

Groundwater valuation studies in Finland

Janne Juvonen, Sari Väisänen, Virpi Lehtoranta

Finnish Environment Institute SYKE

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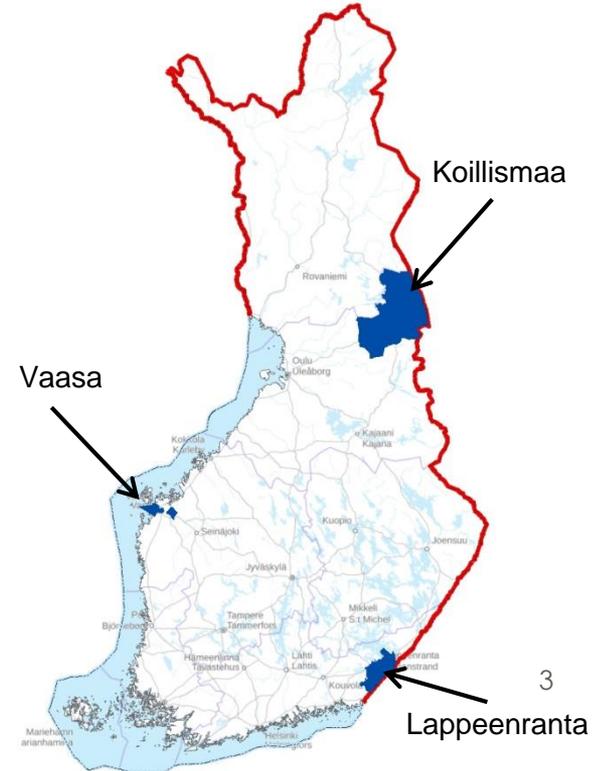
What is valuation?

- Clean groundwater reserves are of example of environmental goods
- They are not priced, thus they are non-market
- Valuation; measuring demand for environmental goods
- How? For example by stated preference methods => Contingent valuation
 - The value of improvement in groundwater reserves reflects individual's willingness to pay for that change
 - “groundwater quality” 196 000 hits in google scholar
 - “Groundwater quality” & “stated preferences” 172 hits in google scholar

Groundwater case studies in Finland

Project: Economic analysis and assessment methods in water management (funded by the Ministry of the Environment and the Ministry of Agriculture and Forestry)

- Three case studies, three different areas that represent different types of water use and different set of pressures
- Lappeenranta is situated on the Salpausselkä Ridge and uses groundwater and artificial groundwater , GWB's have various pressures from human activities
- Koillismaa (Kuusamo and Taivalkoski) is more sparsely populated area with many smaller cooperatives for water supply in addition to municipal water works and also many private wells – very little pressures from human activities
- Vaasa uses surface water, GWB's have pressures from human activities, they are scattered and have a small volume of groundwater



How it was done

- The studies were executed via questionnaires that were around 15 pages and 26 or 27 questions and a possibility to give open comments
- The first study in Lappeenranta in 2014 was only in paper form and was sent out to 864 randomly selected residents
- The second study in Koillismaa between 2016-2017 was a web questionnaire (webropol), with a possibility to request a paper form questionnaire, where a post card with a link to the questionnaire was sent out to 3284 residents and in addition to 2222 persons who own a cottage in the area but don't live there

How it was done

- The third study in Vaasa in 2018 was only a web questionnaire where a post card with a link to the questionnaire was sent out to randomly selected 1000 residents (770 finnish speaking and 230 swedish speaking)
- The questionnaire was basically the same for every study with some moderations according to the area and it was also tested in the area before the actual questionnaire was sent out
- During the questionnaires in Lappeenranta and Koillismaa there was also an article in the local newspaper about the ongoing study

What was asked

- The questionnaire can be divided in to four parts
 - The first part had general questions about the area, how they live, how do they consume water and how do they rate the water quality
 - The second part had information about RBMP status assessment, the status of groundwaters and the programme of measures in the area and questions how do the respondents react to that information
 - In the third part was the willingness to participate in groundwater protection by paying and reasons for paying and not wanting to pay
 - The fourth part was demographic questions (age, gender, incomes, etc.)

