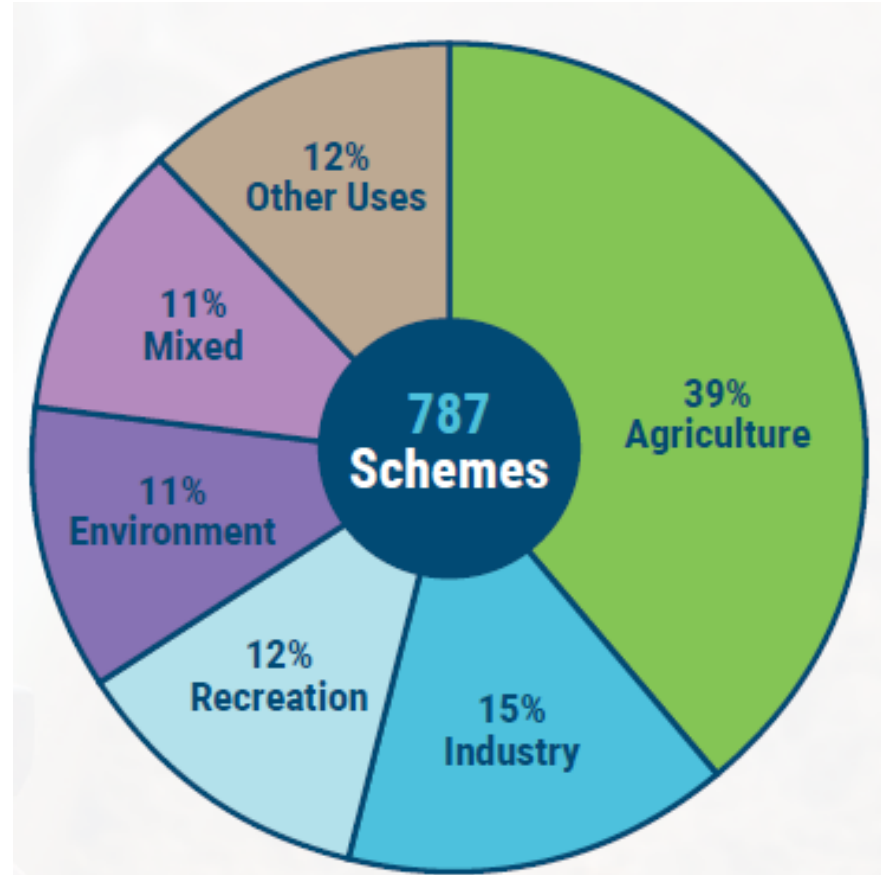
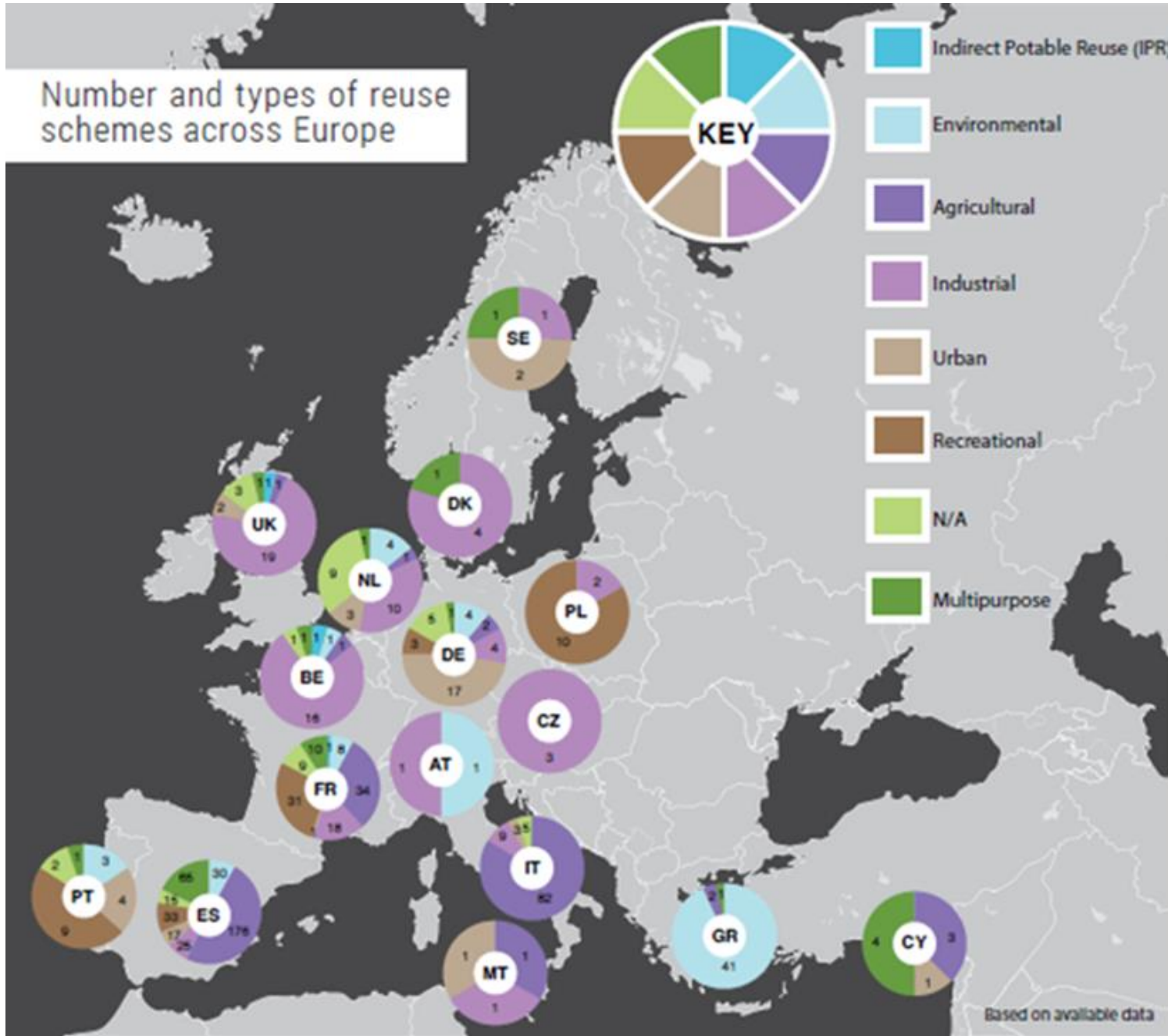
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## 2. TWWR overview

