

# Water reclamation and conservation in Greece legal framework and public perception.

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**Is there a need for water conservation ?**

**Is water conservation in the urban/domestic sector important ?**

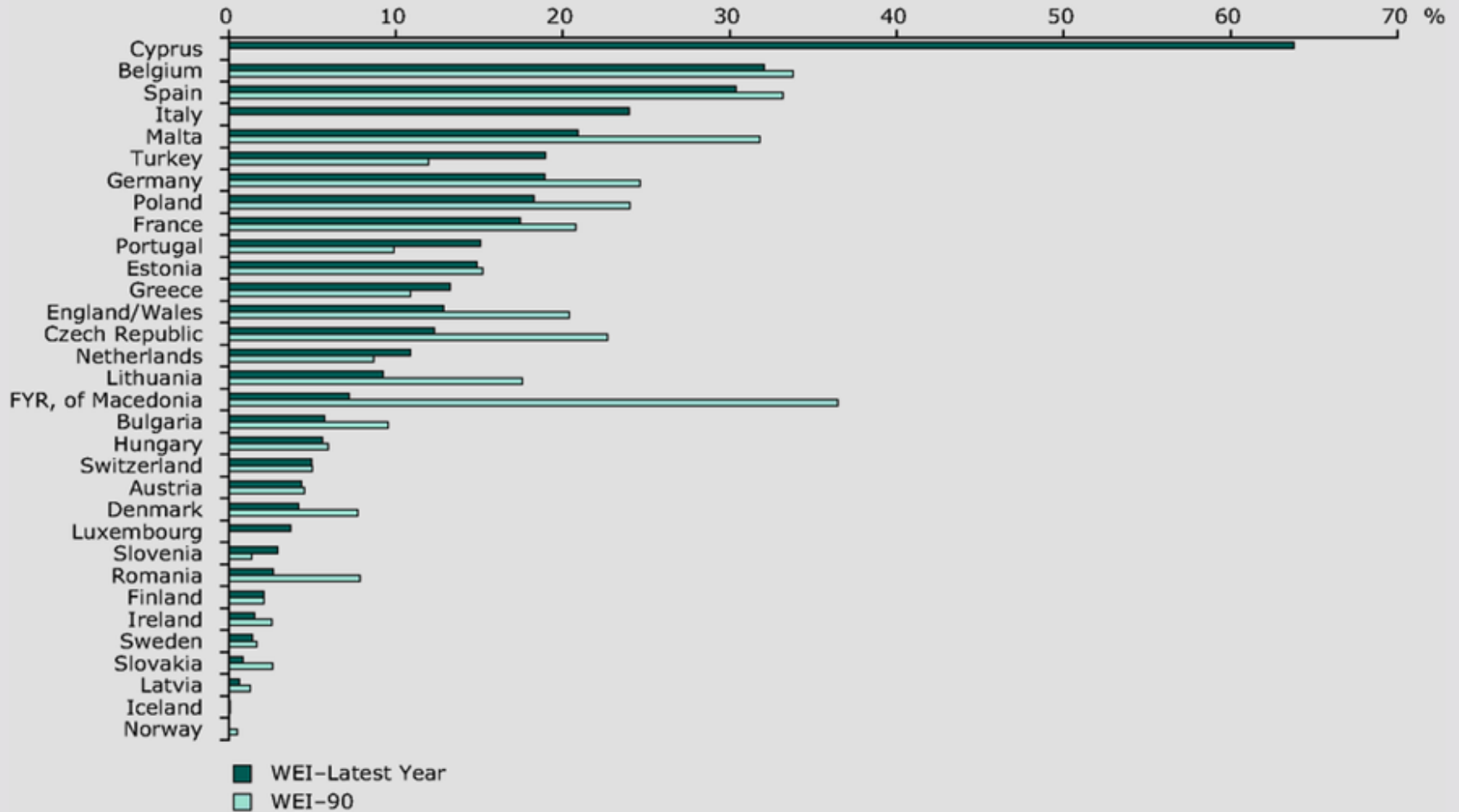
**Is there an appropriate legal/regulatory framework ?**

**Are there available technological solutions and what are the costs involved ?**

**What about the public perspective on the matter ?**

# Indicative WEIs and do they tell the whole story ?

Total abstraction per Year/Long term renewable resource

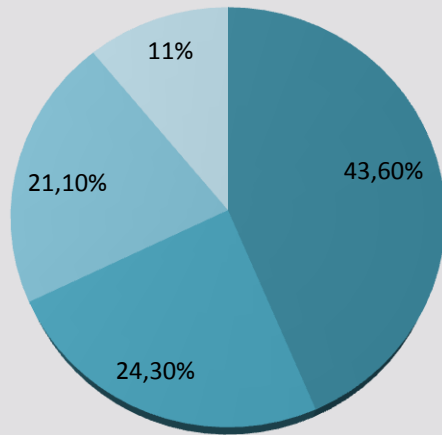


Indicative



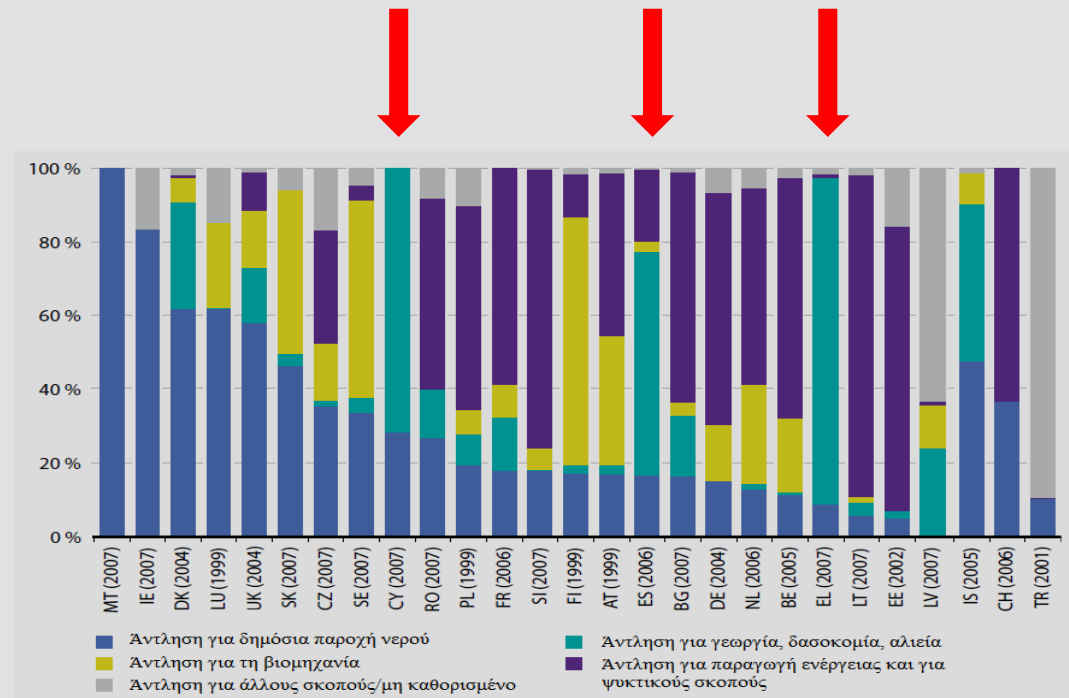
Country	Water footprint (m <sup>3</sup> /cap)
<b>Greece</b>	<b>2.390</b>
<b>Spain</b>	<b>2.325</b>
<b>Norway</b>	<b>1.467</b>
<b>USA</b>	<b>2.483</b>
<b>Hungary</b>	<b>789</b>
<b>Italy</b>	<b>2.303</b>
<b>India</b>	<b>980</b>
<b>Israel</b>	<b>1600</b>