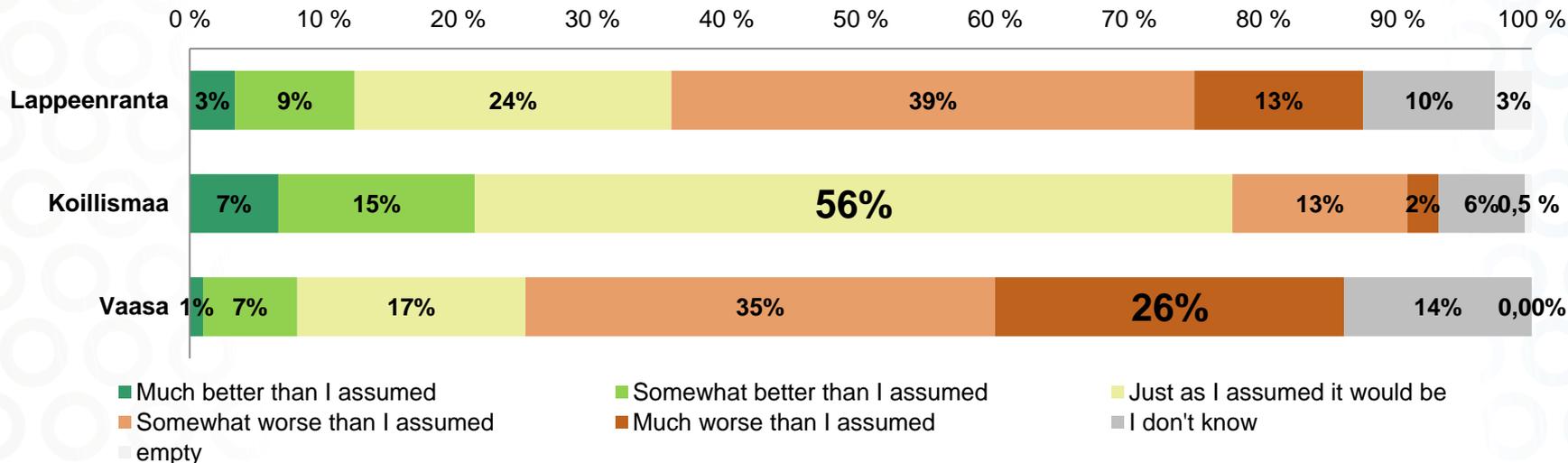
Willingness to pay

- For the willingness to pay we represented a scenario where all the possible measures would be done so that the risks to groundwater deterioration would be minimal after the measures
- 50 % of the costs would be covered by the society, 30 % by different operators, 20 % of the funding is missing
- The respondents were then asked would they be willing to contribute to the funding via a "groundwater foundation" and if yes, how much would they be willing to pay
- In Koillismaa, half of the respondents had the scenario of funding via foundation and half via taxes
 - Results were quite similar regardless the scenario

Results

	Lappeenranta	Koillismaa	Vaasa
Questionnaires sent	864 residents	3284 residents	1000 residents
Respondents (%)	326 (38 %)	560 (17 %)	222 (22 %)
When executed	11-12/2014	11/2016-1/2017	11/2018-1/2019
Web/paper questionnaire	paper	web	web

