Assessment and improvement of the urban water cycle eco-efficiency

Project presentation

Cerdanyola, 20th November 2013

Desirée Marín

LIFE10 ENV/ES/520

Project details

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Title: ASSESSMENT AND IMPROVEMENT OF THE URBAN WATER CYCLE ECO-EFFICIENCY USING LCA AND LCC

Coordinator: CETaqua

Partners: UAB Universitat Autònoma de Barcelona; USC Universidade de Santiago de Compostela; Universitat de València

Duration: From January 2012 to December 2014

Funding: LIFE+ programme from the European Commission

Budget: 1.594.413 €

Project context

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- **People**
  - ✓ Population growth
  - ✓ Increasing urbanisation
  - ✓ High living standards
- **Environment**
  - ✓ European regulations
  - ✓ National/ Regional/ Local laws
- **Economy**
  - ✓ Increase of energy and goods price

Every second, the urban population grows by 2 people

In Europe 80% of the population live in urban areas

Source: UN-HABITAT

An eco-efficient urban water cycle management should…

→Limit its environmental impact

→Guarantee sufficient drinking water supply and waste water treatment to growing cities

→ At a reasonable cost

Objectives and expected results

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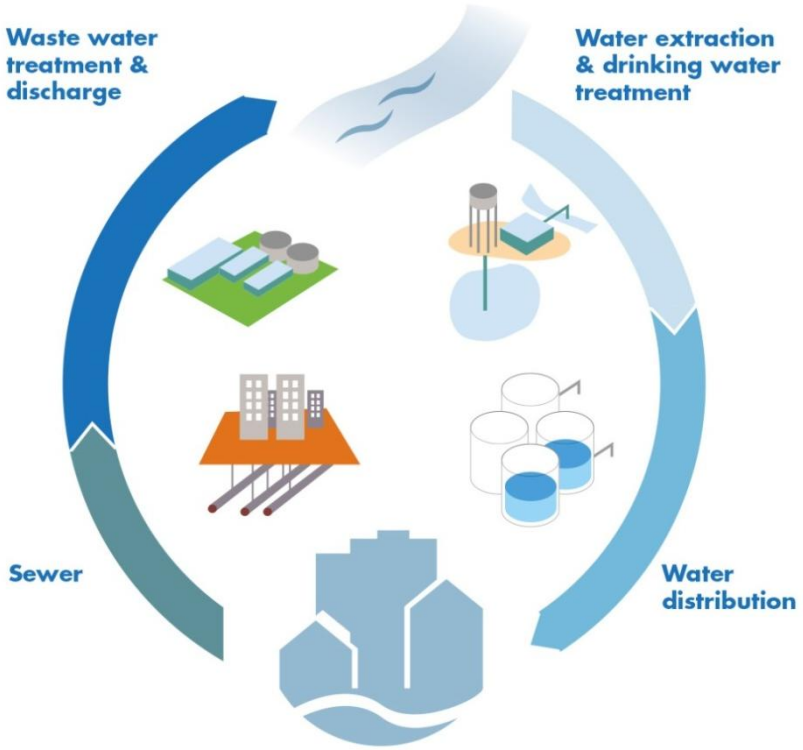
- ✓ **Environmental impacts** assessment and potential reductions
- ✓ **Costs analysis** and evaluation of cost savings
- ✓ Indicators to measure and improve **eco-efficiency**
- ✓ Recommendations of **best practices**
- ✓ User-friendly **tool** development to support decision-making



Urban Water Cycle stages

Actions and schedule

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Action		2012				2013				2014			
Number/name of action		I	II	III	IV	I	II	III	IV	I	II	III	IV
A1	Project Management												
A2	Case studies and methodology definition												
A3	Data collection												
A4	LCA- water extraction and drinking water treatment												
A5	LCA- transport, distribution and sewer												
A6	LCA- waste water treatment												
A7	LCC- urban water cycle												
A8	Integration of results. Indicators												
A9	User friendly tool												
A10	Application of tool to case studies												
A11	Communication and dissemination												
A12	Networking												
A13	After-LIFE communication plan												
A14	Project monitoring												
A15	Project audit												