	EU	Spain	Gujarat	Haryana
Use (focus)	agricultural irrigation and groundwater recharge		industries and thermal power plants	
Aim	Basin water balance; Trade guarantee		Wastewater treatment & Infrastructure financing	
Size	2.4% effluents 1BNm <sup>3</sup> /yr 787 schema	12% 300Mm <sup>3</sup> /yr 361 schema	?	?
Ambition	50% effluents = 5% abstraction? 2030	RBMPs 2021-2027	>25% 0.5-4 yrs 75% 2025 100% 2030	>25% 1-4 yrs
Regulation	1991 UWWTD 2012 policy 2020 regulation	Since 2007 Plan in draft	Policy 2018	Draft policy 2018

# Number and types of reuse schemes across Europe



Images: WRE, 2018

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## 2. Main differences TWWR policies and approaches

Strengths in the **EU and Spain** include:

- Linkages to the **basin water balance and planning**, river health and ecological flows (reduce direct abstractions);
- Focus on **economic growth** and financing, **trade of products**, and resource efficiency;
- Framework for **risk management**; focus on user requirements
- More support to **research and innovation**.

On the other hand, Indian state policies (**Gujarat, Haryana**) have laid down:

- Well developed guidelines on **water allocation rules**;
- Developing **new projects** on treated wastewater reuse,
- Governance structure for **managing treater wastewater projects**.

