Spring monitoring citizen science approach

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WaterAct

Joint actions for more efficient management of common groundwater resources



TALLINN UNIVERSITY



Why?



Interreg EstLat program project Est-Lat155, Joint actions for more efficient management of common groundwater resources (WaterAct)"

WP3 AT3.2 - Establishment of voluntary spring monitoring

- **Spring voluntary monitoring** will be introduced to general public as the overall awareness of groundwater protection is low.
- Easy to understand guide how to carry out voluntary spring monitoring will be developed.
- Web application will be developed by TU to gather the data online.
- Best cost-effective measures how to carry out spring monitoring by non-experts and how to engage public will be tested.

Why use springs in groundwater monitoring?

Advantages for springs being included into national groundwater monitoring networks:

- Reference are no installation or maintenance costs
- sampling does not require time consuming water pumping compared to wells and boreholes.
- Obstacles to use springs as representative monitoring points:
- Solution to identify appropriate sampling frequency.



Why citizen science (volunteer monitoring)?

- Increases the awareness of and interest in local water quality issues.
- Helps to educate through monitoring, volunteers learn how the quality of water is affected by our actions and how we can protect water resources.
- Volunteer water quality monitoring is a great tool for youth environmental education.
- Solutions long-term data or new data on waterbodies that otherwise may go unmonitored.
- Representation with the set of th
- Research shows, that volunteer water quality monitoring data is credible (but needs quality control and training).

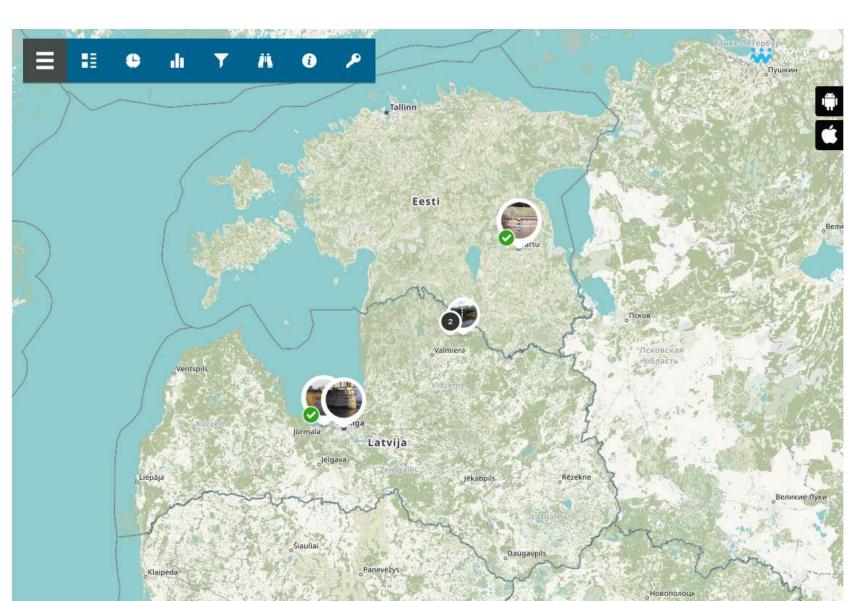


Good practices around the world?



