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MONITOR2020

DEVELOPING MOBILE ON-SITE MONITORING SERVICES FOR CITIZENS AND PROFESSIONALS
"Focus water & sensors"

Jari Silander & Juhani Kettunen,

3rd Science for the Environment Conference

Aarhud Denmark 1-2 October 2015

Tekes

Ympäristöministeriö
Miljöministeriet
Ministry of the Environment

SYKE
Suomen ympäristökeskus

Luke
LUONNONVARAKESKUS

Elinkeino-, liikenne- ja ympäristökeskus

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Finns and lakes (Matti Lindholm, SYKE)

Photo: Kalervo Ojutkangas

- There are about 56 000 lakes (> 1 ha) in Finland
  - About 90 Finns/lake
- 496 200 free-time residences
  - Of which the vast majority is located at a lake
- 34 % of Finns are recreational fishermen
- Hundreds of local water protection NGOs

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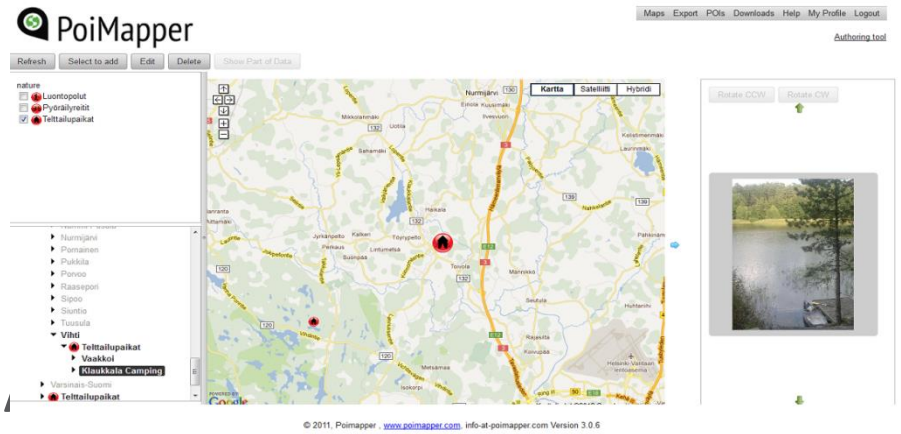
FIELD WITH END USER TO OFFICE



DATA

END-USED
- Student
- Citizen
- Association

EQUIPMENT

APPS

STORAGE

OPEN DATA

SERVICE

OData

JÄRVIWIKI

QUALITY CONTROL

MONITOR2020

WHAT DO YOU WANT? – continuity?

HALI http://www.syke.fi/hankkeet/hali

Availability

Usability

Quality

Wiki – the web service of Finnish lakes and the Baltic Sea

The LakeWiki contains basic information on each Finnish lake over 1 ha in extent and tools for sharing ie. observations and pictures. The idea of LakeWiki is to become a virtual meeting point for people living around a specific lake, where local people can discuss the state of their lake and start restoration projects with the help of authorities. In LakeWiki citizens can maintain observation sites, upload pictures, announce events, discuss matters related to a specific lake or water protection in general.

Funding (B/C> 1)

Wiki -mobile services

AlgalWatch – an smartphone app for sending and browsing observations on algal blooms.

- taking a photo
- assessing amount of algae
- sending your observation.

Organize

A water quality sensor Secchi 3000 - a low cost water quality sensor based on image analysis

- for water turbidity measurements (TSM)
- for secchi depth measurements
- for water color measurements
- Chromophoric *dissolved* organic matter measurements (CDOM).

Secchi3000 and a mobile phone on the top of the device. Inside the container there is the measurement structure with plates consisting of white, grey and black target areas.

