

Article

# Re-Staging *La Rasgioni*: Lessons Learned from Transforming a Traditional Form of Conflict Resolution to Engage Stakeholders in Agricultural Water Governance

Maria Laura Ruiu <sup>1,2,\*</sup>, Sante Maurizi <sup>1,3</sup>, Simone Sassu <sup>4</sup>, Giovanna Seddaiu <sup>1,5</sup>, Olga Zuin <sup>6</sup>, Chris Blackmore <sup>7</sup> and Pier Paolo Roggero <sup>1,5</sup>

<sup>1</sup> Nucleo Ricerca Desertificazione, University of Sassari, 07100 Sassari, Italy; maurizis@gmail.com (S.M.); gseddaiu@uniss.it (G.S.); pproggero@uniss.it (P.P.R.)

<sup>2</sup> Department of Social Sciences, Northumbria University, NE1 8ST Newcastle upon Tyne, UK

<sup>3</sup> Cinearena, 07100 Sassari, Italy

<sup>4</sup> Honorary Magistrate, Public prosecutor, Prosecutor's Office of Sassari, 07100 Sassari, Italy; simonesassu@yahoo.it

<sup>5</sup> Dipartimento di Agraria, University of Sassari, 07100 Sassari, Italy

<sup>6</sup> Baltic 2030 Unit, Council of Baltic Sea States Secretariat, 103 11 Stockholm, Sweden; z-olga@hotmail.com

<sup>7</sup> Applied Systems Thinking in Practice Group, School of Engineering and Innovation, The Open University, MK7 6AA Milton Keynes, UK; chris.blackmore@open.ac.uk

\* Correspondence: marialauraruiu@gmail.com; Tel.: +39-3288346166

Academic Editors: Tim Smith and Arjen Y. Hoekstra

Received: 20 November 2016; Accepted: 17 April 2017; Published: 22 April 2017

**Abstract:** This paper presents an informal process inspired by a public practice of conflict mediation used until a few decades ago in Gallura (NE Sardinia, Italy), named *La Rasgioni* (The Reason). The aim is twofold: (i) to introduce an innovative method that translates the complexity of water-related conflicts into a “dialogical tool”, aimed at enhancing social learning by adopting theatrical techniques; and (ii) to report the outcomes that emerged from the application of this method in Arborea, the main dairy cattle district and the only nitrate-vulnerable zone in Sardinia, to mediate contrasting positions between local entrepreneurs and representatives of the relevant institutions. We discuss our results in the light of four pillars, adopted as research lenses in the International research Project CADWAGO (Climate Change Adaptation and Water Governance), which consider the specific “social–ecological” components of the Arborea system, climate change adaptability in water governance institutions and organizations, systemic governance (relational) practices, and governance learning. The combination of the four CADWAGO pillars and *La Rasgioni* created an innovative dialogical space that enabled stakeholders and researchers to collectively identify barriers and opportunities for effective governance practices. Potential wider implications and applications of *La Rasgioni* process are also discussed in the paper.

**Keywords:** co-researching; dairy farming; ecosystem perception; systemic governance; governance learning; irrigation; knowledge co-production; nitrate pollution; social learning; stakeholders; theatre

## 1. Introduction

This paper describes and evaluates the design and trial of an innovative approach to reconciling disputes over both access and management of natural resources that was inspired by *La Rasgioni* (Phonetics: [La Raʒioni]) (“The Reason”), a traditional local practice of peaceful dispute resolution that existed in Gallura (a province located in the north-east of Sardinia, Italy) until a few decades ago

(Box 1). The modern-day *La Rasgioni* process was part of a long-term participatory scheme adopted to address agricultural water management in a Mediterranean nitrate-vulnerable zone, the Arborea district (Oristano, central Sardinia, Italy), which is described and analyzed below. It was also one of three international learning events of the international CADWAGO research project. The CADWAGO (Climate Change Adaptation and Water Governance) project, with the aim of reconciling food security, renewable energy, and the provision of multiple ecosystem services, was led by the Stockholm Environment Institute from 2013 to 2016 and involved a consortium of researchers mainly from Sweden, Italy, the United Kingdom, the Netherlands, Australia, and Canada who had all previously worked on water governance. The process and outcomes of the trial are therefore interpreted in this paper using the multi-perspective and interdisciplinary approach that was framed by the CADWAGO project [1]. The lessons learned from this interpretation are detailed and discussed.

**Box 1.** La Rasgioni in Gallura, Sardinia.

Traditionally, *La Rasgioni* was used as a public mediation process for reconciling two parties whenever a conflict, often regarding property or livestock, could not be solved in other ways. Five people were involved in the process of reconciliation: two *Alligadori* (lawyers) who represented the interests of each party; three *rasgiunanti* (judges: two nominated by each side, and the *omu di mezu*, arbiter, chosen by both). Once the *Alligadori* had presented their speeches, the *rasgiunanti* examined relevant documents and afterwards were called to pronounce their final verdict. Two solutions were possible: *dizisa* if the request of one of the parties was accepted; or *arrangiu* when a compromise solution was suggested. Everyone could attend the debate, thus turning private conflicts into collective public events in order to create learning opportunities for the whole community [2]. “*La Rasgioni* aimed not only to solve disputes quickly and peacefully, but primarily to restore the pre-existing relationships negatively affected by the conflict, thus preserving the community cohesion” [3].

This paper aims to reflect on the process through which “a change in understanding ( . . . ) goes beyond the individual” [4] and favorable conditions for both learning and developing shared visions [5] are created “through social interactions between actors within social networks” [4].

The overall hypothesis discussed in this paper is that agro-environmental conflicts often arise because of the contrasting perspectives on issues of interdependent stakeholders [6], e.g., of particular relevance to this case, entrepreneurs complaining about public resource mismanagement, contrasts with public authorities applying a command-and-control paradigm to collective natural resource management who assume that people are not acting to protect their resources because they lack the necessary knowledge and understanding [7]. In such situations, the conventional paradigm of producing new scientific knowledge through experimental research to be transferred to users via advisory services aiming to achieve ideal states has been proven to be ineffective [8]. Instead, integrated approaches based on social learning theories and focusing on sustainable transformation processes rather than on sustainable states have generated trust and conducive situations for a change in the understanding of the nature of the issues involved. This change in understanding is a prerequisite for a change in practice [5,6]. This means that the introduction of “new sustainable” practices tends to be facilitated by the adoption of participatory approaches aimed at generating “collective knowledge”. Following this approach, the participation of all the stakeholders is considered vital throughout the entire process of research, because they are active producers of knowledge rather than final “passive receivers” of recommendations. As a consequence of both participating in and understanding all phases of the process, our experience suggests that these stakeholders will be more likely not only to better understand the nature of the problems, but also to put into practice the changes needed. Combining the grounded evidence of action research practice with the power of artistic creativity in generating conducive situations has been shown, in some situations, to help ease the tensions among interdependent stakeholders and provide ideal pre-conditions for the emergence of new learning opportunities for addressing complex issues [9–11].

The long-term participatory scheme that contextualized the modern-day *La Rasgioni* process described and discussed in this paper involved some eight years of participatory co-researching to

identify viable options to mitigate nitrate pollution of groundwater in a highly intensive dairy farming area classified as a nitrate-vulnerable zone by the EU Nitrates Directive (ND). The process was also contextualized in the CADWAGO project, which acted as a catalyst for a “critical learning event” in the community of Arborea, inspired by *La Rasgioni*, and initiated and designed by the research team of the University of Sassari. This event had two main objectives:

- (i) to explore the potential of a creative re-interpretation of the traditional local practice to mediate environmental conflicts and controversies and to facilitate governance learning between representatives of formal institutions and of farmers’ interest in the context of agricultural water governance;
- (ii) to explore how the outcomes deriving from this new process, interpreted through the lenses of the CADWAGO project framework, could help to identify barriers and generate opportunities from enhanced governance learning.

## 2. Conceptual Framework and Background

The main conceptual framework discussed in this paper is that of the CADWAGO project, based on four pillars (perceived ecosystems, institutions and organizations, systemic governance practices, and governance learning), employed together as research lenses [1]. The first three pillars were applied in the project to case studies, whereas the governance learning lens was of a different nature, emerging at the meta-level of the project and with a focus on not just the cases but also on co-learners who worked with the project researchers to consider European water dilemmas [12]. The first pillar was used to consider the “Ecological Components of Ecosystems”, as perceived by local stakeholders. In this Arborea case, the intent was to analyze the water resource system by integrating different systems of interest. The knowledge and perspectives of local stakeholders concerning ecosystem processes were considered in order to identify what they perceive to be either barriers or opportunities to systemic and adaptive governance in the face of climate change [6–13]. The second pillar—climate change adaptability in water governance institutions and organizations—was used to reflect on the institutional landscapes and governance environments involved in the definition and resolution of water-related issues. It also considered how these landscapes and environments hinder and support systemic and adaptive water governance in the context of climate change [14]. The third pillar concerned systemic governance practices, where existing praxis (theory-informed practice), as well as new forms of praxis, are analyzed with the aim of investigating how systemic and adaptive water governance can be enabled in the context of climate change [15–17]. The fourth pillar, governance learning, worked with the meta-level outputs of the other three pillars, or research lenses, and tried to reflect on the most effective ways to translate the results into tools for social learning with the aim of promoting positive change in the governance system. Overall, the scope of the research was to investigate water governance-related issues by acknowledging their uncertain and controversial contexts, determined by a multiplicity of interacting factors such as unpredictable climate fluctuations, fragile environmental balances, and socioeconomic conflicts.

In this paper the contributions of the *La Rasgioni* event and its context are considered one of the CADWAGO project’s three international governance learning events; therefore, the governance learning research lens was considered of particular relevance [12]. Governance learning in CADWAGO (and more concretely in the context of *La Rasgioni*) was conceptualized as an interactive co-production process that drew on “theoretical and applied literature on ( . . . ) how change processes for adaptation and sustainability can be facilitated and enhanced through governance learning and co-production of knowledge” [12] (see paragraph 4.1). Rather than focusing on “individual learning” from others [18], we adopted a definition of social learning that is based on collective or “concerted” learning, aimed at creating shared visions [5] and outcomes not only in terms of “technical qualities” but also “relational qualities” [19]. Specifically, given that a need for a shift from one-directional decision-making towards dialogical, iterative, flexible, transparent, and decentralized practices in the context of water management is generally recognized by scholars (e.g., [19]), we aimed to contribute towards producing

new insights in terms of how participative processes can be framed for actively involving different constellations of stakeholders. Following Pahl-Wostl et al. [20], the social learning process “takes place in a natural/technical and a social (institutional, cultural) context”. This conceptualization of social learning as a process to be “contextualized” is similarly reflected in our adoption of the four CADWAGO pillars, which simultaneously consider the specific “social-ecological” components of the Arborea system, climate change adaptability in water governance institutions and organizations, Systemic Governance (relational) Practices, and Governance Learning. Through the lens of social learning, systemic governance practices and learning are interpreted as multi-stakeholder learning processes that “if adequately conducted, open space for people—including scientists and policy makers—to speak about their assumptions, values, and norms so that decisions become based less on the defense of autonomous interests and hidden meaning and more on appreciation of the interdependency of collective interests” [7]. Further details of how this framework was used and the insights that emerged are provided in the discussion.

