An Ecosystem of Citizen Observatories for Environmental Monitoring

WeObserve Roadshow Scotland Event January 2021

The WeObserve project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 776740

Table of Contents

Executive Summary

The rising trend in citizen science has led to the development of Citizen Observatories (COs) for environmental monitoring. Citizen Observatories are community-based environmental monitoring and information systems, enabling the participation of citizens in environmental monitoring and governance. The WeObserve project improves coordination between existing COs and related regional, European and international activities. One aspect of the project, the WeObserve Roadshow events, brings together local authorities, emergency managers, regional/national policy makers, scientists and experts.

The WeObserve Scotland Roadshow was the fourth such event, and took place online on 9 February 2021. The Roadshow took place under the theme: "Citizen Observatories for flood management". Participants (who represented local authorities, emergency managers, regional/national policymakers, scientists and experts) considered and discussed the potential of Citizen Observatories in their own context of emergency (flood) management and mitigation and what comes into play when implementing a Citizen Observatory.

The Roadshow began with presentations on the current state of flood risk management in Scotland and the citizen observatory in the flood risk management of the Brenta-Bacchiglione river basin. In small-group discussions, key themes were highlighted by participants relating to: the potential of COs in flood management; the social and technical benefits offered by COS; and the challenges of setting up COs. These themes (and the broader discussion within the groups) formed a key platform for the panel discussion at the end of the Roadshow.

1 Introduction

The rising trend in citizen science has led to the development of Citizen Observatories (COs) for environmental monitoring. COs have been supported by the European Commission in several research and innovation programmes. The WeObserve project improves coordination between existing COs and related regional, European and international activities. Through various tasks, activities and a series of events the project aims to raise awareness, improve acceptability and ensure sustainability of COs across Europe and globally.

1.1 Background and Context

WeObserve Roadshow events bring together local authorities, emergency managers, regional/national policy makers, scientists and experts. These events are showcasing how the Alto Adriatico Water Authority (AAWA) effectively uses a citizen observatory in the flood risk management of the Brenta-Bacchiglione river basin. Based on this experience, participants can consider and discuss the potential of citizen observatories in their own context of emergency management and mitigation and what comes into play when implementing a citizen observatory. The WeObserve Roadshow events allow participants to learn about the basic principles of citizen observatories, providing participants with hands-on experience of citizen science and citizen observatories and demonstrating how decision makers are using the information provided by citizens.

The WeObserve Scotland Roadshow was the fourth such event (following the Vicenza, Barcelona and Slovenia Roadshows), and took place online on 9 February 2021. The Roadshow took place under the theme: "Citizen Observatories for flood management", and as such featured presentations and discussions centred on the role of COs in flood management and prevention. 38 participants were in attendance for the Roadshow.

The WeObserve Scotland Roadshow aimed to:

- Demonstrate the implementation of a citizen observatory for flood risk management;
- Discuss the elements that come into play when implementing a Citizen Observatory;
- Explore the potential of Citizen Observatories in the context of emergency management in Scotland.

2 Roadshow Programme

The event began with a brief welcome and introduction, before presentations from Andrew Black and Martina Monego, focusing respectively on flooding in Scotland and the work of a Citizen Observatory in the Brenta-Bacchiglione river basin.

The participants were then divided into three groups, which rotated between three breakout rooms. Each breakout room focused on a different question relating to Citizen Observatories:

1. *In what ways could a Citizen Observatory help you address your information needs related to flood management?*
2. *What (else) would you like to get out of a Citizen Observatory (from a technological and/or social perspective)?*
3. *Which aspects of Citizen Observatories could be challenging, difficult or disadvantageous?*

The discussions in each of these breakout rooms was captured using the online whiteboard tool Miro. Following three rounds of 15 minutes in the breakout rooms, participants then returned for the plenary, which focused on the key points raised during the discussions. These points were then further discussed during a panel discussion between Uta Wehn, Michele Ferri and Andrew Black. The Roadshow then ended with a brief recap.

Time	*Item*	*Presenter*
10.00-10.20h	Welcome and introduction	Mel Woods (University of Dundee)
10.20-10.50h	Presentation: Setting the scene	Andrew Black (University of Dundee)
10.50-11.20h	Presentation: Demonstration of a Citizen Observatory	Martina Monego (AAWA)
11.20-12.05h	Breakout sessions	Led by - Mel Woods, Raquel Ajates and Saskia Coulson (all University of Dundee)
12.05-12.50h	Plenary discussion on CO implementation: social and technological dimensions	Reporting back - Mel Woods, Raquel Ajates and Saskia Coulson (all University of Dundee) Panel Discussion - Uta Wehn (IHE Delft), Michele Ferri (AAWA) and Andrew Black (University of Dundee)
12.50-13.00h	Recap and closing of the Roadshow event	Mel Woods (University of Dundee)

3 Session Opening

The first section of the Roadshow consisted of the Welcome and Introduction, followed by two presentations: i) Setting the Scene of flood management practices in Scotland, followed by ii) a demonstration of a Citizen Observatory in the Brenta-Bacchiglione river basin.

3.1 Welcome and Introduction

The Welcome and Introduction was given by Professor Mel Woods (University of Dundee). She introduced the concept of COs, and gave the examples of COs within GroundTruth2.0, and the GROW Observatories. The WeObserve project was then introduced with its objective to bring four CO projects to demonstrate the economic and social benefit of involving citizens in environmental monitoring.

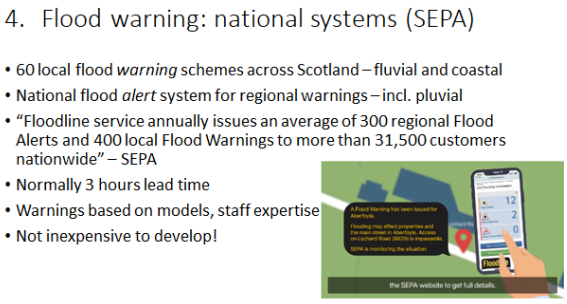
A Tour de Table then took place, with the 38 attendees briefly introducing themselves in turn. Various sectors and organisations were represented, including emergency managers across all national agencies, Scottish Government, local authorities, the UK Centre for Ecology and Hydrology, the British Geological Society, NatureScot, and scientists from the Scottish Alliance for Geoscience, Environment and Society (SAGES) from the Universities of Abertay, Dundee, Edinburgh, Glasgow and St Andrews. Communities at risk from flooding (Alyth, Scotland) were represented, as well as the local flooding initiative Rivertrack (http://www.rivertrack.org).

3.2 Setting the Scene

Andrew Black (University of Dundee) set the scene of flood management, forecasting and prevention in Scotland (see Appendix 1 for presentation slides). Key historic events were highlighted, including the Tay flood (Jan 1993); Glasgow flood (2002); and the East of Scotland flood (2020).

His presentation highlighted the current organisations involved in flood risk management in Scotland - including the central funding role of the Scottish government and the flood warnings and risk assessment by SEPA. Andrew Black further discussed the impacts of the flood warnings offered by SEPA, highlighting their role in reducing adverse impacts (tangibly and intangibly) and increased peace of mind for residents.

