C::Act

Co-designing Citizen Social Science for Collective Action

#5.1

Report on Knowledge Coalition Building

Environmental Justice

●●●●

Date – 30 November 2020
Dissemination level - Public
Responsible Partner - UNSAM
Author(s) / credits

Arza, Valeria (CENIT/UNSAM): writing original draft, conceptualisation, methodology, investigation, formal analysis, supervision

Actis, Guillermina (CENIT/UNSAM): writing original draft, conceptualisation, formal analysis, investigation.

Marchegiani, Pia (FARN): writing review and editing, formal analysis, investigation and supervision

Velarde, Malena (CENIT/UNSAM): writing review and editing, investigation, methodology, software, data curation, formal analysis, visualisation

Cane, Santiago (FARN): formal analysis and investigation

Buchsbaum, Malena (CENIT/UNSAM): writing review and editing, data curation, formal analysis

Swistun, Débora (FARN): Investigation

Reviewers - Isabelle Bonhoure, Teresa Wintersteller, Mariam Malik, Veronika Wöhrer, Katja Mayer

Document History			
Version	Date	Contributor	Comments
1.0	9th November 2020	Arza, V et al (lists of authors above)	First draft KC report to be commented by Consortium coordinators.
2.0	17th November 2020	Arza, V et al	Second draft after incorporating comments by UB. To be read by Consortium members.
3.0	26th November	Arza, V et al	Final draft of the report.

Table of Contents

List of Figures

List of Tables

List of Abbreviations

ACUMAR: Matanza-Riachuelo Basin Authority

CSS: Citizen Social Science

CSOs: Civil Society Organisations

GDPR: General Data Protection Regulation

IC: Informed Consent

PISA: Plan Integral de Saneamiento Ambiental (Sanitation Plan)

QPR: Qué pasa Riachuelo? (What's up Riachuelo)

1. Executive Summary

CoAct (Co-designing Citizen Social Science for Collective Action) aims at co-designing concepts, methods and tools for Citizen Social Science around wicked global social issues. Four different research and innovation (R&I) actions organised the empirical work of CoAct and this report presents the process of building the knowledge coalition network for one of those R&I actions developed in the frame of CoAct WP5.

This R&I action aims at co-designing citizen social science tools to facilitate actions contributing towards Environmental Justice in the Matanza-Riachuelo river basin. The basin covers 64 km-long and 6 million people live there, most of them in vulnerable socio-environmental situations. In particular, we aim at co-designing a digital platform to produce and share data that can contribute to mapping different socio-environmental problems as understood by a diversity of stakeholders and promote concrete actions for addressing those problems.

The Knowledge Coalition works as a network of actors that intervene throughout the project's R&I cycle, by discussing, defining, and co-designing different activities. We define it as the *network of stakeholders who are interested in and informed about the R&I project goal and vision and who play an active role, either participating in or co-designing different actions*.

We expect the network to be continuously evolving and different types of commitment by a variety of actors is foreseen over time, depending on expertise, interests, synergies and project activities. FARN and CENIT/UNSAM identified three different types of actors that would be part of the Knowledge Coalition: researchers working in academic organisations doing research about different socio-environmental problems of the basin; public policy actors from the different jurisdictions involved in the basin (Municipal, Provincial and National) and community actors, which includes people living or working who belong to territorial organisations and also civil society organisations (CSOs) at large.

We had to modify our original plan for the Knowledge Coalition creation due to the Covid-19 pandemic and associated lockdown restrictions. We organised three types of virtual engagement activities with candidates to be part of the Knowledge Coalition: interviews, micro-workshops and a platform co-design workshop. In total we reached around 30 actors (research groups, public policy organisations and territorial and civil society organisations) inside and outside the basin, who participated in some of those instances and expressed their interest in being involved in the R&I action's future activities.

We managed to identify main socio-environmental problems in different locations in the basin as understood by different stakeholders who participated in our action. We also started to delineate the main purpose of the citizen driven platform, which will initially systematise and co-produce information on three main socio-environmental themes: conservation of green areas, water quality and relocation of people living in areas with environmental risks.

2. Introduction

2.1 CoAct General Concept

CoAct (Co-designing Citizen Social Science for Collective Action) is proposing a new understanding of Citizen Social Science as a participatory research co-designed and directly driven by citizens and citizen groups sharing a social concern (See Figure 1). CoAct proposes to face four "wicked" social global issues by engaging citizens in a vulnerable situation. The approach represents a new understanding of the underexplored field of Citizen Social Science (CSS), understood here as participatory research co-designed with citizen groups sharing a social concern. The joint effort will result in the implementation of new or improved science-related policies and the advancement of the CSS approach with regards to its applicability in concrete fields or research.

Figure 1: Citizen Social Science in Action, with citizen groups, a specific concern, and with the support of the Knowledge Coalition

In all CoAct R&I Actions (Mental Health Care, Youth Employment and Environmental Justice), citizens in a vulnerable situation are placed at the centre of the research and their role and dedication conceptually recognize them as **Co-Researchers**. In parallel, the **Knowledge Coalition** is a network of stakeholders who are informed about the R&I Actions' goals, and play an active role, either participating in or co-designing different actions, to harness Co-Researchers' efforts and implement policies and measures based on scientific evidence.

2.2 Definition of the Knowledge Coalition

Knowledge Coalitions are formed by representatives of Public Administrations, Civil Society Organisations (CSOs), educative organisations and Co-Researchers —to name a few. All R&I Actions involve people from different areas of the political, academic/scientific and social realm, according to their field of research. They strive to assure that the composition of the Knowledge Coalition reflects the diversity of actors within their field and is sensitive to gender balance and other socio-structural categories that might become relevant such as ethnicity or age. The involvement and collaboration of the Knowledge Coalition members varies according to the specific R&I Action and different actors may participate in different activities according to their expertise, interest and

expectations regarding synergies with their own activities associated to the social concern. The participation of the individual parties of the Knowledge Coalition can take place in various forms and in different moments of the R&I cycle: creating a structural framework for research, participating in the actual research process, informing on corresponding issues, implementing and discussing possible solutions or getting involved in the dissemination of the project and the transformation of research results into actions according to its acting potential. Regardless of the role, each R&I Action facilitates spaces for dialogue and action with different actors promoting the creation of a dynamic network—and building from synergies among different initiatives adding therefore to the collective effort towards transformation. In order to coordinate the network and opening up spaces for deliberation, the R&I Actions use different methods and approaches, from joint discussions, workshops, expert talks and digital tools to strategy meetings, which aim at a diversity of on- and offline participation possibilities.

2.3 R&I Action #3 Scope

The R&I Action on Environmental Justice explores socio-environmental problems in the Matanza-Riachuelo river basin with the aim of promoting transformative action.

The Matanza-Riachuelo is a heavily contaminated 64 km long river that runs along the southern limit of the City of Buenos Aires, where 6 million people live. It is estimated that 1.8 million people in the basin live in highly vulnerable conditions[1], in terms of housing and access to basic infrastructure. There are several socio-environmental problems related to:

---

[1] See social vulnerability index build by ACUMAR (2018) p. 31

i)   *contamination* from production activities (mainly industrial but also agriculture); sewage effluents since 50% of population in the basin is not connected to sewage system (ACUMAR, 2020, p. 44) and open garbage dumps

ii) *poor infrastructure* in terms of housing (around 800 people live in informal settlements and slums (ACUMAR, 2018, p.31), some of them built on garbage dumps), lack of access to safe water for 21 % of the basin population (ACUMAR, 2020, p.36), and poor access to health system, which exacerbate the social impact of contamination.

The Knowledge Coalition works as a network of actors that intervene throughout the project's R&I cycle, by discussing, defining, and co-designing the different steps towards constructing a digital platform to produce and share data that can contribute to the development and advancement of concrete actions or solutions for the basin's problems.

We will learn from the experience in designing and using a previous platform developed by FARN: QPR which stands for Qué pasa Riachuelo? (What's up Riachuelo?). This platform will be re-built through co-design mechanisms incorporating different perspectives and viewpoints from the basin communities, scientists, and public authorities.

The Citizen Science platform will produce knowledge and understandings about the nature of different socio-environmental problems starting from three of them: water quality, threats to green spaces such as wetlands, and the resettlement of families previously located in the basin towline path. By doing so, it aims to provide useful information to design potential solutions.

FARN and CENIT/UNSAM will guide and implement a set of activities to co-create the Citizen Science platform and promote its dissemination: 1) open-ended interviews and workshops to identify socio-environmental problems in the Matanza-Riachuelo basin as they are understood by different actors as well as practices and activities aiming at addressing them; 2) co-design workshops, where

participants discuss the main functionalities and obstacles for the digital platform development and sustainability; 3) dissemination activities to generate new data sets on socio-environmental problems perception and to define how it can be contrasted with existing information sources and 4) open hackathons for data analysis, interpretation and visualisation of the results.

The R&I Action on Environmental Justice's main Knowledge Coalition actors, the Matanza-Riachuelo basin communities, scientists, and public bodies representatives, are identified through web-based research, bibliometric sources and FARN and CENIT/UNSAM previous connections.

We have carried out three activities to reach these actors: interviews, micro-workshops and platform co-design workshops. During interviews, they narrate their experiences in the basin and their understanding of main problems and how citizen participation may help in the production of knowledge for transformative actions in the basin. Community actors also participate in micro-workshops designed to add bottom-up perspectives to social-environmental issues and identify key practices addressing them. Finally, socio-environmental problems identified through interviews and micro-workshops are discussed by the Matanza-Riachuelo communities' actors, public bodies authorities, members from NGOs, and scientists in a platform co-design workshop. This context provides the opportunity to review preliminary outcomes on the identified problems from an enhanced perspective. The main goal of the co-design workshop is to have instances to reflect on the purpose, type of data and functionalities of the digital platform and to anticipate obstacles that may come up both when designing and using it.