Methodological framework

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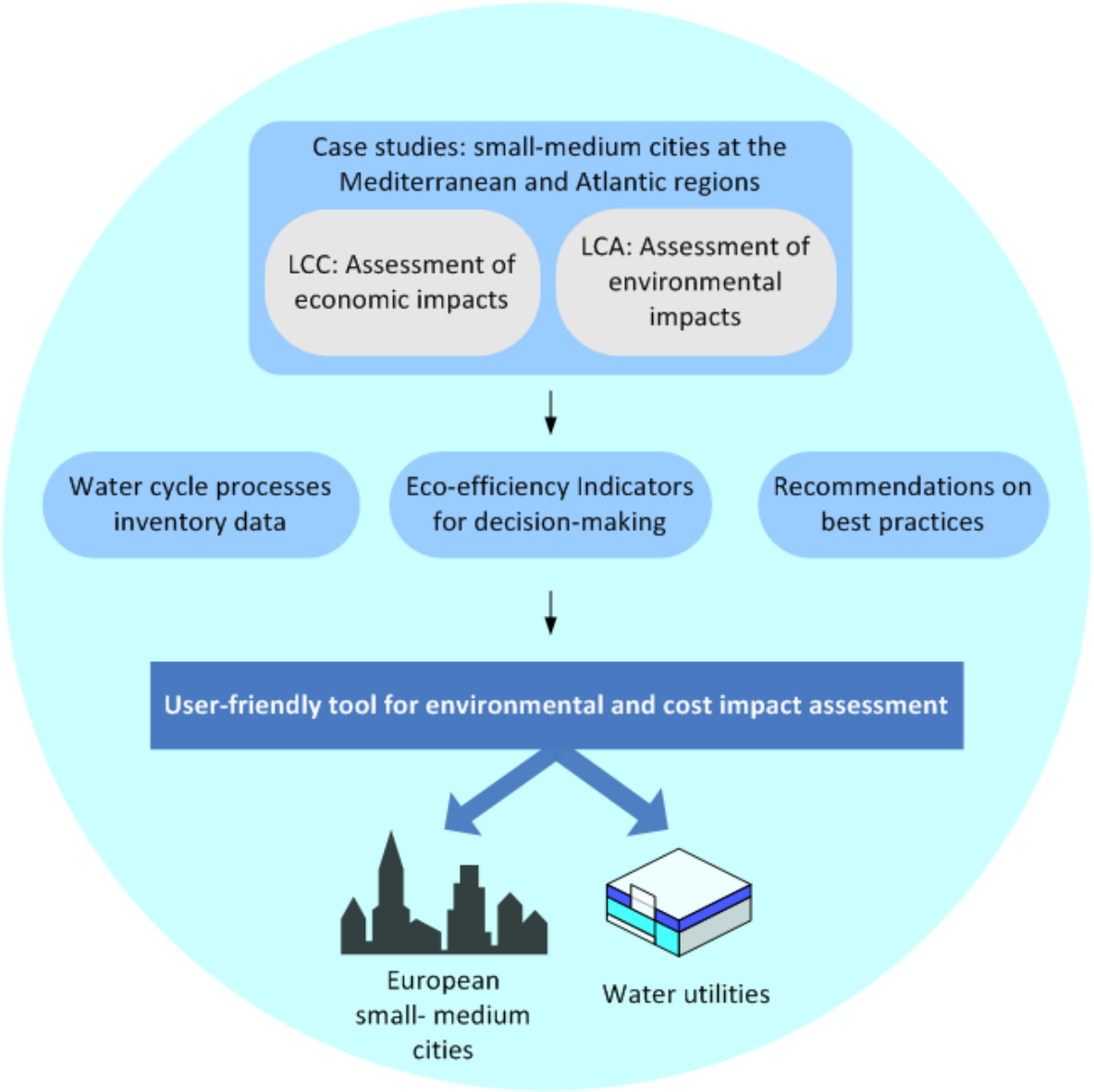

