

Interreg
CENTRAL EUROPE



CWC

European Union
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Development Fund

TAKING
COOPERATION
FORWARD



5) Smart Water Governance



Poliedra - Politecnico di Milano

6 Goals

- Recycle and reuse wastewater
- Increase efficiency in water use and distribution
- Guarantee good quality of water bodies
- Retain water as long as possible on site
- Promote multiple water use and water sustainability
- Preserve flow in water bodies



4 Areas of intervention

- Water Governance
- Water efficiency & water loss reduction
- Rain water management
- Grey water recycling



- Integrated Water management (holistic approach)
- Active involvement of the relevant stakeholders
- Transparent definition of roles
- Tools for active participation
- Stakeholders are enabled to play their roles



Water Governance: categories of intervention

Stakeholders engagement

1. Water pricing system
2. Water conservation programs
3. Minimum quality level standards
4. Incentives e Financial support (for recycled water project & construction of harvesting systems)
5. Education programmes
6. Rainwater harvesting and reuse legislation
7. Greywater reuse legislation

Case by case combination of many categories of intervention - No general patterns



1. Water pricing system

Increase the selling rate of fresh water and decrease the selling price of recycled water.

Main areas of application

Agricultural irrigation

Aquifer recharge

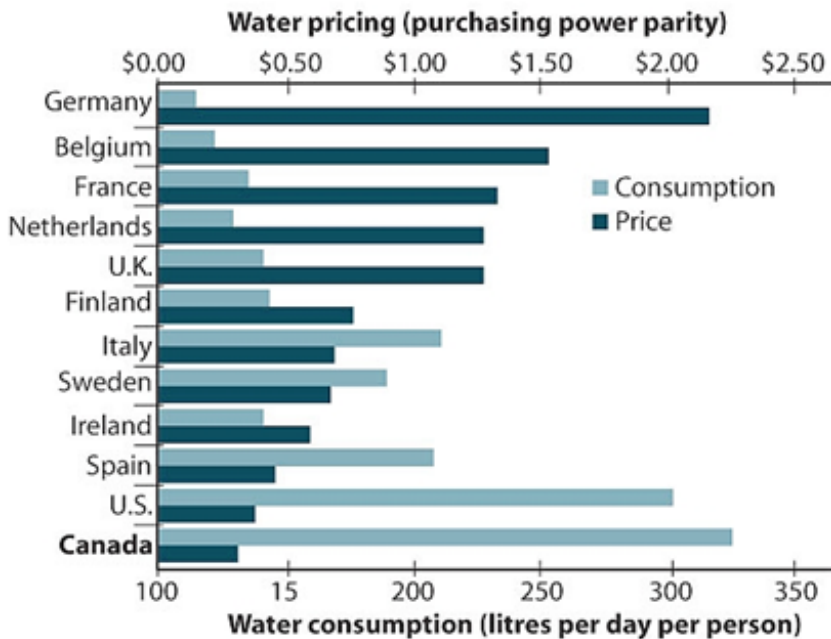
Treated wastewater

PROS	CONS	CRITICALITIES
Reduce consumption of fresh water by increase the water selling rate	Unpopular policy for some users	Tariff setting is a political process with controversy
Reduce the price of the reclaimed water to foster and encourage the use of recycled water		Tariff design is a complex process that needs high volume of data so difficult to fix prices
Promote water conservation		



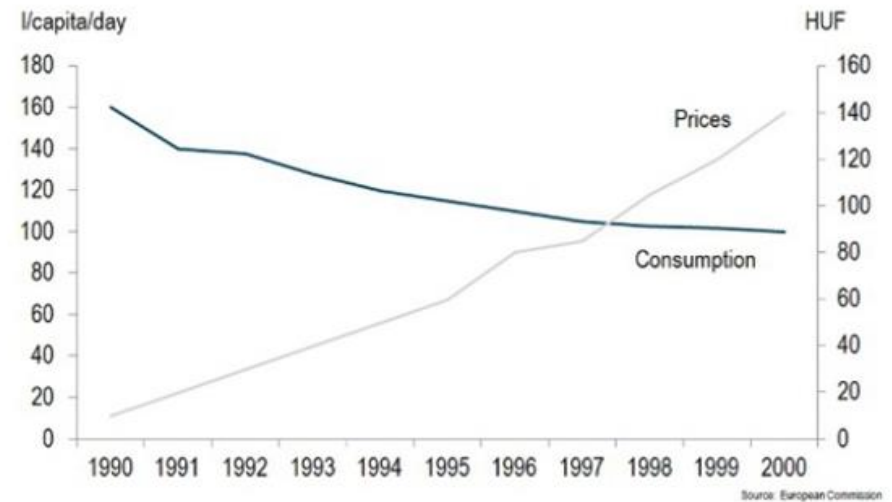
1. Water pricing system

Water pricing versus water consumption



Source: Polaris Water Project

Water consumption and prices in Hungary [l/capita/day; Hungarian HUF]



Source: European Commission



1. Water pricing system

For example reused water tariffs in Cyprus range from 33%-40% of freshwater rates; these ratios appear typical for the EU Mediterranean islands.