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### 3. Objectives of TWWR policies: overview

Elements considered	EU	Spain	Gujarat	Haryana
3. Objectives				
3.1. Positive impact in basin water balance	1, 2, 3	2	4	4
3.2. Ensure supply guarantee	1	2	1,4	1,4
3.3. Human health	1	1	2,4	2,4
3.4. River health and ecological flows	1	1	2,4	1,4
3.5. Economic growth and financing	1	1	1,3	1,3
3.6. Trade of products	1	4	0	0
3.7. Resource efficiency	1, 4	1	0	0
3.8. Targets and timeline	1, 3	1, 2	1,3	1,3

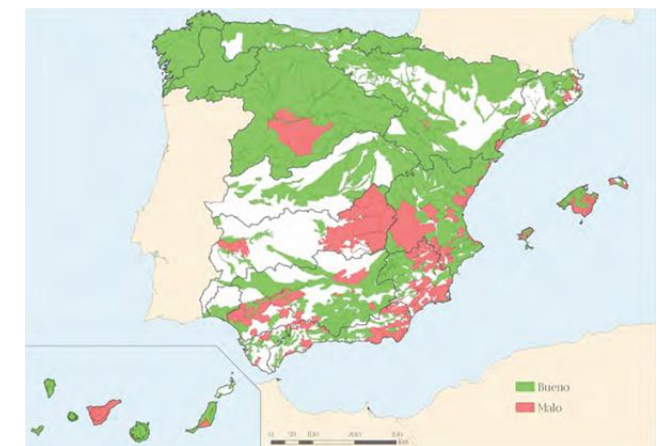
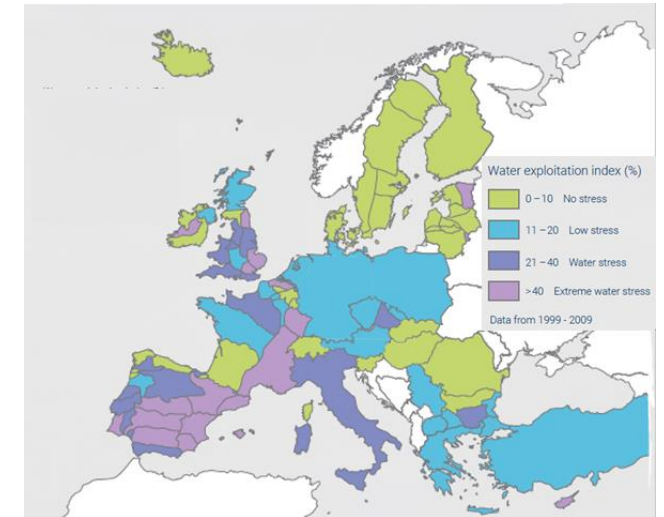
Indication is provided if the team considers that the concerned policy or approach deals with the element in the following form: 1 – directly considered in policy; 2 – considered within related policies; 3 – extensive details provided; 4 – brief elements provided; 0 – not considered

### 3.1. Objectives of TWWR policies: Basin water balance

**EU:** Water re-use should be more systematically considered to **address water scarcity, achieve good status (WFD) and in the investment in the treatment of effluent (UWWTD)**. For this purpose, **guidelines** on Integrating Water Reuse into Water Planning and Management in the context of the WFD were developed in 2016, taking into account underlying environmental and socio-economic benefits

**Spain:** River Basin Management Plans include a basic strategic line to ensure a **stable supply of water** for irrigation purposes while **releasing water to the environment (environmental flows)** and supporting the service of priority demands in periods of drought.

**Gujarat & Haryana:** In the Gujarat policy, the treated wastewater is considered as an additional source of water and its reuse is expected to reduce pressure on fresh water resources.





## 3.2 Objectives of TWWR policies: Economic growth & jobs

**European Union:** Water reuse contributes to the broader water sector which is a key component of EU eco-industrial landscape. The world water market is growing rapidly, and it is estimated to reach 1 trillion € by 2020.

For this reason, water reuse also encompasses significant **potential in terms of the creation of green jobs in the water-related industry**, and it is estimated that a 1% increase in the rate of growth of the water industry in Europe could create up to 20.000 **new jobs**.