Measurement

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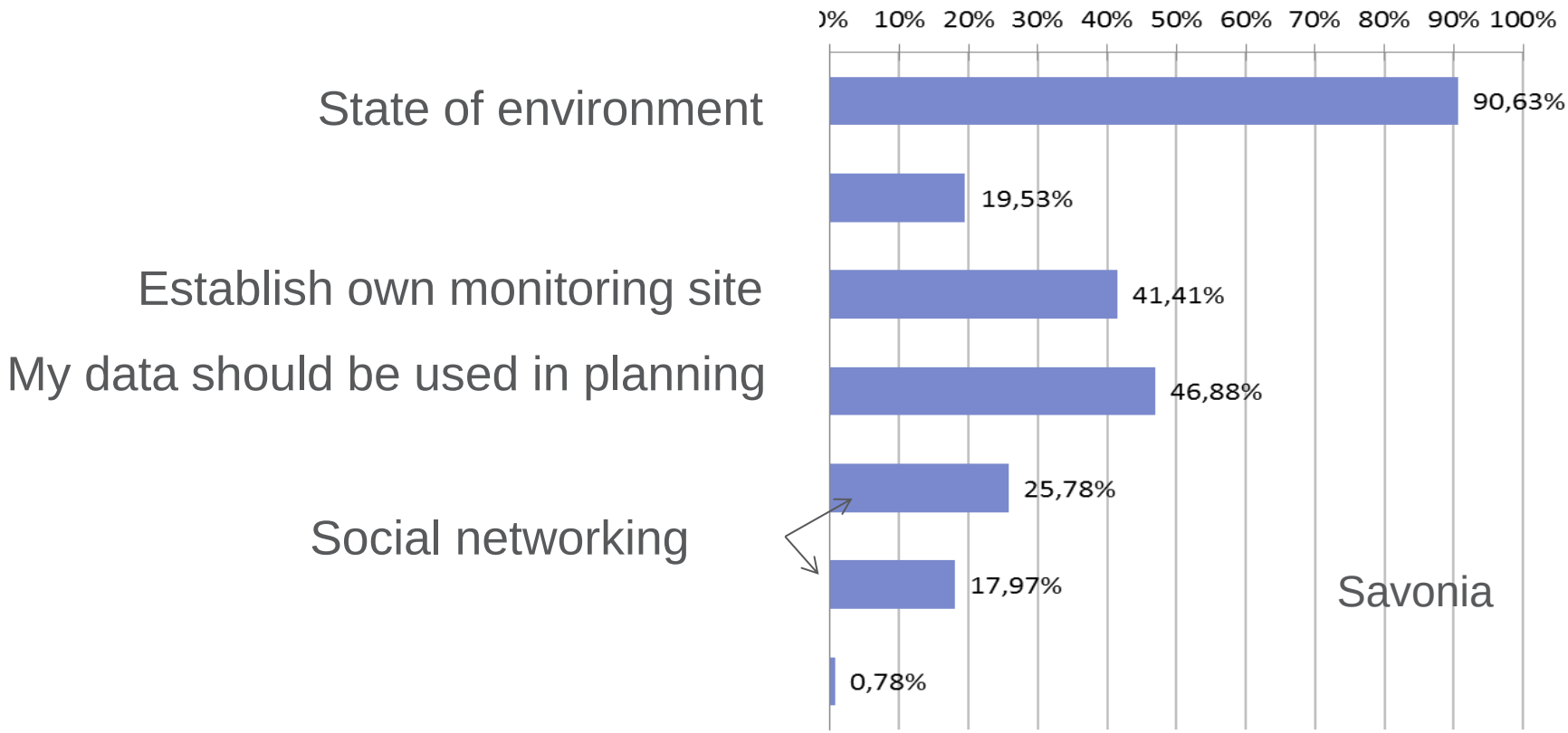
END USER- MOTIVATION

– survey 2015 N. 128, marine & freshwater areas

What motivates your to monitor?



