

Practical use of citizen-based information

ESR 10 - V. Juliette Cortes

Les Diableretes, April 10th/2014

Outline

- Objectives & Conceptual framework
- Results Objective 1
- Progress Objective 2
- Potential Collaboration Objective 3
- Contribution to the CHANGES Book
- Overview

PhD Research Objectives

1. Evaluating quality of data collected by volunteers (Italian study site)

- Inspection of bridges and checkdams

2. Evaluate volunteer inspections for management of hydraulic structures (Italian study site)

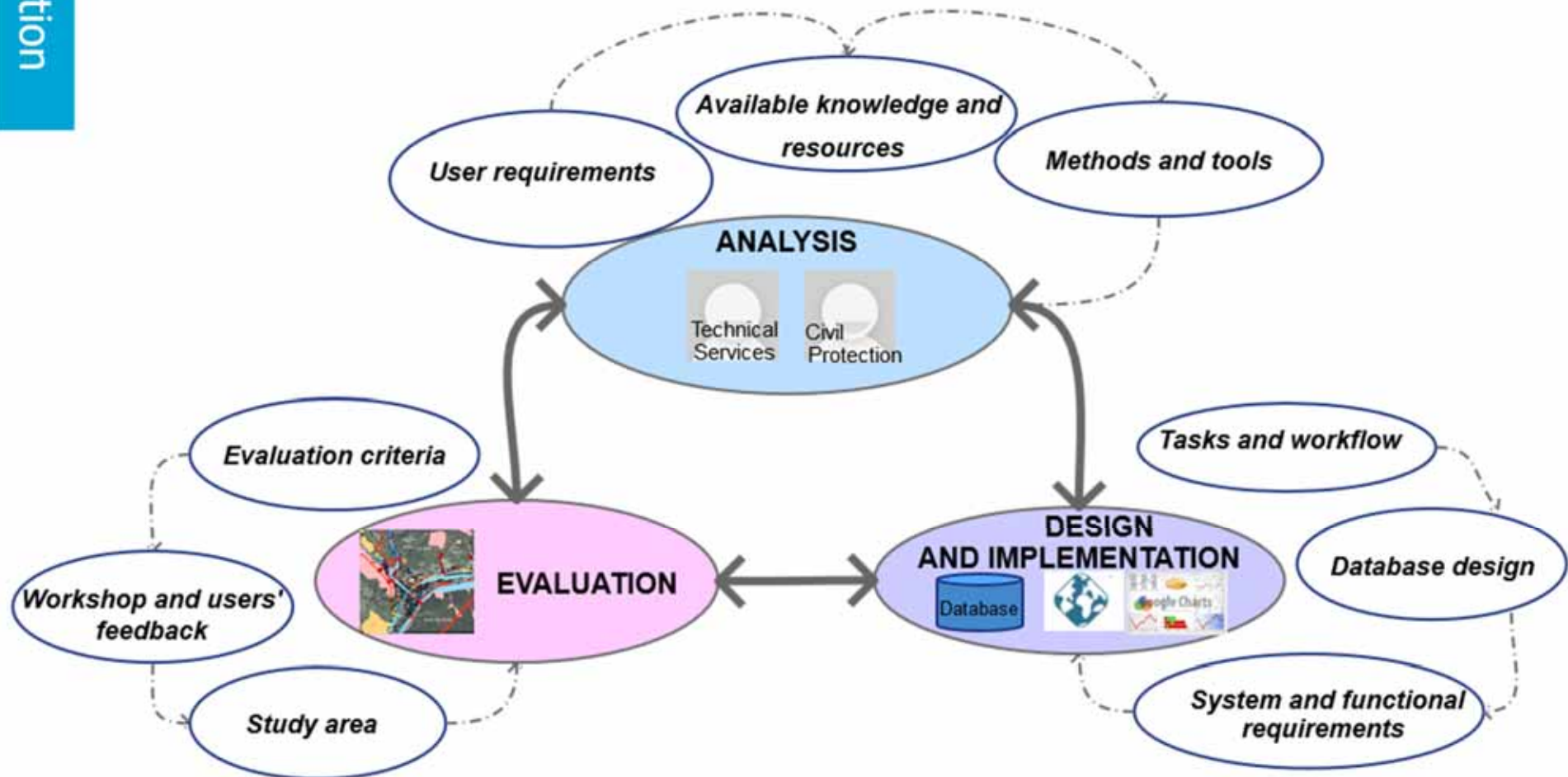
- Decision support methodology to evaluate the functional status