# Water uses in EU

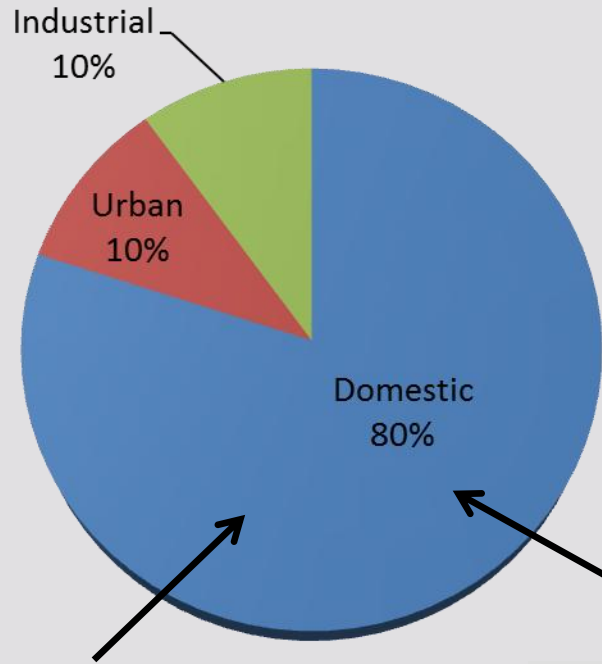


- Energy
- Agriculture
- Urban
- Industrial

## Water uses in selected countries

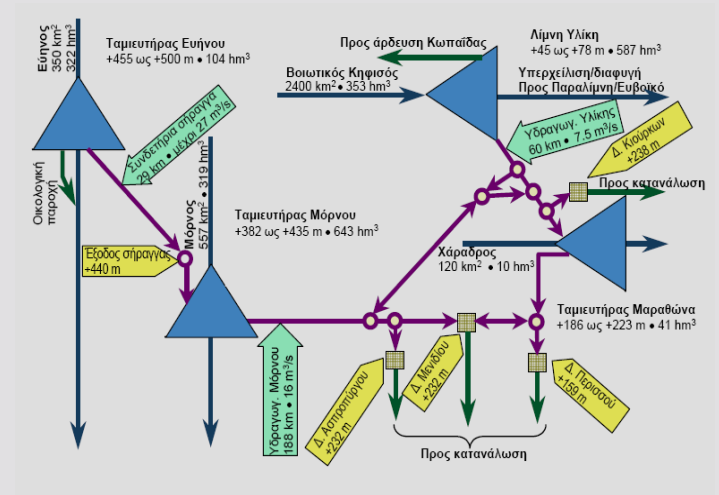
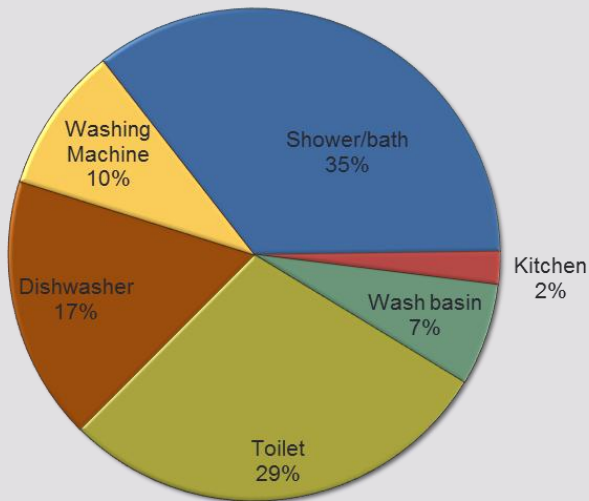


# Water uses in the Greater Athens Area



400-450  $10^6$  m<sup>3</sup>/year

Conventional water consumption  
208 l/person/day



## Legislation/Regulation

### **The EU Water Framework Directive 2000**

**“Addressing the challenge of water scarcity and droughts“ 2007** a communication from the Commission that considers regulatory measures to save water in buildings.

The **"Blueprint to safeguard Europe's waters" (2012)**, where it is argued that there is a lack of additional legislation required for the sustainable management of water resources.

With **the Strategy "Europe 2020"**, the European Union has set targets to be achieved by 2020, involving the efficient use of resources.

The **"Roadmap to a Resource *Efficient Europe*"** is one of the key elements of the "Europe 2020" strategy. The Roadmap states that a “Communication on Sustainable Buildings” should be presented

**The “Communication on Sustainable Buildings” in 2013** , proposes actions to improve resource efficiency in construction, apart from energy efficiency.

**The Eco-Design Directive (2009/125/EC)** sets the context for mandatory requirements for energy using products and energy related products sold in all Member States, including products that use water, such as washing machines and dishwashers.

**The Regulation 1015/2010** on eco-design requirements for household washing machines determines performance criteria, including water consumption.

**The Regulation 1016/2010** on eco-design requirements for household dishwashers also includes benchmarks for water consumption.



## Regulations, programs and initiatives

Beyond the legislative acts of the European Union and related economic tools, saving water at home can be promoted through raising **public awareness**. The actions (often carried by NGOs) that can help raise awareness include:

- campaigns
- the labeling of products and technologies that offer efficient use of water,
- education of the society - students - teachers on matters of water,
- demonstration. projects

Indicative examples (among several at national or regional levels) include:

- ❑ the mandatory **labeling system WELS, applied in Australia** since 2006. WELS is assigned to plumbing products, shower heads, tap equipment, equipment for toilets, washing machines, dishwashers.
- ❑ the **obligatory “Code for Sustainable Homes” applied in the United Kingdom** since 2008, according to which houses are classified into 6 levels, with level 6 referring to the most efficient and sustainable house, while level 3 is incorporated in the building Regulation.

## Greece

In Greece, the **harmonization with the provisions of the WFD** was concluded by Law (3199) in 2003 and by a supplementary Presidential Decree (51/2007).

At a national level the **presidential decree for rainwater tanks on islands**, enforces the construction of rainwater tanks at new homes on several, specified, islands.

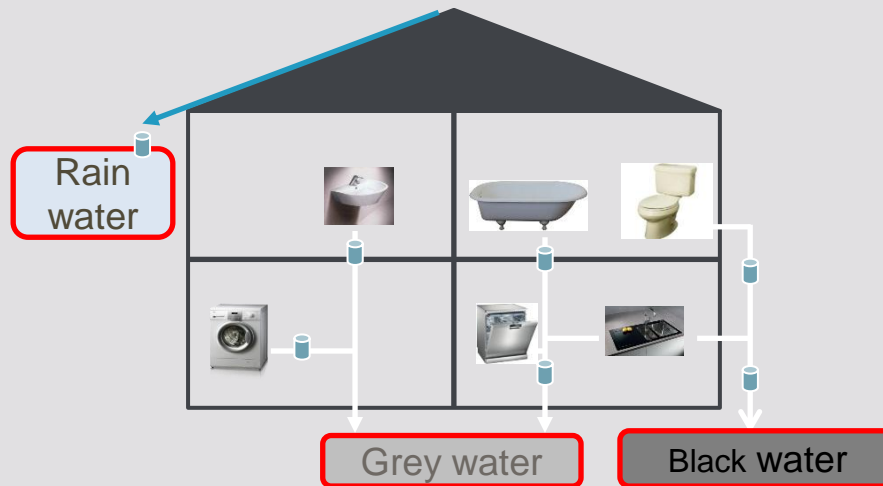
The **New Building Regulation (Law No. 4067, 2012)** includes a provision for the installation of water saving equipment in new residences, equipment to be specified by subsequent decisions of the Minister of Environment, Energy and Climate Change.

In addition, the ministry of Environment, Energy and Climate Change through the Special Secretariat of Water initiated in 2011 the preparation of **an Institutional Framework and a Program of Measures** for household water conservation. The study, conducted in support of this action, showed that simple interventions to equip a household can achieve significant water savings. Several institutional, regulatory and dissemination measures were proposed in the context of the study.