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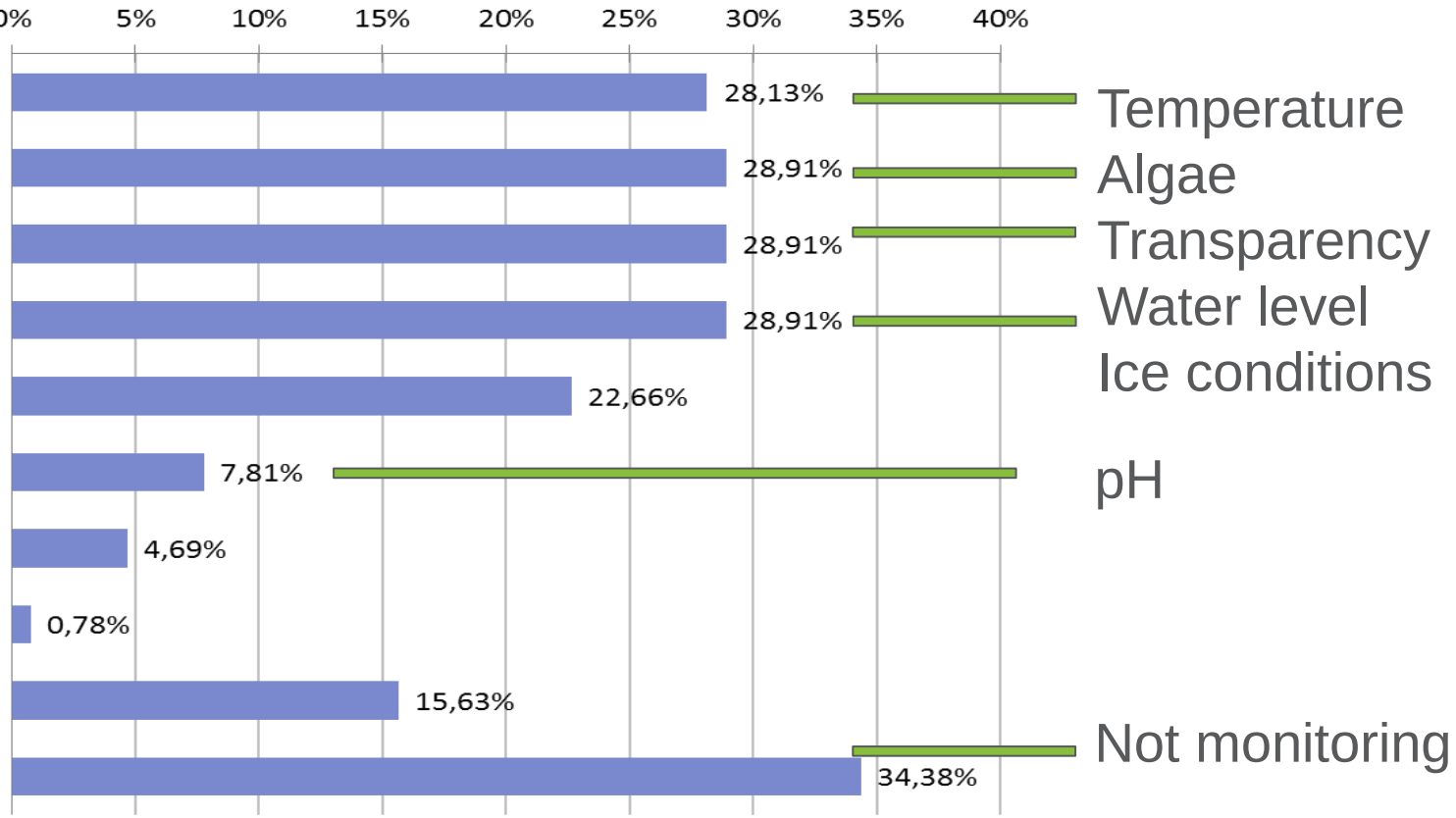
END-USER PARAMETERS?

