WORKSHOP

Circular economy and water re-use
Solutions and role in the River Basin Management Plans
EUROPE-INBO 2016
October 19, 2016, Lourdes, France

Economic issues concerning treated waste water allocation. The case of study of Valencia

Enrique CIFRES, Dr.Eng
MEMBO Advisor
Former Deputy Director of
Jucar River Basin Authority
Water Reuse in Jucar RBMP

MAIN DIFFICULTIES

• Potential users for Treated Waste Water are traditional, with old and consolidated water rights.
• They are located near main WWTP and coastal cities where more Surface WR are available.
• Cost of Treated WW are much higher than other alternatives.

MAIN ADVANTAGES

• These potential users for Treated WW are located nearby and thus cost of infrastructure is affordable.
• Their demands are sufficient to be partially satisfied by WWTP.
• Diverted water for rivers led to improved environmental conditions
• Upstream demands can be satisfied by reducing downstream demands
• Pumping from overexploited inland aquifers can be reduced

• 470 Hm³/year are treated, mainly located in plants of big urban agglomerations. 60% of this volume is concentrated in 15 WWTPs

• 120 hm³/year are directly reused mainly in lower basins with the metropolitan area of Valencia, where irrigation is the main use of the resources
Water Reuse in Jucar RBMP: Valencia and its metropolitan area

<table>
<thead>
<tr>
<th>Waste Water Reuse Plant</th>
<th>Treated volume (Hm$^3$/year)</th>
<th>Reused volume (Hm$^3$/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pinedo (I y II)</td>
<td>116,65</td>
<td>29,16</td>
</tr>
<tr>
<td>Carraixet</td>
<td>13,08</td>
<td>3,74</td>
</tr>
<tr>
<td>Paterna-Fte Jarro</td>
<td>3,7</td>
<td>3,35</td>
</tr>
<tr>
<td>Quart-Benáger</td>
<td>11,00</td>
<td>11,00</td>
</tr>
<tr>
<td>Puebla de Farnals</td>
<td>9,29</td>
<td>5,06</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>153,72</strong></td>
<td><strong>52,31</strong></td>
</tr>
</tbody>
</table>

Source: EPSAR (Public Entity of Waste Water Sanitation, 2015)

- **Users**: Traditional irrigation.
- **EPSAR** (Public Entity of Waste Water sanitation) finances tertiary treatment.
- Discharge holders have a reduction in their Discharge Control Fee.

- Jucar RBD, 108 M€ in 19 measures in order to replace GW by WR in (efficient) irrigation.

Water reuse in Valencia and its metropolitan area
Water Reuse in Jucar RBMP:
Study case: Valencia and its metropolitan area
NWMP - INMEDIATE ACTION PLAN

**REHABILITACIÓN DEL LAGO Y DEL MARJAL**

Recuperación de la calidad de los aportes hídricos
- Reordenación de la infraestructura hidráulica de la huerta y actuaciones relativas al Colector Oeste.
- Subsanación de deficiencias en las redes de saneamiento.
- Actuaciones de mejora de las EDAR del entorno de L’Albufera.
- Reutilización de las aguas de las EDAR del entorno de L’Albufera.
  (16 Hm³/año)

*Dotación de recursos fluviales al lago*
- Actuaciones para la aportación de recursos fluviales del Júcar a L’Albufera desde Tous/Antella.

**CONTROL DE LOS PROCESOS DE ATERRIMIENTO**

Reducción de la producción de aportes
- Repoblación forestal de montes públicos de la cuenca del Poyo.

Aumento de la capacidad de retención de sólidos
- Integración medioambiental del Barranco del Poyo.
- Obras de laminación en cabecera de la Rambla del Poyo y prevención de avenidas y aportes pluviales contaminados del Pla de Quart.

**SEGUIMIENTO Y EVALUACIÓN**

Seguimiento y evaluación
- Red de monitorización, control y adecuación de los indicadores medioambientales.

