groundtruth2.0

Environmental knowledge discovery of human sensed data

Deliverable D1.2

Updated Stakeholder and Context Analysis of the Demonstration Cases

The Ground Truth 2.0 project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 689744. www.gt20.eu

Deliverable Title	Updated Stakeholder Analysis of the Demonstration Cases
Status	Final
Related Work Package	WP1 Social dimensions: co-designing Citizen Observatories
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Dissemination level	Public
Due submission date	28.02.2018
Actual submission	28.02.2018
Project acronym	Ground Truth 2.0
Grant agreement number	689744
Funding scheme	H2020-SC5-2015-two-stage/Topic SC5-17-2015/Innovation Actions
Abstract of Deliverable	Ground Truth 2.0 conceptualizes of citizen observatories to enable a full feedback-loop between citizens, data aggregators and decisions-makers. Identifying and engaging all three stakeholder groups in the co-design process and in the sustained use of the CO is a key requirement for successful implementation of the concept. This document presents an updated stakeholder and context analysis for the GT2.0 project context, reflecting the experiences of the co-design processes implemented over the past year and providing input for the engagement strategy going forward.

Versions and Contribution History

Version	Date	Modified by	Modification details
v.01	14/01/2018	Ellen Pfeiffer	Revise Structure updated Stakeholder and Context Analysis
v.02	02/02/2018	Ellen Pfeiffer	Revision analytical framework
v.03	26/02/2018	Ellen Pfeiffer	Results Demo Case Interviews
v.04	28/02/2018	Ellen Pfeiffer	Analysis and initial submission completed

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1 Introduction

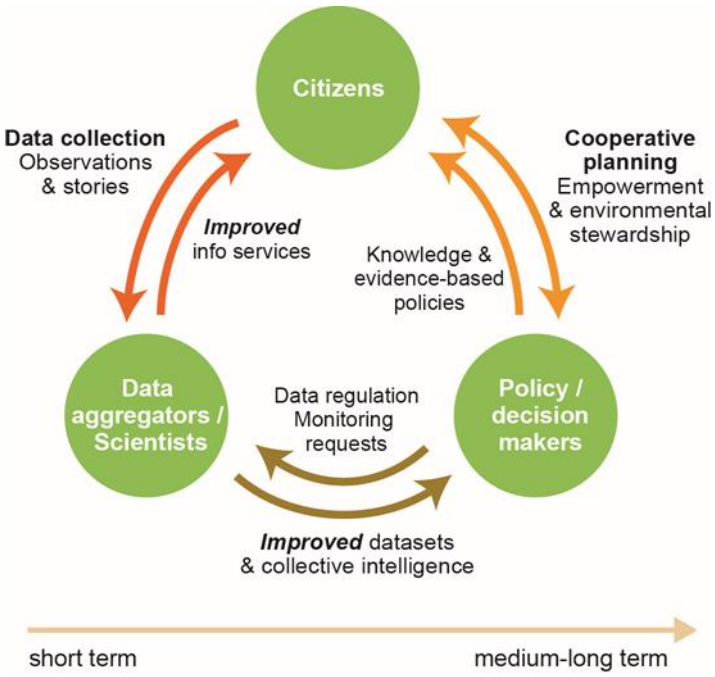
1.1 Background

The Ground Truth 2.0 project co-designs and validates six scaled-up Citizen Observatories (COs) in real, operational conditions in four European and two African Demonstration Cases. *A citizen observatory is a community of citizens, policy-makers and scientists using an **IT platform and tools** to support **stakeholder participation** and the **collection, exchange and use of information and knowledge** on a particular issue.*

The project demonstrates the technological feasibility and societal and economic benefits of such citizen observatories. The ultimate objective is the global market uptake of the concept and enabling technologies.

Ground Truth 2.0 conceptualized of citizen observatories to enable participatory monitoring, cooperative planning and environmental stewardship, by creating and strengthening a full feedback-loop between citizens, data aggregators and decisions-makers. Identifying and engaging all three stakeholder groups in the co-design process and in the sustained use of the CO is a key requirement for successful implementation of the concept (see Fig 1).

Fig 1 Core configuration of GT2.0 Citizen Observatories



The initial stakeholder and context analysis assembled an extensive list of relevant stakeholders for each Demonstration Case (DC), and outlined existing decision-making processes and context parameters. The analysis viewed stakeholders from different perspectives using a dedicated stakeholder analysis framework, reflecting the needs of different tasks in the project context (project management, co-design, IT development, business development).

1.2 Purpose and Structure of this Document

This document presents an updated stakeholder and context analysis for the GT2.0 project context, reflecting the experiences of the co-design processes implemented over the past year. Section 2 briefly reflects on the use of the GT2.0 stakeholder framework and summarizes the method for the updated analysis. Section 3 presents the empirical and analytical findings in the six Ground Truth 2.0 Demonstration Cases. Section 4 documents cross-cutting observations and outlines next steps and implications for the upscaling phase of the six COs.

2 Approach and Analytical Framework

2.1 Recall Baseline Analysis and Approach to Data Collection

The Baseline Analysis served to understand political and societal forces that might affect the Demo Cases, ensure that the approach is appropriate and effective for the situation, and provide insights useful for planning an engagement and communication strategy. For each demo case, we conducted a pre-screening interview, secondary data analysis, a case leader interview with context mapping and stakeholder mapping using a generic "search profile". Per case, between 50 and 80 different stakeholder groups were identified, and the timing and importance of their engagement rated by the Demo Case teams (see Box).

Analytical Dimensions Baseline Analysis

Pre-Screening:

1. Clarification of the issue.
2. Defining characteristics of the case context and local culture
3. Underlying motivations and perceptions of fundamental issues with current policy practice
4. Key actors driving the case
5. Potential Sources of Conflict

Context Mapping:

1. Case Boundaries
2. Political/Administrative Context
3. Environmental Boundaries
4. Social Boundaries
5. Economic Boundaries
6. Technical Boundaries

Stakeholder Mapping:

- Mapping of Core Stakeholders:
  - Recruitment Targets CO Community
  - Expert Advisors for the Design Process
- Mapping of the Enabling Environment:
  - Regulatory Entities
  - Allies and Umbrella Movements
  - Media and the Public
  - Opponents and Critics
- Screening potential buyers and investors

Stakeholder prioritization

Suggested Timing of engagement based on

- Importance of content contribution
- Important due to authority or potential for conflict
- Important for commercialization reasons

Process Screening

- Outline and type of the targeted process
- Ownership of the process and control over the agenda
- Attitudes to outsiders and laypeople

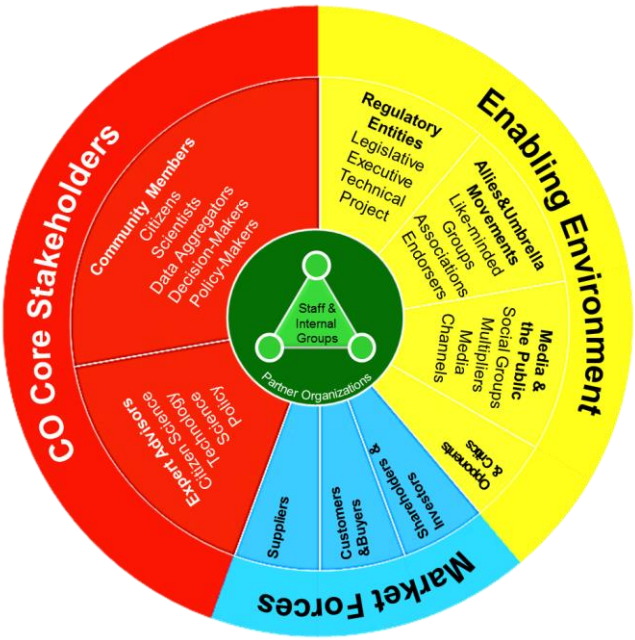
As the Demo Case communities are still in the early stages, the original inventory of stakeholders and 'search profile' of generic stakeholder groups is still relevant to identify stakeholders that might be a valuable addition to the Citizen Observatory, but have not been engaged or considered for engagement yet. Data for an update of the inventory was collected for each of the six GT2.0 Demonstration Cases via desk study of project documents and deliverables (especially Incentives & Barriers, Market Analysis, Functional Design summaries), individual interviews with the Demo Case teams, workshop exercises, and a direct editing of the stakeholder list by the Demo Case teams.

The interviews were conducted via phone-conference, each lasting 2.5 hours. The interview included three parts, covering a review and update of the context analysis, review of the baseline stakeholder categories, identification of key stakeholders, and discussion of DC priorities for in-depth analysis. Interview questions were both asked orally and shared on screen in a presentation, which also served to take notes in a way visible to the interviewees, to avoid misunderstandings, stimulate reflection and further association. The results of the baseline context mapping and stakeholder mapping were copied into the presentations prior to the interview to avoid redundancies (for the interview protocols, see Annex 1). Subsequently, the interview results were used to update the context descriptions, as well as to derive recommendations for the updated engagement strategy.

2.2 Stakeholder Categories in the updated analysis

The GT2.0 Stakeholder Framework was specifically designed to be flexible and comprehensive enough to support meaningful stakeholder analysis for future initiatives in various geographical contexts, social settings and related to different issues. The integrated analytical framework contains ten main stakeholder categories based on their role in the project, i.e. on the rationale and logic guiding their engagement (see Fig 2 below). The framework intentionally allows and requires stakeholders with more than one role to be listed in several categories, thus drawing attention to potential role conflicts, or engagement for multiple reasons.

Fig 2 GT 2.0 Main Stakeholder Categories



2.2.1 CO Core Stakeholders

Core Stakeholders are groups and persons who will be actively and personally involved in the Citizen Observatory and the effort to develop it. The relationship is chosen by the co-design group, who decides which citizen groups, policy makers and scientists to recruit.

Community Members are all stakeholders who identify themselves as participants or members of the CO community, often by 'joining' with a visible act, such as signing a consent form, registering an account, or posting to an online platform. The baseline analysis identified preliminary targets for recruiting the co-design group and members of a pilot community. Purpose of the update analysis is to review the internal composition of the emerging CO community with a view to the project objectives, the intended business model, and the requirements of a sustainable knowledge-based community.

Expert Advisors are officials, professionals, activists, or scientists who occasionally provide expertise, support and advice to the CO, without participating in the activities on the CO platform. During the co-design phase, this focuses on experts relevant to designing the CO-platform. The updated analysis serves to support identification of local expert advisors able to support the community in the long term, both in scientific and political terms.

2.2.2 Enabling Environment

The Enabling Environment consists of stakeholders that influence how the activities of the CO are received, and enable or limit the impacts it can achieve. In contrast to CO Core Stakeholders, the Enabling Environment can be influenced but not chosen by the CO, as the related stakeholder groups either have a legal mandate, or live in the project area.

Regulatory Entities are Regulatory entities are formal authorities that define the playing field and rules of the game for CO activities, based on a formal or legal mandate. This includes councillors, (legislators), public administrations, and oversight bodies. After the objectives of the COs are defined, the updates stakeholder analysis serves to identify decision-makers relevant to the chosen mission of the CO community. As decision-makers involved in the COs might be legally or politically responsible (and accountable) for decisions relevant to the agenda of the CO, it is particularly important to maintain awareness for their double role.

Opponents & Critics are stakeholders who might be sceptical about a CO in general or about the change in social practice it represents, to the degree that they might actively oppose or try to prevent the success of the initiative. Monitoring of these groups is relevant to identify if conflicts can avoided by outreach, information and awareness raising.

Media and the Public subsumes all external stakeholders who are relevant to the creation of a positive and receptive environment for the observatory and its activities. The updated stakeholder analysis serves to clarify the structure of the local 'audience' and to identify trusted multipliers and channels to communicate with them.

Allies and Umbrella Movements are existing powerful associations or initiatives can strengthen the CO objectives through endorsements or alliances. The updated stakeholder analysis serves to maintain awareness for affiliations created by the GT2.0 project frame, and to identify promising targets for strategic alliances in the upscaling phase, if the goals and character of the emerging CO community is sufficiently clear.

2.2.3 Market Forces

Market forces are all stakeholder groups that engage in direct economic (financial) transactions with the Citizen observatory. The segment has been included to facilitate integration of the planned commercialization strategy with the other project tasks and work packages.

[to be finalized based on D3.1]

2.2.4 Internal stakeholders

Internal Stakeholders are functional entities in the CO project or organization. Typically, internal stakeholders are employees and managers of organizations. The structure of the GT2.0 project, specifically of the Demo Case teams, is not a natural fit with this approach. Based on the experience and feedback of the DCs, internal stakeholders will not be mapped separately in this document. For the purpose of this update, the Demo Case team will be listed either as Community Member or Expert Advisor, depending on the case. The Project consortium and PMT act as oversight body for the Demo Cases, and will, therefore, be considered a Regulatory Entity for this stage of process.

2.3 Analysis of the Stakeholder Data

A stakeholder analysis has to provide information on WHO to engage in a case, and to understand WHY, HOW, and WHEN they should be engaged. The baseline analysis focused on the 'who' and the 'when' generated a general broad overview to plan and prioritize targets for recruitment and communication to key actors. The updated analysis can consider the results of the co-design process, using the finalized CO objectives to clarify further the 'why' of stakeholder engagement. Ideally, the analysis should provide insights useful to stabilizing the CO community, ensuring its impact, and judging its contribution to good governance. For the GT2.0 co-design process, the stakeholder analysis should support implementation of the Living Lab principles, allowing the Demo Case teams to reflect if co-design group represents the 'real-life' situation.

The updated context analysis reviewed the plans and assumptions made at the beginning of the process, allowing revision, correction and additions. The below section contains the resulting complete picture, with the results of the update presented in a different text colour. This presentation simplifies tracking of changes, assessment of the relevance of the original analysis (confirmed context factors), and showcasing the increased understanding created in the Demo Case groups through social learning.

The stakeholder analysis looks at the stakeholder landscape as a whole, identifying the driving forces behind the emerging CO communities, both in terms of stakeholder characteristics in general, and in terms of the specific key stakeholder configuration. The update analysis specifically aimed to identify lessons learned with regard to the each stakeholder category per case.

3 Analysis Demo Cases

3.1 Environmental Quality of Life – Flanders, Belgium

The citizen observatory "Meet Mee Mechelen" aims to be an online and offline meeting place where we gather and build data, information and knowledge about air quality and ambient noise and make it accessible for everyone, to support policy making and initiatives for a better living environment.

Overall, the vision, mission, objectives and story outline of the Belgian Demo Case describes an initial focus on the creation of a collective knowledge base as a type of 'support service' to existing processes, but implicitly designed to open up spaces for experiments with new forms of political dialogue. The analysis of the function design also implies a CO designed for collaborative planning within distinct political limits, but with a view to setting up functions of the environmental stewardship domain.

3.1.1 Context Mapping[1]

The Demo Case targets the Belgian region of Flanders (see Fig 3), matching the jurisdiction of the Flemish Department for Environment, Nature and Energy (Leefmilieu, Natuur en Energie - LNE), the main driving force behind the initiative. As part of its political mandate, LNE offers local authorities guidance and subsidies to promote the implementation of local measures improving local environmental quality of life (EQL). The CO is envisioned to help stimulate and support such activities at the local level.

Fig 3 Target Area of the Belgian Demo Case

The project is a successor to an earlier initiative that focused on educating the public about environmental quality of life as an issue. Originally, the Demo Case intended to start with two municipalities as target areas as pilot cases, one urban (Mechelen) and one rural (Hooglede). Exploratory talks during the initiation phase suggested, however, that the GT2.0 approach is difficult to implement in rural municipalities in Flanders. While the rather close-knit communities seem well suited for recruitment of citizens, the structure and limited resources of local administrations make it difficult for them to join the development of the Citizen Observatory. Specifically, responsible decision-makers lack the time to participate themselves,

[1] For local summaries of statistical data and reports quoted, as well as additional background information see OECD country page (http://www.oecd.org/belgium/), OECD Better Life and Regional Wellbeing Indices (http://www.oecdbetterlifeindex.org/countries/belgium/ and https://www.oecdregionalwellbeing.org/BE2.html), World Bank 'Doing Business' Analysis (http://www.doingbusiness.org/data/exploreeconomies/belgium), International Telecommunications Union (https://www.itu.int/en/ITU-D/Statistics/Pages/default.aspx), and the European (http://ec.europa.eu/eurostat) and Belgian Statistical Services (http://statbel.fgov.be/en/statistics/figures/)

but lack the specialized support staff to represent their view in the group. Accordingly, the pilot has been limited to the town of Mechelen. In preparation of the upscaling phase, the project will be presented to all 'center cities' in Flanders, which include all urban municipalities with more than 60,000 residents.