Survey versus wiki-users



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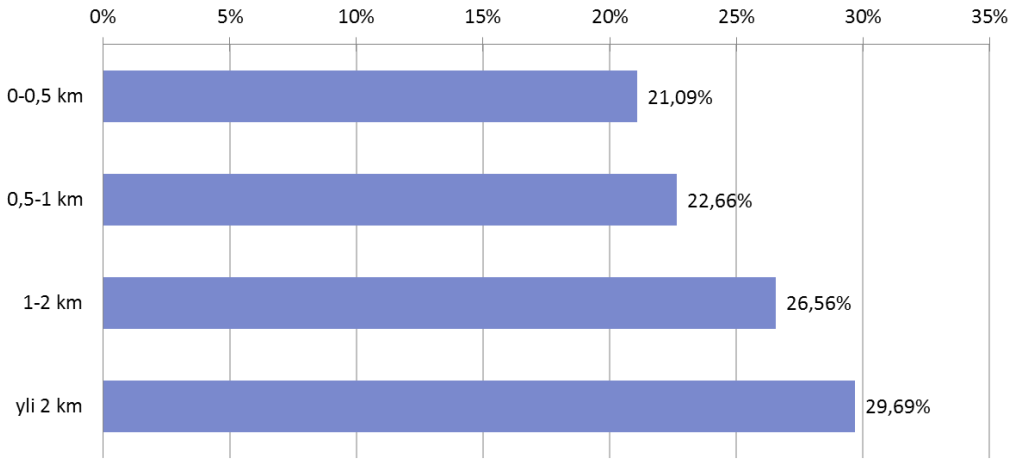
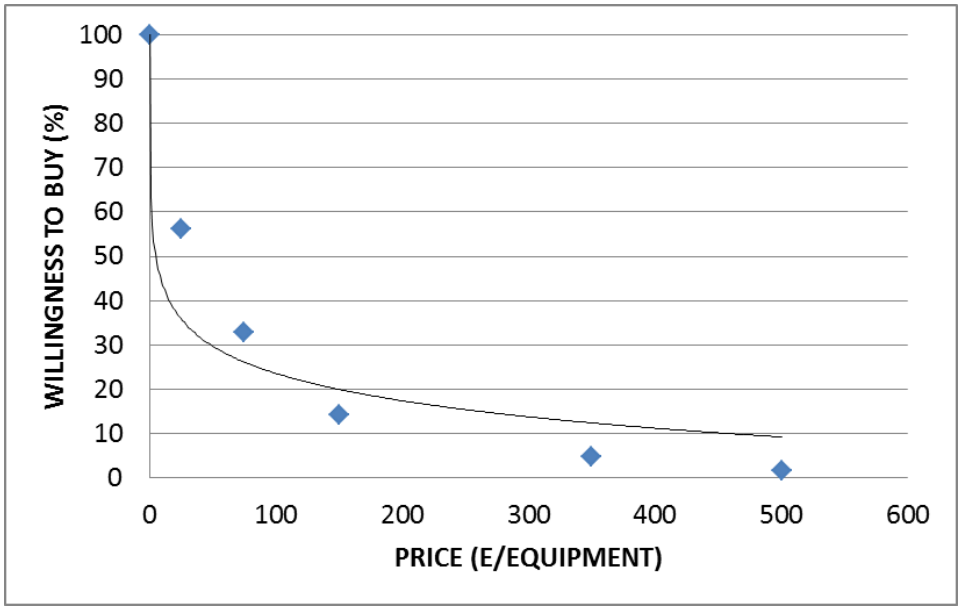
END-USER POTENTIAL?



Data value: 2-5 e/sample*
Volume: 6/person/year
Area: 0-3 km^2

*Depending variables & standing (temp, algae, Secchi diski)



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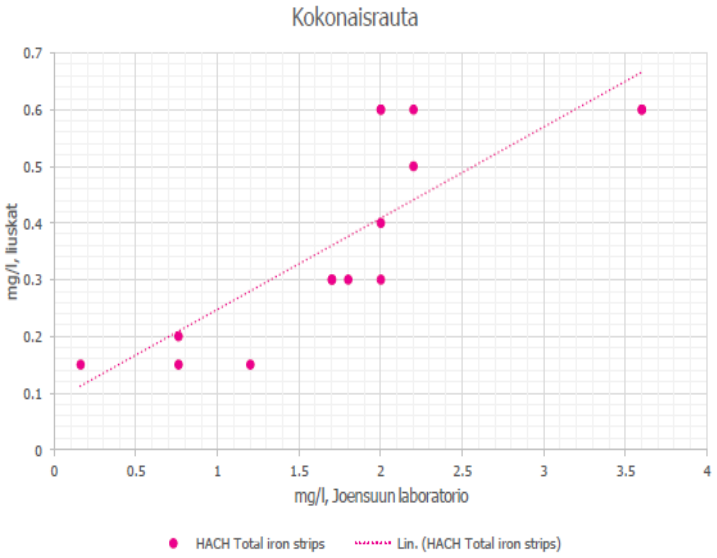
LABORATORY AND FIELD TESTS

(Mäki et.al Savonia poster)

END-USED

- Student (awareness)
- Citizen
- Advance citizen pro

IRON STRIPS



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ROADMAP DIY-SENSOR

DISSERTATIONES CHIMICAE UNIVERSITATIS TARTUENSIS **140 TEEMU NÄYKKI** Novel Tools for Water Quality Monitoring – From Field to Laboratory

2011

2013

2015

QUALITY CONTROL

DISSERTATIONES CHIMICAE UNIVERSITATIS TARTUENSIS **140 TEEMU NÄYKKI** Novel Tools for Water Quality Monitoring – From Field to Laboratory
& Field test poster in the Lobby