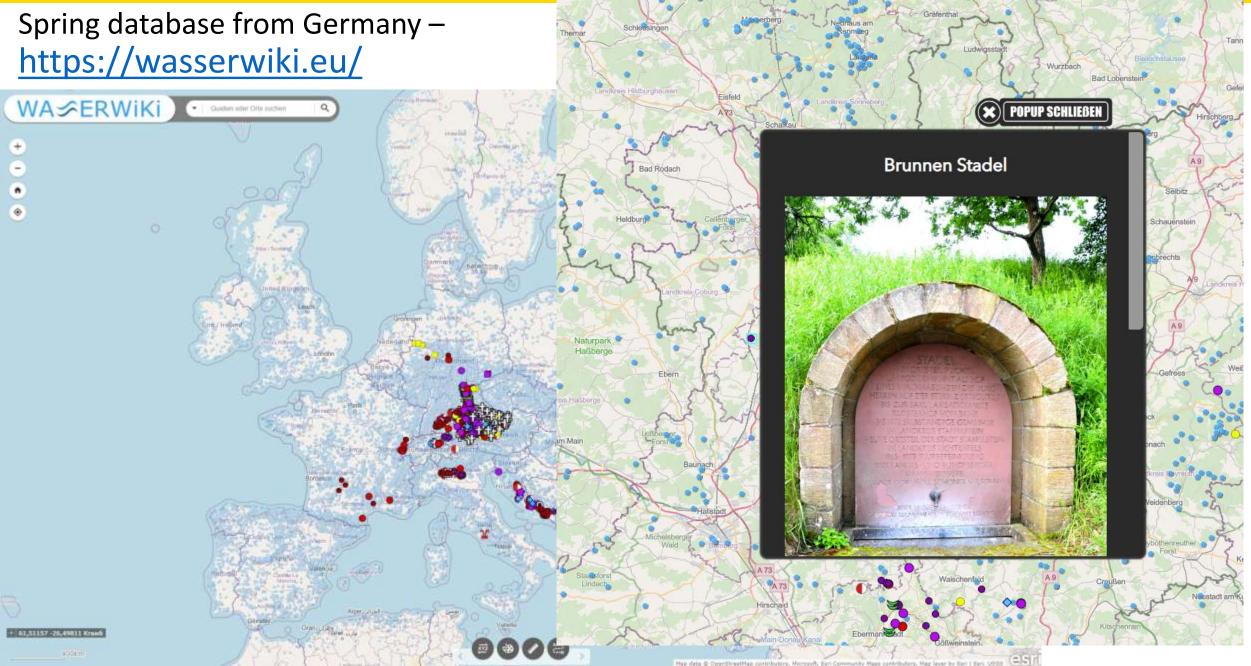
Good practice from Europe

Crowd Water – <u>https://crowdwater.ch/</u>





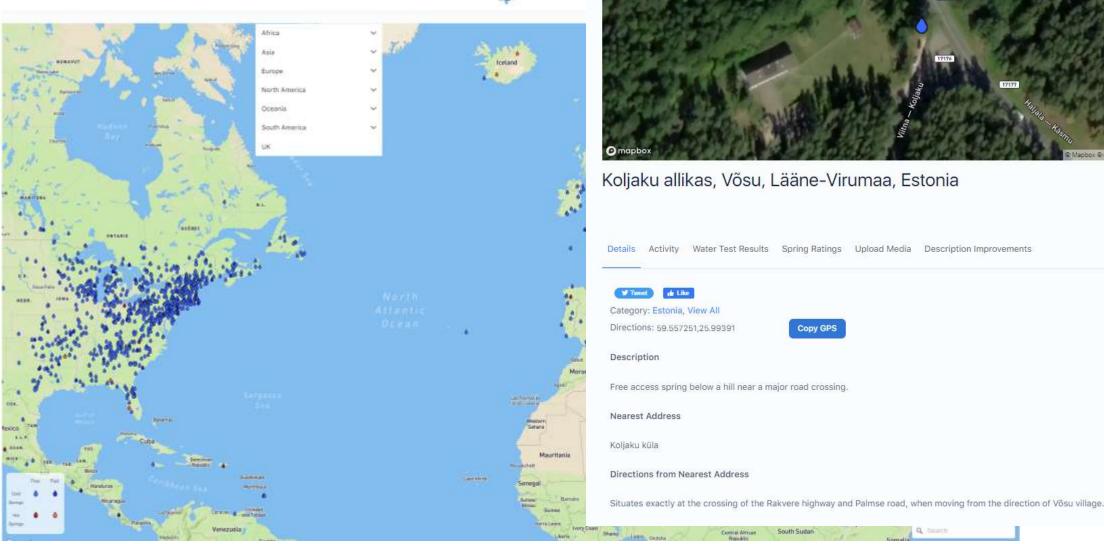
Wasserwiki



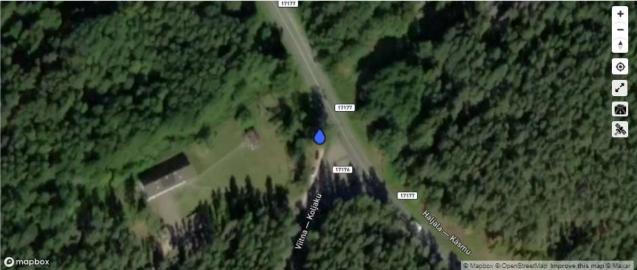
Find a spring

US based spring mapping tool – https://findaspring.com/

Mapi



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Koljaku allikas, Võsu, Lääne-Virumaa, Estonia

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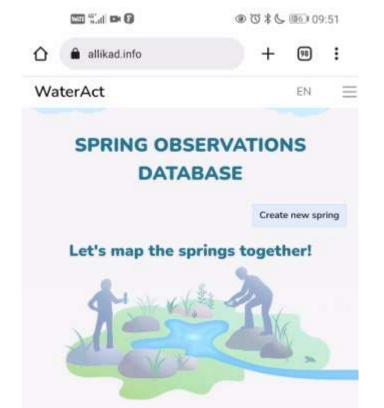
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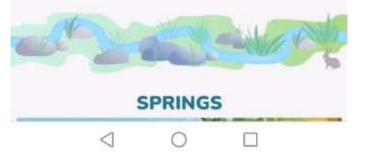


Estonia: https://allikad.info/ Latvia: https://avoti.info/

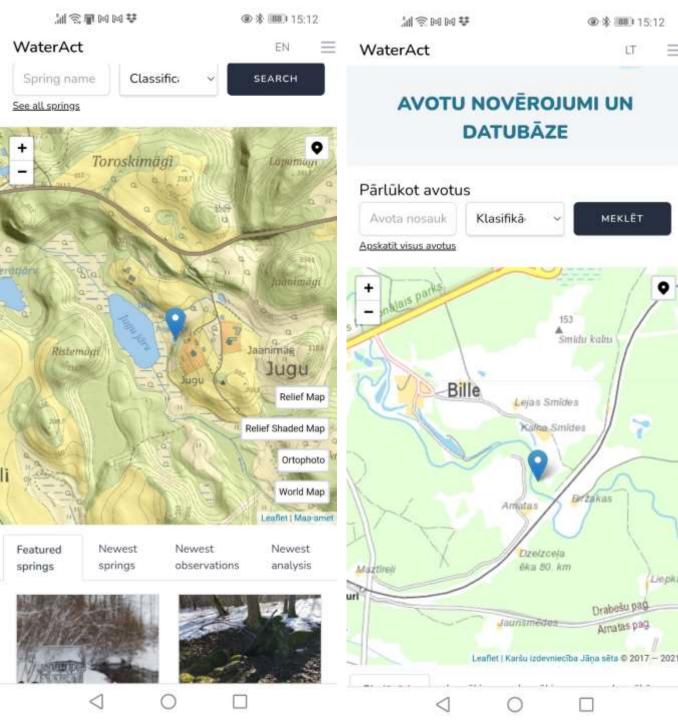


Why volunteer monitoring of springs?

The purpose of mapping the spring locations and assessing water quality is to help scientists and governmental institutions to collect new information. The data obtained this way helps to manage and protect springs. Without your contribution, this would not be possible!



