Engagement activities and their impacts on policy development

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Publication date:
2019

Document Version
Publisher's PDF, also known as Version of record

DELIVERABLE 3.5

Engagement activities and their impacts on policy development

Report

PROJECT ACRONYM	GRANT AGREEMENT #	PROJECT TITLE
GROW	690199	The GROW Observatory

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 690199

DISSEMINATION LEVEL

PU: Public

REVISION HISTORY

REVISION	DATE	AUTHOR	ORG	DESCRIPTION
v0-01	21/10/2018	Josephine Watson	FAO	Observatory Policy Interface (OPI) Report
v0-02	27/02/2019	Deborah Long	UNIVDUN	Inputs to the Outline Template
v0-03	13/03/2019	Lucrezia Caon	FAO	Report review
v0-04	25/09/2019	Clara Lefevre	FAO	Report update
v0-05	28/09/2019	Lucrezia Caon	FAO	Report writing and review
v0-06	08/10/2019	Raquel Ajates	UNIVDUN	Report writing and review
v0-07	29/10/2019	Clara Lefèvre	FAO	Report review
v0-08	30/10/2019	Raquel Ajates	UNIVDUN	Second review
v0-09	31/10/2019	George Konstantakopoulos	FE	Third Review
v1-00	31/10/2019	Raquel Ajates	UNIVDUN	Final review

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Acronyms

CO	Citizens observatory
EC	European Commission
EEAB	External Expert Advisory Board
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GROW	GROW Citizens' Observatory
GSP	Global Soil Partnership
LULC	Land use and land cover
MOOC	Massive Open Online Course
OPI	Observatory Policy Interface
STK	Soil testing kit
SDG	Sustainable Development Goal
SSM	Sustainable Soil Management
VGSSM	Voluntary Guidelines for Sustainable Soil Management
WFD	Water Framework Directive
WFS	Web Feature Service
WMS	Web Map Service

Scope

This deliverable reports on GROW activities that are of relevance to policy makers and on the work of the Observatory Policy Interface (OPI), the policy group of GROW tasked to:

- fill the knowledge gaps on the importance of soil resources for sustainable development and human well-being,

- promote participatory governance on land and water management in Europe by bringing together citizens, growers and policy makers in the development and endorsement of unanimously accepted soil policies

- bring the data and results of the GROW Initiative to the attention of policy and decision makers, and

- affirm GROW as a successful example of citizen observatory (CO) in the region.

The broad ambition is that of ensuring that GROW will remain active after the end of the project and that it will serve as an example to other countries and regions.

After a short introduction to the history of participatory governance in Europe (Section 2), this report provides an overview on the GROW Observatory's activities to promote European citizens' involvement in participatory environmental governance (Section 3). GROW outputs of political relevance are discussed in Section 4. To conclude, Section 5 reports on GROW activities aimed at raising the awareness of European citizens on the tools available to enhance their participation in policy making and at increasing awareness of policy makers on the contribution that citizens can offer to policy development. This section includes the outcomes of the OPI workshop held in Brussels, Belgium on 3 and 4 September 2019.

Background on policy governance in Europe

1.1 Participatory governance and environmental issues

In 2001 the European Commission declared in its White paper on European governance[1] that to be good, governance should be open, coherent, accountable, effective and participative. Indeed, it has been showed that participation of citizens to policy development could help to deepen democracy, strengthen social capital, facilitate efficiency, sustain growth, and promote pro-poor initiatives, equity and social justice.

Regarding environmental issues, by incorporating local knowledge and including stakeholders in the decision-making process, participatory governance also increases awareness and empowers citizens on policy which eventually improves acceptance of decisions and commitment to implementation among stakeholders. Based on these prerequisites, participatory and collaborative forms of governance are expected to lead to more effective improvements in environmental quality. Finally, the involvement of citizens and stakeholders (e.g. businesses, public administrations, researchers) throughout the policy-making process aims to develop better environmental regulations set out to ensure that:

1. Decision-making is open and transparent;
2. Citizens and stakeholders can contribute throughout the policy and law-making process;
3. EU actions are based on evidence and understanding of the impacts; and
4. Regulatory burdens on businesses, citizens or public administrations are kept to a minimum.

Although participatory approaches are commonly presented as antidotes for a lack of legitimacy of traditional policymaking approaches and as a means for leading to more informed and effective policies, several studies have also shown that many participatory approaches fail to do so and can be associated to democratic problems but that their potential is hopeful (Kothari, 2001; Edelenbos and Klijn, 2006; Behagel and Turnhout, 2011; Wehn and Evers, 2014; Wehn and Evers, 2015). There is a need to be cautious about the generalisation and replicability of impacts. Indeed, different perceptions of policy problems, policy solutions and the role of citizens have been put forward as a reason to considering the creating of different ‘shapes and sizes’ of citizen observatories (Wehn *et al.*, 2015).

1.2 Citizen science and participatory governance

Citizen Science approaches (i.e. the involvement of non-professionals in scientific research) have been developing for decades, but have mushroomed over the last ten years, and are increasingly effective and relevant sources of data for improving knowledge of biodiversity, whilst simultaneously increasing public engagement in science (EC, 2013). Thousands of projects have already been developed worldwide (Hecker *et al.*, 2018). Citizen science occurs in all fields of science with different possible outcomes. It can serve research by providing scientific findings, but also teach new skills or knowledge to participants. Finally, it can influence policies and build community capacity for decision making, as well as taking conservation action (Hecker *et al.*, 2018). Indeed, citizen science has the potential to support policy-makers in developing policies with increased transparency and participation, as it creates the evidence base and societal acceptance for policy decision making

[1] https://europa.eu/rapid/press-release_DOC-01-10_en.htm

(Hecker *et al.*, 2018) (Figure 1). Citizen science has therefore the potential to affect integrated resource management decisions and therefore foster participatory governance (Shirk *et al.*, 2012).

However, Newman *et al.* (2012) made major recommendations in the development of citizen science. First, they recommend using cautiously the new technologies and skills (such as mobile applications or sensor networks), as they can appeal to a diverse set of citizen-science participants and could potentially marginalize those unwilling or unable to adopt them. Also, they state that citizen science needs a strong organization and provide sound scientific information by creating a network of organizations (local, regional, and global) and professional associations, as well as open-access peer-reviewed journals and cyberinfrastructure support systems. Also, to better measure and understand the benefits and impacts of public participation in science projects, Hecker et al. (2018) recommend projects to label themselves under the umbrella term of citizen science.

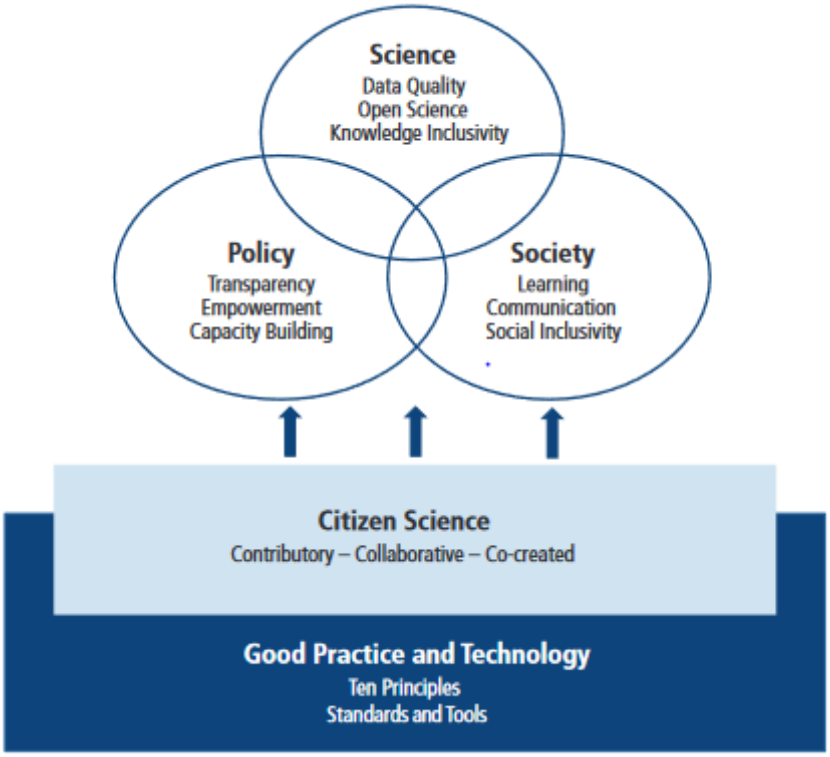

Figure 1: Citizen Science contribution to advances in science, policy and society (Bonn *et al.*, 2018)

Citizen observation and knowledge sharing of the kind proposed by GROW has been identified by FAO's GSP as the most favourable potential facilitator of a bottom-up participatory approach to soil and land governance. GROW represents an opportunity for participatory governance to be linked with citizen science, particularly in relation to evidence-based policymaking, which values empirical evidence over ideologically driven decisions. The toolkits and processes developed through GROW were created to support citizens to develop their own campaigns and collect the data necessary to support their cause, are were detailed in Deliverable 1.3 Missions Toolkit. These processes were designed to meaningfully engage not just with citizens, but also with policymakers at a local, national and European scale.

1.3 Summary of participatory governance actions in the EU

The signature of the Aarhus Public Participation Convention (1998) was the starting point for several political actions to ensure citizen involvement in the policy-making process. In 2001, the United Nations Economic Commission for Europe (UNECE) Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters affirmed three fundamental rights in the policy-making process:

1. The right of everyone to receive environmental information (state of the environment, policies or measures taken, state of human health, etc.) that is held by public authorities. Public authorities are obliged, under the Convention, to actively disseminate environmental information in their possession;
2. The right to participate in environmental decision-making. Arrangements are to be made by public authorities to enable the public affected and environmental NGO to comment on, for example, proposals for projects, plans or programmes affecting or related to the environment. These comments shall be taken into due account in decision-making, and information shall be provided on the final decisions and the reasons for it; and
3. The right to review procedures to challenge public decisions that have been made without respecting the two aforementioned rights or environmental law in general.

