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# Framing Water Policies: A Transdisciplinary Study of Collaborative Governance; the Katari River Basin (Bolivia)

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**Abstract:** Collaborative water governance deals with diverse actors under participatory systems of decision making. This form of water governance involves stakeholders with fundamentally different values and premises about water resources, as well as different understandings of the problem and how to approach it. Thus, one of the major challenges of collaborative water governance relies on the diversity of frames carried by stakeholders involved and the shift from hierarchical decision-making to a more collaborative and participative process. The fragmentation of frames can represent an obstacle, impede mutual understanding, and negatively influence decision making and policy outcomes. Based on participative observation, interviews, and document analysis, we explored the drivers behind the framing process in the multi-actor platform of the Katari River Basin, located in Bolivia. The results highlight a participatory process design favoring the fragmentation of frames and a unidirectional decision-making process, where public authority, scientific–technical expertise, and the local community's knowledge are insulated, and communication among actors is asymmetrical. At the same time, this research reveals the influence of the political context in the framing process.

**Keywords:** collaborative water governance; framing; transdisciplinary research; sensemaking; communication; Bolivia

## 1. Introduction

Disparities in water and sanitation access, agricultural expansion, climate change, and impacts related to draughts and floods brought attention to the sustainability of the water sector as essential for dealing with today's global challenges [1]. However, rather than merely depending on biophysical conditions, the water challenges depend on diverse sector interdependencies, political agendas, economic interests, and cultural aspects, which call for integrative approaches to managing water resources [2]. Such collaborative forms of water governance acquire interest in dealing with the complex nature of these socioecological systems since they bring together multiple and diverse stakeholders involved in the decision-making process. Yet the diversity of backgrounds,

disciplines, cultures, and knowledge can engage differing frames, which can represent an obstacle to articulate collaboration [3].

Effective decision-making relies on understanding how individuals make sense of a problem, a process usually referred to as framing, as in a connection of frames or an interactional frame [4]. Analyzing the framing process in a multi-actor water governance scenario can be decisive for coping with the challenge that diversity represents under collaborative water governance settings [5]. Without the proper management of the framing process, participants might limit their attention to specific aspects, framing the water issues in divergent ways and telling contrasting stories about what is going on and what should be done, which leads to fragmented frames. On the other hand, an interactional framing process in which the actors share and discuss individual understandings of the water issues can help to reduce the ambiguity usually present in participatory water policy-making processes.

Although framing in water management research received ample attention in the past [6–8], little attention was given to understanding the drivers behind framing processes and their relationships to collaborative water governance. Hence, this article aims to understand the drivers behind the fragmentation and connection of frames in multi-actor water governance settings. This study also explores how framing relates with water governance outcomes and results based on how the Katari River Basin multi-actor platform's participants attribute meanings to water issues.

This case study research unveils that the participatory process design and implementation and the political context can be considered drivers behind the fragmentation of frames. We argue that there is a strong relationship between the participatory process design [9], the framing process and the water governance outcomes. Moreover, this research portrays how the fragmentation of frames influences the expected collaborative water governance. Therefore, a proper interactional framing process and collective sensemaking about water issues may improve the effectiveness of water governance platforms.

This article is organized as follows. First, we outline the conceptual framework used in this study. In the methodology section, we present the qualitative methods for identifying the drivers behind the fragmentation and connection of frames in a participatory water governance platform. The results section first summarizes the Katari River Basin (KRB) public participation findings; then, these data are linked with the framing process; finally, we explore how this finding is linked to the collaborative water governance outcomes. In the discussion section, we argue that the participatory process design and the political context are the drivers for the fragmentation and connection of frames. We conclude by presenting how the framing process can be related to the water governance outcomes and results. This research contributes to understanding the relationship between collaborative water governance and the framing process within transdisciplinary decision-making systems.

## 2. Conceptual Framework

### 2.1. Collaborative Water Governance and the Transdisciplinary Approach

Integrated water resource management brought a new paradigm in which river basins are considered the appropriate boundary system for dealing with today´s water challenges and in which the participation and collaboration of stakeholders is imperative for dealing with complex water-related problems. This approach mobilizes multiple stakeholders in decision-making forums to develop and implement policies related to common water resources. This collaborative form of water governance represents a shift from a conventional government control-driven model to a stakeholder shared-management network [10]:

> *Collaborative governance refers to a governing arrangement where one or more public agencies engage non-state stakeholders in a collective decision-making process that is formal, consensus-oriented, and deliberative and that aims to make or implement public policy or manage public programs or assets* [11]

This form of water governance is expected to be more effective than traditional institutions in shaping regulatory outcomes, ensuring compliance, facilitating implementation, and enhancing the effectiveness of water policies. This is due to more knowledge acquisition and acceptance of decisions [12,13].

Collaborative water governance usually involves stakeholders representing public and private sectors such as agriculture, industry, energy, and forestry. At the same time, it frequently crosses public management jurisdictions at different spatial and jurisdictional scales, encountering contested interests, diverse forms of knowledge, and different understandings of the water problems. Consequently, a transdisciplinary approach can be considered necessary in water decision-making processes.