The research tradition of the long-term participatory scheme also has a wider conceptual framework that is complementary to and enhanced by the CADWAGO project’s conceptual framework. It is discussed elsewhere [21], but it is important to recognize that it values co-researching with multiple stakeholders. Of particular relevance to the overall scheme in Arborea is the study of collaborative management systems, which offer a number of classifications and interpretations of specific segments of the participatory process [22]. Some scholars have classified the increasing number of collaborative management approaches in order to compare the effectiveness of each method in relation to the issues investigated [23,24]. Others have focused on identifying criteria to evaluate the effects produced by collaborative natural resource management [25,26]. Further studies have explored approaches to identifying stakeholders in environmental management [27]. What these studies have in common is the key role of participative processes for engaging stakeholders in governance systems, trying to attribute them the same weight. Another lesson emerging from the literature is the mediating role played by research [28] when it comes to enabling dialogue between different parties. Following this line, this paper bases its premises on the assumption that research contexts are potentially capable of creating favorable conditions for stakeholders belonging to different governance scales and sectors to gather and start dialogical processes, when researching modalities are purposefully designed. Secondly, within the research environment, capacity is held for facilitating these types of interactions and boosting participatory processes. Thirdly, researchers are capable of conducting meta-analysis on the outcomes of these processes in order to synthesize the lessons learned and feed back to the engaged actors, thus promoting the development of new knowledge, awareness raising, and enhancing democratic approaches for the solution of water-related dilemmas.

### 3. Approach and Methodology

#### 3.1. The Context of *La Rasgioni*

The event of *La Rasgioni* was part of a long-term participatory action research process adopted to address agricultural water management in a Mediterranean nitrate-vulnerable zone, the Arborea district (Oristano, central Sardinia, Italy). The Arborea district can be described as a “complex, uncertain and controversial system” due to a multiplicity of inter-related interests, mainly concerned with economic activities (such as tourism, agriculture, dairy cattle production, fishing, etc.), which caused conflicts for accessing and managing natural resources and uncertain consequences for the environment (Box 2). Researchers investigated the case study, adopting a long-term and cross-disciplinary approach, recognizing the need to account for a multi-perspective and continuative process, in this case water- and agricultural-related, in order to adequately understand the context and changes of understanding and practice [29–31]. During the research process, researchers were directly involved in “community life” by actively participating in a number of local events (spontaneously or invited by the local community), such as public debates and local festivals. Active participation in these

activities proved significant for increasing local stakeholders' trust in scientists. This is also confirmed by the fact that some farmers provided pieces of their land as sites for experiments. The result was an articulated picture of Arborea's social system, which provided the basis for the development of the methodology underlying *La Rasgioni* event (Box 2).

**Box 2.** Arborea case study.

In the 1930s the land was drained and reclaimed for agricultural production, mainly of irrigated crops, and assigned to rural families coming from other regions of Italy, primarily from Veneto (NE) [32,33]. Nowadays, the dominant activity is dairy farming, with 150 dairy cattle farms rearing some 30,000 cattle. The farms are organized in a cooperative system on 6000 ha of irrigated lowland. Irrigation is provided through infrastructure built downstream: the Eleonora d'Arborea dam, built in 1920. At that time, it was the largest reservoir in Europe, now with extended capacity up to some 800 Mm<sup>3</sup> of freshwater, delivering irrigation water to a potential of some 1000 km<sup>2</sup> agricultural fields through the Oristanese Land Reclamation Consortium. However, for a variety of reasons, only 35% of the land served by the irrigation infrastructures does exploit the potential of the irrigation system, which is mainly used [34] to grow rice, silage maize, forage, and horticultural crops. Given the geographical position of Arborea, directly connected to the salty sea, the land needs to be constantly drained in order to maintain the status quo of the landscape and, consequently, of agricultural practices. The pumping station, built in 1931 during Fascism, with its five electric engines pumping up to 3000 L s<sup>-1</sup>, reminds the local community of the efforts of their forefathers to provide a better future for what is now the present generation [35]. Besides dairy farming, several other activities take place in the area, including agriculture, agro-food industry, fishing, and tourism, mainly attracted by the wetlands and their ornithological biodiversity. A system of natural shallow brackish wetlands still exists in the area between the reclaimed land and the seashore, some of which are declared Sites of Community Interest according to EU Directive 92/43/EEC and Ramsar sites under the Convention on Wetlands of International Importance, which are threatened by increasing temperature and eutrophication [36].

The adoption of the EU nitrates directive in 1991 and its related monitoring system brought water pollution to the attention of the Arborea farmers' community, which until that point did not perceive its stake in the environmental issue. With the implementation of the directive, however, Arborea began to perceive a real threat of damage the image of the local high-quality dairy industry, and started to increase local environmental awareness. Another issue of complaint raised by the local farmers is the inefficient management of the Nitrate Directive implementation, which resulted in delay in compliance at an institutional level (regulations were applied only in 2005), but required farmers to adjust rapidly to new regulations. Restrictions were imposed on animal effluent management, which forced farmers to build manure containers, which resulted in increased costs for dairy farmers already facing a multi-year crisis of milk prices, feedstuff, and mineral fertilizers. In this scenario, the crisis is intensified by climate change, which not only undermines farmers' knowledge of climate prediction, but also threatens cow mortality, fertility, and productivity, as well as crop production and the spread of diseases due to increasingly frequent summer heat waves [37].

The majority of local people in the Arborea district are members of at least one of the four cooperatives that work in the area. The 3A and the Farmers' Cooperatives involve some 200 livestock farmers and horticulture crop farmers; the Fishermen Cooperative involves more than 100 fishermen from the local and neighboring areas; the Bank Cooperative involves savers and investors. The local implementation of the EU Nitrate Directive was expected to satisfy fishermen's needs to reduce fish diseases and mortality and the eutrophication of water, and to improve surface and groundwater quality [38]. However, the lack of involvement of local professionals in the decision-making process and the lack of awareness-raising anticipating the enforcement of the ND resulted in unpreparedness of farmers for the implementation process, which translated into a crisis in the local system [21]. The farmers, in fact, did not perceive their role in the un-sustainability of the system management, or did not feel that the issue affected their own livelihood. A participatory action research process started in 2008 [21–37] and involved interdisciplinary teams composed of agronomists, economists, animal scientists, meteorologists, and social scientists. This research pathway was able to consolidate a long-term trust relationship between researchers and local stakeholders [38–42] and revealed asymmetries between the effective cooperation among livestock farmers and the fragmentation of competences and actions among the public institutional actors in the same catchment. Moreover, following the implementation of the Nitrate Directive, the initial tension between farmers and



fishermen came to also include policy-makers in different positions in the governance system. The European legislators were “accused” of enforcing regulations perceived as top-down and not considering local contexts; the national governments were blamed for promoting controversial policies, supporting agricultural development and, hence, intensification on one side, and environmental protection hence reduced land exploitation on the other; the regional boards were criticized for the lack of awareness raised among the local population despite the long time span between the publication of the Nitrate Directive in 1991 and its implementation (2005) [38]. As a result, the eutrophication of the wetlands surrounding the Arborea District is still an unsolved problem and Nitrate Directive implementation also resulted in a loss of income for dairy farmers. In addition, the delay in regional economic compensations for supplying the economic damage deriving from mass fish death increased this tension [38].

### 3.2. *La Rasgioni* Event

*La Rasgioni* represented the last of three CADWAGO international governance learning events, and took place on the occasion of the final Conference of the CADWAGO International Research Project (15 October 2015, Arborea, OR, Italy). The event was designed to provide a unique opportunity for the local stakeholders to publicly tell their stories and the reasons informing their practice, in front of a team of scientists willing to understand the nature of the issues and provide critical reflections. *La Rasgioni* was also conceived, following a theatrical format derived from the local tradition, to provide the CADWAGO team with a short but authentic illustration of the complexity of the local situation through the lens of the CADWAGO framework.

According to these premises, *La Rasgioni* was articulated as follows: (i) identification of the nature of the local disputes; (ii) gathering of information for implementing a process of “negotiation”; (iii) active involvement and empowerment of stakeholders in preparation for negotiation; (iv) creation of a space for dialogue between conflicting parties; and (v) definition of shared options for future improvements.

A broad spectrum of stakeholders and actors from different sectors and governance levels were identified through a series of semi-structured interviews with representatives of institutions, private companies, local cooperatives, and environmental movements operating in Arborea.

A total of 12 interviews were video recorded (see Table 1). The interviews for the representatives of institutions were focused on two questions: (i) from your perspective and professional context, what are the priorities for the management, distribution, and quality of water? (ii) which modalities and measures would be useful to address such issues in the short, medium, and long term? The questions for representatives of entrepreneurs and NGOs were three: (i) Do you, personally and as an enterprise, feel constrained by the current laws and regulations about the management, distribution, and quality of water? (ii) Thinking about the water system, do you or your enterprise feel constrained by other productive activities or by the behavior of other actors in the area where you operate? (iii) If you were God, what priorities would you set in the short, medium, and long period? The video of the interviews was edited in order to get a short introduction of the various positions by topic, leaving the final word to entrepreneurs and NGOs about priorities to be addressed in the future.

The aim of these preliminary interviews was threefold: (i) identifying the main causes of the local “disputes”; (ii) identifying additional actors involved in water management in Sardinia to be involved in the *La Rasgioni* event; and (iii) gathering information to introduce the public mediation process at the event.

All the interviewees, as well as the other actors identified in the interview phase, were invited to actively participate in the *La Rasgioni* event in Arborea. Additional representatives of the organizations and institutions interviewed, representatives of local environmental movements, and the mayor of Arborea were identified as actors to be invited to the *La Rasgioni* event. In addition to representatives of institutions and agencies that operate at the community, provincial, and regional levels, local actors who deal directly with water-related issues were involved. They mainly belonged to the cooperatives

that work in the Arborea district (Cooperativa 3A, Cooperativa Produttori Arborea, and Cooperativa Pescatori Arborea). Moreover, the mayor of Arborea took part in the trial as a representative of the institutions who could give an additional point of view on local water-related criticisms. These participants were identified as the main actors who deal with water-related issues according to the activities implemented in the area (dairy cattle and fishing) that produce impacts on water resources.

Before starting the *La Rasgioni* process, “The song of Arborea” [43], specifically written for the event, was performed by a professional singer. The song told the story of Arborea, characterized by cultural and identity issues running parallel to economic and environmental ones, and described the current challenges for Arborea. Afterwards, a video [44] presenting the interviews was shown. These introductory moments aimed to create a relaxed context for the participants as well as for the audience, and to immerse participants in the issues at stake (context immersion). Afterwards, the *La Rasgioni* process was briefly described by the moderator, playing the role of *Omu di mezzu*, who introduced the event and the participants.

“The *Rasgioni*: the water court” was structured as follows:

*Omu di mezzu* (judge): role played by a real judge

*Rasgiunanti* (jury): 40 researchers of the CADWAGO project.

*Alligadori* of institutions (lawyer): a researcher from the University of Sassari.