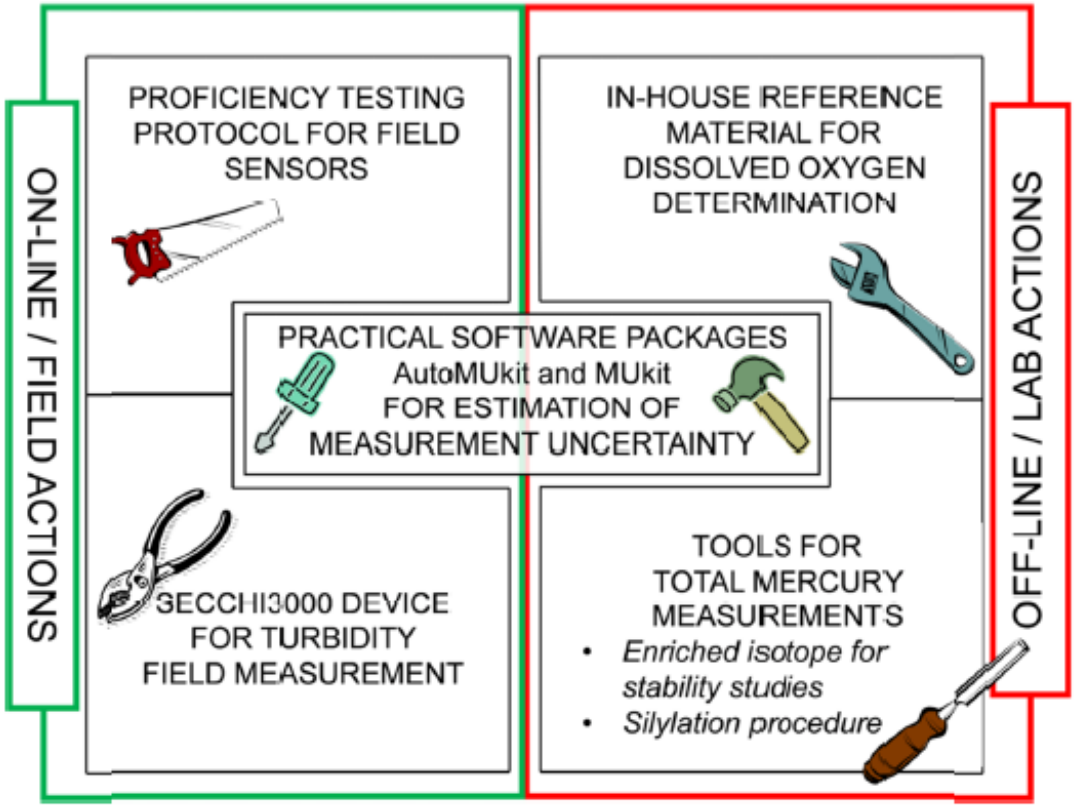
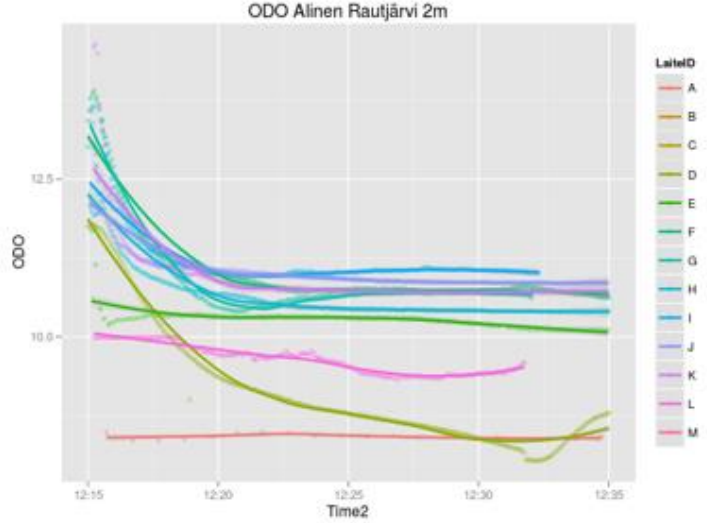


Figure 1. Tools for water quality monitoring investigated in this thesis.

