



How can participation and communication support decisions towards wastewater reuse projects? A methodological proposal

Benjamin Noury, Celine Pascual Espuny, Nils Ferrand

► To cite this version:

Benjamin Noury, Celine Pascual Espuny, Nils Ferrand. How can participation and communication support decisions towards wastewater reuse projects? A methodological proposal. Waterlines: Confluence and Hope through Environmental Communication, The International Environmental Communication Association; University of British Columbia, Jun 2019, Vancouver, Canada. hal-02572030

HAL Id: hal-02572030

<https://amu.hal.science/hal-02572030>

Submitted on 13 May 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

How can participation and communication support decisions towards wastewater reuse projects? A methodological proposal

Benjamin Noury

Société du Canal de Provence (SCP), IRSTEA, IMSIC ~ benjamin.noury@irstea.fr

Celine Pascual Espuny

Mediterranean Institute of Information and Communication Sciences, France (IMSIC) ~ celine.pascual@univ-amu.fr

Nils Ferrand

National Research Institute of Science and Technology for Environment and Agriculture, France (IRSTEA) ~ nils.ferrand@irstea.fr

Abstract

Wastewater reuse (WWR) is an alternative resource that has been developed since the 1970s in the driest parts of our planet. In France, every second year, half of French departments set up restrictions on water use due to scarcity. Irrigation is limited or even prohibited for weeks. WWR could be justified in these territories. However, French regulations have long imposed requirements that have limited this practice. In light of climate change, French Water Agencies multiply pilot experiments. Among them, the Read'Apt project focuses specifically on socio-economic issues linked to WWR projects, sometimes referred to as "social acceptability".

While some studies question the effects of communication and participation, they are yet often promoted as a solution to overcome these social barriers. This presentation describes a methodological framework developed through action research to facilitate the decision making process of a WWR project. The framework is based on a Social Site Characterisation and a participatory communication strategy.

Introduction

Climate change exposes freshwater resources of our planet to intense pressure. Extreme events are intensifying with more water-related natural disasters. Some territories are subject to more frequent droughts. Two-thirds of the world's population live in conditions of water scarcity for at least one month a year (Mekonnen & Hoekstra, 2016). A deficit of 300 million m³ is currently observed between water available and the current withdrawals. Projections anticipate that this "Water Gap" will reach 2.8 billion m³ in 2030 (The 2030 Water Resources Group, 2009).

Several strategies are implemented to address local water shortages (FAO, 2012). Options for additional withdrawals from so-called conventional resources (rivers, aquifers) are considered as a priority. Then, water saving measures are carried out to reduce consumption (search for leaks in the networks, change in agricultural practice, etc.). Finally, non-conventional resources, such as

desalination, rainwater harvesting and wastewater reuse, are finally explored. In this article, we focus on this latter alternative.

Wastewater reuse (WWR) is not a new concept (Angelakis, Asano, Bahri, Jimenez, & Tchobanoglous, 2018). Traces of sewage systems have been found in several civilizations to collect wastewater. Some of this reclaimed water was used again for agricultural irrigation. The development of wastewater treatment plants in the 20th century has extended potential uses of WWR: tourism, industry, urban, environmental (Jiménez & Asano, 2008; Lazarova, Asano, Bahri, & Anderson, 2013). In 1969, the Namibian capital, Windhoek, was the first city to set up a planned system of WWR for drinking water. Worldwide, it is estimated that 32% of wastewater are reused. However, only 16% is reused with treated sewage. In most cases, it is untreated wastewater reuse (Unesco, 2017).

Norms and standards development on WWR¹ has introduced technological and sanitary requirements. However, socio-economic issues, sometimes referred to as “social acceptability”, was soon acknowledged as a key element for the development of WWR in the same way as technical issues (Baumann & Kaspersen, 1974). In response, many studies have identified sociotechnical factors influencing stakeholders' perceptions (Fielding, Dolnicar, & Schultz, 2018)

Among these factors, information and knowledge are identified as central instruments to overcome social barriers. A recent World Bank report (2018) states that “The most successful cases of potable reuse have addressed community outreach through education and marketing.” However, in the literature, there is no consensus on the influence of information. The highly commented projects in Toowoomba (Australia) and San Diego (USA) demonstrate that despite consistent communication, the social protest raised by WWR can compromise project implementation. In their analysis of the San Diego case, Jansen et al, (2007) point out that late public involvement is partly responsible for this failure. Beyond communication strategies, Jansen implies the need to implement stakeholder engagement strategies. However, there are few examples of concrete implementation of a participatory approach to support dialogue around WWR project.