- Allikad.info/avoti.info is browser based map application for finding, describing, observing and measuring of the springs.
- 😤 5 language English, Estonian, Latvian, Russian, French.
- All springs from government databases are already there. Users can check the correctness of information, upload pictures and make observations (describe, measure etc).
- Without user account you can see springs, add information and observations. For adding new springs or observations one must register.
- 😤 New and revised spring will end up in governmental databases.
- When adding new spring, all location information (coordinates, country, local municipality) will come automatically from map.
- At first all springs will have status "Submitted"and will get status "Confirmed" only after rechecking by other users or administrator.



https://allikad.info/ https://avoti.info/

Different maps for Estonia (Landborad) and Latvia (Jāņa sētas).

MEKLET

153

Lejas Smīdes

Dzelzcela

êka 80. km

Kilha Smider

Smidu kalu

Brzakas

- In Estonia it is possible to use Orthophoto and Relief shaded map.
- When adding new spring, all location information (coordinates, country, local municipality) will come automatically from map.
 - At first all springs will have status "Submitted" ("Kinnitamata"/"lesniegts") and will get status "Confirmed" ("Kinnitatud"/"Apstiprināts") only after rechecking by other users or administrator.





Spring monitoring manual for volunteers

Authors: J. Terasmaa, M. Vainu, O. Koit, K. Sisask, P. Abreldaal, L. Puusepp



Estonia-Latvia Contents Why volunteer monitoring of springs? Why to study springs? What is a spring? How to submit spring monitoring data? How to find springs? How to recognise springs? How to describe a spring? How to take a picture of the spring? How to evaluate spring water properties? How to characterize the spring water quality? 9 How to measure spring water guality? Water temperature Importance How to measure? _____ 11 12 pН Importance 12 Electrical conductivity and specific conductance 13 Importance 13 How to measure? 13 Total dissolved solids 14 Importance 14 How to measure? 14 Dissolved oxygen 15 Importance 15 How to measure? 15 Redox potential 16 Importance _____ 16 How to measure? ______16 Alkalinity 17 Importance 17 How to measure? 17 Nitrates 18 Importance 18 How to measure spring discharge? 19 Volumetric method Stream area/velocity methods 21 Weirs 25 References



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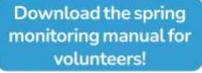
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Starting point

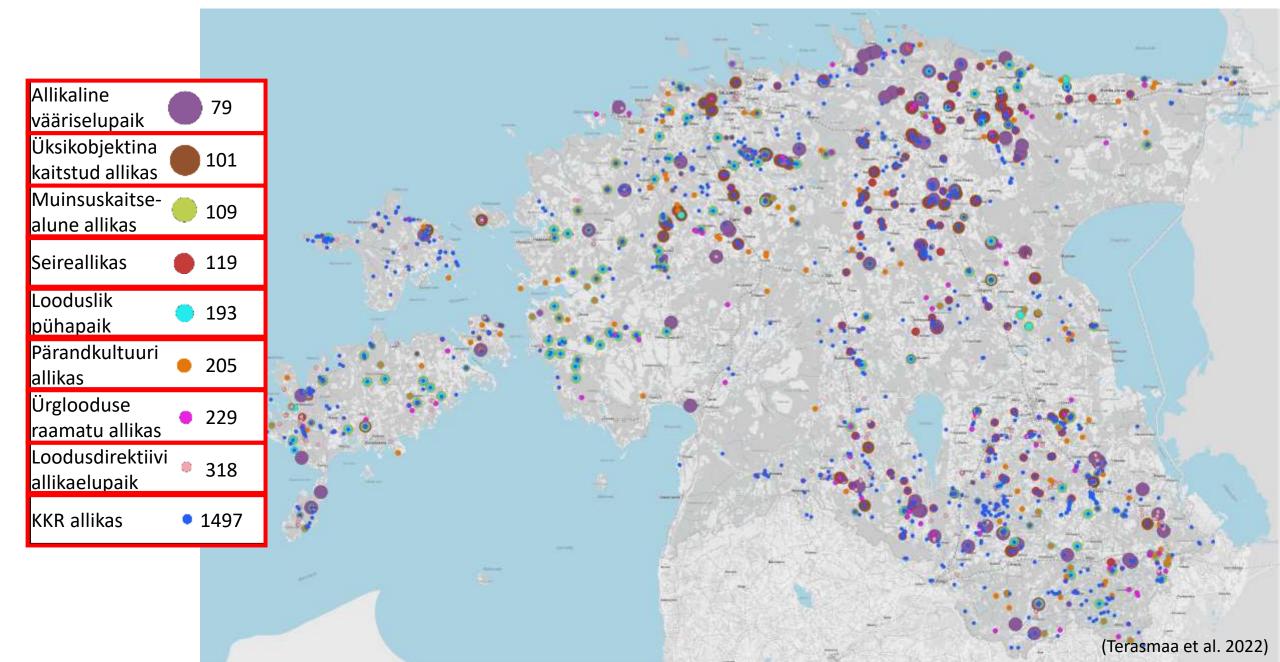


Initial database – 1486 springs from Estonia, 123 springs from Latvia





Source of the sering databases in Estonia





Meeting with schools





Water sampling



Discharge measurements





Loodusesõpradele on hästi teada Järvamaal Norra külas asuv Oostriku Suurallikas, sellest saab alguse Oostriku jõgi. Vähem tuntud allikad saab nüüd uue veebirakenduse abil kaardile lisada

Kanname Eesti allikad kaardile!

estis on riiklikes registri-💳 tes kirjas pisut üle 1400 allika. Möödunud sajandi esimesel poolel loendati ja kirieldati 4500 allikat, kuid enamik neist pole kaardile jõudnud. Hilisemal ajal on meie allikate arvuks pakutud isegi kuni 15 000. Seega on meie teadmised allikatest ja nende asukohtadest üsna lünklikud. Veel vähem on teada Eesti allikavee kvaliteedi kohta.