## What possibilities exist on the domestic consumption sector ?

**Water saving devices:** taps, showers, toilet, dishwashers, washing machines

**Grey water segregation and treatment .** Depending on segregation type and final use several possibilities exist for safe application



**Related costs and cost effectiveness.** Clearly depended on water pricing policies

## Typical characteristics of water saving devices

Product	Conventional	Water Saving	% Reduction
Shower	14 l/min	7,0 l/min	50,00 %
Tap	12 l/min	6,5 l/min	65,10 %
Toilet	10 l/use	4-6,0 l/use	56,70 %
Dishwasher	114 l/day	9,0 l/day	93,75 %
Washing machine	200 l/use	43,0 l/use	78,50 %

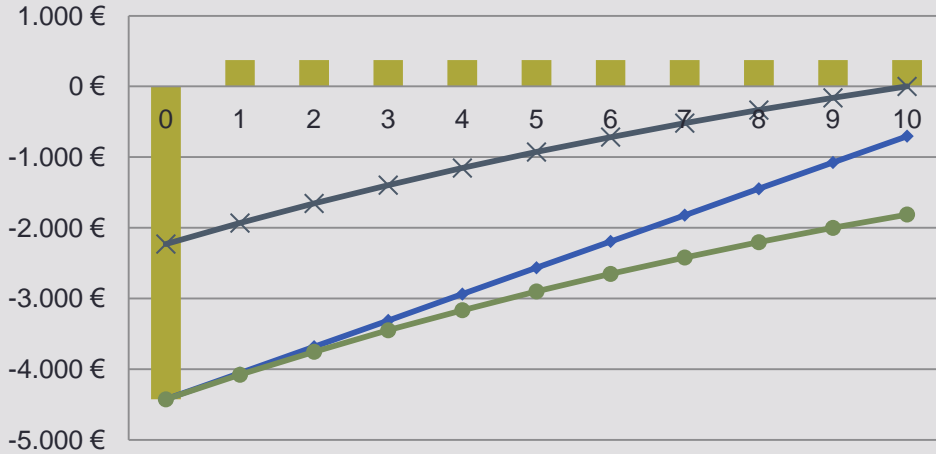


Tap, Shower, Toilet (73% of total consumption, 40% total savings).  
Investment <300 euros per household, recovery in one year

Dishwasher, Washing machine (27% of total consumption, 20% total saving)s. Investment 1300 euros per household, recovery in 8 years

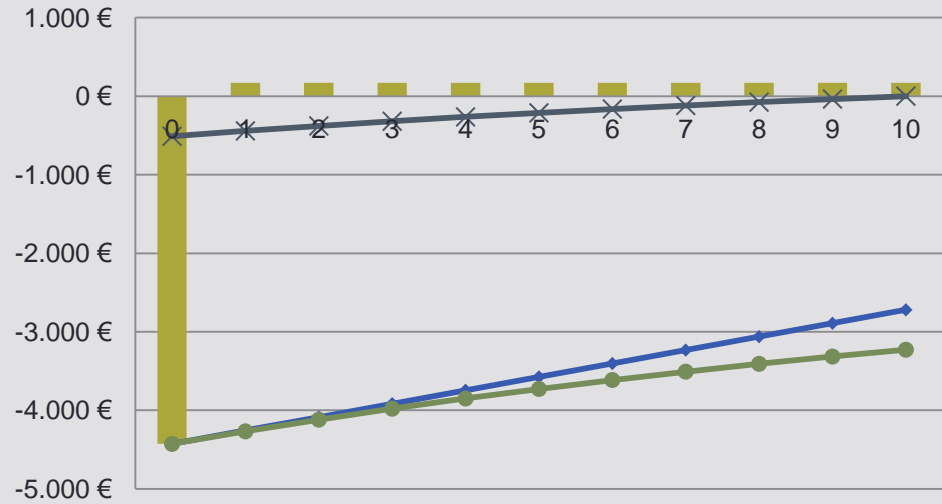
All applications (100% of total consumption ,60% total saving)s.  
Investment 1580 euros per household, recovery in 6 years

Grey water recovery 374 l/d  
Household with conventional devices



- Cash flow
- Cumulative Cash flow
- Present value
- Marginal investment

Grey water recovery 164 l/day  
Household with water saving devices



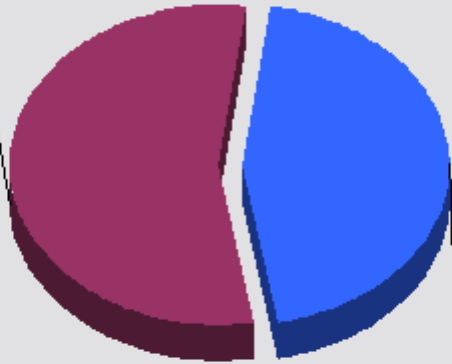
## **Public Perception**

A survey aiming to investigate public perception regarding water issues and more specifically conservation and the use of alternative sources, such as grey water was conducted, involving a questionnaire of 118 variables with single and multiple questions.

Following a pilot application in 50 households, a full scale investigation was performed, involving 800 households of the Greater Athens area and Aegean islands, during June and July 2013.

Adequately informed

55%



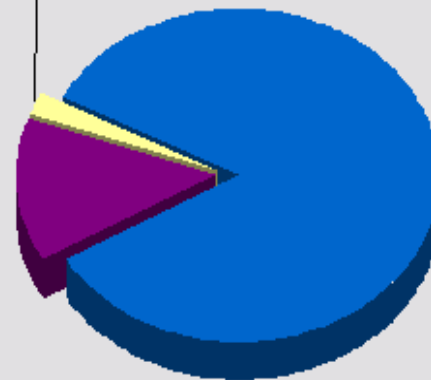
Not adequately informed  
45%

Do you feel that you are adequately informed about environmental problems ?

Do you think that environmental problems are overrated ?