3. Quality of data collected by volunteers using a mobile application (Other study site)

- Advantages for the quality of data-collected

User centered-design approach*

(Citizen based-data for management of hydraulic structures)



*(adapted from Baroni et al. 2010)

Functional status

«Physical conditions of the structure that may affect the function type for which it was designed or built» (Uzielli et al, 2008)



Inspection form & data collection exercise (bridges and check dams)



- Registration questionnaire (Marie Charriere)
- 1 day Training for Learning Group
- 1 day of inspection test for Learning and Control Group (LG & CG)

A



- A1) Deviation of the stream flow in the spillway.
- A2) Status of the structure
- A3) Visibility of the basis
- A4) Status of downstream protection works.

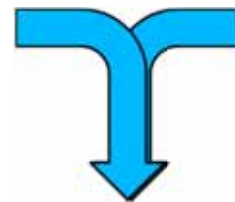


Evaluating quality of data-collected



Participant's Groups	All-V	T
	CG	
LG		«True Value»

Inspection tests in 6 structures

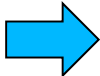


Assignment of ordinal scores to the rating scales

Accuracy, precision & Completeness (EPA, 1997)



Conclusions based on 11 technicians and 25 volunteers

1. Comparable performance but with a pre required range in precision. 

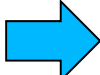
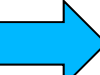

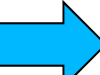
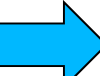
1