2020. aastal alanud Eesti ja Läti ühisprojekti WaterAct raames on loodud veebipõhine allikavaatluste kaardirakendus allikad.info. Kui teate mond allikat, mis pole tähistatud ega hästi tuntud, siis on võimalik sellest teada anda. Selleks et lisada allikate andmebaasi uus läte või uued vaatlused, peab esmalt tegema endale kasutajakonto ja sisse logima. Samalt lehelt saab lugeda allikate kohta ja head nõu, mismoodi allikaid pildistada, hinnata allikavee omadusi ja mõõta vooluhulka.

> Tallinna ülikooli ökoloogia keskus / Loodusajakiri



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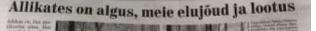
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🔠 1 Mar 2021-12 Sep 2022 💌

Facebook Page reach 🛈

135,030 ⁺ 6.8M%

Instagram reach 🛈

34,894 116.2K%





Outcome



Results so far (as of 12.09.2022)

https://allikad.info/

Users: 218 (~30 from LV) Springs: 2507 (899 new springs, 53 from LV) Observations: 1609 (80 from LV) Photos: 4530

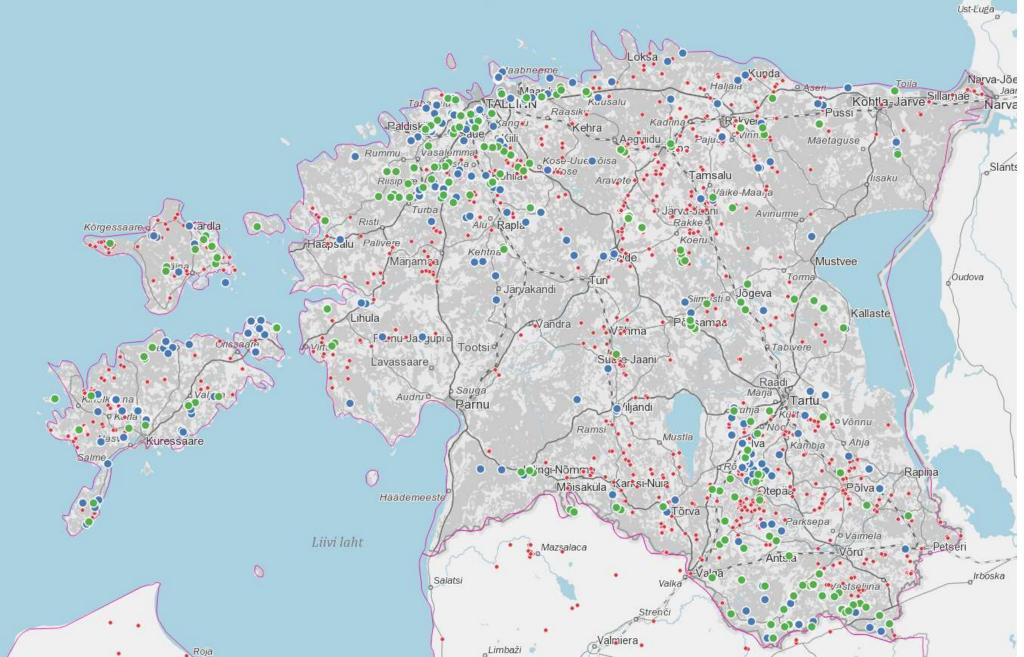
 Facebook group Allikainfo: <u>https://www.facebook.com/groups/allikainfo</u> (649 members)
 Facebook page Kaardistame üheskoos allikad: <u>https://www.facebook.com/allikad.info</u> (676 followers)
 Instagram know.your.water: <u>https://www.instagram.com/know.your.water/</u> (182 followers)
 Youtube channel Allikainfo: <u>https://www.youtube.com/channel/UCT28j3elSSLrJPpm_uANg-g</u>

- + Five schools from Koiva are joined
- + GLOBE schools network
- + At least three school project about local springs
- + Several student thesis will focus on springs

In november we gave to the Land-Board 217 new spring locations, 48 locations corrections and 10 spring locations which are not springs.