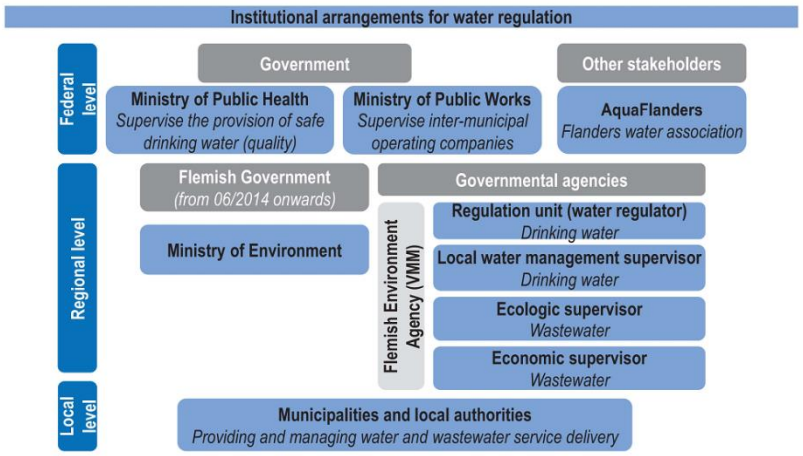
Political Context: The political structure in Belgium includes five levels – EU, national level, federal regions, provinces and cities/municipalities. The federal regions are considered to be the dominant political force for framework policies, with operational decisions taken at the local level. All government levels might be involved in implementing EU Directives or set their own policies. Competencies related to EQL specifically are concentrated on the local level (responsibility for action), and at the regional level (responsibility to motivate action with subsidies as main incentive). Provinces were originally considered to have little relevance, but the co-design phase revealed that provinces serve the municipalities, and have funds and support systems available that the towns can tap into when implementing EQL measures.

With regard to other related policy areas, such as environmental policies, spatial planning and natural resource management, competencies are overlapping; Fig 4 illustrates the resulting institutional complexity for water management. The co-design phase revealed the practical implications of this fragmentation, as agencies in charge of measures needed to solve problems are not necessarily the ones involved in the CO discovering the problem. For example, noise pollution caused by a highway running through the city is nevertheless the remit of the regional road authorities, not the city.

In terms of political culture, the Flanders is described as a rather closed system. Elected officials enjoy strong mandates; electoral programmes serve as a main platform for the competition of ideas. Voting is compulsory in Belgium. According to the OECD, voter turnout stands at 89.4% and is among the highest in the OECD. Overall, the analysis of the political culture suggests that individual citizens with specific grievances who are not part of 'organized politics' need to mobilize significant resources to be heard. This creates a dichotomy between powerful 'organized' actors supported by relatively passive citizens (voters), and community action groups addressing severe grievances not sufficiently addressed in the system in the 'court of public opinion'.

The strict organization of the political system was known in principle at the time of the baseline analysis, and planning for the Demo Case focused on the actors of the 'organized' political process. The co-design phase revealed, however, that the number of citizens and civil society organizations is involved in setting political agendas is much larger than originally assumed, with the implication that the area already has a culture of 'civilian expertise' in dialogue with policy-makers. As one example, the local cyclists' organization independently developed a comprehensive mobility plan for the area. As a second consequence of the political culture, local decision-makers

Fig 4 Structure of the Flemish Water Governance Institutions

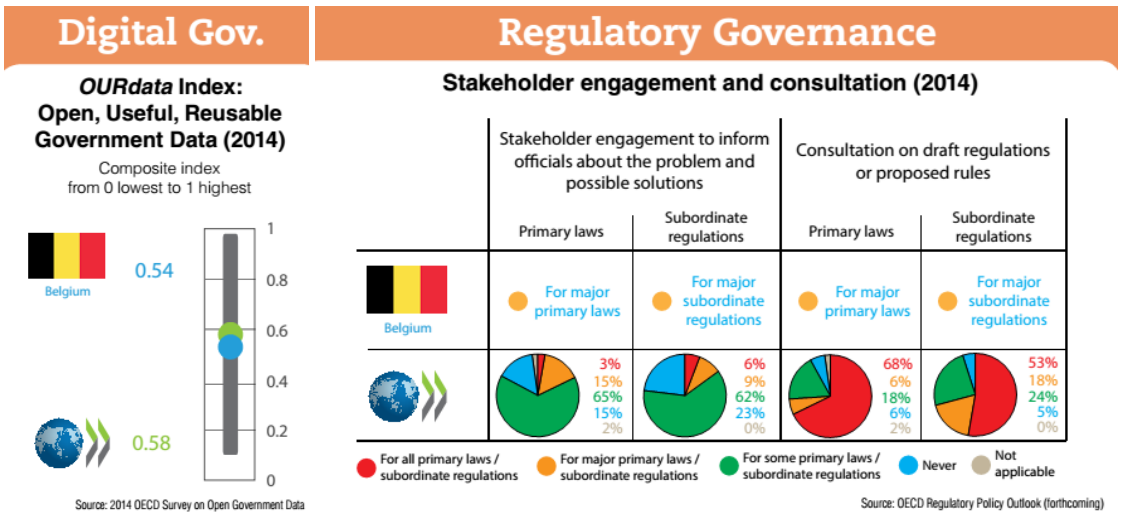


Sources: OECD Survey on the Governance of Water Regulators, 2014; Flemish Environment Agency: www.en.vmm.be and written contribution received 2 May 2014; *Elaborations on the metropolitan database*, OECD (2012), *Redefining "Urban": A New Way to Measure Metropolitan Areas*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264174108-en.

might bring a strong awareness for political programmes to the table, representing the position of their department in official capacity, while privately observing, appreciating or supporting CO aspects relevant to future electoral programmes.

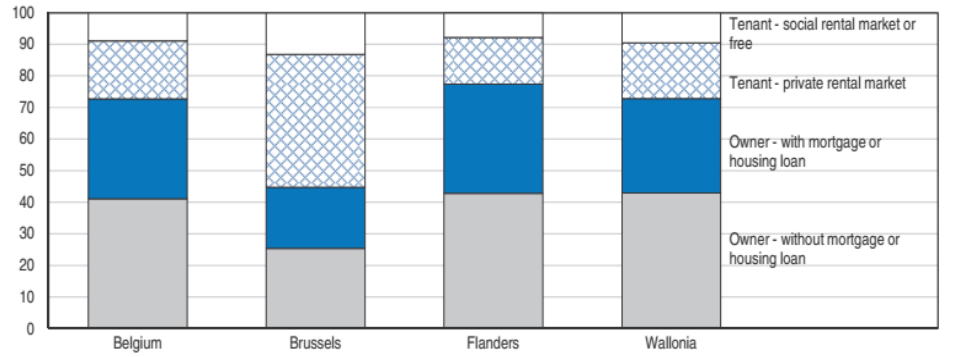
The interviews suggest that a majority of the Flemish population is satisfied with the dominance of elected mandate-holders, "*as long as they do their job*". Reflecting this attitude, failure of government institutions can lead to a massive loss of confidence – the recent Euro crisis led to a 17% loss of confidence in the national governments in Belgium, compared to a 9% loss in the Netherlands, and a 6% gain in Sweden (OECD 2013). The experience of the co-design process are consistent with this notion, as the focus of the group on conducting their own measurements suggest a certain mistrust in official data and motivation to question official narratives. In terms of stakeholder information and participation, Belgium ranks at the OECD average for useful government data, but stays below OECD average reading consultation on draft regulation.

Fig 5 Baseline Indicators Transparency and Participation in Regulation, Belgium



Environmental Context: The Flemish landscape is highly fragmented, in part due to historical political encouragement of free-standing home ownership. The fragmentation of the landscape described above is clearly visible in housing data (see Fig 6). The lack of available plots has led to a quadrupling of real land prices during 1992-2013, while real house prices 'only' doubled. With few open spaces left in the area, urban expansion or infrastructure projects will almost inevitably lead to a loss of recreational areas, amplifying the impacts of planning mistakes. In addition, many citizens commute to work in bigger metropolitan areas, separating professional and private living spaces, and thus contributing to the perception of the latter as the 'house in the green' to be preserved. Cities are currently seeking to improve their attractiveness, and one original question for the co-design phase explored how big an area citizens look at to judge if they are living in a "nice" environment, to understand effective scales for organizing action.

Fig 6 Belgian home ownership (in % of population)



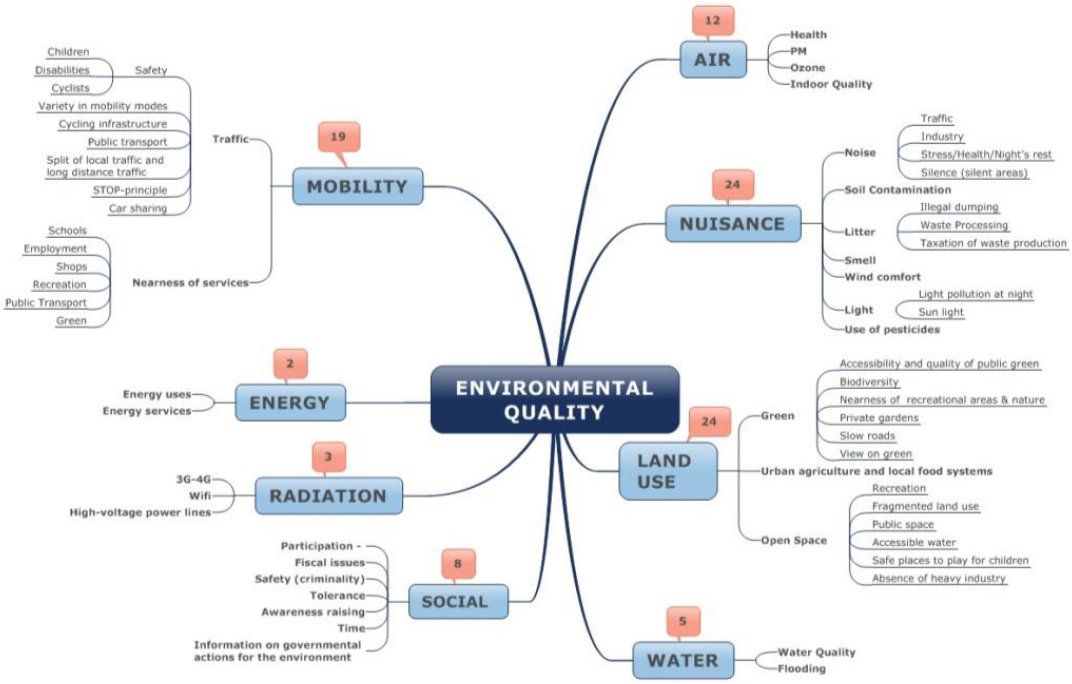
Source: S. Winters and K. Heylen (2013), "How Housing Outcomes Vary Between the Belgian Regions", *Journal of Housing and the Built Environment*, July.

StatLink http://dx.doi.org/10.1787/888933180994

In terms of the environmental context, the co-design process drew attention to the overlap with the economic context on the one hand, and with the social context on the other. In economic terms, the physical phenomena under investigation reflect the influence that bigger cities have on their surrounding areas, as exemplified by the observation that a large share of noise pollution in Mechelen is caused by commuter traffic. In social terms, the process not only highlighted the big variations within the CO area, but also the different reference points of different stakeholders. The early discussions suggest that citizen frame their perception in terms of their neighbourhood, city planners show a tendency to prioritize the city centre. Taken individually, each perception would likely lead stakeholders to promote keeping traffic out of their neighbourhood or area of interest, but the CO data collection encourages understanding of the 'bigger picture' and connectivity of issues. One surprising observation in the design process was that the promotion of urban green spaces and recreational areas attracted less direct interest than originally anticipated. But it seemed to play a role for the dynamic of the discussion, as the group appreciated the chance to discuss a 'nice' topic, not just a problematic one.

Social/Cultural Context: Life satisfaction in Flanders is very high, and 'enjoying the good things in life' is described as one defining characteristic of culture. For example, full-time employees in Belgium report having more time off than most other OECD countries. In terms of personal identity, local citizen are assumed to more strongly identify as 'Flemish' than as 'Belgian'. Local cities compete and compare themselves to each other. Recently, the Mayor of Mechelen joined, and won, a global online competition to become 'best mayor in the world', which is usually dominated by mayors from metropolitan areas with more citizens to vote online. Antwerp and Ghent are positively seen as local cultural centres, while Brussels providing a negative model of a city '*where you work but don't want to live'*. In smaller communities, the culture is can be "*very local*", with a population that has little desire to live in cities and rather wishes to escape the urban sprawl and '*enjoy their garden'*. The described attitudes match the mind map of local citizen concerns found in a LNE survey, which describes issues related to the environmental quality of life predominantly in terms of "nuisances" (see Fig 7). However, the experience of the co-design process suggest that attitudes are changing, with an increased awareness that urban planning and air pollution are closely connected. In turn, this realization motivates people to become more engaged.

Fig 7 Internal survey results: What topics prioritize Flemish citizen with regard to EQL



In terms of general attitudes relevant to the case, the 2014 Eurobarometer Poll "Attitudes of European citizens towards the environment", found that in

- 95% of the Belgian population personally believe that protecting the environment is important, but only 28% of Belgians picked 'Urban issues' as addressed in the CO as major concern, compared to 60% or respondents expressing concern over air pollution and 48% over water pollution
- 67% of Belgians agree that environmental issues have a direct impact on their daily lives, and 68% of respondents felt that citizens themselves are not doing enough to protect the environment.
- 59% of Belgians feel well informed about the environment, 22% of respondents state a lack of information on urban issues, 33% on air pollution, 29% on water pollution
- Sources of environmental information are: 69% TV, 41% social media/internet, 41% newspapers. In terms of trusted sources 52% believe in the reliability of scientists, 41% trust environmental protection associations, 34% TV documentations

With regard to environmental information, the Eurobarometer findings were also observed in the group Demo Case, both in terms of concerns over air pollution, and the relevance of media for the reported attitudes. However, it was also clarified that the reports and perceptions do not necessarily reflect reality. Air quality in the area has been improving over the past years, a fact that surprised many participants, as it is inconsistent with media reporting focused on negative headlines. With regard to civil engagement, 34.2% of Belgians report to volunteer in some form over a year, which is about OECD average. Main areas for volunteering are education and culture, followed by sports. The biggest constraint to engagement in

environmental matters seems to be lack of time of the working age population, which also proved a constraint for recruitment to the co-design group.

Technical Context: Flanders is technically well connected (see Fig 8); the share of households with a broadband connection is 85% in the Flemish region. The population is assumed to mainly use the market leaders in social networks. It is noted that a significant number of people are posting in Dutch or English because they either have international friends or '*think they are addressing an international audience*'.

The initial results of the co-design process currently don't seem to align with this general social media use pattern in the area, as the group has been shaped by older citizens with a strong, identity-based preference for Dutch-language and localized design. Younger users have been underrepresented in the process both due to time constraints, but may also have been discouraged by the level of technical expertise exhibited by older and more experienced citizens, calling into question the value of their contributions.

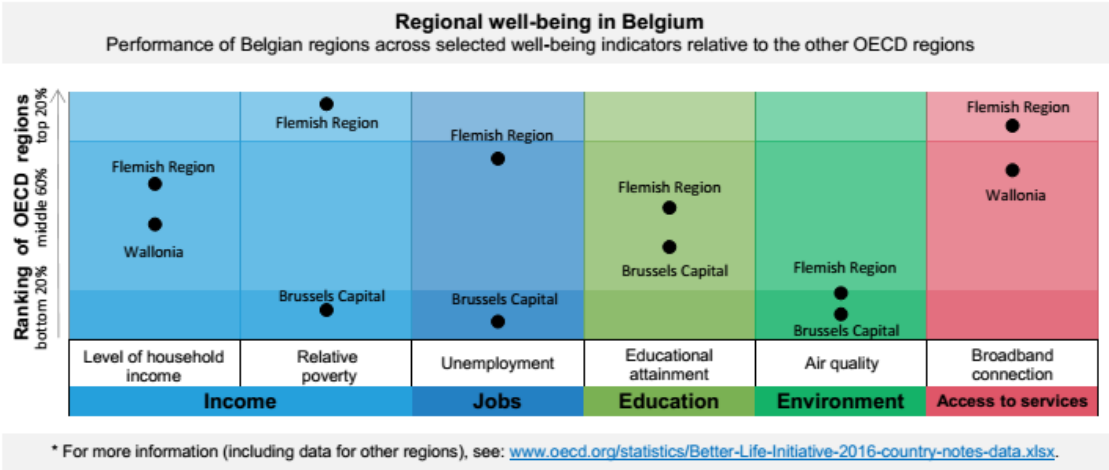
Fig 8 ITU Access and Usage Indicators 2016, Belgium

	Economy	Fixed-telephone subscriptions per 100 inhabitants		Mobile-cellular subscriptions per 100 inhabitants		International Internet bandwidth Bit/s per Internet user		Percentage of households with computer		Percentage of households with Internet	
		2014	2015	2014	2015	2014	2015	2014	2015	2014	2015
17	Belgium	40.7	40.1	114.3	115.7	*221'688*	*241'805*	*82.0*	82.1	82.8	81.8

	Economy	Percentage of individuals using the Internet		Fixed-broadband subscriptions per 100 inhabitants		Active mobile broadband subscriptions per 100 inhabitants	
		2014	2015	2014	2015	2014	2015
17	Belgium	85.0 [7]	85.1 [6]	36.0	36.8	57.8	66.6

Economic Context: Belgium's average household income is close to the OECD average, but household net financial wealth is among the highest in the OECD, and Flanders the regional leader on all variables within Belgium (see Fig 9). Brussels and Antwerp are economic centres of gravity, with industrial zones around the port of Antwerp (chemical, pharmaceutical), and otherwise many scattered SMEs, and a large public sector. Over the past years, the City of Mechelen has invested in a programme to make the city centre more attractive, involving gentrification and the establishment of car-free zones. There are clear signals that the improvement of quality of life and the decreasing accessibility by car present a conflict, and have ambiguous impact on the attractiveness as a shopping location and thus economic success of the city, but this conflict is not yet an issue in the discussion of the CO community.