2

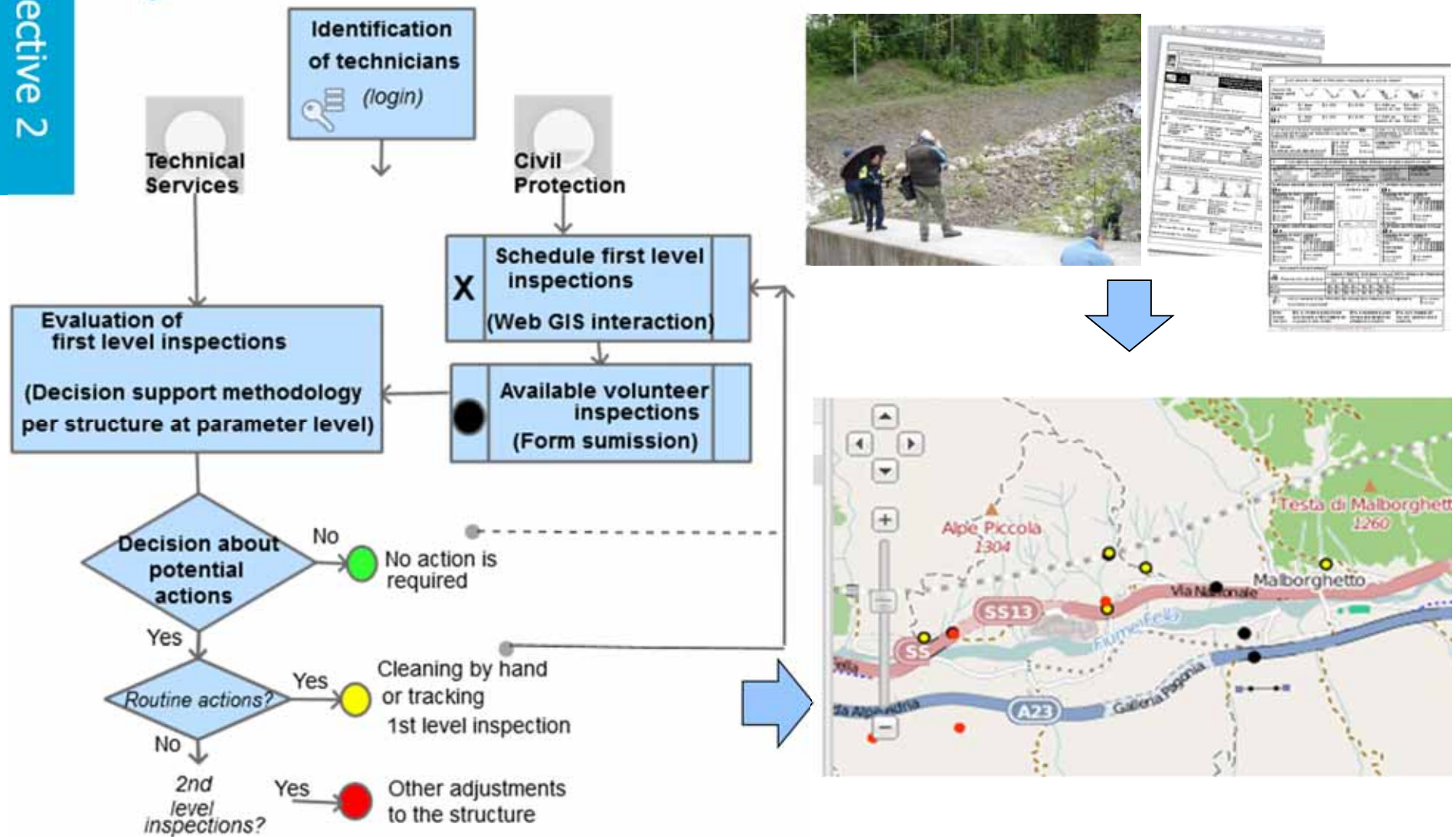
3

4

5

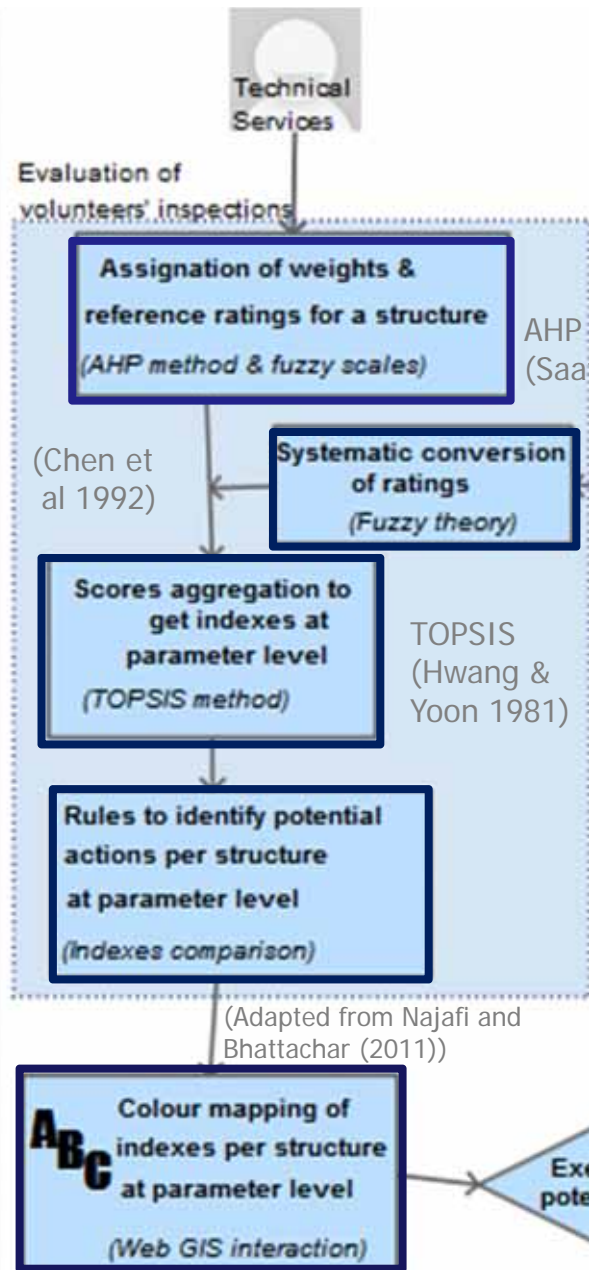
 "Un-specified answers (Us)".
2. Ratings should specify when water or sediment did not allow the assessment.  Completeness ratio (%)
3. Comments and geo-referenced pictures are still required.  
4. Prescreen potential problems.  Preliminary Indexes
5. Handle subjectivity of volunteers with Fuzzy logic theory.  Low-to-very-low