*Alligadori* of farmers, private companies, and environmental movements (lawyer): a researcher from the University of Sassari.

*La Rasgioni* followed a four-phase scheme: after an introduction by the *Omu di mezzu*, the two *Alligadori* highlighted the positions of their respective parties. Then, the *Omu di mezzu* asked the *Alligadori* to report the statements of their witnesses. Witnesses were also asked to reveal how their interests were affected by their counterpart. Finally, the two *Alligadori* made closing statements. The role of the two *Alligadori* was to introduce stakeholders and their motives and stakes in the “process,” to emphasize the “core arguments” that emerged from each testimony, and to deliver the closing arguments. The international participants of the CADWAGO project played the role of the “external jury” and expressed an independent, external point of view based on the public debate they attended. At the end of the dispute, following the old tradition, everyone was invited by the *Omu di mezzu* to join the dinner offered by the farmers’ cooperatives. During dinner the *Omu di mezzu* and the *Rasgiunanti* wrote the “final verdict,” whereas the other participants continued to discuss the issues that arose during the event. This format was designed to create a friendly atmosphere despite the conflicting parties and encourage the shared acceptance of the verdict (see Appendix A for more details of the event script). The choice of an “external jury” made up of international researchers was twofold: giving participants an “external” perspective on their “disputes”; and giving them some “fresh” ideas about how to tackle “water-related disputes”, as suggested by experts in the sector. In contrast with the original scheme, we excluded local actors from the jury in order to avoid potential additional conflicts deriving from the consolidated perspectives of local actors about how to solve the problem. However, the verdict was conceived as an additional “mediating object” to trigger further discussion even after the event was concluded.

After dinner, the final verdict produced by the jury was publicly read to the participants and the Arborea song closed the event.

*La Rasgioni* scheme was intended to create a “public arena” in which local actors, practitioners, and researchers were involved in a process of mutual exchange and learning. The proposed trial aimed to create a platform of dialogue between policy-makers and local actors through the mediation of scientists (who played the role of lawyers in the trial). This approach differs from that taken by Laing and Wallis in their action research [44], which aimed to construct a capacity-building initiative in which policy-makers and scientists dialogue in a setting similar to an actual policy-making process within government or industry. However, in line with their study, *La Rasgioni* reflects on the dramaturgical expedient as a tool for creating a “comfortable” setting for different types of actors, aiming to produce “shared” solutions. At the same time, some reflections on the “authenticity” of the expedient are needed

to highlight both the opportunities and the drawbacks of the method. In fact, as shown by Hajer [45], the “public becomes what the setting makes it,” and this indicates that the ways in which the setting is constructed influence the outcomes of the process in terms of new insights and new ideas. On the one hand, the adoption of a “theatrical” scheme (pre-framed by scientists and artists), which attributes specific roles to the participants, lawyers, judge, and jury, might somehow affect the “genuineness” of the stakeholders’ “performances”. On the other hand, the theatrical framework was interpreted as a useful tool for creating an “informal” and “friendly” exchange, simultaneously informed by “real” content related to “real problems”. Although the long-term involvement of the researchers in studying the local context might have “influenced” the “neutrality” of the trial, the steady dialogue between scientists and the local community also represented a further resource for facilitating the “construction” of the “participatory scheme” informed by previous findings.

**Table 1.** Competences and roles of the institutions and organizations interviewed.

Interviewees	Organization/Institution	Competences/Roles
Representatives of ARDI	Regional Agency of the Hydrographical District	Technical and operational role for protecting water ecosystems and for water-related policy measures at the regional scale.
Representatives of ENAS	Sardinian public water authority	Supply of water for civil, agricultural and industrial uses.
Representatives of ARPAS	Agency for technical support to the Sardinian Government	Control of the application of agro-environmental measures at farm scale and monitoring of water quality in wells, channels, and wetlands.
Representatives of Oristano province	Oristano Province	Responsible for authorizations to the levy and the water outlet and of the control of water treatments.
Representatives and engineers of the Land Reclamation Consortium	Consorzio di Bonidica dell’Oristenese	Provision of water for irrigation to farms and management of the irrigation water systems.
Representatives of the dairy cooperative	Cooperativa 3A	Milk processing, distribution, and marketing of dairy products.
Representatives of the Farmers’ Cooperative	Cooperativa Produttori Arborea	Horticultural products, meat market, and provider of services for farmers.
Representatives of the Arborea fishermen cooperative	Cooperativa Pescatori Arborea	Fishing, aquaculture in wetlands, and fishponds.

### 3.3. Method of Data Analysis

The video records of the preliminary semi-structured interviews were transcribed verbatim (with the permission of the interviewees) and examined through thematic analysis [46]. The aim was to identify the main topics related to the ecological components of the Arborea system, climate change adaptability in water governance institutions and organizations, Systemic Governance (relational) Practices, and Governance Learning, and how these four elements combine generating water conflicts at both the regional (Sardinia) and local (Arborea) levels. This preliminary analysis contributed towards designing the strategy of mediation to be implemented by the researchers playing the role of the *Alligadori* during *La Rasgioni* event. The main topics resulting from the preliminary semi-structured interviews were recalled during the “trial” by both the *Alligadori* in order to deepen the discussion (see Table 2).

*La Rasgioni* event was documented through direct observation by researchers not directly involved in the process. Researchers took notes of the main themes and dynamics that emerged during the events, and the topics were later compared to those highlighted during the preliminary interviews. The issues that emerged were classified under the four CADWAGO pillars and analyzed in relation to the position expressed by each category of participants, paying particular attention to changes in participants’ perspectives during the evolution of the event, in order to evaluate the potential of the dialogical tool adopted.



**Table 2.** Stakeholder perspectives about the current situation and the actions needed to deal with water-related issues in the case study area, as recorded and understood by researchers in relation to the CADWAGO lenses.

Stakeholder	Current Situation	CADWAGO Lenses	Actions Needed
Regional Board Authority	<ul style="list-style-type: none"> <li>✔ The administrative region has developed reservoirs and plans for water resource use and management.</li> <li>✔ Water quality can be improved by complying with the ND rules.</li> <li>✘ Water leakages are caused by obsolete infrastructure problems, bureaucracy, and inefficiencies.</li> <li>✘ High costs for maintenance of infrastructure are not balanced by the income from users.</li> </ul>	Systemic governance practices	<ul style="list-style-type: none"> <li>- Reduce costs and water consumption through better infrastructural maintenance and efficiency.</li> <li>- Increase coordination through dialogue and shared decisions between providers and users.</li> <li>- Promote the competitiveness of agricultural products.</li> <li>- Invest in action and research engaging entrepreneurs and policy makers; Arborea should interact more with neighboring rural districts.</li> </ul>
LAORE—Regional Advisory Agency in Agriculture	<ul style="list-style-type: none"> <li>✔ The ND raised awareness and farmers now manage nitrogen in a more sustainable way.</li> <li>✘ The ND is inadequate and paradoxical in addressing the pollution problem; there is confusion about roles and responsibilities.</li> </ul>	Ecological components of ecosystems; Systemic governance practices	<ul style="list-style-type: none"> <li>- More dialogue between public and private organizations, and clear directions should be given to practitioners.</li> <li>- Adjust ND to local needs and reduce inherent ambiguities and contradictions.</li> </ul>
ARDI	<ul style="list-style-type: none"> <li>✔ Agreements compensate for the slowness of formal authorization processes; dams help during flooding emergencies.</li> </ul>	Adaptability in water governance	<ul style="list-style-type: none"> <li>- Involve all stakeholders.</li> <li>- Work on legislation both on water quantity (planning resource use) and quality (pollution, sustainable land management).</li> </ul>
Mayor of Arborea	<ul style="list-style-type: none"> <li>✔ The ND generated new spaces for dialogue among stakeholders.</li> <li>✘ The implementation of the ND was effective in mitigating the nitrate problem, but it is not yet solved.</li> </ul>	Adaptability in water governance	<ul style="list-style-type: none"> <li>- More interactions are required between different political and technical agencies, and decisions should take into account citizens' opinions and limited resources.</li> <li>- Raise public awareness.</li> </ul>
Land Reclamation Consortium	<ul style="list-style-type: none"> <li>✘ High water costs but inefficient services; implementation is slow and agricultural policies failed in many respects.</li> </ul>	Systemic governance practices	<ul style="list-style-type: none"> <li>- More subsidies to irrigated lands.</li> <li>- More agency to the land reclamation consortium for water management from source.</li> </ul>
ARPAS	<ul style="list-style-type: none"> <li>✘ The different EU directives treat water in different ways and are not always consistent with national legislation.</li> <li>✘ Climate crises are increasingly frequent and unpredictable: the normative system constrains the effective implementation of adaptive measures.</li> <li>✘ Farmers use too much water, which results in increased leaching; water quality is a cross-cutting issue affecting all activities and natural systems.</li> </ul>	Systemic governance practices	<ul style="list-style-type: none"> <li>- Take into account the different perspectives of the stakeholders from the EU to address water quality issues at the local level.</li> <li>- Invest in monitoring networks and weather forecasting services.</li> </ul>

Table 2. Cont.

Stakeholder	Current Situation	CADWAGO Lenses	Actions Needed
Dept. of Agricultural Sciences—University of Sassari	<p>👍 The nitrate pollution has decreased following the ND implementation.</p> <p>👎 In Arborea ammonia volatilization is higher than in other European intensive agriculture districts due to the climate, which is warm even in winter; hence, nitrate leaching is overestimated when using standard coefficients.</p> <p>👎 Arborea farming system too intensive; outside Arborea there is no monitoring, and farmers base their decisions on their own experience.</p>	Ecological components of ecosystems	<ul style="list-style-type: none"> <li>- New economic instruments are required for promoting the use of innovative technologies.</li> </ul>
Lipu (Italian League for Bird Protection)	<p>👍 Five out of eight Italian Ramsar wetland sites are located in this area.</p> <p>👍 Regulations are already in place; there is no need for new laws.</p> <p>👎 Laws are not implemented; water is perceived as “endless” and is taken as a granted good.</p>	Systemic governance practices	<ul style="list-style-type: none"> <li>- Safeguard wetlands and fertile land.</li> <li>- Raise awareness of the potential for a harmonic coexistence between agriculture and nature.</li> <li>- Connect Arborea to neighboring rural districts to reduce intensive farming and support local economies.</li> </ul>
3A Dairy Cooperative	<p>👍 We are not dependent for water supply on any other institutions as we manage our own deep wells with monthly monitoring of water quality; the Arborea community cares for social aspects and mutual support; there is awareness of the global dynamics affecting local business.</p> <p>👎 Regulations perceived as top-down/command-and-control; no adaptation strategies are put in place to face emerging problems.</p>	Systemic governance practices; Adaptability in water governance	<ul style="list-style-type: none"> <li>- The ND must be reviewed.</li> <li>- We are taking into account the increasing attention of consumers to environmentally friendly production.</li> <li>- Invest in awareness raising and change minds about the quality and quantity of water.</li> </ul>
3A Dairy Cooperative	<p>👎 The dairy coop uses some 1400 m<sup>3</sup> of water per day from its own deep wells. Until 7–8 years ago the water salinity steadily increased, but it has now stabilized.</p>	Ecological components of ecosystems	<ul style="list-style-type: none"> <li>- We are structured to be totally independent from public bodies delivering water and intend to rely on our own resources in the future.</li> </ul>
Farmers' Cooperative	<p>👍 Dialogue with politicians is improving in relation to the ND; water is sufficient; nitrate pollution is improving.</p> <p>👎 Mismanagement, inefficient governance, and high costs result in high water prices and frequent water emergencies. Irrigation water is not delivered from October to March when the surplus water from the dam flows to the sea.</p>	Ecological components of ecosystems	<ul style="list-style-type: none"> <li>- Increase N and water efficiency with available technologies.</li> <li>- Invest in improved farmers' awareness of the ongoing transformations, change attitudes (from complaining to pro-active), and cooperate with neighboring rural districts to promote regional rural development.</li> <li>- Invest in research for innovation.</li> <li>- Revise the EU directive.</li> </ul>
Fishermen Cooperative	<p>👎 The situation is worsening for the inefficient management of wastewater; we are threatened by climate change (high water temperature) and wetlands eutrophication. Responses from the regional and province administrations are slow and EU funds often remain unused.</p>	Ecological components of ecosystems; Adaptability in water governance	<ul style="list-style-type: none"> <li>- Restore the riverbed and improve wastewater treatment before discharge in surface water.</li> <li>- Improve the capability of the public administration to respond to emergent issues.</li> </ul>