The history of citizen action in flood monitoring was further highlighted by the discussion of the Citizen Science Snow Survey. This survey ran from 1946-92, and was based on volunteers measuring snow and rainfall across Scotland. It was one of the earliest examples of such citizen involvement.



Following the presentation, a brief Q&A session was held:

Q - Our community is in a PVA. How do we find out what impact climate change will have on our flood risk?
A- SEPA provide some useful information for PVAs, their website might be a good starting point: https://www.sepa.org.uk/environment/water/flooding/developing-our-knowledge/#National_Flood_Risk_Assessment

Q - How do we target the community and scale-up?
A - By using knowledge, potential and knowledge in the communities, in both a top-down and bottom-up manner. We need to ask communities what is needed, and provide them a bottom-up way. We need to offer them ownership and encourage them to make bottom-up system empowering communities. There is a lot of potential.

Q - Are citizen-scientists always limited to gathering data, or can they/have they played a role in analysing the data, designing the project itself etc?
A - WO partners have emphasised that we should not limit citizens to only data gathering, but that they can be involved in all parts of the process. There are lots of stages in processing data from cleaning to full scale analysis, so different levels of engagement are possible.

Q - Local communities often offer a variety of causes and solutions to flooding. As organised citizen scientists do you think understanding will be enhanced and solutions better informed?
A - Dialogue is very important. Floods do not happen often and in reality are incredibly difficult to predict (often impossible). Confidence and accuracy are important.

3.3 Demonstration of a Citizen Observatory

A presentation with a concrete demonstration of a citizen observatory was then given by Martina Monego (AAWA) (see Appendix 2 for presentation slides), focusing on the experience of Brenta-Bacchiglione, an Eastern Alps river basin (Italy).

The flood risk management plan (FRMP) in this area considers hazard, exposure and vulnerability, and the work of the CO here is considered as a good example. A video on the Citizen Observatory of Water in the Brenta-Bacchiglione basin developed by the WeSenseIt project was then shown.

The role of COs as flood mitigation measures was highlighted following the video. Citizens (or civil protection teams) monitor the territory and can gather information from social/physical sensors and early warning systems. Citizens are at the core of the alert system. They must be involved in environmental monitoring and encouraged to actively participate. A key task for COs is to hold education campaigns for technicians and citizens.

The key advantages of the implementation of a CO were highlighted:

- Availability of environmental data -spatial and temporal
- Reliable modelling tools - supported by a larger and widely distributed data sets
- Efficient city planning and management of emergency
- Public awareness - reducing vulnerability and increasing risks awareness
- COs can also generate economic value.
- COs are expected to improve early warning systems, emergency protocols and reduce response times involving citizens across.

Following the presentation, a brief Q&A session was held:

Q - Who were the decision makers for deciding the information to gather and share from the citizens? Is the information (descriptors, scale, accuracy, etc.) changing depending on the decision makers?

A - Mayors and civil protection department are often involved. Platform has different functionalities depending on end users. Some information is already co-defined (e.g. water levels), these are important parameters for predictive models. The water level of flooding, and the location of the flooding are also important - mayors can only view their local information, and information can only be viewed in maps by citizens after approved by authorities.

Q - Was the CO an initiative of the flood management authorities rather than of the community due to the underlying information support system needed?

A - The project was started with the municipality authorities, but also with citizens (e.g. civil protection volunteers). Educational activities were also experimented with by professors and students.

4 Group Discussions

Participants were then split into three breakout rooms each discussing one of three key questions related to Citizen Observatories. After 15 minutes, each group rotated to the following breakout room. The discussion was captured using the online whiteboard tool Miro. This tool was new to most of the attendees, who took this opportunity to become familiar with this novel online technology for collaboration

4.1 In what ways could a Citizen Observatory help you address your information needs related to flood management?

In this Breakout Room, participants discussed the various ways in which Citizen Observatories can help provide information relevant for flood management. Six key themes were identified by this group (see Appendix 3 for the Miro board):

Engagement

The potential benefits of engagement with stakeholders and community offered by a CO approach was at the heart of discussions. It was widely accepted that there was potential for improvements in flood management services and relationships to those at risk. They ranged from partnership formation where communities could help assess risk and quickly respond in an emergency scenario to increasing understanding pre-event through forward planning, and post event in better understanding of the real impact on communities.

Prioritisation and Mitigation

Information and data provided by the CO can aid prioritisation of flood alleviation efforts, not only providing data on prediction but also the aftermath. There is potential to use novel data sources, such as social data, to understand who is impacted the most by taking in metrics that go beyond location and proximity to the source. These may also help identify new mitigation measures, NBS and land provision for this, and also take into account the impact of carbon costs and joint social costs of clean-up.

Trust and Scale

Data provided by communities can help provide information at different scales and address hyper local decision-making, providing the potential to develop more effective flood alert systems. In addition, official data and services can be verified at community level, thus giving the opportunity for better services, where information is understood and trusted.

Data Sources

Community provided data can fill the gap where formal government services are not provided. It can provide new opportunities for communities to work together, and can particularly bring communities together that share risks. There is also potential to explore unconventional data sources, such as new media, consider different granularities, and explore unconventional data sources that may in time be accepted more widely.

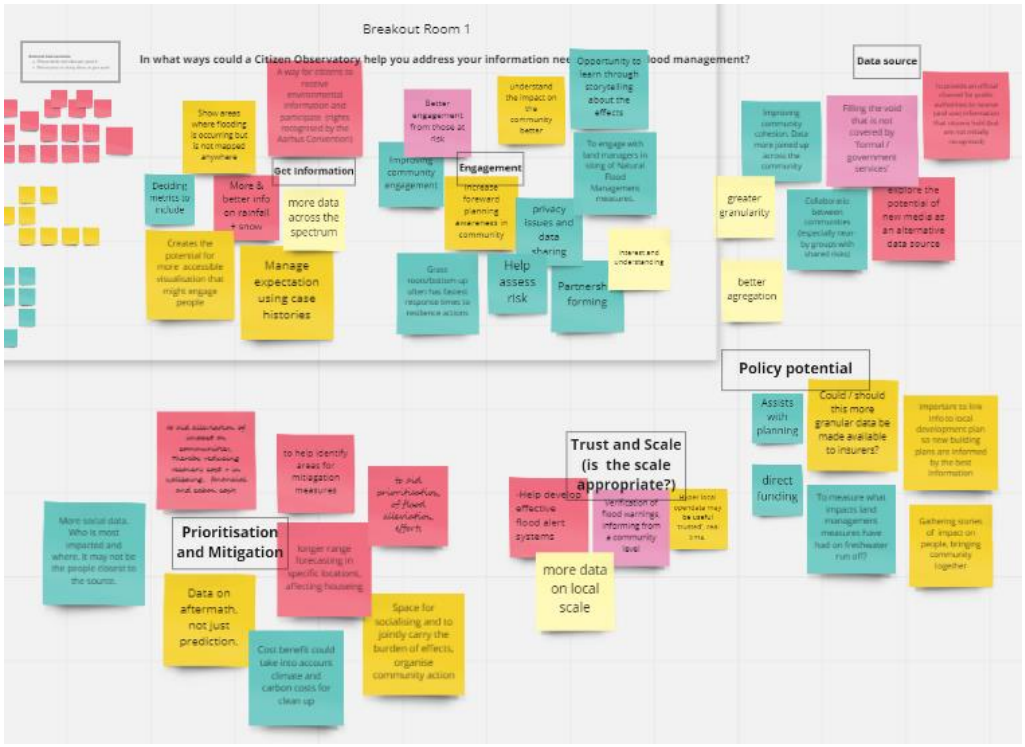
Get Information

There are opportunities to address data and service gaps in novel ways, by providing data visualisation in more appealing, understandable or engaging ways. Visualisations can also provide information where

flooding is occurring but not mapped anywhere else, and can also provide additional information including case histories, rainfall and snow and enable communities to decide what information to include.