The ambition of our work is to link communication and participation in an action research approach. In the context of the Read'Apt pilot project, we aim to assess the effect of different communication facilities on citizens' perception of WWR. These facilities have different participatory intensities. In other words, we seek to gradually involve the citizen in the final decision following a co-construction process inspired by the principles of participatory communication (Freire, 1970). Our reflections also echo those developed by Dewey, who sees participation as a criterion for prioritizing the degree of communication (Quéré, 2014). The higher the degree of communication, the more meaningful is its social impact.

First, we trace the genesis of the research project and present the materials used for this article. Then, we detail the methodological elements used for our participatory approach. Finally, we describe the first results, the difficulties encountered and the reflexive questions raised by an action-research on social acceptability.

¹ NRMCEPHC–NHMRC, 2009 ; USEPA, 2012 et CDPH, 2014

Territorial context and epistemological choice

Genesis of the Read'Apt project

The Calavon and the Lorgue, two tributaries of the Durance, are Mediterranean rivers located in the departments of Vaucluse and Alpes-de-Haute-Provence in the south of France. They are characterized by extremely severe low water regimes with many dry river areas. This water scarcity is a challenge for users, mainly for drinking water supply and agricultural irrigation. In consultation, all the water stakeholders in the territory have set objectives to reduce water withdrawals. Others alternatives to secure the water resources are also explored such as water transfers, drilling, storage, etc.

The Read'Apt project, supported by the French Water Agency Rhône-Méditerranée-Corse, is one of this alternative developed specifically for assessing the potential of WWR from some 20 wastewater treatment plants for local irrigation. The project started in 2017. It brings together local authorities, private partners and researchers. The project seeks to couple different dimensions of WWR (Condom, Lefebvre, & Vandome, 2012) to develop an integrated approach that combines technical feasibility, economic relevance and social acceptability.

In this paper, we focus on explaining the steps carried out to address the "embarrassing notion" of social acceptability (Barbier & Nadai, 2015). This notion has led a lot of work to identify the main socio-technical factors influencing stakeholders' perceptions (Fielding et al., 2018; Hurlimann, Dolnicar, & Meyer, 2009; Po, Kaercher, & Nancarrow, 2003). These works, based on Ajzen's planned behaviour theory, aims to prioritize the socio-demographic and psychological variables that influence behavioral attitudes and intentions.

Information as a factor of acceptability?

Information and awareness-raising are frequently cited as central instruments to overcome social barriers. It can go as far as finding the best name (Menegaki, Mellon, Vrentzou, Koumakis, & Tsagarakis, 2009) or using foreign languages (Geipel, Hadjichristidis, & Klesse, 2018) to facilitate acceptance of WWR. The Joint Research Center of the European Commission recommends in 2014 "to establish an effective consultation and communication strategies to promote public understanding and acceptance for WWR" In practice, communication experiences are diverse. Windhoek City regularly communicates in the media about drought. Singapore has created a brand, NeWater, to change public opinion about recycled water. The Water Reuse & Reuse Foundation (WERF) has developed a series of educational and awareness materials for large-scale communication campaigns for the cities of Perth (AUS) and Orange County (US).

However, the influence of information does not reach consensus in the literature. Some researchers argue that acceptability is not directly related to good information or communication (Goodwin, Raffin, Jeffrey, & Smith, 2017; Po et al., 2003). Empirical approaches from other studies (Dolnicar, Hurlimann, & Nghiem, 2010; Fielding & Roiko, 2014; Price, Fielding, Gardner, Leviston, & Green, 2015) demonstrate that dissemination of information about WWR may have a measurable and positive influence on participants' attitudes towards this practice.

In these approaches referring to the information deficit model, information is considered in a linear way. Skepticism of WWR is attributed to a lack of understanding resulting from a lack of information. This model is strongly questioned. Critics point out its inability to take into account the social, cultural and institutional contexts in which attitudes and behaviors are formed (Bulkeley, 2000; Owens & Drifill,

2008). These approaches neglect the water culture forged in a long history that distinguish wastewater from other water resources (Barbier, 2009; Barraqué, 1985). The other major criticism is that the model sets apart experts from laypersons (McNie, 2007; Wesselink, Buchanan, Georgiadou, & Turnhout, 2013). One explains and the other just listens. In the event of a contestation, it is considered that the scientist and/or the politician have not managed to make themselves understood by the actors concerned.

One way to overcome this model is to set up deliberative processes where communication is effective, inclusive and transformative between citizens and decision makers (Fernandez, 2016). The central idea is that the legitimacy of collective decisions is based on the right, ability, and opportunity of those affected by a decision to participate in the deliberations that determine the content of that decision (Dryzek, 2010). In line with the Aarhus Convention (1998), the promotion of a more transparent communication between citizens and political decision makers has been a priority objective for the European Commission and the water institutions (ministries, river basin organizations, local commissions, etc.). Participatory management and stakeholder involvement are criteria used by the governance literature and many institutions (OECD, GWP, SIWI²) to define the principles of good water governance.

