

4th UNECWAS Seminar “Water in Development and Society”,
Tampere, 31.3.2016

Study on the status and future needs of university level education in the water services sector

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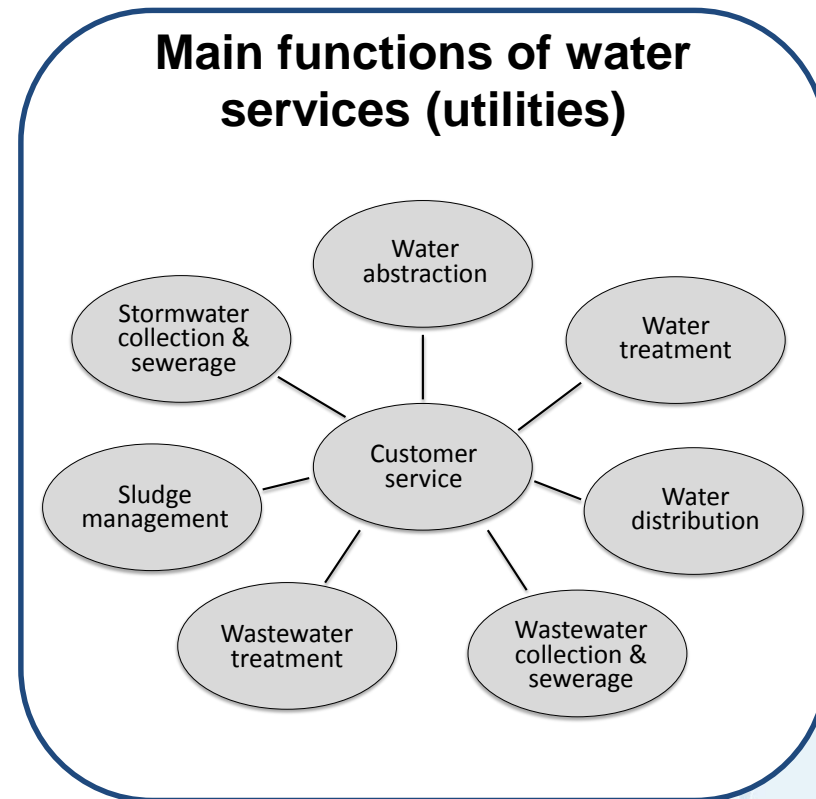