Over the years, the European Commission, in charge of making policy proposals to the European Parliament, has been opening up to citizens in order to achieve better policy results. One major innovation was made in 2009 with the Treaty of Lisbon and the creation of citizen's initiatives by which not less than one million citizens (under certain condition) may invite the European Commission to submit a proposal (Article 11[2]).

Surveys and official stakeholder consultations are regularly set-up in the EU for achieving better resource use efficiency. For example, an internet consultation was held during the development of the Soil Thematic Strategy in 2005, for the redaction of the 7th European Action Plan (2012) a public consultation took place followed by a press release, public debates and consultations are also organized to comment on new Common Agricultural Policies. Country specific dialogues are also part of the process of monitoring progresses in implementing EU environmental policies at the country level. At this regard, the Environmental Implementation Review, initiated in 2016[3] aims to support delivering the objectives of existing EU environmental policies and legislation in an inclusive and participatory manner. Country-specific reports have to be published every two years focusing on essential topics in the area of environmental legislation, followed by country specific dialogues, a peer-to-peer programme and other actions to support Member States' efforts to address implementation gaps.

In addition, more recently three main actions and platform for discussion were launched and are currently taking place in the EU:

[2] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:12016M011
[3] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016DC0316&from=EN

1.3.1 Horizon 2020

First, as one of the implementing tools of the Europe 2020 strategy, the "Horizon 2020" programme funds research, technical development and innovation in the EU, with a particular attention on tackling social issues that European Member States are facing. Therefore, calls for projects among the Horizon 2020 programme aim to foster citizen science. The EU Commission is developing and supporting targeted citizen science activities and a capacity building programme such as *Citizens' Observatories, Collective Awareness Platforms (CAPs*), and the *Science with and for Society* programme. The aim is to support the collection of new evidence and the development of policy options to develop new governance paths. GROW is an example of such projects selected, with the creation of a CO. "Horizon 2020" will be succeeded by "Horizon Europe" for the period 2021-2027.

1.3.2 Europe for Citizens

The Europe for Citizens' Programme 2014-2020 is another tool for encouraging the democratic participation of citizens at EU level. Opportunities for societal and intercultural engagement and volunteering are promoted through three specific measures which are (1) Town twinning – providing support to projects bringing together citizens from twinned towns. This measure seeks to promote civic participation in the EU policy making process and develop opportunities for societal engagement and volunteering at EU level, (2) Networks of towns – providing funding to municipalities and associations working together on a common theme in a long term perspective and (3) Civil society projects – supporting projects gathering citizens in activities directly linked to EU policies, providing an opportunity for direct participation in the policy making process. Within the programme, the European citizens Crowdsourcing project was launched in 2016 and aims to inform citizens about their right to contribute to the policy-making process and how it works as well as to develop citizens' skills on the use of innovative channels of e-participation in policy at the national and European level.

1.3.3 eGovernment Action Plan 2016-2020

Finally, the European eGovernment Action Plan 2016-2020[4] aims to support coordination and collaboration between Member States and the Commission, and the modernisation of public administrations across the EU. Within the action plan a large place is given to enable citizens, businesses and the public administration to co-create and propose new actions to be launched within the programme. The "eGovernment4EU", an online stakeholder platform was created to gather ideas for new actions based on current needs and providing a space for all to collaborate and discuss how to improve eGovernment services in the EU and in order to facilitate a broad reflection on future European policies.

1.3.4 Debating Europe

Debating Europe[5] was launched in 2011 as an EU platform aiming to encourage a genuine conversation between European politicians and the citizens they serve –taking questions, comments and ideas directly to policy makers for them to respond. Since its launch, Debating Europe has

[4] https://ec.europa.eu/digital-single-market/en/european-egovernment-action-plan-2016-2020
[5] http://www.debatingeurope.eu/

interviewed more than 2,500 policy-makers and experts from across the political spectrum. Each has agreed to answer some of the 100,000 comments sent in from citizens online, including from a growing 2.2 million strong community and over 250,000 people followers on Facebook and Twitter.

1.3.5 The Futurium Platform – Policy making 3.0

Futurium is a European Platform which leverages the potential of social networks, open data, semantic and knowledge mining technologies as well as participatory brainstorming techniques to engage stakeholders and harness their views and creativity to better inform policies that matter to them. It is qualified as a "Policy making 3.0" platform (Accordino, 2013).

The essential elements of the Policy Making 3.0 process are:

1. The implementation of policies co-developed by policymakers and stakeholders has an impact on the real world (individuals, society, economy, environment etc.);
2. The real world is monitored and data are gathered, measured and analysed through knowledge mining and statistical tools, which makes it possible to identify trends, issues and challenges and to elicit scientific evidence;
3. The scientific evidence provides information which stakeholders and policymakers can use to reshape policies;
4. Stakeholders and policymakers interact in social networks where other factors rather than evidence emerge, such as personal opinions, corporate interests, lobbying, ideological values and other 'non-measurable' factors (i.e. that cannot be easily sensed and automatically captured). Such factors often prevail over the scientific evidence. There are also boundary constraints that come in the form of values and laws (e.g. constitutional rules); and
5. Policies may also be inspired by desirable visions and aspirations that are not necessarily in line with current, short-term trends and can also be considered as part of the 'emotional' and intuitive factors that influence decisions.

Policy making 3.0 is therefore envisioned as a participatory and evidence-based model designed to provide solutions to a general lack of trust in the security of the underlying IT infrastructures, identity management and uptake by citizens.

1.4 Statistics of involvement of European citizens in participatory governance

According to the EC[6], petitions are the main route through which respondents seek to directly influence decision-making, followed by Internet or social media, expressing one's views on public issues with an elected representative at local/regional level, and public debate at last. The mean for expressing their opinion also changes with the age group. Respondents younger than 24 are more likely to use Internet or social media, respondents aged 40 and over are more likely to express their views with their local or regional elected representatives, and people in their 25-39 are more likely to sign a petition. Ultimately, respondents aged 55 or over are the most inclined to say that they did not do any of these means.

[7] https://ec.europa.eu/eurostat/cache/infographs/ict/bloc-4.html

Education also influences people involvement in policymaking. Respondents with a higher level of education are more likely to try to express their views via all the means under discussion than people who finished their education at a younger age. For example, 42% of people who finished their education aged 20 or over have signed a petition in the last two years, compared with just 16% of those who left school aged 15 or below. In terms of occupation, employees and self-employed people are more likely to seek to express their views using the various available means than manual workers or people who are not working. Nearly half of manual workers (49%) and people who are not working (47%) never used any participatory policy tool, compared with 35% of employees and 34% of self-employed people.

Citizens' Observatories' potential to facilitate participatory governance

In order to collect inputs on the perceived contribution that citizens and Citizens' Observatories (COs) could offer to policymaking, a list of relevant stakeholders in the field of environmental management (policymakers, universities) was compiled.

These were asked to complete an online survey, the results of which are presented and discussed in Section 1.5. Towards the goal of getting a better picture of the status for each European Member country, individual interviews were conducted (Section 1.6). Individual interviews and the online survey results were combined to form country profiles of demand for soil indicator data, policymaking tools and online courses. Profiles can be viewed in Appendix 1.

1.5 Online survey results

Forty-four participants from twenty European Member countries (Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, France, Germany, Greece, Ireland, Italy, Lithuania, Portugal, Republic of North Macedonia, Romania, Slovakia, Spain, United Kingdom and Ukraine) participated in the survey launched by the OPI (see Appendix 2). Respondents were affiliated to universities, agricultural organisations and government departments.

- **Environmental data**

Respondents reported that data to develop and validate soil indicators as well as land use and land cover data (LULC) are the most needed at the national and European level, followed by soil moisture data, soil texture/stone data, potential near real time gridded products and local plant information. Additional comments emphasize that soil moisture is more important to monitor in southern than norther European countries. Other data categories suggested to include soil salinity, soil organic matter, soil depth, and groundwater quality. Requests were made for profiles of soil management practices currently in place per region, data demonstrating concrete links between practices and soil fertility and a system of measurement for ecosystem services.

- **Tools to support participatory governance**

The majority of the participants expressed the need for online courses on sustainable soil and water management practices especially. Most participants noted that the other tools for enhancing citizen participation in policymaking would be extremely useful if paired with educational courses.

The need for establishing a public funded CO for measurement of environmental variables (a source of data) was also highlighted together with the establishment of a citizen channel to send communities targeted messages using campaigns on policy related guidance. Needed tools are also (1) a citizen participatory platform for public voice on new policy directions, (2) a potential test-bed for validation of impacts of certain policy decisions before universal roll out related to food and agricultural practices, and (3) a citizen channel to acquire feedback from "communities" for existing or planned policy initiatives, changes.

The tool perceived as the less needed one is a public funded CO for measurement of specific, new, transient or permanent observations. In addition to the tools proposed by GROW, respondents suggested incentive schemes such as subsidies or sanctions on irresponsibly cultivated products. However, it was noted that incentive schemes are particularly hard to implement, due to evaluation costs.

- **Geographic areas where data are needed the most**

There is a consensus among participants that countries most in need of environmental data are also those with the lowest GDPs. Four specialists recommended concentrating efforts in eastern and southeastern European countries. Seven participants suggested prioritising countries in the Mediterranean Basin, as they represent Europe's most arid regions, and therefore experience higher rates of soil fertility loss and erosion.

- **Investment in soil and water monitoring activities**

Representatives from Austria, Belgium, Bulgaria, Croatia, Czech Republic, France, Greece, Ireland, Portugal, Romania, Slovakia, and the United Kingdom reported that their country invested in soil health research and management. Of the 12 represented countries that have invested in soil health research and work, Croatia, Portugal and Scotland did so while appealing to the SDGs.

Bosnia and Herzegovina, Cyprus, Italy, Lithuania, Republic of North Macedonia, Ukraine reported a lack of investment in soil health although Spain indicated an intention to and Germany shared that their water system investments had soil organic matter (SOM) considerations.