Evaluate volunteers' inspections for management of hydraulic structures

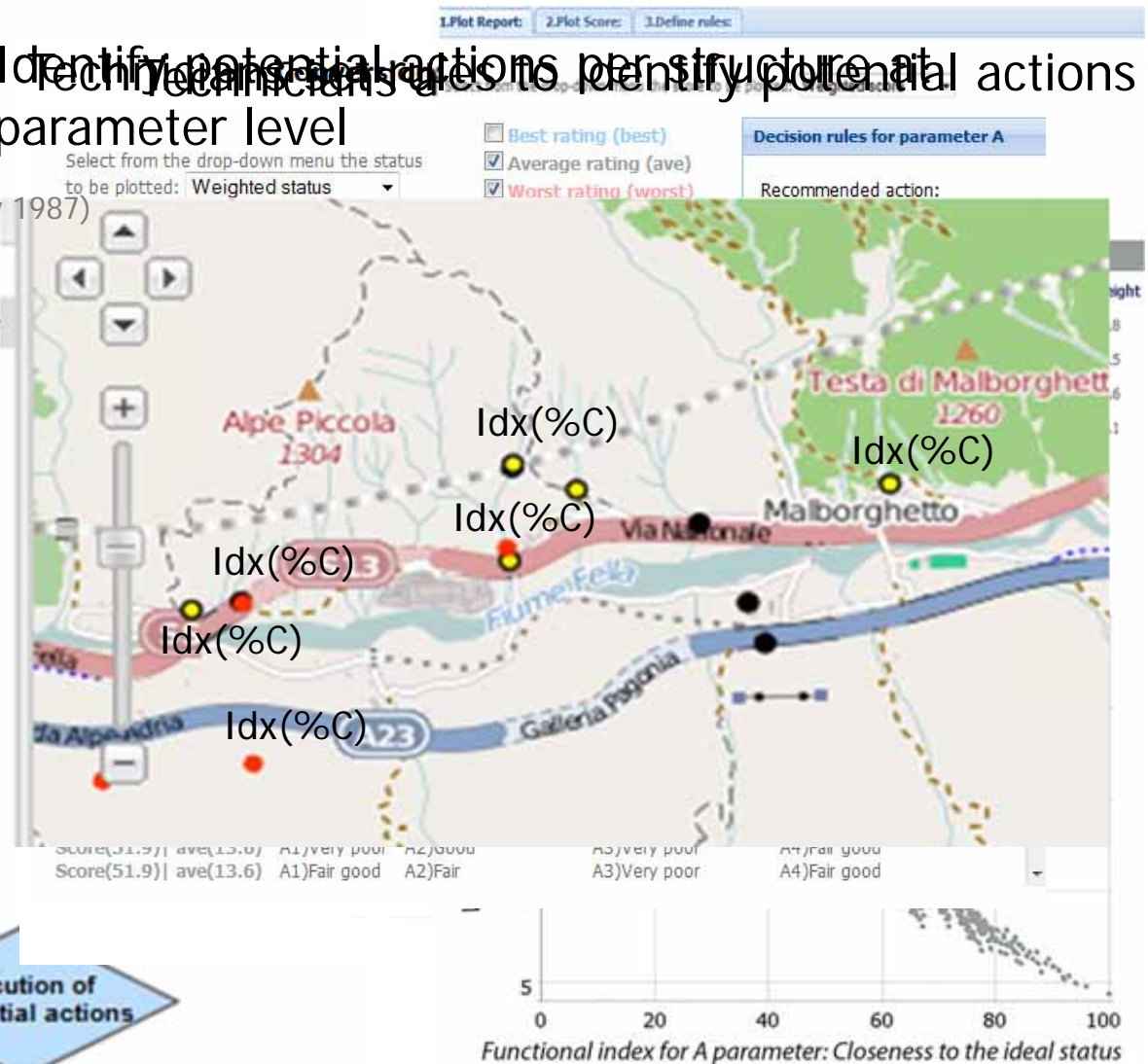


How to evaluate the