## 4. Results

### 4.1. Content of the Interviews and Learning Event

The key issues that emerged during the interviews were infrastructural inefficiencies and environmental concerns, which are described below. Both institutional representatives and entrepreneurs highlighted the importance of raising environmental awareness together with mindset and cultural change, although it was not specified by which means or when this should be carried out. The main results of the adoption of *La Rasgioni* approach can be described for the different stages of the event.

At the beginning of the process, polarized positions emerged, with representatives of the institutions claiming their role in ensuring water security and quality with limited public resources but also recognizing the need for better coordination and investing in research to improve the competitiveness of agricultural systems. Entrepreneurs complained about the confused structure of water governance in Sardinia with overlapping competences and responsibilities that require better coordination. This resulted in the unsustainable cost of water, despite the abundance of water in the reservoirs and untimely response of institutions to the emerging needs, which results in a continuous state of emergency. They also admitted that the ND worked as a catalyst for improving dialogue with policy makers. Representatives of the environmental NGOs, including the Italian League for Bird Protection (LIPU), underlined the relevance of the wetland ecosystems and the need for a balance between agriculture and natural resource use. The 3A dairy cooperative representative presented a more systemic perception of water dynamics involving quality, quantity, and global and local costs.

In keeping with the traditional *La Rasgioni* scheme, the testimonies were reported in the form of a debate, enlivened by the questions of some members of the jury (*Rasgiunanti*).

After the *Alligadori*'s and witnesses' statements, the representatives of the regional Environmental Agency complained about the way different EU directives treat water and how they often do not match the national laws, thus generating a lot of confusion. They also complained about a lack of monitoring networks at the local scale and the need for removing bureaucratic constraints to improve the efficacy of the weather forecasting services. As far as pollution and agricultural water management are concerned, they blamed farmers for using too much water, thus increasing nutrient leaching and runoff and underlined the need to address water quality issues by involving all stakeholders. However, the introduction of the ND was also recognized to be effective by some local experts from the university, who suggested investing in new technology.

By contrast, the entrepreneurs identified bureaucracy and inappropriate governance praxis as more constraining than the "environmental crisis": even during the driest years (e.g., 2003), the scarcity of water availability derived from a mismanagement of the dam, which in turn depended on bureaucratic constraints. This caused multiple damage, in particular to rice growers. From previous records, it is clear that farmers made good use of irrigation water despite the fact that they pay by crop and area instead of by quantity consumed.

Finally, the entrepreneurs agreed with institutional representatives about the need to preserve the beauty of the local landscape and adopt more sustainable milk production practices. The representatives of the farmers' cooperative were proud of how they were managing the land assigned to their grandparents (who transformed a wetland into some of the most productive land on the island).

At the end of the testimonies, the two *Alligadori* made closing statements.

"The normative system for water governance in Sardinia is consistent with regulations and norms. We think that new regulations or assets are not needed. Instead, we need better coordination of actions and of the relationships amongst the institutions, and stronger coordination between producers and institutions. We share a main goal—improving competitiveness of the production systems—while respecting the rules. Some complaints coming from producers are not consistent with reality; there is a

lack of knowledge or prejudice about the role and practices of the institutions. Institutions are guided by professional engineers, accounting for the world of producers" (Institutions' Alligadori).

"The words we heard are proportional to the complications of the bureaucracy. More space is needed for entrepreneurs in water governance. Entrepreneurs produce quality food, but also civil society services, as they showed when livestock farmers proved to be much more efficient than civil protection in helping the neighbor communities affected by the flood in November 2013. New spaces for dialogue should to be created; we want to work in the best possible way" (Enterprises and environmental movements' Alligadori).

After the conclusive remarks of the *Alligadori*, *Omu di mezzu* declared the hearing phase closed, and invited everyone to the dinner. After dinner, *Omu di mezzu* publicly announced the *deziza*, the verdict:

"We thank the witnesses for sharing their knowledge and experiences with us, and we compliment the farmers on the quality of their products, which we enjoyed at dinner. We also compliment the institutions on their efforts to manage and improve the water system in Arborea. We see the role of the jury as not to apportion blame, but rather to make recommendations for the future. We recognize that there are some scientific and technical issues, but we see the real problem is related to people, and in particular, the need for developing effective communication, and spaces for collectively learning the way forward.

To this end, we recommend: the development of a shared vision for improving and transforming water governance; the establishment of partnerships at catchment scale; and exploring the different aims that people have for water and the catchment now and in the future. We feel that the situation can be progressed by providing opportunities to see the world through another person's eyes, and 'living in their shoes'. This evening, we have already heard that people can collaborate on flooding and drilling crises. This gives us confidence that you already have nascent skills and capacity for addressing complex and challenging situations. However, we recognize that there is a lack of ownership of the issues, and it is unclear exactly what the situation is. We suggest that the Mayor is well placed to convene and provide leadership, but the dialogue needs to incorporate a wider range of perspectives, such as bird-watchers, fishermen, environmental NGOs. Tonight has opened up the opportunity for you to work together, drawing on experiences from elsewhere in Sardinia and internationally" (Rasgiunanti verdict).

#### 4.2. Outcomes of the Learning Event

Multiple perspectives emerged during the interviews and the *La Rasgioni* event, not only with regard to the kinds of discourses formulated by institutions on one side and entrepreneurs on the other, but even within the institutional and entrepreneurial domains. In terms of water governance, there were many key issues where all participants agreed: "there is great confusion in terms of water governance and responsibilities. Currently, there is a water supply system that involves the responsibility of six to seven institutions, planners, and authorities". The institutions themselves were aware of systemic inefficiency and admitted that further work needs to be done, although improvements are clearly visible. As a matter of fact, in recent years all actors have experienced an increased dialogue between institutions and entrepreneurs, particularly agricultural ones. A mediating object for this intensified relationship has partly been the ND implementation, as the entrepreneurs in Arborea were enforced to conform to regulatory limits. On the entrepreneur side, they were particularly concerned about damage to the reputation of their community business based on the production of high-quality milk, which would have had implications on the marketing side and, consequently, for the local economic system.

While the ND implementation played the role of a mediating object to extend the farmers' system of interest to water resources quality, the general stand towards the directive was rather ambivalent. On the one hand, it was considered fundamental to regulate surplus nitrogen disposal; on the other

hand, the directive was perceived as a top-down and partially ineffective process wherein local needs and contextual situations were not accounted for, resulting in a paradox of inequality.

The different perspectives emerging from the various stakeholders who played a role in the local water dilemma were summarized and framed according to the CADWAGO pillars (Table 2). Each stakeholder, representing a public or private institution, portrayed his/her own outlook on the current situation with regard to water governance, highlighting the positive traits as well as the weaknesses in the system, and providing their view on what was needed to improve the current situation.

When discussing water governance, some themes recurred in the stakeholders' discourses. One point on which both the representatives of the institutions and farmers agreed was the current situation with regard to nitrate pollution of groundwater. It is acknowledged that since the ND was enforced in Arborea, the emergency status has subsided. It is generally recognized that local actors have not only taken action to prevent further environmental impact, but also have gained awareness of the impacts that undisciplined manure management may have on the environment and, as a result, on the health, livelihood, and economy of the whole local community. However, both groups of stakeholders admitted that the way the Nitrate Directive has been implemented was inadequate as it did not allow for sufficient flexibility and the local contextualization and feasibility of the actions required. In this sense, what clearly emerged was the need to revise the directive, particularly from the entrepreneurs' point of view and that of the institutions working most closely with land management issues (e.g., LAORE, the Regional Advisory Agency in Agriculture).

Institutions and entrepreneurs also appeared to agree on the general inefficiency of the governance system. Among the most discussed issues were infrastructural problems, bureaucratic hindrances, high water prices associated with inefficient and ineffective services, and a complicated institutional framework that generated confusion in the attribution of roles and responsibilities on water management. What emerged from this complicated picture is that there was a general lack of coordination and dialogue among the institutions sharing responsibility on water management and between these institutions and the ultimate users of water, in this case mainly represented by entrepreneurs, both farmers and fishermen, but also, indirectly, environmental NGOs.

## 5. Discussion

The issues that emerged throughout *La Rasgioni* are relevant for the Arborea context, but can at the same time serve as a lesson for other situations involving water dilemmas and governance-related controversies in general.

The conceptual framework outlined in CADWAGO helped us to synthesize the lessons learned through *La Rasgioni* and understand the potential and limitations of this process, including in relation to what lessons could be used to design a similar event in other contexts facing similar types of dilemmas. We now use the four CADWAGO research lenses, mentioned in the introduction, to demonstrate how the adoption of the *La Rasgioni* scheme facilitated the emergence of a large number of issues and insights associated with ecological, social, and institutional factors, governance practices, and learning. We also discuss here the potential significance of these issues and insights for water governance more widely. Finally, we discuss the lessons learned by the implementation of *La Rasgioni* and the wider implications and limitations of its application to similar dilemmas in other contexts.

### 5.1. Insights from Using CADWAGO's Research Pillars

#### 5.1.1. Ecological Components of Ecosystems

*La Rasgioni* created favorable conditions for stakeholders to compare their different perspectives on ecological processes, and to identify related barriers and opportunities of relevance to governance. In this sense, contrasting perceptions, such as in the case of existing dams and water reservoirs, clearly emerged. Even though the local community perceived the inefficiency of these infrastructures to be a



limitation to their activity, their capacity to autonomously manage the effects of extreme weather events (and support other neighboring communities), such as for example flooding, showed the high resilience of the local system. This finding is consistent with the work of Baird et al. [47], who considered five case studies in Europe, Canada, and Australia as part of their CADWAGO work on stakeholder perceptions of ecosystems in flood-prone areas. They found a general shift towards resilience in thinking about flooding. *La Rasgioni's* role in sharing perceptions extends beyond an ecological focus but understanding of science (e.g., in relation to nitrates) has certainly played a significant part in learning about water-related issues in Arborea. For example, the situation created by the event was able to help participants deconstruct the asymmetric perceptions of the water management issues (particularly at the dam level). It helped change the understandings of the various institutional actors who played a role in managing the water from the dam to the farm border, which was a prerequisite for removing crystallized prejudices of downstream vs. upstream actors.