The table presents a comparison of the selling rates of abstracted freshwater and treated wastewater.

Cyprus:

Use	Tertiary Treated Effluent	Fresh not filtered water from government water works
	€/m ³	€/m ³
For Irrigation divisions for agricultural production	0.05	0.15
For Persons for agricultural production	0.07	0.17
For irrigation of hotels green areas and gardens	0.15	0.34
For pumping from an aquifer recharged by the treated effluent	0.08	n.a



2. Water conservation programs

Strategies and actions aimed at the conservation and the reduction of water sources exploitation and water use in general

Main application
Domestic use
Rainwater harvesting
Agricultural irrigation

Chicago's voluntary Meter-Save program:



PROS	CONS	CRITICALITIES
Promote water conservation, reuse and recycle of water	Needs for incentives and funds to be implemented	Careful planning and evaluation
Reduction of water resources exploitation		



2. Water conservation programs

Water Conservation programs are usually **carried out by water utilities**, and they require careful planning and subsequent **evaluation to ensure that the programs continue to save water** and are **cost-effective** investments for the water supplier.

The most appropriate water conservation strategies and actions will vary between communities depending on **local conditions and opportunities**.

One example of water conservation strategy carry out by the city of Chicago is the **Chicago's Meter-Save program**, which installs **residential water meters free** of charge. This program is successful because people are seeing considerable savings with completely free installation and a seven-year guarantee that bills will be no higher than they would be without a meter. Non-metered customers pay a flat fee for water every six months. Metered customers pay only for the water they actually use. The program also offers indoor or outdoor water conservation kits as incentives for signing up.



3. Minimum quality level standards

Minimum quality requirements for water reuse, set of values that recycled water must respect.

Main application

Agricultural irrigation

Aquifer recharge

Treated wastewater

PROS	CONS	CRITICALITIES
Necessary to avoid environmental and health risk	If they are too stringent, the use of recycled water will be impossible	Monitoring and tests should be scheduled on a regular basis
Safe use of reclaimed water		Expensive purification treatments are required



4. Incentives e Financial support

Incentives and funds for recycled water project, Financial support and incentives for the construction of harvesting systems

Main application
Rainwater and Greywater harvesting
Water reuse and recycle
Reclaimed water treatment system



PROS	CONS	CRITICALITIES
Encourage water reuse and recycling	Difficult to monitor efficiency of the investments	Find investors and people who believes in the cause
Technical progress and innovation	Uncertainty of the results	



5. Education programmes

Promote public and citizens involvement, rise awareness and sensibility through information campaign. Educate Young in school

One example is in the U.S., West Basin Municipal Water District has an extensive ongoing public outreach program. A **proactive children's education program**, called the Planet Protector Explorations, was developed to heighten public awareness in the entire community. The **outreach efforts work in tandem with construction, recycled water marketing, conservation, and school education** to inform the public. WBMWD's Speakers Bureau targets local cities and civic and environmental groups that are affected by WBMWD's recycling project. These programs have been instrumental in **capturing the support and enthusiasm of the residents, educators, students, and businesses and industries.**