- **Need for successful citizen involvement in data collection**

Respondents agreed that for citizen data contributions to be accepted by policymakers, preliminary steps must be taken to train participants to foster data reliability. Education must first be approached at the ecosystem level to train farmers without any previous environmental training. Online courses about soil function in ecosystems, to educate farmers further beyond their knowledge of soil contribution to crop dynamics, are amongst the topics suggested for this educational training.

Then, respondents suggested that when developing citizen methods of data collection, training should either be approached through a course or through an online platform with quality checking mechanisms. Responses confirm that data collected by citizens will have the best chance of affecting policy if it is:

a) Reported online with pictures as evidence of observation,
b) Collected in great volume to prove statistical relevance of observations, and
c) Linked to a spatial database to contextualise it by location.

It is noted that a system of quality checking numerical data, through comparison to a baseline agreed on by national government departments, would be most helpful in validating citizen data. However, this requirement will also be the most time-intensive and costly to develop. The GROW Observatory has developed a data quality strategy that is discussed in Deliverable 4.5 Report on validation of Sentinel-1 as well as a full academic paper to be submitted for peer review.

The potential buyers of this data include members of the agricultural management sector, municipalities, regions and any authority with liabilities related to natural resource management and large companies in the food sector interested in sustainable supply chain management. A majority of respondents urged that data should not be sold, but that every effort should be made to provide it for free. When asked whether or not it will be worth it for governments to invest in COs to increase the participation of citizens in *data generation,* there was a consensus that in principle any form of data collection aided by citizens would be welcomed by governments, especially observation-based data. Platforms provided to citizens for sharing their observations of local environmental change, especially those that allow for image-sharing, would assist in prioritising areas in need of funding and government capacity and funding to areas in need.

The participation of citizens in policymaking is perceived as a grey area. 31% of respondents figure that governments would not accept citizen-collected data at all. 32% believe that citizen-collected data would be welcomed by policymakers but would be considered less reliable and could not be used as justification for their legislative decisions unless thoroughly quality checked. Specific advice was given to assist citizens in collecting and sharing soil samples, rather than data. It was also advised to arrange these relationships between farmers and their municipal governments rather than trying to involve federal departments.

- **Barriers to the use of citizen observatories' (COs) for data collection and policy formulation**

Overall, the most frequently mentioned barrier (Figure 1) is the development of a system of standardising methods of data collection and distribution throughout participating countries and validating that citizen data once they are compiled. Lack of awareness about soil health is also perceived as a primary barrier to citizen participation in soil health initiatives. Citizens who lack understanding of threats to soil health in their regions will not be willing to engage with GROW and other COs working on the topic. If citizens are aware of soil health threats and wish to contribute to data collection, their lack of technical education is another challenge that needs to be addressed. Online courses can be administered at the regional level to approach both levels of awareness. A course on general awareness of the connection of soil health and ecosystem services to human life quality was proposed as a priority.

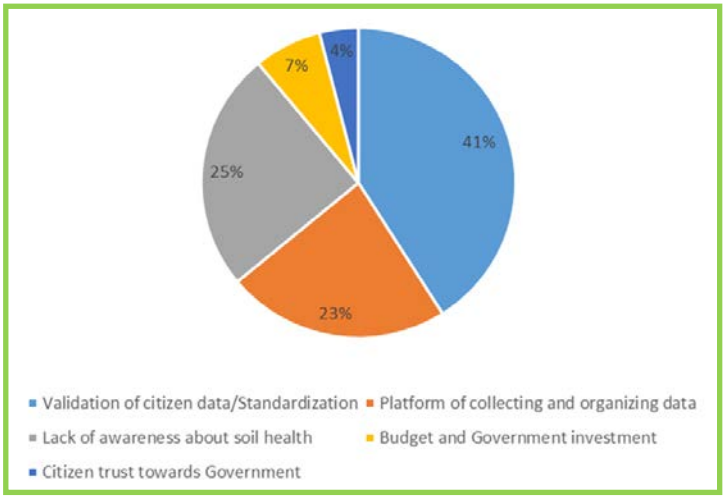

Figure 2. Perceived barriers to participatory governance

Developing a platform for organising and sharing data would be the next barrier to transcend once a method of validating citizen data is agreed on. Data sharing through a common Web Map Service (WMS) and a Web Feature Service (WFS) will greatly aid the standardisation of access to environmental data. A WMS with instructions of data input will allow participants to easily cross-compare their results with data input from neighboring regions. A WFS is a format that can be easily updated frequently by citizens to demonstrate environmental quality changes.

A proposed solution for validation is to ask government departments to generate regional baselines for the data categories, to be incorporated into their individual web platform accounts. Then, a simple statistical model could be built into the platform to compare patterns in data results to the regional baseline.

Citizen trust towards government is an important barrier that can be overcome through transparency and improving the communication between the government and the citizens, and by designating a central decision-making role to community groups: farmer organisations and relevant local non-governmental organisations. It is agreed upon that once citizen awareness of soil health is addressed and increased in Europe, government budget allocations may follow citizen priorities and focus more on soil health.

- **Citizens' awareness of existing participatory governance processes**

An overwhelming majority of respondents commented that there is a need to better inform participatory governance systems. The European Strategy for a Singular Digital Market was mentioned twice as an excellent case study of programs currently evolving in Europe. Indeed, the Digital Single Market strategy was adopted in 2015 and is one of the EC's 10 political priorities. It is made up of three policy pillars[7]:

1. Improving access to digital goods and services;

[7] https://ec.europa.eu/eurostat/cache/infographs/ict/bloc-4.html

2. An environment where digital networks and services can prosper, and
3. Digital as a driver for growth

It was strongly suggested to develop systems at the municipality and city level. Some respondents shared information about programs in their countries (Table 1).

Table 1. National programmes to promote participatory governance

Country	Program
Bosnia and Herzegovina	NGOs: Rural platform, Young Farmers Network, enter the policymaking process directly as a way to promote citizen representation
Germany	Wuppervand – online platform of water system knowledge exchange with Stakeholders.
Portugal	The Portugal National Soil Partnership collects frequent citizen contributions to soil management practice reform efforts by organizing frequent workshops.
Scotland	Lack of secondary parliamentary chamber substituted for with broad public consultation
Spain	The GBIF Biodiversity data center has a citizen science program that processes citizen contributions.

- **Suggestions to make GROW sustainable after 2019**

Many agreed that farmer engagement, through direct and consistent meetings, events and requests for contributions, should be a top priority. Frequent engagement, with actual resulting impact on the programs structure, would increase farmers trust and willingness to engage with GROW. With this trust established, most agree that educational efforts in environmental management – potential MOOCs on ecosystem services and soil management impact on soil health and structure – would make the OPI a valuable resource to any government, by cultivating a new critical mass of citizen scientists. In the process of shaping data communication systems, it was stressed that an economic value should be assigned to environmental services in order to motivate policymakers. The likelihood of being allocated permanent funding from the EU will be increased if stakeholders are identified as end-users, interviewed and catered to through the development of the project. Cooperation with existing initiatives working on awareness-raising (e.g. the ENSA (National Schools of Applied Sciences), local soil science societies, the International Union of Soil Sciences (IUSS), the European Society for Soil Conservation (ESSC), etc.) would facilitate the identification of relevant stakeholders.

1.6 Individual interviews results

To elaborate further on the replies received in the OPI survey, individual interviews were conducted with 42 volunteer participants representing 24 European countries. Three points were discussed:

- How are national laws and international frameworks like the Voluntary Guidelines for Sustainable Soil Management (VGSSM) by FAO received and adopted at the national level?
- Which are the main barriers to the implementation of these laws, regulations and frameworks at the field level?

- Which measures can be put in place to increase the acceptance of these laws, regulations and frameworks among interested land users, etc.?

General trends of priorities and barriers to implementation of soil related policies can be observed (see Appendix 3 for the detailed list of contributions). These trends will indicate main areas of action to be targeted by the GROW programme. More precisely, the most common barriers to the implementation of international frameworks and national programs for environmental reform include:

1. **Competing Issues:** Many policymakers focus on meta-issues like drought, directing funds away from specific agricultural issues.

2. **Lack of interest and commitment from farmers:** Policy makers are aware of the lack of relationship and trust between them and farmers. Although they try to address the issue through regular meetings (e.g. seminars, conferences, events, demos) but there is no real engagement. In the words of a Spanish contributor: "farmers attend to have paella and then leave".

3. **Lack of farmer engagement through extension services**: Local extension centres are mainly providing farming subsidies and do not have the capacity or the mandate to support farmers on agronomic issues (e.g. water, pests, erosion etc.). Therefore, farmers have a low level of engagement with these services.

4. **Need to emphasise benefits:** Most farmers need support to improve their agronomic management, but often are not aware of how closely sustainable practices and prosperity are linked. The determining factor of GROW's success according to interviewees was based in its potential to identify and emphasise on the economic benefits that the program will provide to farmers.

5. **Need for increased communication/influence channels between academia and policymakers:** Due to the lack of communication between scientists and policymakers, scientific outcomes often do not affect policy directions.

Based on the above-mentioned points, three main priorities were identified as the most agreed and widely applicable across Europe:

1. **Support strategies to improve farmer engagement:**

- *Implement mediator organizations between farmers and government:* This would facilitate communication between farmers and government departments. These organizations could be farmers' organizations or NGOs.

- *Smallholder Farmer Community Champions***:** The development of a specific strategy to engage smallholder or family farm operations was also suggested. 50% of European farms are family operated, and these operations tend to be dedicated to traditional farming methods (Lowder *et al.*, 2016). The family farm engagement strategy could be based on the selection of Community Champions that come from traditional farming backgrounds. These Champions could be trained in the farming reform methods needed in their region, and then asked to clearly communicate the message that GROW aims to improve, not disrupt or change, traditional farm structures, to their communities. The development of smallholder farm engagement strategies should be informed by regional profiles

of supply chains, to determine the areas dominated by this farm structure. Once family farm networks and practices are profiled, a strategy can be developed for approaching and engaging these stakeholders, which is critical to GROWs success. Farmer engagement should then be orchestrated as locally as possible, with inputs from relevant regional-level governments.