**Haryana & Gujarat:** Policy considers treated wastewater as an economic commodity



### 3.3. Objectives of TWWR policies: Trade barriers

**European Union:** Setting EU common standards should prevent potential obstacles to the free movement of products (mainly crops irrigated with reclaimed water). **Different requirements in individual jurisdictions** negatively affect the level playing field.

**Spain:** According to the NWR Plan, the quality intended for **agricultural use** is very demanding in order to ensure that the consumption of products irrigated with reclaimed water does not pose any risk to human health and also to guarantee for the **commercialization of the product** since it demonstrates in a reliable way that there are no such **health risks**.



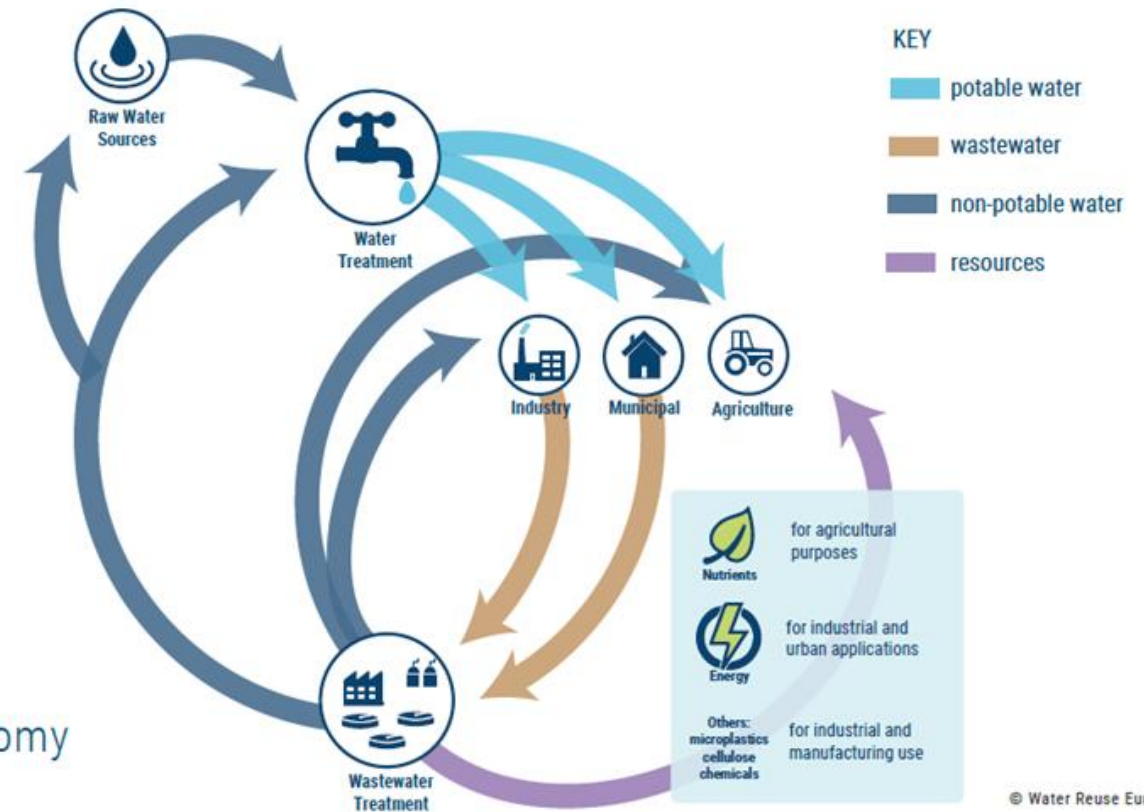
Image: <https://ec.europa.eu/jrc/en/news/minimum-quality-requirements-water-reuse-agriculture>

### 3.4. Objectives of TWWR policies: Circular economy

**European Union:** Enabling the **recycling of water and nutrients**. Reusing water generally consumes **less energy** than alternative supply options (desalination/inter-basin transfers) and because it may allow for less energy consumption in waste water treatment this initiative can contribute to make EU countries less dependent on energy imports.