Participatory approaches are popular to support WWR project implementation (Harris-Lovett, Binz, Sedlak, Kiparsky, & Truffer, 2015; Hartley, 2006; Marks, 2006). These works highlight the impact of participatory arrangements on trust, the perception of equity and legitimacy that applies to both the decision-making process and its outcome. The decision is considered fair when it comes from a legitimate mechanism. In 2003, Birkhoff emphasized that for complex projects such as WWR, the involvement of different interests, knowledge and expertise in the decision-making process leads to better decisions. However, few participatory approaches have been implemented to support WWR projects.

With Read'Apt, we want to stimulate dialogue on WWR. The aim is not to persuade or subtly secure acceptance of WWR in a logic of "democratic persuasion" (Claeys-Mekdade, 2003) but rather to reveal an unknown alternative within the prime space (Noury, Garin, Montginoul, & Campardon, 2019). In this perspective, the research project is seen more as an inductive approach in which the participatory process must be an opportunity to create knowledge, to stimulate mutual learning between decision-makers and stakeholders (Seguin, 2016) and to support local actors in building their own options and choices (which may not be the implementation of WWR).

We assume a "calculated" and planned participation. However, this does not mean that its social scope is reduced to the creation of a simulacrum. We envision that participants will be able to contribute to define the form and nature of the experience they will have. Participating cannot be reduced to fulfill a role over which they have no control (Zask, 2011).

Our approach is anchored in a logic of participatory communication as opposed to a diffusionist approach. This means that we want to put the population at the heart of the communication process with a set of activities which contribute towards individual and social change (Bessette, 2007). We do not aim at the politicization and confrontation presented in the pedagogy of the oppressed (Freire,

² Organisation for Economic Co-operation and Development, Global Water Partnership, Stockholm International Water Institute

1970) but at an awareness of the various facets of WWR and the structuring of a collective reaction to this alternative.

Our posture is therefore engaged. We are part of a mutual learning process where knowledge is built through action and, in return, citizen action is guided by the scientific process. Scientific knowledge is embedded in a social and political context. It is socially constructed (Latour, 1987) with many influences linked to their production conditions: project funding, institutional partnership, researcher's personality (Moscovici & Buschini, 2003), etc. Our questioning is also reflexive, as emphasized by Egan Sjölander et al. (2018), on the place and the consequences of a research in Information and Communication Sciences that comes under action research.

Methodology

We distinguish two phases in our methodological approach. A qualitative preparatory phase based on the concept of Social Site Characterisation developed by Brunsting et al. (2013) and an "action" phase with a repeated experimentation plan.

Social Site Characterisation

Any communication process, whether participatory or not, begins with a territorial analysis to define the issues, the actors involved, their expectations and perceptions. Social Site Characterisation tested on complex environmental issues such as CO₂ storage seems relevant to question the social feasibility of a project before starting a socially and financially costly participatory approach. The objective of this step is not so much to ensure the success of the project in a territory as to ensure the relevance of initiating a dialogue there.

This method combines four distinct tools:

- A bibliographic research to understand the territorial hydrographic situation (local water management reports), to position the place of water in local history (municipal archives) and to evaluate social sensitivity (minutes of public meetings).
- A media analysis conducted with Factiva from 2000 to 2017. "Treated wastewater reuse" and "recycling treated wastewater" concepts were scanned in fifty national, regional and specialized press titles. Only daily and weekly publications were studied.
- Semi-directive interviews with the main stakeholders. 31 interviews were conducted with individuals concerned by the challenges of water scarcity in the Calavon and Lague rivers: farmers, government services, local authorities, environmental associations. There are no industrialists in the study area.
- A local population survey to test the dependence between the variables identified in semi-directive interviews. These surveys were conducted by Master 2 students from the University of Aix Marseille on the markets and supermarkets of 7 municipalities in the area. 120 questionnaires were collected.

Experimental setup for participatory communication

We do not consider a Participatory Action Research (PAR) in the sense of Reason (Reason & Bradbury, 2008). Participants and researchers will not jointly decide on objectives and methods. On the other hand, they participate in the collection, analysis and final decision.

The objectives are defined by the researchers based on the literature and the results of the Social Site Characterisation. The aim is to test different participation and communication mechanisms and to evaluate the transformations they generate in social representation. The hypothesis is that the more actors are engaged in the final decision, the more they modify their representation.