Almost none of the representatives of entrepreneurs expressed concern about water availability in the future, despite climate change threats and diffused water quality issues. This is consistent with the findings of Nguyen et al. [42], which evidenced the need for further investment in well-designed learning spaces for farmers and entrepreneurs to promote anticipated virtuous and voluntary behaviors to improve water use efficiency and facilitate their understanding of climate change expectations in the future. In fact, the director of the dairy cooperative, which is pumping out 1400 m<sup>3</sup> water day<sup>-1</sup> of groundwater with higher (but steady) salinity than in the recent past, recognized that the cooperative members were not prepared for a possible deterioration in their well water quality.

#### 5.1.2. Climate Change Adaptability in Water Governance Institutions and Organizations

Participants in *La Rasgioni* expressed a need for changes in the management of water to enable systemic and adaptive responses to climate change. Despite differences in attributing responsibilities and perceiving the implications of certain actions, both institutions and entrepreneurs agreed about the existing confusion around water legislation (in particular in the implementation of EU directives at the local level), the inefficiency of the current water management systems, and the lack of infrastructure and maintenance. In particular, an excessive fragmentation of the management process, and the consequent need for structural simplification, was perceived by both parties as one of the main constraints to improving the water governance system.

The concepts of “governance” and “participation” are a subject of controversy: “... members state water bureaucracies, perception of water management, as well as how they formulate water policy, mostly depend upon what sort of political culture and under what historical foundations their bureaucracies operate. More importantly, it depends upon what sort of reaction they get from society and the public regarding their water management practices” [48]. Hence, “there is often a large gap between participatory *rhetoric* (including theoretical discourse) and participatory *practice*” [49]. Often participatory procedures only provide legitimacy to well-intentioned and already pre-packaged policies. This is particularly worrying in the overall present-day perception of the European Union by its citizens, who, on the one hand, admit some important benefits (peace, human rights, and health security), but on the other hand notice important governance shortcomings: political weakness, democratic deficit, erosion of national sovereignty, and ineffective agricultural policies [50]. Our results are consistent with those of Huitema et al. [51], who highlight that public participation can improve the quality of decisions, the legitimacy of management, and its reflexivity. However, much depends on the ability and willingness of stakeholders to participate and of policy makers to create the conditions for participation.

From this perspective, the public arena provided by *La Rasgioni* not only created conditions for interaction between interdependent stakeholders polarized into two “opposite” parties (institutions and entrepreneurs), but also within the multiplicity of institutions that work in water management and do not have in their daily professional life many opportunities to communicate each other.

Enabling such interaction is strongly related to the social and institutional components of what can be seen as the socio-ecological system of water governance. In fact, throughout *La Rasgioni* the idea that both institutions and local communities play a primary role in tackling water-related issues became central. It was also clear that the institutional framework upon which local bodies depend to improve their adaptive capacity to change is important as well. Understanding how and where improvements can take place in the context of water governance is the most challenging matter, not only because of management issues but also because of the systemic complexity related to environmental problems. Fischer et al. [52] refer to two particular challenges associated with this complexity: difficulties in framing environmental problems in law and in ascribing responsibility for environmental problems. The discussions raised during *La Rasgioni* highlighted that the institutional framework should ideally result from a systematic dialogue process, not only between the water users and the decision levels, but also among the constellation of institutions that manage water resources. In fact, as emerged during the event, there is a need to improve both communication and coordination among institutional bodies, rather than completely reform the system. Smith et al. [0], in their CADWAGO's work package associated with the same research lens, identified a need to take a holistic and systemic approach to assessing the capacity of institutions and organizations to respond to water governance challenges such as climate change. The findings from *La Rasgioni* suggest that this kind of dialogical process has the potential to help increase institutional and organizational capacity to respond to water governance challenges, although further research and dialogue would be needed in order to understand the strengths and limitations of *La Rasgioni's* contribution as a conducive modality for boosting the participation and engagement of relevant stakeholders.

### 5.1.3. Systemic Governance Practices

CADWAGO's systemic governance practices work package focused on existing and potential interconnections among practices and aimed to critically assess how history, facilitation, stake-holding, and reflexivity contributed to water governance under climate change [17]. *La Rasgioni* helped produce many insights in terms of actual and potential systemic governance practices. All participants recognized that some steps have been taken towards the establishment of a dialogue process intended as a consolidated praxis (theory-informed practice). All parties see the benefits deriving from the interaction between the top and bottom levels, in particular in terms of producing "proactive" behaviors. This is the case, for example, with the Nitrate Directive implementation: after an initial generalized dissatisfaction (due to the lack of dialogue between the top and the bottom levels), the creation of a dialogue platform (thanks to a number of public initiatives in which both parties participated) contributed to increasing entrepreneurs' environmental awareness. At the same time, institutions had the opportunity to understand what kind of policies were needed to reinforce local resilience, for example through the implementation of new regional measures. This means that local entrepreneurs started to consider the positive effects of the Nitrate Directive in terms of environmental benefits, and institutions began to accommodate the normative framework to meet local needs.

*La Rasgioni* highlighted many interconnections among practices. It was found that new entrepreneurs started to be concerned about climate change, water governance, and environmental care. However, their worries were directly connected to their economic activities. This means that environmental threats are also increasingly perceived as economic threats. Not only do they perceive an inefficient water management as a barrier to their business, but also their environmentally friendly production strongly depends on consumer orientation. Therefore, the acceptance of new praxis and processes seems to depend on potential positive economic outcomes. Both parties agreed on the fact that protecting the environment and natural resources (such as water) is fundamental, as well as preserving local social and economic assets. In fact, the sustainability of their system of interest depends on environmental, cultural, social, and economic co-occurring factors. Hence, the evidence that emerged in the context of *La Rasgioni* framework shows how a constructive dialogue between institutions and entrepreneurs could be simultaneously based on these factors. On the one

hand, adopting the entrepreneurs' perspective, institutions should seek to engage in dialogue in order to facilitate the introduction of innovative practices, which can produce benefits in economic (and simultaneously environmental and social) terms; on the other hand, adopting the institutions' perspective, entrepreneurs should adopt a more proactive attitude instead of a "complaining" one.

#### 5.1.4. Governance Learning

*La Rasgioni* is strongly connected to the governance learning component of the CADWAGO framework. Because of its public nature, *La Rasgioni* offered the opportunity to open up spaces of mutual learning that sensitized all participants, included the jury and the audience, to existing interdependencies, uncertainties, and latent conflicts between institutions and different organizations of stakeholders connected by a net of complex water-governance-related issues. In this sense, the creation of an event such as *La Rasgioni* provided a context that, despite its "ad hoc constructed" character, facilitated interaction between actors who otherwise hardly ever have the chance or perhaps the willingness to communicate. Even though the environmental awareness of some local actors belonging to the cooperatives might have already been influenced the existing collaboration with researchers (in relation to the long-term research conducted in the area), *La Rasgioni* represented the first occasion for entrepreneurs and institutions to compare and discuss their different perspectives and environmental values. Moreover, the location of *La Rasgioni*, a theatrical stage, provided participants with a democratic setting where everyone was equal, part of one group (institutions or non-institutions), and under the control of a "external judge" (*Omu di mezzu*) and an "external jury." In this sense, participants' roles and hierarchies were not emphasized and instead each actor could feel part of a larger group. At the same time, the participation of a rather large number of actors who previously never had the chance to meet and discuss water dilemmas enabled the sharing of varied and often conflicting perspectives existing within each group, particularly the institutional one. In this sense, the *La Rasgioni* event achieved unprecedented results, as it provided both participants and observers with a comprehensive picture of the water dilemma and, most importantly, because it created a space for dialogue and confrontation among actors who perceived this as one of the main gaps within the water governance system. A range of theories of social and experiential learning influenced the design of the *La Rasgioni* process, alongside the various practitioners' experiences of social processes and working with the community [42–48]. Closer scrutiny of what occurred during *La Rasgioni* using some of these theories may help to illuminate and also provide a structure for how to move from deliberation to collective action to address some of the water governance issues of Arborea. Theories of experiential learning focus on knowledge produced through transformation of experience via a process that involves reflection [54–57]. Other theories suggest some ways forward for the *La Rasgioni* process; for instance, Kolb and Fry's experiential learning cycle [54] includes times of conceptualization and testing in addition to experiencing, observing, and reflecting; Schön [56] distinguishes between reflection-on-action and reflection-in-action, which is particularly relevant to the nature of spaces for learning; and Mesirow [57] emphasized the need for critical reflection in order to change meaning, structures, and perspectives [58]. All three areas of theory provide principles for guiding the facilitation of dialogue. In moving towards action, theories of social learning can help to explain what and how social interactions contribute to both individual and collective learning. For example, Wenger [59] and his colleagues work with communities of practice and complex "landscapes" of practice [60] to draw out distinctions of practices, community, and identity alongside experiences and focus on the dynamics and boundaries of practice. In the *La Rasgioni* process in Arborea, these theories have the potential to help draw out and make multiple perspectives and interactions more apparent and to facilitate them by contributing to a design for learning [12].

#### 5.2. Wider Implications and Applications—Beyond Arborea and beyond Water

The restaging of *La Rasgioni* for the mediation of conflicts was successful in providing conducive learning spaces and facilitating the active and open participation of stakeholders in complex water

governance issues in a sensitive context. Possibly, similar outcomes to those obtained through *La Rasgioni* could have been achieved with different modalities of stakeholder engagement, but the format of *La Rasgioni* proved to be quite efficient in terms of resources and time invested and enabled all participants to gain a high level of engagement and mutual understanding. In half an evening, including the consecutive Italian–English translation to the jury, all participants engaged, with a positive attitude, in a constructive discussion. The design of this stakeholder engagement modality was nurtured in two ways. One was the trust of key stakeholders, gained by the local research team across some eight years of agro-ecological action co-researching in the Arborea district. Second is the close collaboration between theatre professionals and the interdisciplinary and international team of scientists that informed the design of the process with social learning theories.

The format of the event was designed to enable the jury, composed of experts who encountered the Arborea case study for the first time, to gain sufficient insight into the core aspects of the complexity of the situation and provide advice for improvement. At the same time, stakeholders were given a rare chance to reflect on their own role and practice beyond the boundaries of their business (entrepreneurs) or daily life in an institutional office (institutional representatives). All participants appreciated the diversity of perspectives around water governance in the region, and both parties shifted from a polarized complaining/defensive attitude to a convergent motivated/pro-active attitude.

Key ingredients for creating the right atmosphere to defuse potential tensions and conflicts included: the transformation of the dispute to a theatrical performance (including the song); the venue in the theatre of Arborea; the role of the *Omu di mezzu* and the *Alligadori* in mediating and leaving sufficient time to all witnesses to tell their story; the foreign guests put in the position of listening to and questioning the witnesses; and the informal modality of the dinner before the *dezisa*. The process also generated motivation and openness in revealing genuine witnesses' experience. Such modalities are often ignored in the format of the meetings among experts and practitioners or scientists.