Proftest SYKE

STABILIAZATION TIME



FEASIBLE IN SITU PARAMETERS

HALI http://www.syke.fi/hankkeet/hali

In the field with good quality can be measured (The feasibility of field meters in surface water monitoring Apil 22.2015, thesis Kahiluoto):

- Conductivity,
- Turbidity
- Temperature
- pH (calibrate + note service life)
- Oxygen (challenge for volunteers “Shelton 2012”)
- Discharge (ok, Shelton 2012)
- N, P (not suitable)
- Chl-a (pending)

APPS' & TOOLS

Survey (n.128 no random & testing & QFDmatrix product planning, decision matrices, and customer-driven engineering.

END-USER HAVE (n.128):

- 70 % smart phone with internet
- ~ 90 % access to internet home/office

APPS':

- 2/3 ready to pay (ref: LUKE, farmers, 30 interviews)
- Usability high
- Need instructions
- Large font (elderly people)

TOOLS

- Prefer tablet "elderly people large text"

END-USER OPPORTUNTIES
FEASABLE TOOLS
USABLE TOOLS
GOOD DESIGN

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STORE AND SHARE DATA

To reduce implementation time and cost and increase product value/functionality

- focus on open standards
- use more open source tools and SDKs

Collect: CKAN portal (www.ckan.org)

Share: OData - the best way to REST (www.odata.org)

Use: Excel etc.

Browse: Global http://index.okfn.org/

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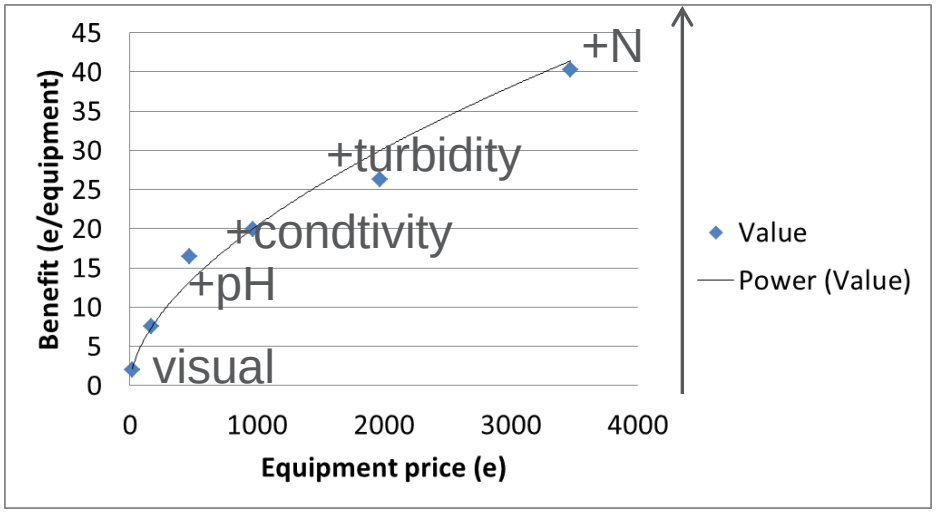
WORTH OF MONEY?



Expenditure:

- Organize voluntary activity (20 ke/year)
- Data service (field to open, 5 ke/year)
- Wiki service (30 ke/year)

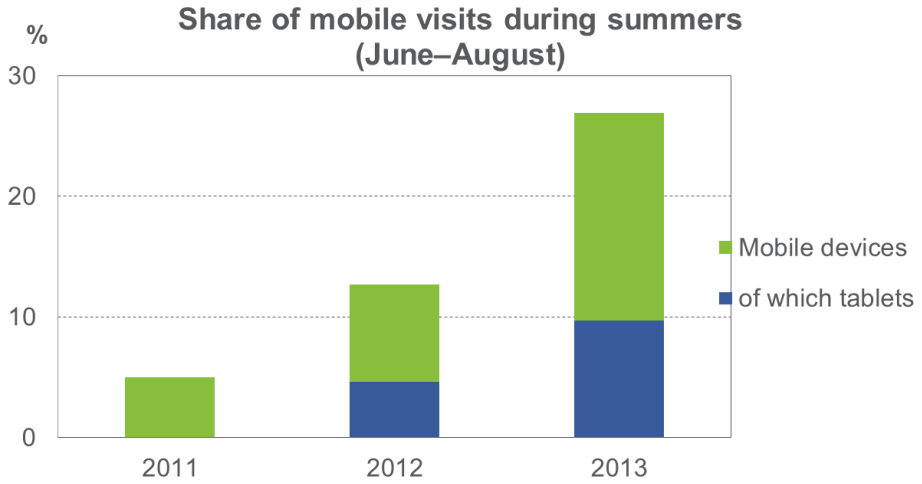
How many observations we needed annually (B/C>)?