Workshops' participants and interviewees who explicitly communicate their interest in being connected to projects activities and outcomes are all considered members of the Knowledge Coalition, which is then defined as a stakeholder network of actors interested in and informed about the R&I project goal and vision. This network includes activists, social and territorial organisations, NGO's representatives, neighbours, scientists and policy makers mobilized to promote Environmental

Justice. The Knowledge Coalition contributes to frame both the R&I Action's items goals and co-design different activities related to the Citizen Science platform. All actors in this network have experience in putting forward different activities aiming at providing knowledge and actions towards Environmental Justice. We plan to promote synergies with these actors' practices. We foresee that, responding to their own interests in the different subject matter, actors in the Knowledge Coalition network will participate in and co-organise activities aiming at the design, dissemination, use and/or impact of the Citizen Science platform throughout the project.

3. Knowledge Coalition formation

3.1 Local context mapping

The idea of creating a Citizen Science platform to address socio-environmental problems in Matanza-Riachuelo basin was first sketched in 2017. This project was inspired by FARN's development of the citizen-driven data platform QPR and CENIT/UNSAM research experience on open science and citizen participation in the production of knowledge aiming at transformation.

3.1.1 FARN Experience in Promoting Sanitation and Facilitating Citizen Participation in the Basin

In 2004 a group of local residents and workers from Villa Inflamable presented a lawsuit before the Supreme Court of Justice of the Nation (hereafter the Court). The lawsuit focused on environmental pollution damage in the Matanza-Riachuelo basin and a series of demands and claims against the National State, the Province of Buenos Aires, the Government of the City of Buenos Aires and forty-four companies.

In 2006 the Matanza-Riachuelo Basin Authority (ACUMAR) was created. ACUMAR is an autonomous public organisation which combines the work of the three levels of governments that have authority over the territory (National, Buenos Aires Province, and Buenos Aires City). It is the highest authority in the area on environmental issues. In 2008, the Court, in a landmark ruling, instructed ACUMAR: i) to repair air, water, and ground damage caused by discharges to the river; ii) to improve the quality of life of the citizens of the entire basin and iii) to prevent future damage.

Also, in 2008 a group of Civil Society Organisations (CSOs), including FARN[2] were admitted by the Court as third parties interested in the legal cause. Together with the Ombudsman, and other three CSOs, the Collegiate Body was created by the Supreme Court's ruling to monitor the environmental clean-up and the progress of the Sanitation Plan (PISA Plan Integral de Saneamiento Ambiental in Spanish). Specifically, among the given roles was to promote citizen participation in the monitoring of the environmental clean-up and associated activities of the basin. It was subsequently decided that this Collegiate Body assumes the actual representation of the public in that process of sanitation. The Court mandate was to foster citizen participation in the monitoring of ACUMAR′s work, especially in its compliance with the Sanitation Plan.

In 2010 FARN and other CSOs initiated the project QPR Qué pasa Riachuelo? and in 2011 they launched the geo-referenced platform that enabled open access to data related to the ACUMAR's PISA. The final expected outcome was that communities could monitor these activities' execution and influence public policies in their territory.

In a second stage, QPR published citizen-generated data, which was a very innovative move. QPR became one of the first citizen-driven platforms in the country. The new section, "Social Monitoring'',

---

[2] The other CSOs were Greenpeace Argentina Foundation; Social and Legal Research Centre (Centro de Estudios Legales y Sociales) and Neighbours Association of La Boca.

established active mechanisms to control and watchdog the Sanitation Plan's execution. This section included a new feature: a form that could be completed anonymously by citizens. This form gathered information that was then uploaded and published as a "story" (a neighbourhood alert taken by FARN to request further information on the matter to the competent authority) or as an "action" (an activity carried out by the community); whose responses were also published. "Social Monitoring'' section also included a "News" subsection that displayed a social survey on the presence of the issues associated with the Basin in the media. For more information on the case, please see Fressoli and Arza (2016) and Mira (2016).

In its first stage of development, FARN and other CSOs established an agreement with ACUMAR to fetch data about PISA execution and to publish it on an interactive map. Neighbours from different parts of the basin and the CSOs involved were able to visualize this information and to contrast it with the cleaning up activities carried out in the basin's territory. This was a key step since information was neither systematised nor easily accessible at that point in time.

	QPR 1 (2011)	QPR 2 (2012-2014)
Data	Fetch data from ACUMAR. Display data on an interactive map.	Fetch data from ACUMAR, TECHO. Publish data produced by social organisations. Display data on an interactive map.
Citizen participation features	Upload citizen-generated alerts using an online form administered during face-to-face workshops and meetings.	Upload citizen-generated alerts using an online and public form. Platform provides environmental traffic light based on that data

Technologies	USHAHIDI, JavaScript, CSS, HTML, ApacheConf	
Data cleansing	Different instances of information cleansing: Collegiate body, FARN. Platform strategy development environment (Garage Lab). Citizen alerts and reports validated collectively during meetings.	FARN staff checked citizen-generated data before publication.
Data openness	Datasets open to the public in csv format available on http://datospublicos.org/	Datasets open to the public in csv format.
Dissemination activities	Workshops at Matanza-Riachuelo basin schools. Workshops all along the Matanza-Riachuelo basin. Contact local newspapers.	

Table 1: Technologies and main features of previous two versions of FARN's QPR

Although FARN organised workshops and other activities within the community to foster platform use, spontaneous participation was rather low. First, neighbours from the basin did not perceive the platform as a tool to solve their problems and eventually lost interest in reporting any situation as there were no concrete responses carried-out by ACUMAR. Second, neighbours feared reprisals by powerful groups with conflicting interests (e.g., industries verting waste). Third, the wide digital and technology gap in the affected communities limited the platform's use to the FARN workshops.

The QPR's dependency on workshops to feed its database weakened its community impact. As soon as the project ran out of funds to sustain the workshops, the generation of systematic information could not be further guaranteed. Funding was also needed for the cross-reference validation done by FARN's own staff on the citizen information about breaches to existing regulation and on the follow-up with national authorities on the different issues raised on the platform.

Overall, QPR's main success was to push ACUMAR to grant access to information related to the Sanitation Plan, to systematize existing data and to make it visible. This was a central claim from communities seeking solutions to long-lasting socio environmental problems. In fact, ACUMAR ended-up developing its own geo-referenced tool showing information on socio-environmental basin's problems, among other issues. However, the goal to foster citizen-generated data remained unfulfilled.

The mentioned experiences made it clear that a new version of QPR had to be re-conceptualized to become a tool that could be uptaken by citizens. This goal not only aims at increasing the amount of citizen-generated data but also to build a sustainable platform that might become more independent from resources raised by leading organisations.

3.1.2 CENIT/UNSAM Experience with Open Science and Citizen Participation in the Production of Knowledge Towards Transformation

In 2015 CENIT/UNSAM led a research project to understand how participatory science could contribute to overcoming health, inclusion, and environmental challenges in Argentina. This project was part of the Open and Collaborative Science in Development Network and CENIT/UNSAM research team analysed the Sanitary Camps (Campamentos Sanitarios) in different rural and peri urban settings. These camps were organised by medical faculty and students responding to communities' demand for epidemiological data in locations exposed to pesticide sprayings.

The Sanitary Camps were held from 2010 until 2019 as part of the medical curricula at the National University of Rosario School of Medicine and produced epidemiological data representing more than 100,000 people (Verzeñassi & Vallini, 2019). The camps involved communities and local governments in the research process and the dissemination of the collected data. Their action had a tremendous political and social impact, especially for Sprayed Peoples (Pueblos Fumigados) and

other socio-environmental movements that tried to document the detrimental human health impacts of the agro-industrial system based on extensive use of pesticides, a research area barely studied.

Eventually, the Sanitary Camps were dismantled by the School of Medicine's authorities. A great opportunity for transformation was lost and the question on how participatory science aiming at transformation in a political conflictive situation could overcome social, cultural and political barriers remains open. These are typical obstacles in undone science (Hess, 2007) and studying them is particularly critical for open science scholars as we struggle with the question of how to incorporate political angle when dealing with methodological decisions, such as how to share data and information without risk of data being misused or the projects being boycotted/suppressed.

When researchers from CENIT/UNSAM first learnt about QPR, they got very enthusiastic about the role the tool had in pushing public policy forward. They also saw the potential to go beyond its social monitoring role and to use it to create relevant knowledge for solving pressing socio-environmental problems, influencing public policy and promoting transformative actions. As the Sanitary Camps experience showed, when the community gets involved in participatory research, they do so mobilised by the urge to change their reality. The community could tell what types of practices could work better than others. Social scientists and CSOs could also contribute methodologically and by promoting strategic alliances to push data and ideas to convert into public policy and actions.

CENIT/UNSAM has been very active in advocating open science policies in Argentina. The research centre has actively collaborated with other research organisations, CSOs and public policy, including the Science and Technology Policy authority to advance discussions on both the promotion of open and citizen science and how to articulate it into public policy schemes. Activities included seminars, policy workshops, technical assistance, festivals, community workshops and other dissemination activities. All these activities allowed CENIT/UNSAM to better understand the potential

challenges in developing citizen science projects, addressing also the necessary alliances for conducting this type of research.

3.1.3 CoAct Riachuelo

In 2017 both teams started to collaborate and jointly developed the vision that citizen participation facilitated by digital tools could promote transformative actions towards Environmental Justice in the basin. They agreed to learn from QPR experience and re-launch a new platform to share and create new knowledge on citizen's understanding of socio-environmental problems and their practical experiences in dealing with them. Based on their previous experience and connections, FARN and CENIT/UNSAM defined that there were three types of actors that had to be involved to put forward their project on Citizen Science for Environmental Justice. First, CSOs that had been participating in the basin's judicial conflict and the public policy catalysed by it and territorial organisations or individuals from the community with personal experience in searching for solutions to socio-environmental problems to be prioritized (see below). FARN is the primary contact point for their previous experience working with these local groups or organisations. We aim at good gender and geographical balance.

Second, academic organisations and researchers working on those socio-environmental issues or with experience in advancing Citizen Science projects. CENIT/UNSAM is the main contact point, and selection considers disciplinary and gender diversity, with a particular focus on Universities located in the basin and research groups with previous experience in participatory science.