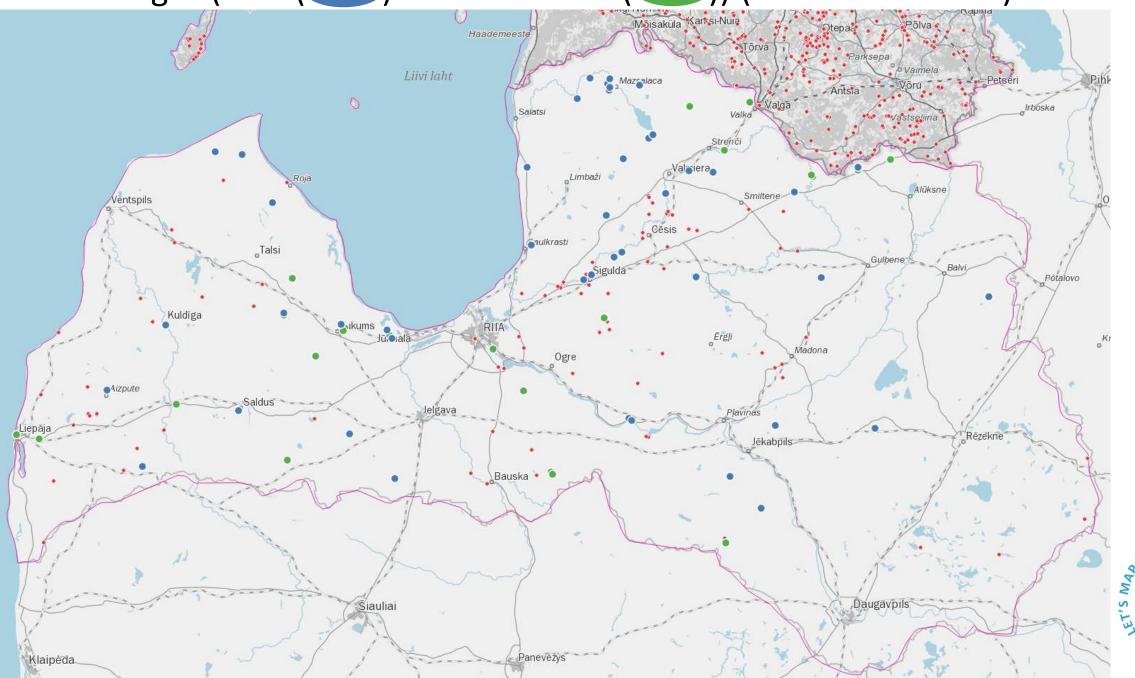




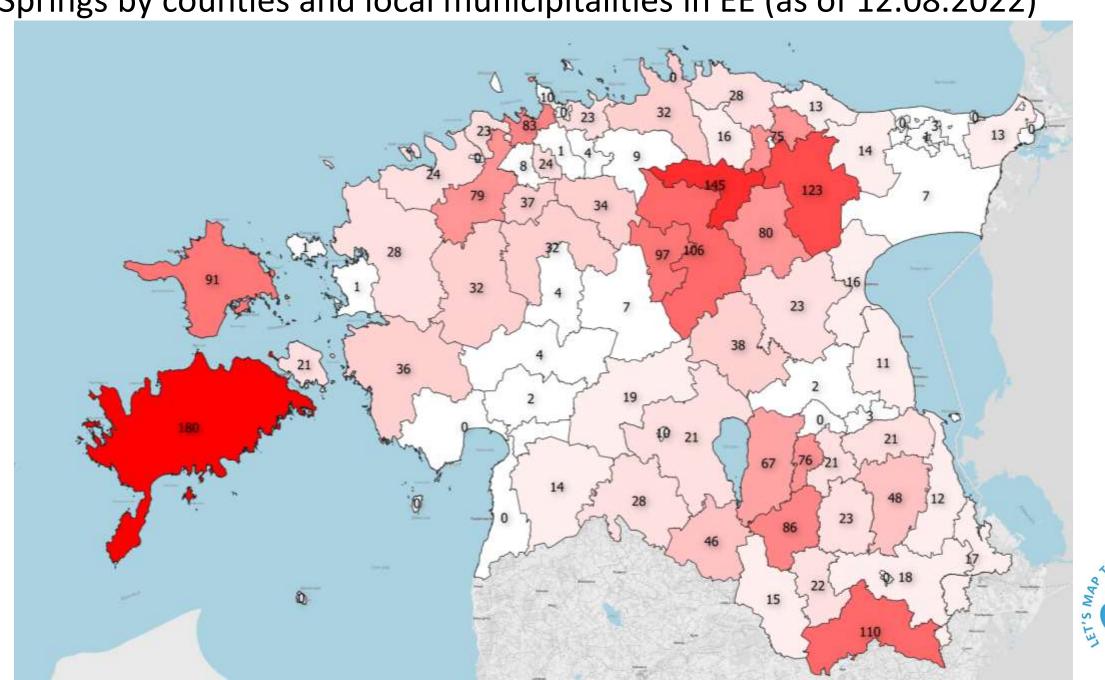




LV changes (new (n=53) and corrected (n=26)) (as of 12.09.2022)