The details of how GROW's development and strategy of the GROW Places network and the Community Champion scheme for the Observatory were discussed in detail in Deliverable 2.4 Community Champions Programme.

2. Provide cost-benefit analysis of soil health

Policymakers and farmers alike could better understand the direct benefits they would receive, from improved crop yields and ecosystem health, from improving soil health across their land. Profiles of the ecosystem services linked with improved soil health, and estimations of the extent to which the services reduce costs of irrigation, fertilisation or pesticide inputs, would be motivational to citizen and government stakeholders.

3. Fund agricultural ministry extension services

Many participants agreed that regionally-based government extension services already collaborate with local stakeholders, which allows them to communicate more efficiently with farmers and implement government programs. Some interviewees suggested that GROW should therefore collaborate extensively with extension centers throughout Europe. Eastern European countries noted a severe lack of investment in their national extension offices, and an absence of them in many regions. Citizens' Observatories could have a huge impact if they created a strategy for supporting government extension efforts, or forming them if they do not already exist.

In conclusion, the results of the interviews emphasised that Eastern European governments have structural issues that require different approaches. Indeed, their agricultural extension services suffer from a lack of funding, lower government budgets to support international framework implementation, and a higher corruption of government departments in comparison with wealthier European states.

Because water issues tend to be prioritised for government funding, especially in the dryer Mediterranean European states, respondents from Spain suggested that water and soil issues be addressed together within campaigns, and that the co-dependency of these two environmental resources be emphasized: appeal to the link between soil health and water retention, water purification.

GROW activities covered many of the insights from the surveys and interviews regarding: 1) training on participatory governance and channels 2) raising awareness of environmental issues, specifically soil and food systems issues 3) provided a platform for citizens to submit soil and land data 4) created a platform for stakeholders to access citizen-generated data for free. The importance of raising citizen awareness of environmental issues was most agreed upon, and was addressed by GROW through MOOCs (see Section 1.6).

GROW contribution to SDGs

The United Nations´ 17 Sustainable Development Goals (SDGs)[8] address global challenges including those related to poverty, inequality, climate, environmental degradation, prosperity, and peace and justice. The Goals interconnect, and the global target is to achieve all of them by 2030. The SDG 17 goals are translated as 169 targets, Lang and Mason (2018) have identified that 70 involve food and farming topics so GROW's activities are particularly relevant and conducive to contributing to SDG objectives.

The use of Citizens' Observatories (COs) by regional, national and local governments is believed to be an interesting lever to contribute to the achievement of many of the SDGs (Thematic Research Network on Data and Statistics, 2019). Indeed, it can bring increased trust in official statistics, as citizens can see their own data reflected in them. It can also improve relationships between governments and citizens because of increased levels of understanding on both sides and provide new potential proxy indicators particularly for difficult to measure Tier 3 indicators, which do not yet have standardised international methodologies. Eventually, when citizens can see their data holding governments and policy makers to account, they are motivated and more likely to raise awareness of SDGs more broadly to civic society and contribute to and be part of collective action to transform society to reduce poverty, improve equality and halt environment degradation.

The GROW Observatory aimed to demonstrate the concept of CO in operational conditions. To do so, GROW created a sustainable citizen platform and community to generate, share and utilize high quality data on land, soil and water resource at a resolution not previously considered. The vision was to create a movement around environmental observations, to empower citizens to participate in environmental decision making, to extend and reduce costs in global earth observation activities, and to contribute to innovation in the Digital Single Market.

By enabling more people to manage soil and land sustainably and locally grow appropriate food, GROW contributes to **SDG 2** (Zero hunger) and especially sub-indicator 2.4.1[9] (Long, 2018).

Also, GROW CO made it possible to validate harmonised soil data through citizens, scientists and policymakers collaborating through using a crowdsourced in-situ sensor network that ultimately enhanced the ability of society to better manage climate variability and cope with climate change. The use of cost-efficient and reliable soil moisture sensors (associated with training through GROW MOOCs or seminars) by citizens has the potential to validate soil moisture data in diverse climatic regions and areas of the world, thus contributing to filling the current gap in information in low-income regions, and consolidate current databases on soil moisture.

Currently, a total of 68% of the 93 environmental SDGs indicators cannot yet be measured due to a lack of data (Campbell and Jensen, 2019). Getting information on a regular basis could facilitate monitoring activities of soil moisture which is a key parameter to farming practice. COs and citizen science can therefore would provide a solution to the current gap in effective monitoring the global progress against the SDGs (Campbell and Jensen, 2019). This monitoring approach ultimately contributes to better climate change models and to use locally appropriate and sustainable practices for soil and land management. This directly contributes to **SDG 13** (Climate action) and especially sub-

[8] https://www.un.org/sustainabledevelopment/sustainable-development-goals/
[9] 2.4.1: Proportion of agricultural area under productive and sustainable agriculture. More information: https://medium.com/grow-observatory-blog/growing-local-food-a-contribution-to-sustainable-development-goal-2-d83362f171e2

indicator 13.3.2[10], as well as **SDG 15** (Life on land) and especially target 15.9[11] by engaging growers in generating data and interpreting results and using data to engage with local soil & land governance issues.

By increasing access to information on regenerative food practices – growing practices and techniques which help to preserve and improve soil health and biodiversity – GROW aimed to empowered tens of thousands of people across the world. Focusing on Europe, hundreds of people involved in soil sensing also made a vital contribution to environmental monitoring. Empowering more people to grow food in their own growing space can increase their access to nutritional food, and potentially provide higher food security to them and their families.

GROW's series of free online courses covered a wide range of diverse topics related to the SDGs, from the environment to farming and participatory governance. The core ingredients of a CO, are citizens. GROW has connected people from similar and different backgrounds and interests so they can inspire and learn from each other. At the local level, GROW has supported 20+ communities across Europe in GROW Places. These networks enable people to learn together, enjoy activities together and exchange advice and information. At the global level, GROW linked people from all corners of the world interested in food growing, data, sensing, art, environmental policy and citizen science, therefore directly contributing to **SDG 4,** and especially Target 4.7[12] Statistics on the geographical reach of learners was presented in Deliverable 3.2 *Replicability of GROW outside EU borders.* All the details for each of the online courses GROW has created and general enrolment statistics can be found in WP1 Deliverable 1.4 *Report on Missions Outcomes.*

One of the barriers to achieving the SDGs is that their global formulation can be too removed from the day to day realities of local communities across the world. As part of the MOOCs, learners were asked to share ideas on how the SDGs could be "translated" from their global perspective into a more actionable format at the local level. Below we share a couple of quotes from learners:

"*Maybe have local SDG champions to explore the goals with local communities, starting with choosing the one that the most members of their particular community are likely to agree on, so that relationships are built before moving on to ones that would be more difficult to accept for that community. Also I would say, go back to first business planning principles, in other words explore the basic goals themselves and not the literature, strategies and plans that are likely to have been developed in relation to them already elsewhere*."
(MOOC learner)

"As a retired teacher, I am particularly interested in how schools can be involved in translating the SDGs into more actionable formats at the local level. Many of the SDGs are targeted at the future of our planet and so school students today will be particularly affected by progress (or lack of) towards the achievement of the SDGs.

[10] 13.3.2: Number of countries that have communicated the strengthening of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions. More information : https://medium.com/grow-observatory-blog/how-citizens-and-communities-can-take-climate-action-62bcdb2183a5

[11] Target 15.9: By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts. More information: https://medium.com/grow-observatory-blog/shifting-the-paradigm-global-ecosystem-health-and-local-growing-948ce35394dc

[12] Target 4.7: By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development

This should be sufficient motivation for students to be involved in actions suited to their age that support the SDGs. In schools it is easy to target these actions at the local level and also involve parents working with their children at either a community or family level."
(MOOC learner).

Additionally, GROW has hosted public events to support and promote the SDGs, such as GROW's "Citizens and Open Data for Sustainable Development" event (Athens, February 2019).[13] In December 2018 GROW also held a series of events in different countries to celebrate World Soil Day.[14]

COs and the GROW Observatory, in particular, are in a strong position to make the links between the underpinning progress that lead towards the SDGs, and citizen-generated environmental and food growing data. Enabling citizen scientists to monitor their own environment provides two advantages: first, the creation of locally generated data to improve accurate information for that area, and second, through the training and data collection process, increasing the number of engaged citizens. The GROW activities and communities are a good illustration of a CO building capacity for citizens to get involved in governance and policy making, by enabling citizens to take part and demonstrate how their actions can contribute to achieving these global goals.

GROW work on awareness raising

Awareness raising is key to the promotion of bottom-up participatory governance processes. In this regard, GROW put great effort in informing European citizens on what participatory governance is and on the tools they have available to contribute to policy making (see Section 5.3).

1.7 Engaging citizens in policy making: using MOOCs

In order to educate citizens that GROW aims to engage, ensuring that they are equipped with background knowledge about the agricultural subjects and management practices the program advocates, Massive Online Courses are in development to be administered to all GROW participants. The fourth GROW MOOC was developed covering topics on Participatory Governance, including:

- Moving from data to action
- Defining what positive change citizens wish to create in their community and how to go about monitoring change through community-based level indicators
- Introduction to participatory governance
- Participatory Governance e-channels in Europe
- Creating impact at the global level: How GROW is contributing to the Sustainable Development Goals
- Successful case studies of participatory governance in Europe and raise individual interest in initiating these processes within learners' own communities.

MOOC4 ran in November 2018. As the project's end date was October 2019, a 2nd iteration of MOOC4 in 2019 was not possible. For this reason, the governance content was transferred from

[13] https://medium.com/grow-observatory-blog/greece-citizens-and-open-data-for-sustainable-development-event-b7f265a951c9
[14] https://medium.com/grow-observatory-blog/join-us-for-world-soil-day-e5b241e3dc02

MOOC4 to MOOC3 iteration 2, which run in May 2019, offering learners two iterations of the policy-related content. Appendix 4 includes a set of slides that was included in the MOOCs in a video format.