functional status* of the structures?

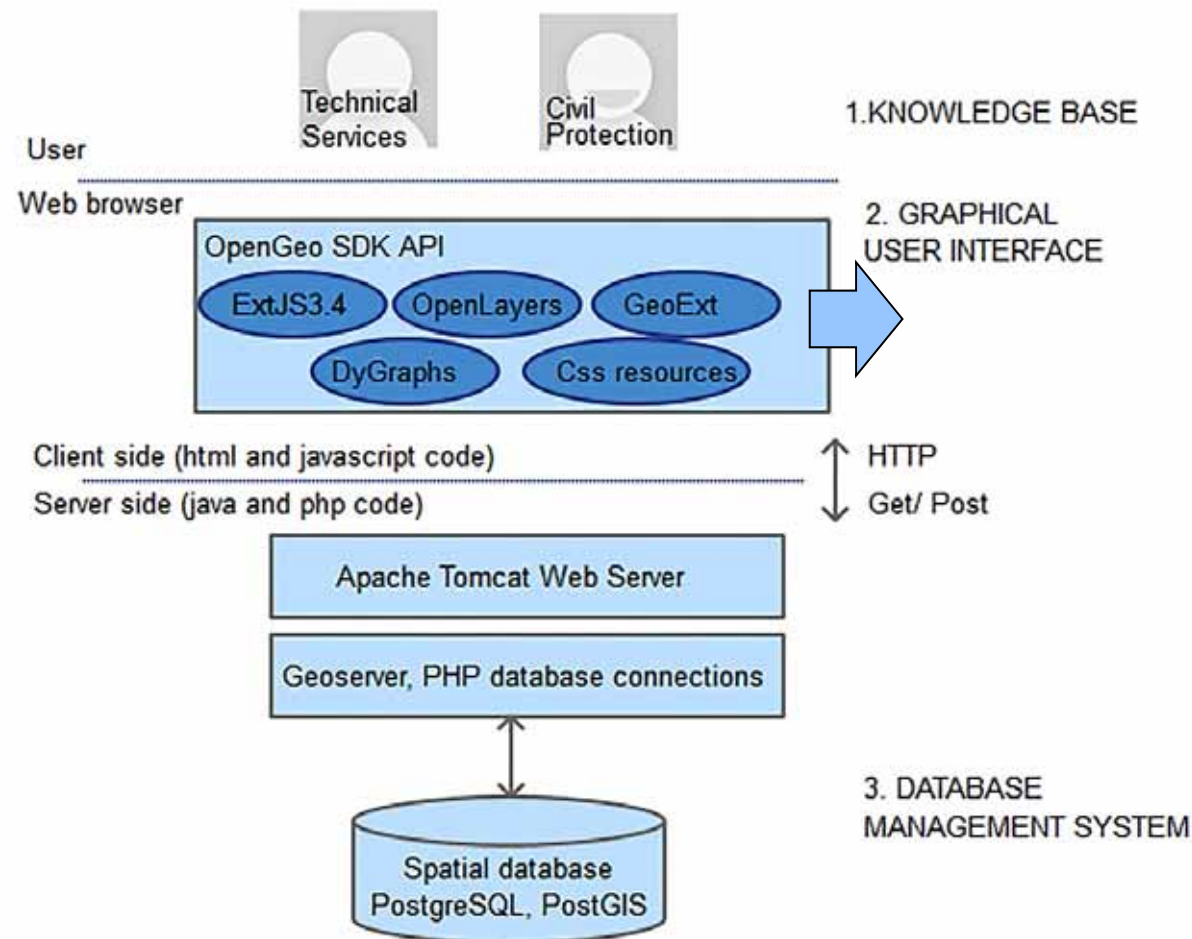
Identify potential actions per structural parameter level