Third, policy makers from different jurisdictional levels (municipalities, provincial and national) with presence in different geographical areas of the basin, with special focus and responsibilities on environmental or sanitation policies. FARN and CENIT/UNSAM would work side by side to bring along these stakeholders, building from their previous networks and expertise.

3.1.4 Other Citizen Science Initiatives in the Riachuelo Basin

We must also mention some particular experiences of Citizen Science in the Matanza-Riachuelo basin, associated with socio-environmental problems, which are close cousins of our R&I action and whose main representatives are also part of our Knowledge Coalition. On the one hand, AppEAR is a project with both scientific and educational goals, that aims at mapping aquatic habitats of the continental water bodies in Argentina. It also includes educational content and games in a mobile application and web-based platform (Cochero, 2018). The basin's territory is included in the more 400 sampling sites of the project. Anticipando la Crecida was launched in 2014 as an extension project from the University of Buenos Aires. Since 2017 it has an agreement with Municipality of La Matanza, one of the jurisdictions that is more affected by the risk parameters identified by ACUMAR (ACUMAR, 2018). Biodiversity in the Matanza-Riachuelo basin (*Biodiversidad de La Cuenca Matanza-Riachuelo · INaturalist*, n.d.) is a Citizen Science initiative promoted by FARN in the context of the international program "Humedales sin Fronteras" (Wetlands without borders). The initiative uses the platform iNaturalist to register citizens observations of natural species in the area, promoting their conservation and the visibility of the threats that affect them.

3.2 Knowledge Coalition constitution process

Once we identified the three different groups—policy makers, science actors and community actors—we started mapping potential candidates within each of them. FARN included community members who were known to be active in the basin, based on their own experience and also drawing from existing networks of territorial organisations and other CSOs working with them. CENIT/UNSAM searched for academic actors by analysing public bibliometric databases as well as the national portal on information in science and technology, which includes projects, researchers and scientific database. The list of candidates of policy actors include all relevant organisations working on environmental and sanitation policy in the basin. From these lists CENIT/UNSAM and FARN

collectively selected 45 people (50% female) as potential candidates to be invited to the project activities and who therefore could become part of the Knowledge Coalition. We sought to promote diversity in terms of variables mentioned above: gender, geography, political jurisdiction and discipline. In addition, especially in the case of community and policy actors, previous connection was also a variable that weighed heavily in our selection decision.

Before formally contacting any of these actors, we worked on the ethical and data security aspects of these activities. This proved to be challenging since there is not much experience in ethical procedures for social sciences in Argentina. Neither UNSAM nor FARN had an Ethical Committee who could revise our procedures. We reviewed several informed consent (IC) procedures for other research areas, and we studied Argentinean regulation both on Personal Data and science and technology activities, which are both consistent with General Data Protection Regulation (GDPR). Our research activities are aligned with the ethics requirements contemplated in the 3º article of the Argentinian Law 25.467 of the National System of Science, Technology and Innovation, regarding the inalienable and universal principles for conducting research activities. Additionally, the project is compliant with the Law 25.326 of personal data protection requisites, as the investigation procedures contemplate informing the participants about how their personal data will be handled and processed. For this purpose, IC forms have been developed, in order to make participants aware of their rights and of the data's different uses. The procedure was approved by the UNSAM Vice Dean office, which is responsible for research projects in UNSAM.

We developed different IC forms for the different planned activities; these were later modified, to adapt to the online activities as imposed by the Covid-19's lockdown measures. Eventually we also simplified them using plain language techniques and video formats to address certain obstacles (see more on section 4.1 below). The IC forms and procedures for our R&I action also benefited widely from contributions by other researchers in the CoAct consortium.

Finally, regarding Data Protection, we discussed our research data cycle for the development of the data management plan by Open Knowledge Foundation, part of CoAct consortium. When our research activities started and we began to generate and collect data we consulted with the UNSAM information technology team on cybersecurity issues in the context of home office imposed by the lockdown. They informed us to continue working with the institutional accounts of the cloud service of GDrive provided by the UNSAM. We have also requested remote access to the institution's service to make monthly backups.

4. Knowledge Coalition in action

Our plans to build the Knowledge Coalition had to be modified due to the Covid-19 pandemic and associated lockdown measures that started in mid-March 2020 and continue until the present time (early November 2020). People need special permits to move further than 500 meters away from home and gathering indoors is forbidden. Thus, our planned activities had to go fully virtual and it became challenging to reach both community actors —who had poor or no connectivity— and policy makers. Our research takes place in the areas more heavily affected by the Covid-19 spread. In addition, Argentina is going through an economic crisis, which preceded the lockdown but has worsened by the pandemic and associated lockdown measures. Therefore, both community and policy makers are affected by high degrees of sanitarian and economic urgencies.

To build the Knowledge Coalition we planned to perform interviews from the above-mentioned list of 45 people, and to organise a "recognition workshop" to consolidate it, and jointly co-design the upcoming activities. The workshop was planned for the first semester of 2020 and was first postponed under the expectations that restrictions were going to end within a few months. As this did not happen, we eventually had to cancel the face-to-face format. We proceeded to interview

potential Knowledge Coalition actors and replaced the "recognition workshop" with other types of virtual workshops as discussed in more detail below.

4.1 Knowledge Coalition Activities

For developing the network of actors to be part of the Knowledge Coalition we developed three different types of activities: interviews, micro-workshops with the community, and a platform co-design workshop. Table 2 briefly summarises the characteristics of participants and the digital tools used in each instance, which are described in more detail below.

	Date	Platforms used	Science actors		Public policy actors	Community actors		Total participants	
						Territorial organisations from the Basin	NGOs or other CSOs	People	Organisations / projects
Micro-Workshop 1 participants	11/8/2020	Zoom	People	-	-	6	2	8	2
			(Organisations)			(1)	(1)		
Micro-Workshop 2 participants	25/8/2020	Zoom	People	-	-	6	2	8	4
			(Organisations)			(3)	(1)		
Interviewees	April to September 2020	Zoom/Meet	People	11	5	1	4	21	17
			(Organisations. / research groups)	(9)	(4)	(1)	(3)		
Workshop participants	29/10/2020	Zoom/ Jamboard/ Mentimeter/ Padlet	People	2	9	4	7	22	17
			(Organisations. / research groups)	(2)	(6)	(3)	(6)		
Actors in the Knowledge Coalition network (counted only once, although they may have participated in different activities)								**51**	**30**

Table 2: Participants in different activities organised as part of CoAct R&I # 3 from April to October 2020 and digital tools used

4.1.1 Initiating First Contact: the Interviews

We designed three types of questionnaires for one-hour interviews with the three different types of actors. The questionnaire includes some questions that were common to all types of actors and some actor-type's specific ones. Among the former, we ask about the role/experience/activities of each actor in the basin; the problems/issues that each actor understands as the most relevant and the best/possible solutions that they identify. In addition, we asked all of them about the role of citizen participation in policy making (for community and policy actors) and on knowledge production (for academic actors). Finally, we also ask them to recommend some other groups or projects that may be interested in our project, so as to continue enlarging our network. Regarding the specific sections, for community actors, there were questions regarding the role of public policies; for academic actors, there were questions about the contribution of science in policy making; and, finally, for policy makers we asked about their priorities in the basin and how they matched those coming from community actors.

We performed 18 interviews, some of them to individual actors and others, to a couple of them jointly. As can be seen in Table 2, there were 5 people from the community or CSOs, 11 from the scientific organisations and 5 from the policy sector; 57% of them were women.

In all interviews IC forms were sent in advance, 30% provided oral consent during the interviews. Most interviews were recorded. IC for interviews included a series of statements for which people could choose their preference regarding the use of personal data. In general, people have agreed on us sharing direct quotes from interviews and attributing them with full names, but they normally requested us to show quotes beforehand. Particularly for community actors, IC procedures resulted to be cumbersome. Some of the expressed obstacles were associated with the provision of digital signatures and with the length and technical language. To address these, we opted for oral consents

in some cases and eventually simplifying the content and changing the procedure for community members (see below).

4.1.2 Micro-workshops, a tool to Co-produce Knowledge in Lockdown Time

During July and August, we organised online micro-workshops to be held only with members of the basin's local communities. The purpose of these workshops was to collect these stakeholders' collective views on socio-environmental problems and their practices to overcome them. They were planned together with Iconoclasistas, the art-group that is also part of our Knowledge Coalition, who are the experts in the collective mapping methodologies that were part of the activities we had planned for our R&I action pre-Covid-19.

So far micro-workshops have been organised with participants from two different locations of the basin. There were six participants in each workshop, who knew each other and lived nearby and belong to territorial organisations such as museums, schools, and neighbour associations. Workshops were coordinated through WhatsApp groups to agree on schedule, to share information, including IC materials and to answer specific questions. They were conducted through video calls in the Zoom platform. They were only audio-recorded.

During the workshops, Iconoclasistas worked with maps of the neighbourhoods and asked participants to use a piece of paper, which was divided in three columns. In each of them they had to identify problems, positive practices to address them, and most prominent territorial organisations responsible for those practices. They were also asked to geo-reference those elements. Micro-workshops lasted over two hours and a half, during which people shared their annotations and thoughts while Iconoclasistas were taking notes on the maps. People interacted while presenting their views, complementing their experiences and getting involved in conversations about problems, practices, actors and locations.

The micro-workshop method was an adequate approach for producing rich information and could work as a first step in the process of co-designing a Citizen Social Science project in a digital environment: it allowed to engage the communities in a discussion with researchers in a dynamic way, because it generated a sense of collective belonging. Through the dialogue it allowed the development of a collective vision of socio-environmental problems. Since the method contributes to the identification of actors and practices that help to solve problems, it facilitates the discussion about future possible pathways for action. This information was very rich for expanding the map of actors and also for identifying positive practices.