To do this, we have chosen four levels of participation: information, consultation, collaboration and co-decision. The methods proposed for each level are defined in consultation with the partners of Read'Apt project during a specific workshop.

Information: this level is considered "non-participatory" in the literature. It is more in line with the diffusionist and monological model. However, in practice, the term "participatory" is mobilized for very different approaches. As trendy concept, participation is used for all approaches with citizens, even if they are manipulative. In our research project, a website (www.reut-luberon.fr) is designed to present the project, the hydrological situation and WWR practices. This website is publicized through partners' websites and their social networks.

Consultation: at this stage, the experimentation enters into a dialogical logic where project partners and citizens can exchange. These exchanges do not guarantee the modification of the project. It is rather a matter of awareness and taking time to answer the population's questions. A public meeting is organized for this purpose. The partners present the ongoing experimental project, its genesis and the first results obtained.

Collaboration: still in a logic of exchanges, collaboration differs from consultation by a co-production dimension. 3 successive participatory workshops are proposed to citizens. They are open to all. The objective of the workshops is to define the conditions for implementation (and non-implementation) of treated wastewater reuse projects in the Calavon and Lague basins. Each workshop corresponds to a distinct participatory time with 1/ knowledge: exploration of local water issues with a role-playing game, visit of the wastewater treatment plant, meetings with experts, 2/ Exchange: elaboration of the main principles of implementation via a focus group; 3/ Synthesis and evaluation: drafting of a citizen charter and validation of its content by all participants.

Co-decision: In this last level, the participatory ambition is to involve citizens in the final decision on a WWR pre-project. In the classic scheme of a WWR project, the social feasibility is only questioned once the technical and economic feasibility has been validated with a pre-selected scenario. At this level, there is no longer any possibility of modifying the technical system. Contributions from the local consultations do not change the technical proposal. A social touch is developed in order to make this technical solution more acceptable. In our methodology, we plan to organize a meeting between the citizens and consultants who carry out the feasibility study to discuss the scenarios envisaged, modify them, or even abandon them if necessary.

The participants' perception and attitudes are systematically assessed during the different stages of the experiment in accordance with a repeated experimental plan. Our control group is made up of citizens who responded to the survey carried out on markets and supermarkets in the Social Site Characterisation phase.

Results

The participatory experimentation is underway. The results of this phase cannot be presented. Nonetheless On the other hand, we come back to some of the pitfalls encountered during the preparation and the organization of this experimentation.

Social Site Characterisation

There is a long history related to water rights on the Calavon. The availability of the resource is not a new issue in this river basin. From the 12th century, development began to transfer waters from the Durance River. The canals built over the centuries allow the progressive development of irrigation. Many acts regulate access to the resource and organize its distribution between different uses: agricultural irrigation, mills and cities.

In the upstream part of Calavon, the area covered by the Read'Apt project, several hydraulic investment plans have been drawn up. However, none of these plans have been successful, although several initiatives have tried to revive, at different times. This historical reading sheds light on the feelings of abandonment and injustice that prevail among current farmers during the interviews.

The lack of water has marked this territory geographically and socially for several centuries. The Calavon has always been a dry torrent most of the time but the actual demographic and economic pressure exacerbate water imbalances. Water saving measures are carried out by all actors in the basin: leakage control in drinking water networks, drip irrigation, water-saving cultivation, public awareness, etc. Water scarcity is unanimously highlighted by the water stakeholders met during the interviews. However, this unanimity is not reflected in the general public survey. 50% of the citizens think that water resources are sufficient in the area.

Three other issues are identified in the Lague and Calavon management documents: improving water quality, preserving and enhancing the environment and involving stakeholders. Discussions for water policy in these basins were held as early as 1983 after a press release (GEO, 1983) describing the river as "pestilential cloaca". Then, the Luberon Regional Natural Park impulsed in 1993 a consultation processes to develop a Water Development and Management Plan (SAGE). It is one of the first rivers in France to initiate this type of approach one year only after the 1992 National Water Act which sets this institutional mechanism. There is therefore a significant experience of concerted action for water in this territory.

It is interesting to point out that WWR is mentioned in regional management documents such as the Source³ and the SDAGE⁴. However, it is not included in the local documents for the Lague and the Calavon basins. The practice is known but not discussed or promoted as an option to explore to address water scarcity issues. This observation is confirmed by the analysis of the semi-directive interviews. Preventing leaks, raising awareness of water saving, water-saving agricultural cultivation and hillside retention are the priority options invoked.