Neither  
2%

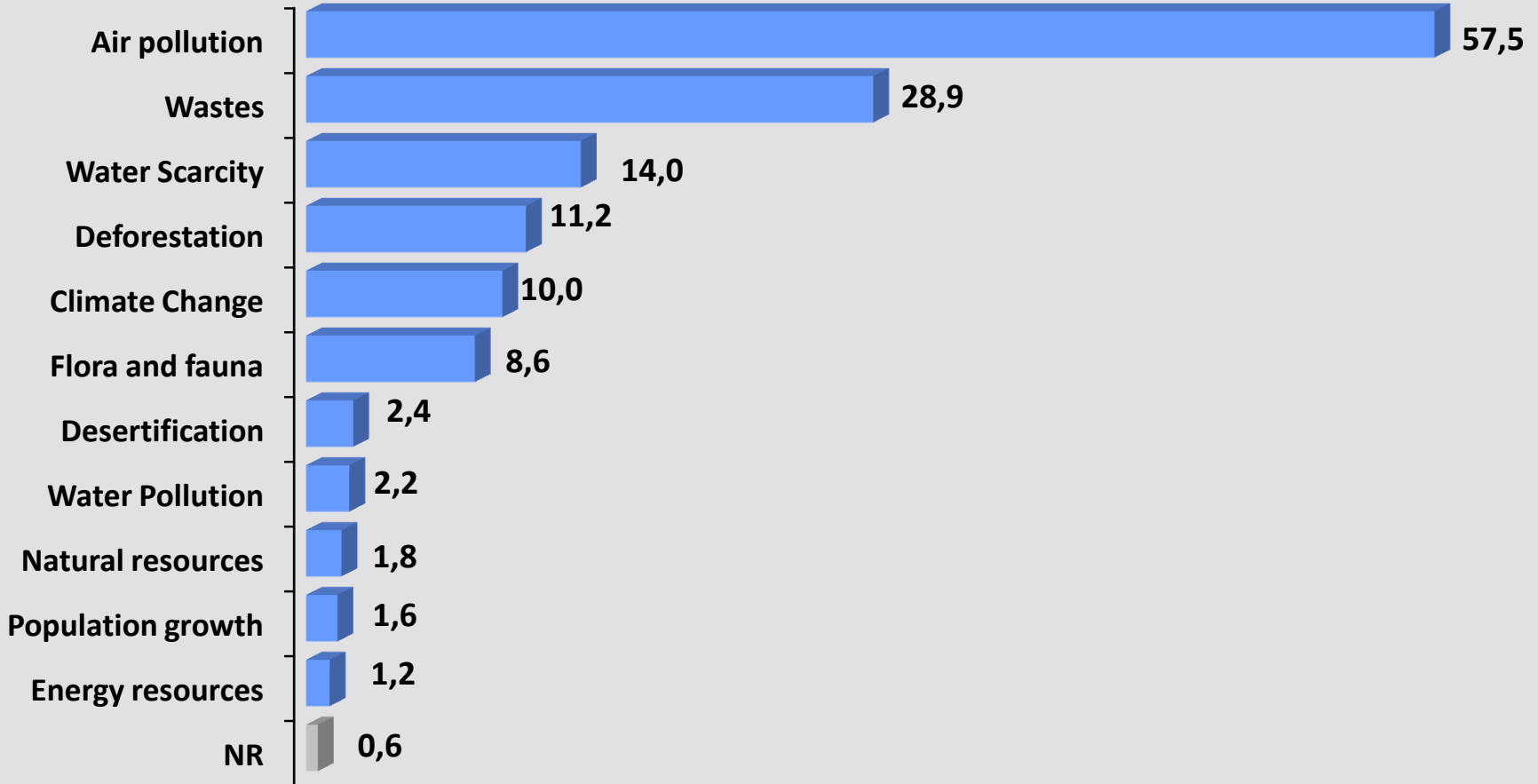
No  
84%



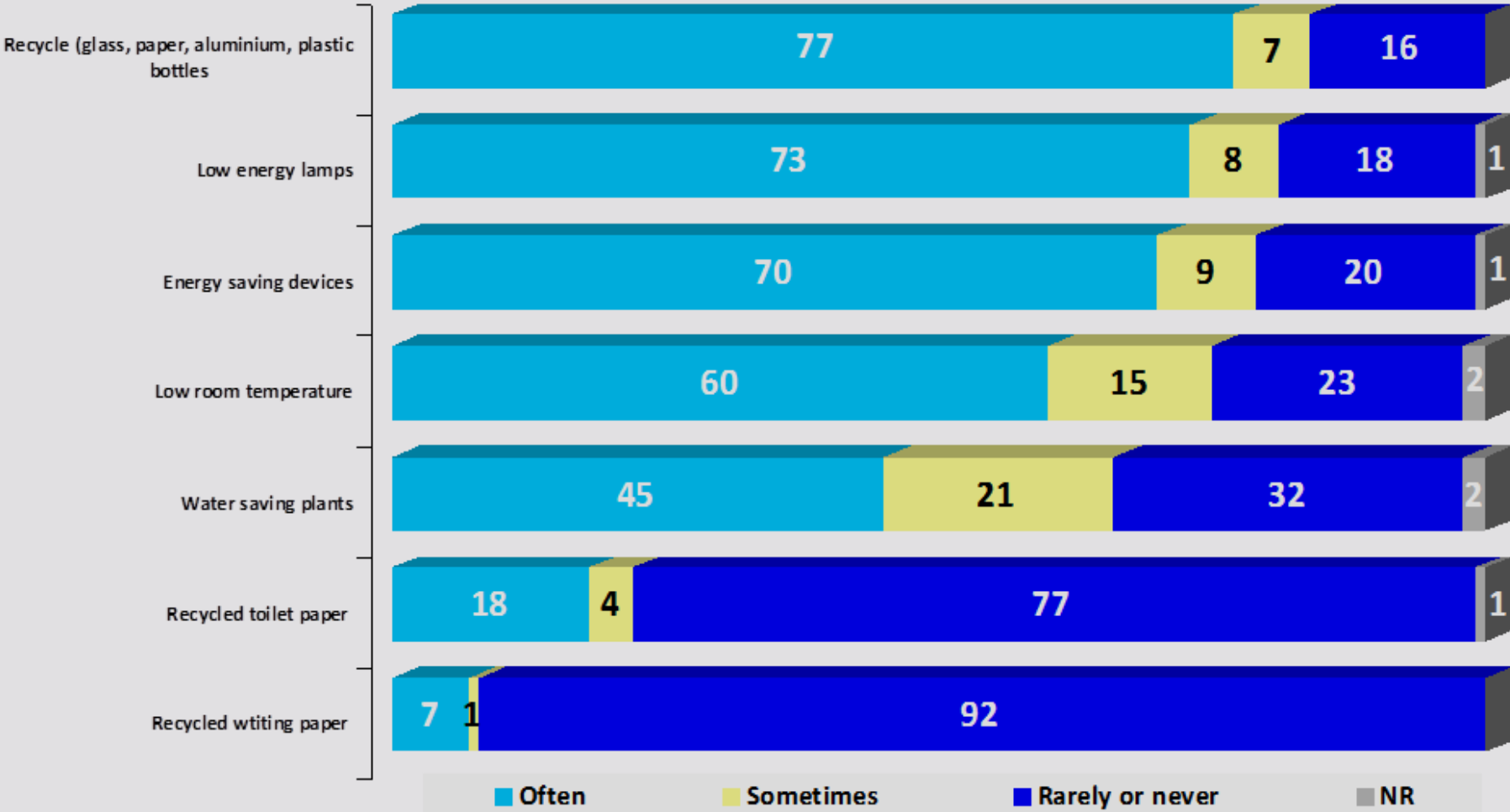
Yes  
14%



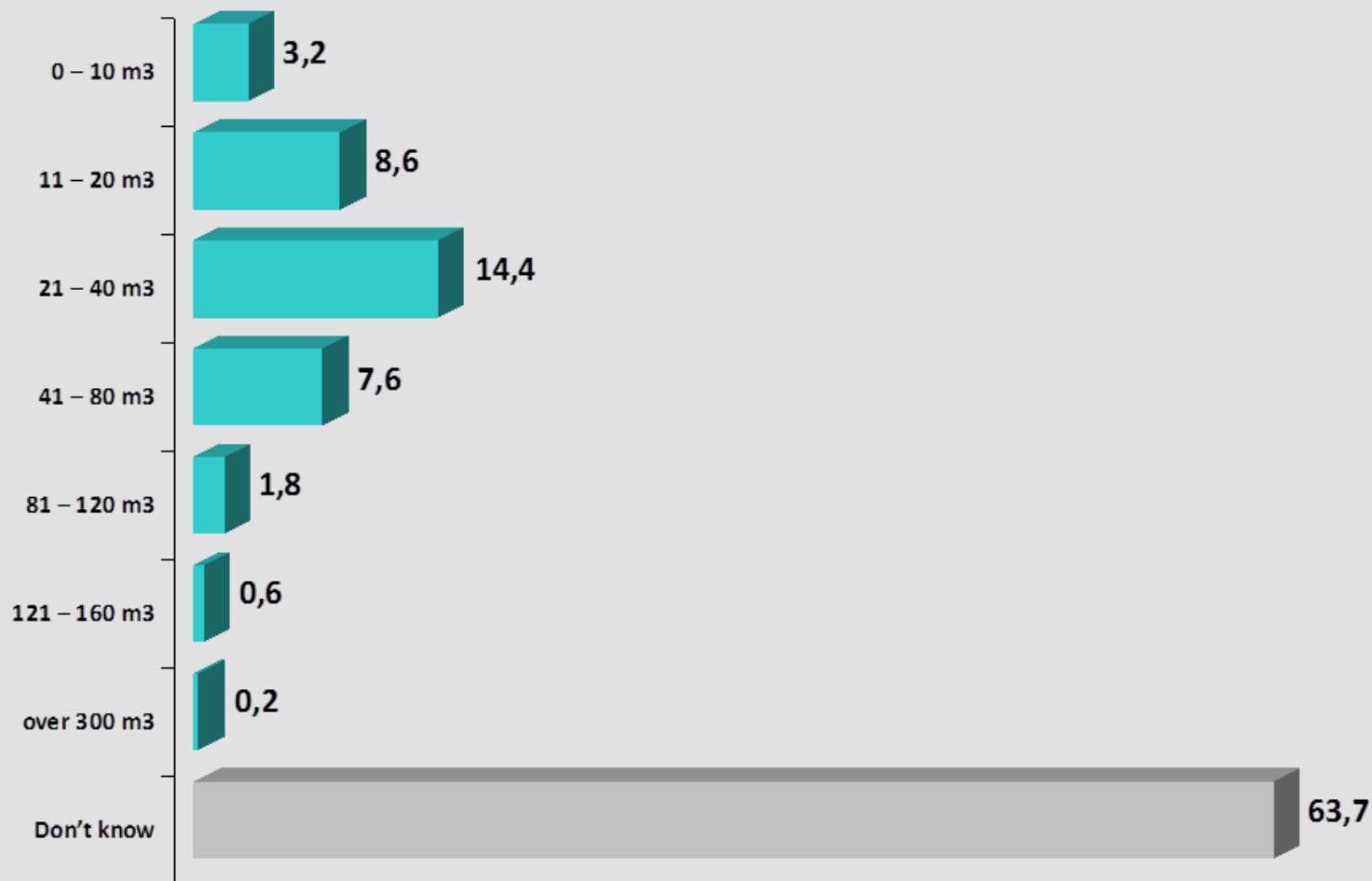
