

Sustainable Water Resources Management, Control and Consumption in a Changing Climate: Participatory Research Initiatives in Brescia

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Abstract

Aiming at closing the gap between the academy and the civil society, participatory research initiatives set the favorable framework for public engagement and awareness raising on environmental issues. Local communities and stakeholders can play an active role in the research process, also by sharing their experience and field knowledge. The academy can benefit from this approach collecting data and information for the validation of theories, models and methodologies.

A Science Shop (www.watshop.it) focusing on 'Sustainable water resources management, control and consumption in a changing climate' is running at University of Brescia since 2019. A few projects have already started, showing the potentials of this approach to promote active engagement and knowledge sharing. Addressed topics span from water consumption and water availability for water supply systems to sustainable urban drainage to mitigate the hydraulic risk. New methodologies aiming at evaluating the socio-economic impact of non-structural measures are also investigated.

From one hand recent European directives require participatory processes in the management of water systems, on the other hand environmental sustainability is being addressed by an increasing number of citizens' associations willing to act in line with the SDGs. Moreover national and international networks of participatory research initiatives can provide a continuous and very precious support through their case study and best practices collection. The WatShop experience is presented here, outlining its potentials and limits and promoting further international cooperation.

Keywords: Water resources management; Sustainability; Climate change; Public engagement.

1. INTRODUCTION

Since a few years public engagement is being fostered by Italian universities, with the aim of both closing the gap between the academy and the civil society and raising awareness on several issues, including environmental ones, among a broad audience. Besides Community-Based Participatory Research (CBPR) aims at engaging local communities in research projects dealing with their needs. The participatory research concept goes back to the second half of the last century, when the distance between the academic world and the civil society real needs started to be pointed out and a balance between research and action needed to be found (Grossi et al., 2018). With the beginning of this century, a strong emphasis is given to the potentials of this type of approach (e.g. Corburn, 2005; Minkler et al., 2006), which is being fostered by the European Commission (EC, 2003) as well.

Science shops are meant to favor CBPR, as they are meant to provide independent participatory scientific research in response to concerns experienced by citizens and local civil society: a demand-driven and bottom-up approach to research. Science shops can be based at universities, SMEs or NGOs. Those based at universities can give students opportunities to do community-based research as part of their curriculum. Science shops use traditional science communication techniques and they are part of an interactive science communication system. First science shops were established in the Netherland from the 1970s to bridge the gap between science and society, but they have now spread to a number of other countries (Mulder and De Buk 2006).

Through specific calls of the Horizon 2020 Science with and for Society (Swafs) program, the European Commission promoted the expansion of these initiatives and funded the project Scishops.eu (Enhancing the

Responsible and Sustainable Expansion of the Science Shops Ecosystem in Europe and beyond, <http://www.scishops.eu>). In the framework of the project, 10 new science shops started their activities. WatShop (<https://www.WatShop.it/EN>) is the science shop based at University of Brescia (UNIBS, Northern Italy) and focusing on 'Sustainable management, control and consumption of water resources in a changing climate'. This topic is directly linked to environmental policies, emergency plans, river basin management plans and irrigation practices. In this context, participatory processes are essential to raise awareness on the importance of new policies and rules.

2. METHODOLOGY

"Planning is the process used to define an organisation's direction in the pursuit of a particular goal. [...] Planning includes the clear articulation of what is intended to be achieved within a specific budget, looking at the current political, social, environmental and economic factors which can influence the realisation of this result. Planning incorporates an analysis of the pathways to take to achieve this result, choosing the most appropriate, effective and efficient. [...] Intended results should be clear, expressed focussing on the long term, measurable through indicators, and associated with shorter term targets" (Development Results, 2013). Planning can be considered preparatory to monitoring and evaluation (M&E) as they strongly rely on a good planning.

Monitoring can be defined as "a continuing function that uses systematic collection of data on specified indicators to provide management and the main stakeholders of an ongoing development intervention with indications of progress and achievement of objectives" (Glossary, 2010). Monitoring is therefore typically used to show how much progress is being made towards meeting defined objectives.

Last, evaluation aims at determining "the relevance and fulfilment of objectives, development efficiency, effectiveness, impact and sustainability. An evaluation should provide information that is credible and useful, enabling the incorporation of lessons learned into the decision – making process" (Glossary, 2010) of all stakeholders involved.

Alongside planning, monitoring and evaluation, impact assessment has become, in the last few years, central. After publication of the Paris Declaration on Aid Effectiveness (Bissio, 2005), in fact, institutions and organisations have been urged to demonstrate the effectiveness of their actions and impact assessment has become the main mean to evaluate the positive and negative, primary and secondary effects produced by an intervention. This way, we go beyond simple planning, monitoring or evaluating, as we seek to establish causality between an intervention and the changes that it produced (Simister, 2017). Whatever type of impact assessment is used (to measure change, to assess the change or to illustrate the change), participatory methodologies need to be deployed, in order to come to a critical assessment that keeps into consideration how a certain situation have impacted, or it is impacting, on the lives of the different groups of stakeholders.

There are many tools and approaches there can be used when engaging different stakeholders, ranging from conventional qualitative interviews and focus groups, to more specific quantitative tools or workshops. The decision on which method to employ must take into account the following criteria:

- objective of the assessment and expected outcomes (policy formulation, programme development, project definition, research activity, political empowerment of people)
- subject to be discussed
- available resources to organise the assessment
- available time for the assessment
- type of participants (CSO's, policy makers, researchers, citizens, etc.)
- actual level of engagement of the participants (dialogue, consulting, involving, collaborating, empowering, direct decision)

Probably the most comprehensive and useful tool for selecting and learning on participation tools is an interactive online Action Catalogue, developed by the EC-funded Engage2020 project in 2015. The tool is meant to enable researchers, policy-makers and other stakeholders to select the appropriate format for the participatory initiatives they wish to develop. The database is searchable on 32 criteria, including objective of application of the method, level of stakeholder/public involvement, geographical scope of application, time needed for the execution of the methods, and many other. The catalogue is available at: <http://actioncatalogue.eu/>.