Based on our experience with IC forms in interviews with community actors, for micro-workshops we decided to change our IC procedures. FARN produced a video which explains the main activities of our R&I action, including how the information was going to be used. The video and a statement on our commitment regarding the use of the data was sent by WhatsApp, and participants had the chance to ask questions using the same platform. In addition, we dedicated the first half an hour to read a plain language version of the aspects that required consent, showed the video again, answered any question and recorded an oral statement of agreement from all participants.

4.1.3 Narrowing the Scope: Focussing on Strategic Topics

Based on the information gathered during interviews and considering FARN's experience and agenda in the basin, we decided to start working on three issues, all of which are of great relevance in relation to Environmental Justice and citizen participation. Those issues are water quality; protection of green areas and relocation of population affected by situations of environmental risk.

The decision to focus on these issues was both strategic and practical. On the one hand, FARN has been leading both judicial activities and territorial engagement on these topics, and thus it makes

sense to focus the development of the platform on issues well connected to FARN's current and future agenda. On the other hand, given lockdown restrictions, and because we were not able to organise collective mapping workshops as initially planned, we decided to start working in the platform's co-design using virtual on-line workshops. To make them manageable, we needed to reduce the quantity of socio-environmental issues and thus, decided to start working on the topics that were identified —in interviews and micro workshops— as relevant and coincide with FARN's own agenda. The platform could then incorporate other socio-environmental demands.

Water quality is a key issue in the Riachuelo basin. The water receives sewage and industrial effluents, as well as solid urban waste, which represent the main causes of contamination in the basin. By jointly analysing the water quality and the evolution of associated regulation, it is possible to observe both the advances or setbacks in polluting factors and in public policies aimed at rebuilding the environment and preventing future damage.

ACUMAR has the leading role in terms of ruling about water quality. The Collegiate Body is currently demanding the setup of new limits in terms of permitted discharge amounts and water quality goals that may allow the restoration of the river. In 2017 new regulation was issued which modifies parameters but expected improvements in terms of water quality based on those new values and assessment methods are marginally. The water quality goal that has been established, according to the Collegiate Body, is also insufficient to reduce contamination.

By including this topic on the platform, the population could report isolated events, such as strange spills, increased rubbish in the water mirror. Also, they could share their understanding or personal experience on water quality or public policy, and how that matters for their lives. For several years, FARN brought evidence on these issues, partly collected using the preliminary versions of QPR as a

social monitoring tool[3]. The organisation systematically discussed in Court the importance of water quality, since it is a central issue for environmental recompositing.

The wetlands of the basin are the most significant green spaces, the sites with the greatest biodiversity in the basin, where nature becomes present in an urban setting. This issue has been prioritized because it accounts for the relation between people and ecosystems, their involvement in taking care and valuing the last remaining natural areas within a highly dense metropolitan region. The state of wetlands is highly relevant for basin environmental health. They provide fundamental environmental services and constitute the main tool for environmental re-composition since the river has minimal slope, with almost stagnant waters. Nevertheless, wetlands in the basin are territories under dispute, with several different actors pushing for their access to land.

Citizens groups have collectively requested the legal protection of these areas for a long time. Some protection was achieved in some areas of the basin. However, both real estate companies and different private projects (including a waste management company) have occupied these areas, putting them in danger. There are different kinds of conflicts in the area, involving not only different jurisdictions but also diverse economic, habitational and nature conservation interests. Many of these conflicts are taken to the judiciary powers.

---

[3] The regulation of water quality and its control have been highlighted by the Collegiate Body in the last hearings convened by the Supreme Court in 2016 and 2018, as can be seen in the public access file (Autos "Mendoza, Beatriz y otros c/ Estado Nacional y otros s/ daños y perjuicios (daños derivados de la contaminación ambiental del Río Matanza Riachuelo)", expte. Nº CSJN 1569/04(40-M)) and especially in presentations "Opinión del Cuerpo Colegiado 2016" and "Resumen de la presentación - Cuerpo Colegiado - Audiencia 14-3-18". Also in the published document "9 años del fallo de la Corte. Una política de Estado todavía ausente. 2017". On the other hand, in the execution file of the sentence in relation to water quality ("Acumar c/ Estado de Aguas, napas subterráneas y calidad de aire" FSM 052000003/2013, that processes before Juzgado Federal de Morón Nº2) there are numerous presentations by the Collegiate Body in relation to Resolution 46/17 on water quality.

Moreover, a draft law on the protection of wetlands is being discussed at the national level in Congress, which could have a high impact on the Riachuelo Basin.

FARN has been working on protecting wetlands for several years[4]. The organisation has advocated for wetlands to become natural reserves, using different legal strategies including litigation. Hence, it has strong ties with territorial organisations and residents who work for their protection. Some are members of the Knowledge Coalition and co-researchers in this R&I action. FARN is currently part of a campaign to achieve the legal protection of Ciudad Evita´s wetland and also monitors the situation of other wetlands, making legal presentations as to avoid alterations to those ecosystems.

Finally, we included relocation of the population[5] living in areas with environmental risks for three reasons. Firstly, this is a question of great social and legal relevance: as part of the judicial mandate of the Supremes Court, around 17,700 families had to forcibly move in order to restore the

---

[4] Through its biodiversity area, FARN has been working on the protection of wetlands for several years, throughout the national territory and particularly in the Matanza Riachuelo Basin. FARN promotes the enactment of a wetland protection law (https://farn.org.ar/leydehumedalesya-ambientalistas-piden-avanzar-con-un-texto-unificado/) and works for the specific protection of wetlands in the Riachuelo through studies (https://farn.org.ar/wp-content/uploads/2020/10/Reserva-Ciudad-Evita.pdf), written and audio-visual publications (https://youtu.be/-gN7A2o0Arw https://www.youtube.com/watch?v=_pMRW2Lihto&feature=youtu.be https://farn.org.ar/preocupacion-por-la-reserva-municipal-santa-catalina/),presentations to administrative authorities (https://farn.org.ar/alerta-en-santa-catalina-por-obras-de-ampliacon-de-vias/ https://farn.org.ar/farn-pidio-al-poder-ejecutivo-de-la-provincia-de-buenos-aires-vetar-la-ley-que-desafecta-64-hectareas-de-la-reserva-natural-laguna-de-rocha/) and before the court of execution of the sentence "Mendoza", where various intrusions in the wetlands of the basin have been denounced and the judge was able to order the creation of an environmental evaluation system in ACUMAR of works and projects to be carried out in wetlands or protected natural areas and to protect (all this can be seen in the public access file "Ordenamiento territorial (autorización de mov. de suelos) s Contencioso" FSM 052000017/2013, that processes before Juzgado Federal de Morón Nº2).

[5] Part of the actions that FARN has developed in this matter can be reflected in the hearings cited in note 1 and in the file of relocations of the execution of the sentence "Mendoza" ("Acumar s/ Urbanización de villas y asentamientos precarios s/ Contencioso Administrativo"FSM 052000001/2013, that processes before Juzgado Federal de Morón Nº2). There, irregularities have been reported in construction projects, shortcomings in moving processes and lack of compliance by political leaders. The organisation also participated in a public hearing held to create a relocation protocol (https://www.acumar.gob.ar/wp-content/uploads/2016/12/Informe-Final-Audiencia-P%C3%BAblica-2017.pdf).

environment and avoid risks to the population. New houses have been slowly built (over 4000). There have been discussions about the quality of the new houses, their location (in relation to the life plan of the people and the environmental status of the new locations), the quality of the constructions, the participation of the people affected in the processes and decision-making. As a matter of fact, this is the only issue included in the judicial cause that had direct participation of affected people. There are many different ways in which policy making has responded to these processes. But the information is dispersed; each process has been carried out without information from the others. The platform could then be a very relevant tool to facilitate participation, to share experiences and practical knowledge, and to strengthen connections that may enable transformative actions towards improving living conditions for communities in the basin.

Issue	Relevance	Connection to FARN's agenda	Platform´s potential contribution (examples)
water quality	Sewage and industrial effluents, as well as solid urban waste, represent the main causes of contamination in the basin.	For several years, FARN brought evidence on water quality. The organisation systematically discussed its importance in Court.	To share people understanding or personal experience on water quality or public policy, and how that matters for their lives.
protection of green areas	Green areas provide fundamental environmental services and constitute the main tool for environmental re-composition. Nevertheless, wetlands in the basin are territories under dispute, with several different actors pushing for their access to land.	FARN has been working on protecting wetlands for several years. The organisation has advocated for wetlands to become natural reserves, using different legal strategies including litigation.	Articulation among different organisations, for instance to share strategies towards green area conservation.
relocation of population affected by situations of environmental risk	As part of the judicial mandate of the Supremes Court, around 17,700 families had to forcibly move in order to restore the environment and avoid risks to the population. There	FARN has been active in reporting irregularities in relation to relocations in different judicial causes. The organisation also participated in public hearings held to create a relocation protocol	To share experiences and practical knowledge, and to strengthen connections that may enable transformative actions towards improving living conditions for communities

	have been discussions about the quality of the new houses, their location (in relation to the life plan of the people and the environmental status of the new locations), the quality of the constructions, the participation of the people affected in the processes and decision-making.		in the basin.

Table 3: Selected Environmental Justice issues in Matanza-Riachuelo to start working in the platform co-design

4.1.4 Targeting the Platform: the Co-design Workshop

The goal of the workshop was to produce a first brainstorming of ideas about how the platform could become a useful tool for sharing ideas, experiences and practices in relation to problems and solutions involved in each of the three selected topics. At the same time, this workshop enabled the interaction among members of our Knowledge Coalition network for the first time. Therefore, it had the double purpose of formally launching the project and creating a space for the stakeholders to start interacting. We needed a virtual space designed for people to share their ideas regarding the project's purpose, in the context of lockdown restrictions, this had to be virtual. We adapted methods for a digital experience taking into consideration that it included people who were not necessarily accustomed to digital tools, neither they knew each other.