The process of using a theatrical performance or traditional practices to enhance communication, raise awareness, and mediate conflict is well known in some areas of scholarship and practice, e.g., in participatory development, environmental education and interpretation, and health education. Examples range from the use of puppetry to promote sustainable development in Japan [61] and role-play and performance in health education (e.g., in the context of Ebola outbreaks and HIV/AIDS [62]) to the use of drama and theatre as a social intervention in conflict and post-conflict situations [63–67]. Some of those working in theatre and drama who have made the link with politics, social justice, and learning have been particularly influential in this field, e.g., Augusto Boal's work [68,69] in legislative and forum theatre, which involves the audience in dialogue; and cognitive psychologist Jerome Bruner's reflections on the role of storytelling, including in law (both referred to in Box 1) [70]. One specific example that the *La Rasgioni* performance in Arborea inspired is provided by Professor Michael Wilson, one of the participants in the CADWAGO's governance learning event that included *La Rasgioni* (see Box 3).

There is evidence that the restaging of *La Rasgioni* already inspired other similar successful initiatives to address water governance dilemmas in different contexts [71]. In doing so, it is important to be aware of some of the limitations of such a process. One important point is that *La Rasgioni* as a "one-off event" can open up new spaces for dialogue starting from a situation of lack of dialogue, in particular within institutional stakeholders belonging to different (or the same) public bodies and/or between institutional representatives and entrepreneurs. While this process has the potential for becoming a breakthrough process, it would require further resources and commitment for the follow-up to achieve actual change and/or to unblock intransigent situations. At Arborea, some of the institutional representatives who could be considered problem "owners" (Checkland [72]), such as those administrators able to influence the re-design of the domain and role of the different administrations in water governance, did not want to participate. Yet others agreed either to show the video of their interview (e.g., the politician at the head of the Regional Water Government Body) or to join the event (e.g., Regional Councilor for Agriculture). Most of the participants from public water and

environmental agencies were those who do the everyday office work, which is also important. On the other hand, the most powerful entrepreneurs “joined the game,” while the weak ones participated in the event only by watching the video of the interviews.

**Box 3.** Inspired by *La Rasgioni*—beyond the local water dilemma.

In October 2015, I was fortunate enough to be invited by CADWAGO to witness a restaging of *La Rasgioni*, a traditional Sardinian form of conflict resolution that existed until the 1960s, as a way of resolving disputes at a community level and collectively exploring dilemmas around the deployment of shared resources. I use the word “restaging” deliberately here and with some caution, as the event primarily spoke to me as a theatre scholar. What I witnessed was a piece of theatre, a forum for collective community storytelling, and I was reminded of Augusto Boal’s Forum Theatre, . . . Jerome Bruner’s work on storytelling and justice, and many other things besides. Most of all, though, it struck me as a way to bring together narrative, technical, scientific, and technical epistemologies into a single performative event that created space for a new way of thinking about issues. It was both a judicial and a social event—using perceived dilemmas and divisions to find collective solutions and enhance community cohesion and a sense of joint enterprise. Never had policymaking seemed so much fun.

The question I left with was how I might take this inspirational experience and use it to inform the work we were doing on . . . [our] . . . project. Clearly, there would need to be some changes—a traditional Sardinian cultural practice is what it is—tied to a specific place, community and its culture. So we brought into play some of our expertise in storytelling, theatre and British traditional practices and created our own unique version of *La Rasgioni* . . . . It was inevitably very different from the event in Sardinia, but also instantly recognizable. We are now planning a second version . . . , to be held in Peterborough . . . and it continues to evolve.

In reporting on a decade of social learning inquiry in the context of water management internationally [73], some of the authors of this paper made a case for investing in local systemic innovation through social-learning praxis design [74]. The range of insights into the different aspects of water governance provided by *La Rasgioni* and its ability to inspire similar activity in other contexts suggest that it could provide an example of the kind of systemic innovation that could be worthy of further investment in co-designing pathways for sustainable development at the community level.

## 6. Conclusions

The adoption of the *La Rasgioni* model was successful in terms of both stimulating the emergence of latent conflicts (and their potential viable options), and exploring new dialogical tools for actively engaging stakeholders in a learning circle aimed at mediating these conflicts. The combination of the four CADWAGO pillars, translated into a tool (*La Rasgioni*) for mediating local disputes, enhanced governance learning by creating dialogical spaces for collectively identifying barriers and opportunities represented by the ecological components of the ecosystem, by the “adaptation capacity” of the system, and by the systemic and potential new governance practices. All participants—researchers included—were actively involved in a co-learning experience about different perspectives, concerns, and interests. Participants were motivated to identify convergent win-win solutions, which either reconcile different systems of interest or allow them to co-exist. In this sense, the public and theatrical nature of *La Rasgioni* created spaces of social learning about interdependencies, uncertainties, and conflicts between institutions and local organizations.

*La Rasgioni* proved to be a useful tool for creating conditions conducive for stakeholders to share different perspectives on ecological processes, and to jointly identify barriers and opportunities to systemic and adaptive governance. In fact, although individual interviews helped researchers understand and report (as mediators of knowledge) the diverse positions that emerged about specific issues, the adoption of a public arena was useful for motivating actors with different perspectives to directly interact and identify common solutions or, at least, share understanding of water-related issues.

One of the main outcomes from *La Rasgioni* is that the current institutional arrangement in Sardinia is critical in addressing effective and efficient water management in a climate change context. Such a situation generates unbalanced power relationships among interdependent stakeholders and would



require a more holistic and systemic approach to address the water-related crisis, considering that only a few stakeholders from both parties perceived the concrete risks associated with climate change. In order to deal with this imbalance, participants identified common ground/vision/interests that combine the preservation of both social and economic assets. The increased awareness of the interconnection between practices at different levels in the catchment revealed the potential for more public–private synergies in developing effective systemic governance practices, providing that institutions do not constrain the adoption of innovative practices and entrepreneurs adopt a proactive attitude.

The unprecedented public learning space on water governance issues opened up by *La Rasgioni* at Arborea could not be so effective if it was not informed by sound social learning theories that shaped the design and implementation of the “theatrical” scheme, which gave participants the opportunity to discuss key issues in an informal way. This approach overcame the difficulties that usually emerge in the context of participatory practices, where some actors might not feel comfortable to reveal what they thought publicly [71–73]. In this context, instead, the presence of a “lawyer” facilitated stakeholders in expressing and moving towards converging opinions on the nature of the issues and actions to take. The *La Rasgioni* event gave institutional representatives the chance to understand what kind of improvements are needed to support systemic and adaptive water governance, the entrepreneurs to be listened to by institutions, and researchers to facilitate this dialogue and collect more comprehensive data. Ultimately, the process helped all participants to understand that there are different normative systems and institutions besides the formal national and supranational ones [74–76]. These systems, developed at the local level, do not necessarily consist of written norms; however, stakeholders might consider them reliable instruments that help them to deal with existing conflicts of interest.

The external jury, which did not impose any specific solution but invited participants to reflect on what an independent point of view perceives as the weaknesses and strengths of the system, was considered useful by stakeholders after the conclusion of the event.

There are a number of open questions worth addressing further in future developments of this kind of process. For instance, one of the participants fed back the following comment on some of the limitations of adopting *La Rasgioni* to mediate controversies on water governance: “The form of the court was potentially confrontational, in that by dividing diverse stakeholders into two groups you were introducing a polarizing dynamic which otherwise would have been much weaker if present at all. For example, what would it have been like to design a stakeholder dialogue in which participants were allocated to eight rather than two stakeholder groups, and then during the dialogue had to work in mixed as well as separate stakeholder combinations?”

In conclusion, the adoption of the *La Rasgioni* format in the context of managing conflicts related to local natural resources might enhance public participation and give voice to weak stakeholders by using the “trial” as a mediating object for social learning. Its public, “theatrical” nature might inspire local government practitioners to develop alternative and more effective ways to address water governance dilemmas, in particular where the existing normative framework is perceived by local actors as inappropriate for developing resilient and adaptive governance systems.

**Acknowledgments:** We gratefully acknowledge funding for this work, as part of the Climate Change Adaptation and Water Governance (CADWAGO) project, from Riksbankens Jubileumsfond, the Volkswagen Stiftung, and Compagnia di San Paolo through the Europe and Global Challenges program. We also gratefully acknowledge the contributions of all participants in CADWAGO’s governance learning activities. Much of the long-term background research prior to the event was conducted in the context of the Agroscevari (D.M. 8608/7303/2008—[www.agroscevari.it](http://www.agroscevari.it)) and MACSUR (D.M. 2660/7303/2012—[www.macsur.eu](http://www.macsur.eu)) projects, both funded by the Italian Ministry of Agricultural Food and Forestry Policies. The authors acknowledge the contribution of all active participants to the *La Rasgioni* event in Arborea on 15 October 2015, in particular the Cooperativa Produttori Arborea and the “3A” dairy cooperative for kindly providing concrete support for the initiative. We also acknowledge the logistical support of the research team of the Desertification Research Centre, University of Sassari (in particular: Alessandra Paulotto, Laura Mula, Roberto Lai, and Antonio Pulina) and the staff of the communication and press office of the University of Sassari. We also wish to thank John Colvin for sending us useful feedbacks following participation in *La Rasgioni*. We are grateful to Michael Wilson and his staff at Loughborough University, UK, for enhancing the value of the original idea by adapting it to an English context.

**Author Contributions:** Sante Maurizi directed the event and conceived the idea with the direct involvement of Pier Paolo Roggero and Simone Sassu, the latter acting as the *Omu di mezzu* during the performance. Olga Zuin recorded the event and provided an anthropological perspective to the analysis; Giovanna Seddaiu and Pier Paolo Roggero provided an agro-ecological perspective of agricultural water management and performed the role of *Alligadori* during the event; Maria Laura Ruiu, Pier Paolo Roggero, and Giovanna Seddaiu contributed to the organization of the event. Chris Blackmore contributed to the theoretical framing of the analysis. Pier Paolo Roggero was the scientific coordinator of the local research team. All authors contributed to writing and editing the manuscript.

**Conflicts of Interest:** The authors declare no conflict of interest.

## Appendix A. *La Rasgioni Script*

Participating were: Simone Sassu (*Omu di mezzu*), Giovanna Seddaiu (*Alligadori* of institutions' representatives), Pier Paolo Roggero (*Alligadori* of entrepreneurs), Daniela Cossiga (singer), some 30 researchers from the CADWAGO project (jury), and stakeholders (witnesses). Produced by Sante Maurizi, Cinearena.

Arborea Song (<http://bit.ly/arboreasong>)

Introduction: Researcher/artistic director

- Why are we here?
- What are we going to build together?
- The meeting aims to provide an informal space for reflection, not an exhaustive process.