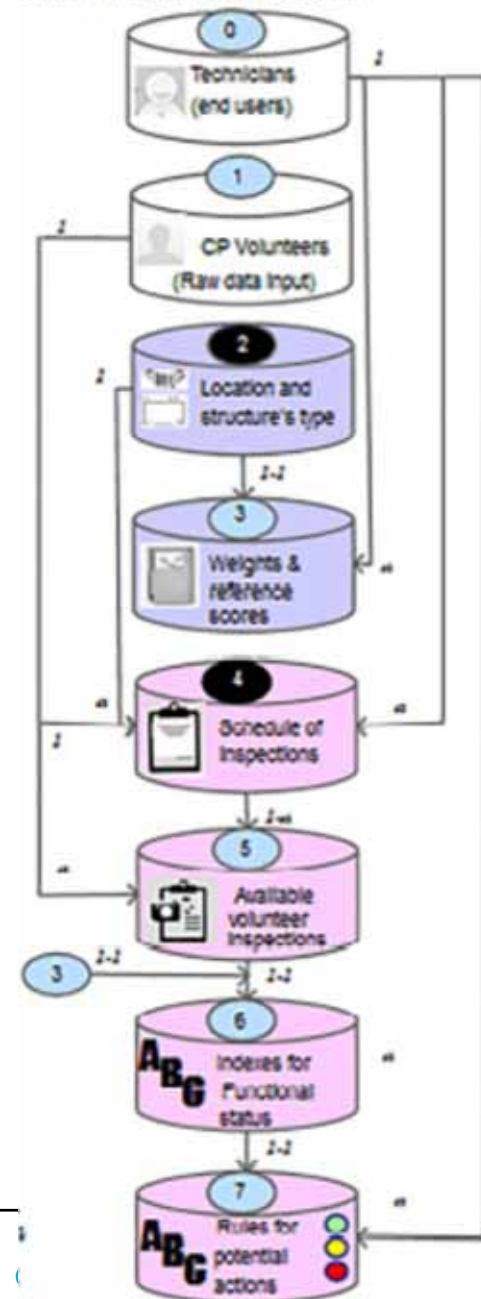
AHP
(Saaty 1987)



Prototype web-based tool



DATA BASE STRUCTURE AND ENTITY RELATIONSHIP DIAGRAM



Prototype web-based tool

Suite App - Mozilla Firefox

localhost:8080/changes-fella/app_changes-fella.php

Welcome juliettica@hotmail.com

Schedule First Level Inspections Evaluate First Level Inspections

Project Properties

Evaluate First Level Inspections

#	Parameter	Output
Step: 1. Select Structure:		
1.	A,B,C	
Step: 2. Set weights:		
Step: 3. Check reference ratings:		
Step: 4. Select report:		
Step: 5. Get Indexes for Functional status:		
Step: 6. Set rules for potential actions:		
Step: 7. Update colour mapping:		

Map Properties

Layers

Legend

t_cd_findex_b0

- Not scheduled
- Not available inspection
- Not evaluated
- Report evaluated

Map

Search for a location ...