# Major Environmental Concerns

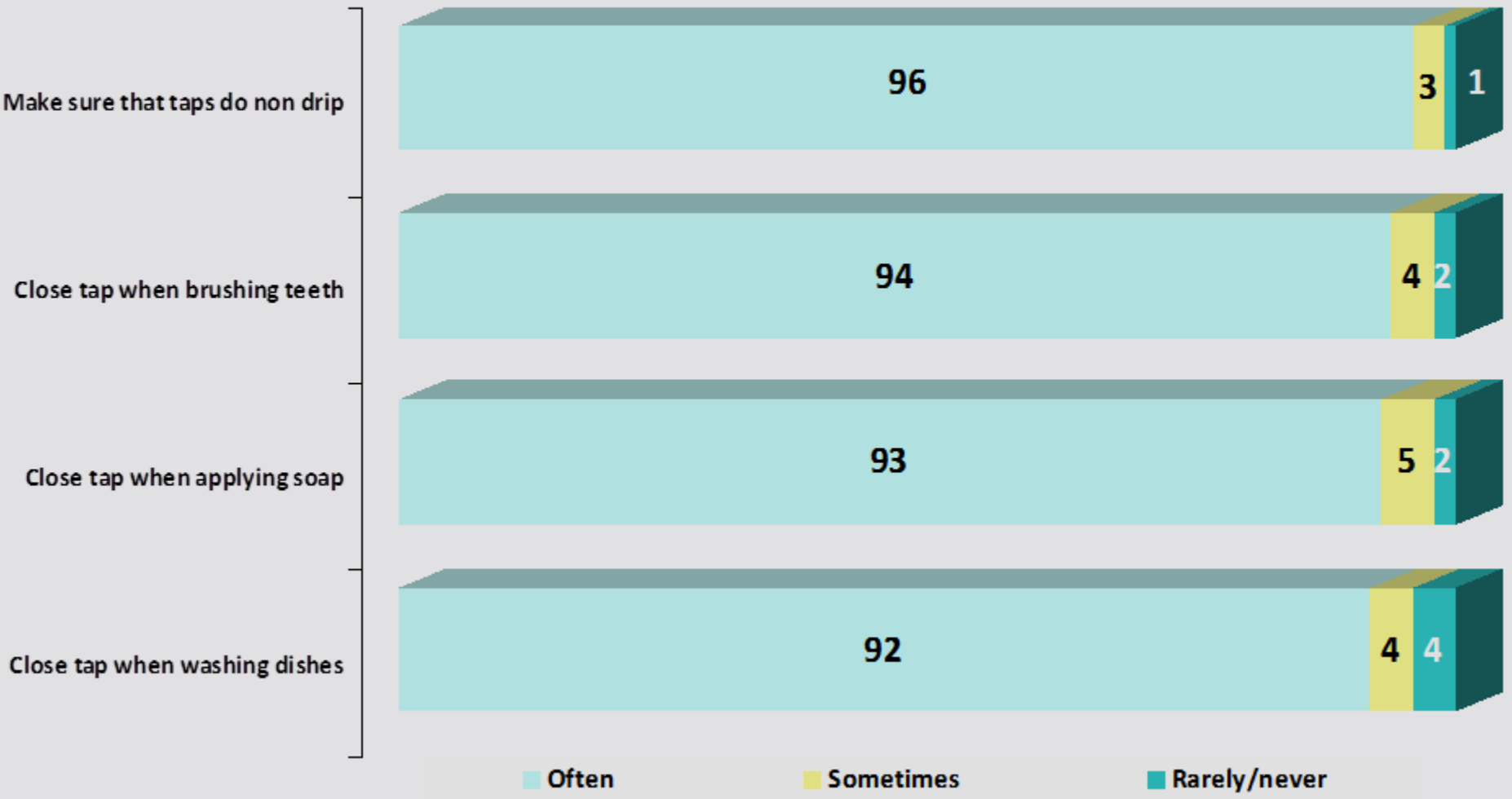


# Environmental friendly practices

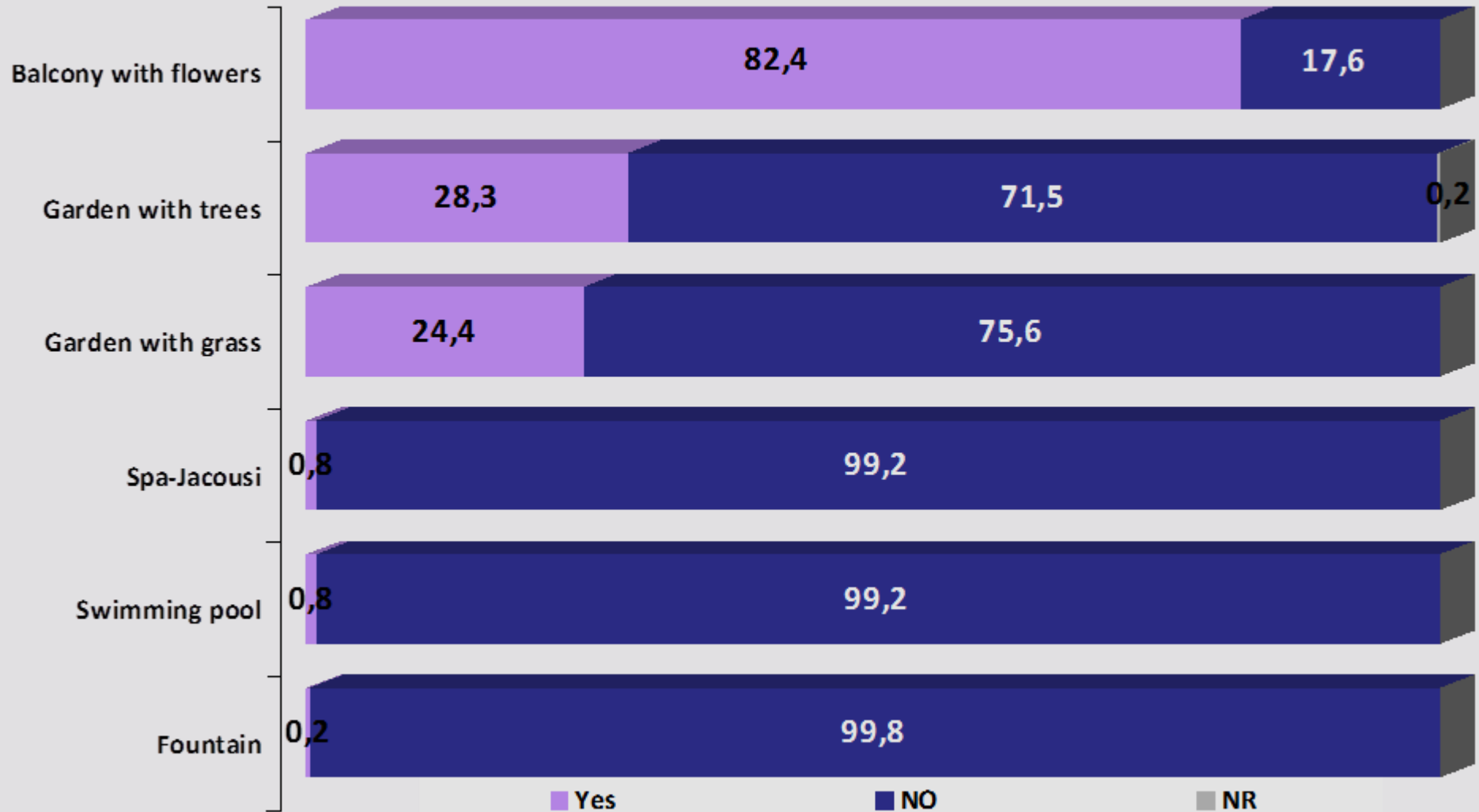