Fig 9 Regional Well-Being Indicators, Belgium



3.1.2 Stakeholder Landscape

Core Stakeholders

Co Community Members: The strongest groups driving the Belgian Co are organized groups with matching agendas, such as cyclist associations or neighbourhood action groups. Such groups seem to see the CO as opportunity for a fresh start with political engagement, as the Environmental Advisory Board seems dominated by city administration and does not allow sufficient input from organization members in the setting of the agenda. There is a fluent connection to political parties in the group, representatives of parties with matching political programmes are involved directly or indirectly (officially participating in a different role), and seem to appreciate the possibility of a CO stimulating public debate on certain issues. The community does not include any commuting professionals at this point, so view of stakeholder 'reliant on causing noise pollution' is not yet heard.

Expert Advisors: The Demo Case features a strong overlap between citizens and experts, as several of the core citizen representatives are highly informed activists with a long history in the issue area. The challenges with addressing identified issues and suggests that advisors supporting the political integration and outreach to new agencies when needed might be useful.

Enabling Environment

Regulatory Entities: A key lesson of the co-design process is the difference between regulatory entities relevant for the problem under investigation, entities relevant to solutions for the problem, and supporting functions. For example, air quality and noise pollution was perceived as in the remit of the city administration, which was engaged accordingly, but solutions will have to involve the regional road authorities and additional city units. This raises the question if the CO design will be open and flexible enough to actively recruit additional authorities at a later stage, and successfully bring them into the conversation.

As a second lesson, the co-design drew attention to entities specifically providing support services for municipalities. In Flanders, this in particular concerns the provincial government. It is suggested that such entities are tremendously useful, and have valuable resources, but are easily overlooked as they are not 'topical'.

Finally, the role conflicts of representatives becoming community members was observed in practice, with participants representing official and mandated positions in the group, but also contributed to reflections on the political potential of the CO. However, such contributions had to be kept within confined limits, to avoid breaches of professional ethics.

Opponents and Critics: As expected, key critics in the area are actors concerned about the amount of time and resources needed to conduct a meaningful co-design process. In addition, it was confirmed that actors concerned about ownership of the political agenda also plays a role, exemplified by the insistence of the City of Mechelen to retain control over press releases.

Public and Media: With regard to communication to wider audiences, the original channels have been confirmed and used. In addition, the newsletters of participating organizations have been identified as an important communication channel, which is consistent both with the stewardship ambitions captured in the vision, and the importance of organized citizens as key recruitment targets for the community.

Top Ten CO Core Stakeholders

The most important stakeholders of the Demo Case, both in terms of actors important to have as members of the CO Community and in terms of actors most important critical to shape the enabling environment in light of the CO Objectives are:

- Organized citizens: Monn (Cycling federation)
- Organized citizens: Members of local neighbourhood initiative on air quality
- Local legislator: Council member (chair of council's environmental group)
- Local administration: Environmental department, City of Mechelen
- Local Administration: Mayor's office, Smart City Group
- Technology expert and data aggregator: VITO
- Individual Citizens: ‚unorganized but environmentally interested'
- Investor and issue expert: LNE
- Organized citizens: „the other side" – e.g. automobile federation (not yet engaged)
- Organized citizens: Youth organizations and school or student groups

3.2 Water availability in Climate-Proof Planning – Rivierenland, Netherlands

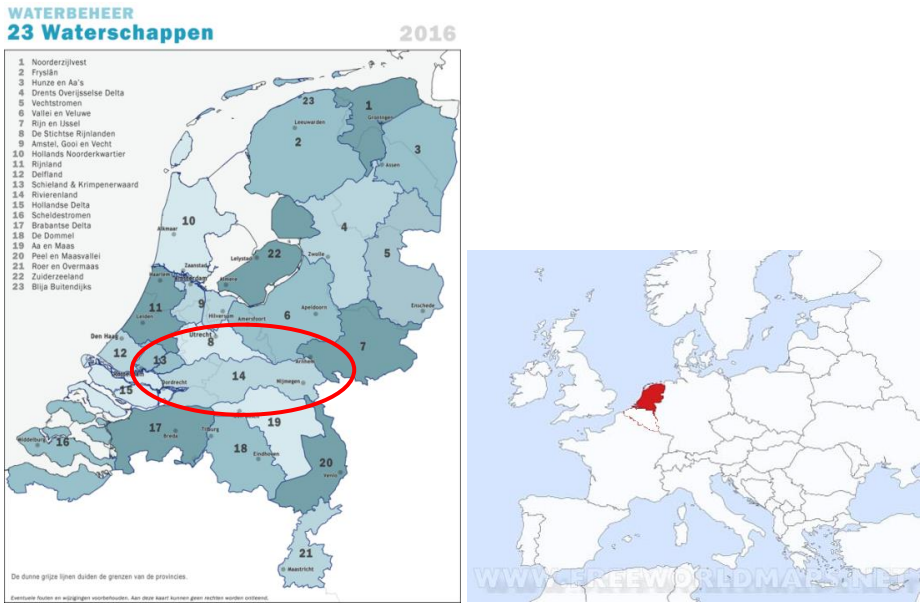
The citizen observatory 'Grip op water' is intended as a place (on- and offline) where collected observations, knowledge and warnings are shared, where bottlenecks and measures are constructively discussed along short communication lines and where it is clear which actions are taken by which party.

Overall, the vision, mission, objectives and story outline of the Dutch Demo Case seems to imply that the ultimate goal is a transition towards full Environmental Stewardship with shared responsibility for results, combining both the response to acute situations and a systemic, knowledge-based evolution of social practice. The domain adaptation analysis reveals, however, an approach that retains the current model of agency based planning, with a dialogue about individual responsibilities on each side.

3.2.1 Context Mapping[2]

The Dutch Demo Case originally targeted the Rivierenland (see Fig 10) as one of 23 Dutch water management jurisdictions administered by a Water Board (WB). The region was chosen because the Demo Case leaders perceive the WB Rivierenland as the leading Dutch WB in terms of process innovation and data driven management. The WB Rivierenland was an early adopter of advanced technologies in disaster management and is now one of the first WBs to experiment with new forms of participation and communication.

Fig 10 Target Area of the Dutch Demo Case



Over the course of the co-design process, the pilot area was reduced to a small section of the Rivierenland, the communities of Heusden and Altena. The focus on a smaller area was initially altered to accommodate

[2] For local summaries of statistical data and reports quoted, as well as additional background information see OECD country page (http://www.oecd.org/netherlands/), OECD Better Life and Regional Wellbeing Indices (http://www.oecdbetterlifeindex.org/countries/netherlands/ and https://www.oecdregionalwellbeing.org/NL22.html), World Bank 'Doing Business' Analysis (http://www.doingbusiness.org/data/exploreeconomies/netherlands), International Telecommunications Union (https://www.itu.int/en/ITU-D/Statistics/Pages/default.aspx), and the European (http://ec.europa.eu/eurostat) and Dutch Statistical Services (https://www.cbs.nl/en-gb/)

the logistical requirements of the co-design process, but later confirmed by the strong local view of the co-design group. While the observatory will be upscaled to other communities later, one observatory covering the area of the water board does not seem to be aligned with the analytical perspective of the citizens.

Political Context: The political structure in the Demo Case has four 'regular' political hierarchies – EU, national, provincial and municipal – with the Water Board areas as cross-jurisdictional units overlapping the provincial boundaries (see Fig 11Fig 11). However, while the institutional structure is complex, the boundaries of water boards are in fact more visible in the physical landscape as other administrative jurisdictions, as their boundaries are usually delineated by dikes or water discharge areas.

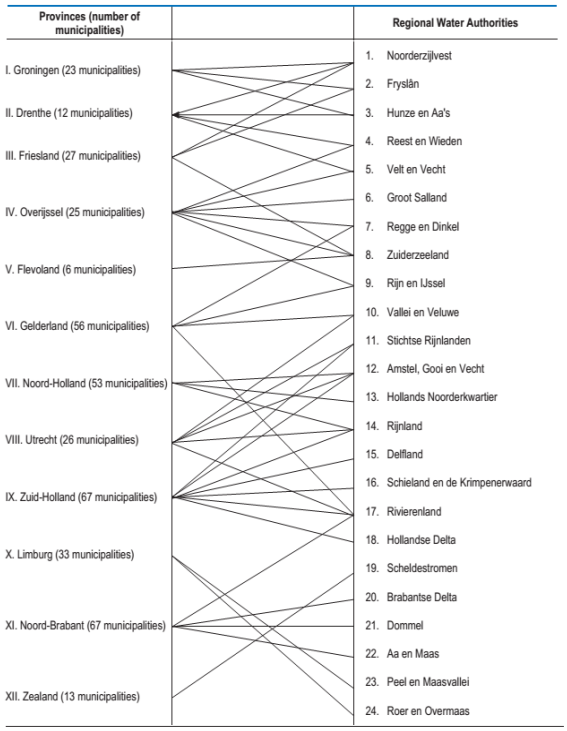
The issue of "water in the streets" as investigated by the Demo Case does not sit easy with the institutional structure for water management in the Netherlands. The phenomenon used to be very rare, but climate-change related changing weather patterns and the extensive sealing of surfaces in urban development it is becoming more frequent and will remain frequent in the future. Technically, both storm water collection and planning urban features is under the authority of the municipalities, but the need to remove collected water requires effective collaboration between municipalities and water boards, but also between different water boards. In addition, as the issue involves an evolving systemic problem, it also requires a systemic response, which involves perceptions of citizens and negotiations of responsibilities between different actors as much as legal definitions.

In the current system, the responsibilities for different aspects of water management are more or less clearly defined between the different layers of government. While Rijkswaterstaat is responsible for overall planning of the water management system, the water boards responsible for operation and management of the regional system, as well as for flood defences and waste water treatment, municipalities responsible for spatial planning and drainage systems, and the provinces responsible for integration of spatial planning and related policies (see Fig 12).

In practice, the responsibility of the various levels has shifted, handing more power and autonomy to the WBs, and reducing the supervisory role of provinces. For example, decisions with regard to water levels, construction and improvement of water management structures used to require prior provincial approval, but no longer do.

Most significantly, Water Boards also gained more autonomy over financial decisions; they not only raise their own taxes, but since enactment of the 2011 Administrative Agreement of Water Affairs again no longer require provincial approval of management plans and cost-related by-laws. Where provincial approval is still required, decision-makers tend to bow to the technical expertise of the WBs.

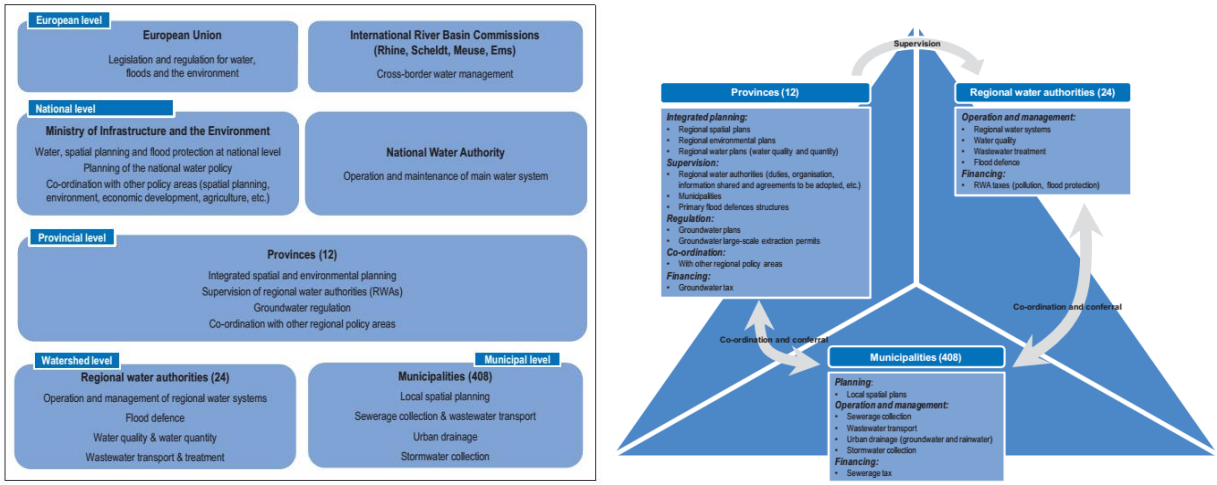
Fig 11 Dutch Provinces and Water Boards



WATER GOVERNANCE IN THE NETHERLANDS: FIT FOR THE FUTURE? © OECD 2014

With regard participation in water management, presentation of plans to the public has been introduced in the 1970, in part as response to massive political protests connected to aspects of the Delta works. Since 2000, public consultation and communication with interest groups has been formalized as part of the planning process. However, the consultations usually take place in the form of public events in which people can voice opinions. The interviews suggest that participation in these events is usually limited to personally affected citizens and organized interests groups, most ordinary people are perceived to be mostly unaware of how the process works.

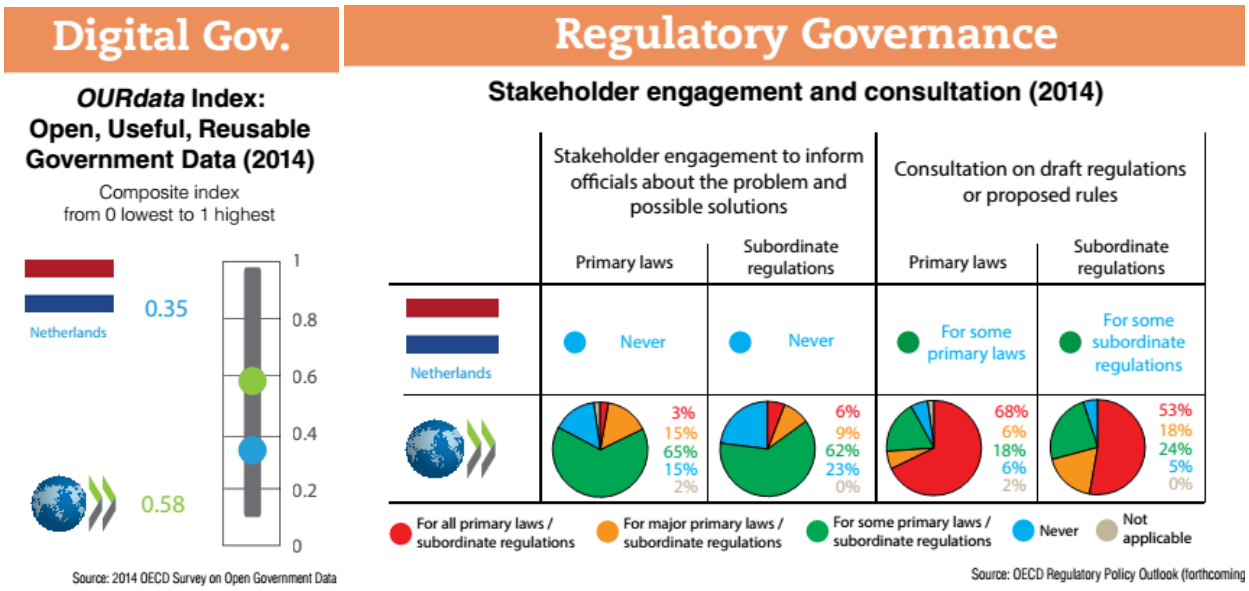
Fig 12 Institutional layers and mutual dependencies of Water Management in the Netherlands



Source: OECD 2014

Participation in other policy areas including urban planning is less common. In terms of stakeholder information and participation, the Netherlands rank far below average of OECD countries for useful government data, as well as on consultation of stakeholders on policies and draft regulation (see Fig 13). The Dutch government currently seeks to increase citizen involvement in local decision making and is actively searching for ways to engage the public more, which offers a niche for citizen observatories to actively pursue. However, the Dutch traditionally have a culture of openness, “speaking out” and hearing groups affected by a (central) decision, an informal side that requires consideration in the further analysis. In water boards, this traditionally includes groups like farmers or, increasingly, environmental groups.

Fig 13 Baseline Indicators Transparency and Participation in Regulation, the Netherlands



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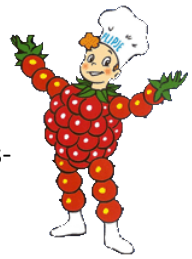
Environmental Context: As the focus of the Demo Case is on pluvial flooding, environmental boundaries of the issue are determined by weather patterns and local climate systems on the one hand, and the 'flow logic' and drainage capacities of the Dutch water management system on the other hand.

