Waste water reuse and valorisation in the EU and India – Water4Crops

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Water4Crops (W4Cs)

- Full title: “Integrating biotreated wastewater reuse and valorization with enhanced water use efficiency to support Green Economy in EU and India”
- An EU-India collaborative project: same structure and process
  - EUFP7 and DBT- India funded
  - 2012-2016
  - Coordinators: IRSA CNR (Italy) and ICRISAT (India)
  - 22 EU, 14 Indian partners
W4Cs EU- India: same structure & process
Objectives

- Developing innovative bio-technological wastewater treatments for enhancing wastewater agri. reuse
- Improving water use efficiency through improved agronomics, plant breeding and new irrigation technologies
- Co-creating innovative combinations of bio-treatment, recycling of water and high-value products, and bio-productions for the development of agri-business in Europe and India
- Enhancing Europe-India cooperation through Mirror Cases approach and INNOVA platforms
W4C: Integrating four topics

- Technologies and treatments for:
  - Industrial waste water valorization
  - Municipal waste water valorization
  - Reuse and water use efficiency in agriculture (e.g. wetlands)
  - Water use efficiency through better crop varieties (genomics)

And,
- Developing business opportunities
Enhancing W4Cs business opportunities

- Waste water
  - Extraction added value: clean water, elements, and energy
  - Co-creation of new product combinations: enhanced business opportunities

- Consumption
- Biorefinery Foodprocessing
- Crops
  - Safer, intensified & sustainable production
Finding business opportunities

- **Inventory:** maturity of technology and experience with business development
- **Developing INNOVA platform (KENGI partners)**
- **Identifying of business opportunities (long list): joined INNOVA platform meeting - boundary conditions (legislation)**
- **Identifying potential business cases: (short list based on C/B ratio– 2nd INNOVA platform meeting)**
- **Developing business cases: building and strengthening partnerships, looking for resources,...**
W4C partner experiences

Development stage
- Early (formative) stage (tentative idea, lab phase..): 32%
- Middle stage (testing, prototype development): 23%
- Later stage (testing phase, up scaling, market expansion): 45%

Experience in marketing new technologies in Europe
- No experience: 52%
- Little experience: 21%
- Moderate: 6%
- Much experience: 21%

Experience in marketing new technologies in India
- No experience: 64%
- Little experience: 15%
- Moderate: 12%
- Much experience: 9%
A W4C solution

Waste water from olive oil production

Cascaded Biorefinery

Multibrick technology

- Anaerobic digestion
- ISPR
- SPE
- Bioplastics

- Energy
- VFA
- Polyphenols
- Bio-plastics
- Recycled water
Financial viability of a W4C solution

<table>
<thead>
<tr>
<th>Product</th>
<th>Cost per Unit</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>15 c/kWh</td>
<td>300,000 €</td>
</tr>
<tr>
<td>VFA</td>
<td>500 – 1000 €/t</td>
<td>100,000 €</td>
</tr>
<tr>
<td>Polyphenols</td>
<td>10 – 100 €/kg</td>
<td>500,000 €</td>
</tr>
<tr>
<td>Bio-plastics</td>
<td>200 €/t</td>
<td>100,000 €</td>
</tr>
<tr>
<td>Recycled water</td>
<td>0.5 €/m³</td>
<td>5,000 €</td>
</tr>
</tbody>
</table>

**Total:** 900,000 €
Examples of new EU-India cooperation

- VITO (Belgium) and TERI (Delhi, India) work together on agro-food industry waste water
- SBBGR municipal waste water treatment is promoted during IFAT conference (2014), with help of EIRC (Bangalore, India) and GIZ India
- Constructed wetlands are tested in Germany, Italy, Greece and India
- Improved maize and tomato varieties are tested by University of Bologna and ICRISAT in cooperation with SMEs
- Jointly developing new proposals (Alterra –ICRISAT)
- Joined linkedin group
Lessons learnt

- Collaboration requires active management
- Communication: Face to face interaction, common websites
- Technology push business model constrains market uptake in EU/India
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www.water4crops.org

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