Policy Potential

With improved collaboration on data provision, information and services there is potential to inform policy, assist with planning, direct funding and land management. The benefits could include better informed local development plans and action. There are questions about data privacy and ownership, and questions about granular data that could be taken up by insurance companies with unanticipated outcomes.



4.2 What (else) would you like to get out of a Citizen Observatory (from a technological and/or social perspective)?

In this Breakout Room, participants focused on potential social and technical outcomes of Citizen Observatories. Four key themes were identified within this group (see Appendix 4 for the Miro board):

Integration

Integration was perceived as a key benefit and ambition for COs from different perspectives: from data integration (interoperability) to integration of projects and objectives to increase relevance for and interest from communities. For example, a conservation project for protecting pollinators could also have flooding-related objectives.

Detailed confidence levels in warnings

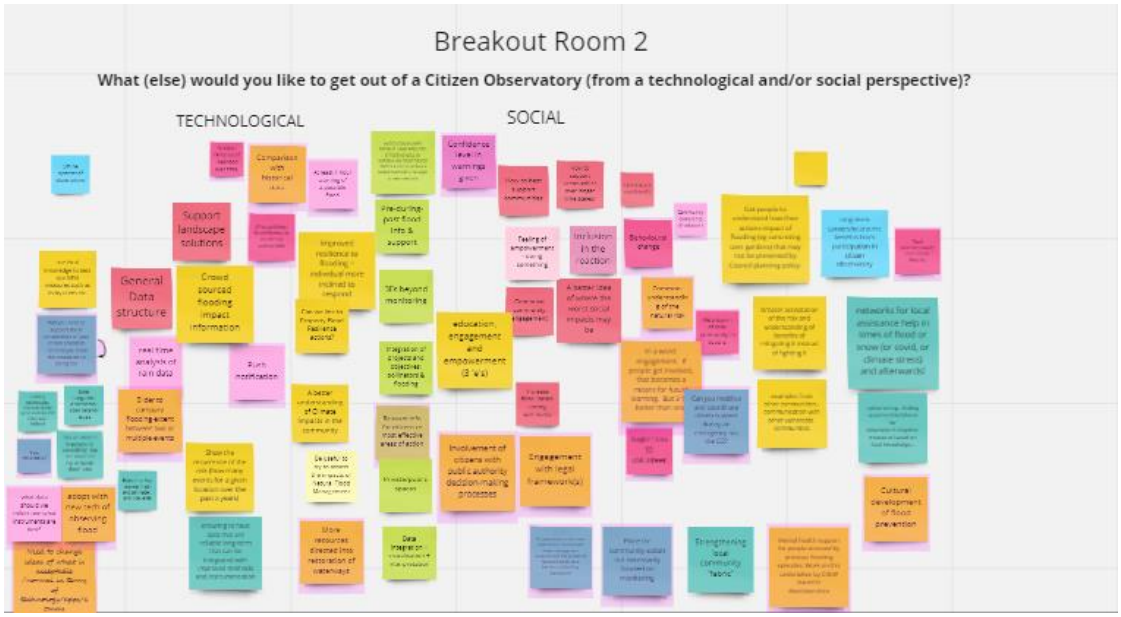
Providing confidence levels when issuing warnings can avoid warning-fatigue in communities (e.g. citizens ignoring a warning because previous warnings with low confidence levels not specified as such did not have any adverse effects). The use of historical data in combination with test methods for new data, as well as being open to test new methods in parallel were solutions put forward to increase data confidence levels.

The 3Es: Education, Engagement and Empowerment

The 3Es are seen as crucial for successful and sustainable COs. Data and technology literacy are key. The 3Es approach is relevant before, during and after flood events, e.g. providing mental health support for people stressed by previous flooding episodes (case study: CREW team based in Aberdeenshire), or farmers supporting other farmers with feed for cows when harvests have been lost. Fostering a community fabric is considered to be a remit of COs, to enable communities to organise around local environmental issues beyond data flooding or data collection for the CO.

Useful data formats and accessible technologies

Prioritisation of enabling technologies characterised by good usability and information feedback. Data visualisation is important for accessibility - but it is also important not to 'dumb-down' data. This theme links to the previous one on the 3Es, as training opportunities for communities to understand and interpret their own data are considered as core activities of a CO.



4.3 Which aspects of Citizen Observatories could be challenging, difficult or disadvantageous?

In this Breakout Room, participants focused on potential difficulties relating to Citizen Observatories, at all stages of the process. Four such aspects were highlighted during the discussion (see Appendix 5 for the Miro board):

Engagement

Challenges surrounding engagement and participation in citizen science cover areas, such as, ensuring initial participation overcomes the general fatigue of participating in an initiative that tries to mitigate or resolve flooding risks unsuccessfully. There are also challenges in engaging citizens before and during a project to ensure that all voices are heard and that participants are motivated over long periods of time. Difficulties with participation can be linked to public and media perception of a project and how to mitigate issues around negative outside influences.