In terms of landscape, the area is the area is defined by two main rivers (Maas and Waal), as reflected in the name 'Rivierenland' (River land). Location in riparian flood plains makes dykes and other water management infrastructure a traditional and prominent feature of the landscape; control over major rivers also forms traditional sources of influence (trade and customs) and also served as a natural defence against enemies.

Social/Cultural Context: The project area is densely populated, with high pressure on space. '*Every square meter is planned and managed*', which increases both the relevance and the challenges of a project related to spatial planning and urban infrastructure.

Culturally, the region does not have a particularly strong local identity. One contributing factor to this is the high mobility of Dutch society. In the Netherlands, commuting over long distances is quite normal, separating the focus of people's professional and private life and creating a set of 'workday-citizens'. Nijmegen is the only major city in the region, it is an old city (the oldest city in the Netherlands founded by the Romans) with strong and visible historical landmarks. One local curio is "Flipje" (depicted right), the mascot of a local jam producer invented in 1935, who turned into a famous and iconic character with its own comic books, museums, and place on touristic street signs.



However, the new focus on a smaller project area has increased the importance of the local identity, and decreases the influence of commuters. Small town communities have a strong connection to and interest in 'their' town, to the degree that public officials living outside the municipality might face questions regarding their credibility and loyalties. In addition, the pilot area self identifies as a rural community, with all citizens highlighting the importance of involving local farmers.

In terms of environmental attitudes, according to the 2014 Eurobarometer Poll "Attitudes of European citizens towards the environment",

- 97% of the Dutch population personally believe that protecting the environment is important
- 66% of Dutch agree that environmental issues have a direct impact on their daily lives and 70% feel that citizens themselves are not doing enough to protect the environment
- 57% of respondents feel well informed about environmental issues,
- Sources of environmental information are: 70% TV, 53% social media/internet, 56% newspapers in terms of trusted sources, 60% believe in the reliability of scientists, 44% in Environmental protection associations, 28% in TV documents

Technical Context: Connectivity in the Netherlands is high and universal (see Fig 14). Use of online services is supported by an official digital ID system that provides access to government services, but is also used by insurance providers and similar services. Emergency services have adopted an SMS based alert system, and in many locations police and city officials participate in WhatsApp groups set up, for example, in neighbourhoods. Social media platforms in use are the international leaders such Facebook and Twitter, no specific regional or local platforms are known. In terms of media, free local newspapers are produced in many locations, and larger volume papers are distributes at train stations and widely read by commuters. In the pilot area, the co-design participants are currently mostly older citizens, and with few exceptions, are little engaged in social media.

Fig 14 ITU Access and Usage Indicators 2016, Netherlands

	Economy	Fixed-telephone subscriptions per 100 inhabitants		Mobile-cellular subscriptions per 100 inhabitants		International Internet bandwidth Bit/s per Internet user		Percentage of households with computer		Percentage of households with Internet	
		2014	2015	2014	2015	2014	2015	2014	2015	2014	2015
113	Netherlands	41.3 [24]	41.3	116.4 [23]	123.5	*229'961*	*242'326*	*95.7*	96.2	95.8	96.0

	Economy	Percentage of individuals using the Internet		Fixed-broadband subscriptions per 100 inhabitants		Active mobile broadband subscriptions per 100 inhabitants	
		2014	2015	2014	2015	2014	2015
113	Netherlands	93.2 [50]	93.1 [40]	40.8 [19]	41.7	69.2 [23]	70.5

Economic Context: In Economic terms, the project area is divided in a rural Eastern part dominated by farming, and an urbanized and more industrialized part in the West around the city of Nijmegen. In general, Dutch incomes lie above the OECD average, and the Dutch enjoy comparatively low labour market insecurity. Regional disparities on income and other key economic statistics are relatively low. Life satisfaction in the Netherlands is also substantially higher than the OECD average level.

3.2.2 Stakeholder Landscape

Core Stakeholders

Co Community Members: At this point, the emerging Co community relies on the support of local residents who have previously been affected by flooding and participated as volunteers in working groups by

the Waterboard. The engagement of 'organized' citizens, considered essential at the beginning of the process was not successful so far, neither conservation groups nor the weather amateurs signalled willingness to invest time in informing their members. Attempt for direct recruitment of neighbours and via a newsletter article have not elicited responses. However, a follow up round of targeted outreach based on baseline analysis is outstanding, so these findings are preliminary.

Expert Advisors: The Demo Case has not yet systematically explored selection of useful expert advisors.

Enabling Environment

Regulatory Entities: A key issue of the co-design process was the nature of required collaboration between the municipalities and water board. As of this point, for both entities mostly the administrative side participated, less the legislative side. An important lesson learned from the process is the extent to participating RE representatives need to secure approval by superiors for any decision.

Opponents: As originally assumed, municipalities are indeed concerned about the resources needed for the CO. The process started with the assumption that municipalities already have sufficient mechanism to collect inputs from citizens, and feared it will be more work for them. This attitude is slowly changing, as the municipality recognized the benefit of organizing information in one place and achieve more impact.

Top Ten CO Core Stakeholders

The most important stakeholders of the Demo Case, both in terms of actors important to have as members of the CO Community and in terms of actors most important critical to shape the enabling environment in light of the CO Objectives are:

- Subnational Administration: Waterboard Rivierenland
- Local Administration: Municipality (soon administration of three towns to merge)
- Individual citizens: Local residents
- Business groups dependent on natural resources: Local farmers
- Organized citizens: Local Nature Conservation NGO
- Technical and issue expert: Hydrologic

3.3 Preparing for Climate Change – Catalonia, Spain

The Observatory will store phenological data, in particular observations collected by citizens, and make it accessible in real time, with the aim of influencing decision making regarding adaptation to climate change. Overall, the vision, mission, objectives and story outline of the Spanish Demo Case implies a focus on classic Citizen Science with political relevance derived from 'joining forces' and a resulting visible presence in the public and political space. The domain adaptation analysis implies a CO almost exclusively designed for 'classic' citizen science. There is an ambition to influence the political agenda, but little willingness to seek a good fit of CO activities with the political process, locating the discussion how scientific facts become decision-relevant information mostly outside the observatory.

3.3.1 Context Mapping[3]

The Spanish Demo Case targets the Autonomous Community of Catalonia (see Fig 15), which corresponds to a federal state but with extended autonomy. Technically, there is no reason to limit the project to Catalonia; a predecessor project was national and all materials are in Spanish. The choice of the project area reflects the best set and configuration of relevant actors, and was thus actively matched to the 'organizing frame for action'.

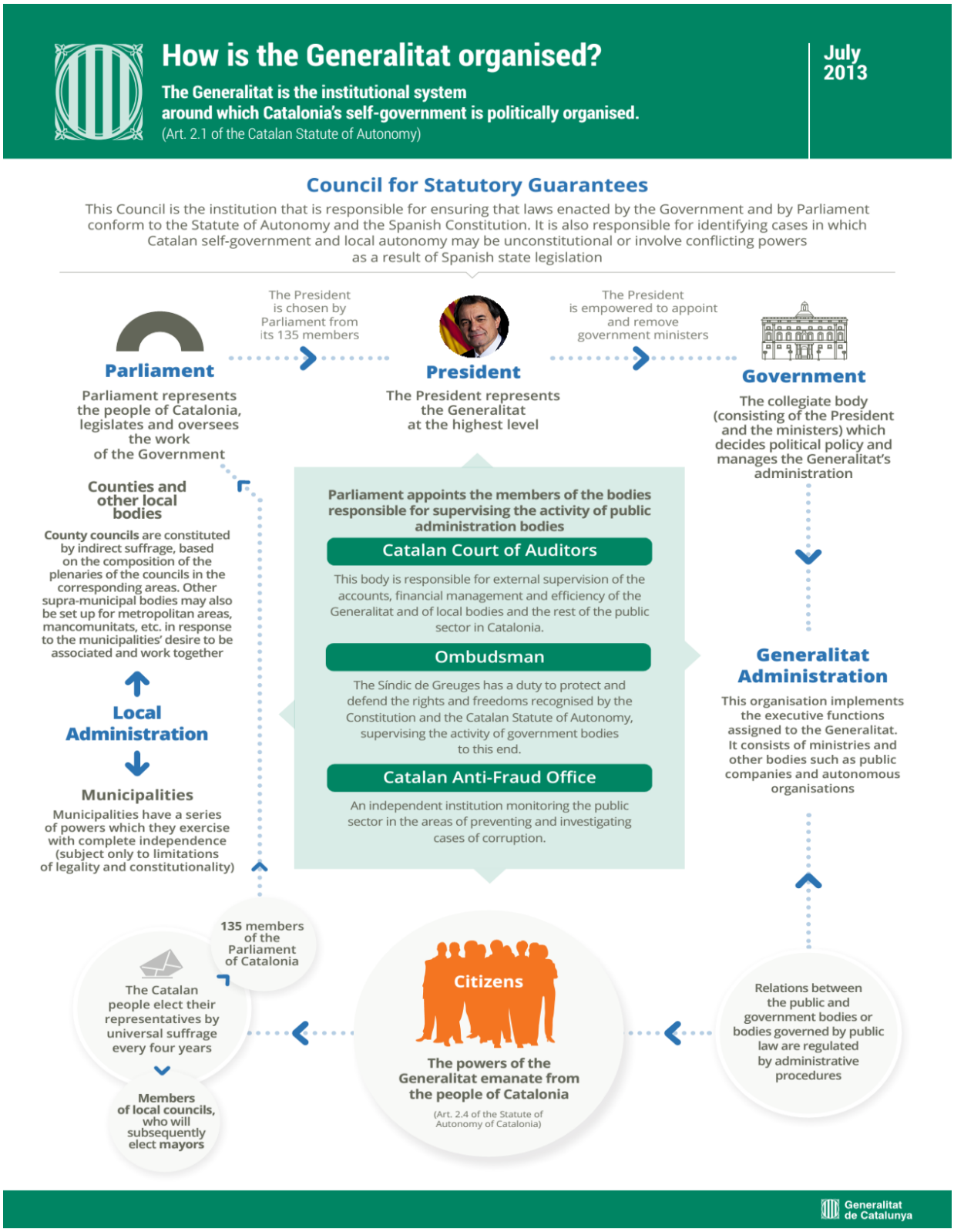
Fig 15 Target Area of the Spanish Demo Case

Political Context: The region has five relevant government levels – EU, national level, the autonomous community of Catalonia, provinces, and municipalities (see Fig 16). Catalonia has jurisdiction over the environment and biodiversity, and administers natural reserves and protected areas. The Spanish regions also have full competencies in spatial planning.

Currently, the area experiences high political instability caused by a controversial independence referendum and dissolution of the Catalonian government by the Spanish government. At this point, it is unclear if the intervention by the central government has implications for the political autonomy of the region. In this situation, all non-essential political processes have been effectively suspended. The situation at the regional level is expected to continue until a new government is formed and a new status quo is successfully negotiated, a process that might take considerable time. However, it should be noted that the political paralysis does not seem to reflect a new level of mistrust or lack of willingness to cooperate, but rather genuine lack of clarity what can be decided by whom.

[3] For local summaries of statistical data and reports quoted, as well as additional background information see OECD country page (http://www.oecd.org/spain/), OECD Better Life and Regional Wellbeing Indices (http://www.oecdbetterlifeindex.org/countries/spain/ and https://www.oecdregionalwellbeing.org/ES51.html), World Bank 'Doing Business' Analysis (http://www.doingbusiness.org/data/exploreeconomies/belgium), International Telecommunications Union (https://www.itu.int/en/ITU-D/Statistics/Pages/default.aspx), and the European (http://ec.europa.eu/eurostat) and Catalonian Statistical Services (http://www.idescat.cat/en/)

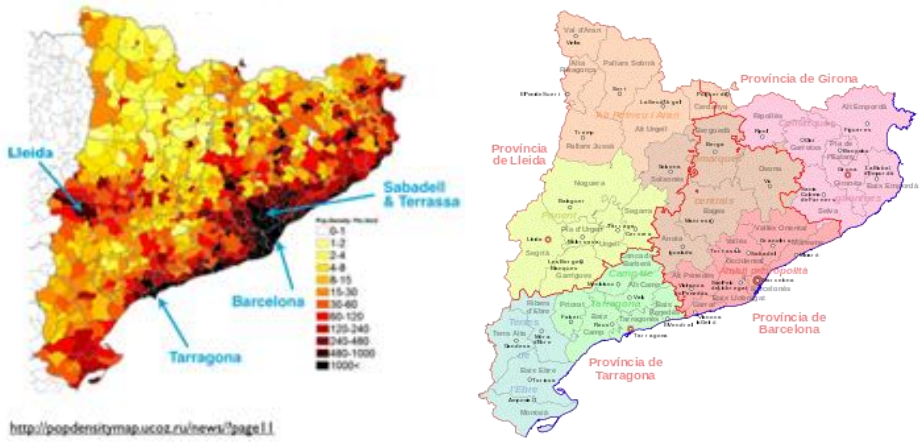
Fig 16 Structure of the Catalonian regional government



Power in the government hierarchy is linked to resources, which in turn depends on population density. Combined with a general political culture that favours autonomy over centralized power, provinces and

municipalities with sufficient economic resources will seek (and tend to gain) higher autonomy. Most notably the Barcelona Metropolitan Area (AMB) in the project region (see Fig 17). The AMB and local government levels are less affected by the political situation.

Fig 17 Population Density in Catalonia and Boundaries of the Barcelona Metropolitan Area (AMB)



In terms of political culture and participation, trust in central institutions is generally low, a legacy of the relatively recent dictatorship. The Euro-Crisis eroded confidence further (-16%). Both reflecting and contradicting this mistrust, Spanish provision of government data far above OECD average, and consultation on all draft regulations is mandatory (see Fig 188). Trust in government institutions is generally low in Spain, and has been further eroded over the past few years. As effective participation and collaborative resource management requires a certain level of trust, this has to be considered in the framing of messages and activities.

Fig 18 Baseline Indicators Transparency and Participation in Regulation, Spain

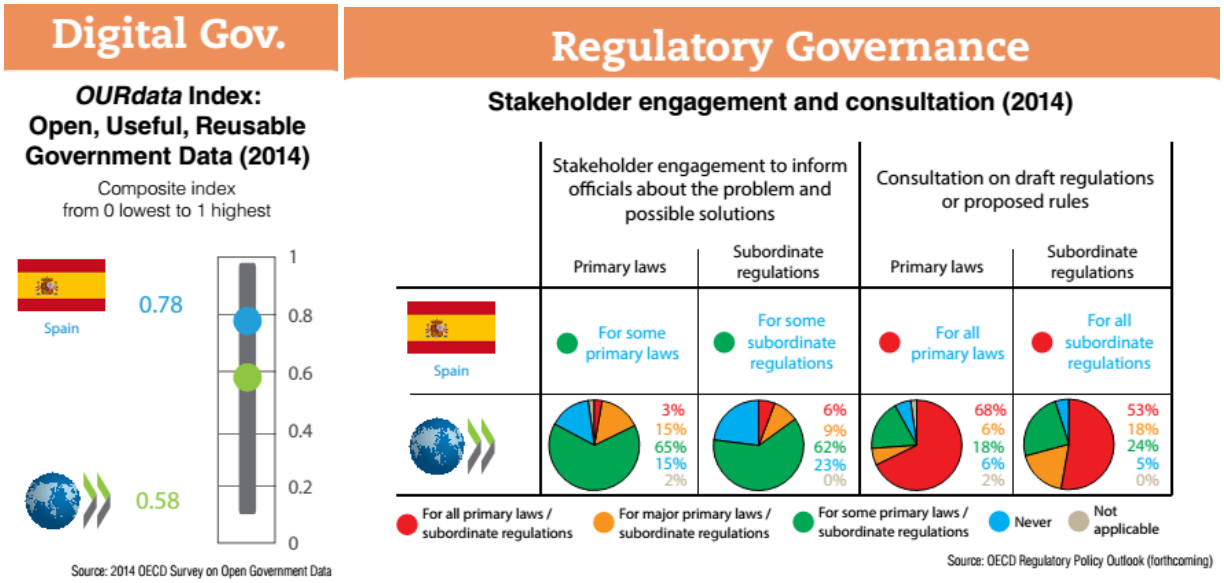
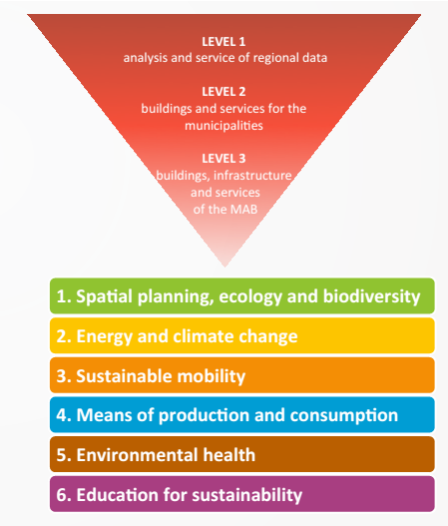


Fig 19 Catalonian Climate Change Response framework



Regarding competencies for climate change and biodiversity policies in Catalonia, activities are concentrated at the regional level and in the city of Barcelona. Law 31/2010 created a frame for climate change adaptation planning, which is currently being implemented in the AMB. The assessment frame includes biodiversity, environmental health and education for sustainability, offering possible connection points for phenological data (see Fig 199). A climate change mitigation strategy, climate change adaptation plan, and an energy and climate plan have been developed; a sub-national law on climate change as framed by COP 21 is in development. Activities by the Catalan Office for Climate Change include a Voluntary Agreement Programme for CO2 emission reduction in municipalities.