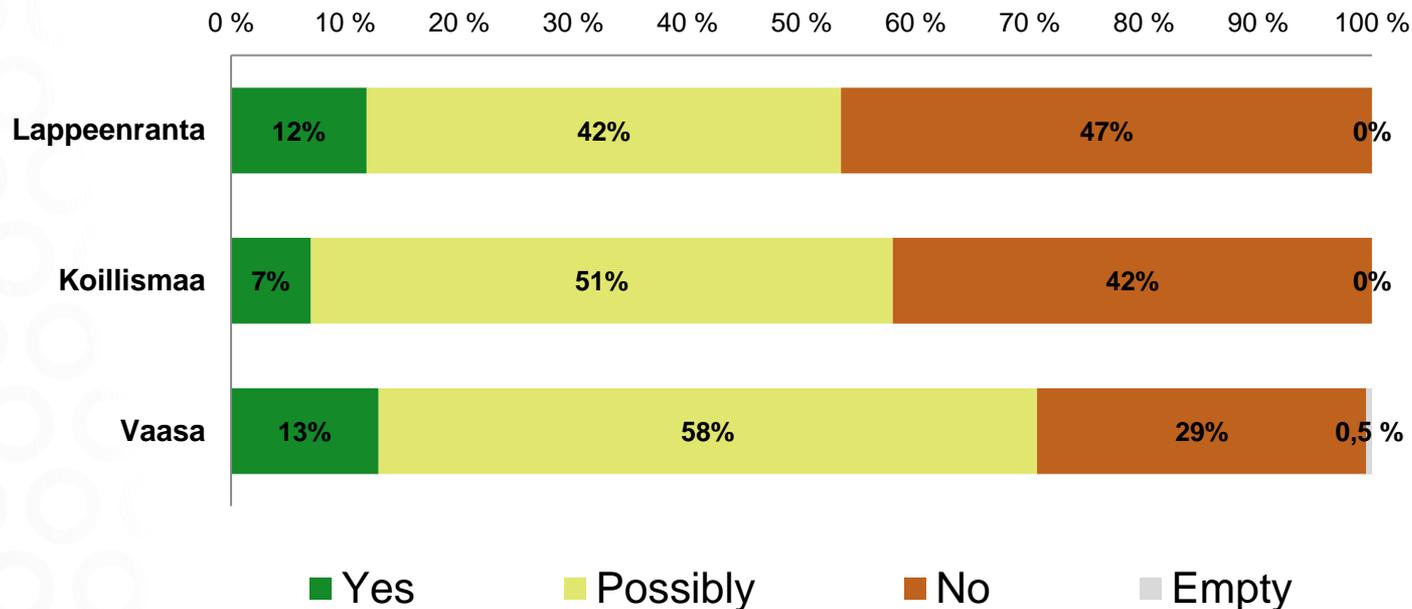
The state of the ground waters shown in the maps was



How would you rate your tap water? (scale 4-10)

Lappeenranta	Koillismaa	Vaasa
8,9	9,5	8,6

Would you be willing to pay to enhance the state of the ground waters (as described earlier)?