**Spain:** Planning documents include energy efficiency criteria

Water in the Circular Economy





### 3.5. Objectives: Targets and timeline

**European Union:** Reusing more than 50% of the total water volume theoretically available for irrigation from waste water treatment plants in the EU would avoid more than **5% of direct abstraction**. 5 different **policy options** have been assessed regarding their impact; and **consulted with the public**; and a **large number of studies** were previously carried out to support policy development.

**Spain:** Targets (in terms of contribution to the achievement of WFD environmental objectives) and timelines (time horizons for completion of each specific measure) are established in the RBMPs for each one of these measures.

**Gujarat:** The policy aims to promote treated wastewater reuse of at least 25% of the total fresh water consumption in a short term depending on the existing infrastructure for wastewater collection and treatment. The **reuse proportion is to be increased to 70% by 2025 and 100% by 2030**.

**Haryana:** > 25%.

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### 3.6. Objectives: Questions

1. Which of these objectives shall be incorporated into an Indian framework at the Union level?
2. How relevant are the European objectives for Indian policy-making?
3. Which additional information would be useful/important for a transfer/adaptation?
4. ...

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## 4. Implementation: Overview

Elements considered	EU	Spain	Gujarat	Haryana
4. Implementation				
4.1. Legal basis	1	1	1	1
4.2. Ownership, roles and responsibilities	2, 4	1, 3	1,3	1,3
4.3. Planning and implementation	2, 3	1, 3	1,3	1,3
4.4. Use of treated wastewater	1, 2	1, 2	1,3	1,3
4.4.1. Quality standards and treatments norms	2, 4	1	2	2
4.4.2. Uses				
4.4.2.1. Industry	2	1, 3	1,3	1,3
4.4.2.2. Agriculture and irrigation	1, 3	1, 3	1,4	1,3
4.4.2.3. Groundwater recharge	1, 3	1, 3	0	0
4.4.2.4. Potable use	0	0	1,4	1,3
4.5. Operations and maintenance				
4.5.1. Technologies accepted and available	2	1	2,4	2,4
4.5.2. Models of operations	0	1	1,3	1,3
4.5.3. Costs and financing	0	1	1,3	1,3
4.5.4. Control and enforcement	0	1, 4	1,3	1,3

Indication is provided if the team considers that the concerned policy or approach deals with the element in the following form: 1 – directly considered in policy; 2 – considered within related policies; 3 – extensive details provided; 4 – brief elements provided; 0 – not considered



## 4.1. Implementation: Quality standards

**European Union:** Based on a risk-based approach & following WHO, new draft **minimum requirements and monitoring frequencies** for water reuse in **agricultural irrigation**; from urban and some industrial wastewater. Cover *E. coli*, BOD5, TSS, Turbidity, as well as *Legionella spp.* and Intestinal nematodes; **additional requirements** may in particular concern (a) heavy metals; (b) pesticides; (c) disinfection by-products; (d) pharmaceuticals; (e) other substances of emerging concern; and (f) anti-microbial resistance.

**Industrial water reuse** is already a common practice in many sectors. The Commission will assess further integration of water reuse in the development and review of **Best Available Techniques Reference Documents (BREFs)** under the scope of the Industrial Emissions Directive(2010/75/EU) & **Sectoral Reference Documents on best environmental management practice (BEMP)** as part of the EU Eco-Management and Audit Scheme (EMAS) for relevant sectors.

**Spain:** Royal Decree RD 1620/2007) includes quality standards for **process and cleaning waters** except in the food industry; other industrial uses; process and cleaning waters for use in the **food industry; cooling towers** and evaporative condensers. Detailed quality standards for **different irrigation purposes**.

**Gujarat:** Environment (Protection) Amendments Rules, 2017 for treated wastewater **discharged to water bodies and on land**, following parameters are considered: pH, BOD, TSS, and Fecal Coliforms.

**Haryana:** In addition, for **irrigation use**, the policy recommends maximum values on the Total Dissolved Solids (TDS) concentration; Sodium Adsorption Ratio (SAR) values; Boron concentration; and no coliforms in the treated wastewater.