Legacy

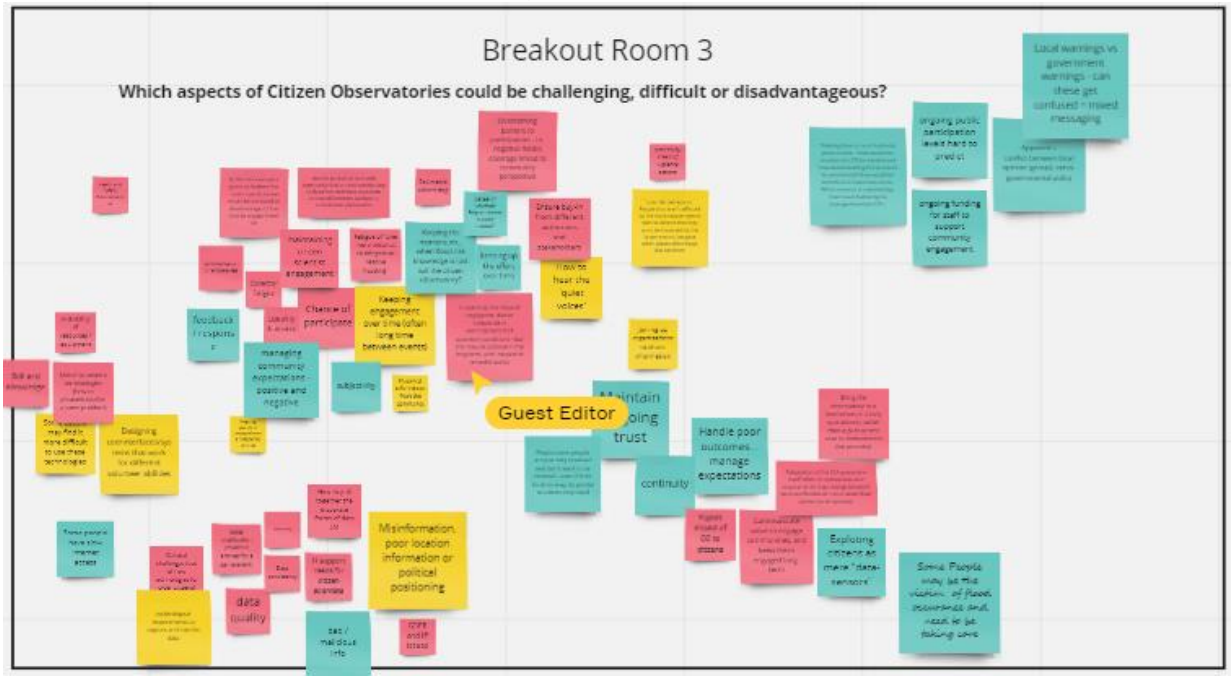
Ensuring that historical knowledge is available for public access is a critical challenge. For flood risk and disaster management, too often projects are reactive and many are built from scratch without the proper knowledge of previous initiatives and information. There is a lot of existing knowledge both in archival material and also the local people which should be tapped into and captured for open-access.

Complications with data

Data quality, consistency and accuracy are key concerns when considering a citizen science approach. In addition to the skills required for using devices and platforms for data collection, which could be caused by issues around cultures in certain groups (e.g. the uptake and use of new technology for older citizens). Having IT support for citizens is crucial, as is a strategy and the correct methods for pulling together the disparate forms of data.

Connecting actors and organisations

Disparate and various information often create a culture of mixed messages and confusion. This can be seen in situations where government warnings do not reflect the situation in local areas. The crux of this issue can be found in a greater schism where diverse actors and organisations do not have the means or pathways to share information and knowledge.



5 Plenary discussion

The leads from the three Breakout Rooms briefly gave feedback on the discussions from their rooms. Each lead highlighted the key topics that were touched upon. Following this feedback, a short poll of the participants took place:

Given your local circumstances, which approach to setting up a Citizen Observatory do you think would be most appropriate?

1. *Relevant authorities, technical and scientific experts design it, then they reach out and mobilize the public in data collection and other Citizen Observatory activities*
2. *Build on existing public-private dialogues or platforms and expand these towards a Citizen Observatory*
3. *Start with local movements/ civil society organisations, then see how authorities and experts can come into play to form the Citizen Observatory*

About 52% of participants voted for Option 3, 36% for Option 2, and the remainder for Option 1.

Following the poll (and focusing on its results), a panel discussion took place with Uta Wehn (IHE Delft), Michele Ferri (AAWA) and Andrew Black (University of Dundee).

Michele Ferri began the discussion, suggesting that, based on his experience, the process behind setting up a Citizen Observatory has to start from authorities. If not, it is difficult to involve them in the process later. Once authorities have been involved, citizens can then be included. However, he stressed that it is important to also bring scientists and citizens together - scientists can also contribute significantly to CO movements.

Uta Wehn suggested that, while it is crucial to have authorities on board, it is not a guarantee for success. Sometimes, the authorities may want to get involved but not the citizens; alternatively, early enthusiasm for a CO by authorities can reduce if a CO affects their own decision making that the authorities cannot (yet) accommodate.

It was then commented by a participant that a sense of community ownership is important in engaging the community and maintaining momentum. Mel Woods highlighted that the GROW COs considered this, and released open data. This allowed citizens ownership of the data. Uta Wehn indicated that what drives community ownership, engagement and momentum will differ from one CO to another and needs to be carefully considered (e.g. data in one CO, greater accountability and improved stakeholder relationships in another CO).

Michele Ferri then discussed the challenge of convincing the authorities of the use of COs. In many case studies, it is clear that the theory of COs appears attractive to authorities, but they do not do anything to apply the concept in real life. They need to be convinced to be part of the process.

Andrew Black rounded off the discussion by highlighting the scale and challenge posed by flooding, and potential ways in which COs can help address this issue. He was struck by the scale of flooding and the number of residents and houses affected. Sometimes, however, there are also small communities that want to help their situation. By setting up the COs, citizens can have a big impact.

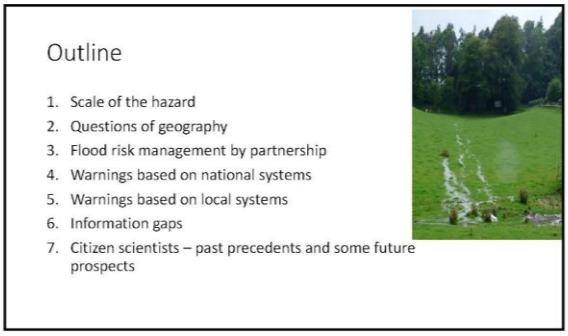
A brief recap of the session was then given by Mel Woods, before the Roadshow was formally closed.

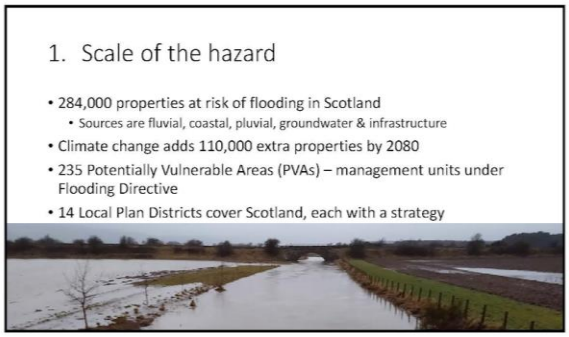
6 Conclusions

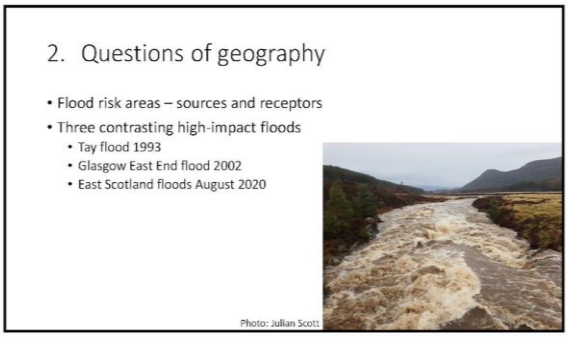
The WeObserve Scotland Roadshow was the fourth such event, and took place under the theme: “Citizen Observatories for flood management”. 38 participants were in attendance for the Roadshow.

