



CiRCIE 2019

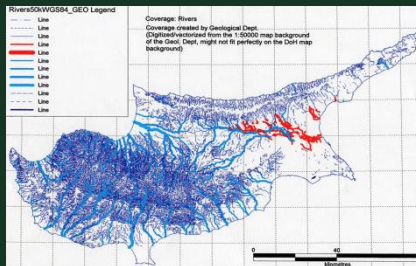
Challenges for the Islands in the era of the Circular Economy

Management of treated wastewater reuse in Cyprus

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Under the auspices of



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CIRCULAR ECONOMY AND RECYCLING WATER WATER

- ❖ **Circular economy of wastewater management starts with the utilization of produce treated wastewaters (reclaim/recycle)**
- ❖ Water Reuse has been subject to numerous technical scientific seminars/workshops.
- ❖ Most of the efforts to promote the use of recycling water has been focused on technical issues **related to the water quality standards and treatment processes**

- ❖ These also apply to the recently proposed EU standards for reuse.
- ❖ Little attention has been given to public perception and acceptance
- ❖ Never the less Integrated water management programs specially in arid, semi-arid areas **MUST incorporate the use of reclaim water in their water conservation measures AND PROMOTE REUSE which can also benefit the agricultural production**

MAJOR REASONS FOR REUSE IN CYPRUS

- Water value (revenue)
- Water scarcity (need to consider additional supplies)(desalination)
- Environmental constrains (zero discharges)
- Stricter and higher effluent quality requirements (EU)
- Sustainable development

- **Circular economy**

REUSE IN CYPRUS

Organization Structure

“Sewage Boards” are responsible for Collection, Treatment and disposal (Law).

CY Government (Water Development Department) undertakes the tertiary treatment AND the infrastructure and management of recycling water.

DRIVING FORCES FOR REUSE IN CY

Sewage Boards Perspectives

- Provide solution to effluent discharge/
- Transfer of Responsibility to Water Authorities
- Since in Cyprus disposal into surface waters is prohibited, the options available are discharge into the sea or reuse
- Public opposition to sea outfalls (tourist industry, high investments, non-sustainable, waste of a valuable resource).

Benefit economically

WATER AUTHORITIES (WDD) PRESPECTIVE

Integrated Water Management imposes Reuse (directed/indirect)

- Augment the available water resources
 - Means to supplement freshwater supplies
 - Reduce stress on the water resources
 - Valuable source /bring a revenue
 - Sustainability (minimise Desalination/sea)
- **EU policies (circular economy)**

Driving forces for Reuse lead to mutually benefits and not to conflicts, as a result of different prospective between the organizations.

CY Experience to promote Reuse

- Present uses (agriculture, aquifer recharged, Park, Lawns, Stadiums etc).
- **Presently the Demand does not meet the supply**
- Difficulties and uncertainties to utilize all
- quantities (**LACK OF POLITICAL DECISION how to utilize** it /Unwillingness, /fear, risk, marketing)
- New areas equal to increase demand
- Provide flexibility for disposal and try to promote reuse

COMPONENTS TO PROMOTE REUSE

- Technical issues
- Public health issues
- Economical and financial aspects
- Legal/Regulatory aspects
- Management/Institutional Arrangements
- Public Perception/Acceptance
- Political will

TECHNICAL ISSUES: TREATMENT

- Appropriate treatment to provide a “safe effluent” (**microbiological quality**) and a **chemically acceptable** (salinity, conductivity, N, P).
- Storage to meet seasonal demands imposes removal of N,P (eutrophication) BUT DO NOT PROMOTE CIRULAR ECONOMY
- Provide treatment that will make the water reusable
- And acceptable to the farmers

PUBLIC HEALTH ISSUES

- Origin of Effluents → health risks → Restrictions (barriers).
- Restrictions creates fear and concerns.
- **Provide for more advance treatment** to ensure total destruction of pathogens at source (secondary, tertiary, chlorination, storage)
- Use of appropriate irrigation technics (drop irrigation for crops consumed raw)

PUBLIC ACCEPTANCE AND PERCEPTION

Public acceptance is related to health issues and technical issues

Fear → Ignorance, Restrictions, Marketing of goods, Confusion / Psychological)

What to Do?

- Education/ involvement /Participation/shape Public opinion / Demonstration/
- Regulations and appropriate monitoring infrastructure

LEGAL AND REGULATORY ASPECTS

- **Laws and Regulations provide more confidence to the Users farmers and consumers**

(Permitting, Enforcement of Guidelines, EIA, Monitoring)

MANAGEMENT AND INSTITUTIONAL ARRANGMENTS

(Ensure O+M, Good quality water, Inspection, Communication)

Built up confidence to farmers and consumers

ECONOMICAL ASPECTS

Reclaim water have a value/Water Authorities and Farmers can benefit.

- **Water Authority:**

- Conservation of fresh water avoid desalination
- Revenue

- **Farmers:**

- Lower water rates
- Save of fertilizers
- Continuous irrigation of their land

POLITICAL WILL

- Political will is closely related to the farmers and public acceptance
- Recycling water – **Essential Component Integrated water management**
- Utilization in existing infrastructure not to create new demands
- **Essential to promote additional infrastructure**

Public Acceptance are votes

CONCLUSION AND RECOMMENDATIONS

Recycling water is a valuable source which must be used in order to supplement the existing water supplies and may even bring a revenue.

Quality of treated wastewaters must optimizes between wastewater treatment level AND options of Reuse or Disposal (sustainability).

Reuse Schemes (fodder crops)



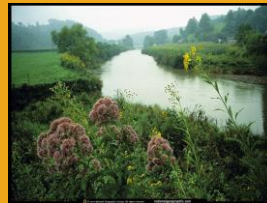
Reuse Schemes (fruits trees)



Reuse Schemes (landscape)



Thank you for your attention



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