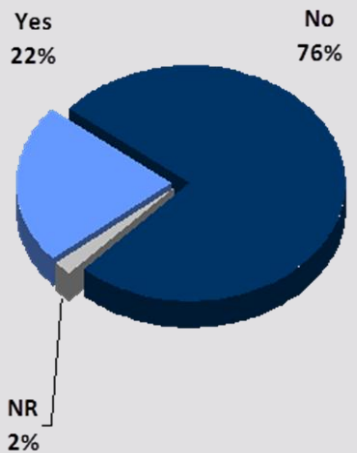
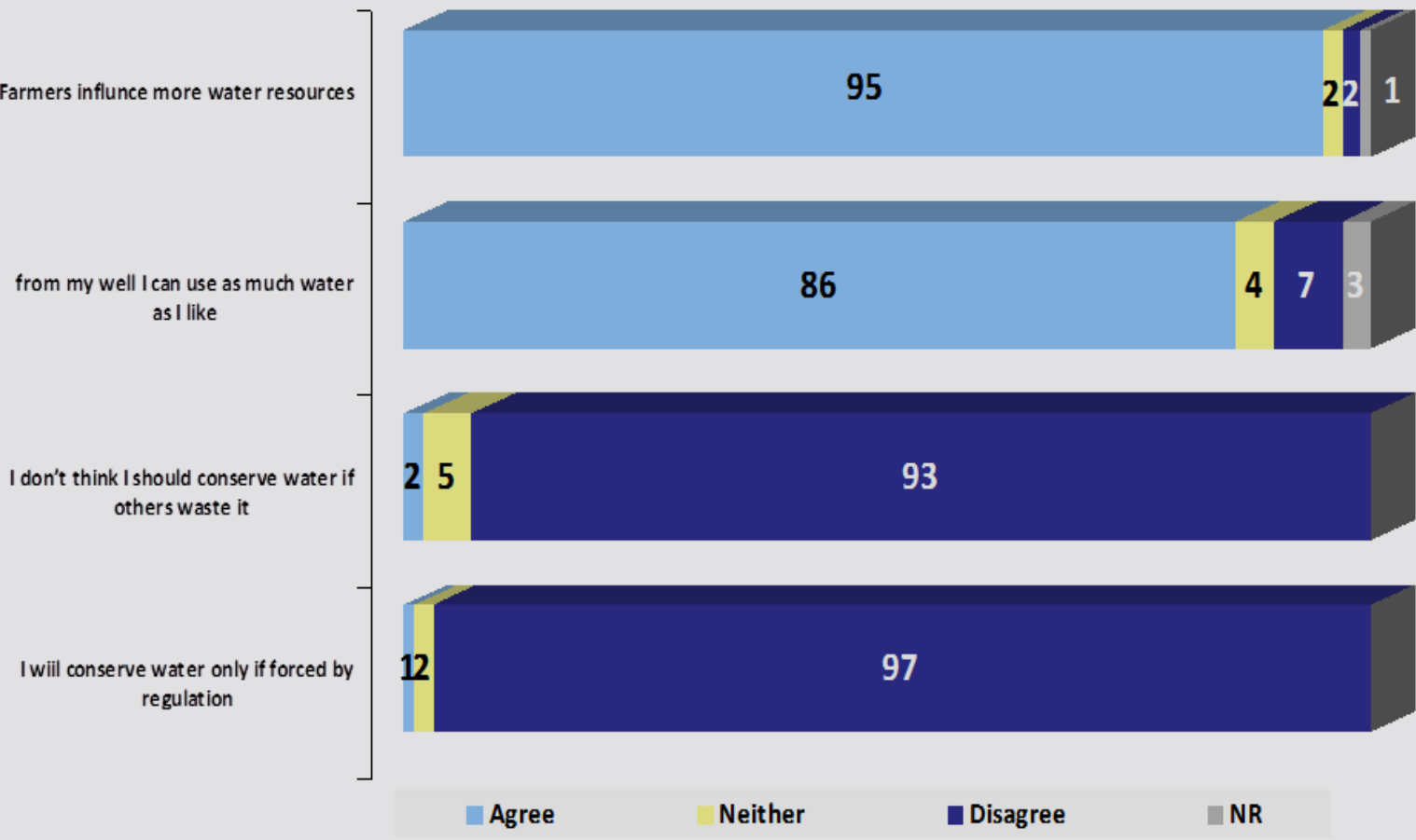
## How much water does your household consumes per paying period ? (2-3 months)