Participants

We built a list of 120 potential candidates to be invited to the workshop. Among them there were 15% from scientific organisations, 33% from policy and 52% from the community. The invitations included a flyer for advertising the event, the workshop programme and a registration form which

included the video on information of personal data management (same video as in micro-workshops). To register for the workshop, people had to agree on our data policy, and they could opt for their names to be mentioned as participants. Only those properly registered were contacted with the virtual credential to attend the meeting. Especially among community members, there were some people that were not included in the original list but learned about the workshops by other members of the community and asked for permission to participate, which was granted in all cases. Members of CENIT/UNSAM and FARN pursued a dedicated follow-up of invitees.

In total there were 34 registered participants and over half of them actually participated in the workshop. Among participants, there were around 10% from scientific organisations, 45% from community and CSOs and 45% from Policy covering different jurisdictions; 50% of participants were female and their interests were evenly spread around the three thematic areas. Some people that had registered to participate afterwards explained that they had overlapping activities but were still interested in the project. Also, at the last moment some community members who had registered to participate had to deal with some emergency situation in their territory and did not attend. We will follow-up on this too.

Methods - Dynamics

The workshop lasted two hours and included plenary and group sessions. The main goal of the activity was to gather information on the participants' inputs on the project main outcome: an open-source Citizen Science platform for promoting actions towards Environmental Justice

There were three plenary sessions, with group sessions in-between. We used several digital tools as mentioned below and enabled the Zoom chat for conversation and reactions.

The first plenary included presentations by representatives of both leading organisations (FARN and CENIT/UNSAM) about the project and its Citizen Social Science approach. After these, a collective

exercise to gather information was conducted using the online tool of wordcloud of Mentimeter. Two questions were posed to the group in order to understand participants' perception of the existing problems: first, we presented a question on the main socio-environmental problems in the basin; and second, we proceeded similarly but focussing on of each the three topics of interest: conservation of green areas, water quality and relocations. The wordclouds that emerged from this session were then used as inputs for the discussions on both group sessions. The second plenary session consisted of a brief presentation of FARN's previous versions of QPR platform and their interest in promoting the participation in the basin as a fundamental aspect of Environmental Justice. The relevance of the three thematic areas was also briefly discussed. Finally, the last plenary session included the presentation of the group discussions and a reflexive exercise conducted by ZSI to gather information on the participants' expectations about the project using the Padlet tool.

The group discussions were facilitated and annotated by CENIT/UNSAM and FARN teams. The first group session aimed at identifying how people got informed about socio-environmental problems in the basin with the idea to create an initial map of the type and sources of information about the basin that could be included in the platform. Therefore, we used the first group session as a first anchor in the process of collectively discussing the project: stakeholders were asked about their knowledge regarding information sources and formats and the problems they face when using it. This contributed to focus on the project's main goal (to create an online Citizen Science platform to map socio-environmental problems and potential solutions) by broadening out the diversity of perspectives of what is considered useful information.

The second session was more directly associated with the project's expected output: we asked participants to discuss their ideas about the platform's purpose and the information to be produced and shared through it on each thematic topic. We used the wordclouds from the mentimeter exercise as reflexive points but with the focus on online interactive formats (as presented by the examples

from the first session). We also asked about obstacles and problems that may turn up when designing and using such a platform.

The group sessions were organised through breakout rooms where the facilitators used the Google Jamboard tool to introduce the discussions in interactive ways, and for the participants to be able to write their thoughts and opinions in a more direct way, considering they may not feel initially comfortable with sharing them out loud. The boards also aimed at providing a record of the discussions, and to allow the facilitators to have inputs to catalyse the conversation, as they were shared online and the annotations visible for the participants in the other breakout rooms, allowing for cross fertilization of the debate.

4.1.5 The Knowledge Coalition as a Network Approach

We initiated the project idea in close collaboration with a dozen of actors among policy makers, CSOs and community actors, and researchers from academic organisations, all of whom wrote letters of support for the project proposal in March 2019. In Figure 2 we draw how the network expanded both outside but especially inside the Matanza-Riachuelo basin. New actors who shared the R&I action were contacted by FARN and CENIT/UNSAM to take part in some of the activities we described above. There were also some few cases that initiated the contact themselves. Those that expressed their interest to remain connected are considered part of the Knowledge Coalition network, reaching a total of 32 actors, classified in research groups (28%), public policy organisations (22%) and CSOs (50%).[6]

---

[6] In Table 2 we stated that there 29 unique organisations which participated in the R&I action activities but in Figure 2 there are two additional organizations (one NGO and one territorial organization) which are part of our knowledge coalition since 2019.

Thus, we define our Knowledge Coalition as a network of stakeholders who are interested in and informed about the R&I project goal and vision and who play an active role, either participating in or co-designing different actions. Actors in this network interact and deliberate in spaces mainly facilitated by the project's coordination team. In all cases, we seek to build from synergies of their activities in the basin.

Knowledge Coalition Network
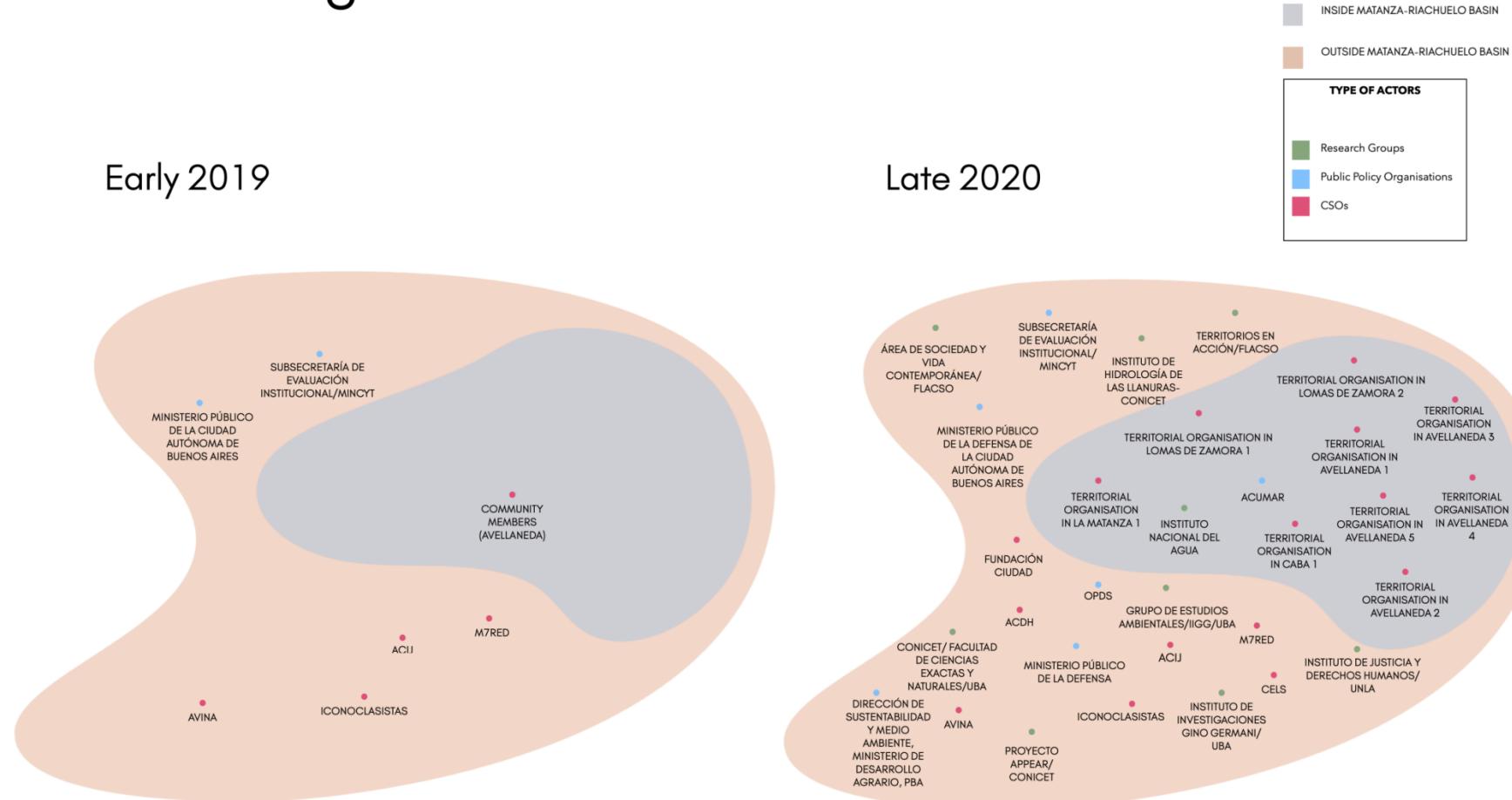
Figure 2: Network expansion in 18 months within and outside the Matanza-Riachuelo basin

4.2 Knowledge Coalition Outcomes

4.2.1 Introduction

This section is organised in three blocks. First, based on interviews and micro-workshops, we present the socio-environmental problems and actors' socio-technical practices addressing them. We found an extensive list of socio-environmental problems affecting the basin that we classified in broad categories, developed to allow comparability with other sources of information, especially ACUMAR. We contrast these understandings across different types of actors and in different locations.

Second, we focus on the concept of participation for the production of knowledge that could contribute towards transformation. We are interested in reflecting from the perspective of different actors conforming the Knowledge Xoalition their understandings on the value of participation and also on how participation could be implemented and supported. We believe it is important to recognize that there are different ways in which participants could engage with Citizen Science projects (Haklay, 2018), depending on their interests, capabilities and project goals. Thus, in our R&I action we also expect that participation will adopt different characteristics for different actors in different activities and processes. Particularly, we are interested in addressing how the communities, in general, and co-researchers who are part of the Knowledge Coalition will participate. In this section we will present an approach to the stakeholders' perceptions of citizens' participation in both policymaking and knowledge production processes. These inputs are key to better understand the expectations and tensions that may appear when co-designing the project and defining its focus in the different instances with the knowledge coalition members

Third, we present preliminary results on the co-design workshop, particularly in relation to the participating stakeholders' experience in using available information about the basin and their ideas on the purpose and potential obstacles in using the platform.

4.2.2 Socio-environmental Problems and Practices to address them

Figure 3[7] depicts the most important issues raised by different actors when asked, in an interview setting, about socio environmental problems.