Aligned with collaborative water governance, the transdisciplinary approach integrates diverse forms of scientific and nonscientific knowledge, facilitating a systemic way of addressing a complex problem [14,15]. It also includes nonacademic actors in the process, involving community-based stakeholders who are usually closely related to and/or affected by the decisions made. Transdisciplinarity can be considered a collective learning and innovation process that is particularly employed in ecological and sustainable development issues [14,16]. Consequently, the transdisciplinary approach seems relevant to investigating the collaborative water governance process.

Decision-making can be considered at the core of collaborative water governance [17]. Decisions are usually driven by how decision-makers make sense of the situation they are dealing with. The web of interdependencies among actors, the lack of uncertain information, and the ambiguity because people may disagree on what exactly the problem turns decision-making into a difficult task [18]. To deal with this, framing is a process employed to connect the diverse ways participants understand the water problems.

## 2.2. Framing and Making Sense of the Water Problems

Collaborative water governance involves actors with fundamentally different values and premises about water resources, as well as different understandings of the problem and how to approach it based on the change from a government control-driven model to a stakeholder-shared managed network. Thus, one of the major challenges of collaborative water governance is the diversity of stakeholder frames involved and the challenge to unidirectional models of governance. Art Dewulf is one of the main authors who has worked particularly in the field of water management related to issue framing, the cognitive frame, and interactional framing analysis. His proposal has also been linked with sensemaking and decision-making in collaborative water management [18].

A cognitive frame consists of individual mental understandings, interpretations, and simplifications of reality [5]. The various disciplines, forms of expertise, and backgrounds involved in these multi-actor settings usually limit individuals to focus their attention on particular aspects of the situation, portraying separate understandings of the issues involved and how these should be addressed. Therefore, it is pivotal to reveal the cognitive frames since they influence how people act towards the issues involved. Furthermore, it is necessary to encourage an interactional framing analysis, where the diversity of frames can be revealed but also discussed and eventually connected in a framing process. While cognitive analysis allows us to see how people build their frames individually, in their own minds, interactional framing allows us to see how people can build their framing collectively in relation to how they interact with each other [4].

Framing is strongly connected with sensemaking. To make sense of situations that triggered ambiguity and uncertainty such as complex water problems, people will attribute, negotiate, and construct new meanings through interactions in particular contexts. How an issue becomes "an issue" in the first place, what meanings are built around it, and how it is named and discussed will influence the way it will be tackled and eventually solved [19,20].

Effective decision-making in collaborative water governance relies on connecting the ways individuals make sense of a problem, a process usually referred to as interactional framing or a connection of frames [4]. Framing is a process required for dealing with the

ambiguities in multi-actor settings [4]. It involves knowledge co-production, which can generate motivation and commitment to articulate collective action. The connection of frames is the meaningful constructed story in which the common ground is explored and negotiated [18]. It is a constructive form of dialogue in which the participants provide meaningful contributions that can be questioned by others and through which situations are explored, formulated, and reformulated in a productive way [5].

On the other hand, without incorporating framing into water management, the participants might limit their attention to specific aspects of the situation, framing water issues in divergent ways and telling contrasting stories about what is going on and what should be done. This results in different understandings, voices, and opinions around the problem and the specific situations these multiple actors are dealing with. This fragmentation of frames generates a specific kind of ambiguity [21] that can turn water decision making into a potential minefield, directing the resultant water policies into big words without concrete choices [18].

### 2.3. Framing and Effective Public Participation

To understand the fragmentation and connection of frames, we rely upon the participatory framework proposed by [9]. This framework (see Figure 1) was developed to understand the effectiveness of public participation in environmental governance. However, it is also applicable to the study of framing based on the dimensions incorporated and the detailed characteristics proposed within the framework.

This model assumes that the results and outcomes are dependent on how exactly the public participates. At the same time, the societal context influences participation. Furthermore, the results and outcomes feed back into the societal system. Each dimension of this model incorporates specific characteristics, allowing for a better understanding of the variables influencing public participation in environmental governance (Table 1), which are also useful for understanding the causes and the potential influence of the fragmented and connected frames in collaborative water governance and its policy outcomes. Further explanation on applying this analytical framework is provided in the next section.

**Table 1.** Characteristics concerning context, process, and results.

| Context | Process | Results |
|---|---|---|
| Problem structure | Process design | Direct results of the participation process |
| - problem complexity (expertise and time required for understanding)<br>- spatial scale<br>- possible solutions (technical and other, costs) | - opportunities for NSA to participate (process type as given by CA)<br>- fairness (representativeness, etc.) | - information gain for the CA<br>- consensual conflict resolution<br>- NSA's acceptance of and identification with the decision<br>- strengthening of trust relationship among NSA and between NSA and CA |
| Actors | Process realization | Substantive output and outcome |
| - interest, concern<br>- power/resources<br>- informedness/understanding of the problem<br>- willingness to participate | - information flow from CA to NSA (measure of relevant information that is provided)<br>- information flow from NSA to CA<br>- alic>16) actual participation and intervention on the part of NSA | - result of decision (suitability of measures; incentives, sanctions, implementability)<br>- implementation and compliance by the addressees<br>- environmental outcomes (measurable effects according to the stated goal) |
| Social structure | | |
| - public attention towards the issue<br>- collective social capital (generalized trust)<br>- social norms | | |