Methodological framework

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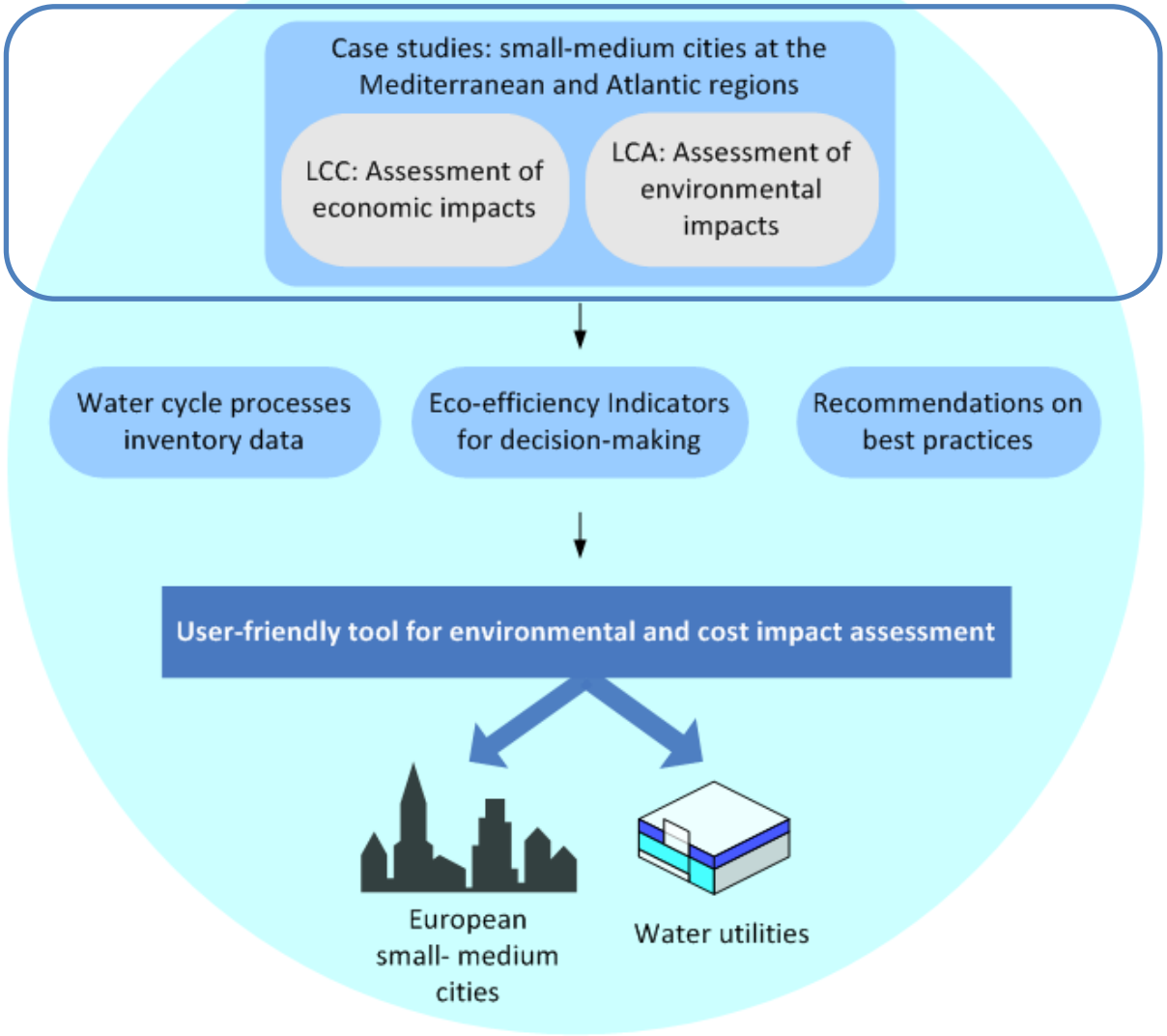