The details of the MOOCs, including levels of participation, are presented in WP1 Deliverable 1.4 Mission Outcomes. In this section, we would like to share the two successful case studies of Participatory Governance were highlighted in the MOOCs the implementation of the European Commission's Water Framework Directive, or WFD, in Germany (2001-2028), and the recent Portugal Soil Partnership (2015).

The WFD was passed on December the 20th 2000 by the EU Commission, with a goal of completion by 2027. The WFD was designed to resolve water usage and quality issues. The EU Commission strongly encouraged that participatory governance approaches be used to implement the WFD at the national level, and in Germany, authority over its implementation was given exclusively to stakeholders. Implementing the WFD in Germany has been unique, because efforts have limited federal government support. Alternatively, the design and implementation of legislation is coordinated by actors working on every level of the national water system. Members of nature conservation organizations, the National Farmers Union and National Fisheries Organization, work within three advisory boards at the Schleswig-Holstein district level to oversee the activities of 34 working groups that work at the provincial level to prepare water quality guidelines and measures of improvement.

The National Soil Partnership of Portugal was selected as a second case study for the MOOC, due to the perspective it lends on the successfully implementation of an international agriculture framework. Using the Global Soil Partnership (GSP) as a model, Portugal implemented the Portugal Soil Partnership in 2016, creating a platform for collaboration between the Director General of Agriculture and Rural Development, technical specialists within a Secretariat and farmers. Direct farming community engagement is supported through events and workshops organized by the Partnership secretariat. Through these collaborations, Portugal has adapted the VGSSM to the specific structure of their own agricultural sector, writing a national set of "Soil Management Guidelines."

On the level of governance, the success of the WFD program in Germany so far shows how greatly citizens can contribute to solving environmental problems that affect their community, when the government supports their participation in policymaking processes. Moreover, the Portugal Soils Partnership demonstrates that international frameworks can lead to national change if these are engaged with and aligned to the community level.

By presenting these case studies, the MOOCs raised awareness of potential participatory governance strategies that are applicable in all national contexts. One of the learners commented:

> *"I was not aware of any of the cases presented in the study. Very interesting! Participatory government is a really promising concept. It is not always easy to implement but as the movement grows I believe new organisatory tools will develop to make the process smoother. The Portuguese example is very encouraging, I will use that case in a course I teach!"*
>
> (MOOC learner)

With regards to the topic of Participatory Governance e-channels in Europe, many of the learners commented on their knowledge of online petitions, but were not aware of channels such as Debating Europe or Futurium. Other comments included:

"I knew none of those mechanisms even though I have signed online petitions just not in connection with the EU. That is very exciting and interesting. I know it has nothing to do with this course but I would explore all these tools in connection with Brexit."
(MOOC learner)

"Perhaps I am a little jaded but all this looks highly bureaucratic - Only groups with access to fairly large amounts money are likely to be able to go through the whole process without being blocked by vested interests"
(MOOC learner)

"No I was not aware of these participatory measures, i think some sort of intermediary is needed for most ordinary people to be able to contribute. I certainly rely and support pressure groups that share my values like Friends of the Earth, and Greenpeace to alert me to issues and to raise petitions and submissions and Extinction rebellion to take action."
(MOOC learner)

The MOOCs encouraged citizens to contribute to policy solutions for agricultural problems that affect them by:

1. Searching online for policies that already exist at the community level, as well as for stakeholder groups such as farmers organizations or environmental advocacy groups, that are working on the agricultural or environmental issue at hand, then establishing contact with them
2. In cases where no policies exist, organizing a petition with like-minded people to send to their local government representative for participatory processes to be established.
3. Making use of FAO tools, materials and contacts that exist to support daily environmental decisions and work. Possibilities are emphasised for individuals to contribute their inputs to the development of global and regional guidelines and frameworks by responding to calls of participation.

1.8 OPI Workshop

On 3 and 4 September 2019, the OPI organized a multi-stakeholder policy workshop in Brussels, Belgium (see the workshop agenda in Appendix 5). Overall, twenty-six policy makers, advisor to policy makers, researchers and champion farmers contributed to the discussion (see list of participants in Appendix 6). The workshop aimed at (1) raising the awareness of policy-makers on the potential contribution of citizens and COs in policymaking, and (2) at gaining a better understanding of policy-makers' data insight needs and priorities to assess whether these can be collected by or addressed through citizens and COs.

The meeting was opened by Mr. Rodrigo De Lapuerta Montoya, from the FAO Liaison Office with the European Union and Belgium, and by Mr. Petros Kokkalis, European Member of Parliament, who recognised the importance of citizens and COs in natural resources management and conservation which is often overlooked. However, it is evident, and GROW has demonstrated that, when properly designed, carried out, and evaluated, citizen science can provide sound science, efficiently generate high-quality data, and help solve environmental problems. Ultimately, citizens' participation in policy

making can contribute to developing more sustainable and easier to implement policies, with a referenced example of the new Common Agricultural Policy. The Sustainable Development Goals are giving great attention to monitoring activities so that worldwide, decision-makers and nongovernment organizations are increasing their use of citizen volunteers to enhance their ability to monitor and manage natural resources, track species at risk, and conserve protected areas. In light of recent findings that 68% of SGD indicators have not enough data to assess their progress GROW and the OPI team identifies COs as a key solution, yet there is still the need for a better understanding of the social, economic, and ecological benefits of citizen science from a number of stakeholders including policy related professionals and related governmental bodies.

Thereafter, Mr. Drew Hemment, GROW Principal Investigator from the Edinburgh Futures Institute, introduced participants to the GROW Observatory project, highlighting how COs are key to turn data into knowledge, insights and better-informed decision making. Ms. Lucrezia Caon from the Global Soil Partnership (GSP, FAO) summarized the work done by the OPI since the start of the project in 2016 in four blocks:

1. Research on the concept of participatory governance in Europe (see Section 2);
2. Assessment of the perceived contribution that citizens and COs could give to policymaking (see Section 3);
3. OPI activities on awareness raising (see Section 5.1 and 5.2);
4. Development of strategies to demonstrate the added values of citizen science and to overcome the barriers hampering citizens from contributing to policy and decision making.

Additional information on European policies for soil and land conservation, and for sustainable food production were provided by Mr. Pavlos Georgiadis from CulturePolis, who also moderated the panel discussion on bridging the gap between citizens, policy and data. Mr. Georgiadis based his talk on different policy briefs that were published on Citizen Science.[15] Ms. Marzia Mazzonetto from the European Citizen Science Association, Ms. Caon, Mr. Hugo De Groof from DG Environment and Mr. Wico Dieleman, champion farmer from GROW Place Netherlands were invited to share their experience on citizens involvement in policy formulation and data collection. The upcoming launch of the Global Soil Doctors Programme by the GSP of FAO is an example of the initiatives cited. Besides training farmers on the practice of SSM, the programme aims at involving farmers in soil assessment and monitoring through the execution of soil data collection and analysis activities. Data transferred to the national government will improve national databases, thus contributing to the establishment of national soil information systems to be used for policy formulation and SDGs reporting.

At the purpose of gaining a better understanding of policy-makers' data insight needs and priorities to identify the barriers in collaborating with COs, participants joined a World Café organized around four tables and topics:

- **Table 1: Policy and Citizens**
  Core question: *"How can we use citizen science and Citizen Observatories to engage citizens in policy processes and participatory governance?"*
  Facilitator: Dr. Raquel Ajates, University of Dundee
- **Table 2: Policy and Politics**

[15] Policy Brief #1 "BioBlitz: Promoting cross border Research and collaborative Practices for Biodiversity Conservation", Policy Brief #2 "Do It Yourself Biotechnology (DIYBio) for open, inclusive, responsible Biotechnology", Policy Brief #3 "Citizen Science and Open Science. Synergies and Future Areas of Work" available on : http://togetherscience.eu/about/deliverables

Core question: *"What are the data insight needs and priorities required by policy-makers?"*
Facilitator: Ms. Lucrezia Caon, GSP, FAO

- **Table 3: Science**
  Core question: *"What opportunities and barriers do citizens, scientists and policy makers face to collaborate with citizen observatories?".*
  Facilitator: Mr. Pavlos Georgiadis, CulturePolis
- **Table 4: Technology**
  Core question: *"How can new sensing technologies and open citizen-generated data foster service Innovation?"*
  Facilitator: Mr. Andy Cobley, University of Dundee

Facilitators were all members of the GROW consortium identified based on their field of expertise and role in the project.

Under the **theme "Policy and Citizens"**, the definition of "citizen", "governance" and "government" was put under discussion. It was stressed the need for a CO to connect to global issues and to become a platform to connect people. In order to build trust and become a translator of knowledge to different groups of stakeholders, a CO should focus on something positive rather than on threats and avoid prioritising specific types of knowledge (e.g. scientific knowledge over farmers' knowledge of their land). Awareness raising activities and training can help empowering citizen groups and increasing the commitment of young people to the cause especially. Ultimately, these will contribute to overcoming social barriers. Other insights and questions posed by this group included:

- How many COs would be needed and what geographical level?
- Is "citizens" the right word to use? Some attendees felt citizens refers to urban populations. Some farmers do not identify with that label;
- The creation of connections with local councils that could be set up at the local level to encourage face to face interaction and local engagement. COs could offer a platform to create a network of councils at EU level;
- The need to be clearer about the difference between *government* and *governance;*
- Raising awareness and providing training are first steps to empower citizens;
- There is some degree of scepticism about policy makers wanting to "hear" citizens, but empowered citizens who also have data can put better informed pressure into politicians
- COs ability to help politicians with the "fear of finding out" new policy problems and not having the capacity to deal with them.
- Can COs be neutral if they represent/are commissioned to carry out data collection by a specific group of actors? Do citizens face the risk of being "used"?

The **theme "Policy and Politics**" was analyzed at three levels: EU level, national level and local level. The perceived needs and priorities of each level were identified, these are presented in Table 2.