Source: Adapted from [9]. CA refers to competent authority and NSA stands for Non-state actors.
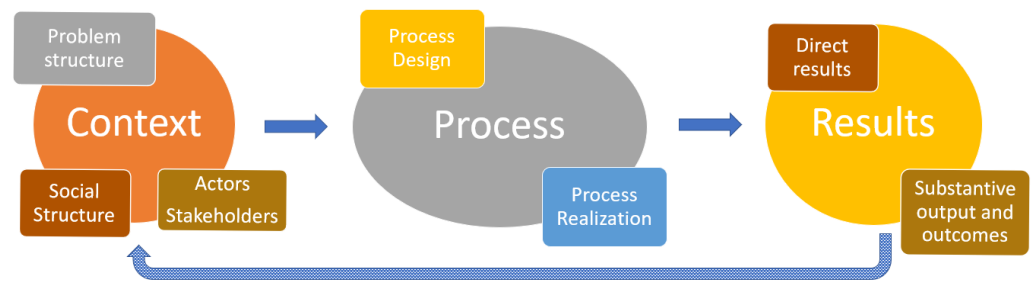
**Figure 1.** Analytical framework of public participation effectiveness [9].

## 3. Materials and Methods

### 3.1. The Katari River Basin Case Study

The KRB is located in South America, in the Andes region of La Paz, Bolivia. This case first caught the attention of the national authorities in 2002, when rural indigenous communities initiated several protests due to the high levels of contamination present at the discharge area of this watershed. The rural migration and mineral reservoirs within this river basin had triggered the development of mining activities, urban expansion, industrial growth, and increases in agricultural practices (Figure 2). These developments are responsible for the environmental disaster present in the river basin since they all contribute diverse forms of contamination.
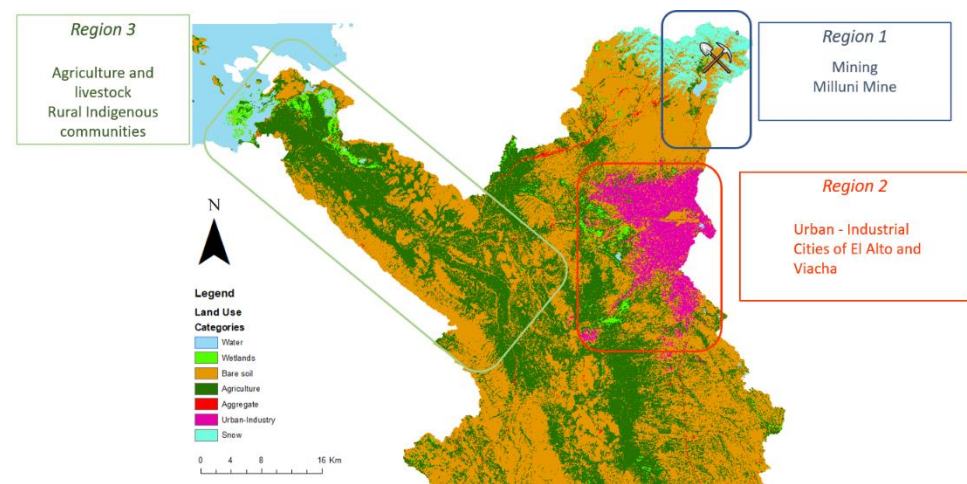


**Figure 2.** Katari River Basin—Regions of environmental influence.

Over 16 years, although public policies developed by the national, regional, and municipal governments attempted to deal with the problem of contamination, the trend of environmental degradation continued, reflecting a lack of policy effectiveness [22]. In 2016, the Bolivian Ministry of Water and Environment initiated a river basin master plan that established the KRB Interinstitutional Platform. This platform was created to bring together diverse stakeholders and involve them in a collective decision-making process to deal with the severe contamination problem. The KRB incorporates five municipalities: El Alto, Viacha, Laja, Pucarani, and Puerto Pérez. The KRB interinstitutional platform includes various levels of public authority jurisdiction in which the vertical interplay incorporates the national and regional governments, municipalities, and rural indigenous communities.

Consequently, this interinstitutional platform includes representatives from all government levels. At the same time, it incorporates representatives from universities, research institutes, and international cooperation agencies. Furthermore, the interinstitutional platform also includes civil society representation in terms of community-based organizations such as rural indigenous representatives and farmer unions. This platform is presented in Figure 3.
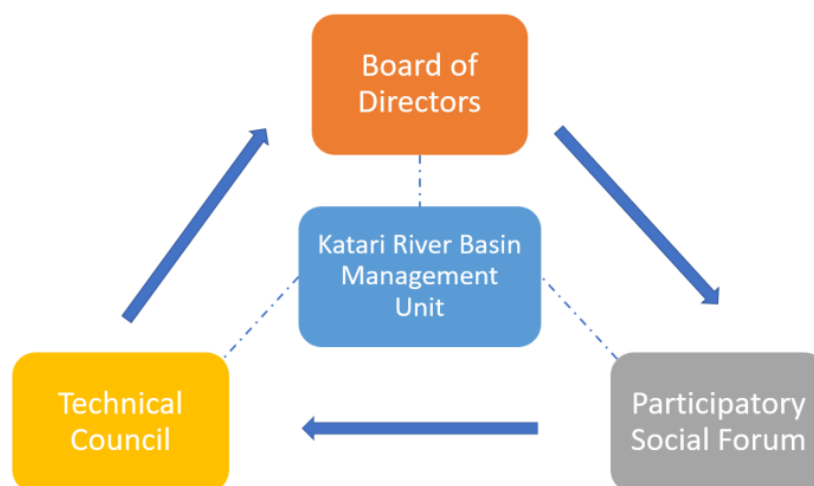
**Figure 3.** Katari River Basin platform's organizational structure, from [23].