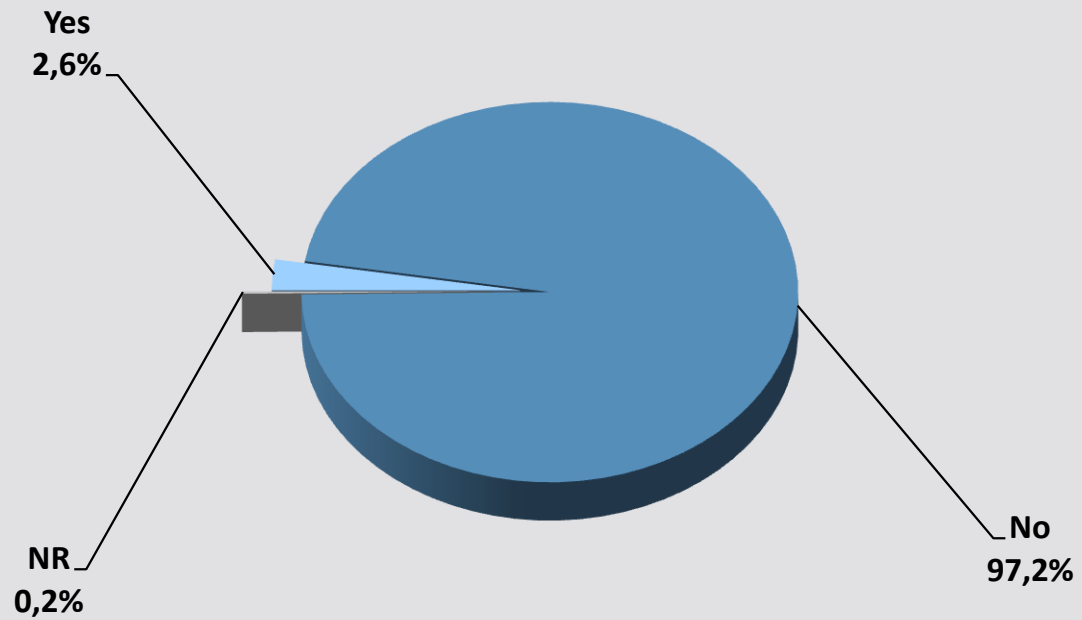
## Water demanding devices/places



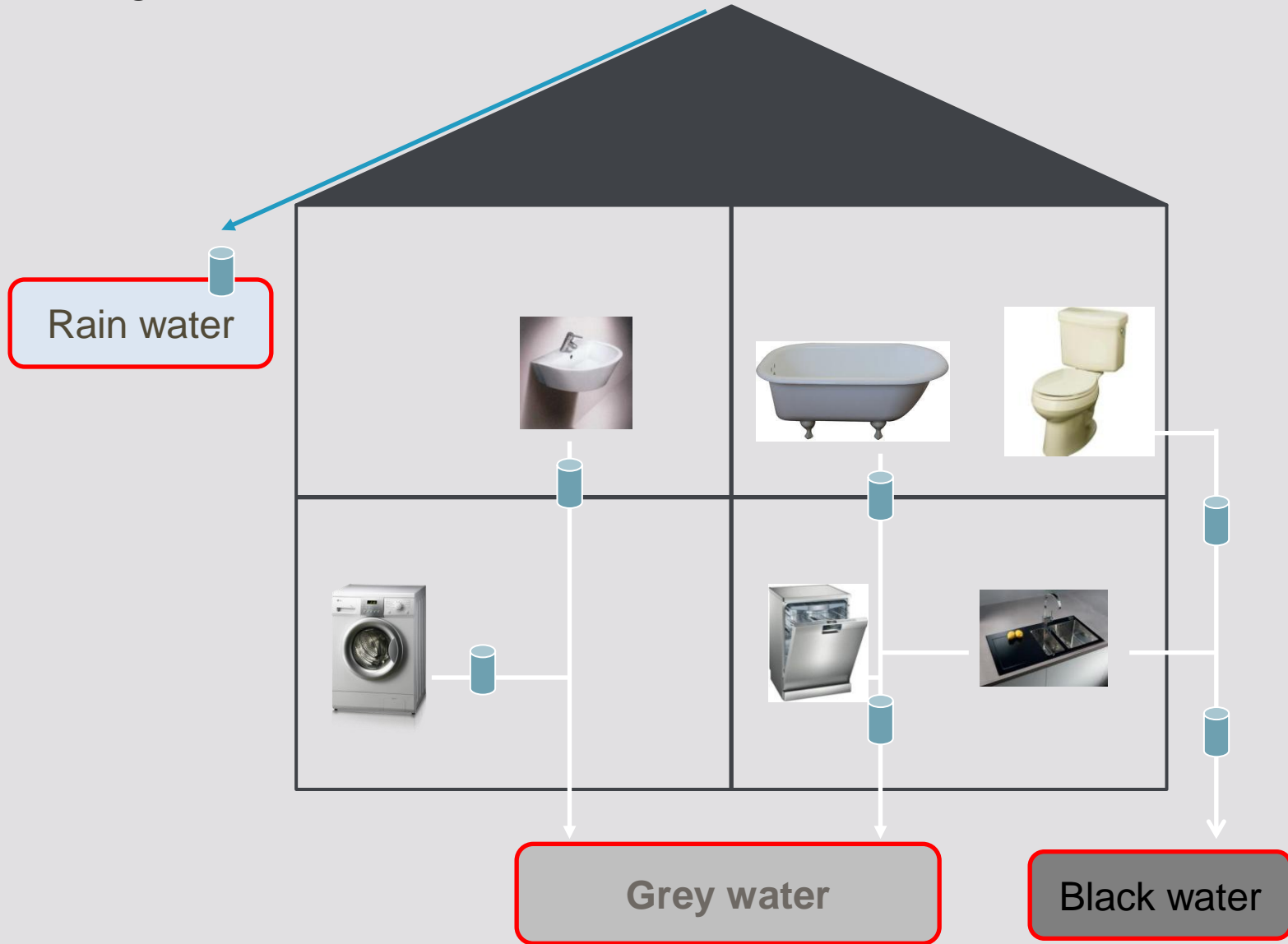


Are willing to invest in water saving devices ?

# Have you ever heard about " Grey Water"

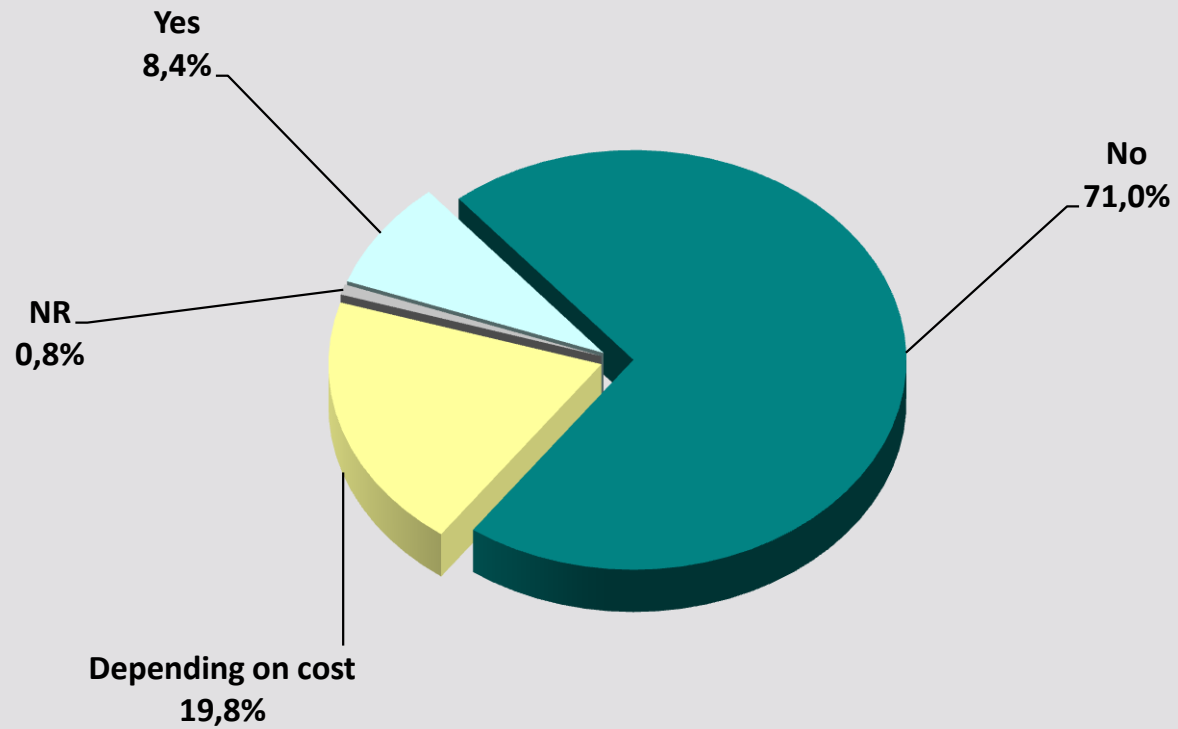


Following a brief explanation .....

