Global Water Ecosystem - Past, Present, Future?

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FuturesLab CoFi Laurea University of Applied Sciences

Futures of a Complex World, 12-13 June 2017, Turku, Finland

Three Global Challenges: East-West, North-South, and Human-Nature Tensions

East-West-tension
- economic sustainability
- degrowth, downshifting, sharing economy etc.

North-South-tension
- social sustainability
- polarisation, haves and havenots, bottom of pyramid

Human-Nature-tension
- ecological sustainability
- climate, lack of clean water, end of fossil materials, pollution of seas etc.
CIRCLE project (New opportunities for energy and nutrient recycling in water supply)

- CIRCLE project (9/2016-8/2018) focuses on enhancement of recycling and re-use of energy and nutrients in municipal wastewater treatment
- The objective is to reduce the use of imported nutrients and energy in relation to the volume of production
- Partners: Häme University of Applied Sciences (coordinator), Laurea University of Applied Sciences, Aalto University, The Association for Water and Environment of Western Uusimaa & SYKLI Environmental School of Finland
- Funded by European Regional Development Fund

CIRCLE project as a background for the study
Phases during the first year 9/2016-6/2017

Current state
- collected background information

A. Energy recycling
B. Nutrient recycling
C. Water resources, re-use, recycling
D. Technology

1. Actors / ecosystem
2. Financial mechanisms
3. Legislation
4. Education needs
5. Best practices

6. Future
- Changing factors, dynamics

“awareness” Seminar 5/2017
Workshop - challenges and solutions

Laurea UAS

FACTORS
PESTE-changes + 20V
ACTORS
Changes in ecosystem

“Impact” Seminar 11/2017 with stakeholders
Workshop - recommendations - guiding lines

Vision of Circle project
New opportunities for energy and nutrient recycling in water supply
- Pilots
- Concepts
- Education
- Publications, reports

Tarja Meristö 12/2016
### Water Ecosystem – Key Actors

<table>
<thead>
<tr>
<th>Importance of different actor groups</th>
<th>Big (Arvo: 4)</th>
<th>Quite big (Arvo: 3)</th>
<th>Small (Arvo: 2)</th>
<th>Very small (Arvo: 1)</th>
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<tbody>
<tr>
<td>1. Companies (avg: 3,13)</td>
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<td>2. Water treatment plants (avg: 3,59)</td>
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<td>3. Authorities (avg: 3,11)</td>
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<td>4. Water cooperatives (avg: 2,35)</td>
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<td>5. Agricultural actors (avg: 2,00)</td>
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<td>6. Decision makers (municipal) (avg: 2,85)</td>
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<td>7. Decision makers (national) (avg: 3,28)</td>
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<td>8. Decision makers (EU) (avg: 2,94)</td>
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<td>9. Education (avg: 2,20)</td>
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<td>10. Research (avg: 2,54)</td>
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<td>11. Environmental organisations (avg: 2,37)</td>
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<td>12. Residents' associations (avg: 1,96)</td>
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<td>13. Lobbying organisations (avg: 2,33)</td>
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<td>14. Experts (avg: 2,87)</td>
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<td>15. Active citizens (avg: 2,15)</td>
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### Water supply business cluster in Finland (draft)

**CORE ACTORS/FIELDS**
- Communal water treatment
- Municipalities
- Water cooperative societies
- Environmental administration
- Component manufacturers
- Industrial water treatment

**RELATED AND SUPPORTING FIELDS**
- Drilled well entrepreneurs
- Water desalination
- Packaging of water
- Water pollution control in agriculture
- Fishing industry
- Chemical industry
- Energy industry
- Forest industry
- Groundwater experts
- Energy production
- Production of biofuels
- Equipments
- Investors
- Associations
- Regional Centres for Economic Development, Transport and the Environment (ELY Centres)
- Associations
- Tax authorities
- Legislators
- Business sector
- Citizens
- Logistics
- New products
- New investments

**ENABLERS**
- Supervision of construction
- Health authorities
- Environmental authorities
- Tax authorities
- Business sector
- Citizens
- Logistics
- New products
- New investments

**Student project team of Laurea UAS**
- Tuomas Pursiainen, Janne Vehkaoja, Hilla Heimo & Päivi Hiitelä

**www.laurea.fi**
Change Factors affecting on the future: evaluation according to the web survey (Finland)

(\text{Red}=\text{disagree}, \text{Green}=\text{agree})

1. Difference of the legislation in foreign countries will form limitations for the Finnish companies and their business opportunities.
2. Reform of the Regional Administration in Finland will break the monopoly of municipalities.
3. EU directives and harmonization will obstruct regional development.
4. Weak economic situation in municipalities will bring totally new fees and taxes on the water services (e.g. rainwater fee)
5. Citizens’ willingness to pay extra for clean water with good quality.
6. Public-Private Partnership models will provide new business opportunities for agile actors.
7. The loading of Water Services in Rural residential areas will significantly decrease because of the urbanization development.
8. Water Crisis will cause a collapse in trust index of citizens concerning municipalities’ Water Services.
9. Urbanization will put speed to the automatization of agriculture and its water services.
10. Growing Demand for energy-efficiency will move water services towards local solutions (e.g. concerning logistics).
11. Digital follow up services and products will enable real-time pricing of water (analogy from energy sector, stock exchange electricity)
12. Technologies enabling Recycling of energy and nutrients will come to water service branch slowly.
13. Lack of (clean) water is a fact in international context and that will rise the water prices.
14. Extreme weather phenomena will make more difficult the control of floodwater significantly in Finland, too.
15. The growing awareness of people can be recognized in everyday life concerning water consumption, too.
Change Factors affecting on the future: evaluation according to the web survey (PESTE factors / Finland)