In terms of climate adaptation policies specifically, the strategies of the AMB and Catalonia are mostly aligned, but the co-design process revealed that policy implementation is affected by rivalries and overlaps in competencies between departments and actors both inside Catalonia and between Catalan and Spanish national agencies. With climate change adaptation a relatively new policy field, the related roles are not sufficiently defined. As a result, the co-design process has to carefully navigate potential competency conflicts, and sometimes act as an intermediary between different political silos. However, all involved policy/decision-makers strongly advocate in the co-design group that the CO should fit the described policy frame.

In terms of nature conservation, the 2007 national Nature Conservation Act introduced ecological networks into spatial planning, which has been fully implemented in the spatial planning process in Catalonia. The related guidelines integrate mapping of protected areas, connecting areas, and agricultural value areas into spatial plans, which might provide an opportunities for the introduction of phenological observations into the political conversation (see Fig 20).

Fig 20 Visualization of protected areas, agricultural value areas and connectivity areas in a 2006 Spanish spatial plan

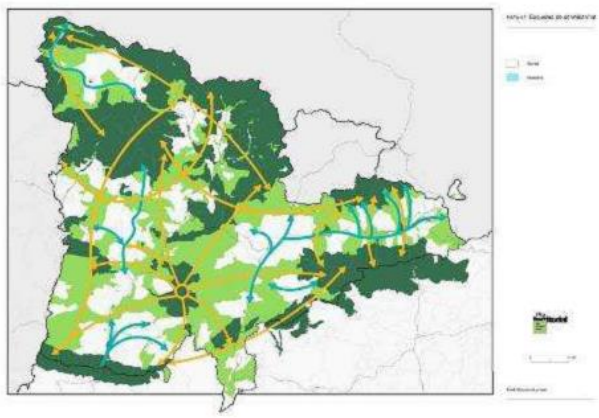


Figure 3. Extract from the L'Alt Pirineu Aran spatial plan (2006). The top map shows protected areas (dark green), connectivity areas (light green) and agriculture value areas (yellow) in the district. The bottom map outlines the desired connectivity. The Northern border is with France and Andorra, the West with the Aragon region, and the South and Southeast with other regional districts

Environmental Context: The case area is located in a transition area between Mediterranean and Europe. It features a wide variety in landscapes and extensive protected areas. Climate change is visible, in phenomena such as the changing length and intensity of seasons including more extreme heat waves, but the real-life implications for most people remain unclear. The AMB expert group on climate change operates with estimates of average summer temperature in Catalonia rising between 0.4ºC and 3.7ºC by 2040, and between 3.6ºC and 7.8ºC by 2100, with potentially significant implications for the boundaries of vegetation zones including for agricultural production as well as the habitats in protected areas. In terms of large-scale connectivity, Catalonia is part of the Mediterranean corridor, one of the main routes for bird migration to Africa.

Social/Cultural Context: Local identity in Catalonia is strong, rooted in historical regional competition and reaffirmed by a strong Catalan language movement. However, for the issues under investigation, identity politics were originally deemed of little importance. Most members of the population speak both Catalan and Spanish. The experience of the co-design process suggest, however, that local identity is very important for community building purposes. Participants have a strong preference for use of Catalan language both in workshops and for all materials.

The biggest social division to be considered is that between the Barcelona metropolitan area and the rural hinterland. Barcelonans are described to consider the country-side their 'playground', as a location for leisure activities, and sometimes second homes for better-off citizens. It also seems that city populations are more interested in nature observations with the CO, even though urban environments offer less opportunities for spotting species. While primary destinations for local getaways are the beaches in summer, and skiing areas in winter, the market for local green "inland" tourism is growing, especially in Barcelona province.

In terms of attitudes relevant to the case, the 2014 Eurobarometer Poll "Attitudes of European citizens towards the environment", found that in

- 96% of the Spanish population personally believes that protecting the environment is important
- Only 23% of Spanish respondents named loss of species and ecosystems as addressed in the CO as major concern, compared to 58% for air pollution and 57% for water pollution
- 83% agree that environmental issues have a direct impact on their daily lives and 60% feel that citizens themselves are not doing enough to protect the environment
- 56% feel well informed about environmental matters, 28% say they lack information on depletion of natural resources and loss of species/habitats respectively
- Sources of environmental information are: 67% TV, 37% social media/internet, 29% newspapers. In terms of trusted sources, 41% believe in the reliability of scientists, 32% in environmental protection associations, 25% in TV documentaries

General water scarcity elevates the importance of weather observations in Spain, "talking about the weather" is more than small-talk and reflects a permanent fear of water restrictions. This is even more acute in western provinces of Spain, and media reports are well noted. In addition, skiing is a popular sport in the area important, and snow forecast closely watched. After a series of warm winters with little snow and early springs, the public perception is that 'climate change is happening', which helps to engage people in the discussion. But there is a sense that the public uses two indicators for climate change: snow

in skiing areas and water reserves in dams. Only the second is in fact climate change related, and water use patters affect water reserves as much as rainfall patterns, so the public conversation reflects both a connection point for the observatory and its challenges. The CO focus on vegetation can tap into that general fear and sense of urgency, especially as the media is currently reporting on fruit trees blooming as early as January. The phenomenon attracts reporting because it is unusual, but the reporting contributes to an increased sense of urgency in the population on the one hand, and draw attention to phenological observation as better indicator for changes.

Technical Context: Connectivity in urban areas is excellent, 76% of households have broadband coverage, though there are some minor coverage issues in rural areas (see Fig 21). Dominating social networks are international leaders such as Facebook and Twitter, but the region does have some local (Catalan-language) TV stations as communication channels the CO is using successfully.

Fig 21 ITU Access and Usage Indicators 2016, Spain

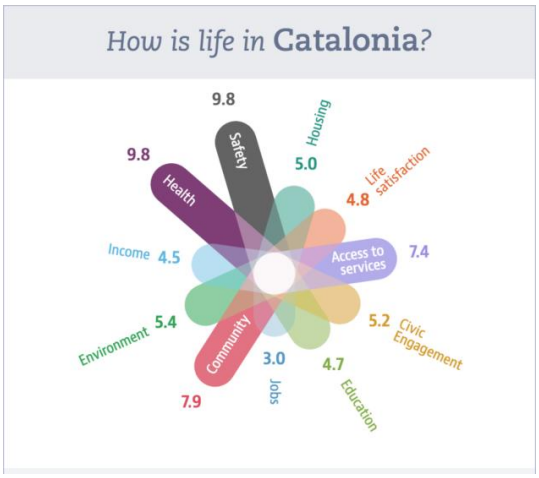
	Economy	Fixed-telephone subscriptions per 100 inhabitants		Mobile-cellular subscriptions per 100 inhabitants		International Internet bandwidth Bit/s per Internet user		Percentage of households with computer		Percentage of households with Internet	
		2014	2015	2014	2015	2014	2015	2014	2015	2014	2015
143	Spain	41.2	40.6 [34]	107.9	107.9	*92'025*	*105'006*	*74.0*	75.9	74.4	78.7

	Economy	Percentage of individuals using the Internet		Fixed-broadband subscriptions per 100 inhabitants		Active mobile broadband subscriptions per 100 inhabitants	
		2014	2015	2014	2015	2014	2015
143	Spain	76.2 [66]	78.7 [53]	27.6	28.3 [26]	77.3	82.1

Economic Context: Catalonia is highly industrialized and one of its wealthiest regions. It is Spain's biggest regional economy in terms of contribution to GDP, but also the most indebted. It is a primary European tourist destination, with around 8 million annual visitors in the Barcelona area alone, and due to the location at the Mediterranean coast a highly attractive location to work. The region suffers, however, from high unemployment of over 20%, and high political and economic uncertainty. According to the OECD regional well-being survey, the ranking of Catalonia in terms of income and access to services is high compared to the rest of Spain, but it is one of the lowest ranked regions for life satisfaction, environmental quality, community support, and civil engagement (see Fig 22).

The experience in the co-design process does not seem to obviously confirm this data, and was received with surprise. The differing perception might be caused either because rural populations are not currently participating in the group, or for lack of awareness that other Spanish regions rank their own well-being higher.

Fig 22 Regional Well-Being Indicators Catalonia



3.3.2 Stakeholder Landscape

Core Stakeholders

Co Community Members: The CO is designed around two existing observer communities (Meteocat and Natusfera), though both groups are not directly represented in the process, only through the partner organizations. In terms of other involved citizens, the process so far has changed expectations, with hikers' organizations not responding, while bird and butterfly watchers seem more active as expected. Schools are emerging as core target group with strong reactions to the initiative, and venters have been discovered to be habitual and expert observers, as cropping times is based on phenological cues.

Expert Advisors: Reflecting the importance of the Meteocat and Natusfera observer communities, the two organizations themselves are key gatekeepers to core stakeholders, and have to be retained as expert advisors at least. Barcelona Province Council has proven particularly helpful in the Co-Design process and is interested in the collected biodiversity data for general [spatial] planning purposes, confirming the assumption of the baseline analysis. However, more unexpectedly, it was discovered that the provincial level provides planning services to municipalities with lower technical capacity outside the metropolitan area. This function provides crucial resources, which has been especially valuable as the province has picked up proposals that the autonomous region has bypassed so far. However, for long-term success the autonomous government needs to be involved.

Enabling Environment

Regulatory Entities: Due to the political situation, few lessons could be derived for the regulatory landscape. The lack of reaction of the autonomous government is likely at least partially due to the situation, and at this point, it is considered possible that the Catalan Meteorological service might be disbanded. However, it was noted that participating entities strongly encourage alignment of activities with exiting climate adaptation frameworks, suggesting that they might indeed see the 'playing field' as clear and boundary condition for the co-design results.

Opponents: As expected, the DC has not observed any opposition to the initiative yet.

Public and Media: University students and schools have emerged as an important and receptive target audience and communication channel. Teachers in particular are responded very positively to the initiative, and the local university has hosted an exhibition.

Top Ten CO Core Stakeholders

The most important stakeholders of the Demo Case, both in terms of actors important to have as members of the CO Community and in terms of actors most important critical to shape the enabling environment in light of the CO Objectives are:

1. Organized citizens: Meteocat Observers
2. Organized citizens: Natusfera Observers
3. Investors and technical expert: CREAF
4. Subnational administration: Barcelona Province Council (Via Natural Protected Areas)
5. Subnational administration: Autonomous Government
6. Organized citizens/NGO: Institut Catalo d'Ornitologia (ICO)
7. Organized citizens/NGO: Butterfly Monitoring Scheme a Catalunya (CBMS)
8. Organized citizens: Schools
9. Business target groups: Farmers
10. Issue experts: Scientific Expertise

3.4 Water quality management in Stockholm and Flen/Sweden

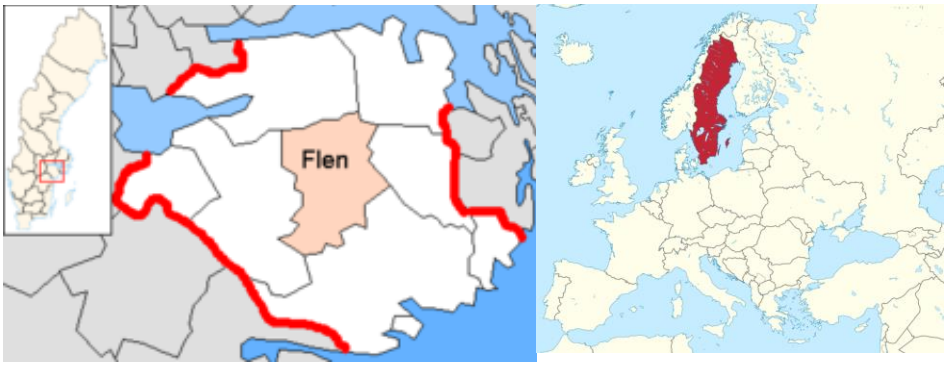
The mission of the Flen citizen observatory is to supports all stakeholders to collaborate in the governance and management of aquatic ecosystems by collecting data, sharing knowledge, and make accessible data that complements established governmental initiatives.

Overall, the vision and mission, objectives and story outline of the Swedish Demo Case implies a focus on supporting the establishment of environmental stewardship with knowledge-based collaboration. The mission and narrative implies that related activities will be mostly limited to support for knowledge exchange, evoking a scenario with a stronger resemblance to observatories for 'classic' Citizen Science, reflecting that environmental stewardship is an ambition in Sweden, but not a reality yet.

3.4.1 Context Mapping[4]

The Swedish Demo Case aims to develop a Citizen Observatory that can be up-scaled to the national level; the Demo Case areas serve, therefore, as pilot regions (see Fig 233). Originally, two areas have been selected, Stockholm as urban area with a more specific localisation to be decided; Flen as rural area. Stockholm had been selected as the most influential metropolitan area in the country, with an existing network of contacts, but was later excluded from the pilot for lack of feasibility at this stage. Flen has a committed community in an 'Eco-village', with objectives that aligns well with the guiding principles of GT2.0. The upscaling phase will aim to attract local communities with interests similar to Flen and encourage them to create their own observatories based on the Flen model.

Fig 23 Target Area of the Swedish Demo Case



Political Context: Sweden has four main levels of government; EU, national level, counties and municipalities. Government authority is highly decentralized, with almost autonomous municipalities. Stratification and further sub-division of city governments according to local preferences and political demands creates a fragmentation and complexity that can be "*mind-boggling*" and makes it easy to '*pass the buck*' and avoid action and responsibility. The national level is less fragmented and central directives such as National Environmental Targets (Miljomål) are more coherent, but it is generally the tasks of lower levels to

[4] For local summaries of statistical data and reports quoted, as well as additional background information see OECD country page (http://www.oecd.org/sweden(), OECD Better Life and Regional Wellbeing Indices (http://www.oecdbetterlifeindex.org/countries/sweden/ and https://www.oecdregionalwellbeing.org/SE11.html), World Bank 'Doing Business' Analysis (http://www.doingbusiness.org/data/exploreeconomies/Sweden), International Telecommunications Union (https://www.itu.int/en/ITU-D/Statistics/Pages/default.aspx), and the European (http://ec.europa.eu/eurostat) and Swedish Statistical Services (h http://www.scb.se/en_/)

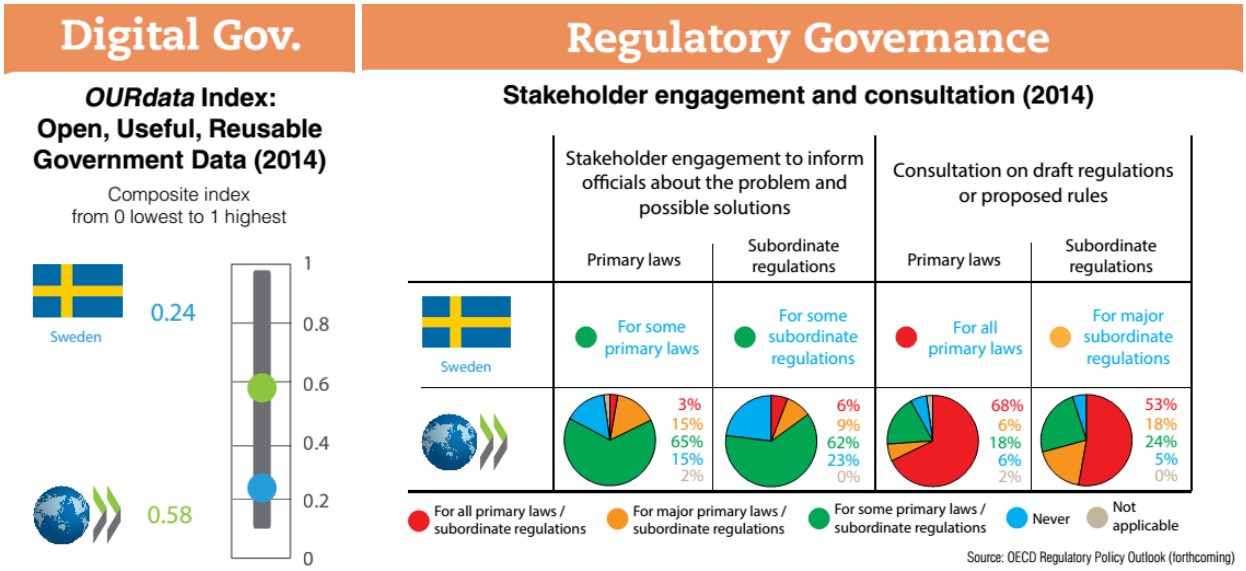
‘interpret’ the law, which includes distributing responsibility for implementation of aspects of central directives to local entities.