The rich diversity of the involved actors and the complexity of the problem behind this river basin make this case study a suitable scenario for exploring the drivers behind the fragmentation and connection of frames.

### 3.2. Methods

This research relied on two main approaches to framing: cognitive and interactional. Whereas cognitive frame focuses on an individual representation when confronting an issue, interactional framing refers to the co-construction of the meaning of the issue [4]. The former was operationalized through individual interviews with KRB platform participants to discern their individual representations of water issues and their interactions within the platform. The latter was studied through observing the party's co-construction of water issue meaning during KRB interinstitutional platform meetings.

At the same time, this study was conducted following a transdisciplinary approach. This work is a result of the La Paz Transdisciplinary Learning Community from the Inter-University Cooperation program in Bolivia. This program is implemented between academics from Universidad Católica Boliviana and academics from Flemish universities in Belgium and is supported by the Flemish interuniversity council VLIR-UOS. These diverse backgrounds have contributed to this research. As water management problems tend to be highly complex, they require different forms of knowledge, expertise, perspectives, and ways to make sense of it. The research team worked in a collective and dialogical process for the data collection, the data analysis, and the writing of this article. This enriched the discussion about framing under collaborative water governance forums.

### 3.2.1. Data Collection

The study is based on an abductive strategy that aims to understand social life based on the recounts, meanings, and language from the social actors [24]. It was applied through the semi-structured interviews, held during April 2021 with members of the KRB interinstitutional platform, such as community-based organizations, national government agencies, regional environmental agencies, municipal governments, and international cooperation agencies. Initially, 30 different members of the KRB platform who had attended the General Assembly in 2020 were considered for this study. From this initial pool, 13 actors were considered in the sample, through randomized purposive sampling (11 were interviewed individually and 2 were interviewed jointly). At least one member of the four groups of actors was selected randomly (see Table 2). Moreover, we aimed to maintain a gender balance.

**Table 2.** Stakeholders interviewed.

| Group of Actors | Gender (Female/Male) | Code |
|---|---|---|
| Community Representative 1 | M | CR-M-01 |
| Community Representative 2 | M | CR-M-02 |
| Ministry of Environment and Water Representative 1 | F | MEW-F-01 |
| Ministry of Environment and Water Representative 2 | F | MEW-F-02 |
| Ministry of Environment and Water Representative 3 | F | MEW-F-03 |
| Health Ministry Representatives (in joint interview) | M-M | OM-M-01/OM-M-02 |
| Regional government representative | F | ARGL-F-01 |
| Municipal Government Representative 1 | F | M-F-01 |
| Municipal Government Representative 2 | F | M-F-02 |
| International Cooperation Representative 1 | M | I-M-01 |
| International Cooperation Representative 2 | M | I-M-02 |
| University Representative | F | U-F-01 |

We used semi-structured interviews according to a guide proposed in a previous study [25]. Participants were asked about their (a) perceptions of water problems in the area, (b) the possible solutions, (c) the main challenges, (d) the river basin committee work, (e) its outcomes, (f) their participation in the KRB interinstitutional platform, (g) the results from that process, and (h) their suggestions for improving the work and the water situation. These questions allowed us to understand the cognitive frames, i.e., how the actors attributed meanings and built an understanding of water issues. Against this backdrop, it was possible to reveal how cognitive frames are disconnected or connected.

Furthermore, we observed the KRB interinstitutional platform functioning during the annual technical and general assembly in December 2020. The purpose of this observation was to understand the interactional framing process, namely, how the actors jointly co-constructed, contributed to, questioned, and explored the river basin water issues and how the interaction between assembly parties' shaped and formulated the river basin scenario. We observed how the participatory process occurs, who intervenes more often, why, and how. Furthermore, in February 2021, we observed the Board of Directors' Assembly and in July 2021, the Participatory Social Forum and Technical Council meetings. Additionally, during the Participatory Social Forum, we held informal interviews with three community-based representatives. These observations aimed to offer a better understanding of the actors involved, their actual roles in the platform, the KRB interinstitutional platform meetings' structure and organization in practice, and their actual decision-making capabilities.

Describing the fragmentation/connection of frames implies understanding the KRB context, policy framework, current real-life events, and people perceptions through multiple pieces of evidence. This research describes the KRB's environmental circumstances based on previously published studies [22,26–30]. The analysis of these secondary data focused attention on understanding the river basin context and its environmental characteristics. The policy framework analysis evaluated the problem framing, the policy objectives, and the scale considered with the policies developed for the Katari River Basin. This secondary data review incorporates Law 2798 [31], the 2010 KRB Plan [32], the 2014 Bolivian Government Comptroller Environmental Audit [33], and the 2018–2030 KRB Plan [23], which is the current river basin policy under implementation. This research also explored local media articles from 2004 to 2019 to consider the social context and important (political)

events during the period in which the decision making and policies regarding the KRB studied here took place. Based on all this information, it was possible to demonstrate the formal KRB problem framing.