****

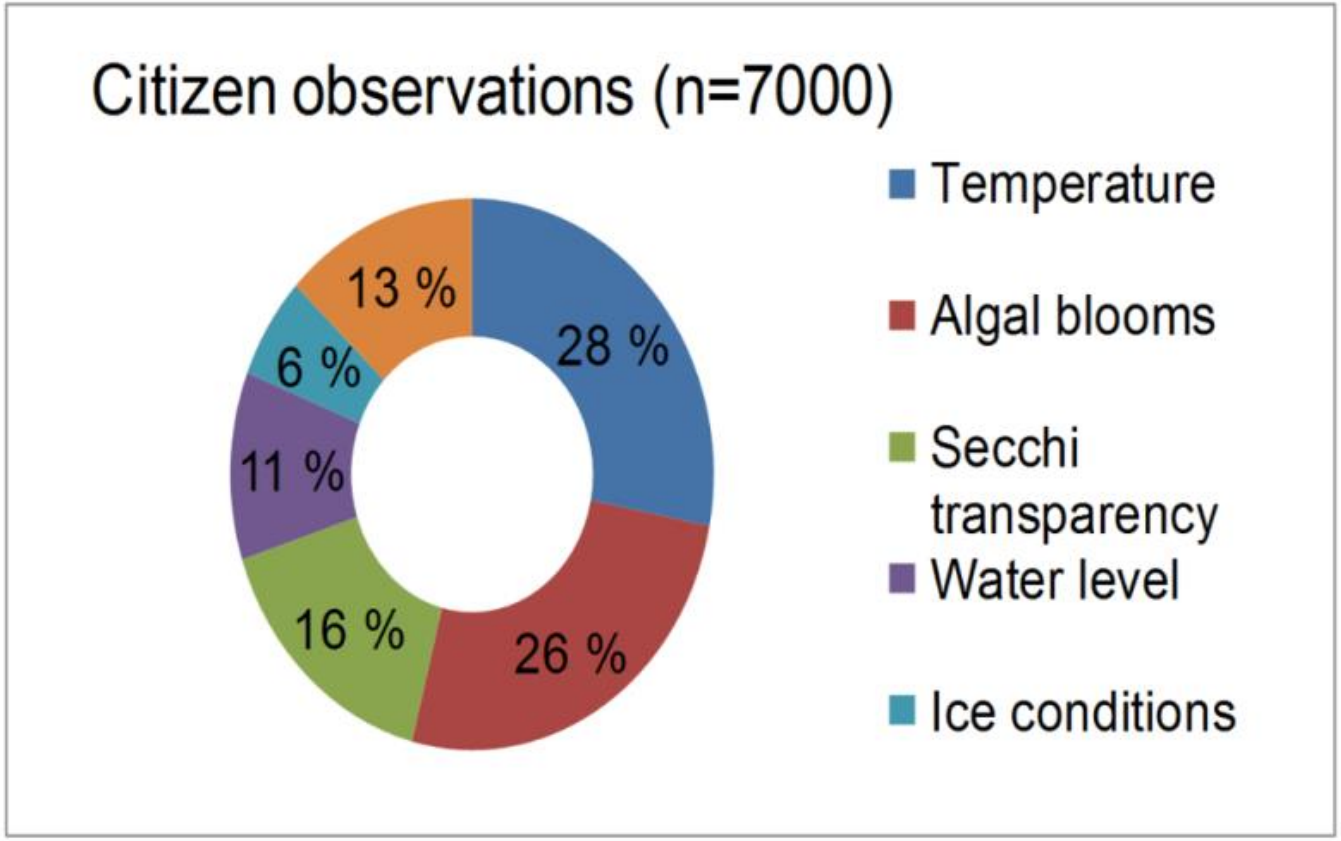
10 000 – 20 000 observations/annually

Over 2000 citizens

DO WE HAVE > 10 000 observations (B/C>1)?



Different types of observations



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CONCLUSIONS

Availability	Funding (B/C> 1)
Usability	Organize
Quality	Measurement

6 CRITERIAS FOR SUCCESS?