Exploration of WWR alternative via the Read'Apt project seems to correspond more to a political and financial opportunity than to a current need in the river basins. The emergence of the project was

³ Strategy for a rational and harmonize use of the water resource

⁴ Masterplan for Water Development and Management

facilitated by a shared vision among partners and Water Agency funding to cover up to 50% of the costs. Partners' objectives are different but concomitant as shown in table 1.

Table 1: Partners' objectives

Local authority	Implement water saving experiment that can help farmers, which are well represented in municipal councils.
Facilitator of the local water management plan (Regional Park)	Study an innovative solution, especially since innovation and experimentation is a founding mission of the Regional Natural Parks in France.
Regional water development corporations	Obtain new references on treated wastewater reuse
Farmers	Explore a potential security of water resources.

All the partners have an interest in the implementation of this project even if it is not a priority in view of the actual territorial context. Some stakeholders interviewed believe that the practice may not be relevant in 2019 in the area. However, in the perspective of climate change, it is important to prepare for the future and explore alternatives that could be socially misunderstood.

Communication and awareness-raising initiatives are praised by stakeholders as an essential condition for the implementation of WWR projects. Most stakeholders interviewed are skeptical about the reception of this innovation by citizens. They believe that WWR practice is not well known. They suggest a dedicated communication strategy.

The general public survey reveals that 57% of respondents had already heard about the WWR, mainly through the media (TV and radio). These figures are surprising because the media analysis carried out reveals very low media coverage of the topic. Only 156 press articles mentioning WWR between 2000 and 2017 have been identified. 30% of these articles are devoted exclusively to WWR. In other cases, it is generally an option cited in a list of solutions to address water scarcity. The results can be explained by a greater media coverage in 2018 due to several parliamentary reports and the publication of two methodological guides on WWR (ARPE, 2017; INEC, 2018). In addition, we focused on the print media, while the information seems to have been disseminated mainly on television and radio. Two weeks before the surveys, WWR was broadcasted on national prime time radio and television channels on the occasion of World Water Day (Leibowitch, 2019; Munos, 2019; Relat, 2019).

In terms of attitude, the results below corroborate national water surveys in which a very large majority of individuals (75% in the CIEAU 2018 survey) support the use of WWR for fruit and vegetable irrigation. (C.I.Eau, 2018)

Table 2: Citizens' attitude towards WWR.

Parks and green spaces	Streets cleaning	Orchards	Market gardening	Meadows for livestock
------------------------	------------------	----------	------------------	-----------------------

Favorable	83%	81%	69%	66%	53%
Mitigated	7%	5%	12%	10%	16%
Unfavorable	9%	7%	17%	21%	24%
Without notice	2%	3%	2%	3%	7%
Against irrigation	0%	3%	0%	0%	0%

These results confirm trends in the literature (Smith, Brouwer, Jeffrey, & Frijns, 2018) on the relationship between attitude and use. People are less favorable to use treated wastewater for market gardening (66%) than for watering green spaces (83%). This distinction is also confirmed when questioning consuming intentions. 91% of people interrogated would continue to frequent green spaces irrigated with WWR. 59% would continue to purchase from grocers who sell fruits and vegetables irrigated with WWR.

Finally, surveys and interviews reveal a need for information. It is expressed by both the population and water stakeholders. 60% of the population surveyed feel that they are not sufficiently informed about water. The stakeholders interviewed would like more information on the WWR (20/33).

When reading the results of the Social Site Characterisation, one can see that water scarcity is an important issue in the territory. It is shared by water stakeholders but not necessarily at the level of the local population. WWR is a known but not discussed practice. Actors and citizens are not opposed to it, but practicing it does not seem to take priority over other management options. The Read'Apt project therefore responds more to a political and financial opportunity than to a current local need in terms of water resources. However, this need could evolve in a context of climate change. The majority of stakeholders and citizens believe that water resources will be reduced. Should this happen, WWR could be a potential alternative and they would like to have more information.

The participatory approach presented below is not an end in itself. It must be a means for citizens to learn about water and to define together the future conditions for the implementation WWR projects, when relevant. The purpose of opening up spaces for dialogue is not to make WWR accepted but rather to make it appear as one option in the prime space. Our work as researchers is to evaluate the effect of participatory processes on social representations and not to encourage the implementation of WWR projects in the territory.

Experimental setup for participatory communication

The experimental setup is currently being implemented. We do not have sufficient hindsight to present the results of this approach. Nevertheless, we will share a first feedback on the difficulties encountered during its design and implementation. The pitfalls encountered stem from the reconciliation of operational and research objectives to the difficulties inherent in the organisation of the participatory process itself.

The interest and difficulties of implementing participatory action research have been widely researched in the literature (Reason & Bradbury, 2008). Along this line, we have favoured the anchoring of our work in a local reality to the detriment of a control of all the variables of our experimentation. The main

difficulty in our case is the reconciliation of operational and research objectives. Some want to communicate on the project while others are setting up a research project.