3.2.2. Data Analysis

The data analysis was grounded in coding and categorizing, where the data were labelled, organized, and linked in particular codes that can be grouped into categories [34]. These codes and categories represent new concepts built by the researcher according to the data. We applied this method to the 11 selected interviews and the recorded General Assembly meeting (December 2020), the Board of Directors Assembly (May 2021), the Participatory Social Forum (June 2021), the Technical Council (June 2021), and informal discussion with three community-based representatives, held after the Participatory Social Forum in June (2021). We used NVivo software to conduct this process in two main stages. NVivo is a qualitative data analysis tool that allows for coding, a qualitative method that allows for going beyond the collected data in order to connect, transform, reorganize, and reconceptualize data, opening more analytical possibilities by building new relationships among data and developing new categories built on them [35]. In this case, we began with the open coding stage, where we labelled the most important information using the three key categories context, process, and results. For this process, we considered the observations and the information notes based on secondary data review. Then, in the axial coding stage, we started to build new categories. The results that came after this process are presented in the following section.

## 4. Results

### 4.1. The Social Context behind the Fragmentation of Frames

The social context around the KRB is characterized by problem complexity and a spatial scale that goes beyond the boundaries of the KRB and the social structure, all of which influence public participation.

The KRB problem is highly complex because there are four main environmental drivers generating the contamination: mining passive environmental waste located in the Milluni Mine, urban wastewater, industrial effluents, and solid waste produced in the cities of El Alto and Viacha [25,27,32,33,36,37]. These drivers of contamination occur in divergent local spatial and jurisdictional scales involving many authority jurisdictions and stakeholders. Moreover, the impacts associated with these environmental drivers are materializing in a different spatial scale in which vulnerable indigenous groups are affected by the environmental impacts [22]. To find a sustainable solution to the problem of environmental degradation, the potential solutions must be linked with the origin of this problem in which these environmental drivers are the primary sources of contamination.

Moreover, the spatial scale linked to the contamination problem shown in Figure 2 points to a hydrological system incorporating the five main municipalities highlighted in Figure 4's left side: El Alto, Viacha, Laja, Pucarani, and Puerto Pérez [22,28,29,37]. The river basin´s policies developed from 2004 to 2010 aligned with this spatial scale. However, the KRB´s Plan 2018 incorporated the Lago Menor, now involving 24 municipalities in total. This policy is currently under implementation (Figure 4).

This change in the policy spatial scale may have important implications for how the KRB scenario is framed since the hydrological spatial scale shows a link based on the river basin interrelations, i.e., stakeholders are connected through the surface water crossing their jurisdictions. In contrast, the municipalities in the 2018 policy increase the number of problem frames involved. At the same time, these lack an interconnection, which increases the complexity and challenges in the framing during the river basin committee meetings.

The social structure refers to public attention on the issue, social norms, and collective social capital (generalized trust). Regarding the public attention on the issue during the data collection, there was very little local news coverage of water contamination in the KRB. Additionally, concerning social norms, the data did not reveal collective social norms among

the participants, which could be another sign of fragmentation among them. Associated with the collective social capital, the KRB findings reveal mistrust among the different actors involved in the KRB interinstitutional platform. The community representatives expressed a lack of trust because the public authorities did not seem to answer their demands. Moreover, academics, international cooperation representatives, and community representatives expressed a lack of trust regarding the information given by the Ministry during the forums and assemblies.
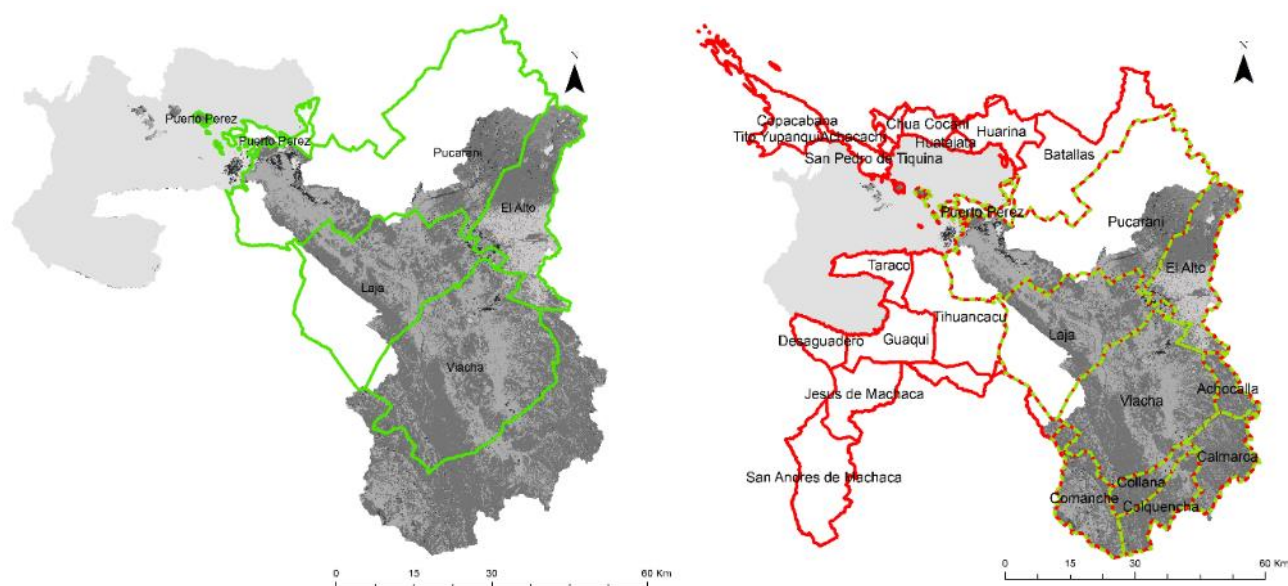