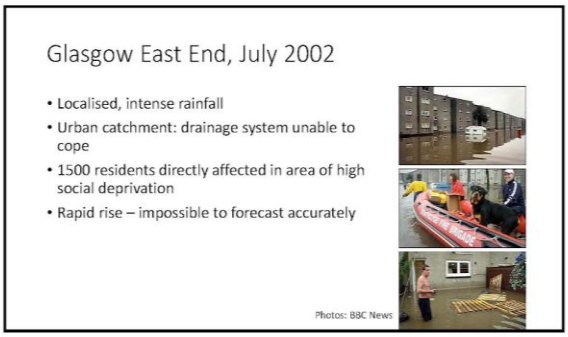
The WeObserve Scotland Roadshow allowed participants to understand the potential of COs in flood risk prevention. With such a wide spread of sectors represented, and with a deep understanding of the concepts among the participants, lively discussions were also had throughout the Roadshow, particularly in the Breakout Rooms and during the plenary session. The themes identified in the discussions, and further discussed throughout the Roadshow are of importance to understanding the role that COs can play in supporting flood management in Scotland.

Appendix 1: Setting the Scene



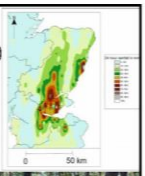






East of Scotland floods, August 2020

- Localised convective rainfall cells
- Mostly small, rural catchments <20 km^2
- Impacts arguably greatest when combined with unstable slopes, affecting infrastructure
- Rapid rise



Aerial image: RAIB

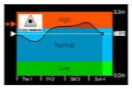
3. Flood risk management by partnership

- Flood risk management involves key partners working together
- Policy, central funding: Scottish Government
- Flood warnings, risk assessments, coordination: Scottish Environment Protection Agency (SEPA)
- Watercourse assessment and maintenance, emergency assistance: local authorities
- Drainage infrastructure: local authorities and Scottish Water
- Planning control: local authorities
- Flood alleviation: local authorities, owners & occupiers
- Information: residents, SEPA, local authorities

4. Flood warning: national systems (SEPA)

- 60 local flood *warning* schemes across Scotland – fluvial and coastal
- National flood *alert* system for regional warnings – incl. pluvial
- "Floodline service annually issues an average of 300 regional Flood Alerts and 400 local Flood Warnings to more than 31,500 customers nationwide" – SEPA
- Normally 3 hours lead time
- Warnings based on models, staff expertise
- Not inexpensive to develop!

5. Flood warning: local systems - RiverTrack



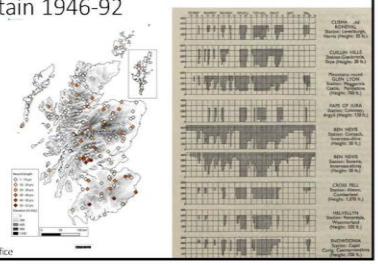
Benefits of flood warnings

- Reduced adverse impacts
  - Tangible losses
  - Intangible losses
- Peace of mind
- Increased resilience
- Opportunity to "do something"

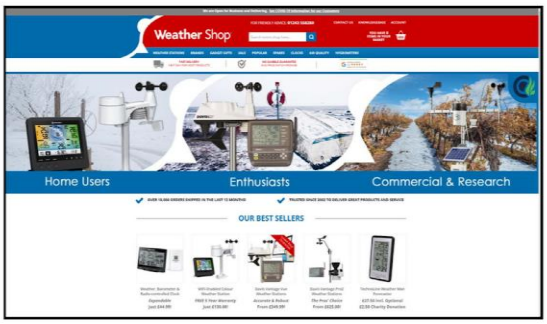
6. Information gaps

- Impossible to have all the information everywhere – floods are complex
  - Rainfall patterns are uneven
  - Timing of rainfall varies between events
  - Snowmelt is difficult to quantify – especially how much
- Scope for more and better information on *causes, character* and *impacts* of flood – to help real-time forecasting, model calibration and risk assessment
- Forecasting especially needs to know 'how big', 'how soon' and 'how confident'?
- Particular challenges for small communities presently lacking support

7. Citizen scientists and the Snow Survey of Great Britain 1946-92



Images: Spencer *et al.* (2014), Met Office



7. Citizen scientists and the Snow Survey of Great Britain

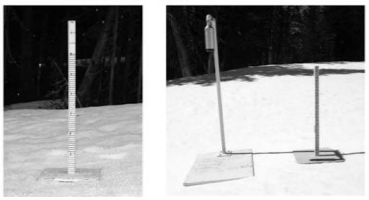


FIGURE 1.3 Left: Snow board graduated in centimeters. Right: Automated snow board and snow board graduated in inches. (P. Tom Leonard)

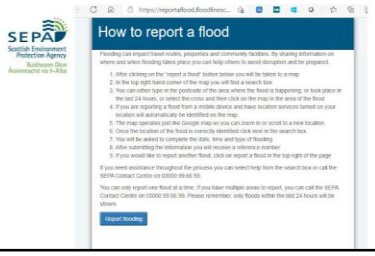
Photos: American Avalanche Association

7. Citizen scientist opportunities

- Alistair: "Over the past few weeks what precipitation we have had has **mainly turned to ice**. Our back lawn had a thick sheet over it for a couple of weeks, our own glacier, that has only finally gone with last nights rain. **The ground has been frozen to about 100mm** which meant that any precipitation or thaw simply turned to ice. Over past few days the **thaw and precipitation formed lakes that struggled to drain**. This morning there are signs of softening and better drainage."

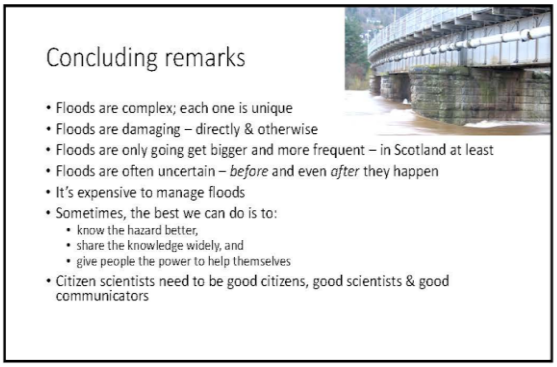
Doesn't this level of perceptiveness challenge us to think what a flood forecasting system could or should be like?