This negotiation between research and operations cannot end with a simple juxtaposition of tools that would encompass the researcher applying a monitoring and evaluation approach to the defined communication strategy. Effective participation requires the opening of the decision-making space and transparency in the information disseminated. This therefore leads to changes in the very functioning of the project and its decision-making process.

Discussions were therefore held with the partners on a common definition of participation and co-decision. The latter could lead to the refusal to set up a WWR project in the territory. Some partners modified their utilitarian vision of the humanities and social sciences during the discussions. At the beginning, the presence of humanities and social sciences in the Read'Apt project was seen as a way to legitimize a socio-technical approach.

However, the space for dialogue and decision-making is limited to WWR. This was primarily the funding partner's request. The main reason, however, is the lack of political will to open up the discussion to water resources management more broadly. Such a participatory ambition would challenge the current institutional approaches to water management in Calavon and Lague. The consultation mechanisms in place involve various actors in a form of representative democracy since citizens are represented through their elected representatives or environmental associations but without direct interaction with them. The opening of a participatory approach on water and not focused on WWR would call into question the work carried out in these bodies. This is considered as not politically desirable at the moment.

The setup of a participatory action research approach requires a significant amount of time which should not be neglected. Timescales issues are frequently cited as a difficulty in cooperations between economic actors and researchers. Economic actors often require a faster operability of the research results than researchers are able to provide. The current project experienced timescales issues, but of different nature. It is researchers who stressed partners to be more responsive in the field. The participatory process on WWR is not considered as a priority for the territory. It sometimes struggles to find its place on actors' agenda.

The pace of the research project is therefore imposed by the field and the partners. This requires flexibility and a high degree of adaptability. In our case, we have made sure to allow sufficient time between the various stages of the process. This allowed us to implement alternative solutions without distorting the steps of the experimental setup. For example, the website (information phase) was made available online 1.5 months later than initially planned. This was due to administrative and content validation difficulties. The site was still able to be released 15 days before the date of the public meeting (consultation phase).

Finally, the organization of a participatory action research process leads researchers to play different roles: designer, facilitator, observer and evaluator. These roles can overlap and be assigned to the same person. It is therefore essential to carry out reflective work on the researcher's place in the process in order to estimate his influence. To facilitate this reflexivity, we ensured that the observer researcher who observed the process did not also facilitate the participatory workshops. A project partner facilitated the public meeting while a senior researcher facilitated the consultation and co-decision workshops.

Discussion

Social acceptability is not an easy question to address in a participatory research approach in communication sciences. We have the impression of constantly walking a fine line that we denounce, acceptology⁵.

Talking about the problem rather than a solution would allow to move away from this fine line. Rather than talking about WWR, ethically we should have opened a broader dialogue around drought and possible actions to be taken. WWR would then be one alternative among others.

This option was quickly eliminated so as not to jeopardize the ongoing water management efforts. It was neither the objective of the partners nor that of the donor to open such a reflection. In addition, such a participatory process would take longer than the 3 years of a doctorate. It would require strong political support to integrate citizen action proposals in institutional planning processes.

First, we moved away from the notion of acceptability to the question of social feasibility. Currently, feasibility studies for WWR in France only include technical and economic components. The Social Site Characterisation approach resulting from CO2 storage projects seems to be adapted to other environmental issues to measure the social feasibility of a project. It allows exploring social issues linked to WWR and taking them into account before a development decision is made, rather than considering them as an objective to be achieved.

The methodological proposal presented here seeks to couple scientific questions with a territorial reality. On the one hand, we question the effects of participatory communication setups on perceptions of WWR. On the other hand, we seek to open spaces for dialogue to bring out an alternative in the prime space.

Communication researchers sometimes underestimate the challenge of implementing conceptual strategies and models outside a laboratory, especially at the scale necessary to observe significant changes in public opinion and public policy. In our experimentation, the challenge is to distinguish between changes resulting from the process and those related to the environment. We also need to accept that a total capture of all the social interactions linked to our process is not possible. Most of them will take place outside the planned arenas.