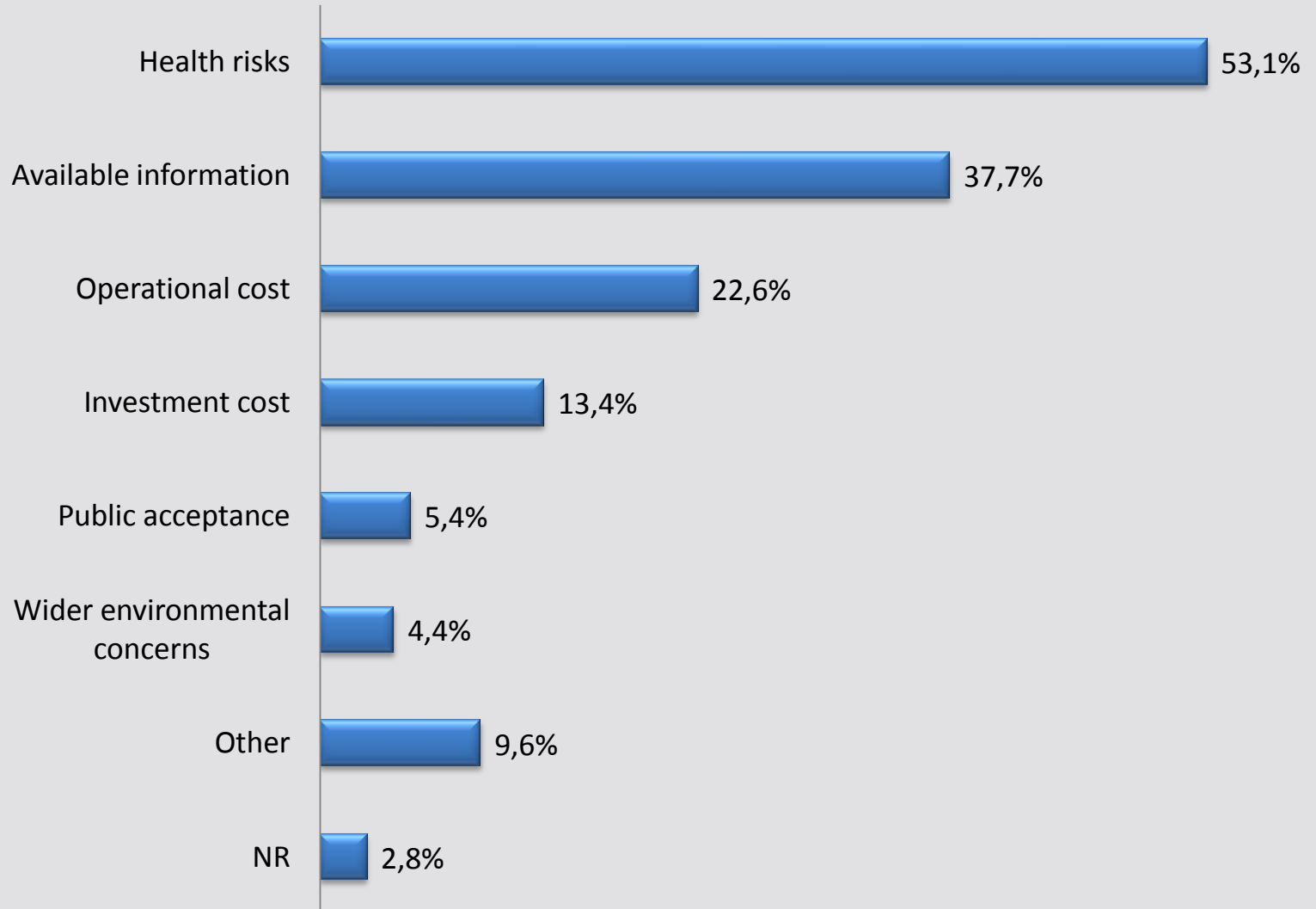




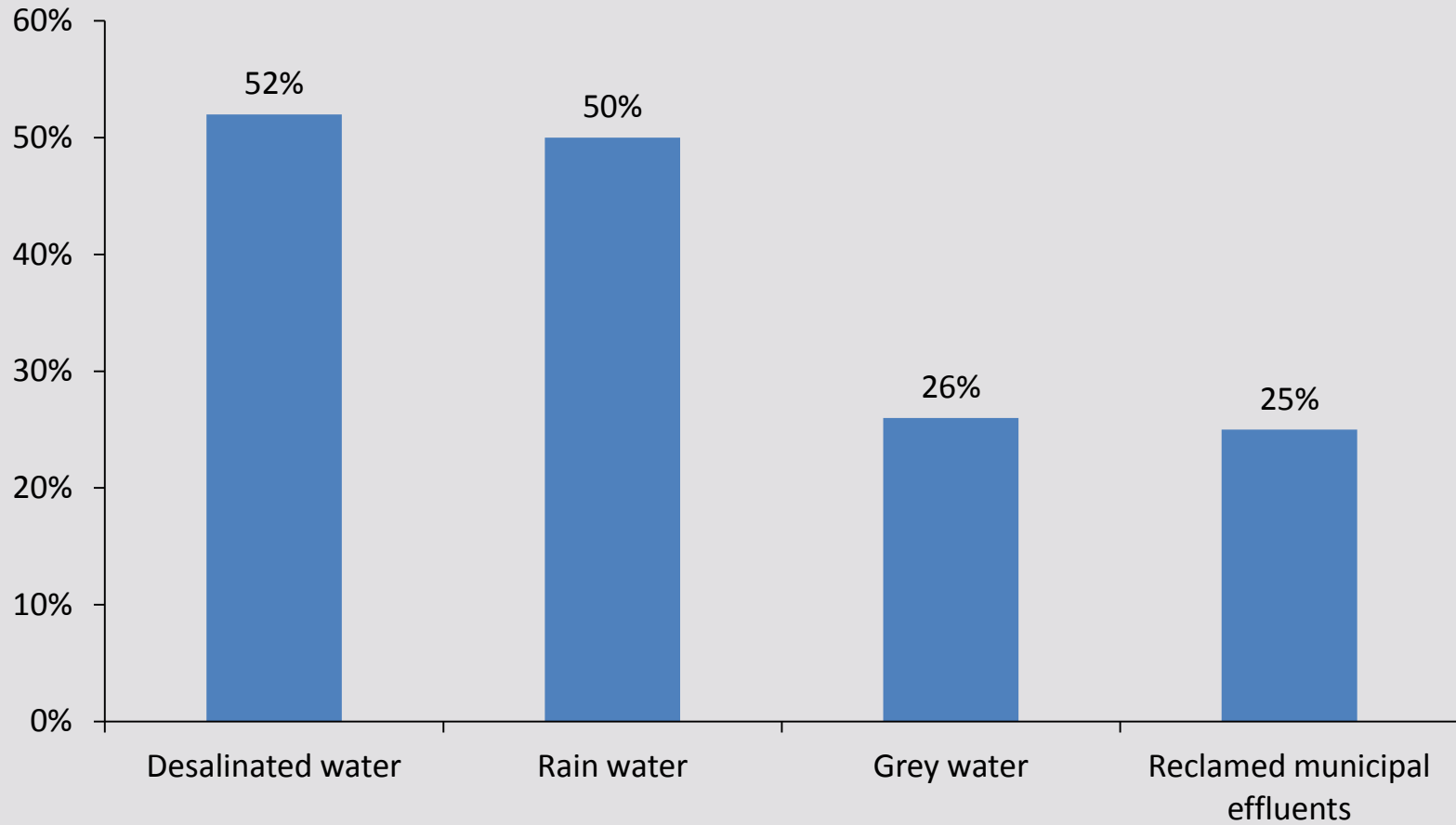
..... would you be interested in using grey water ?



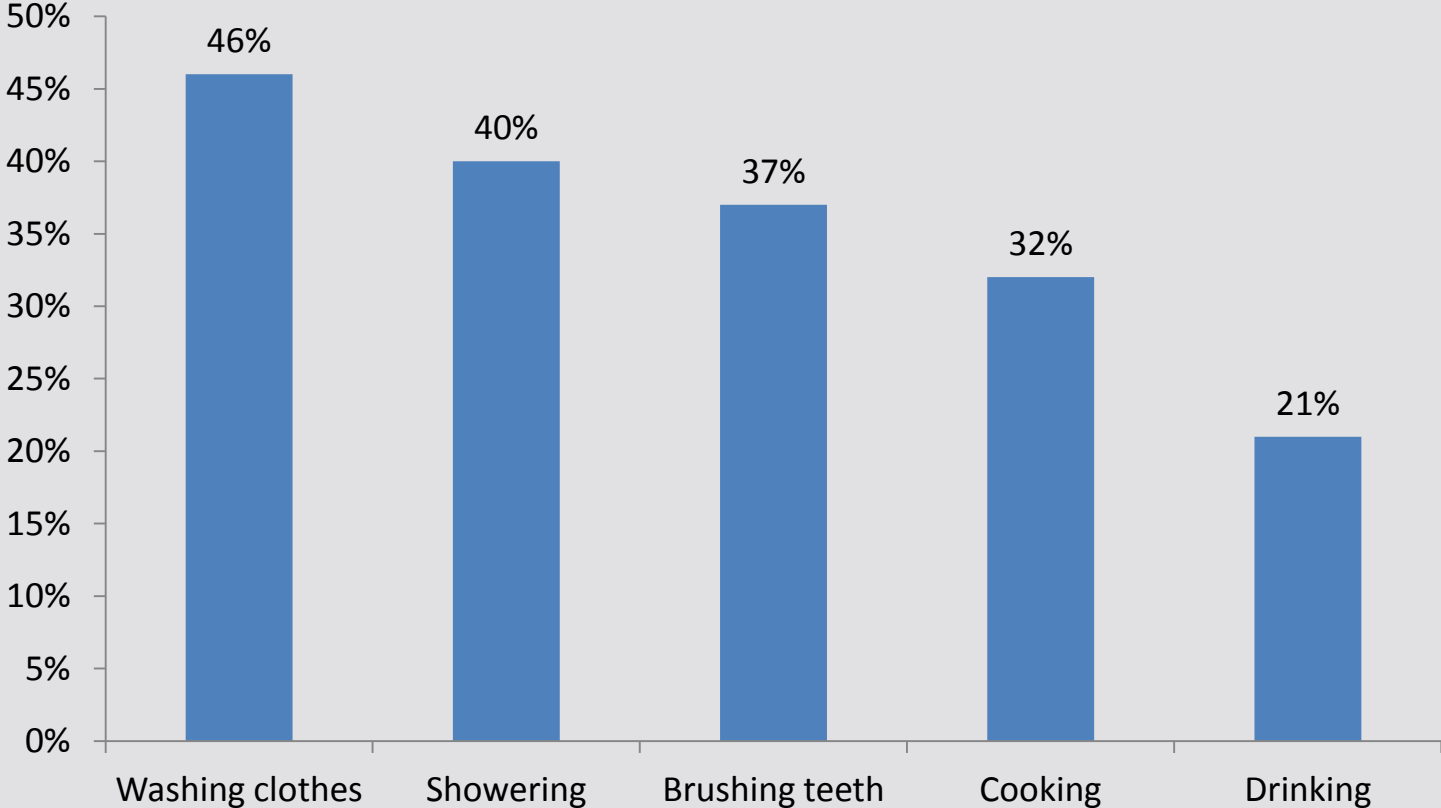
## Major issues for water recycling practices



# Which sources of alternative water would you consider appropriate



If needed what uses would you consider appropriate for reclaimed water



*Thank you for your attention*



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