7. Citizen scientist opportunities

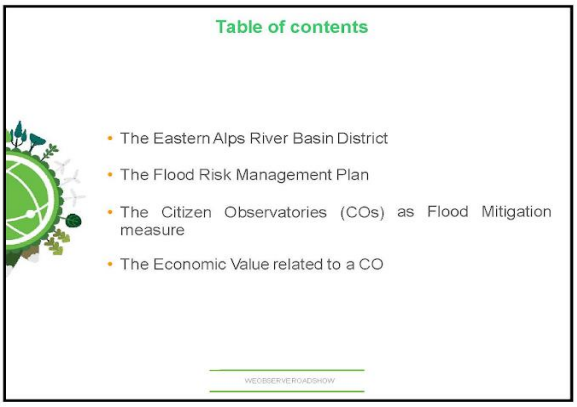


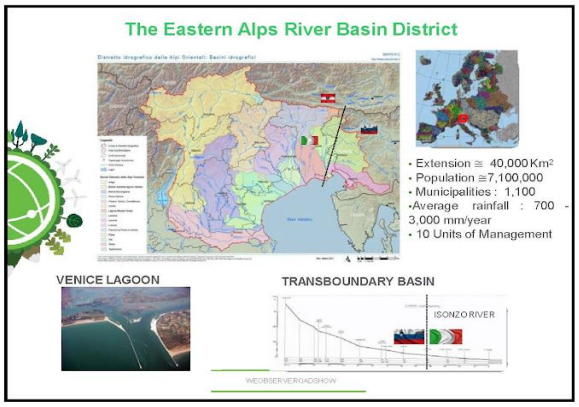
7. Citizen scientist opportunities

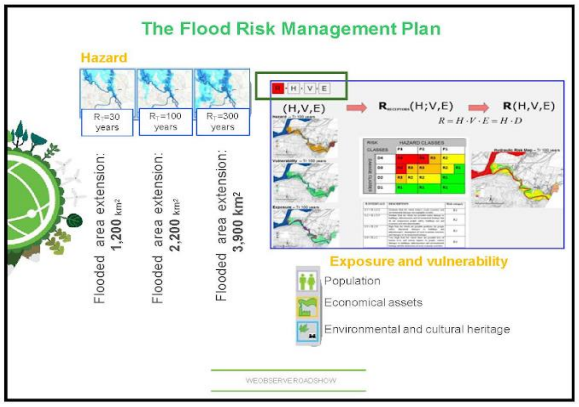
- More rainfall measurement – NB cost constraints
- More water level monitoring – especially at good hydrometric sites
- More snow depth monitoring
- More advice needed to support the above
- More power to communities
  - Monitoring as basis of community initiatives for sel

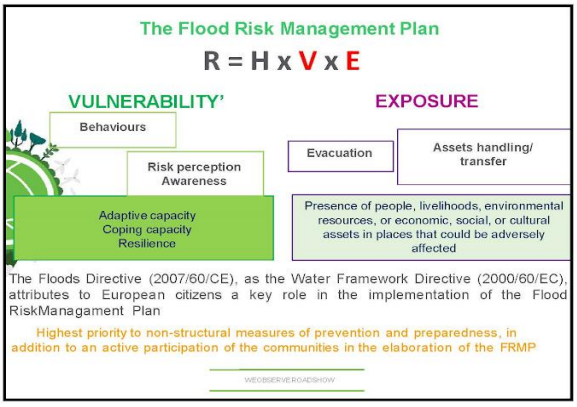

Concluding remarks
• Floods are complex; each one is unique
• Floods are damaging – directly & otherwise
• Floods are only going get bigger and more frequent – in Scotland at least
• Floods are often uncertain – *before* and even *after* they happen
• It's expensive to manage floods
• Sometimes, the best we can do is to:
  • know the hazard better,
  • share the knowledge widely, and
  • give people the power to help themselves
• Citizen scientists need to be good citizens, good scientists & good communicators

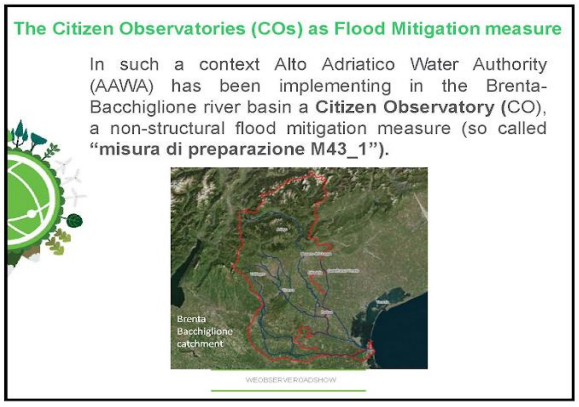
Appendix 2: Demonstration of a Citizen Observatory











The Citizen Observatories (COs) as Flood Mitigation measure

This measure originated from the positive experience gained during the **WeSenseIt** project, that was selected by the European Commission as a "good practice" of application of the Floods Directive.

WeSenseIt (VIDEO)

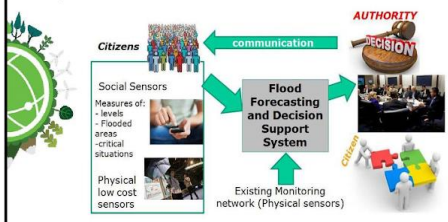
WESENSEIT

European Commission

WEOBSERVEROADSHOW

The Citizen Observatories (COs) as Flood Mitigation measure

It is a virtual place where citizens and decision-makers can exchange and mutually share information about floods



It is a decision support system during all phases of a flood: preparation emergency, recovery

WEOBSERVEROADSHOW

The Citizen Observatories (COs) as Flood Mitigation measure

Social sensors

Phisycal sensors

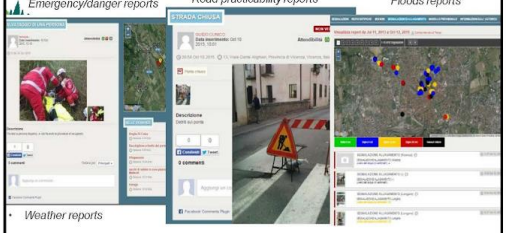
Real-time data collection about weather conditions, river levels and floodings

WEOBSERVEROADSHOW

The Citizen Observatories (COs) as Flood Mitigation measure

Examples of useful information sent by Citizens to Authorities

Emergency/danger reports *Road practicability reports* *Floods reports*

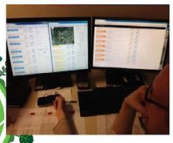


- *Weather reports*
- *Reports on vegetation status along rivers*

WEOBSERVEROADSHOW

The Citizen Observatories (COs) as Flood Mitigation measure

Early Warning System



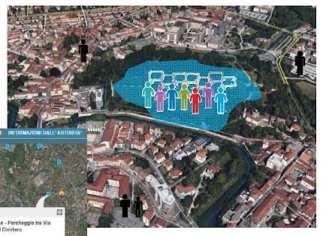
Inside the platform the results of an Early Warning System (EWS) are also made available: during the WeSenseIt project the so called AMICO EWS, developed by AAWA, was used

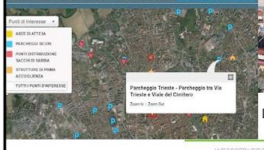
WEOBSERVEROADSHOW

The Citizen Observatories (COs) as Flood Mitigation measure

Examples of communications that citizens could receive from Authorities

Notifications about near dangerous sites





Notifications about near safe places

WEOBSERVEROADSHOW

The Citizen Observatories (COs) as Flood Mitigation measure

Supporting communication with Civil Protection teams during an emergency

- manage an emergency in real time
- monitor the area of interest comprehensively
- have real-time feedback about the activities performed by Civil Protection teams in the field (transmission of their position and sharing of further useful information, i.e. the status of progression of previously assigned tasks, in order to optimize emergency management)

WEOBSERVEROADSHOW

The Citizen Observatories (COs) as Flood Mitigation measure

Some examples: VICENZA (April, 25th 2014)

City evacuation due to the dismantle of a II World War Bomb

Real time monitoring of tasks in collection points

Explaining the operation to the head of National Civil Protection Department

Control room activities

WEOBSERVEROADSHOW

The Citizen Observatories (COs) as Flood Mitigation measure

Some examples: VICENZA – Civil Protection Activities

The use of technologies was tested during civil protection exercises organized by the municipality of Vicenza

Volunteers took also part to evaluate the operation of mobile application and e-collaborative platform.