⁵ « Acceptology is the art of making others accept what they do not want to accept - in other words, making recalcitrant people swallow the pill, making the unacceptable pass through » translated from Chateauraynaud, 2013

References

- Angelakis, A. N., Asano, T., Bahri, A., Jimenez, B. E., & Tchobanoglous, G. (2018). Water Reuse: From Ancient to Modern Times and the Future. *Frontiers in Environmental Science*, 6.
- Barbier, R. (2009). Le buveur d'eau et le recyclage des eaux usées. *Espaces et sociétés*, 4(139), 107-121.
- Barbier, R., & Nadaï, A. (2015). Acceptabilité sociale : partager l'embarras. *VertigO - la revue électronique en sciences de l'environnement*, 15(3).
- Barraqué, B. (1985). L'évolution de la problématique de l'assainissement au XXe siècle : hygiène, confort, environnement (Commentaire). *Sciences sociales et santé*, 3(2), 103-109.
- Baumann, D. D., & Kasperson, R. E. (1974). Public acceptance of renovated waste water: Myth and reality. *Water Resources Research*, 10(4), 667-674.
- Bessette, G. (2007). *Eau, terre et vie: communication participative pour le développement et gestion des ressources naturelles*. Paris Québec: L'Harmattan Presses de l'Université de Laval CRDI.
- Birkhoff, J. (2003). Community conflict over water reuse. Perspectives from conflict analysis and resolution. Appendix C. In *Water reuse. Understanding public perception and participation* (IWA Publishing). Alexandria, Virginia, USA: T. W. Hartley.
- Brunsting, S., Pol, M., Mastop, J., Kaiser, M., Zimmer, R., Shackley, S., ... Rybicki, C. (2013). Social Site Characterisation for CO2 Storage Operations to Inform Public Engagement in Poland and Scotland. *Energy Procedia*, 37, 7327-7336.
- Bulkeley, H. (2000). Common knowledge? Public understanding of climate change in Newcastle, Australia. *Public Understanding of Science*, 9(3), 313-333.
- Chateauraynaud, F. (2013). La radicalité est-elle soluble dans l'argumentation ? La sociologie des controverses et l'endogénéisation de la critique sociale. Présenté in « Pourquoi la controverse ? Définitions, enjeux et méthodes », Université de Liège.
- C.I.Eau. (2018). *Les français et l'eau. Baromètre 22ème édition*.
- Claeys-Mekdade, C. (2003). *Le lien politique à l'épreuve de l'environnement: expériences camarguaises*. Bruxelles: PIE-P. Lang.
- Condom, N., Lefebvre, M., & Vandome, L. (2012). *Treated wastewater reuse in the Mediterranean: lessons learned and tools for project development*. Valbonne: Plan bleu.
- Dolnicar, S., Hurlimann, A., & Nghiem, L. D. (2010). The effect of information on public acceptance – The case of water from alternative sources. *Journal of Environmental Management*, 91(6), 1288-1293.
- Dryzek, J. S. (2010). *Foundations and Frontiers of Deliberative Governance*. Oxford: Oxford University Press.
- Egan Sjölander, A., Nordlund, A., Fick, J., & Jansson, S. (2018). The multiple meanings of water: wastewater treatment and reuse seen from a communication perspective. In *7th European Communication Conference (ECREA)*. Lugano, Switzerland.
- FAO (Éd.). (2012). *Coping with water scarcity: an action framework for agriculture and food security*. Rome: Food and Agriculture Organization of the United Nations.
- Fernandez, R. J. (2016). How to be a more effective environmental scientist in management and policy contexts. *Environmental Science & Policy*, 64, 171-176.
- Fielding, K. S., Dolnicar, S., & Schultz, T. (2018). Public acceptance of recycled water. *International Journal of Water Resources Development*, 1-36.
- Fielding, K. S., & Roiko, A. H. (2014). Providing information promotes greater public support for potable recycled water. *Water Research*, 61, 86-96.
- Freire, P. (1970). *Pedagogy of the oppressed*. Herder and Herder.