Table 2. Needs and priorities at the local, national and European level

	Needs	Priorities
EU Level	• Data for monitoring the status of the environment and the improvements derived by implementing policies • Harmonized data in terms of units, methods, etc. In this regard, a protocol of collection of the samples is needed	• Have open access data for policy implementers to use
National level	• Local data to report to the EU and international bodies • Data to tailor the rural development plans (e.g. direct and indirect costs of the concrete application of a measure) • Need for in-situ data • Need for data on soil biodiversity, diffuse contamination and emergent contaminants. Need to show that there is a problem in order to support policies. • Data, frameworks, Directives, etc. need to be aligned with EU requests	• Soil data acquired at the local level need to be brought up to and used the national and EU levels to improve smaller scale related policies • Collaborative identification, implementation and dissemination of solutions • Availability of cross data in terms of soil quality and farming techniques • Understanding farms and farmers. Visiting the farms can help to share knowledge. • Quantify the value of the measure in terms of ecosystem service • Acquire data on protected species and invest in data validation (needed to report to the EU too)
Local level	• Data for modeling, which strongly contribute to the provision of recommendations and the identification of solutions • Data for reporting on the SDGs	• Harmonization of all stakeholders needs so to present consolidated needs to policy and decision makers

Under the **theme "Science**", participants raised the following issues:

- Concerns about data robustness, which links to the tendency of researchers to be in control of the experiment. Indeed, data collected by citizens might be rejected by the scientific community and thus not reach policy and decision makers.
- Lack of citizens' research literacy can be overcome by well defining the methodology of the CO and by creating more opportunities for co-design measures.
- Other barriers identified were: access to technology (e.g. internet access), attitude towards technology, concern about the confidentiality of the data collected, and the sustainability of the observatory.

- Quantitative and qualitative measurements – scientists are sceptical about quantitative data quality. Simple protocols are better than complex ones with different layers of observations and data requests.
- Evidence – some policy makers do not know how to translate data into policies with objectives and clear indicators – but this is an opportunity for COs to generate proposals, also for policy makers wanting to shape an environmental policy to request CS evidence to support it.
- Machine learning will improve earth observation and sensing.
- Media and experts can help with awareness raising.
- In some cases, land values can be affected by COs' activities, which links to ownership of data and unexpected implications of open data: e.g. soil contamination – project is asking for postal code so that they know the village but not the specific address. In some countries is a legal obligation to share info on land for sale regarding contamination.

Under the **theme "Technology"**, the existence of a pyramidal system relying on data collection at the bottom and wisdom at the top was recognised. Participants stressed how this system should operate as a continuous feedback cycle and how user experience would increase the quality of the data collected. Still, innovation can be into look or outlook. Questions raised by this group included:

- What is innovation? Who is it for? For Citizen Science? Or on environmental management?
- The user experience of using technology – open source technology and hacking enables people to add other capabilities to the technology that had not been incorporated into the original design.
- CS can also provide feedback on technology to improve it.
- Innovation can be inward/outward looking at the same time – look at the system inwardly and how it can be improved while at the same time, the system is producing data and you can consider outward looking innovation i.e. how the current system in its current status can generate innovation
- COs need to ensure a feedback loop and circularity to improve the system.

The workshop closed with a session on co-designing climate innovations and solutions for overcoming major barriers in COs operations. The novel methodology for this co-design session is described in detail in WP1 *Deliverable 1.4 Mission Outcomes* along with results from other Co-Design for Climate Innovations Workshops run by GROW with other groups of stakeholders. The workshop methodology received the Academy for Design Innovation Management (ADIM) 2019 Top III Workshops Award in London (see announcement on the conference website: https://designinnovationmanagement.com/adim2019/). A public report from the ADIM event including a more detailed description of the methodology and examples of session outputs can be accessed here: https://discovery.dundee.ac.uk/en/publications/design-for-climate-services-a-co-design-approach.

While farmers worked on "winning farmers' trust", researchers worked on the "validation and standardization of data collected by COs". Possible ways to win farmers' trust are:

- Approach farmers with options rather than with solutions or co-design solutions with them;
- Contact and work with champion farmers not only at the national but also at the international level. Besides being stimulating, working with champion farmers will help COs to make contact with the community and get accepted by them.

Possible ways to address the issue of data validity are:

- Numbers should be evaluated before becoming data;
- Verified data should be used for publishing in recognized journals where the data source
- should be acknowledged;

Workshop attendees' highlights and insights

- The good work done by the project in terms of networking, use of sensors, observations from the GROW places and monitoring activities was acknowledged by participants;
- COs are good for bringing people with a same idea together;
- Need for defining a strategy to promote education and investment on youth, policy, and CO in Europe;
- Need to identify a reliable funding mechanism to spread the project around Europe;
- COs should train citizens for them to be able to follow protocols and work with scientists;
- The methodology to implement CO activities oriented to data collection and policy development should be simple. Easy to use tools are recommended;
- Politicians need to know about the implications of soil health for health and sustainability and how to get farmers to adopt more regenerative soil management and food growing practices. In this regard, a better analysis of the triggers of and barriers to change should be carried out;
- Need to discuss citizen science outputs' ownership and exclusivity;
- Need to involve farmers in the process of data interpretation as they should not only provide data;
- The purpose of stakeholders associations is that of neutralising conflicts by making people agreeing on some same points to bring to the attention of policy makers;
- Participants feared that COs are just a European mode;
- The proposal to work on urban soils was made.
- Local media should give COs visibility to foster collaboration between scientists and citizens.

Conclusions

COs were identified to be favorable potential facilitators of a bottom-up participatory approach to soil and land governance. Acknowledging the potential of participatory governance to improve acceptance of decisions and commitment to policy implementation among stakeholders, the European Union invested in the development of awareness raising and citizen engaging tools. However, citizens' participation in decision-making resulted strongly dependent on citizens' education and age (see Section 1.4). The constraints hampering the contribution of CO to policymaking varies with the country and it is proportional to the availability of extension services and intermediary knowledge brokers. In accordance to these observations, the OPI revealed the need for policy bodies to invest in the development of online courses and other participatory tools and systems. The organisation of training opportunities to get citizens to work with scientists was also recommended.

The conclusion on the activities launched in the framework of GROW (MOOCs, interviews and policy workshop) suggest that COs could help gathering environmental data especially in Eastern and Southeastern European countries, and in arid countries in the Mediterranean Basin. However, the issue of data validation should be considered when developing data collection schemes. Indeed, the

participation of citizens in policymaking is perceived as a grey area. 31% of respondents to the OPI survey figured that governments would not accept citizen-collected data at all. 32% believed that citizen-collected data would be welcomed by policymakers but would be considered less reliable and could not be used as justification for their legislative decisions unless thoroughly quality checked.

Respondents agreed that for citizen data contributions to be accepted by policymakers, preliminary steps must be taken to educate participants and to create data reliability. Ultimately, data collected by citizens will have the best chance of affecting policy if it is:

a) Reported online with pictures as evidence of observation,
b) Collected in great volume to prove statistical relevance of observations, and
c) Linked to a spatial database to contextualise it by location.

For data validation, it was recommended to government departments to generate regional baselines for the data categories, to be entered into their individual web platform accounts. Then, a simple statistical model can be built into the platform that compares patterns in data results to the regional baseline. If this is not possible, then observation-based data would be the most welcomed by policy makers. In any case, citizens and farmers should not be seen only as data providers but should be involved in data analysis and interpretation to enable them to benefit from sensing activities and data at the individual and community level.

Other barriers to the use of COs for data collection and policy formulation were identified to be citizens' lack of trust towards government and the financial resources made available by the government to promote COs activities. Citizen trust towards government is an important barrier that can be overcome through improving the communication between the government and the citizens, and by designating a central decision-making role to community groups: farmer organisations and relevant local non-governmental organisations. Incentive schemes such as subsidies or sanctions on irresponsibly cultivated products could support COs activities although they are particularly hard to implement, due to evaluation costs.

In conclusion, the use of Citizens' Observatories (COs) by regional, national and local governments is believed to be an interesting lever to contribute to the achievement of many of the SDGs. Indeed, it can bring increased trust in official statistics, as citizens can see their own data reflected in them. It can also improve relationships between governments and citizens because of increased levels of understanding on both sides and provide new potential proxy indicators particularly for difficult to measure Tier 3 indicators, which do not yet have standardised international methodologies.

As described in detail in WP3 Deliverable 3.6 *Business Plan for the GROW Observatory*, policy consultation for more informed decision making is an important part for GROW. On the other hand, and being pragmatic on the research carried out, there is not enough market validation to suggest is a core part of a service proposition, and the challenges ahead, e.g. lack of government resources to support continuous CO activities and some concerns around data validity, have been discussed in this document.

However, these concerns are gradually being overcome as policy makers realise the value and savings that COs can generated, e.g. during CO events. GROW and COs in general, have demonstrated their capacity to transform policy design and make citizens an integral part of it, and we believe this is the future of policy design. Robust citizen science methodologies and procedures have

being implemented by GROW to increase trust on citizen-generated data and we hope these will contribute to the future role of COs in policy making at both national and EU level.

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Appendix 1 – Country Profiles

Policymaking tools are the following: A: A citizen channel to communicate with government, B: Citizen participatory platform for policy needs, C: Citizen Observatory (CO) for obstacles to policy, D: CO for environmental data, E: Online courses, and F: Area to conduct case study of policy decisions. Soil data most important to COs listed were : Soil moisture data, Land use and land cover data (LULC), Soil texture/stones data, potential near real time gridded products (useful for the validation of satellite data), data to develop and validate soil indicators, local plant information: cultivars, planting/harvesting dates, plant requirements and others. () is the number of replies received. See Appendix 2 for the complete survey.