**Figure 4.** Spatial scale. Left shows the intersection between the KRB and the main jurisdictions involved. The right shows the 2018 KRB intersected with the 2018 Katari River Basin Plan jurisdictions involved.

The lack of trust among participants may be explained through the interinstitutional platform structure. As shown in Figure 3, the structure differentiates participants into three social clusters: The board of directors integrated by the ministry, state, and municipalities representatives; the technical council, which includes international cooperation agencies, researchers, and university representatives; and the participatory social forum, featuring community-based organizations. Under this structure, the power of decision-making remains within the board of directors and excludes representatives of the technical council and the participatory social forum. Overall, the participatory process design might contribute to the participants' lack of trust, which we discuss later in the paper.

*4.2. Decision-Making Processes and the Fragmentation of Frames*

In collaborative forms of governance, the meanings attributed to the problem to be solved are related to the decision-making process. The design of this process will determine who participates and the flows of communication and interactions among actors. Thus, in this section, we present the meanings constructed around the decision-making (focused on the participatory process design and the process realization), the water issues, and how this affects the fragmentation of frames. We consider this essential for the coproduction of knowledge, collective sensemaking, and the connection of frames.

4.2.1. Participatory Process Design in Decision making

The process design plays an important role in fairness in terms of equal opportunities for participants to share their concerns and express their ideas. It is relevant for the framing process and for finding collective solutions to socioecological complexities. The KRB platform involves a widely diverse group of participants. However, local rural communities

felt undermined by the KRB platform because some of them were not summoned to the meetings. In addition, other participants did not receive a direct invitation from the platform, and some argued that the lack of local native language speakers in the communication process impeded a shared sense for collaborative action:

> *I suggest including those who live there, from the communities on the Titicaca Lakeshore. If we could integrate the people who know the reality, those who also speak Aymara ( . . . ) they will explain it to us in their language. In this way, I believe we can carry out concrete actions with the participation of the communities* (community representative 2).

On the other hand, the process design includes representation of local public authorities from municipal governments. As the river basin policy has incorporated 24 municipalities since 2018 (Figure 4), this process design included municipal governments out of the KRB hydro-geographical scale. In river basin collaborative governance, the influence of an inconsistent match between the hydrological geographical scale and the participatory design may have a crucial influence on the connection of frames. Some participants highlighted this issue and considered that it might negatively influence the process:

> *So, if what they are talking about is not an issue that concerns me, what will I contribute to the discussion? I stay silent, looking vacantly at their conversation ( . . . ) So maybe the Board of Directors or the organizers [should] identify the different problems at the beginning and determine which institutions relate to which issue. So, if the problem concerns me, I could say something ( . . . ) I could complain* (regional government representative).

Moreover, most environmental drivers are located in El Alto, the main source of contamination since the majority of the environment drivers occur under its jurisdiction and spatial scale. However, several stakeholders considered that the participation of the municipality of EL Alto has been significantly limited:

> *This has also been another big problem, that the municipality of El Alto itself has not always been a participant despite the fact that it is the main source of contamination* (Ministry of Water and Environment representative 2).

This could be explained through the following argument:

> *I have complained in two of their assemblies because they gave the same weight to the rest of the municipalities as to El Alto, when, in reality, those municipalities gravitate around El Alto ( . . . ) So, they didn't grant to El Alto the importance it deserves ( . . . ) El Alto has been downplayed, although the problems really arise there. The largest concentration of people lives there compared to the other lake municipalities, which suffer the consequences. I have noticed this deficiency* (municipal government representative 1).

The data analysis shows 39 references in 11 interviews mentioning that the lack of participation of El Alto is linked to the political context:

> *The main factor is the political differences they had. In the last five years, there has been [in El Alto] a [municipal] government opposed to the [national] government ( . . . ) So, the national government has not given much importance to the municipal one. It has also been reciprocal. The municipal government [of El Alto] participates [in the platform] but at the level of its technicians, who have no decision-making power* (Ministry of Environment and Water representative 1).

At the same time, the KRB participants revealed some important divergencies in the problem understanding at different scales. On the one hand, most of the participants representing higher levels, such as the ministry, international cooperation agencies, universities, and research institutions, framed the problem as surface water contamination. On the other hand, at the local levels, the local water services were also a priority:

> *All the provinces that attended this forum told each other: brothers, we don't have drinking water ( . . . ) We need wells to be drilled; we need water. You know well that*

*water is life. So, our brothers improvise digging wells and drink that water but do not know if it is safe* (informal interview—participatory social forum).