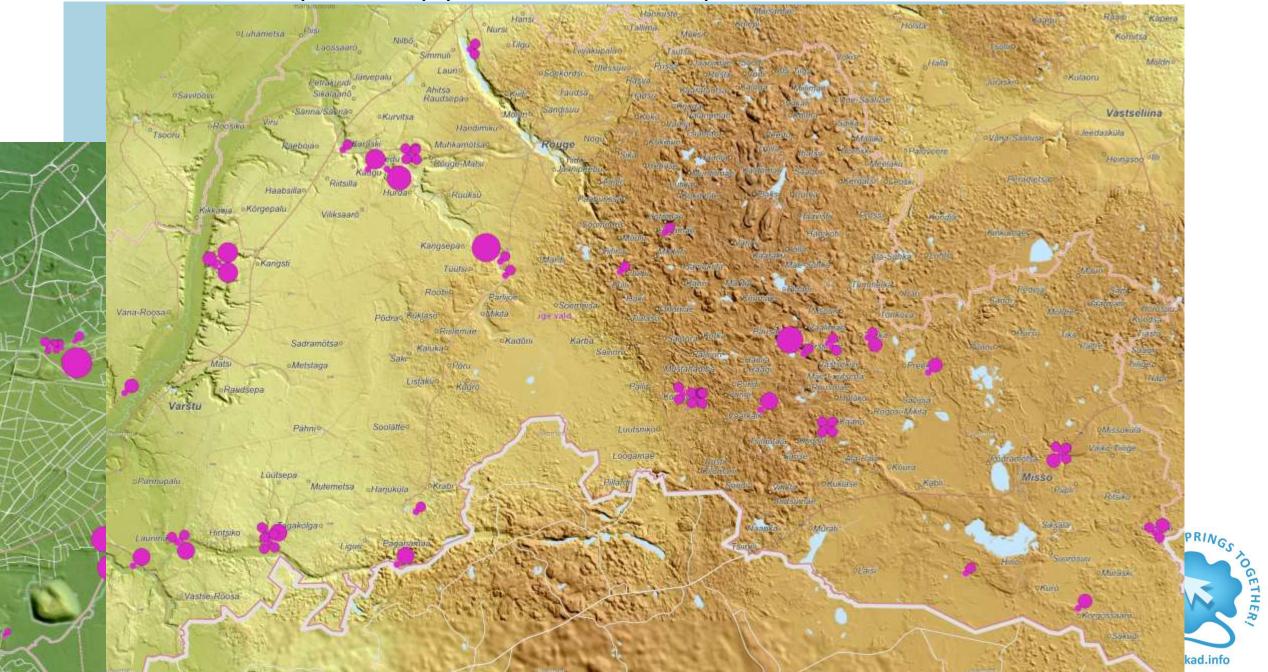




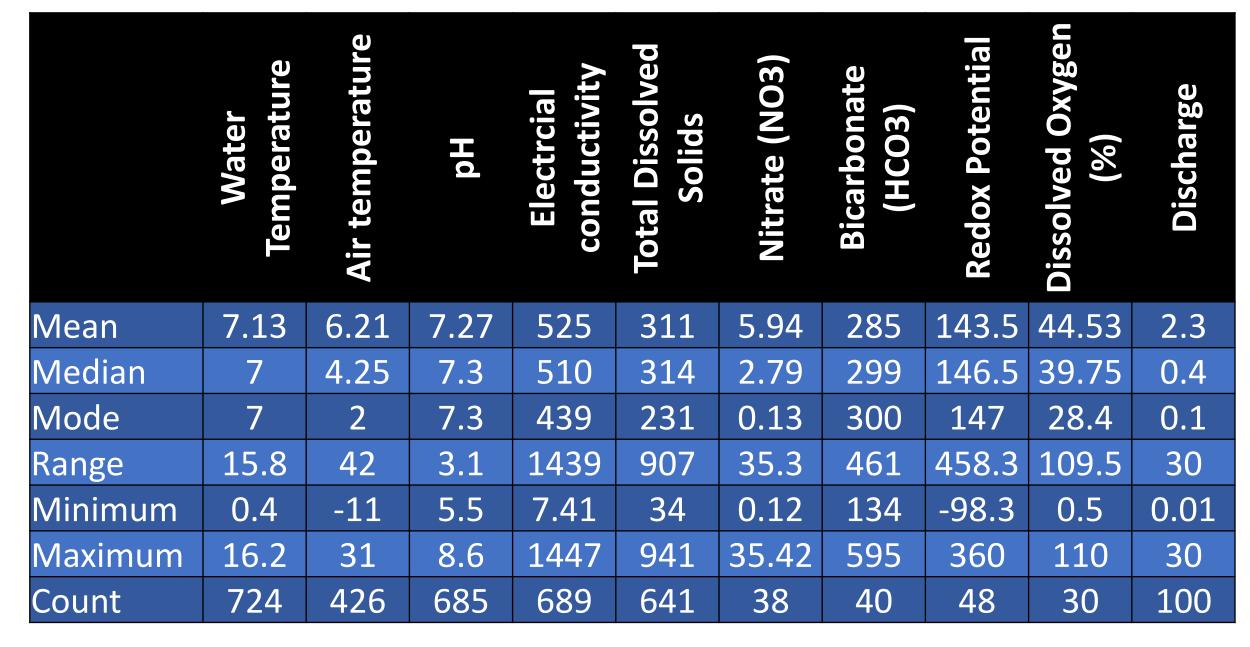


Springs by counties and local municipitalities in EE (as of 12.08.2022)

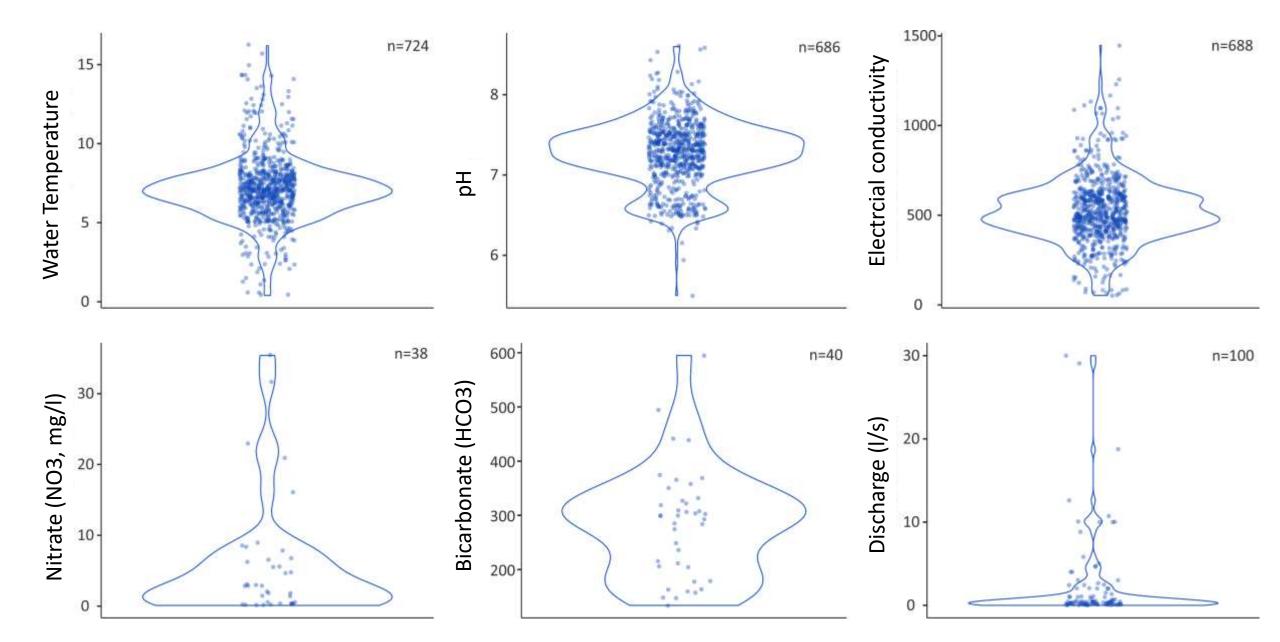
EE observations (n=1053) (as of 31.05.2022)