Main application

Domestic use

Rainwater harvesting

Greywater reuse

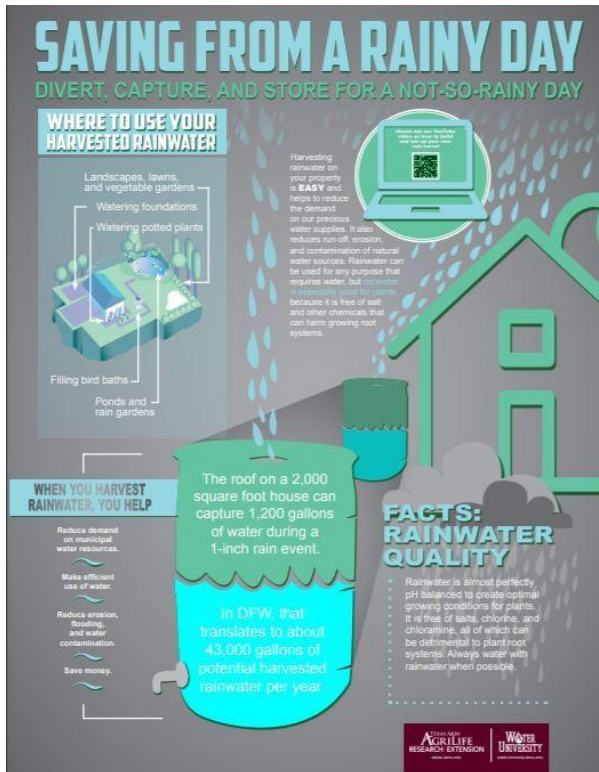


6. Rainwater harvesting and reuse legislation

Laws and regulations to build harvesting system and how to reuse water

Main application

Rainwater harvesting



PROS	CONS	CRITICALITIES
Reduces storm water runoff thus preventing flooding and overloading of sewage treatment plants	Difficulties in managing the whole process and in combining legislation and technical aspects	Needs of incentives and funds to apply the legislation
Reduce use of fresh water		
Increase of water availability		



6. Rainwater harvesting and reuse legislation

In India rainwater harvesting and reuse has been **widely adopted** between Ministers, Authorities, Agencies and people.

Many cities adopt **laws and policy on rainwater harvesting**; in addition **financial assistance** is given to people who decide to build a rainwater harvesting system. For example, in New Delhi a financial support is given to a maximum of 50% of total cost of the Rain Water Harvesting structure or 100000 rupees (1260 euro), whichever is less.

In addition in most of the Indian cities rainwater harvesting has been made mandatory.

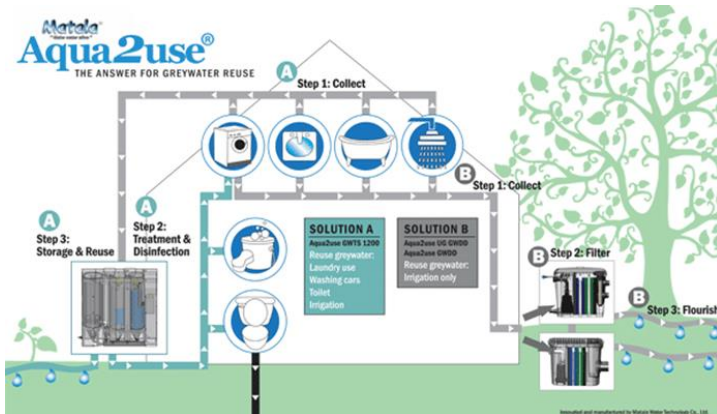


7. Greywater reuse legislation

Laws and regulations to build greywater recycling system and how to reuse wastewater.

Main application

Greywater system



PROS	CONS	CRITICALITIES
Reduce use of fresh water	Difficulties in managing the whole process and in combining legislation and technical aspects	Needs of incentives and funds to apply the legislation
Increase of water availability		Create an efficient legislation in order to avoid environmental and health risk



7. Greywater reuse legislation

Rainwater harvesting legislation has been advancing steadily across the U.S. nation for a number of years, starting with the landmark document adopted by the State of Texas in 2001, “**The Texas Manual on Rainwater Harvesting.**”

While not as common as legislation related to rainwater harvesting systems, several states across the U.S. are in the process of enacting or have already enacted **legislation that enables greywater reuse**, including Washington, Massachusetts, New York, South Dakota, Montana, Texas, Nevada, Arizona, California, Utah, New Mexico, Georgia, Idaho, Wisconsin, and Florida.

Generally speaking, **greywater reuse is more broadly permitted for subsurface irrigation than it is for flushing toilets.**

When greywater is reused for irrigation, purification of the greywater is typically not required, particularly for smaller scale systems.

Greywater reuse for flushing toilets typically must include a purification process such as chlorine or UV treatment.

Much of the efforts to legalize **greywater use** can be found **in arid areas of the country** that are prone to drought; the same is true on the international level where drought and water quality are serious issues. Therefore, a **majority of initiatives** worldwide related to greywater reuse **focus to a greater extent on irrigation issues** (for agricultural uses for example).



Greywater & Rainwater reuse - Citizens involvement

An example of rainwater and greywater reuse is located in Bucaramanga (Colombia) where **three alternatives** for the greywater - and rainwater **harvesting** systems and their subsequent **reuse** are proposed trying to **balance end-user preferences and water availability**.