Country	**Tools most interested in**	**Soil Data Most Important to CO (Y/N country interested)**	**Online Courses most wanted**
Austria	-	1. Soil Texture 2. Soil health indicators	- Healthy soil/water management - Ecosystem services
Belgium	All tools	1. LULC 2. Soil Indicators	- Soil and water management (2) - Ecosystem services (2) - Participatory Governance
Bulgaria	A, D, E	**Y.** 1. Soil Moisture 2. LULC 3. Soil texture 4. Real time satellite imagery data	- Healthy soil and water management (3) - Ecosystem services (3)
Bosnia and Herzegovina	All tools	1. Soil Moisture 2. LULC 3. Soil texture 4. Soil Indicators	-
Croatia	-	1. LULC 2. Satellite 3. Local plant info	-
Cyprus	D	**Y.** 1. Soil indicators 2. LULC	-
Czech Republic	-	**Y.** 1. Soil indicators	- Sustainable soil/water management (4)
France	A, B, D, F	**Y.** 1. Soil Moisture 2. Soil texture 3. LULC 4. Soil Health indicators	- Sustainable Soil/water management (5)
Germany	D	**Y.** 1. Soil health indicators 2. Real time satellite measurements Groundwater measurement	-
Greece	D	**Y.** 1. Soil moisture 2. Soil health indicators 3. LULC 4. Local plant info	- Soil/water management (6) - Participatory Governance (2)

Ireland	-	**Y.** 1. Soil Indicators	-
Italy	B	**Y.** 1. Real time gridded soil data through satellite 2. Soil health indicators 3. Soil moisture	- Healthy soil/water management (7) - Participatory Governance (3)
Lithuania	D, F, E	**Y.** 1. LULC 2. Soil Texture 3. Real time satellite grid	- Healthy soil and water management (8) - Ecosystem services (4)
Macedonia	**D**	**N.** 1. Soil Texture 2. Soil health indicators	-
Portugal	A, B, C, D	All listed data points	- Healthy Soil/water management (9) - Ecosystem Services (5)
Romania	E, F	All data, besides satellite info	- Ecosystem services (6)
Scotland	A, B, C, F	**Y.** 1. Soil Moisture 2. Real time satellite data 3. Soil Indicators	- Soil and water management (10) - Ecosystem services (7)
Slovakia	A, C, E	1. Soil Moisture 2. LULC 3. Soil Texture 4. Soil Indicators	- Soil and water health (11) - Participatory governance (4)
Spain	D	**Y.** 1. Soil moisture 2. Soil indicators 3. Real time gridded data 4. Soil depth	- Healthy soil water management (12) - Ecosystem Services (8) - Participatory Governance (5)
Ukraine	E	All data categories, except Plant info	- Sustainable Soil/water management (13) • DEM soil mapping
United Kingdom	All tools	**Y.** All data listed	- Sustainable soil/water management - Ecosystem Services

Appendix 2 – Survey Issued

OPI - Preliminary questions to policy makers

According to you, which environmental data are needed the most in your country and in Europe?

A. Soil moisture data
B. Land use and land cover data (LULC)
C. Soil texture/stones data
D. Potential near real time gridded products (useful for the validation of satellite data)
E. Data to develop and validate soil indicators
F. Local plant information: cultivars, planting/harvesting dates, plant requirements
G. Others, please specify_____

According to you, which of the following tools are needed the most in your country and in Europe?

H. A citizen channel to send "communities" targeted messages using campaigns on policy related guidance

I. A citizen channel to acquire feedback from "communities" for existing or planned policy initiatives, changes

J. A citizen participatory platform for public voice on new policy directions (public initiated ideas, grass roots issue identification)

K. A public funded citizen observatory for measurement of environmental variables - a source of data (currently part of GROW)

L. A public funded citizen observatory for measurement of specific, new, transient or permanent observations (currently not part of GROW)

M. A potential test-bed for validation of impacts of certain policy decisions before universal roll out related to food and agri practices

N. Online courses on:

    a. the ecosystem services provided by natural resources
    b. sustainable soil and water management practices
    c. participatory governance
    d. Others, please specify _____

O. Others, please specify_____

Is there any specific geographic area where data are needed the most?

Is your country/region investing in monitoring activities on soil and water? If yes, is this related to the achievement of the SDGs or is it a country driven activity?

How do you see the involvement of citizens in data collection? Do you think that data collected by citizens will be welcomed by policy makers to, for instance, validate satellite data and environmental models, or would they be considered unreliable? Otherwise, how can these data be used the best?

Who are potential buyers of data collected by citizens?

Do you think it is worth to invest in citizens' observatories and therefore increase the participation of citizens in policy making and data generation?

Which are the main barriers to the use of citizen observatories' for data collection and policy formulations?

Do you think that citizens are properly informed on how to participate in the policy making process in your country and in Europe? Is there any specific platform/tool to promote participatory governance in your country?

Is there something you think we should have asked you but haven't yet?

Appendix 3 – Application of national soil health programmes and barriers per country (Individual interviews)

3.1. Framework Adoption and National Soil Health Programs. () is the number of replies received per countries.

Country	Frameworks Adopted	National Soil Health Programs Currently in Place	Insights
Austria (3)	Austrian Soil Science Society works to apply official guidelines on fertilization **How:** every region given authority over their own soil management guidelines. They meet to coordinate activities	Austrian Soil Science Society guidelines LANDMARK Steering Committee collaborates, with AGES and others, to promote regional organic food production for soil and human health	- Communicate research results to farmers non-technically – recommendations - Approach creation of new regulations considering the regulations that farmers are already balancing
France (2)	The 4 per 1,000 Initiative: Adopted nationally under the framework of the Lima-Paris Action Plan (LPAP) **How:** Mobilization of French Farmers organizations. Agricultural Organizations are listed as official members, many of which represent farmers. These organizations are invited to events and workshops.	The Global Conservation Agriculture Network	- It is better to invest in education, trainings, farmers projects led by farmers - Big farmers organizations negotiate with government for subsidies - Subsidies are not a good way to promote changes in agriculture because monitoring is too expensive to do. - Best to host workshops, rather than conferences, in farming regions, otherwise farmers won't have the time or funding to attend, and teach conservation practices, placing emphasis on future benefits.
Republic of Northern Macedonia (1)	If the Ministry of Agriculture is approached with guidelines, they will accept them if they are given support by an international donor	None	
Italy (4)	Limited	The European Soil Conversation Group works to implement projects in Italy, not necessarily frameworks	- Farmers are always engaged with directly to facilitate knowledge and tech transfer - Trust between farmers and local authorities is good, communication happens - GROW could provide channel for increased communication
Lithuania (1)	Rarely implemented due to lack of national budget, Environmental issues not	National monitoring systems exist for soil pollution, but	- Farmers do not trust advice of government authorities over tradition. Suggested to work through NGOs

	given priority	environmental issues always secondary to human health issues.	rather than government as often as possible to encourage communication
Portugal (8)	The FAO Voluntary Guidelines for Sustainable Soil Management (VGSSM) was implemented by the Portuguese National Soil Partnership	Yes, the VGSSM was used to create nationally specific SSM Guidelines	- Portuguese Farmers are engaged directly through the program and are motivated to participate, as they are deeply impacted by soil health issues
Scotland (1)	More focus on national plans	The Soil Monitoring Action Plan (Soil MAP) to support the collection of soil data and makes information available that meets the need of identified users	- Key was improving communication between variety of users and identifying who needs soil data, what the gaps are, successfully

3.2. Barriers to Framework and Soil Health Program Implementation. () is the number of replies received per countries.

Country	Barrier	Proposed Solution
Belgium (1)	- An education system, standardized to overcome stigma against citizen science. - Standardization of citizen data collection	- A **citizen science training system** should be designed for the long-term; in a way that it could be applied to diverse future projects, established as a tool that will allow government to always factor in social dimensions of an issue - Platform with pictures included, reduces some doubts
France (2)	- Farmer participation in the formation of these programs, as farmers are not well represented outside of associations, cannot attend decision-making meetings because they have to take care of their land - Lobby strategies prevent new-comers to influence - Budget prevents decisions from being executed	- Platform to foster better communication between farmers associations and individual farmers – connect the network to allow for knowledge exchange - Government regulation of lobbies - To encourage budget allocation, create clear Cost-Benefit analysis of proposed management practice changes, in terms of human health, ecosystem services and environmental quality improvement
Italy (4)	- Trust between farmers and government required on both sides: farmers may spread false data to influence government investment	- Allocate **bulk of resources to extension services and local government**, that can work together with farmers to collect data and design programs
Lithuania (1)	- Farmers refusing to trust or work with government - Impact of subsidies hard to assess, makes subsidies inefficient	- Always implement government programming **through NGOs and farmers** organizations – make them primary collaborators - Invest instead **in training and educational programs,** raise awareness about and teach to assess the long-term costs of environmental degradation
Republic of Northern Macedonia (1)	- Lack of investment on soil, whereas citizen action only ever motivated through funds	- Donors must be identified and mobilized at the national level

Portugal (7)	- Consistency of data collected by farmers - 3rd party to check citizen-collected data	- Prioritize communicating utility of data (translating environmental improvement to economic benefit) to increasing farmer profits primarily, above explaining environmental benefits **- Support extension services** with funding and training to allow them to participate, generally, in implementing international frameworks locally
Spain (6)	- Farmer attention is not on soil degradation: it's on innovation and machinery enhancement - New generation farmers/organic more willing to engage than traditional - Farmers repelled by government and will not engage	- Incorporate **seed funding for new**, more sustainable but also yield enhancing machinery - Engage new generation first, but **support Urban market creation** for all: spaces in cities for rural farm products to be sold will grab attention of older generation - GROW should **mobilize farmer organizations, engage extension services, work to support/fund median agencies** between farmers and government *instead of trying to act as median agency*
Ukraine (1)	- Lack of farmer engagement - Validating citizen data	- Translate **the result of soil data to monetary value: project value loss** induced by soil erosion and communicate it clearly to farmers - Treat data as observations to a. direct attention towards env. Trends. b. validate expert data

Appendix 4 : Slides included in the MOOCs in a video format.