## 4.2. Implementation: Groundwater recharge

**European Union:** Proposed legislation on minimum requirements, based on Groundwater Directive. Within the policy, there is no reference to nutrient-sensitive areas which might be affected; however, the Water Framework Directive refers to **Drinking Water Protected Areas** and to **Nitrates Vulnerable Zones**, which have to be compulsorily considered in RBMP. **Flexibility is given to Member States to define more stringent limits.**

**Spain:** RD 1620/2007 has established the **quality standards under two possible schemes:** 1) aquifer recharge **by percolation** located through the terrain; 2) groundwater recharge **by direct injection.**

**Gujarat & Haryana:** Not included

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## 4.3. Implementation: Technologies accepted and available

**European Union:** Specific technologies are **not included** in or recommended by the EU policy. Technology providers in this sector are the EU-scale companies and difference in standards among Member States prevent companies to benefit from a clear framework **allowing economies of scale and standardisation** which would support innovation and development of **solutions at lower costs**. In addition, several bodies are accredited for **Environmental Technology Verification (ETV)** of wastewater treatment technologies.

**Spain:** The NWR Plan **proposes sequences of adequate treatment processes** to achieve the different quality standards.

**Gujarat and Haryana:** The policy refers to the **CPHEEO manual on Sewage and Sewage Treatment Systems, 2013** for the most appropriate technologies suitable under different conditions. Innovative technologies developed by IITs, NEERI and others may also be referred to.

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## 4.4. Implementation: Questions

1. Shall the Indian policy framework establish minimum quality standards? Which focus shall be followed?
2. How shall the uptake of adequate and innovative technologies be assured?
3. ...

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## 5. Risks and constraints. Overview

Elements considered	EU	Spain	Gujarat	Haryana
5. Risks and constraints				
5.1. Identified regulatory and management barriers	1	4	0	0
5.2. Water allocation, including enforcement	2, 4	1, 2	1,3	1,3
5.3. Research and innovation	1, 2, 3	1, 2, 3	2,4	2,4
5.4. Dissemination of showcases	2	2	0	1
5.5. Governance arrangements	0	1, 2	1,3	1,3
5.6. Public engagement and awareness	1, 2	1, 2	1,3	1,3
5.7. Funding	2	1	1,3	1,3

Indication is provided if the team considers that the concerned policy or approach deals with the element in the following form: 1 – directly considered in policy; 2 – considered within related policies; 3 – extensive details provided; 4 – brief elements provided; 0 – not considered



## 5.1. Risks and constraints: Barriers

**European Union:** A specific assessment on barriers to reuse of treated wastewater was undertaken by JRC (2014). Main barriers:

- low **economic attractiveness** of reuse solutions,
- low **public acceptance** of reuse solutions and limited awareness of its benefits,
- a lack of **common EU environmental/health standards** for reused water, and
- **poor coordination** of the professionals and organisations who design, implement and manage such schemes

Water reuse is subject to the first **Innovation Deal** signed in 2017. This voluntary cooperation between the European Commission and 14 partners from national and regional authorities, universities, knowledge centres, innovators and end-users **addresses existing regulatory barriers** to innovation in this sector.

Water reuse can be **better integrated in water planning & management.**

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## 5.2. Risks and constraints: Allocation and enforcement

**European Union:** Member States are requested to implement policies which assure that the ecological status of water bodies is preserved or improved; including measures such as **abstraction control** (WFD Art.11.3.c).

**Spain:** Water allocation follows a **standard procedure managed by RBOs**, and which aims to assure that water resources are sustainably used. Water reuse as solution to groundwater bodies water allocation has surpassed the available water resources. Non-authorized abstractions keep relevant.

**Gujarat and Haryana:** The policy state that the **local bodies should clearly specify** (2/yr) the quantity and quality of treated wastewater available. Large prospective water users are required to apply. Allocation by SHLPC. Non-authorized abstractions keep relevant.