One of the key consequences of the described decentralization and fragmentation is a lack of comprehensive sources for government data. Data is openly available, but collected and kept in silos and not shared across government departments and with citizens in an effective manner. Accordingly, Sweden has one of the lowest scores for data that is ‘open, useful, and re-usable’ in the OECD (see Fig 244). A number of initiatives currently attempt to increase collaboration, including efforts by the Swedish land survey, a scheme by the Ministry of Enterprise, as well as a Stockholm Stad initiative for Open Data. However, a central effort or directive aiming to make data coherent is still absent.

The experience of the co-design process full confirmed the original assumptions, and revealed the full extent of the problem. It is reported that not even public officials can clearly say which authority is responsible for which aspect of the water quality problem, or identify the boundaries between different competencies. ´The water management system in general is huge, but entirely focused on the highly regulated drinking water supply, with water bodies much less regulated and monitored.

In terms of participation, provisions for stakeholder engagement in laws and regulation are about, or slightly below, OECD average. Public officials typically consider themselves leading experts in their own field, so they are both crucial advisors for the CO, and citizen contributions can easily be interpreted as questioning such expertise. Accordingly, building acceptance with policy makers is very important. Citizen Science has attracted increasing attention ion Sweden last year, with local conferences being held involving communities and government to explore when and how it can be made to work. This offers opportunities for the CO.

Fig 24 Baseline Indicators Transparency and Participation in Regulation, Sweden



Environmental Context: Water quality in the pilot regions will involve a perspective on catchments of relevant rivers and inland lake systems. The project area is part of the Bio Region Mälarden, which is one

of the most polluted Bio Region in Sweden. Sweden considers its water quality policies general successful and performing well. But in the region, water quality is mostly affected by diffuse pollution from agriculture, which is extremely difficult to control and expensive to clean up. A connecting issue and reference point for the topic of water quality is the Baltic, the pollution of which is very present in the public awareness.

Social/Cultural Context: Swedish society is part of a "Northern European" culture, projected and represented externally, for example, through joint embassy complexes in other countries. Internally, bigger cities have strong local culture, and a distinction and competition exists between the metropolitan areas and "The North". In rural areas, the general perception is that political attention is focused on Stockholm, to the detriment of other regions. Flen specifically attempts to create local identity as Eco Village, with strategies relates to energy, food production etc. Here, environmental concerns provide a uniting factor.

With regard to environmental attitudes, the 2014 Eurobarometer Poll "Attitudes of European citizens towards the environment" finds that

- 100% of the Swedish population personally believe that protecting the environment is important, and 64% of Swedes names water pollution as a main concern. It is the highest rated concern in Sweden, and in Europe, only Finns express higher concern about water pollution.
- 75% of Swedes agree that environmental issues have a direct impact on their daily lives, and 82% feel well informed, through 33% feel a lack of information on water pollution
- Sources for environmental information are: 68% TV, 40% social media/internet, 60% newspapers. In terms of trusted sources 69% of Swedes believe in the reliability of scientists, 60% in in Environmental protection associations 60%, 30% in TV documentations
- 70% feel that citizens themselves are not doing enough to protect the environment

Currently, Sweden experiences a shift in attitudes, with ‚environmental protection' considered as an outdated concept and more focus on ‚living with the environment'(eco-modernist approach), environmental stewardship and circular economy approaches. This positions the vision and mission of the CO well as part of this wider societal shift.

In terms of civil engagement, Swedes volunteers lightly above OECD average, 36.2% of the Swedish working age population report that they engaged in formal volunteering in a year. This is contrasted by the engagement of younger generations: Civic participation of students, with 25.4% of 14-year olds report having participated in organisations, groups or clubs over a year, one of the lowest shares in the OECD. Interestingly, the creative problem-solving skills of Swedish students also fall below the OECD average level.

This is also experienced in the co-design process, with mainly senior citizens most interested in getting involved and learning more about the issue. However, the reason for this might be lack of time as well as a generally lower awareness for the problem. In Sweden, people traditionally place both trust end responsibility in the hands of the government, an attitude usually justified by high taxes. A belief of government responsibility together with well-advertised high standards for drinking water quality implemented by successful regulators might lead to a public misperception about the nature of water quality problems. For example, drinking water quality is constantly monitored, while water bodies are only controlled twice a year, a fact that is likely little known.

Two specific additional issues have been revealed in the co-design process. For one, Sweden has a strong unwritten rule that people are free to walk on other people's property as long as no harm is caused. However, using this convention to access water bodies for measurements on the property of owners who disagree with this type of citizen involvement might be a source of conflicts and needs to be considered. Furthermore, over the past years, Flen has accepted a large number of refugees, which changes population dynamics. This has raised the question if involving refugees in a CO might be a welcome activity supporting their integration in society.

It should be noted that Sweden was one of only a handful of countries in which the Euro crisis did not lead to a loss of citizen confidence on their central institutions. In fact, Swedish confidence in the central government increased by six percent (in comparison: NL (-9%), BE (-17%) and ES (-16%)). However, the influx of migrants in 2015/16 seems to have triggered a loss in confidence in the government, and contributed to the current motivation for more citizen involvement

Technical Context: Network access including 4G access is ubiquitous in Sweden (see Fig 25). The age gap in technology use is comparatively low, as public services are offered online across all age groups and supported by an official digital ID scheme. However, an age gap has been observed in the use of data collection apps and social networking tools. Official websites are used because it is mandatory, but that use makes it easy to misjudge related media-affinity. For senior citizens tools and websites have to be very simple and user-friendly. Twitter, Facebook and Instagram are considered the most popular social networks, though local groups might have their own Google groups or blogs.

Fig 25 ITU Access and Usage Indicators 2016, Sweden

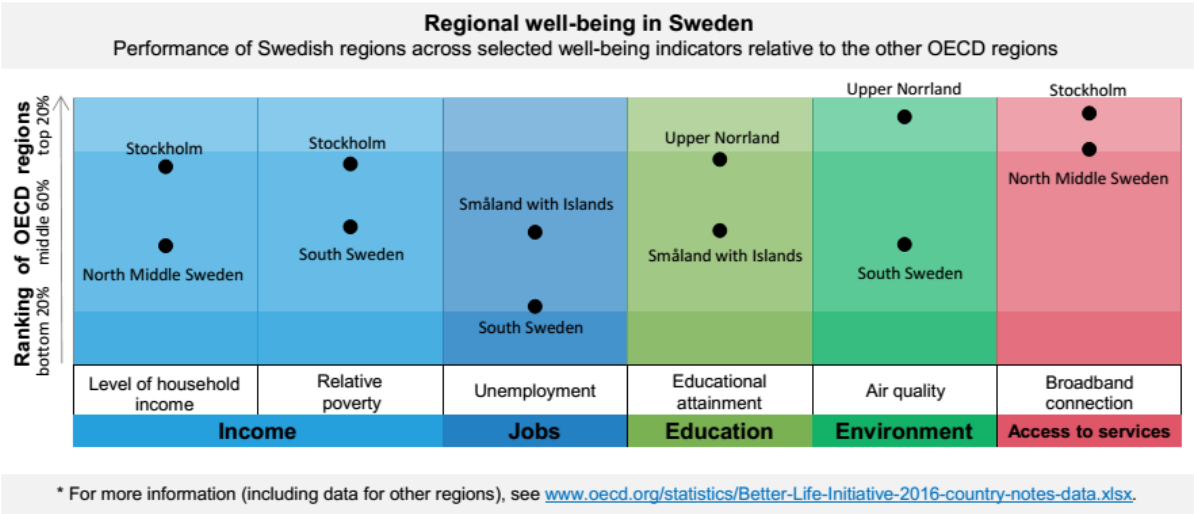
	Economy	Fixed-telephone subscriptions per 100 inhabitants		Mobile-cellular subscriptions per 100 inhabitants		International Internet bandwidth Bit/s per Internet user		Percentage of households with computer		Percentage of households with Internet	
		2014	2015	2014	2015	2014	2015	2014	2015	2014	2015
151	Sweden	39.2	36.7	127.8	130.4	*392'780*	*421'237*	*90.1*	88.3	89.6	91.0

	Economy	Percentage of individuals using the Internet		Fixed-broadband subscriptions per 100 inhabitants		Active mobile broadband subscriptions per 100 inhabitants	
		2014	2015	2014	2015	2014	2015
151	Sweden	92.5 [67]	90.6 [54]	34.1	36.1	116.3	122.1

Economic Context: Sweden is a high income country, with economic power concentrated in the Stockholm area (see Fig 266).

In Flen, the economy is dominated on the one hand by three major industrial employers, including an ice cream producer (50% national production), a famous organic dairy producer, and the headquarters of Volvo Parts, and by a service sector supporting tourism and outdoors activities on the other. The Flen region has lots of summerhouses with owners likely keen to preserve the quality of the environment. The eco-village concept is valuable for this clientele, their interest might differ from local residents. Local agriculture is mainly industrial in nature.

Fig 26 Regional Well-being indicators Sweden



3.4.2 Stakeholder Landscape

Core Stakeholders

CO Community Members: As expected in the "Swedish approach" (always start initiatives small, prove that it works, then grow it from there), recruitment of community members is based on direct personal contact. As initiatives compete for the attention of volunteers, it is important to translate general awareness that 'something needs to be done' into a specific proposal what exactly can be done, in a form citizens can scrutinize. Experts, officials and multipliers expect to be wooed personally. Accordingly, attempts to engage further organized groups like hikers or conservation NGOs via simple invitations have not elicited response, as the more targeted outreach is pending. However, experience of the first year suggest that the key target audience is "*Citizens who are (a little bit) frustrated about how environment is handled by government*"

Expert Advisors: For the Swedish Demo Case, experts on citizen science have proven very useful, in addition to experts on water quality. An important limitation for the engagement of government technical experts is the difficulty of officials to spend time with activities that are not a line item in the agency budget. Nevertheless, the DC has generally received positive response, reflecting a rising interest in Citizen Science in the Swedish government and appreciation for the inclusive co-design approach.

Enabling Environment

Regulatory Entities: A key lesson of the co-design process was the realization that few government agencies are entirely clear on the boundaries and links between roles and mandates related to water quality. Accordingly, the co-design group has to essentially learn how authorities conduct job practically on a daily basis, creating clarity about who should be brought on board and who project really wants. It was noted that authorities reacted generally positive, and show interest in the possibility of a CO to generate public awareness.

Opponents: On the citizen side, opposition stems from the mentioned belief that monitoring is the government's job taxes pay for. On the expert and decision-maker's side, opposition is more likely to be passive, with opponents believing that a CO does not offer interesting opportunities, lacks reliability, and cannot improve of 'real' expertise. It was noted that attitudes within one agency sometimes differed, with sceptical staff working on the issue side (i.e. water quality), balanced by supportive staff involved in citizen science.

Public and Media: In line with the personalized approach to recruitment, communications are most effective through local and very specific channels, such as local newspapers, local radio, and the Eco Village mailing list. Contact with one a very supportive local journalist proved to be a crucial asset for the initial publicity 'Blitz'.

Top Ten CO Core Stakeholders

The most important stakeholders of the Demo Case, both in terms of actors important to have as members of the CO Community and in terms of actors most important critical to shape the enabling environment in light of the CO Objectives are:

1. Individual Citizens: Communities Flen and Dunkern
2. Local administration: Municipality Flen
3. Issue experts: SU (Demo Case Team)
4. Issue experts: SLU
5. National administration: Swedish Water Authority
6. National administration: Swedish Water and Waste (Utilities)
7. Organized citizens: Keep Sweden Clean
8. Issue experts: Lantmäteriet (land survey)
9. Technical experts: Tech Partners
10. Organized citizens/multiple: BioRegion Mälarden stakeholder group

3.5 Biodiversity conservation in the Mara triangle, Kenya

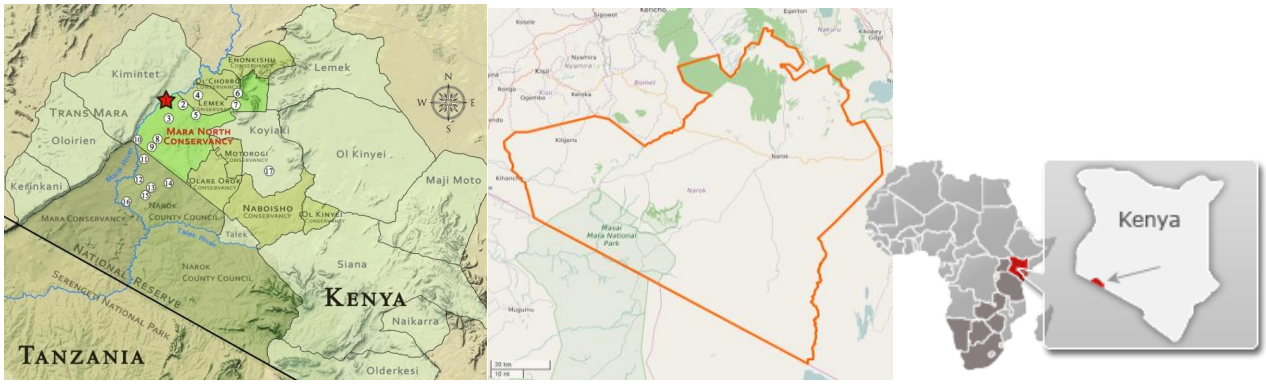
The Maasai Mara citizen observatory will constitute a multi-stakeholder platform for generating and sharing of data, information and knowledge to improve policy making and implementation for sustainable livelihoods and biodiversity management in the Mara ecosystem.

Overall, the vision, mission, objectives and story outline of the Kenyan Demo Case implies a focus on improving the quality of policies and their implementation through facilitated collaboration, with a design that imagines 'collaboration' (initially) as sharing and discussing information with a common purpose. The domain adaptation analysis implies a CO fundamentally designed for environmental stewardship, but in a low capacity situation that will use the more structured interactions of collaborative planning processes as a stepping stone to empower the involved stakeholders over time.

3.5.1 Context Mapping[5]

The Demonstration case will take place in the 'Mara triangle', consisting of the Maasai Mara National Reserve plus a number of nature conservancies around it (see Fig 27). The areas are managed by different entities, but are accessible to tourists with one combined ticket and have no fences to separate the natural units. After the co-design process, the activity focus remains on the conservancies, but there is an increased awareness that political relevance requires the CO to cover Narok county as a whole to reflect the jurisdictional boundaries.

Fig 27 Target Area of the Kenyan Demo Case



Political Context: Kenya has three levels of government, the national level, provinces with little operational relevance, and a district level that has recently been dissolved and restructured into counties. Counties contain the constituencies of MPs and wards. The project area is located in Narok County (see **Error! Reference source not found.**). Politically, the local situation is shaped by the fallout from this relatively recent reorganization. A few years ago, Kenya introduced counties as a new layer of government and devolved power to these local governments. The restructuring created a lot of uncertainty, including through overlapping jurisdictions and authority. People are considered to be little informed; few citizens

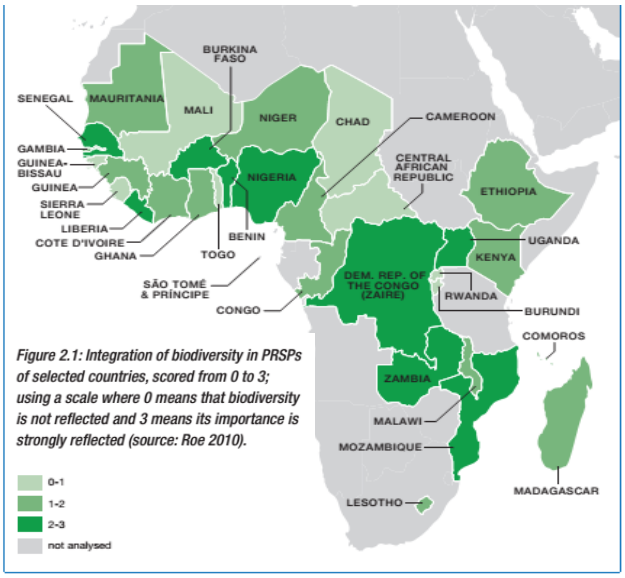
[5] For statistical data and reports quoted, as well as additional background information see World Bank 'Doing Business' Analysis (http://www.doingbusiness.org/data/exploreeconomies/Keny), and International Telecommunications Union (https://www.itu.int/en/ITU-D/Statistics/Pages/default.aspx)

know what has changed or where to go to address concerns. Even departments themselves don't know who is has authority over issues.

Struggles between the national and local level over '*who has the right to decide'* are a permanent feature and lead to long delays, for example experienced in recent the negotiation of a new water law. As a result, there is little willingness to cooperation, everything is kept '*in the family*' of known and trusted groups. However, considerable effort has been invested over the past years to establish a transboundary basin management system for the Mara catchment, which has created a network of connected actors experienced in collaborative planning in the area.

Wildlife and biodiversity conservation is subject to a patchwork of different entities. There is a mechanism of joint public-private management for both national reserves and conservancies, but the Kenya Wildlife service is responsible for wildlife, and technically manages the wildlife within areas managed by counties. With regard to biodiversity, UNEP and the Convention for Biological Diversity (CBD) report that Kenya implements National Biodiversity Strategies and Action Plans (NBSAPs), the main CBD instruments, at the national level (see Fig 288). With the political reform, the counties gained a mandate for managing biodiversity, but the issue is considered low on the political agenda.