Participatory Governance Success Story

The Water Framework Directive: Germany

The Water Framework Directive (WFD):
Citizen-designed framework to resolve water usage and quality issues

Participatory River Basin Management (RBM) organized by Interest groups:

- **The Nature Conservation Sector**
- **National Farmers' Union**
- **National Fisheries Organization**

And **citizens** within working groups at the provincial level. While the *Federal Ministry of Agriculture, Environment, and Rural Areas* attends working group meetings, **it has no right to vote.**

Allocating **control over water quality measurements to community groups** has greatly increased citizen trust in the program.

growobservatory.org

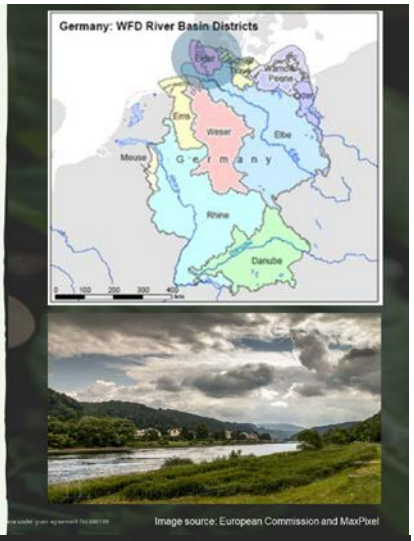

Image source: European Commission and MaxPixel

Portugal's National Soil Partnership

Partnership between: The Ministry of Agriculture and Rural Development → Academics → a Secretariat → Farmers

Parceria Portuguesa para o Solo

Department of Agriculture and Rural Development

Soil workshop, Coruche, 2017: "Observation and interpretation of soil profiles in the field of Sustainable Soil Management"

Has gained 30 national partners to increase regional collaboration

Parceria Portuguesa para o Solo

SPCS Sociedade Portuguesa da Ciência do Solo

Rede Rural Nacional

PDR 2020

PROGRAMA DE DESENVOLVIMENTO RURAL 2014-2020

PORTUGAL 2020

Accomplishment: Adapted FAO's **Voluntary Guidelines for Sustainable Soil Management** to Portugal's Ag sector

Image sourcere

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 690199

Lessons from Case Studies: How to get involved with Participatory Governance at Home

Research policy opportunities

Search online for policies that already exist in your community, as well as for stakeholder groups such as farmers organizations or environmental advocacy groups

Reach out

Get in contact, over email, the phone or in person meetings with the government departments and stakeholder groups working on agricultural issues.
Ask them what participatory processes already exist!

Gather like-minds

Organize a petition with like-minded people to send to your local government representative for participatory processes to be established

Contact the Global Soils Partnership (GSP)

Contact the FAO GSP for support or to contribute knowledge addressing soil health issues!

growobservatory.org

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 690199

Images source: Wikimedia commons and FAO GSP


Main Barriers Facing Participatory Governance Programs like the GROW Observatory Policy Interface
According to a GSP Survey
• Barrier 1: Lack of citizen education awareness of problem being addressed or about policymaking process
• Barrier 2: Lack of trust between Government agencies and citizens
• Barrier 3: Trainings and regular quality assessments.
• Barrier 4: System of monitoring progress and demonstrating success.
Data source: GSP survey concerning GROW OPI
growobservatory.org


Proposed Solutions
• Solution 1: Spread awareness through media and workshops, about problem and citizen ability to shape policy
• Solution 2: Contact farmer organizations or NGOs at community level, co-organize events/courses. Make sure benefits of reform are clearly communicated
• Solution 3: Web services for citizen use, updated with EU specialist data
• Solution 4: Citizen feedback mechanism incorporated into web services
growobservatory.org
Images source: Wikimedia commons


GROW
OBSERVATORY
Thank you for your attention!
Remember, you have the power to shape agricultural policy
Presenter
The Food and Agriculture Organization of the United Nations (FAO)

Appendix 5 – Agenda of the OPI workshop (3-4 September 2019, Scotland House, Rond-Point Schuman 6, Brussels, Belgium)

3 September (10.00 - 17.00)

Start	End	Session
10:00	10:30	**Registration / coffee**
10:30	10:35	**Opening remarks** *Mr. Rodrigo De La Puerta Montoya, FAO* *Liaison Office with the European Union and Belgium*
10:35	10:50	**Introduction to the GROW Observatory** *Dr. Drew Hemment, Edinburgh Futures Institute, GROW Principal Investigator*
10:50	11:05	**Introduction to the Observatory Policy Interface (OPI)** **Policy-making: needs, gaps, good practices** *Ms. Lucrezia Caon, Global Soil Partnership, FAO*
11:05	11:20	Q&A session and discussion
11:20	11:50	**Bridging the gap between Citizens, Policy and Data** • "Consolidating European policies for soil & land conservation and sustainable food production" Presentation by *Mr. Pavlos Georgiadis, CulturePolis* • "GROW Place Netherlands" Presentation by *Mr. Wico Dieleman, GROW Place Netherlands* • "Challenges & Opportunities for Participatory Governance for Sustainable Development in Europe" Presentation by *Mr. Petros Kokkalis, Member of European Parliament*
11:50	12:50	**Bridging the gap between Citizens, Policy and Data** Panel Discussion followed by Q&A Panelists: • Ms. Marzia Mazzonetto, ECSA - European Citizen Science Association • Ms. Lucrezia Caon, Global Soil Partnership, FAO • Mr. Petros Kokkalis, European Parliament • Mr. Hugo De Groof, DG Environment • Mr. Wico Dieleman, GROW Place Netherlands Moderator: *Mr. Pavlos Georgiadis, CulturePolis*
12:50	13:50	**Lunch break and group picture**
13:50	14:10	**Introduction to World Cafe & session objectives** *Ms. Stephania Xydia, CulturePolis* *Mr. George Konstantakopoulos, FutureEverything*
14:10	16:10	**GROW Cafe** • Table 1: Policy and Citizens "How can we use citizen science and Citizen Observatories to engage citizens

		in policy processes and participatory governance?" Facilitator: *Dr. Raquel Ajates Gonzalez, University of Dundee* • Table 2: Policy and Politics "What are the data insight needs and priorities required by policy-makers?" Facilitator: *Ms. Lucrezia Caon, Global Soil Partnership, FAO* • Table 3: Science "What opportunities and barriers do citizens, scientists and policy makers face to collaborate with citizen observatories?" Facilitator: *Mr. Pavlos Georgiadis, CulturePolis* • Table 4: Technology "How can new sensing technologies and open citizen-generated data foster service Innovation? Facilitator: *Mr. Andy Cobley, University of Dundee*
16:45	16:50	**Wrap-up** Presentation of results & Prioritisation of challenges and opportunities

4 September (10.00 - 15.30)

Time		Session
10:00	10:30	**Registration / coffee**
10:30	10:45	**Welcome** **Aims for the Workshop & Personal introductions** *Mr. George Konstantakopoulos, FutureEverything*
10:45	11:00	**Identified barriers and opportunities from Day 1** Brief summary by *Mr. George Konstantakopoulos, FutureEverything*
11:00	10:45	**Introduction to "A Co-Design Approach to Citizens' Observatories Workshop"** Presentation by *Dr. Raquel Ajates Gonzalez, University of Dundee*
11:10	12:30	**Co-designing solutions for bridging the gap between citizens, data and policy Workshop** *Facilitators:* *Dr. Raquel Ajates Gonzalez, University of Dundee* *Ms. Stephania Xydia, CulturePolis* *Mr. George Konstantakopoulos, FutureEverything* *Mr. Pavlos Georgiadis, CulturePolis*
12:30	13:30	**Lunch break**
13:30	15:00	**Co-designing solutions for bridging the gap between citizens, data and policy Workshop** (continued)
15:00	15:30	**Concluding notes** *Mr. George Konstantakopoulos, FutureEverything*

Appendix 6 – List of participants in the OPI workshop

Fist name	Last name	Position	Affiliation
Marzia	Mazzonetto	Project Manager	ECSA European Citizen Science Association
Anne-Katrin	Bock	Policy Analyst	European Commission
Gerard	Rass	General Secretary	APAD - Association for the anthropology of social change and development [France]
Petros	Kokkalis	MEP (Greece - Syriza)	European Parliament
Mario	Catizzone		Save the Landscape Forum
Nerea	Aizpurua	Policy Officer	European Commission
Hugo	De Gruff	Policy Officer	DG ENV
Nele	Bal	Policy coordinator soil management	OVAM
Nora	Weis	Outreach & Communication	Heinrich-Böll-Stiftung Brussels EU
Breffni	Carpenter	Agriculture Counsellor	Permanent Representation of Ireland
Ana Margarida	Fernandes Esteves	Senior Researcher	Instituto Universitário de Lisboa ISCTE-IUL
Elizabeth	Wiltshire	European Programme Officer	The Democratic Society
Izabela	Freytag	Project Advisor	EASME Executive Agency for SMEs - European Commission
Nucia	Randrianarison	Consultant	COLLABORATIVE THINKTANK
Federica	Vaghetti		FAO Brussels Liaison Office
Claudia	Cordovil	Professor	Instituto Superior de Agronomia - University of Lisbon [Portugal]
Edoardo	Costantini	Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria	CREA - Council for Agricultural Research and Analysis of Agricultural Economics [Italy]
Tomasz	Poprawka	EU Policy Expert	Polish Science Contact Agency - PolSCA
Lisa	Haller	Junior Scientist	Research Institute of Organic Agriculture - FiBL Europe
Karin	Ulmer	Senior Policy Officer - Food Security / Trade	ACT Alliance EU
Josep	Pinyol Alberich	PhD student	University of Exeter

Wico	Dieleman	ZLTO	GROW Place Netherlands
Tania	Walisch	Centre for Ecological Learning	GROW Place Luxembourg
Rodrigo	De la Puerta	FAO RAP	FAO Brussels
James	Wardell		GROW Place Croatia
Jose	Navarro Pedreño	Professor	University Miguel Hernández of Elche

From the GROW Consortium

Drew Hemment, Edinburgh Futures Institute, University of Edinburgh

Andy Cobley, University of Dundee

George Konstantakopoulos, FutureEverything

Lucrezia Caon, Global Soil Partnership, FAO

Dr. Raquel Ajates Gonzalez, University of Dundee

Pavlos Georgiadis, CulturePolis

Stephania Xydia, CulturePolis

Theo Gerontopoulos, CulturePolis