WEOBSERVEROADSHOW

The Citizen Observatories (COs) as Flood Mitigation measure

Beaware pilot evaluation

VIDEO

WEOBSERVEROADSHOW

Educational campaigns for technicians and citizens

Citizens are the core of the alert system: they must be involved in environmental monitoring and encouraged to actively participate ❷ **awareness of the need of collaborating for everyone wellness**

TRAINING activities with Civil Protection volunteers and technicians

EDUCATIONAL campaigns with school teachers and students

WEOBSERVEROADSHOW

The Citizen Observatories (COs) as Flood Mitigation measure

Involvement of technicians (expert citizens):
agreements were signed and formative sessions started

Results of the monitoring activity carried out during the flood occurred in November 2019

- ❑ Over 70 technicians involved
- ❑ 1655 images and reports acquired
- ❑ Over 50 bridges monitored

Numbers of reports for day

WEOBSERVEROADSHOW

Education campaigns for technicians and citizens

- Educational programs, approved by the Italian Ministry of Education, are planned to start shortly (corona permitting): the project aims at 300 primary schools and middle and secondary schools.
- This communication plan (5 years) has the ambitious goal of involving 75,000 people by promoting the mobile app's download and consequently the environmental monitoring

WEOBSERVEROADSHOW

The Citizen Observatories (COs) as Flood Mitigation measure

Potential of a Citizen Observatory:

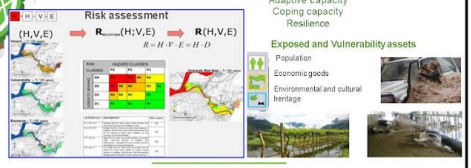
- greater availability of environmental data, both in terms of spatial and temporal density (hard to achieve via traditional systems if relevant investments are not planned)
- more reliable modeling tools, supported by a larger and more widely distributed data set in the territory
- better knowledge of the territory by decision-makers, that could identify actions to implement for a more efficient city planning and management of emergency
- greater dissemination of environmental data will also make local communities less vulnerable and more aware of existing risks (more flood-resilient)

WEOBSERVEROADSHOW

The Citizen Observatories (COs) as Flood Mitigation measure

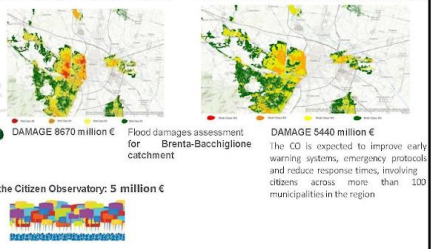
The Citizen Observatory can generate social but also ECONOMIC value !!!!

A **cost benefit analysis** was elaborated to demonstrate the value of the Brenta-Bacchiglione CO from an economic point of view: in detail the citizen observatory is expected to **decrease the social vulnerability of the flood risk** (Title: *The Value of Citizen Science for Flood Risk Reduction: Cost-benefit Analysis of a Citizen Observatory in the Brenta-Bacchiglione Catchment*; MS No.: hess-2020-332; https://hess.copernicus.org/articles/24/5781/2020/)



WEOBSERVEROADSHOW

The Citizen Observatories (COs) as Flood Mitigation measure



The implementation of the CO over the entire Brenta-Bacchiglione basin is **financed by the Italian Ministry of the Environment** (ITA003_1DAO_009_M43)

WEOBSERVEROADSHOW

THANK YOU!

Autorità di bacino distrettuale delle Alpi Orientali (AAWA)

Distretto delle Alpi Orientali

michele.fern
martina.monego @distrettoalpiorientali.it
giovanni.tomei

This project has received funding from the EU's Horizon 2020 research and innovation programme under GA no 776906

Appendix 3: Breakout Room 1

Breakout Room 1

In what ways could a Citizen Observatory help you address your information needs related to flood management?

Get Information

- A way for citizens to receive environmental information and participate (rights recognised by the Aarhus Convention)
- Show areas where flooding is occurring but is not mapped anywhere
- Deciding metrics to include
- More & better info on rainfall + snow
- Creates the potential for more accessible visualisation that might engage people
- Manage expectation using case histories
- more data across the spectrum

Engagement

- Improving community engagement
- Better engagement from those at risk
- Grass roots/bottom up often has fastest response times to resilience actions
- understand the impact on the community better
- increase foreward planning awareness in community
- Help assess risk
- privacy issues and data sharing
- Partnership forming
- interest and understanding
- Opportunity to learn through storytelling
- To engage with land managers in siting of Natural Flood Management measures.

Data source

- Improving community cohesion. Data more joined up across the community
- greater granularity
- better agregation
- Collaboratio between communities (especially near-by groups with shared risks)
- Filling the void that is not covered by 'formal / government services'
- explore the potential of new media as an alternative data source
- To provide an official channel for public authorities to receive (and use) information that citizens hold (but are not initially recognised)

Policy potential

- Assists with planning
- direct funding
- Could / should this more granular data be made available to insurers?
- To measure what impacts land management measures have had on freshwater run off?
- important to link info to local development plan so new building plans are informed by the best information
- Gathering stories of impact on people, bringing community together