Fig 28 Implementation of NBSAPs in Africa



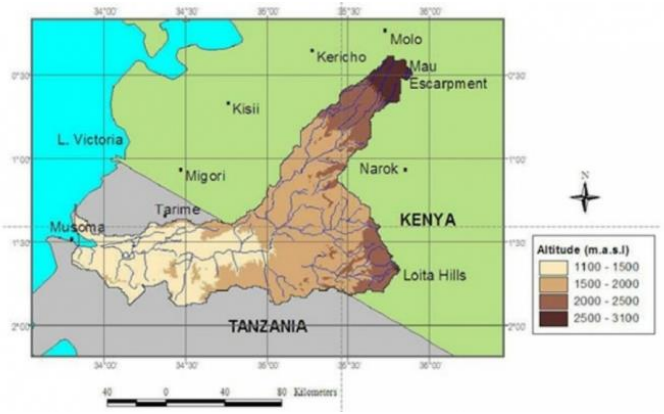
The main political conflict lines are created by budget allocation decisions. While decision powers are devolved, the budget is distributed centrally at the national level. Masai Mara is 'only' a reserve, not a national park, but it is one of Kenya's main tourist attractions, and tourism revenues alone make Narok one of the wealthiest counties and a valuable asset to the Kenyan economy. But the status of the local infrastructure does not match the importance as tourist destination, raising questions about both central infrastructure investments, and the use of reserve revenues at the local level. Representatives in Narok County are mainly Masai, but that does not mean that local Masai communities are the main beneficiaries of decisions.

A recent election has established the new system more firmly, with roles and responsibilities slowly falling into place. At the national level, the elections led to conflicts and controversies, which is closely watched locally, but has little impact on activities apart from delays of actions that require national attention. Overall, Narok county not clearly aligned in national political division. Neither the budget allocation issues not biodiversity related policy agenda has been advanced over the past year.

Environmental Context: The Maasai Mara reserve and the Serengeti National Park in neighbouring Tanzania are part of one shared ecosystem, divided by the river as both political and natural boundary. The Mara reserve is part of the annual wildebeest and zebra migration circle, the most spectacular wildlife event and tourist attraction which connects the two protected areas. But as Kenya and Tanzania compete for visitors in the parks, there is no visible transboundary collaboration between the management units.

As second natural unit, the project area is part of the Mara Catchment (see Fig 2929), which might indirectly influence biodiversity conservation though water management decisions taken during droughts or create upstream-downstream conflicts.

Fig 29 Outline of the Mara Catchment



In the co-design process, the catchment aspect has not influenced the project focus, but is felt as boundary condition. Currently, the country is heavily affected by droughts, leading to livestock deaths and making water related issues more acute. This has resulted in increased encroachment on the natural reserve.

Social/Cultural: The Maasai Mara National Reserve is located in the traditional tribal area of the Masai people (see Fig 30), the presence of an interaction with the tribal structure and culture is, therefore, an intrinsic aspect of the local situation. The culture is highly autonomous and self-contained, tribal councils are involved in local decision making.

Fig 30 Traditional Masai tribal areas

Traditionally, the Masai people are pastoralists who place almost exclusive priority on the well-being of their cattle. Typically, these Masai do not hunt, so wildlife is not considered particularly valuable or even relevant, with the exception of predators attacking cattle. As the natural reserve is legally designed to 'keep people out', this does not create a direct conflict within the target area, but outside the reserve the perceived right to defend livestock will likely take precedence over any legal protection granted to the attacking predator. The Masai do feel the region including the reserves and conservancies are 'their' land, but increasingly see opportunities offered by tourists. Several families and tribes have opened their homesteads to tourists, which usually visit as a detour from safari vacations, thus connecting the economic opportunities to the wildlife conservation.

However, not all Masai are pastoralists, Narok County also houses the Purko Masai, who turned to farming long ago. Farms and livestock geographically separated, with farms located upstream. As a rule of thumb, farming Masai are more likely to be Christianised and more educated. In general, it seems that local diets

and lifestyles are slowly changing, and while education used to create no conflicts with traditional lifestyles, more tribe members moving into agriculture might create internal conflicts. In general, young Maasai show less interest in pastoralist lifestyle, and increasingly migrate to urban areas. The recent droughts might influence changes, as traditional lifestyle becomes harder and drive local to increase agricultural activities, for example to grow fodder.

Technical Context: Mobile connections in the project area are patchy, and almost no connectivity exists within the natural reserves (see Fig 311). However, most people have a phone and know where they get a connection (see Fig 32). The internet is almost exclusively accessed via Smartphones, but data tariffs are prohibitively expensive, making it important to create offline functionality that can be synchronized once Wi-Fi is available. Mobile payments are a key driver for increased smartphone penetration.

The electrical grid is expanding, in part due to a government initiative to connect schools to the electricity grid. Solar energy is also expanding, driven by mobile phone providers and church initiatives, who package solar panels with batteries, light and mobile phone chargers. There is a substantial inequality in terms of access and uses of technology for men and women.

Fig 31 Mobile network coverage in the project area

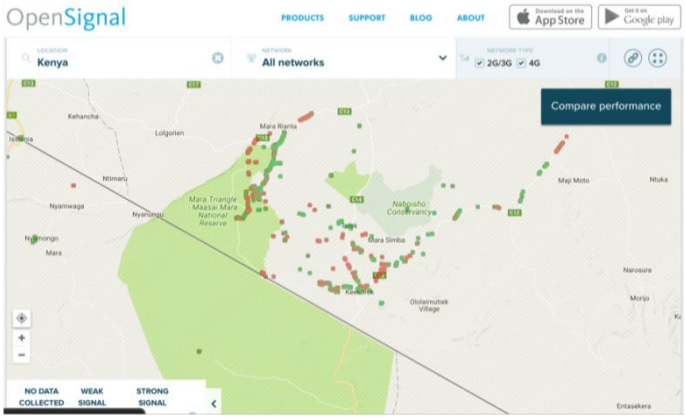


Fig 32 ITU Access and Usage Indicators 2016, Kenya

	Economy	Fixed-telephone subscriptions per 100 inhabitants		Mobile-cellular subscriptions per 100 inhabitants		International Internet bandwidth Bit/s per Internet user		Percentage of households with computer		Percentage of households with Internet	
		2014	2015	2014	2015	2014	2015	2014	2015	2014	2015
82	Kenya	0.4	0.2 [22]	73.8	80.7	25'200	40'067	*12.3*	*13.1*	*16.9*	*19.6*

	Economy	Percentage of individuals using the Internet		Fixed-broadband subscriptions per 100 inhabitants		Active mobile broadband subscriptions per 100 inhabitants	
		2014	2015	2014	2015	2014	2015
82	Kenya	*43.4*	*45.6*	0.2	0.3	9.1	15.5

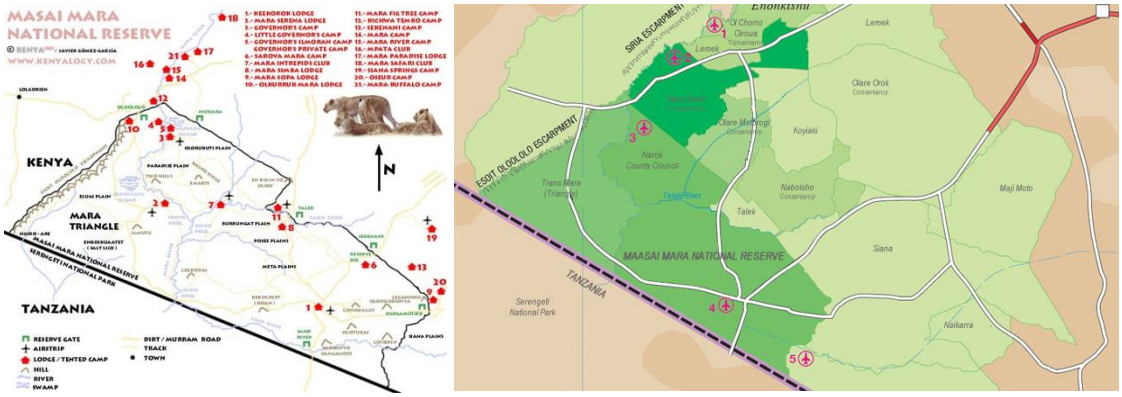
In terms of social networks, Facebook is considered the dominant network, in part because it is bundled with online access in the company's internet.org initiative. WhatsApp is gaining popularity also as a means for free phone calls. Twitter and other networks are less popular. As a result of the recent political conflicts, two national TV stations were recently closed, which increases the relevance of local radio and online sources (national politics followed closely)

It is noteworthy that the main form of information sharing in the Masai culture is mouth-to-mouth, connected to the tradition to greet and share information whenever fellow tribesmen are encountered. Today, community radio is another main source for local information, providing news in local languages.

Economic Context: Narok is an economically productive county. Apart from livestock raising, it features large-scale maize farming in the East, wheat farming in the West, and tourism in the South. “Masai” is also a successful brand, and Masai traders roam whole country scouring for business opportunities and to import international goods for the local market. However, wealth is very unequally distributed, and the drought is increasing inequality further.

With regard to the tourism sector, the county has a touristic infrastructure in the form of safari lodges and small airports for aerial tours (see Fig 333). Most of the lodges and tours are operated by international companies and concession holders. To limit the system pressure in the high season, the county is now limiting the number of lodge licenses.

Fig 33 Touristic infrastructure in Narok County



3.5.2 Stakeholder Landscape

Core Stakeholders

Co Community Members: The NGO “Friends of the Mara” surfaced as key stakeholder with a well-developed network, active social media presence, and similar interests in their community. The NGO is acting as a bridge for project (both to locals and government), while at the same time tools introduced by GT fill a gap for them, as fundraising for an IT platform had previously been unsuccessful. Local administrations involved in the process likely because they appreciate the opportunity to engage with new technologies, raising slight concerns that the technology might be high jacked for government interests.

Expert Advisors: The co-design process mainly confirmed the expected expert advisors.

Enabling Environment

Regulatory Entities: Most regulatory entities have been confirmed as suspected in the baseline analysis, with the exception of the local Water Resource [Management] Authority (WARMA), that emerged as crucial stakeholder due to its mandate for granting all licenses for water abstraction and are thus connected to managing the ongoing droughts.

Opponents: Most local stakeholders share a certain reluctance with sharing data. On the citizen side, reporting of data such as animal numbers is feared to lead to tax demands, while reporting of damages is

not expected to lead to compensation. On the government side, transparency is seen as a potential embarrassment, and a general preference values control over a proprietary tool. For livestock traders, better informed citizens might reduce profit margins.

Public and Media: With the shift of the Demo Case focus from biodiversity conservation to supporting the balance between biodiversity and livelihoods, the CO has to place more focus on communication channels that reach the local communities as new core target audience.

Top Ten CO Core Stakeholders

The most important stakeholders of the Demo Case, both in terms of actors important to have as members of the CO Community and in terms of actors most important critical to shape the enabling environment in light of the CO Objectives are:

- Organized citizens: Friends of the Mara
- Subnational administration: County Executive
- Business target group /NGOs: MMWCA (Owners)
- Business target group: Pastoralists
- Organized citizens: Tourists
- Subnational administration: WARMA
- National Administration: National Kenya Wildlife Service
- National Administration: Kenya Meteorological Department
- Technical expert: Upande
- Scientific target group: Universities (Egerton IWRM Knowledge/Maasai Mara University)
- Issue experts: Museums/African Conservation Center

3.6 Community-based natural resource management in the Silowana-Complex, Zambia

The "Niti Luli" platform will provide the virtual space for a "permanent community meeting" of local communities, government agencies, NGOs and donors, improving coordination between government agencies and donors, and giving communities more influence in decisions affecting their lives and livelihoods.

Overall, the vision, mission, objectives and story outline of the Zambian case describes a focus on enforcing 'due process' on the one hand, and increasing the capacity of the community members to participate in the process on the other. The domain adaptation analysis implies a CO designed to support collaborative planning, combined with more open ES support to reflect the mandate of the CRBs and the relevance of including donors.

3.6.1 Context Mapping[6]

The Demo Case will take place in the so-called Silowana Complex the Zambian part of the 5-country Kavango-Zambezi Transfrontier Conservation Area (KAZA-TFCA, see Fig 344), including a 5,000 km² wildlife protected area and a 4,000 km² buffer zone around it. The KAZA-TFCA was established by an international treaty that designates the protected area and outlines a management framework, but administration falls under the authority of individual national governments. The Demo Case is part of a broader government-funded capacity development effort to implement a local integrated development programme for the area, and ultimately contribute to the TFCA treaty obligations. The broader project has already completed two activity phases since 2009, creating a relationship with local authorities that the Demo Case will draw on.

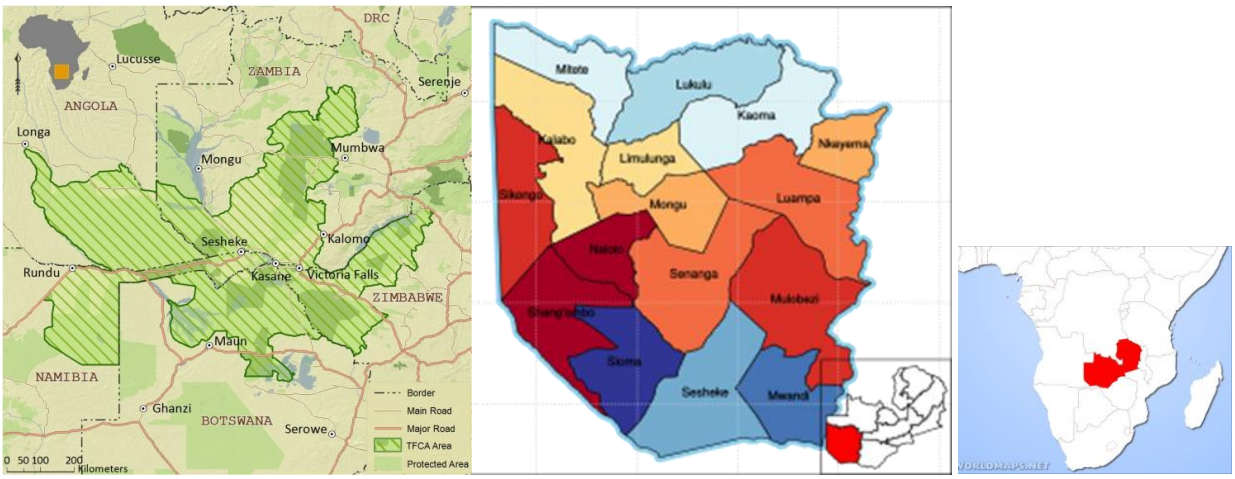
As the CO is designed specifically as a support tool for CBNRM under the Wildlife act, the project area is technically the Game Management Area "Lower West Zambezi", which is an area inside the Silowana complex.

Political Context: Zambia has four formal levels of government, a national level as centre of political power, provinces headed by a provincial minister, districts headed by district Commissioners, and sub-districts. The project area is located in two districts, Sioma and Sesheke, in the province of Western Zambia. The district and provincial level has some relevance to the project due to their involvement in spatial planning, infrastructure and development projects. But the key focus for the purpose of the CO is the interplay between national and sub-district decision-making.

The sub-district level contains three different overlapping types of political entities. The first are constituencies of local elected representatives, the second the hereditary chiefdoms of the traditional tribal system, the third one are game management units established under the national Wildlife Act, the central focus of attention for the CO. Game Management Areas follow the boundaries of traditional chiefdoms, with the chief as patron, but the authority of chiefdoms are regulated under a different law and administered by a different ministry. Usually, the three sub-district entities are complementary, but overlaps can occasionally create tension.