Case studies and demonstration sites

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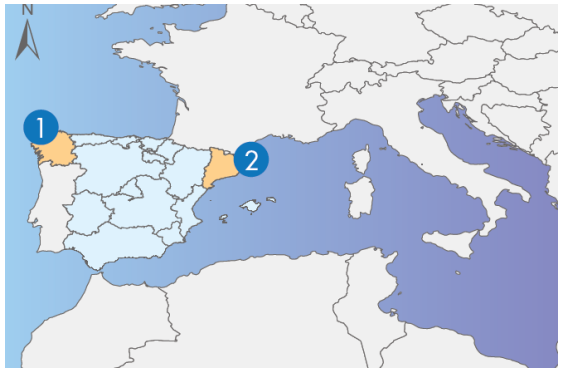

- ✓ Different climate → water availability
- ✓ Different water use patterns

1 Galicia

- ***Oceanic*** *climate, few dry periods*
- *Average rainfall (Santiago de Compostela):* **1890 mm/year**
- *Mostly* ***rain-fed*** *agriculture*
- *Population density:* **95 inhab/km²**
- *Household water consumption:* **146 L/inhab/day**

Betanzos

2 Catalonia

- ***Mediterranean*** *climate, water stress*
- *Average rainfall (Barcelona):* **640 mm/year**
- *Mostly* ***irrigated*** *agriculture*
- *Population density:* **234 inhab/km²**
- *Household water consumption:* **139 L/inhab/day**

Calafell

Life Cycle Assessment (LCA)

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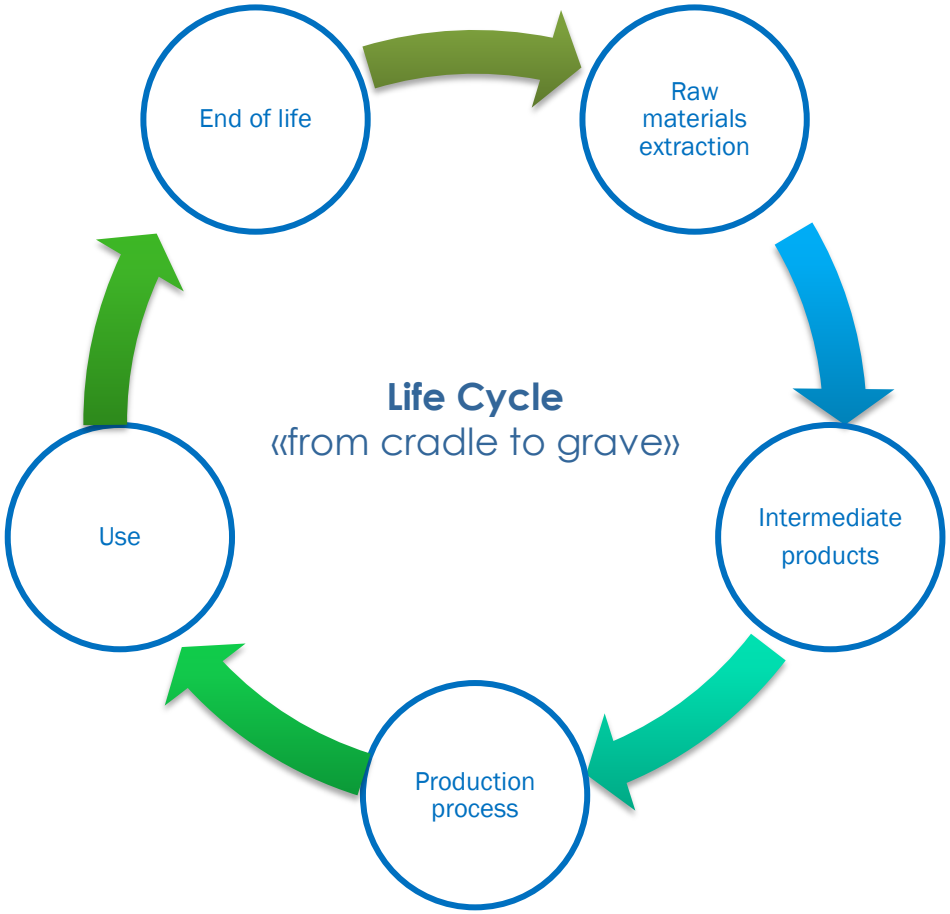
Standardised methodology for a product/activity **environmental impact assessment** along its entire life cycle (ISO 14040:2006 & 14044:2006)