---

[7] This wordcloud displays the frequency of nouns used by interviewees to answer the question "What are the Matanza-Riachuelo basin's main socio-environmental problems?". We used the bag-of-words method coded in Python to represent the multiset of the words used in this part of the interview and then we filtered all terms that did not match the noun criteria. Finally, we rendered the resulting dataset using nubedepalabras.es
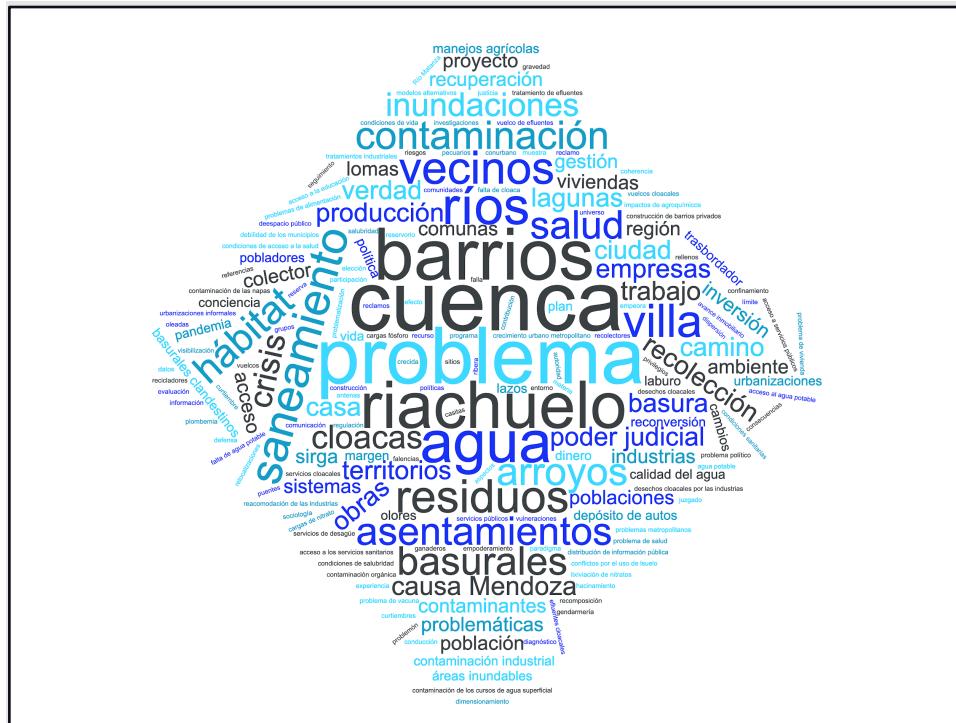
Figure 3: Wordcloud of nouns for interviewees' responses to the question on socio-environmental problems in the basin

Those words come as responses to the specific section in the questionnaire asking about socio-environmental problems. Thus, issues related to the water, sanitation, floods, sewage system, settlements (informal housing), rubbish, contamination and health stand out in the wordcloud. However, there are also other nouns, which do not represent problems, specifically, but relate to the situated experience of actors in the basin: such as river, neighbourhoods, neighbours, water streams, territory, work, people, etc.

The interviews' and micro-workshops' materials (transcriptions and notes) were analysed to map the main issues of the basin identified by the stakeholders. After listing these problems, we codified them into six categories that emerged from the project's original proposal and could work to contrast our findings with official public policy's documents. The six categories of problems are the following:

- social vulnerability: includes any reference from the interviewees or micro-workshops' participants to the conditions affecting the living standards of communities in the basin. These conditions include infrastructure deficiencies related to the provision of public services and basic rights such as access to food, health, education and housing as well as references to the stigma that such conditions may produce.

- contamination: the material consequences of different activities that affect the basin's environment related to productive activities, deficient public infrastructure and/or individual behaviour.

- green spaces conservation: actions and situations that refer to the disturbance of public areas that provide environmental and recreational services to the basin. Some of them were legally defined as objects of protection.

- flooding: references to the events produced by the covering or submerging of normally dry land by heavy precipitations and river overflow.

- health problems: all the individual or collective discomforts or diseases that actors directly associate with living in the basin or with contamination.

- public policy (actions and inactions): the issues identified as part of the actions or absence of them that are meant to be implemented by the public policy authorities (national, provincial or local) to comply with the judicial sentence request, and translated into the PISA.

These categories have some relation with the ones contemplated by ACUMAR's risk maps, develop to determine the prioritization of the different policy interventions[8]. The authority refers to social

---

[8] In 2018 the authority developed an environmental risk map (ACUMAR, 2018) with the purpose of guiding public policy interventions (mainly relocations/urbanizations and infrastructure) and a health risk map (Pasqualini et al., 2018) that incorporates among other variables the Integral Evaluations of Environmental Health in Risk Areas (EISAAR for their initials

vulnerability—defined as the ascertainable condition of certain groups associated with their exposition to socioeconomic, habitational, sanitary, nutritional, psychosocial and environmental factors that determine their capacity to recover from catastrophes and threats—when including as a variable the people's housing conditions (for which there is available consolidated official data). Floods and contamination are reflected as several of the threats that are determinants of risk: landfills (sites identified and tracked by the Direction of Solid Waste Management), presence of industrial establishments (considered as priority for control as these industries have been categorized as high in environmental complexity) and the quality of the underground water for human consumption (evaluating the presence of nitrates, as an indicator of potential contamination by industrial activities). The health index considers several issues associated with the morbidity and mortality produced by environmental diseases and contamination (as evaluated by ACUMAR in air, water, land, etc.). Finally, protected areas and wetlands in particular are monitored by a program that seeks to create a database for their sustainable management and preservation, although it includes water and sediments parameters only, for the hydrogeological characterization of the wetlands.

In Figure 4 below we map the problems that were mentioned during both interviews and micro-workshops and their locations according to actors' narratives. It goes without saying that data displayed there does not represent a complete picture of the problems faced in each location, but attempts to highlight both the complexity of the socio-environmental phenomena ahead and the extension of situated experiences that conform our network. In addition, since research activities

in Spanish) that the authority has been conducting (in alliance with the municipal jurisdictions) since 2016 to evaluate the population's environmental health by along the basin. In 2019 (ACUMAR, 2019) it also published a report for which it had begun working in 2016 with the National Scientific and Technical Research Council to produce an inventory of the basin's wetlands, following the judicial demands as well as the Collegiate Body's recommendations.

were carried out in the context of Covid-19 pandemic and lockdown restrictions, all actors, but especially community and policy actors, were overwhelmed by daily sanitary and economic emergencies, which may have changed their own priorities regarding socio-environmental problems.

The construction of the Knowledge Coalition network is proposed in this project as a dynamic process. So far, we have connected with actors with experience in eight of the fourteen municipalities included in the Matanza-Riachuelo basin: Avellaneda, Almirante Brown, Merlo, Lanús, La Matanza, Lomas de Zamora, Esteban Echeverría, and Buenos Aires City. In most jurisdictions we map socio-environmental problems belonging to several categories, with important specificities in each   of   them.

Socio-environmental problems identified by Knowledge Coalition network in interviews and micro-workshops

Created with Datawrapper
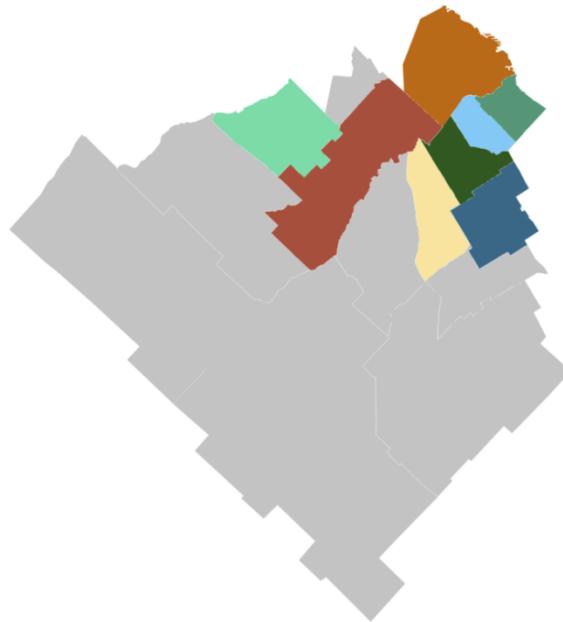
Socio-environmental problems categories

○ **SOCIAL VULNERABILITY:** Lack of basic services: housing, health care, transport, education, water, electricity, sewers. Social stigma. Lack of internet access

○ **FLOODING:** Covering or submerging of normally dry land due to flood rivers.

○ **GREEN SPACES CONSERVATION:** Land occupation. Norm violations from real estate developers. Threats to wetlands ecosystem.

○ **PUBLIC POLICY (ACTIONS AND INACTIONS):** Consequences of public policy actions such as resettlement of families previously located in the basin towline path. Consequences of lack of public policy actions.

○ **CONTAMINATION:** Disposal of sewage and industrial effluents into water bodies. Industrial waste. Landfills. Aerial contamination.

○ **HEALTH PROBLEMS:** Health problems associated with contamination.

LA MATANZA

○ **SOCIAL VULNERABILITY**: hunger, precarious education: public schools without water supply, precarious health: few first aid rooms or complexity studies, urban deterioration (neglect and deficiency): clogged sewers, drains blocked by rubbish, overcrowding, lack of public services. Poor rubbish collection.

○ **FLOODING**

○ **GREEN SPACES CONSERVATION:** real estate businesses in protected areas, loss of cultural heritage due to land occupation, rubbish dump in protected areas, loss of trees, wetland filling, plant extraction, landfills over wetland, burning of landfills that leads to forest and grassland, poor maintenance of green spaces, destruction of native species.

○ **PUBLIC POLICY (ACTIONS AND INACTIONS):** no control on constructions and the territorial ordering, absence of housing plan, lack of urban planning.