Besides this wide range of tools, following is a more detailed description of the two main methodologies currently in use.

2.1 The Logical Framework Approach (LFA)

In recent years, the logical framework approach, that used to be almost uniquely applied to the development sector, is being employed to acknowledge a variety of social change processes. The LFA is a project design methodology that enables the main elements of a project to be summarised in the so called "logframe matrix". In order to build a useful and effective matrix, the first step is to analyse the state of the art,

the current situation and its drawbacks, to develop a vision of the desired future and determine the strategies to reach it. This is done through the development of the so called “problems tree”. This process consists in the identification of (i) the negative aspects of an existing situation and (ii) of the “cause-effect” relations among them. This problem analysis phase is typically performed using a brainstorming approach, where all stakeholders are invited to list the specific problems they see in a specific context and with regards to a specific subject (eg. flood mitigation-related problems, water management-related problems, in a certain area, in a certain time of the year). These problems are then grouped by type and ordered, thus creating a sort of “tree” where they are organized in terms of cause/effect. These hierarchical visual representation of the problems forces the stakeholders to find an agreement on the main problems to be analysed and their relationships, reaching a situation where the one, maximum two, main issues raised by the participants are actually considered crucial to all of them. If, on one hand, the highest the number of stakeholders that participates to this preliminary analysis phase, the longer the brainstorming process, on the other hand, the higher the possibility that the final selected problems actually mirror the reality as they should be agreed by the majority of stakeholders.

Of course, it is absolutely necessary to specify the problems in an adequate way that actually describe the reality. So, for example, describing a problem in terms of “absence of” is a fake problem, as it doesn't describe an issue to be solved, but the absence of a desiderata.

Once problems are defined, grouped and hierarchically ordered, they need to be transformed into reachable objectives where, instead of having cause effect relationships, we will have “means to reach an objective” relationships. This is the so called “objectives tree” and it provides a clear and effective overview of future desiderata.

Starting from the so-defined objectives, the logframe matrix can be developed. This logframe is not a fixed structure, but a support to further brainstorming among stakeholders. It is a dynamic project development and management tool that requires long times to be developed, but it can provide that the internal logic of a project is consistent, and activities, results and objectives connected. Being the logframe structure based on the concept of cause and effect, when done properly it allows stakeholders to also define outcomes and outputs.

The use of the LFA must be carefully supervised since if, on one hand, it facilitates a process of reflection about how a project will support change and it ensures M&E and impact assessment are taken into account during the planning stage, on the other hand it can be difficult to use in case of complex programmes, since the logical framework was originally designed for simple projects.

2.2 Participatory Learning and Action

PLA is a type of qualitative research. It is used to gain an understanding of a community or situation and is always conducted with the full and active participation of community members. It can be applied through a wide range of participatory tools and approaches (Chambers, 2008) to support people within communities to analyse their own situation, rather than have it analysed by outsiders (Gosling and Edwards, 2003).

First, the goals and objectives of the PLA are clarified and agreed with the communities. Next, a set of relevant tools and approaches are selected, which can include mapping, interviews, focus-groups, observation and case studies. If, on one hand, PLA can help provide a good, in-depth understanding of a community, including its capacities and problems, however, PLA can also be time consuming. It is therefore important that the benefits of the work to communities outweigh the costs. This is one of the reasons why PLA should not just be carried out for data extraction. Participatory approaches are not inherently ‘good’, and as with any development work they can be carried out in a sloppy, biased, rushed, uncritical or self-serving way. An essential element for good PLA is good facilitation skills. PLA work may expose tensions in communities and may arouse false expectations if not handled well. The role of the facilitator is therefore very important (Napier and Simister, 2017).

3. RESULTS AND DISCUSSION

WatShop has already dealt with a few projects. For example, one of them was coordinated by a partner social enterprise, aiming at promoting communication efficiency and debating among young citizens (16-26 years old) and focusing on a few challenges. Within this project Watshop was taking care of the focus on ‘water’. Forthcoming activities of the science shop will include science cafes, co-creation events, workshops and stages for high school students focusing on specific aspects of the main science shop topic. In addition, WatShop has been working with other partners on research and innovation project proposals that will possibly make its activities more sustainable.

Currently two pilot participatory research projects are being developed on the effects of climate change on the hydroelectric power production and adaptation strategies to climate change in the sustainable

management of water resources in Brescia. In these two pilot projects a combination of the methodologies described above will be implemented.

4. CONCLUSIONS

Communities are being involved since the very beginning of the science shop activity, which is constantly monitored for further improvements. WatShop partners represent different actors of the civil society (municipalities, social enterprises, water service managers, land reclamation authorities, etc.) which are contributing to the science shop activities. Water efficiency, droughts and floods are the most frequently issues mentioned by potential stakeholders. Responsible research may benefit from the society interest in facing these issues while communities and civil society may better understand through responsible research the selection of structural or non-structural measures to limit damages and economic losses.

Sustainability of the science shop beyond the funded European project is a challenge to cope with as the activity evolves and the communities and stakeholders give trust to the science shop. Besides participating in European and international project proposals, research projects promoted by local authorities and funding agencies are being developed.

5. ACKNOWLEDGEMENTS

This research was partially carried out within the framework of the Scishops.eu project, which has received funding from the European Union's H2020 Research and Innovation Action under Grant Agreement No 741657.

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