[6] For statistical data and reports quoted, as well as additional background information see World Bank 'Doing Business' Analysis (http://www.doingbusiness.org/data/exploreeconomies/Zambia), and International Telecommunications Union (https://www.itu.int/en/ITU-D/Statistics/Pages/default.aspx)

Fig 34 Target Area of the Zambian Demo Case



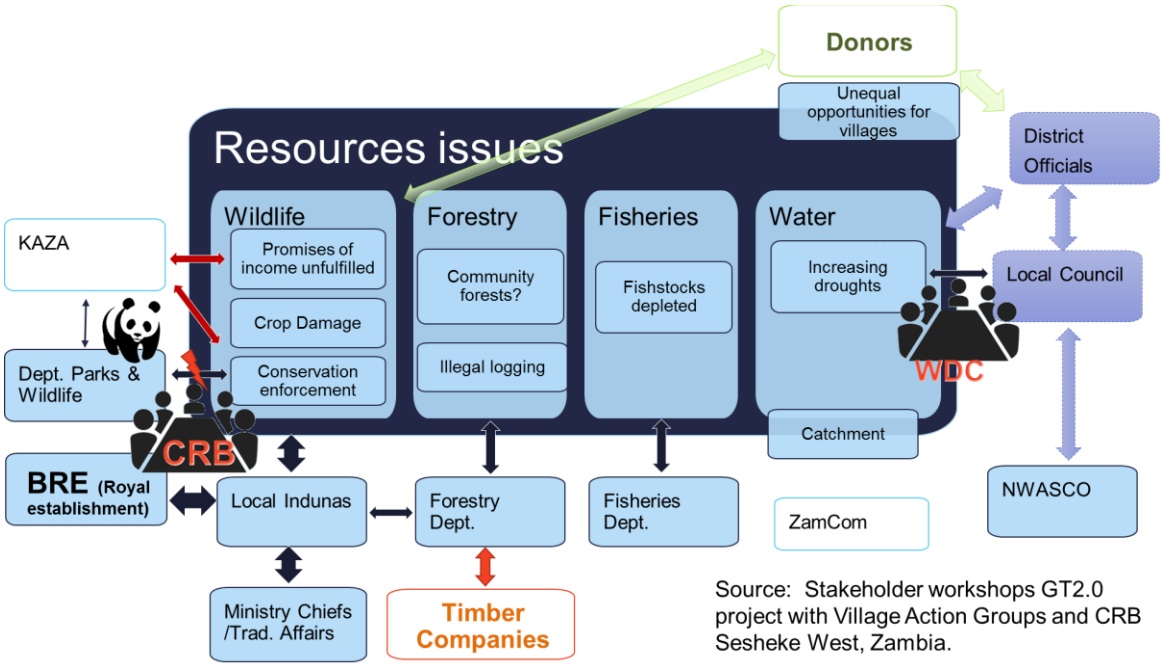
Community Resource Boards (CRBs), the target authorities of the CO, can be established on application of the local community under the Wildlife Act. They consist of elected members from the local community, plus representatives of the chief, the local council and the ministry. Their mandate includes involvement in wildlife management and the development of resource management plans, and entitlement to a percentage of income generated from utilisation of local resources through, for example, hunting licenses of filming permissions. CRBs have been set up with varying success across Zambia, strongly reflecting the presence of commercially interesting resources in different areas. The Silowana area has been lagging behind mainly because there are few sources of revenues from wildlife management. In general, the CRBs are designed as a means to delegate authority over natural resource management back to local communities, however, there is a discrepancy between ambition and performance, and a number of aspects suggest that the structure of the scheme itself does not fully match the aspiration generally due to capacity limitations, implementation failure and a narrow focus on a wildlife based model.

Over the past few years, plans for community-based decision making have been included in several other laws, including those for water management, forestry and fisheries. The laws suggest that existing CRBs should be used where they already exist instead of creating new community structures, however, there seem to be few efforts to provide the “empowered” CRBs with proper resources to fulfil their expanding mandates. Resource requirements of regular CRB elections are high, frictions occur between different policy agendas, and frequently, and vested interests affect decisions regarding the use of funds allocated under benefit sharing schemes. In 2014, the Ministry of Wildlife to dissolved all CRBs; a number of them have not been re-constituted since. CRBs do not have the same role in timber licences and concessions as they do under wildlife legislation. However, a new opportunity in forestry has emerged with the new provision for community forestry which will grant communities rights to manage and benefit from forests that are declared as community forests.

Overall, a constitutional change and decentralization policy is supporting activities that strengthen local decision-making, but the complexity of the institutional landscape involved in local resource issues, with numerous overlapping and conflicting roles and interests presents a major challenge (see Fig 35). Key problem areas are the expansion of CBNRM to forestry (CFM), as valuable economic interests are affected,

and conflicts between environmental conservation policies and local community goals as illustrated by the strained relationship between communities and the wildlife police.

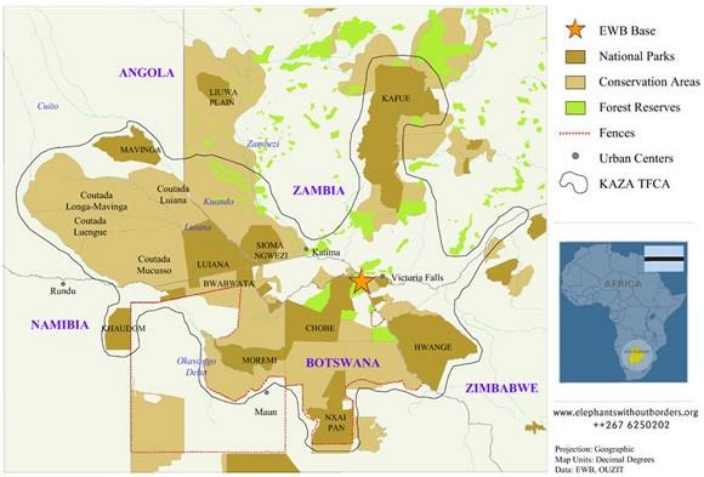
Fig 35 Institutional map CBNRM in Sesheke West



Source: Stakeholder workshops GT2.0 project with Village Action Groups and CRB Sesheke West, Zambia.

Environmental Context: The project region is located in a transitional landscape moving from wet woodlands to the dryer landscape of the Kalahari sand, a distinct landscape that is a strong source of local identity. Two environmental boundaries play a role in the project context. First, the project area features one of the highest elephant population densities in the region, creating extensive human wildlife conflicts (see Fig 36). The local population considers elephants a problem and in direct and existential conflict with their livelihood ("The elephants are as interested in your crop as you are"), conservation efforts, therefore, contain mitigation measures against animal damage as a prominent feature.

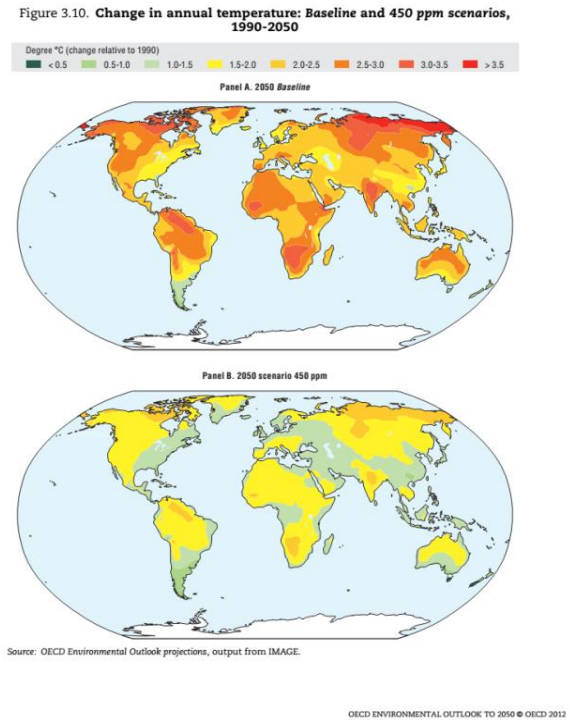
Fig 36 Elephant Population in the KAZA-TFCA



Secondly, Silowana is located in the upstream sections of the Zambezi catchment, revealing the local forests as a valuable provider of ecosystem services for sustainable catchment management. Timber harvesting and generally increasing water stress already focuses more attention on the deteriorating catchment, and increase pressure

on the community. As part of a low rainfall belt, the area is strongly dependent on the river, and climate change related changes in weather patterns increase the need to create adaptation strategies (see Fig 37). Local agriculture has low resilience to changes, as cultural preferences favour vulnerable crops, increasing the urgency of the issue.

Fig 37 Climate Change Scenarios predicting a 'hot spot' in the project area



Social/Cultural Context: The culture is defined by traditional tribal structures - the region used to be a nation run by a system of kings and Chiefs, who remain powerful today. CRBs are generally homogenous in terms of tribal affiliation and language, with stratification according to gender and age. The project area is very remote and sparsely populated, urban-rural migration and distinctions though not very significant, are nonetheless evident in the number of people who have returned to settle in their home areas after retirement. This has some influence on the language and levels of literacy. Accordingly, the cultural reference points are mainly local. As noted above, the strong cultural food preferences for Maize, is a direct source for local vulnerability, as it is much more affected by drought than sorghum and millet.

Technical Context: Mobile phone ownership is spreading despite the remote location, and cell phone coverage is growing fast (see Fig 38). Nevertheless, data tariffs remain prohibitively high, functionality of apps has to provide offline functions that can be synchronized once free Wi-Fi connections are in range. Affordable Chinese smartphone models are particularly popular, as people like cameras and sharing pictures. WhatsApp and Facebook are the most popular social networks. Community radio is a key source for local information.

Fig 38 ITU Access and Usage Indicators 2016, Zambia

	Economy	Fixed-telephone subscriptions per 100 inhabitants		Mobile-cellular subscriptions per 100 inhabitants		International Internet bandwidth Bit/s per Internet user		Percentage of households with computer		Percentage of households with Internet	
		2014	2015	2014	2015	2014	2015	2014	2015	2014	2015
174	Zambia	0.8	0.7	67.3	74.5	*3'434*	3'187	*6.6*	*7.4*	*10.1*	*12.7*

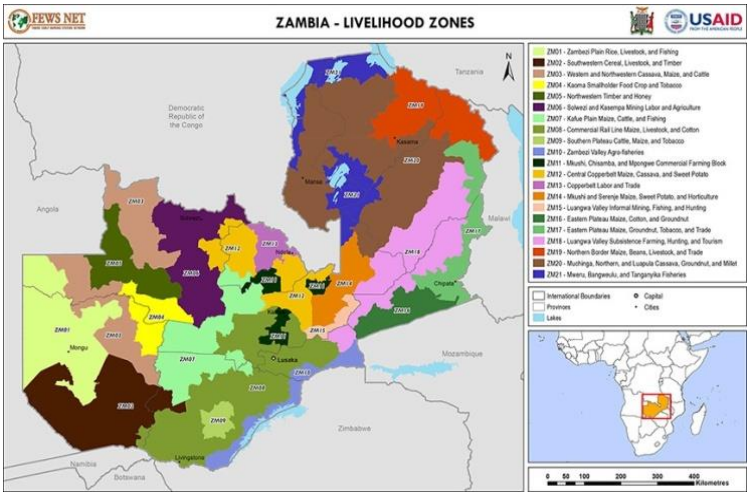
	Economy	Percentage of individuals using the Internet		Fixed-broadband subscriptions per 100 inhabitants		Active mobile broadband subscriptions per 100 inhabitants	
		2014	2015	2014	2015	2014	2015
174	Zambia	*19.0*	*21.0*	0.1 [30]	0.1 [36]	8.8 [39]	13.8

Over the course of the co-design process it has become clear that the original analysis only applies to urban areas such as Sesheke town and Sioma. If citizens have mobile phones at all, it is usually feature phones, network coverage is very unequal and the area has no access to the power grid. Phone ownership and use is connected to social status, so smartphones are most likely found with representatives and people who go to urban areas on a regular basis, such as councillors, teachers, and traders.

Economic Context: The majority of the local population engages in subsistence farming with low productivity. The area used to be rich at fisheries, but fish stocks have been significantly depleted. Similarly, a tradition of cattle raising was destroyed by an animal pest so herd sizes tend to be small.

The area has the highest timber producing areas in the country (see Fig 3939), but timber concessions are mainly held by Chinese companies harvesting at industrial scales. Under a new policy scheme communities will gain the right to declare community forests. But the frame has not been implemented yet, leaving currently little of the benefits with the locals. The local importance of timber makes forests a particularly important aspect of CBNRM is the project area, both to share in benefits from timber harvesting, and to be able to explore alternative uses, such as payments for ecosystem services in catchment management. Zambia is currently negotiating a proposal for a 50bn dollar investment from the green climate fund, which make such scenarios more realistic.

Fig 39 Main sources of livelihoods in Zambia per region



Wildlife tourism is an area of interest, and some lodges already exist along the river mainly for sport fishing, providing some employment opportunity and market for local produce. However, the sector is small and informal; opportunities for upscaling are being explored by the respective ministries and project partners.

Initiatives that might change the economic landscape are a current push by the government to invest in industrial agriculture (e.g. cashew nuts), and plans to dam the Sioma waterfall for hydropower. Environmental concerns do not play a big role in such plans. In Contrast, a new FAO project frame offers opportunities to access to non-timber products in communities, and planting of local trees (forest regeneration).

3.6.2 Stakeholder Landscape

Core Stakeholders

CO Community Members: Three core lessons emerged from the experience of the co-design process. First, the key community members to address are those concerned about treatment and participation of local communities in decision-making processes, with all activities directly and visibly linked to everyday concerns resulting from these decisions. Second, WWF is involved with a high number of different activities and project is the area, making its staff an important target group to achieve some of the objectives.

Finally, the local council, as well as its village level ward councillors and Ward Development Committees are the key stakeholders for the decentralization of government functions including water supply and infrastructure. Coordinating the activities of the CRBs and WDCs will be crucial to avoid local role conflicts.

Expert Advisors: The technical staff of donors involved in designing the interventions implemented under the CCCDP framework represent a crucial resource for the project side, district officials for the alignment of local initiatives with national development strategies. Politically sensitive issues such as the implementation will require political champions, including in Lusaka. For the issue community forestry, the office of the local Assemblyman has been won, who has personal expertise and interest in improving forestry.

Enabling Environment

Regulatory Entities: As the objectives of the CO aim to improve better coordination between government departments and other actors, director level approval of the initiative will be required in several agencies, so that staff of involved national agencies are free to collaborate with the CO. At the local level, the changing mandate of the local council under the decentralization strategy and possible strategic changes in the organization of the DNPW imply that the regulatory framework is in flux. In this situation, it is of crucial importance to further involve the BRE as stabilizing entity. Finally, the experience of the co-design process highlights that donors operate as quasi-regulatory entities in the area.

Opponents: The initiative needs to overcome the perception that natural resource management aims to protect the interests of trees and elephants over the protection of people, as the resulting lack of trust greatly reduces the willingness to become an active participant in the observatory. Furthermore, it has been noted that development projects can actively compete for resources and attention.

Top Ten CO Core Stakeholders

The most important stakeholders of the Demo Case, both in terms of actors important to have as members of the CO Community and in terms of actors most important critical to shape the enabling environment in light of the CO Objectives are:

- Organized Citizens: VAGs
- Local decision makers: CRBs
- Local administration: Council and Ward Councilors
- National decision-maker: DNPW
- Technical and issue expert/'business' target: WWF
- Subnational administration: District officials
- Issue experts: Donors operating in the area
- Local legislation/administration: BRE and indunas

4 Comparative notes and implications for the generic guidelines

4.1 Observations of the baseline analysis

At the time of the baseline analysis, the Demo Cases mainly approached the Citizen Observatories as tools for the production of 'objective' data to be used by technocrats in administrative entities, and paid relatively little attention to more 'political' actors, especially elected officials and legislative bodies with higher incentives to engage in collaboration and dialogue with citizens (Haas, 1992). Similarly, it was suggested that citizens with the highest motivation to engage in collective action might be activists, not neutral brokers. After the first stage of the co-design process, most cases strategies have been adjusted in the expected direction. Legislators are actively involved in at least three cases, and the communities in Kenya and Belgium are driven by pre-existing citizen groups that see the development of a technical platform as an opportunity. However, is should be noted that pilot activities conducted by such idealistic stakeholder groups have also led to data sets that visualized the complexity of political issues. Accordingly, an agenda-driven CO design might nevertheless support fairness in negotiating solutions.

As a second observation, the baseline analysis noted the lack of attention for policies that determine parameters of citizen engagement and prepare engagement of relevant decision-makers. At this point, both the Spanish and the Belgian case discovered that interim government levels initially dismissed as irrelevant are in fact valuable core stakeholders as providers of support services and resources for municipalities. In Sweden, public officials involved in citizen science initiatives have been revealed as valuable allies in the face or more reluctant topical experts.

Finally, the observed confrontation of citizens perceiving their situation in holistic terms such as 'landscape' and 'life' with specialized government silos picking out individual aspects has been confirmed and strengthened over the first year. While hardly a new observation, this aspect opens an interesting line of investigation for the Citizen Observatory.

4.2 Cross-cutting observations

As cross-cutting observation after the first year, the updated stakeholder analysis notes the following:

- The focus of a majority of citizens involved in the cases might be described with 'very local'. The intuitive 'framework for organizing action' seems to start at the level of neighbourhoods and villages. However, the co-design process seems to have opened such perceptions, by drawing attention to interconnectedness of issues and the interests of other stakeholders. However, for effective community building, close personal connections at the smallest level seem to be most promising.
- The suggested citizen focus is challenging for public officials at the local level. Administrations in small municipalities rarely have the specialized manpower to effectively invest in the process, and agencies with the authority to implement solutions to observed problems usually involve larger jurisdictions. This observation has two implications. On a practical level, the lack of manpower in small community administrations might effectively prevent the development of Citizen Observatories in such cases, even though the social structure might actually favour it on the citizen side. On a conceptual level, this observation links the creation of a Citizen Observatories more clearly

to established dynamics in the interplay of scale-dependent resource regimes, and known characteristics supporting the emergence of functioning collaboration (Young, 2006).

- The time consuming nature of the co-design process meant that in several cases the co-design process was carried by senior citizens. Whether their design preferences represent the interests and expectations of the majority of community members cannot be judged at this point, but might represent a generic challenge for co-design processes.

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