○ **CONTAMINATION:** contamination by intensive livestock and feedlot very close to streams, sewage waste in areas surrounding the Matanza River, sewage outlet in stream, rubbish dumps, contaminated water, contaminated wells, polluted and plugged streams.

○ **HEALTH PROBLEMS:** problems related to rubbish dumps.

LANÚS

○ **PUBLIC POLICY (ACTIONS AND INACTIONS):** resettlements.

○ **CONTAMINATION:** tanneries.

LOMAS DE ZAMORA

○ **FLOODING**

○ **GREEN SPACES CONSERVATION:** animal hunting, land occupation, intentional fires.

○ **PUBLIC POLICY (ACTIONS AND INACTIONS) :** Some neighbourhoods were left out of relocation plans despite having similar problems.

○ **CONTAMINATION:** landfills.

MERLO

○ **PUBLIC POLICY (ACTIONS AND INACTIONS) :** resettlements.

AVELLANEDA

○ **SOCIAL VULNERABILITY**: poor sanitary conditions, accumulation of solid waste, dirt, housing urgency: housing subdivisions and overcrowding, rodents, poor network connectivity, few doctors, lack of drinking water and electricity supply, stigmatisation.

○ **FLOODING**

○ **PUBLIC POLICY (ACTIONS AND INACTIONS):** resettlements, lack of public investment, indifference to community activity.

○ **CONTAMINATION:** oil waste pollution in the Riachuelo, wastewater, open sewers and toxicology, aerial contamination.

ALMIRANTE BROWN

○ **PUBLIC POLICY (ACTIONS AND INACTIONS):** lack of support to communities.

CIUDAD AUTÓNOMA DE BUENOS AIRES

○ **SOCIAL VULNERABILITY**: electric risk.

○ **FLOODING**

○ **GREEN SPACES CONSERVATION:** urban extractivism, sale of public lands and green spaces.

○ **PUBLIC POLICY (ACTIONS AND INACTIONS):** resettlement, lack of planning and land use planning, delay in the conversion of a health center into a hospital.

○ **CONTAMINATION:** industrial waste, landfills.

ESTEBAN ECHEVERRÍA

○ **SOCIAL VULNERABILITY**: lack of sewers, lack of drinking water.

○ **FLOODING**

○ **GREEN SPACES CONSERVATION:** land occupation, wetlands filling.

○ **PUBLIC POLICY (ACTIONS AND INACTIONS)**

○ **CONTAMINATION:** sewage discharges to the lake, chromium and nitrate contamination in groundwater.

Figure 4: Basin map and socio-environmental problems classified in six categories

When the analysis is organised by types of actors, we could identify different problems' prioritisation and also different practices aiming at addressing them, as shown below.

CSOs and territorial organisations in our network frequently referred to issues related to social vulnerability, particularly in relation to poor access to housing and lack of access to public services such as drinkable water and sewage. Contamination of water and land coming from industrial and sewage waste and rubbish was also pointed out frequently among main problems. Since one of our micro-workshops was organised with neighbour associations defending natural reserves, green area conservation and changes in habitat conditions also turned up as important concerns. Finally, this type of actor was the one more prone to identifying problems they suffered that were directly related to policy action or inaction.

CSOs' and territorial organisations also reported activities to address those issues. These involve the organisation of complaints, mobilisations and environmental awareness campaigns against rubbish dumping, the destruction of natural reserves and the sale of public spaces. CSOs in particular, have a leading role in making visible main issues and in claiming for participation on both regulatory design and monitoring policy processes.

Policy makers in our network identified problems similarly to communities but their priorities focus on the social vulnerability —housing deficit and lack of access to public services, but also basic needs such access to food, health and employment. Besides, they also mentioned environmental contamination problems which cannot be underestimated such as rubbish dumps and dumping of sewage and industrial effluents, and their associated health problems they may cause. The deficit of green areas and the risk of gentrification that can follow the improvements at the basin's environment were also mentioned in some interviews, although not as main problems.

It must be noticed that actors from policy bodies have been in office for less than a year (governments in all jurisdictions changed in December 2019) and during pandemic time. Thus, although they mentioned some specific practices that were carried out in their jurisdictions to promote citizen participation (e.g., municipal forums for the conservation of green spaces) or environmental monitoring (e.g., creation of technical observatory of agrochemicals), they were still incipient and overpassed by other activities to deal with current emergency.

Finally, members of research organisations tend to focus on single issues related to their research specialisation. They usually highlight how those issues are important for communities wellbeing. Water quality was one important research goal, and therefore, environmental contamination due to several causes included industrial, agricultural and sewage waste; rubbish dumps were highly mentioned. Researchers relate contamination with health problems and they mention that social vulnerability, especially the one associated with housing and lack of essential public services, only worsen the relation between contamination and health. In addition, the conservation of green areas was also mentioned as vital importance to avoid recurrent floods, aggravated by solid waste disposal obstructing streams, that cause evacuations and even deaths.

As mentioned, activities and experiences by researchers from scientific organisations in our network were mostly related to analysing contamination, particularly in relation with water quality. For example, how water remediation tools used in other countries could be applied at the basin, or the elaboration of methods to control water use or the use of Citizen Science methods to monitor aquatic environments. There were also biological studies related to metal contamination, engineering studies for monitoring water bodies throughout the basin to anticipate floods and social studies on the effects of relocation on people and neighbourhoods. Most of these studies attempt to have an impact on public policy.

4.2.3 The Meanings and Processes of Citizen Participation in Policy Making (for Community and Policy Actors) and on Knowledge Production (for Scientific Actors)

In our R&I action—and in citizen social science more generally—we envisage that people who engage are politically interested in changing a reality that affects them. They may contribute not just with information or data production about problems as defined by researchers, but also with their personal and situated experience in seeking for solutions. Yet, (their) participation could be organised in different ways by establishing the appropriate governance mechanisms. In this section we discuss how this idea is seen by different actors in the knowledge coalition, when we asked them about their understanding of the role of citizen participation.

In our Knowledge Coalition network, citizen participation was recognised as having different roles which could be broadly associated to the different types of actors we interacted with. From a civil society perspective citizen participation in policy making has a democratising role; it is seen as the opportunity to be treated as equals in the definition of public policies priorities. In turn, from the perspective of public policy, citizen participation has a contributory role as it allows for a better identification of community priorities. If successful, this contributes to policy actions to be culturally or socially appropriated by the community, an important dimension for both the effective implementation as well as the sustainability of public policy.

Academic actors were asked about the role of citizen participation in the production of scientific knowledge. In general, participation was seen as a route to improve the responsiveness of science. It was claimed that scientific projects could better reach community needs when working closely with them. In addition, due to that very same reason participation also contributed to the legitimisation of

science, before society and public policy actors, which is valued particularly during periods when public investment in science is questioned.

Regarding policymaking processes, civil society actors see that community organisation is a necessary condition for participating in public policies, but it is not sufficient. Articulation with public policy bodies is also important to build trust relations that may be conducive to more effective participation. There are several important experiences in the basin where participation has accomplished important achievements, such as producing information about the sources and consequences of pollution (Pereira & Tobías, 2014), mapping and contrasting the results of the policy implementation (del Castillo & Fressoli, 2016; Radtke, 2018) and co-producing protocols for the relocations processes (Demoy et al., 2016). In all cases, there were social organisations and NGOs involved in the mobilization of different stakeholders. Yet, the organisations and community actors we interacted with identified a risk of citizen discouragement, since participation can be very demanding and—although included in the basin's sanitation policy judicial sentence—there are no binding

mechanisms created for participation to be translated into tangible public policy measures: existing mechanisms such as the "working roundtables" and public audiences are not binding. In addition, processes are so slow that can be frustrating.

In turn, policy makers discussed the difficulty of balancing participation and deliberation with contexts of emergency decision-making (such as those imposed with the difficulties of Covid-19 times). But they also discussed the lack of appropriate mechanisms that would enable more engaged participation (innovating from the traditional consultative approaches).

Finally, although as we mentioned there are some well-established experiences of Citizen Science in the basin, most researchers we interviewed do not consider citizen participation as an integral part of the knowledge production phase of the research cycle. They see it as part of University outreach

activities or introduced through traditional channels such as interviews to obtain data, or communication strategies, to share research outcomes, and in some cases, for social monitoring of environmental data. Outside specific Citizen Science networks, there is little knowledge about Citizen Science projects. Researchers working in Citizen Science projects, argued that it proved to be difficult to sustain collaboration with communities for a long time, especially because those activities are not recognised in scientific evaluation schemes and also because it was too demanding on time and energy to be ready to commit to those activities in the long run. Dealing with community expectations, especially in the context of social vulnerability, was also mentioned as an important barrier.

4.2.4 The First Steps Towards Platform Co-design

One of the goals of the workshop was to identify current use of digital information by different stakeholders and the problems they face in general when looking for information. Participants discussed in small groups the information they use in their daily activities in the basin and we also asked specifically about some sources of information which share digital open data, to understand their experience with them in terms of access and use. There were 30 unique sources of information mentioned in the almost 50 post-its written in Jamboard. The distribution of digital vs. analogue sources was 20 to 6, with 4 that were classified as ambiguous (as they could be consulted either way and participants did not specify). We also found that in all break-out rooms participants mentioned at least one local source of information (from municipality's websites or contacts to local press, organisations and neighbours). In relation to people's experience when using available information, the issues mentioned were: information's obsolescence (due to lack of update or website maintenance); data format which made it difficult to reuse; visualization issues; and data fragmentation.

The second purpose of the workshop was to initiate more concrete discussions with members of the Knowledge Coalition on our R&I action goal of building a Citizen Science platform for mapping socio-environmental problems and promoting actions towards Environmental Justice. We divided the discussion on break-out rooms per thematic areas, but we found that there were some common topics that stood up in all rooms: to share experiences and narratives regarding the problem matter, and to facilitate networking and dialogue among different initiatives. The main concerns regarding the use of a digital platform that emerged in the three sessions were related to restrictions in technological infrastructure; lack of technical capabilities; potential misinterpretation or inadequate use of the uploaded information; and the need for data validation.