*Omu Di Mezzu*

- Moderator of the meeting
- Introduction of the parties and roles
  - o Some interviewees are not here in person
  - o Witnesses of entrepreneurs
  - o Witnesses of institutions
  - o *Omu di mezzu* (the middle man)
  - o *Alligadori* (two researchers from the University of Sassari on behalf of entrepreneurs and institutions)
  - o *Rasgiunanti* (the international jury)
  - o Audience: involved by writing their questions on Post-it notes (collected by the *Omu di mezzu* at the end of the trial).

The two *Alligadori* illustrate the positions of the parties and introduce the witnesses.

The *Alligadori* for the institutions, a researcher from the University of Sassari, says:

*The implementation of the European, national, and regional rules on water management in this area has been delegated to organizations and institutions (EU Water Framework Directive and Nitrates Directive have been implemented at the national level according to national and regional laws).*

*Some members belonging to the main competent institutions in charge of water governance are here.*

Introduction of the witnesses to the institutions' representatives:

- o Major of Arborea
- o Vice-president of the Governing Board of the European Initiative "Joint Program Initiative "Food Agriculture and Climate Change" JPI FACCE and Consultant for the Ministry of Agriculture
- o Regional Councilor for Agriculture (Autonomous Region of Sardinia)
- o President of the Regional Water Boards Authority and Major of Sassari
- o Representatives of Regional Multisectoral Water Management Board
- o Agrometeorologist at ARPAS "Weather and Climate Department"
- o Agronomist of "Water User Association Oristanese district"
- o Representative of LAORE—Regional Advisory Agency in Agriculture

- Additional testimonies from people who live and work in the Sardinian River Basin District—*Distretto idrografico*” and the province of Oristano

Statement: *We are in a nitrate-vulnerable zone which is subject to a certain number of constraints and aims at improving the water quality of surface water and groundwater.*

The *Alligadori* of entrepreneurs and local organizations, a researcher from the University of Sassari, says:

The inhabitants of Arborea have transformed a swamp and infertile area into one of the most agriculturally productive and economically developed area of Sardinia, rich in valuable habitats of community interest that attract tourists from around the world.

Introduction of the witnesses:

- Director of Arborea Producers’ Cooperative
- President of Arborea Producers’ Cooperative
- Director of 3A Cooperative
- Professor and member of the Management Board of the 3A Cooperative
- President of 3A Cooperative
- Maria Rita Saba (responsible for quality and food safety), Nieddittas, Fishermen Cooperative of Arborea (in the video)
- Representative of LIPU (Italian League for Bird Protection), Oristano section
- Technician at Arborea Producers’ Cooperative

Statement: *Business activities carried out in the plain of Arborea generate employment, welfare and economy and are a priority for this area. They take place in a context of market uncertainty and threats associated with natural disasters and climate change. Water is essential for the development of this area. In order to improve water governance in this area, it is necessary to invest in productive activities to combine economic development and conservation of environmental resources.*

Short video with interviews (10 min) (<http://bit.ly/interviewslarasgioni>)

The *Omu di mezzu* hands over the floor to the *Alligadori*.

*Alligadori* for the Institutions

The *Alligadori* briefly discusses the video interviews, asking *Omu di mezzu* to hear the witnesses who have not granted video interviews by asking them a precise question that requires a succinct reply (translated into English for the jury).

The *Omu di mezzu* hands over the floor to the witnesses from the institutions who want to answer the *Alligadori*’s question, giving priority to the following (who were not interviewed):

- Representative of ARPAS
- Representatives of ENAS—Regional Multisectoral Water Management Board
- Expert, Italian Ministry of Agriculture
- Mayor of Arborea

The *Omu di mezzu* hands over the floor to the *Alligadori* for the Entrepreneurs.

The *Alligadori* briefly discusses the video interviews, asking the *Omu di mezzu* to hear the witnesses who have not granted video interviews by asking them a precise question that requires a succinct reply (translated into English for the jury).

The *Omu di mezzu* hands over the floor to the witnesses from the institutions who want to answer the *Alligadori*’s question, giving priority to the following:

- Expert and Professor of animal nutrition, University of Sassari

The *Omu di mezzu* invites first the *Rasgiunanti* and then the audience to pose short questions to the witnesses, who can reply with a maximum of three sentences.

*Rasgiunanti (the jury)*

- At least one question for each CADWAGO pillar
  - Ecological components of ecosystems
  - Climate change adaptability in water governance institutions and organizations
  - Systemic governance practices
  - Governance learning

Collection of Post-its with questions asked by the public. The *Omu di mezzu* calls on people one by one.

Arborea Song

Dinner

*Omu di mezzu* reports to the audience *li Rasgiunanti's* decision:

*Detzisa or Arrangiu*

*End*

## References

1. CADWAGO: Climate Change Adaptation and Water Governance—Reconciling Food Security. Renewable Energy and the Provision of Multiple Ecosystem Services. Available online: [http://www.cadwago.net/?page\\_id=152](http://www.cadwago.net/?page_id=152) (accessed on 18 November 2016).
2. Sassu, S. La Rasgioni in Gallura. In *La Risoluzione Dei Conflitti Nella Cultura Degli Stazzi*; Armando: Rome, Italy, 2009. (In Italian)
3. Maurizi, S. Come Gestire l'Acqua: La Lezione che Arriva Dalle Comunità Locali. Sassari. *La Nuova Sardegna* **2015**, *33*. Available online: <http://lanuovasardegna.gelocal.it/regione/2015/11/10/news/come-gestire-l-acqua-la-lezione-che-arriva-dalle-comunita-locali-1.12422905> (accessed on 17 November 2016). (In Italian)
4. Reed, M.; Evely, A.C.; Cundill, G.; Fazey, I.R.A.; Glass, J.; Laing, A.; Newig, J.; Parrish, B.; Prell, C.; Raymond, C.; et al. What is social learning? *Ecol. Soc.* **2014**, *15*, r1. [CrossRef]
5. Koontz, T.M. Social learning in collaborative watershed planning: The importance of process control and efficacy. *J. Environ. Plan. Manag.* **2014**, *57*, 1572–1593. [CrossRef]
6. Toderi, M.; Powell, N.; Seddaiu, G.; Roggero, P.P.; Gibbon, D. Combining social learning with agro-ecological research practice for more effective management of nitrate pollution. *Environ. Sci. Policy* **2007**, *10*, 551–563. [CrossRef]
7. Steyaert, P.; Jiggins, J. Governance of complex environmental situations through social learning: A synthesis of SLIM's lessons for research, policy and practice. *Environ. Sci. Policy* **2007**, *10*, 575–586. [CrossRef]
8. Ison, R.; Russell, D. *Agricultural Extension and Rural Development: Breaking Out of Knowledge Transfer Traditions*; Cambridge University Press: Cambridge, UK, 2007.
9. Liebmann, M. Introduction. In *Arts Approaches to Conflict*; Liebmann, M., Ed.; Jessica Kingsley Publishers: London, UK, 1996.
10. Leavy, P. *Method Meets Art: Arts-Based Research Practice*; Guilford Publications: New York, NY, USA, 2015.
11. Wilsdon, J.; Willis, R. *See-Through Science: Why Public Engagement Needs to Move Upstream*; Demos: London, UK, 2004.
12. Blackmore, C.; van Bommel, S.; de Bruin, A.; de Vries, J.; Westberg, L.; Powell, N.; Foster, N.; Collins, K.; Roggero, P.P.; Seddaiu, G. Learning for Transformation of Water Governance: Reflections on Design from the Climate Change Adaptation and Water Governance (CADWAGO) Project. *Water* **2016**, *8*, 510. [CrossRef]
13. Powell, N.; Osbeck, M. Approaches for understanding and Embedding Stakeholder realities in Coastal Governance: The Case of Mangroves in the Mahakam delta, East Kalimantan. *Int. J. Sustain. Dev.* **2010**, *18*, 260–270.
14. Bellamy, J.; Smith, T.; McDonald, G.; Taylor, B.; Walker, M.; Jones, J.; Pero, L. *Criteria and Methods for Monitoring and Evaluating Healthy Regional Planning Arrangements*; Tropical Savannas Management CRC: Darwin, Australia, 2003.
15. Schön, D.A.; Rein, M. Frame reflection. In *Toward the Resolution of Intractable Policy Controversies*; Basic Books: New York, NY, USA, 1994.
16. Ison, R.L. *Systems Practice: How to Act in a Climate Change World*; Springer: London, UK, 2010.

17. Ison, R.; Collins, K.; Colvin, J.; Jiggins, J.; Roggero, P.P.; Seddaiu, G.; Steyaert, P.; Toderi, M.; Zanolla, C. Sustainable catchment managing in a climate changing world: New integrative modalities for connecting policy maker, scientists and other stakeholders. *Water Resour. Manag.* **2011**, *25*, 3977–3992. [CrossRef]
18. Bandura, A. *Social Learning Theory Englewood Cliffs*; Prentice-Hall: Upper Saddle River, NJ, USA, 1977.
19. Steyaert, P.; Barzman, M.; Billaud, J.P.; Brives, H.; Hubert, B.; Ollivier, G.; Roche, B. The role of knowledge and research in facilitating social learning among stakeholders in natural resources management in the French Atlantic coastal wetlands. *Environ. Sci. Policy* **2007**, *10*, 537–550. [CrossRef]
20. Pahl-Wostl, C.; Mostert, E.; Tàbara, D. The growing importance of social learning in water resources management and sustainability science. *Ecol. Soc.* **2008**, *13*, 24. [CrossRef]
21. Nguyen, P.L.; Seddaiu, G.; Roggero, P.P. Hybrid knowledge for understanding complex agri-environmental issues: A case study on nitrate pollution in Italy. *Int. J. Agric. Sustain.* **2014**, *12*, 164–182. [CrossRef]
22. Koontz, T.M.; Newig, J. From Planning to Implementation: Top-Down and Bottom-Up Approaches for Collaborative Watershed Management. *Policy Stud. J.* **2014**, *42*, 416–442. [CrossRef]
23. Blumenthal, D.; Jannink, J.L. A Classification of Collaborative Management Methods. *Conserv. Ecol.* **2000**, *4*, 13. [CrossRef]
24. Scott, A. Focussing in on focus groups: Effective participative tools or cheap fixes for land use policy? *Land Use Policy* **2011**, *28*, 684–694. [CrossRef]
25. Conley, A.; Moote, M.A. Evaluating Collaborative Natural Resource Management. *Soc. Nat. Resour.* **2003**, *16*, 371–386. [CrossRef]
26. De Vente, J.; Reed, M.S.; Stringer, L.C.; Valente, S.; Newig, J. How does the context and design of participatory decision making processes affect their outcomes? Evidence from sustainable land management in global drylands. *Ecol. Soc.* **2016**, *21*, 24. [CrossRef]
27. Colvin, R.M.; Witt, G.B.; Lacey, J. Approaches to identifying stakeholders in environmental management: Insights from practitioners to go beyond the ‘usual suspects’. *Land Use Policy* **2016**, *52*, 266–276. [CrossRef]
28. Moeliono, I.; Fisher, L. Research as mediation: Linking participatory action research to environmental conflict management in East Nusa Tenggara, Indonesia. In *Natural Resource Conflict Management Case Studies: An Analysis of Power, Participation and Protected Areas*; Castro, A.P., Nielsen, E., Eds.; Food and Agriculture Organization of the United Nations: Rome, Italy, 2003; pp. 60–79.
29. Swyngedow, E. The political Economy and Political Ecology of the Hydro-Social Cycle. *J. Contemp. Water Res. Ed.* **2009**, *142*, 56–60. [CrossRef]
30. Feitelson, E. What is water? A normative perspective. *Water Policy* **2012**, *14*, 52–64.
31. Zurita, M.D.L.; Thomsen, D.C.; Smith, T.F.; Lyth, A.; Preston, B.L.; Scott, B. Reframing water: Contesting H2O within the European Union. *Geoforum* **2015**, *65*, 170–178. [CrossRef]
32. Angioni, A.M. *L’Arboreino. Dalle Paludi Alla Bonifica del Terralbese, da Mussolinia ad Arborea*; P.T.M. Editrice: Mogoro, Italy, 2002. (In Italian)
33. *Cooperativa 3A Nel Latte—Cinquant’anni Della Cooperativa 3A Latte Arborea, 1956–2006*; Ellisso Editori: Nuoro, Italy, 2006. (In Italian)
34. Fanni, S.; Loddo, S.; Mameli, M.G.; Manca, D.; Puddu, R.; Repetto, A. Indagine sull’Effettivo Utilizzo Delle Aree Irrigue a Piano Stralcio di Bacino Regionale. 2006. Available online: [https://www.regione.sardegna.it/documenti/1\\_46\\_20060428153020.pdf](https://www.regione.sardegna.it/documenti/1_46_20060428153020.pdf) (accessed on 1 February 2017). (In Italian)
35. Fadda, P.; Mura, L.; Ripa, L. *Comune. di Arborea. Arborea—Intrecci con la Storia*; Oristano: S’Alvure, Italy, 2009. (In Italian)
36. The Habitats Directive. Available online: [http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index\\_en.htm](http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm) (accessed on 11 February 2017).
37. Dono, G.; Cortignani, R.; Dell’Unto, D.; Deligios, P.; Doro, L.; Lacetera, N.; Mula, L.; Pasqui, M.; Quaresima, S.; Vitali, A.; et al. Winners and losers from climate change in agriculture: Insights from a case study in the Mediterranean basin. *Agric. Syst.* **2016**, *147*, 65–75. [CrossRef]
38. Ruiu, M.L.; Seddaiu, G.; Roggero, P.P. Developing adaptive responses to contextual changes for sustainable agricultural management: The role of social capital in the Arborea district (Sardinia, Italy). *J. Rural Stud.* **2017**, *49*, 162–170. [CrossRef]
39. Demurtas, C.; Seddaiu, G.; Ledda, L.; Roggero, P.P. Replacing organic with mineral N fertilization does not reduce nitrate leaching in double crop forage systems under Mediterranean conditions. *Agric. Ecosyst. Environ.* **2016**, *219*, 83–92. [CrossRef]