STUDY ON THE STATUS AND FUTURE NEEDS OF UNIVERSITY LEVEL EDUCATION IN THE WATER SERVICES SECTOR

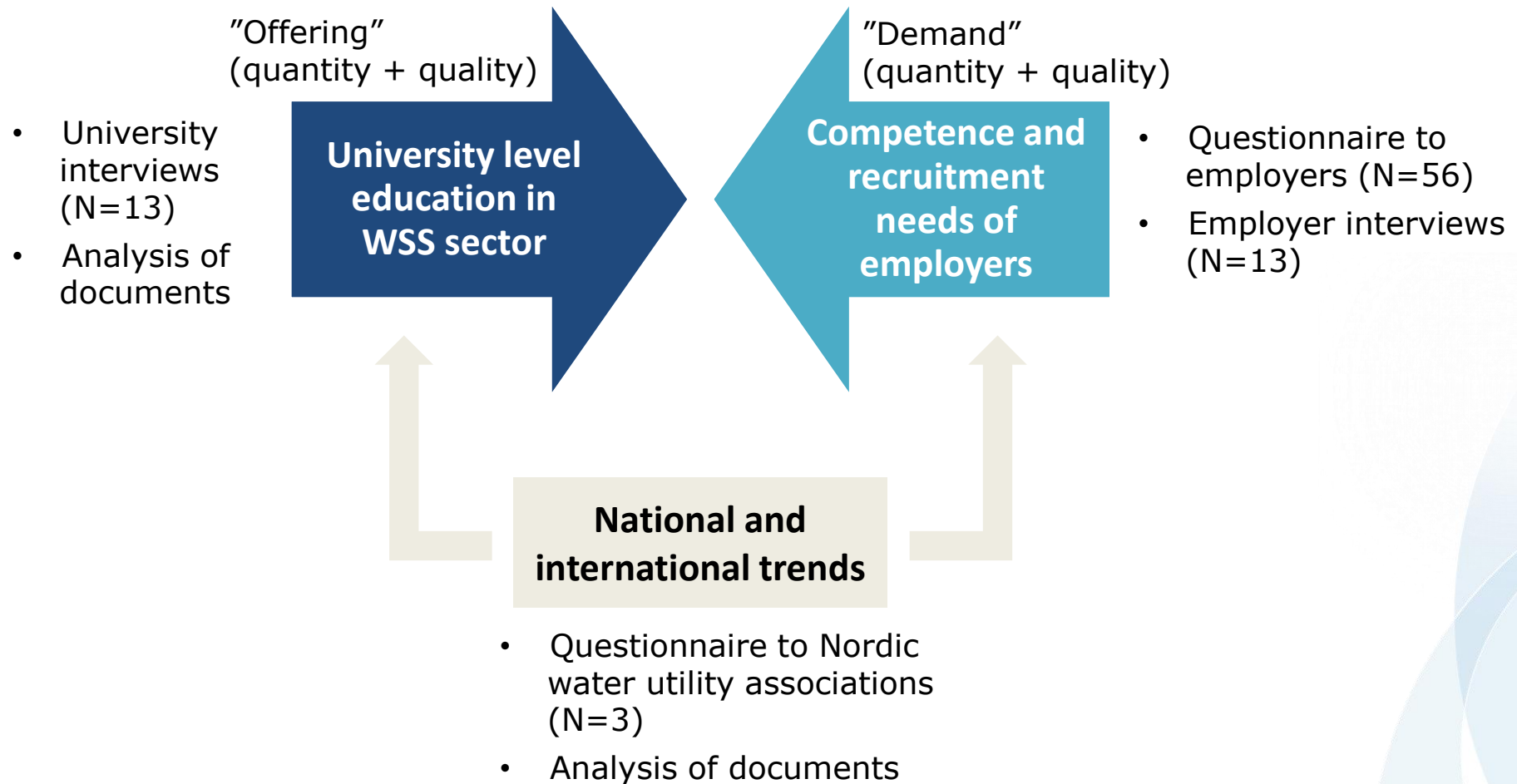


Objectives and limitations of the study

- The study aimed at building a clear view on the quantitative and qualitative need for university level education in the water services sector at present and in future.
- **The three main questions of the study were:**
 1. What is the **future need** for university level educated staff in the water services sector in the future?
 2. How do the **quantity and contents** of university education **respond** to the forecasted needs of the sector?
 3. Which **national and international trends** may affect the needs of competence and skills in the future?
- The study focused on **education offered by technical applied and science universities**. Expected that these persons can after their education work as water (supply) engineers in water utilities or the private sector.



Position and methods of the study



Current employment in the water services sector

	Total staff number (estimate)	Of which have higher education and work with water services (estimate)
Water utilities	4000	360 (9 %)
Companies	1500–1800	600–720 (40 %)
Public sector, research organisations (water supply)	200	200 (100 %)
Total	5700–6000	About 1100–1200 (about 20 %)

The amount with higher education has declined in the water utilities by almost 200 in the last 10 years (total staff number has decreased by 10000). The amount of staff with university level education is much lower than in other Nordic countries.

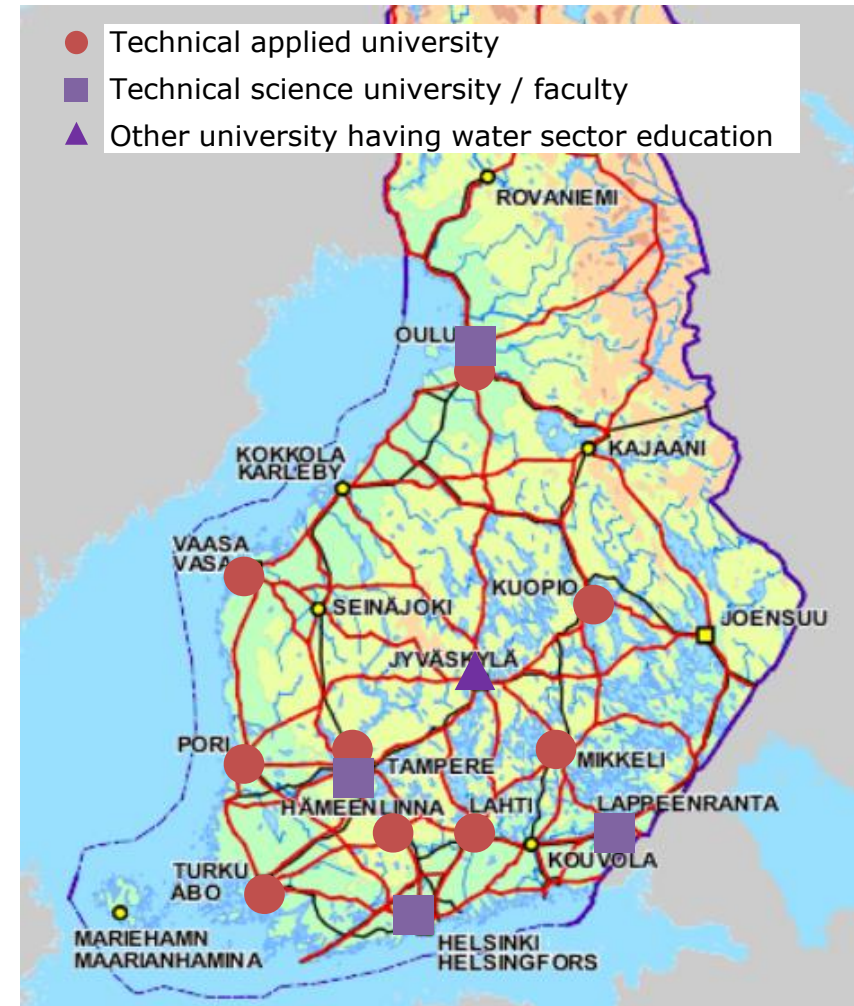
- **Recruitment needs of employers: about 165–220 new persons in the next 5 years** (about 33–44 per year) just to replace staff to retire.
- In order to make the sector develop and grow more university level educated staff are needed.
 - E.g. 5 % growth in the staff number of sector's companies would increase total staff demand by 25-30 persons each year.