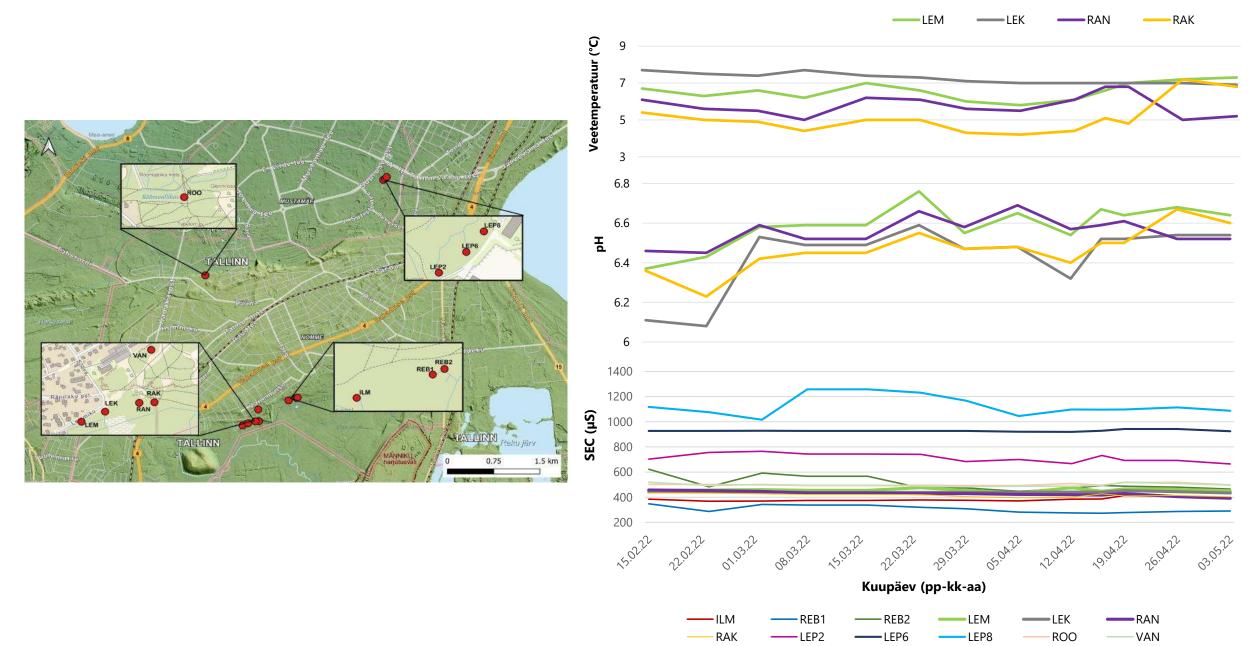
Observations (n=1053) (as of 31.05.2022)



Solutions (n=1053) (as of 31.05.2022)

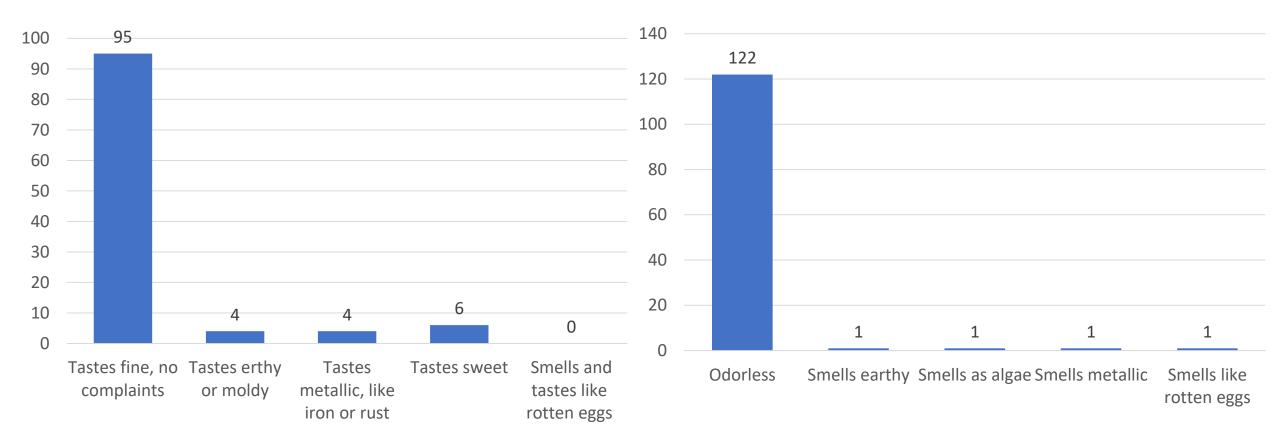


Spring monitoring (Ess, H. bachelor thesis, 2022)