- Geipel, J., Hadjichristidis, C., & Klesse, A.-K. (2018). Barriers to sustainable consumption attenuated by foreign language use. *Nature Sustainability*, 1(1), 31-33.
- GEO. (1983). Calavon - La Rivière assassinée. *GEO*, (50).
- Goodwin, D., Raffin, M., Jeffrey, P., & Smith, H. M. (2017). Evaluating media framing and public reactions in the context of a water reuse proposal. *International Journal of Water Resources Development*, 0(0), 1-21.
- Harris-Lovett, S. R., Binz, C., Sedlak, D. L., Kiparsky, M., & Truffer, B. (2015). Beyond User Acceptance: A Legitimacy Framework for Potable Water Reuse in California. *Environmental Science & Technology*, 49(13), 7552-7561.
- Hartley, T. W. (2006). Public perception and participation in water reuse. *Desalination*, 187(1-3), 115-126.
- Hurlimann, A., Dolnicar, S., & Meyer, P. (2009). Understanding behaviour to inform water supply management in developed nations – A review of literature, conceptual model and research agenda. *Journal of Environmental Management*, 91(1), 47-56.
- Jansen, H. P., Stenstrom, M. K., & de Koning, J. (2007). Development of indirect potable reuse in impacted areas of the United States. *Water Science and Technology*, 55(1-2), 357-366.
- Jiménez, B., & Asano, T. (2008). Water reclamation and reuse around the world. In *Water Reuse: An International Survey of current practice, issues and needs* (B. Jiménez and T. Asano, eds, Vol. 7, p. 3-26). London: IWA Publishing.
- Latour, B. (1987). *Science in Action, How to Follow Scientists and Engineers through Society*. Cambridge, Massachusetts: Harvard University Press.
- Lazarova, V., Asano, T., Bahri, A., & Anderson, J. (2013). *Milestones in Water Reuse*. London: IWA Publishing.
- Leibowitch, E. (2019, mars 22). Les eaux usées bientôt recyclées [Interview]. *Le 12-14*. France Info.
- Marks, J. S. (2006). Taking the public seriously: the case of potable and non potable reuse. *Desalination*, 187(1), 137-147.
- McNie, E. C. (2007). Reconciling the supply of scientific information with user demands: an analysis of the problem and review of the literature. *Environmental Science & Policy*, 10(1), 17-38.
- Mekonnen, M. M., & Hoekstra, A. Y. (2016). Four billion people facing severe water scarcity. *Science Advances*, 2(2).
- Menegaki, A. N., Mellon, R. C., Vrentzou, A., Koumakis, G., & Tsagarakis, K. P. (2009). What's in a name: Framing treated wastewater as recycled water increases willingness to use and willingness to pay. *Journal of Economic Psychology*, 30(3), 285-292.
- Moscovici, S., & Buschini, F. (Éd.). (2003). *Les méthodes des sciences humaines*. Paris, France: Presses universitaires de France.
- Munos, M. (2019, mars 22). Bernard Barraqué : « On va aller vers une réutilisation des eaux usées [...] mais cela coûte très cher » [Interview]. *L'invité de 6h20*. France Inter.
- Noury, B., Garin, P., Montginoul, M., & Campardon, M. (2019). Water reuse in France - Social perception of an unknown practice. Presented at 12th IWA International Conference on Water Reclamation and Reuse. "Overcoming Water Stress by Water Reclamation and Reuse", Berlin.
- Owens, S., & Drifill, L. (2008). How to change attitudes and behaviours in the context of energy. *Energy Policy*, 36, 4412-4418.
- Po, M., Kaercher, J. D., & Nancarrow, B. E. (2003). *Literature Review of Factors Influencing Public Perceptions of Water Reuse* (Technical report No. 54/03) (p. 44). CSIRO. Consulté à l'adresse

- Price, J., Fielding, K. S., Gardner, J., Leviston, Z., & Green, M. (2015). Developing effective messages about potable recycled water: The importance of message structure and content. *Water Resources Research*, 51(4), 2174-2187.
- Quéré, L. (2014). Le modèle esthétique de la communication de John Dewey. Présenté à Communication, culture et communauté. L'Ecole de Chicago en débat, Universidade Lusofona do Porto (Portugal).
- Reason, P., & Bradbury, H. (Éd.). (2008). *The Sage handbook of action research: participative inquiry and practice* (2nd ed). London ; Thousand Oaks, Calif: SAGE Publications.
- Relat, Y. (2019, mars 31). Les eaux usées, ce trésor caché [Reportage]. *le journal de 20h*. France 2.
- Seguin, L. (2016). Effet d'engagement des acteurs et support de réflexivité : L'exemple d'une conférence de citoyens sur l'eau. *Éducation relative à l'environnement. Regards - Recherches - Réflexions*, (Volume 13-1).
- Smith, H. M., Brouwer, S., Jeffrey, P., & Frijns, J. (2018). Public responses to water reuse – Understanding the evidence. *Journal of Environmental Management*, 207, 43-50.
- The 2030 Water Resources Group. (2009). *Charting our water future - Economic frameworks to inform decision-making* (p. 198).
- Unesco (Éd.). (2017). *Wastewater: the untapped resource*. Paris: UNESCO.
- Wesselink, A., Buchanan, K. S., Georgiadou, Y., & Turnhout, E. (2013). Technical knowledge, discursive spaces and politics at the science-policy interface. *Environmental Science & Policy*, 30, 1-9.
- World Bank. (2018). *Water Scarce Cities: Thriving in a Finite World—Full Report* (p. 277). Washington, DC.: World Bank.
- Zask, J. (2011). *Participer : Essai sur les formes démocratiques de la participation*. Lormont: Editions Le Bord de l'eau.