Future competence needs of employers

- Employers named as the **most affecting trends** for competence needs: ageing infrastructure, requirements for energy and materials efficiency, and development of ICT and automation.
 - Also climate change, development of legislation and regulations, new technological solutions and mergers of water utilities, etc.
- In competences other than directly water services related, e.g. competences in customer relations and services, communication, management, and planning and construction management were expected to become more important.
- Employers see it important that technical university level education as an **independent educational sector** will be developed also in the future.
- **Continuous education** seen as a relevant and important element in competence development.
- **Co-operation** btw universities and water utilities is very important, both to recruit competent staff and to develop water sector RDI-activities.

Technical university level education in the water sector in Finland

- In Finland university education in water (services) sector is offered in 9 applied technical universities (AMK) and in 4 science universities (total 13 universities).
- Nowadays education is largely offered in energy- and/or environmental technology programmes (10 out of 13), unlike in the past.
- This ensures that graduates understand well the connections btw energy and water.
- However, core competence related to water infrastructure construction and maintenance remains very low.



Contents of university education in the water services sector

- Extent of water sector education varies considerably.
- If water supply courses are e.g. only 15 cp (<10%) of total 180 cp, inevitably water services competence remains vague. Water sector studies should be at least 60 cp.
- Only in 5 universities (of 13) the courses cover almost all (5/6) main activity areas of water utilities.
- About 65 water services related theses are made annually.

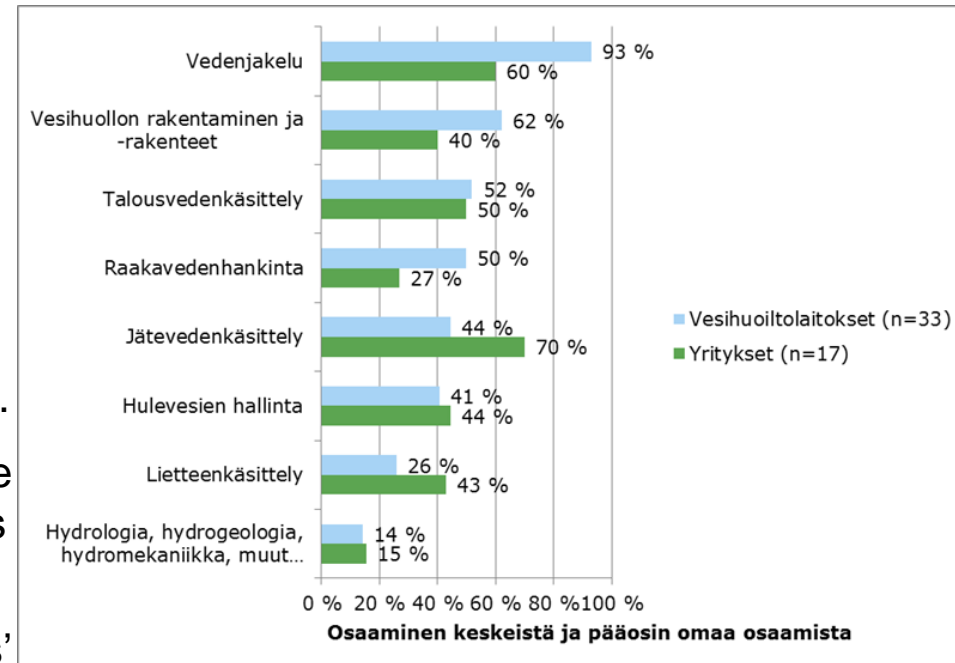
Degree programmes (number)	Extent of education related to environmental and water technology* (cp)	Extent of education related to water technology* (cp)
Universities of applied science (AMK)		
Energy and environmental engineering - BScTech (ins. AMK) 7 nos	25 – 100 cp	10 – 60 cp
Civil engineering (Infrastructure engineering) - BScTech (ins. AMK) 2 nos	32 – 38 cp	12 – 29 cp
Science universities		
Energy and/or environmental engineering - TechCand 2 nos (PhilCand 1 no*) - MScTech 3 nos (MScPhil 1 no*)	TechCand 25 – 33 cp MScTech 24 – 75 cp	TechCand 5 – 18 cp MScTech 24 – 60 cp
Civil engineering (Infrastructure / Municipal engineering) - TechCand 1 no - MScTech 1 no	TechCand. 20 cp MScTech 29 cp	TechCand 10 cp MScTech 26 cp
Process or chemical engineering - MScTech 2 nos	MScTech 26 – 75 cp	MScTech 11 – 50 cp