It seems that the higher levels of authority, such as the Ministry of Water and Environment, considered environmental priorities over other local needs. The ministry authorities developed and tried to implement environmental infrastructure in municipalities and rural communities, although without much success.

The KRB platform presents asymmetrical participation, which can lead to fragmented frames in the KRB water governance. This is likely because there are communities that are not included despite their importance, because they are not invited to platform meetings or because their local language is not represented at the meetings. Moreover, there is an asymmetry concerning El Alto municipality participation because of its political differences with the national government. Finally, the incorporation of 24 municipalities represents an inconsistent match between the hydrological geographical scale and the participatory design. This can explain the disconnected issue framing because not all participants are equally affected by the problems of the Katari River Basin.

### 4.2.2. Decision-Making Process Implementation

Participation in the KRB platform takes place within three separate meetings: a social participatory forum, a technical council, and a board of directors meeting. Then, a General Assembly that includes all representatives of these three groups takes place. The structure of these meetings encompasses three segments: an introduction, a discussion table, and the meeting´s results presentation.

In the introduction, the Ministry of Water and Environment presents the KRB management plan and the implementation progress. This section usually takes place over two and a half hours. After this long introduction, many participants showed fatigue, and some others left the meeting before the following segment. Additionally, this segment is a one-way information flow that highly limits the interaction and discussion:

*I have not seen scenarios where they tell us 'What ideas do you have?' or 'What projects do you have?' They shall bring them on so we can manage them through the platform* (Ministry of Water and Environment representative 2).

Moreover, the information given by the Ministry of Water and Environment during these meetings is considered biased by some participants:

*a presentation of the UGCK [Ministry of Water and Environment], showing its annual report, explaining that everything has been done very well and that it has spent its entire budget ( . . . ) In fact, when we leave the assembly, we have the impression that the world is perfect [he chuckles]. I hope it is the case, but I sincerely doubt it is really the case knowing the basin* (international cooperation representative 2).

During the second part of the meetings, the ministry staff organizes discussion tables and decides who participates in each of them. These roundtables are clustered in the following five themes based on the KRB 2018 policy: (1) institutionality with plural participation and social control, (2) population and water security for production, (3) hydraulic-environmental quality management (two tables), (4) life systems sustainability, and (5) knowledge management and hydro-environmental information. However, most of the participating organizations have only one representative at the platform, limiting their participation and dialogue to only one roundtable:

*But the most important thing is that not all the municipalities participated in these round tables ( . . . ) For example, another table discussed the issue of wastewater in which I did not participate. But we also have these problems and have ideas to solve them* (municipal government representative 2).

Finally, the third part of the meetings is presenting the meeting results. During this part, in the board of directors meetings and the General Assembly, the ministry staff presented the resolutions developed by each roundtable. In the technical council meetings

and the participatory social forum, each roundtable assigned one representative to present their resolution. When we asked the interviewees about the interaction, dialogue, and participation during the KRB platform, many of them expressed disconformity:

> *Honestly, I wouldn't evaluate it very positively because although it is a meeting of components that can interact, they don't get to interact. So, we meet but do not interact. The worst thing is that since we don't interact, we don't discuss and conclude. Therefore, we don't act. So, as you see, it's a sequel, steps that we must distinguish. We have stayed at the first step, at the idea* (university representative).

In sum, participation in the KRB interinstitutional platform is asymmetrical because of the one-way information flow, the bias in the information, the exclusion of some participants, and the protagonist role of the Ministry of Water and Environment. Indeed, during the second and third parts of the meetings, the degree of participation was still rather low; attendees checked their cell phones during the meetings or stepped out of the room to take calls, and some even fell asleep during the meetings. In fact, almost 50% of the participants left the meeting before it ended. This can be linked with the unidirectional flow of information in the meetings because ministry representatives presented their activities and their results without involving the participants in their presentations. The only time participants had the opportunity to talk was during the roundtables, which started after two or three hours of just listening to the ministry representatives. However, even then, the discussions were limited to the topics chosen by the ministry representatives, and even with the diverse actors, not everyone participated equally, and this asymmetrical process of participation restricted any interactional framing and diminished the expected outcomes of collaboration.

*4.3. Participatory Process Design and the Water Governance Outcomes*

The decision-making results of a collaborative process can be classified into two main categories: the direct results of the decision-making process and the substantive output and outcomes. As will be seen, the outcomes are uninformed actors and unilateral initiatives.

Within the direct results of the participatory process, it is expected that there will be an information gain, a potential conflict resolution, and the acceptance of and identification with the decisions made during the process. The KRB results show a limited information gain since, as mentioned previously, the information flow was mainly unidirectional. Participants did not have significant interaction with the public authorities and consequently could not provide considerable insights into the process. At the same time, nonstate actors also indicated limited information gain or understanding of the KRB interinstitutional platform. For instance, many interviewees showed confusion between the river basin plan, the interinstitutional platform, and the KRB management unit. Some participants referred to the platform as the KRB plan, and others referred to the KRB management unit as the platform. This reveals a limited understanding of the governance structure and its functioning.

By design, the KRB decision-making process did not allow consensual conflict resolution. As mentioned previously, each cluster of stakeholders was limited to similar forms of knowledge and institutional backgrounds and, consequently, to a certain frame. As a result, conflicts arise because transdisciplinarity benefits are hampered through this compartmentalized dialog among stakeholders.