Help 1. Select Structure:

The corresponding Help contents will be here.

cd_b_findex	cd_b_rule	cd_b_compl	rep_id_b_t_cd_r...	cd_refv_b_id_t...	codice
30.0	0	100.0	3		0300541800D04

Prototype web-based tool

Suite App - Mozilla Firefox

localhost:8080/changes-fella/app_changes-fella.php

Welcome juliettica@hotmail.com

Schedule First Level Inspections Evaluate First Level Inspections

Project Properties

Evaluate First Level Inspections

#	Parameter	Output
Step: 1. Select Structure:		
1.	A,B,C	030229610...
Step: 2. Set weights:		
2a.	A	⚠
2b.	B	⚠
2c.	C	⚠
Step: 3. Check reference ratings:		
3a.	A	⚠
3b.	B	⚠
3c.	C	⚠
Step: 4. Select report:		
Step: 5. Get indexes for Functional status:		
Step: 6. Set rules for potential actions:		
Step: 7. Update colour mapping:		

Map

Search for a location ...

1. Select Structure:

Help

Available structures

Responsible Agency: Geological Survey Structure: Select type...

Str.ID	Identification	Dimensions (meters)	Connected elements
1	0300330200D03		
2	0300591500D03		
3	0300541800D04		
4	0302296100D02		
5	0300594400D02		
6	0302049600D03		
7	0302306900D01		
8	0300590600D01		
9	0302247500D01		

Identification

Str.ID: 0302296100D02

Type: gabbionate

Material: Pietrame

Arrangement:

Display on map Query

Select Close

cd_b_index	cd_b_rule	cd_b_compl	rep_id_b_t_cd_r...	cd_refv_b_id_t...	codice
20.0	0	100.0	4		0302296100D02

zoter

Prototype web-based tool

Suite App - Mozilla Firefox

localhost:8080/changes-fella/app_changes-fella.php

Welcome juliattica@hotmail.com

Schedule First Level Inspections Evaluate First Level Inspections

Project Properties

Evaluate First Level Inspections

#	Parameter	Output
Step 1. Select Structure:		
Step 2. Set weights:		
Step 3. Check reference ratings:		
Step 4. Select report:		
Step 5. Get Indexes for Functional status:		
5a.	A	⚠
5b.	B	⚠
5c.	C	⚠
Step 6. Set rules for potential actions:		
6a.	A	⚠
6b.	B	⚠
6c.	C	⚠
Step 7. Update colour mapping:		
7a.	A	⚠
7b.	B	⚠
7c.	C	⚠

Map

Search for a location ...

Help

The corresponding Help contents will be here.

- ⬆️ No action is required
- ⬆️ Cleaning by hand or tracking 1st level inspection
- ⬆️ Other adjustments to the structure

cd_b_index	cd_b_rule	cd_b_compl	rep_id_b_t_cd_r...	cd_refv_b_id_t...	codice
100.0	0	100.0	1		0300330200D03

Dis

Evaluation workshop: (Inspection tests in 6 structures)*

(Abitato Cucco, Malborghetto)



*(Hussin et al. 2014)

** To be confirmed

Participants' Groups



CG
x 5



LG
x 10

Day 1: Inspection
Day 2: Web-tool

1 day

2 days of involvement



**



**Expectation's
questionnaire**

IdxA

IdxB

IdxC

IdxA

IdxA

IdxB

IdxB

IdxC

IdxC

WEB-TOOL

Same
weights/
structure

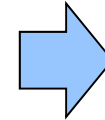
**Expectation's
questionnaire**



**Satisfaction's
questionnaire**

Evaluation criteria

1) How effective are the indexes to represent the functional status of the structure?



2) How can the methodology and the tools being improved?



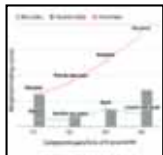
- Transparency:

Information about decisions and decision-making procedures.

(de Fine Licht 2014)

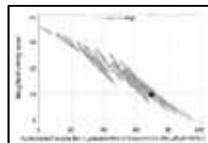
- Uncertainty*:

Changes in the indexes induced by changes in rating scores.