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Value</th>
<th>Agree (value: 3)</th>
<th>Disagree (value: 2)</th>
<th>Totally disagree (value: 1)</th>
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<tbody>
<tr>
<td>1</td>
<td>Difference of the legislation in foreign countries will form limitations for the Finnish companies and their business opportunities (avg: 2,32)</td>
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<td>2</td>
<td>Reform of the Regional Administration in Finland will break the monopoly of municipalities (avg: 2,09)</td>
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<td>Weak economic situation in municipalities will bring totally new fees and taxes on the water services (e.g. rainwater fee) (avg: 3,02)</td>
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<td>5</td>
<td>Citizens’ willingness to pay extra for clean water with good quality (avg: 2,89)</td>
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<td>6</td>
<td>Public-Private Partnership models will provide new business opportunities for agile actors. (avg: 3,15)</td>
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<td>7</td>
<td>The loading of Water Services in Rural residential areas will significantly decrease because of the urbanization development (avg: 2,45)</td>
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<td>8</td>
<td>Water Crisis will cause a collapse in trust index of citizens concerning municipalities’ Water Services. (avg: 2,07)</td>
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<td>9</td>
<td>Urbanization will put speed to the automatization of agriculture and its water services (avg: 2,40)</td>
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<td>10</td>
<td>Growing Demand for energy-efficiency will move water services towards local solutions (e.g. concerning logistics) (avg: 2,53)</td>
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<td>Digital follow up services and products will enable real-time pricing of water (analogy from energy sector, stock exchange electricity) (avg: 2,96)</td>
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<td>12</td>
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<td>13</td>
<td>Lack of (clean) water is a fact in international context and that will rise the water prices (avg: 2,89)</td>
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<td>14</td>
<td>Extreme weather phenomena will make more difficult the control of floodwater significantly in Finland, too (avg: 3,06)</td>
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<td>15</td>
<td>The growing awareness of people can be recognized in everyday life concerning water consumption, too (avg: 2,76)</td>
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PESTE / the most significant changes

**Political**

“Rainwater belongs to the state -> water business by plane
End of state owned company”

**Economic**

“For mid-class consumers prices of air tickets too high
Increasing costs of air plane vehicles”
Social

"Clean water a privilege only for a few people
Tourism - an unethical activity?"

Technological

"Copying water for household use a new opportunity
Water zipping possible, too"
Ecological

Clean water the most valuable asset for marketing in tourism

Unexpected natural phenomena more common in future

Drivers for future

Water technology: innovations in this field or not?

Water reserves on the globe: lack vs. enough?
Scenario Axes

Key Drivers: water technology and water reserves

S1: Enough water; new water packaging, storing and zipping technology
S2: Polluted water reserves; well-developed technology
S3: Polluted water reserves; under-developed technology
S4: Water enough, but unequally distributed; no advanced technology

Four alternative scenarios 20 years ahead

S1: ZIP-water and a flying water bottle
In interest of packaging, copying and airline companies

S2: Water mine
In interest of airline company

S3: Water war
In interest of war industry and speculative investors.

S4: Social water- common good with water
In interest of states and refugees
### Visionary Concepts

#### 1: ZIP-water and a flying water bottle
- WATER-EXPRESS, FLYING WATER BOTTLE, TRANSPORT COMPANY
- Removeable zip-water, shared brand with copying company

#### 2: Water mine
- Flying water mine, the revolutionary concept for the future
- Living labs and open innovation as participatory hype activities around water mine (crowdsourcing, open source, crowdfunding)
- Pilot and pioneer concept-> getting finance and talents
- Cloud Catcher 2040 / Water Hoover / Cloud Busters / Water Mine in the Sky

#### 3: Water war
- Speculative ownership in stock exchange
- Army-flights
- Red Cross-hospital flights
- Water business as usual, if possible

#### 4: Social water
- As daughter company a social entrepreneurial firm: thematic water park around Muumin, Santa Claus and Marimekko and Common Good with water-flights
- Transportations as Basic business but also co-operation with volunteer NGOs

### Selected views to future

#### Scenario 2: Water mine
- Cloud Catcher 2040
- Water Hoover
- Cloud Busters
- Water Mine in the Sky
Next Steps in Circle project by FuturesLab CoFi, Laurea UAS

- Food Production and its ecological footprint to the Baltic Sea (futures workshop in August 2017/prepared by UAS student Riina Kärki)
- Visionary Concepts for Small and Medium Size Enterprises (thematic interviews and tailor made visionary concept design workshops in SMEs, autumn 2017)
- Deeper analysis and reporting the results of web-survey (autumn 2017)
- International benchmarking together with other CIRCLE project research partners (autumn/winter 2017/2018)
- Final reporting August 2018, special issue is Water Economy Journal late autumn 2018

Thank you!
Do not hesitate to contact us!

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