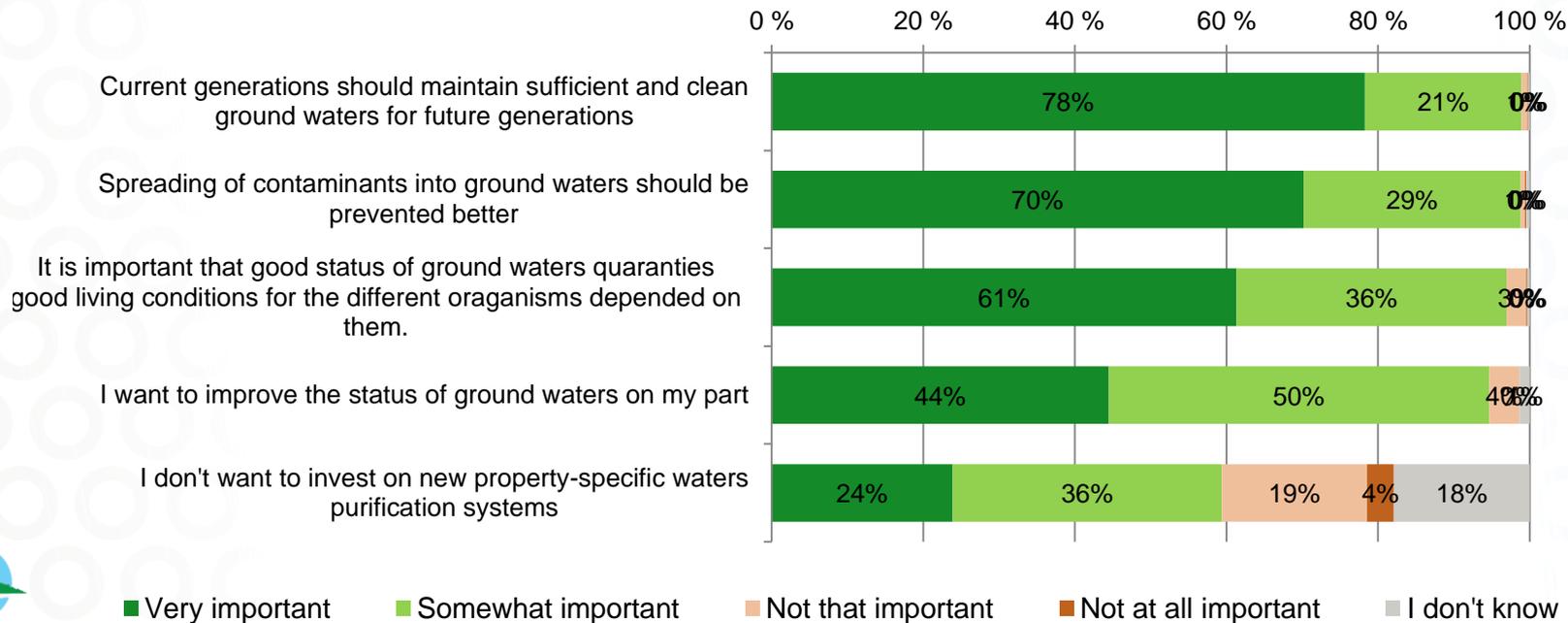


Payment card used in the questionnaires

<u>Your monthly payment during the next 6 years.</u>	I would definitely pay	I would almost definitely pay	I'm not sure if I would pay	I would almost definitely not pay	I would definitely not pay
0,50 €/month (6,00 €/year)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1,00 €/month (12,00 €/year)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2,00 €/month (24,00 €/year)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4,00 €/month (48,00 €/year)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8,00 €/month (96,00 €/year)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16,00 €/month (192,00 €/year)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32,00 €/month (384,00 €/year)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
More than 32 €/month, how much _____ €/month	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