- Sensitivity*:

X changes in the rating scores that are required to get a Y index.



Use feedback of participants to:

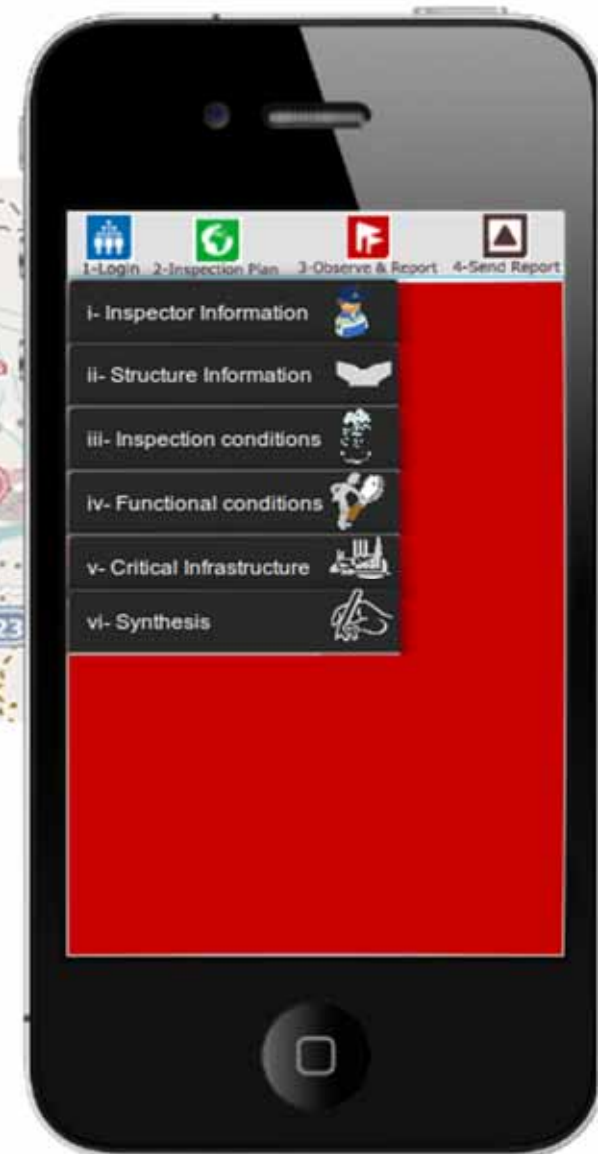
- Interpret results
- Improve methodology and tools

**DEFINITE tutorials

Advantages on quality of data-collected using a mobile applications*

- Accuracy & Precision:
linguistic rating scales.
- Completeness:
% unspecified answers
- Representativeness & Comparability:
Embedded glossary and tag of pictures

* Looking for internship funding & ICT support.
Potential collaboration WeSenseIt Project to inspect dikes in NL.



Ch 05: Adapting risk management strategies to future changes

1. Emergency preparedness and response strategies in Europe – an overview: assessment of organizational capacity*

- Theoretical & Lit. Rev.

2. The role citizen of science projects to support risk management strategies (5 pages)

- Theoretical & Lit. Rev.
- Example Italian case study.

3. The role of ICT- and mobile-based tools to coordinate prevention and preparedness activities (10 pages)

- Theoretical & Lit. Rev: Need for User – centered design approach
- ICT tools CHANGES study sites (e.g. PETER, SIDS, ARCUS)
- Examples Italian case study and other study sites for coordination and support of ICT

So far..

Achievements

- Conference Papers:
 - FloodRisk 2012
 - Hydroinformatics 2014
- Journal Papers:
 - Submitted Quality of volunteers' data
 - On progress DSS methodology
 - Co-Submitted on Coordination preparedness & prevention

Challenges

- Stakeholder involvement is a time consuming approach.
- Socio-technical approach required volunteers involvement & support of ICT tools.
- Replicate the methodology in other study site/hydraulic structure.

Thanks for
your attention!