allikad.info

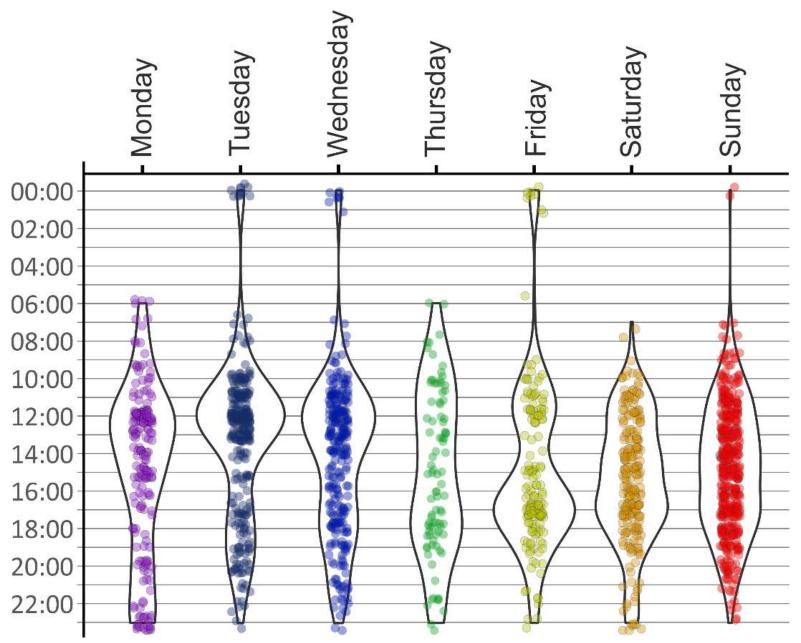
Water odor and taste descriptions (EE)



- In 81 cases water is described as odorless and with good taste
- In 6 cases water is described as odorless and taste sweet
- In 3 cases water is described as odorless and taste earthy or moldy
- In 1 case water is described as odorless and taste metallic
- In 1 case water is described smell as algae and taste fine
- In all other case only taste or smell is described



Solution: Second Second







What we learned?



😤 It works!

Servations, 4530 photos. We have 899 new springs, 1609 observations, 4530 photos.

- Data quality is generally good only few cases with wrong submissions and mix-ups.
- Most effective way to get longer timeseries is trough the educational institutions schools, universities etc.
- Activity of the regular volunteers is directly connected with campaigns (social media, newspapers, TV, radio etc).



Thank you!



bit.ly/WaterAct-project

R^G

bit.ly/WaterAct-Researchgate

JOIN -> https://www.facebook.com/groups/197231101712583/

以外



latvijas vides, ģeoloģijas Un meteoroloģijas centrs



UNIVERSITY OF LATVIA



REPUBLIC OF ESTONIA

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ENVIRONMENT AGENCY

MINISTRY OF THE ENVIRONMENT

GEOLOGICAL SURVEY OF ESTONIA



THE ONLY WAY IS HE

Conservation Agency

Republic of Latvia

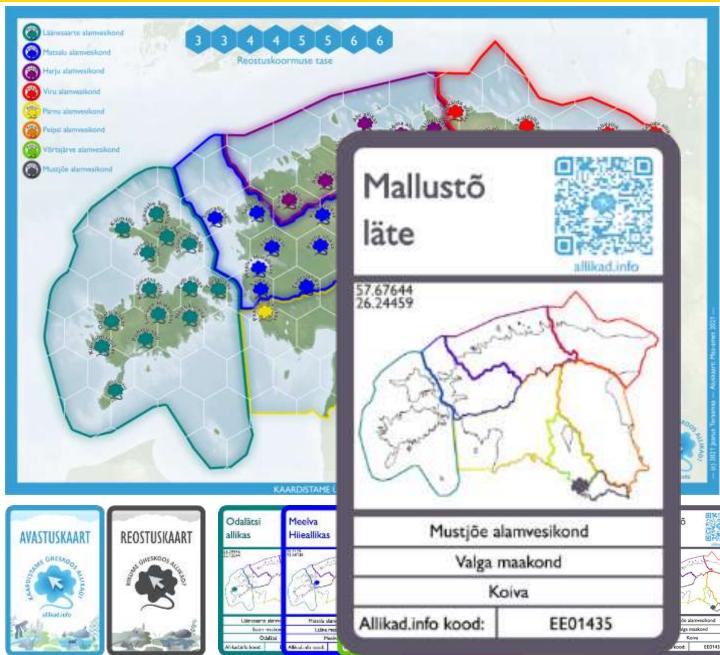




Joint actions for more efficient management

of common groundwater resources

Co-op board game "Let's map the springs together!"



- 1 gameboard with Map and springs
- 92 spring discovery cards
- 92 spring pollution cards
- 8 bonus cards
- 8 disaster cards
- 8 role cards
- 6 game pieces
- 200 markers for spring status (70 green, 60 yellow, 40 orange, 30 red)
- 8 blue markers for riverbasins (sub-basins)
- 1 blue marker for pollution level
- 8 water research stations

Spring and their locations with coordinatest and link to the allikad.info database.

Uus veeseaduse	Önnetuskaart		ÖST spetsialist	
Verieoluse täiendus tagab alikatele parena kaite. Saad kuim väga haivas sesandis alikate parandasta keisene seisandisa. Positiivne mõju avaldab ka teistele ambritseestele alikatele.	Ti läpää mostaisiammasi taut äile elere sääk. 2) Tärkku Maranstan pula ataman hanti Sele allika sesuoitmaneh taarnali "Aga hab". 2) Taga lak allisansatan velepääk mag settusei natipai paale.	ROLLIKAART	 Stad albia seisandi manta ühe regenuena väga healu, Rui alamvesikoma reostuse põhjai an tuvastatud, saad ühe regenuena kagu albiaalu väga hease nosundise via, Sinu alfikualal oleka ajal seisandid ei saa haheneda. 	ARDISA PAROLE
Seda kaarni saab kasutada igal ajat.	Card contraining to recover planted	R. Butter	Exercitare Design affica?	*