5. Concluding Remarks

Our R&I action involves fairly complex and diverse socio-environmental phenomena in a large territory which is densely populated. In this context, we seek to articulate with a large network of allies, with previous experience and responsibilities in the basin. Network formation is dynamic and the participation of actors in the R&I activities will vary over time and the type of action. From our experience, we could argue that three variables affect engagement by different types of actors: thematic expertise and/or interest of participants; degree of synergies with their own activities in the basin and the specificities of the expected contribution for each planned action. We envisage that in order to address the complexity of socio-environmental issues involved in R&I action we need to enable participation from a diverse set of stakeholders, who could contribute to better identify problems, mobilise resources and facilitate socio-technical transitions, as the academic and policy literature suggest (Bäckstrand, 2003; Gallopín & Vessuri, 2006; Sauermann et al., 2020; Stirling, 2007). However, as these authors claim, the social impact of Citizen Science projects depends on overcoming several challenges that turn up when trying to guarantee scale, diversity and intensity of

participation (Den Broeder et al., 2018; Heiss & Matthes, 2017; Kythreotis et al., 2019; Sauermann et al., 2020). Challenges are related to how to sustain participation and how to respond to the time, technical and regulatory constraints that each participant faces in their own institutional and cultural context for action. Thus, to promote sustainability of such participation we need to link to interests and previous and future activities of these heterogeneous participants. That is why we believed a network structure of stakeholders' participation is more appropriate than a fixed coalition of stakeholders. This implies that stakeholders will participate on and off in the different activities we propose but they are nevertheless well informed and connected to the project activities; they will actively participate when they find it suitable in terms of their own agenda. The challenge is then how to promote synergies among diverse stakeholder agendas without departing from the R&I action vision, that is to encourage citizen participation facilitated by digital tools to promote transformative actions towards Environmental Justice in the basin. The virtual environment imposed by Covid-19 pandemic added new challenges, particularly when considering the digital gap affecting people living in vulnerable conditions.

Network formation is a dynamic process and therefore it is always a work-in progress. Yet, people in the Knowledge Coalition network have manifested explicit interest in participating and being informed on our activities. Therefore, despite important challenges ahead, especially in relation to Covid-19 related restrictions and uneven and poor digital infrastructure in the country, we think we have been able to create a yet incipient but growing network of actors interested and connected to our R&I action.

The main challenge we encountered so far was to work in a lockdown situation with communities living in vulnerable situations with poor digital infrastructure. On more than one occasion, it was not possible to contact interested members of the community due to connectivity issues. Articulation with

public policy actors was also very complicated in this situation; we could do not more than acknowledge that they were buried in daily emergencies and we were not as successful as we expected in reaching them. Interviews and workshops turned virtual. For the former and for the cases the digital barrier was overcome, we faced some challenges in administering the Informed Consents. We learnt from the process and it went more smoothly over time. For the latter, we originally thought it may have been complex to gather a diversity of actors in a virtual environment, especially due to asymmetric power, digital capabilities and potentially conflicting interests. But after building trust through interviews, information communications and micro-workshops we managed to organised a very productive interactive workshop, some six months after the R&I action formally initiated.

Challenges in relation to implementing the IC procedure were manifold. Firstly, we needed to design the tool almost from scratch. Informing participants of the research processes and obtaining their explicit consent is a common practice in biomedical projects in the country. However, in those cases people are the object of research and therefore tools used in those contexts are not straightforwardly adaptable to the participatory and collaborative approach of our R&I action. When the project began and prior to our initial activities we designed the IC forms and procedures. We documented all the participatory activities and made decisions in terms of the information we would share with the consortium's members, discussing the types of personal data to be collected and measures of protection. We followed our colleagues' recommendations and studied their forms' proposals, as well as our local normative guidelines and examples of consent for other disciplines and developed our own for the different types of stakeholders and their participation, translating them to English as well.

When we had to reprogram our activities due to the lockdown, we needed to design new tools for unforeseen activities such as micro and co-design virtual workshops. The impossibility of meeting face-to-face led us to innovate in our procedure, simplifying the language but also the format for providing information: FARN communication team produced a video and we implemented both oral

consent and electronic agreement through Google Forms, with identification assured by requesting confirmation with emails.

Going through those challenges made us confident in our capacities to adapt our plans and remain flexible to new turns in the context of uncertainty. We have relied on stringent mechanisms for organisation and articulation among main partners. We established a fortnight team meeting fixed schedule since the beginning of the lockdown, which allowed us to thoroughly discuss necessary changes in original plans. We also documented decisions and established follow-up mechanisms.

In addition, for building the Knowledge Coalition we rely on both organisations' previous networks and we devote time and effort to build trust with new contacts, which is of paramount importance for the success of our project activities. We learnt it could be gained even in the absence of face-to-face interaction.

We were also positively surprised by the good reception of digital tools among workshop participants. Yet we believe in future workshops and interactive activities we need to provide more time for oral discussions. In the co-design workshop, we realised that some of the group discussions were cut down before they could properly finish.

Overall, we found that virtual interactions worked better in more institutionalised environments. However, in the case of community members along the basin we still need to experiment with alternative mechanisms.

6. References

ACUMAR. (2018). Identificación de áreas prioritarias para intervenciones en la cuenca Matanza-Riachuelo. Análisis de riesgo ambiental.

ACUMAR. (2019). Estudio de Humedales en la cuenca Matanza-Riachuelo. Estado de situación.

ACUMAR. (2020). Informe de Mandas. Estado de cumplimiento y acciones.

Bäckstrand, K. (2003). Civic Science for Sustainability: Reframing the Role of Experts, Policy-Makers and Citizens in Environmental Governance. Global Environmental Politics, 3(4), 24–41. https://doi.org/10.1162/152638003322757916

Biodiversidad de la cuenca Matanza-Riachuelo · iNaturalist. (n.d.). Retrieved 26 October 2020, from https://www.inaturalist.org/projects/biodiversidad-de-la-cuenca-matanza-riachuelo

Cochero, J. (2018). AppEAR: A citizen science mobile app to map the habitat quality of continental waterbodies. Ecología Austral, 028(02), 467–479. https://bibliotecadigital.exactas.uba.ar/collection/ecologiaaustral/document/ecologiaaustral_v028_n02_p467

del Castillo, M & Fressoli, M. (2016). ¿Qué pasa Riachuelo? In M. Fressoli & V. Arza, The impact of citizen generated data in Argentina (pp. 21–26). CIVICUS DataShift.

Demoy, M., Yacovino, P., Olejarczyk, R., Swistun, D., Campos, N., & Lekerman, V. (2016). Articulación entre la academia y la gestión pública. Reflexiones sobre la experiencia en procesos de relocalización involuntaria de población. Ponencia Presentada En Congreso Internacional Contested_Cities. Disponible En: Https://Bit. Ly/2iAv8FL [Fecha de Consulta: 08/10/2018].

Den Broeder, L., Devilee, J., Van Oers, H., Schuit, A. J., & Wagemakers, A. (2018). Citizen Science for public health. Health Promotion International, 33(3), 505–514. https://doi.org/10.1093/heapro/daw086

Fressoli, M., & Arza, V. (2016). Discussion. In M. Fressoli & V. Arza, The impact of citizen generated data in Argentina (pp. 42–53). CIVICUS DataShift.

Gallopín, G., & Vessuri, H. (2006). Science for sustainable development: Articulating Knowledges. In Interfaces between Science and Society (1st ed., pp. 35–52). Greenleaf Publishing Limited. https://doi.org/10.9774/GLEAF.978-1-909493-67-4_4

Haklay, M. (2018). Participatory citizen science. In Citizen Science: Innovation in Open Science, Society and Policy. UCL Press.

Heiss, R., & Matthes, J. (2017). Citizen Science in the Social Sciences: A Call for More Evidence. GAIA - Ecological Perspectives for Science and Society, 26(1), 22–26. https://doi.org/10.14512/gaia.26.1.7

Hess, D. J. (2007). Alternative pathways in science and industry. MIT Press.

Kythreotis, A. P., Mantyka-Pringle, C., Mercer, T. G., Whitmarsh, L. E., Corner, A., Paavola, J., Chambers, C., Miller, B. A., & Castree, N. (2019). Citizen Social Science for More Integrative and Effective Climate Action: A Science-Policy Perspective. Frontiers in Environmental Science, 7. https://doi.org/10.3389/fenvs.2019.00010

Mira, J. (2016). Activismo verde: Participación ciudadana por el derecho al ambiente sano en la Argentina. http://ri.conicet.gov.ar/handle/11336/28611

Pasqualini, M. F., Bañuelos, C., Faure Montania, E., González, J., Hepp, Y., López, F. E., Malinovsky, V., & Mayo, P. (2018). Mapa de Riesgo Sanitario Ambiental de la Cuenca Matanza Riachuelo (ACUMAR, Ed.). ACUMAR.

Pereira, P., & Tobías, M. (2014). Políticas de agua potable y saneamiento y demandas locales en el Área Metropolitana de Buenos Aires. MG Merlinsky, Cartografías Del Conflicto Ambiental En Argentina. Buenos Aires: CICCUS-CLACSO.

Radtke, A. R. (2018). Caminos de la Villa: A case study in civic advocacy through crowdmapping [PhD Thesis].

Sauermann, H., Vohland, K., Antoniou, V., Balázs, B., Göbel, C., Karatzas, K., Mooney, P., Perelló, J., Ponti, M., Samson, R., & Winter, S. (2020). Citizen science and sustainability transitions. Research Policy, 49(5), 103978. https://doi.org/10.1016/j.respol.2020.103978

Stirling, A. (2007). A general framework for analysing diversity in science, technology and society. Journal of The Royal Society Interface, 4(15), 707–719. https://doi.org/10.1098/rsif.2007.0213

Verzeñassi, D., & Vallini, A. (2019). Transformaciones en los modos de enfermar y morir en la región agroindustrial de Argentina. ISSA. http://www.biodiversidadla.org/Documentos/Transformaciones-en-los-modos-de-enfermar-y-morir-en-la-region-agroindustrial-de-Argentina