40. Nguyen, T.P.L.; Seddaiu, G.; Viridis, S.G.P.; Tidore, C.; Pasqui, M.; Roggero, P.P. Perceiving to learn or learning to perceive? Understanding farmers' perceptions and adaptation to climate uncertainties. *Agric. Syst.* **2016**, *143*, 206–216. [[CrossRef](#)]
41. Lai, R.; Seddaiu, G.; Gennaro, L.; Roggero, P.P. Effects of Nitrogen fertilizer sources and temperature on soil CO<sub>2</sub> efflux in Italian ryegrass crop under Mediterranean conditions. *Ital. J. Agron.* **2012**, *7*, 196–201. [[CrossRef](#)]
42. Nguyen, T.P.L.; Mula, L.; Cortignani, R.; Seddaiu, G.; Dono, G.; Viridis, S.G.P.; Pasqui, M.; Roggero, P.P. Perceptions of present and future climate change impacts on water availability for agricultural systems in the western Mediterranean region. *Water* **2016**, *8*, 523. [[CrossRef](#)]
43. The Arborea Song. Available online: <http://bit.ly/2ewUDFJ> (accessed on 17 February 2017).
44. Laing, M.; Wallis, P.J. Scientists versus policy-makers: Building capacity for productive interactions across boundaries in the urban water sector. *Environ. Sci. Policy* **2016**, *66*, 23–30. [[CrossRef](#)]
45. Hajer, M.A. Setting the stage a dramaturgy of policy deliberation. *Adm. Soc.* **2005**, *36*, 624–647. [[CrossRef](#)]
46. Interviews about Water Governance in Sardinia and Especially in Arborea. Available online: [https://www.youtube.com/watch?v=gB94nO\\_elVg](https://www.youtube.com/watch?v=gB94nO_elVg) (accessed on 17 February 2017).
47. Baird, J.; Dzyundzyak, A.; Plummer, R.; Bullock, R.; Dupont, D.; Jollineau, M.; Kubik, W.; Pickering, G.; Vasseur, L. Ecosystem Perceptions in Flood Prone Areas: A typology and its Relationship to Preference for Governance. *Water* **2016**, *8*, 191. [[CrossRef](#)]
48. Oktem, O. *Water Politics and Political Culture: Turkey's Compatibility with the European Union*; Springer: Cham, Switzerland, 2016.
49. Leeuwis, C. *Communication for Rural Innovation: Rethinking Agriculture Extension*; Blackwell Publishers: Hoboken, NJ, USA, 2004.
50. Baker, D.; Schnapper, P. *Britain and the Crisis of the European Union*; Palgrave Macmillan: Basingstoke, UK, 2015.
51. Huitema, D.; Mostert, E.; Egas, W.; Moellenkamp, S.; Pahl-Wostl, C.; Yalcin, R. Adaptive Water Governance: Assessing the Institutional Prescriptions of Adaptive (Co-)Management from a Governance Perspective and Defining a Research Agenda. *Ecol. Soc.* **2009**, *14*, 26–44. [[CrossRef](#)]
52. Fisher, E.; Lange, B.; Scotford, S. *Environmental Law: Text, Cases and Materials*; Oxford University Press: Oxford, UK, 2013.
53. Smith, T.; Thomson, D.; Melo Zurita, M.L.; Baum, D.S.; Lyth, A. Climate Change Adaptability in Water Governance Institutions and Organisations. Project Brief for Work Package 2. Available online: <http://www.cadwago.net/wp-content/uploads/2013/09/130808-CADWAGO-WP2.pdf> (accessed on 10 November 2016).
54. Kolb, D.A.; Fry, R.E. Toward an applied theory of experiential learning. In *Theories of Group Process*; Cooper, C., Ed.; John Wiley: London, UK, 1975; pp. 33–57.
55. Lewin, K. Action research and minority problems. In *Resolving Social Conflicts*; Lewin, G.W., Ed.; Harper & Row: New York, NY, USA, 1946; pp. 201–216.
56. Schön, D. *The Reflective Practitioner: How Professionals Think in Action*; Ashgate: Aldershot, UK, 1983.
57. Mezirow, J. *Fostering Critical Reflection in Adulthood: A Guide to Transformative and Emancipatory Learning*; Jossey-Bass: San Francisco, CA, USA, 1990.
58. Blackmore, C. What kinds of knowledge, knowing and learning are required for addressing resource dilemmas? A theoretical overview. *Environ. Sci. Policy* **2007**, *10*, 512–525. [[CrossRef](#)]
59. Wenger, E. *Communities of Practice: Learning, Meaning and Identity*; Cambridge University Press: Cambridge, UK, 1998.
60. Wenger-Trayner, E.; Wenger-Trayner, B. Learning in a Landscape of practice—A framework. In *Learning in Landscapes of Practice: Boundaries, Identity and Knowledgeability in Practice-Based Learning*; Wenger, T.E., Fenton-O'Creevy, M., Hutchinson, S., Kubiak, C., Wenger-Trayner, B., Eds.; Routledge: London, UK, 2015; pp. 13–29.
61. Fernandez, G.; Shaw, R. Education, Training, and Capacity Building for Sustainable Development. In *Sustainable Development and Disaster Risk Reduction*; Uitto, J.I., Shaw, R., Eds.; Springer: Tokyo, Japan, 2016; pp. 215–225.

62. Mwansa, D.M. Theatre for Development: A Multifform Approach to Behaviour Change and Empowerment in the Fight against Spread of Hiv/Aids. Defence Forces. Available online: <http://www.unesco.org/education/uie/pdf/Mwansa.pdf> (accessed on 18 February 2017).
63. Johansson, O. The Limits of Community-Based Theatre Performance and HIV Prevention in Tanzania. TDR: The Drama Review New York University and the Massachusetts Institute of Technology. Available online: <https://eprints.mdx.ac.uk/10803/1/The%20Limits%20of%20Community-Based%20Theatre.pdf> (accessed on 18 November 2016).
64. Wilson, M. The tradition of personal storytelling, the narrative superhighway and notions of authority in the public debate on climate change. In *Storytelling Today: Instrument, Tradition and Art*; University of the Algarve: Faro, Portugal, 2013.
65. McCarthy, J. *Enacting Participatory Development: Theatre-Based Techniques*; Earthscan: London, UK, 2004.
66. Barnes, H.; Coetzee, M.H. *Applied Drama/Theatre as Social Intervention in Conflict and Post-Conflict Contexts*; Cambridge Scholars Publishing: Newcastle upon Tyne, UK, 2014.
67. Yankah, V. Shuttle theatre as theatre for conflict resolution: The CILTAD/Agoro experience in Ghana. South African. *Theatre J.* **2011**, *25*, 197–207. [[CrossRef](#)]
68. Boal, A. *Theatre of the Oppressed*; Pluto Press: Sidmouth, UK, 1979.
69. Boal, A. *Legislative Theatre: Using Performance to Make Politics*; Taylor and Francis: London, UK, 1998.
70. Bruner, J. *Making Stories, Law, Literature and Life*; Harvard University Press: Cambridge, MA, USA, 2002.
71. The Reasons. Available online: <http://dryproject.co.uk/tag/the-reasons/> (accessed on 18 February 2017).
72. Checkland, P. Soft systems methodology: A thirty-year retrospective. *Syst. Res. Behav. Sci.* **2000**, *17*, S11. [[CrossRef](#)]
73. Colvin, J.; Blackmore, C.; Chimbunya, S.; Collins, K.; Dent, M.; Goss, J.; Ison, R.; Roggero, P.P.; Seddaiu, G. In search of systemic innovation for sustainable development: A design praxis emerging from a decade of social learning inquiry. *Res. Policy* **2014**, *43*, 760–771. [[CrossRef](#)]
74. Ison, R. Governing in the Anthropocene: What future systems thinking in practice? *Syst. Res. Behav. Sci.* **2016**, *33*, 595–613. [[CrossRef](#)]
75. Blackmore, C.; Ison, R.; Jiggins, J. Social learning: An alternative policy instrument for managing in the context of Europe's water. *Environ. Sci. Policy* **2007**, *10*, 493–498. [[CrossRef](#)]
76. Ison, R.; Röling, N.; Watson, D. Challenges to science and society in the sustainable management and use of water: Investigating the role of social learning. *Environ. Sci. Policy* **2007**, *10*, 499–511. [[CrossRef](#)]



© 2017 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).