Life Cycle Assessment (LCA)

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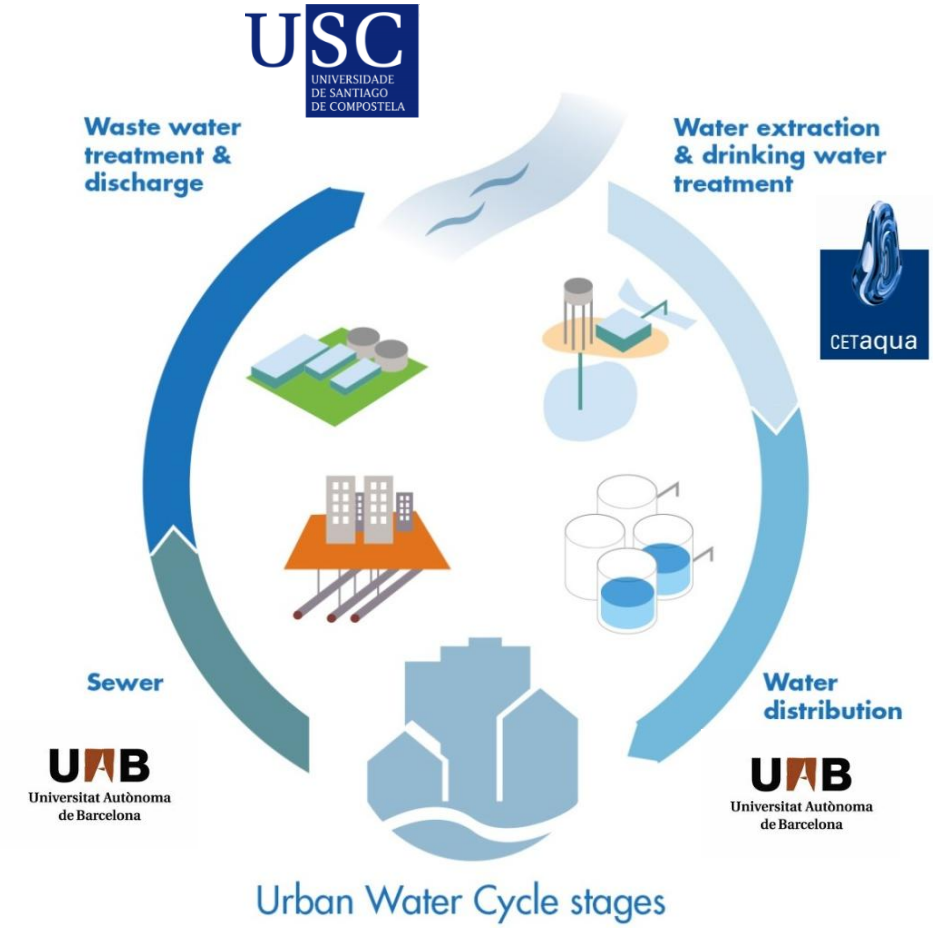
Standardised methodology for a product/activity **environmental impact assessment** along its entire life cycle (ISO 14040:2006 & 14044:2006)

Facilities' Life Cycle	Data sources
Construction	Reference case studies
Operation and maintenance	On-site measurements of GHG and water quality
Decomissioning	Water utilities databases



Urban Water Cycle stages

Life Cycle Costing (LCC)