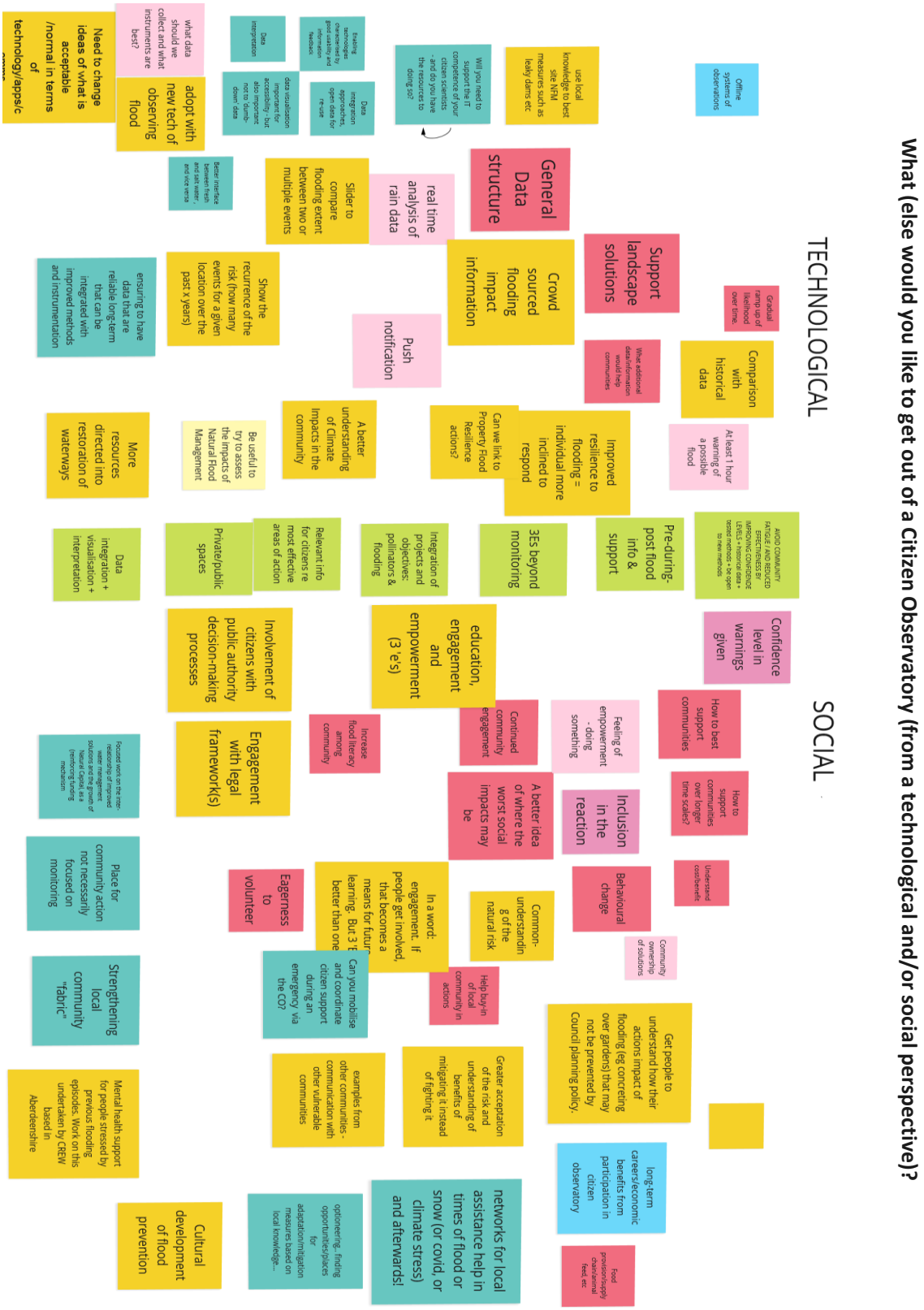
Trust and Scale (is the scale appropriate?)

- -Help develop effective flood alert systems
- more data on local scale
- Verification of flood warnings, informing from a community level
- Hyper local opendata may be useful 'trusted', real time,

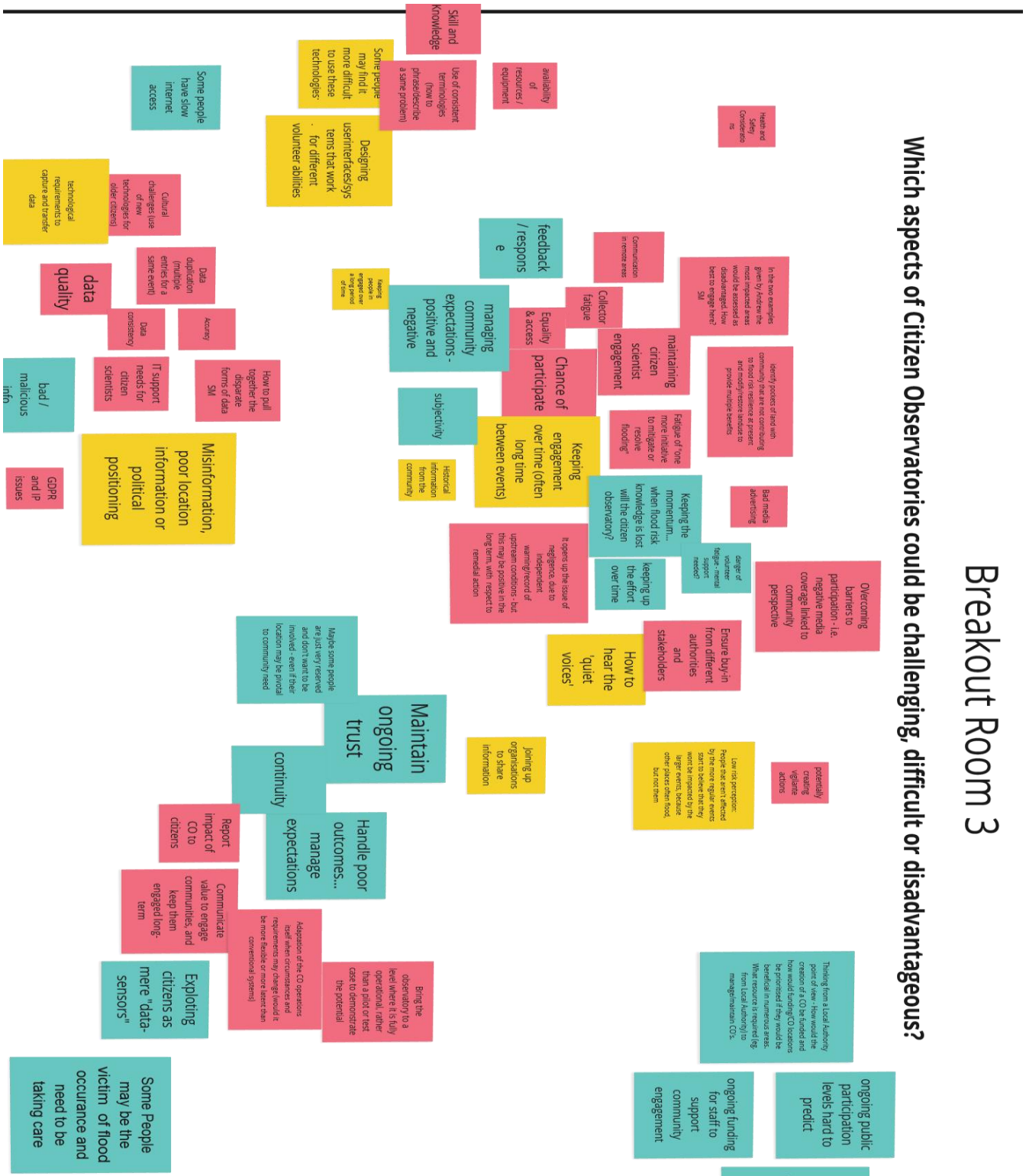
Prioritisation and Mitigation

- to aid alleviation of impact on communities, thereby reducing recovery cost - in wellbeing, financial and cabon costs
- Data on aftermath, not just prediction.
- More social data. Who is most impacted and where. It may not be the people closest to the source.
- to help identify areas for mitigation measures
- longer range forecasting in specific locations, affecting houseing
- Cost benefit could take into account climate and carbon costs for clean up
- to aid prioritisation of flood alleviation efforts
- Space for socialising and to jointly carry the burden of effects, organise community action

Appendix 4: Breakout Room 2



Appendix 5: Breakout Room 3



- END OF DOCUMENT -