*N.B. Part of the courses are optional in many programmes. Credit point numbers indicate the maximum if the student chooses all water technology related courses.

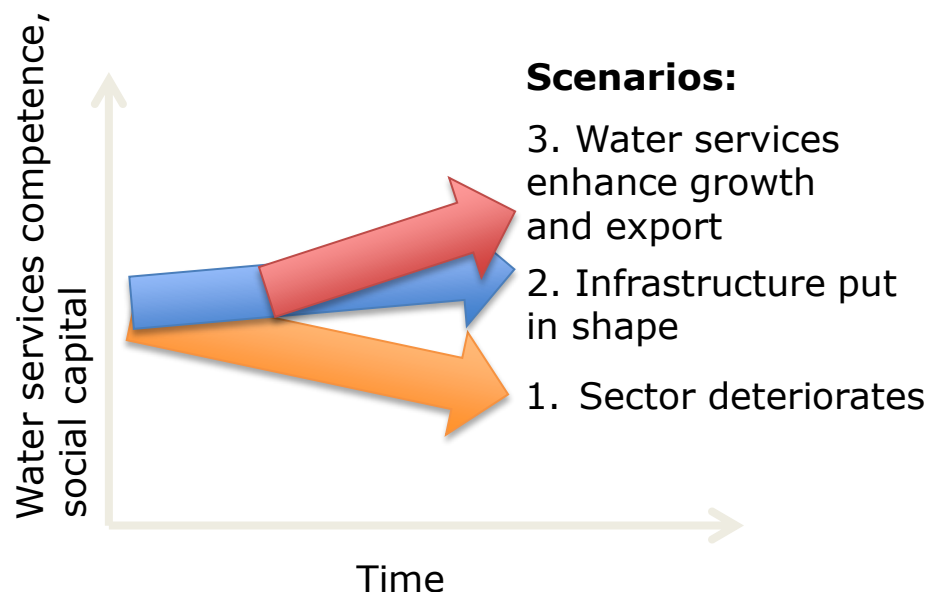
Employers' needs vs. university level education

- Employers have felt that **recruitment is difficult** for positions requiring university education in water services (over 60 % of respondents).
- The biggest challenge in recruitment is inadequate competence of applicants in water supply technology (74 % of respondents).
 - Water utilities think that education focuses **too much on generic** environment and energy competence.
- Wide, but especially technical competence focusing on water utilities' core activities is important.
 - Many mentioned deficits in applicants' basic knowledge. Especially **competence related to construction** was considered important.

Importance of water supply technology related competence in my organisation:



Scenarios for development of water services sector education and research in Finland



- **Scenario 1** will realise, if business-as-usual continues.
- **Scenarios 2 and 3**, common recommendations:
 - Co-operation btw science and applied universities should be developed and profiles clarified. Need to discuss water sector education contents and mutual responsibilities. Responsible bodies: universities and the Ministry of Education and Culture.
 - Co-operation btw universities and employers should be further developed and systematised.
 - Competence related to construction should be strengthened in university education.
 - More resources are needed for water sector research, development and innovations. Public sector can support development, but it should initiate from the sector itself (mainly water utilities).

Development of water services sector education – Recommendations for action

Scenario 2: Infrastructure put in shape

- Ensure sector attractiveness by developing "water services brand"
- Develop competence criteria for water utilities
- Develop common "education strategy" for water sector university units
- Profile some universities / education programmes as "water services programmes"
- Utilise and develop continuous education in co-operation btw various universities
- Develop co-operation btw water utilities, universities and companies in education and research (e.g. RDI clusters)
- Develop co-operation btw water utilities to strengthen resources
- Increase proportion of university level educated staff in water utilities

Scenario 3: Water services enhance growth and export

- Utilise better water utilities as pilot platforms to create new commercial innovations
- Increase cross- and multi-disciplinarity, co-operation with economic actors and other sectors
- Develop incentives and leverages in universities to support co-operation with economic actors
- Better utilisation of competence centres, e.g. activation of universities and companies in projects, initiation of water services sector research programmes
- Better utilisation of structural funds projects
- Identify and utilise business opportunities in emerging and developing economies



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