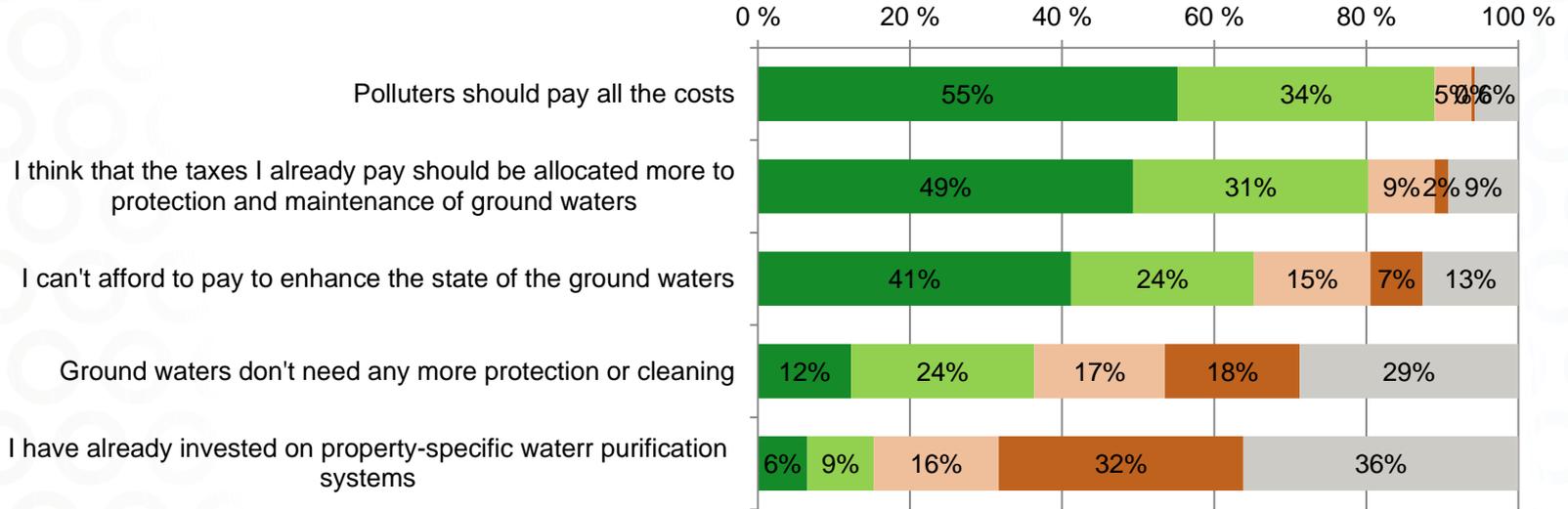
Reasons to pay

Reasons for willingness to pay in all areas (N=569-662)



Reasons not to pay

Reasons for unwillingness to pay in all areas (N=401-455)