**RED DE ITINERARIOS NATURALES INTERPRETATIVOS**
(en colaboración con la Generalitat Valenciana)

*Most urgent actions: Reuse of WW: 16 Hm³*
REUSE OF TREATED WATERS

- REUSE FOR IRRIGATION
- ENVIRONMENTAL RESUSES
- STORM RUNOFF
Recent reuse actions promoted by MAGRAMA

RE-USE INCREASE FROM PINEDO WWTP

Agricultural reuse of treated (regenerated) waters from Pinedo WWTP reducing spilling into the sea.

CATARROJA PORT PUMPING STATION AND 17 KM PIPELINE CATARROJA-BENIFAIÓ (ARJ). (ACUAMED)
Recent reuse actions promoted by MAGRAMA

UPDRAIDNG AND UPDATING SUECA WWTP

1. MARENY DE BARRAQUETES - SUECA WW PUMPING STATION
2. SEWAGE NET IMPROVEMENT IN CITY OF SUECA
3. SUECA WWTP UPGRADNIG
4. SUECA WWTP TERTIARY TREATMENT
5. REGENERATED WATER PIPELINE AND ESTANY DE LA PLANA WETLAND
This Project allows treated wastewaters to meet required quality for agricultural purposes and environmental use by means of artificial wetland.
BEFORE REUSE

INLAND IRRIGATION

AQUIFERS

NON SUSTAINABLE EXTRactions

CITY

WWTP

TRADITIONAL IRRIGATION

DO NOT NEED MORE WATER

SEA
RESEAU INTERNATIONAL DES ORGANISMES DE BASSIN
INTERNATIONAL NETWORK OF BASIN ORGANISATIONS
RED INTERNACIONAL DE ORGANISMOS DE CUENCA

Enrique Cifres, Dr. Eng
MEMBO Advisor
Oct 2016

AFTER REUSE

MEET DEMANDS FAR FROM WWTP

ENVIRONMENTAL FLOWS GUARANTEED

INLAND IRRIGATION

REDUCE OVEREXPLOITATION

AQUIFERS

PUBLIC SUPPORT JUSTIFIED

TRADITIONAL IRRIGATION

CITY

WWTP

SEA
Who have to pay?

Who are the benefits for?
- Entire basin
- Environment
- New users
- ...

Reducing overexploitation
Guaranteed environmental flows
Meet demands far from WWTP
After reuse

Who have to pay?

Entire basin
Environment
New users
How the costs are “allocated”?

- **Public investment (taxes)**: Local
- **Public investment (taxes)**: Local
- **NWMP (see later)**
- **Reduction overexploitation**
- **Reduce environmental flows guaranteed**
- **Meet demands far from WWTP**
- **Public support justified**

**Graphical Representation**:
- **CAPEX** (Capital expenses)
- **OPEX** (Operation expenses)
- **WWTP** (Wastewater Treatment Plant)
- **Tertiary treatment**
- **Desalination**
- **Sanitation fee (DW users)**
- **Re-users (tariff)**
- **Public investment (taxes)** Local
- **NWMP (see later)**
AFTER REUSE

NWMP (see later)

REDUCE OVEREXPLOITATION

All RBO users (General costs)

Environment (No recovery)

PUBLIC SUPPORT JUSTIFIED

FINANCING SOURCES

40% EU grants (FEDER)

40% Public capital

20% Private market

RBO (fee)

TRADITIONAL IRRIGATION

WW producer (local)
Control Fee reduction

ENVIRONMENTAL FLOWS GUARANTEED

MEET DEMANDS FAR FROM WWTP

PUBLIC SUPPORT JUSTIFIED

REDUCE OVEREXPLOITATION

After reuse

INLAND IRRIGATION

WWTP

Financing sources
Circular economy and water re-use

Economic issues concerning treated waste water allocation. The case of study of Valencia

Thank you
Merci
Gracias

MENBO Mediterranean Network of Basin Organisations
REMOC Red Mediterránea de Organismos de Cuenca
www.remoc.org

Enrique CIFRES, Dr.Eng
MEMBO Advisor
Former Deputy Director of
Jucar River Basin Authority

comments welcome to:
enrique@cifres.com