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## 5.3. Risks and constraints: Research and innovation

**European Union:** Research and innovation address:

- **Improvement of treatment facilities, development of smart technologies, and reduction in energy consumption.**
- Action Groups within the European Innovation Partnership (**EIP**) on **Water**: Industrial Water Reuse and Recycling (InDuRe), Water & Irrigated agriculture Resilient Europe (WIRE), Real Time Water Quality Monitoring (RTWQM), Verdygo - modular & sustainable wastewater treatment.
- The **European Regional Development Fund** (ERDF) can also offer funding opportunities for innovations in water reuse, if those are in line with the **smart specialisation strategies** of Member States and regions.
- The Commission also launched specific calls on water issues under the **Horizon 2020** work programme (**India Water call with 7 projects 2019-2023!**), which includes water reuse in the circular economy topics.
- Innovation in water reuse can also be supported by **LIFE** (Programme for the Environment and Climate Action)

**Gujarat:** recommends involving state Water and Land Management Institute (WALMI), Gujarat Engineering Research Institute (GERI), Gujarat Jalseva Training Institute (GJTI) and other relevant stakeholders. The aim should be to **research, develop and promote state-of-art technologies and trainings** for effective and economic management of water resources (including treated wastewater). These activities will be spearheaded by the TWW cell.

**Haryana:** suggests using facilities available at HIRMI, Kurukshetra for preparing **cost effective and technically viable projects for development of water grids required for irrigation** with treated unused wastewater. For the **capacity building** of the in-service personnel managing treated wastewater reuse projects, HIPA will be involved. These activities will be spearheaded by the TUW cell.

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## 5.4. Risks and constraints: Dissemination of showcases

### European Union:

- European Innovation Partnership (EIP) on Water,
- Water Europe (2019) 'Atlas of the European Water Oriented Living Labs',
- Water Reuse Europe (2018) includes a list of showcases of water reuse across the EU
- Horizon 2020 pilot sites

### Spain:

- Centre for New Water Technologies (CENTA)
- National Irrigation Technology Centre (CENTER)

**Haryana:** The policy suggests that the projects conceptualized using innovative technologies **should be brought to attention** of various international organizations, research and training centres, etc. to form several bilateral development cooperation partners.

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## 5.5. Risks and constraints: Financing

### European Union:

- Innovation (funding for early adopters) can be supported by LIFE (Programme for the Environment and Climate Action).
- EU funding for water reuse infrastructure is already available under the **European Regional Development Fund (ERDF)**, the **Cohesion Fund (CF)** and the **European Agricultural Fund for Rural Development (EARDF)**. The Commission will encourage Member States to use these opportunities and prioritise water reuse investments in their Operational Programmes. As an example, water reuse is included in the **Thematic Guidance Fiche on Water Management** as a key priority for investments in the water sector and action of high European added value for the ERDF and the CF. Investments in water reuse infrastructure can also be eligible for the **European Fund for Strategic Investments (EFSI)**.

**Spain:** One of the main objectives of DSEAR Plan is to establish an adequate financing model for measures included in the RBMPs.

**Gujarant and Haryana:** Models based on **Public-Private-Partnership (PPP)** have been suggested: DBO, DFBOT-Annuity, BOT-User Charges, BOT-End Use, and Hybrid Annuity Model (HAM)..

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## 5.6. Risks and constraints: Questions

1. Which are the key barriers to successful TWWR?
2. How can enforcement of water allocation be strengthened?
3. How important is the role of research and innovation?
4. How can dissemination of success stories and demonstration sites be fostered?
5. Is the current PPP-based financing model adequate/sufficient?
6. ...

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# Final list of Questions

- **Risks and constraints**
  1. Which are the key barriers to successful TWWR?
  2. How can enforcement of water allocation be strengthened?
  3. How important is the role of research and innovation?
  4. How can dissemination of success stories and demonstration sites be fostered?
  5. Is the current PPP-based financing model adequate/sufficient?
- **Implementation**
  1. Shall the Indian policy framework establish minimum quality standards? Which focus shall be followed?
  2. How shall the uptake of adequate and innovative technologies be assured?
- **Objectives:**
  1. Which of these objectives shall be incorporated into an Indian framework at the Union level?
  2. How relevant are the European objectives for Indian policy-making?
  3. Which additional information would be useful/important for a transfer/adaptation?

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**Thank you for your attention !**



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