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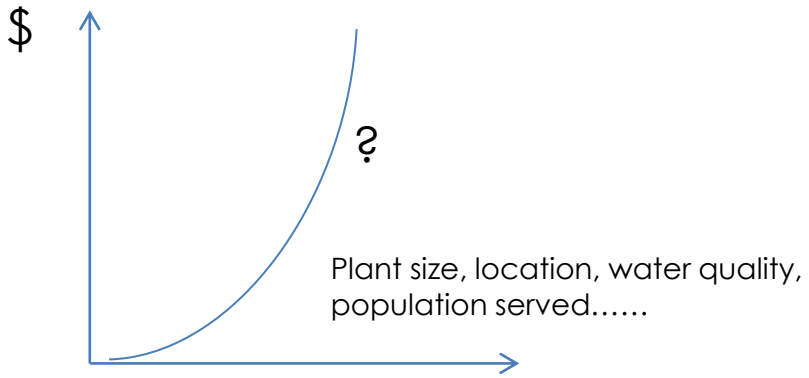
Engineering method LCC

- ✓ Very detailed study on costs
- ✓ Identify economic hotspots
- ✓ Difficult to generalise

Parametric method LCC

- ✓ Estimation of Cost functions
- ✓ Extension of results possible
- ✓ All technologies / processes considered



Environmental impacts:

- ✓ Already included in the LCA
- ✓ Monetization of externalities as a complementary information

Methodological framework

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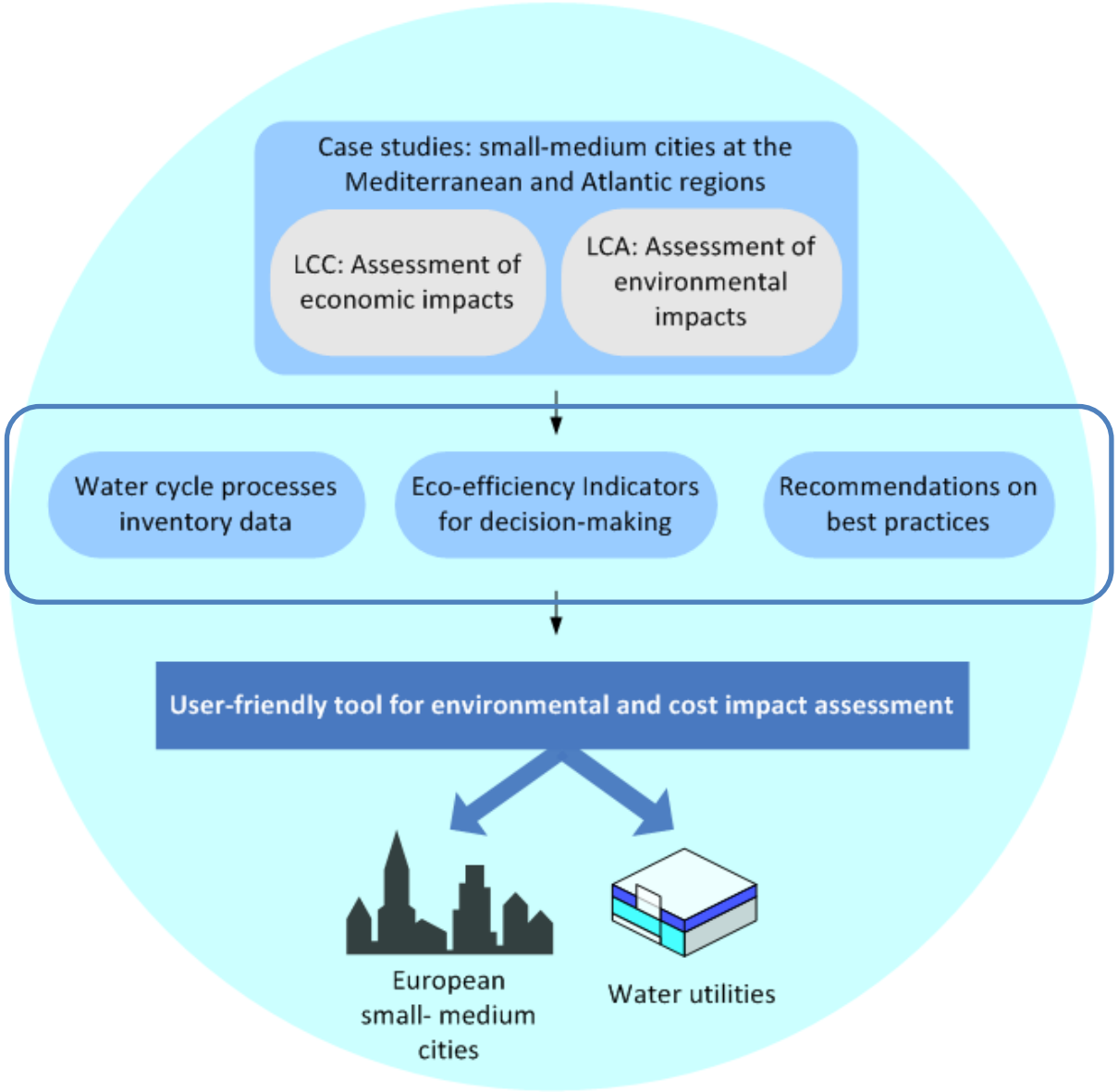