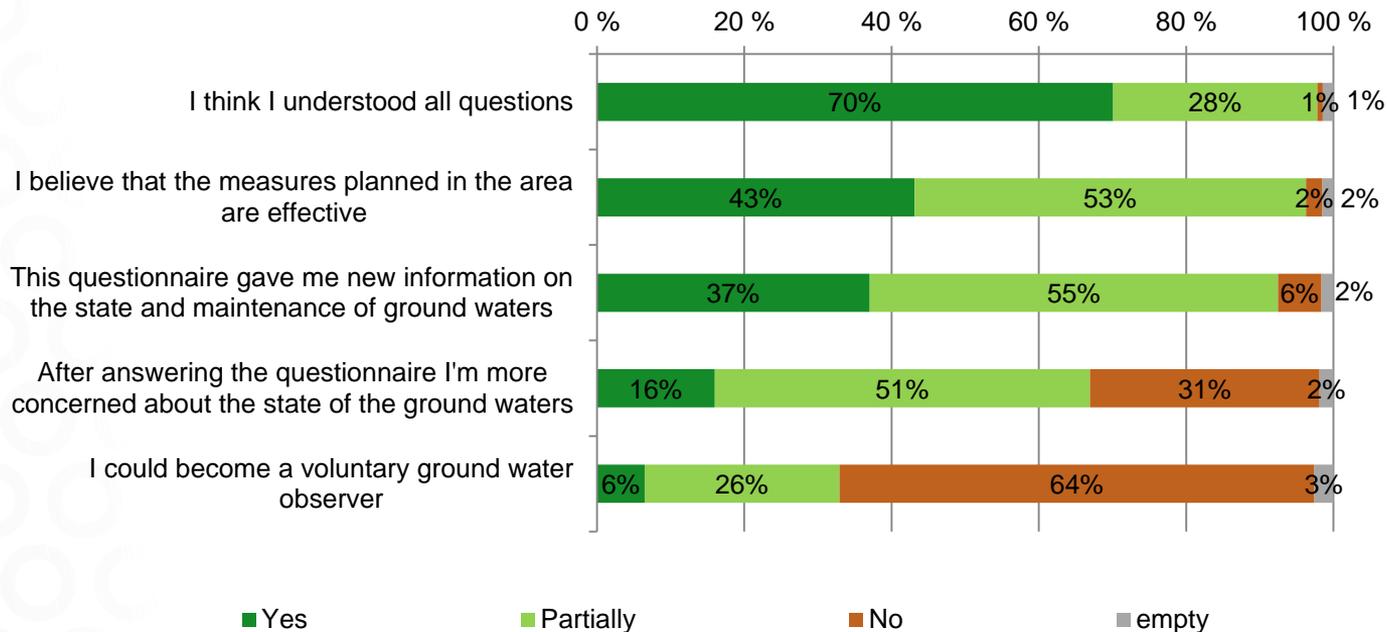


Thoughts of the respondents

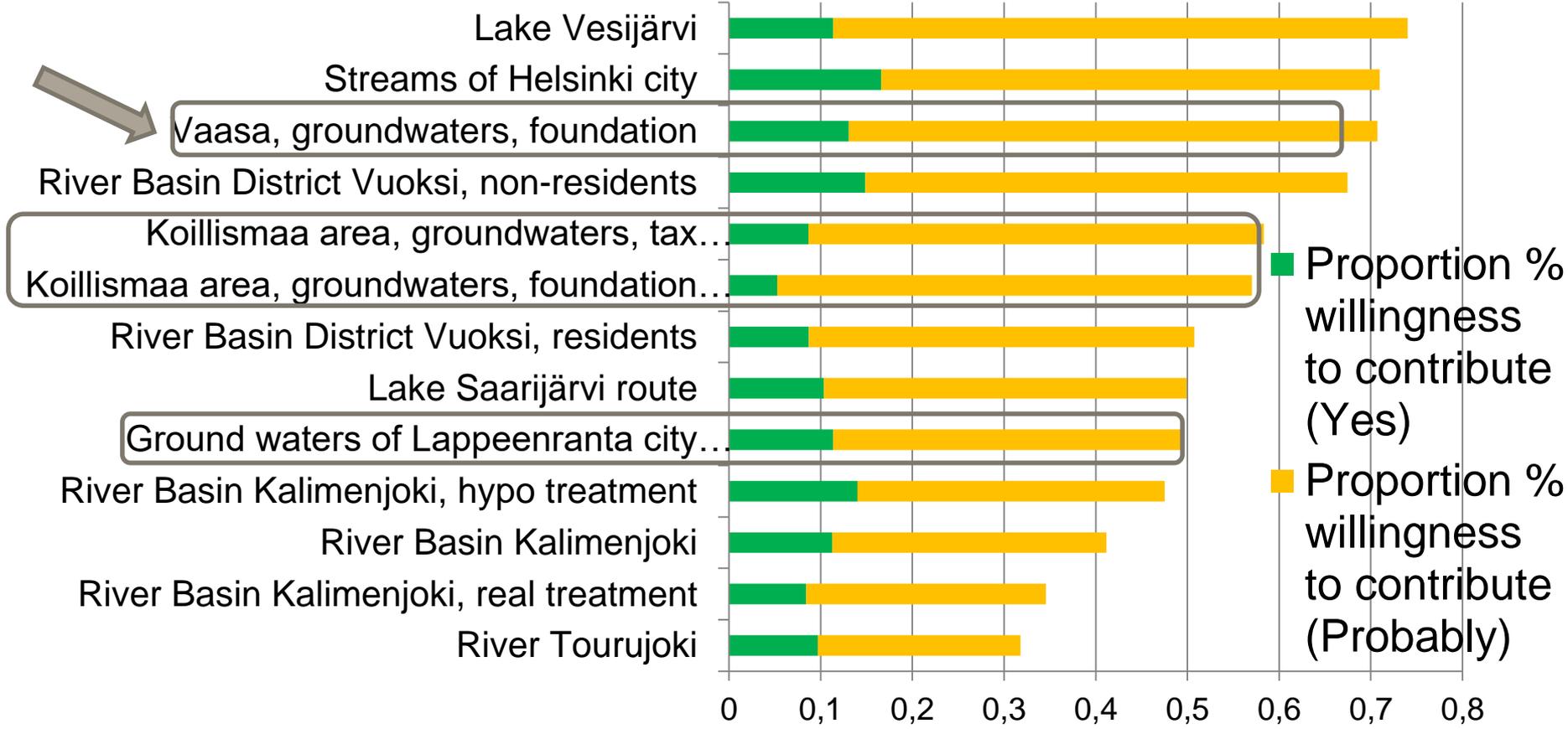
In all areas 80-90% of the respondents

- Totally agreed that sufficient and high quality groundwater reservoirs should be preserved to future generations
- Totally or somewhat agreed that groundwater protection is one of the most important things in society
- Felt that mapping and restoring of contaminated land-areas is very or somewhat important

Thoughts of the respondents



Groundwater valuation studies – comparison of results to other water related valuation studies?



Usage of results

- Through the studies we have data from the benefits of the measures used for groundwater protection
- Idea to use benefit transfer for similar areas
- Monetary benefits are usable in cost benefit analysis
- Basis for using disproportionate costs in exemptions
- The results are also usable in the case study areas for the planning of future water supply and even branding the water quality (e.g. Koillismaa)

Thank you!