Eco-efficiency indicators

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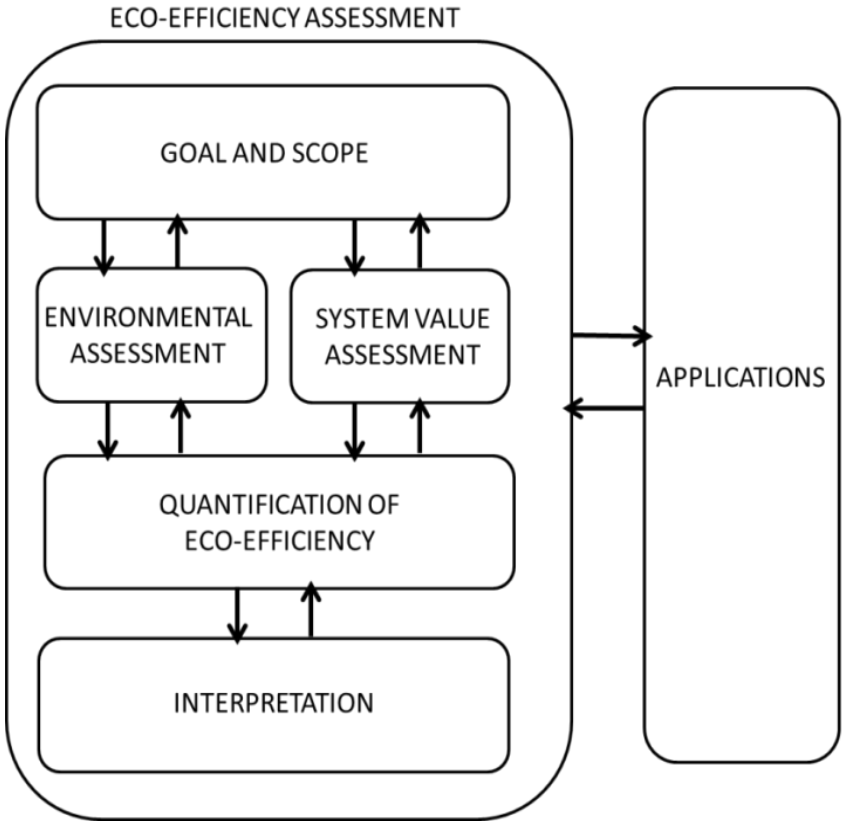
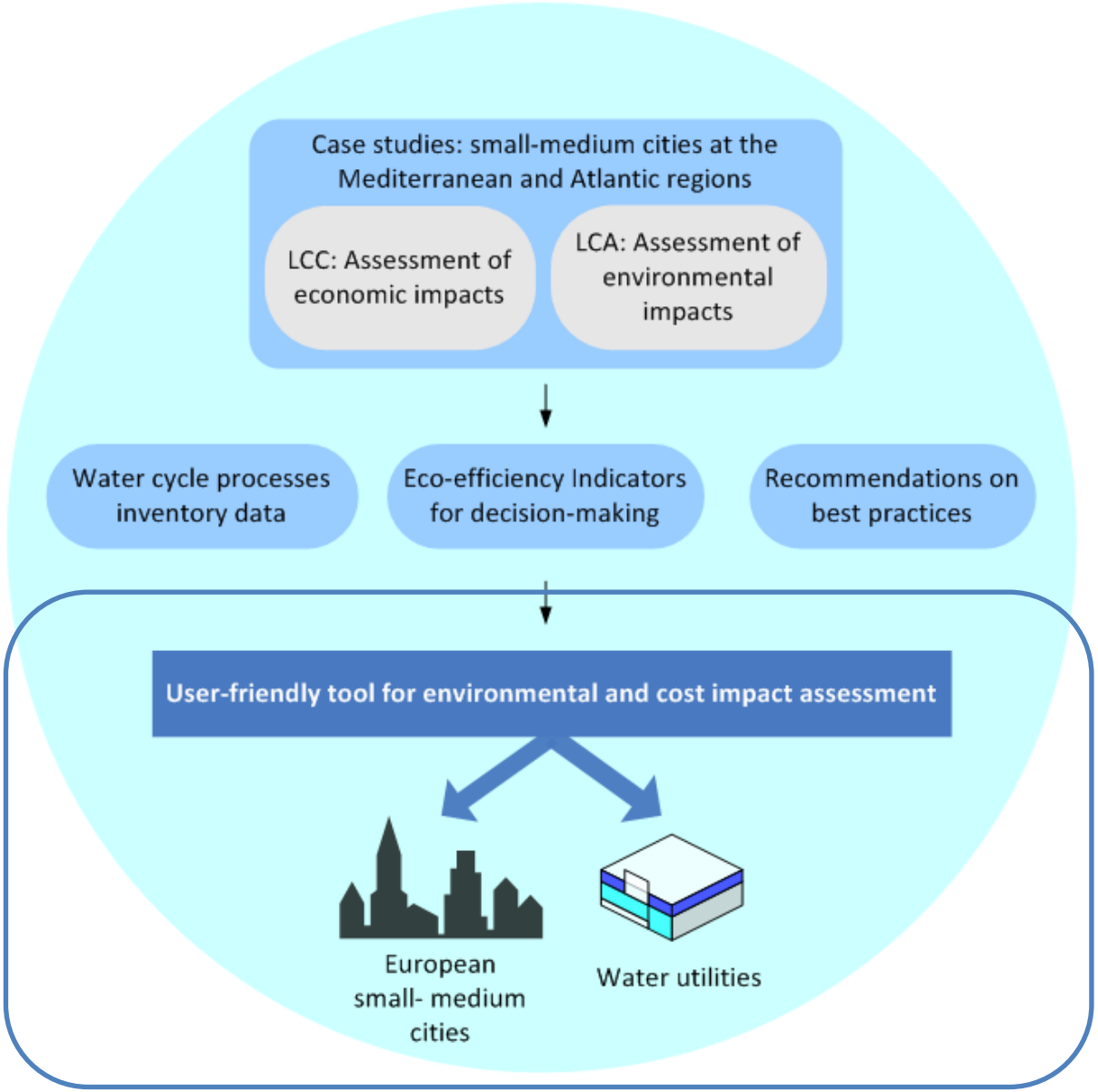
Recently released **ISO14045** on **eco-efficiency** : Environmental impact of a product system related with its product system value

- ✓ Environmental analysis = LCA
- ✓ Product system value analysis = LCC
- ✓ Set of eco-efficiency indicators combining different types of environmental and economic indicators



Methodology



Stakeholders

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Public entities

Àrea Metropolitana de Barcelona

Oficina Catalana del Canvi Climàtic

Water utilities

AQUALOGY

Sorea

Aquagest

CLABSA

Municipalities and general public

Expert networks

- Spanish Life Cycle Assessment Network
- IWA the International water association Working Group for Life Cycle Assessment of Water and Wastewater Treatment (LCA-Water WG)

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