> *Since they ignore us, we are thinking to close the valve [of the water supply]* (community representative—informal interview, participatory social forum).

This can also be linked to the acceptance of and identification with the decisions from the local actors. Thus, the community-based organization tends to criticize the limited actions of public authorities, while ministry representatives tend to accuse local communities of blocking the projects they try to implement within their municipalities:

*From my perspective, communities are also a great constraint. When someone wants to do a project, some communities oppose it. [The project] is delayed, and funding is lost because there is no social consensus* (Ministry of Water and Environment representative 2).

This can be explained because of another consequence of the asymmetrical process of participation: the lack of trust among stakeholders involved in the KRB interinstitutional platform. This mistrust is expressed by the community-based organizations toward the government ministries:

*Sometimes they do activities and don't call us [despite being community-based authorities]. They don't take us into account ( . . . ). They just tell us: you should organize an activity because a ministry member will come. So, we attended and helped, but we do not know what is behind it, what institution is behind it, or if the project continues* (informal group interview—July 2021).

Furthermore, there were expressions of mistrust toward the people chosen by the Ministry because they are outsiders:

*In the Ministry, who is now in charge of the Katari Basin? A 'Cochalo' (a person from Cochabamba, which is a city located in a region distant from the Katari River Basin). That 'Cochalo' . . . does he know our reality? No. The government is making a mistake because it should appoint people who live and understand here. Thus, [the government] could coordinate with us. But instead, he will not be able to work with us* (informal group interview—July 2021).

One of the representatives from the international cooperation also linked the mistrust with the lack of constant information. Moreover, as mentioned previously, the KRB interinstitutional platform as designed clusters stakeholders based on their institutional background into four groups (Figure 3). First, the River Basin Board of Directors incorporates the Ministry of Water and Environment, the State Government of La Paz, and the autonomous municipal governments. Second, the Technical Council includes university representatives, research institutes, and international cooperation agencies. Next, the Participatory Social Forum gathers community-based representation, which incorporates farmer unions, fisherman associations, neighborhood boards, dairy producers' cooperatives, and irrigation federations among others. Finally, the River Basin Management Unit is the Ministry's decentralized arm responsible for coordinating and operationalizing the river basin plan. Clustering the interactions among these forms of knowledge may be considered a driver behind the connection and fragmentation of frames within the participatory process.

The decision outcomes refer to the actual resolutions arising out of the participatory process. However, the KRB shows no evidence of consensus-oriented decisions emerging from the process. Instead, ministry agencies, municipal governments, and international cooperation agencies mentioned individual projects implemented based on each organization´s unilateral decision as their contribution to the river basin problem:

*We have cleaned the entire lake shore in our sector, which corresponds to us. Just there. We cannot go any further because it belongs to other communities, which will have to mobilize and clean as well. In that way, I think, we can maintain our lake* (community representative 2).

At the same time, it is expected that the decisions made during the meetings would be implemented in the river basin policy. However, the KRB plan did not result from a consensus-oriented decision-making process. The plan was developed by the ministry staff and delivered to the stakeholders. Furthermore, the 2018 policy plan lacks concrete objectives and reflects a high level of ambiguity:

*Because it is more an assessment, it isn't very objective, and it is not very specific. So, for example, its goals are not measured by indicators* (Ministry of Water and Environment representative 1).

> *For me, it is not a plan. It seems more like an assessment and perhaps recommendations*
> *for strategies. Planning should be long-term [actions] based on diagnosis to really identify*
> *what the biggest problems are* (international cooperation representative 2).

Concerning the implementation of the decisions, the Ministry and municipalities pointed to limitations to the KRB plan implementation due to the resistance of community-based organizations:

> *After the community told us: 'we don't want (the project)', we have found another place*
> *through dialogue with the regional government. It has been very complicated, but we*
> *finally obtained the land. But the last thing that happened to us is that the local people do*
> *not want this new place for the treatment plant* (Ministry representative—Assembly
> of the Board of Directors).

The environmental results are expected to show improvement in conditions such as water quality, biodiversity, or other environmental indicators linked to the policy objective. However, the timeframe of the KRB policy implementation did not allow us to see the actual environmental effects linked to the participatory process, since the policy implementation under analysis was initiated in 2018. On the other hand, there have been over 16 years of river basin policy implementation, and the contamination trend does not show any improvements [22,38].

At the same time, community-based representatives considered that the measures that are currently implemented lack sustainability. For instance, one of the measures implemented by the ministry is the solid-waste collection on the Lake Titicaca shore. This action may be positive in the short term for dealing with the environmental impacts in the river basin, but it does not seem a long-term solution. Without measures tackling the sources of the problem, i.e., the cities of El Alto and Viacha, solid waste will still be present on the shore of Lake Titicaca:

> *I remember that two years ago or maybe less, they cleaned the entire shore of Lake Titicaca*
> *and the Huatajata cemetery. I think they have also reached the entire shore of Cohana. I*
> *don't know that place well, but they cleaned it up. But that was momentary because if we*
> *return to the place, now it is still contaminated* (community representative 2).

The weak and asymmetrical participation affects the outcomes of the KRB platform, since the problems are not discussed and decisions are not made in collaboration among all stakeholders.

### 4.4. Framing Water Issues in the Katari River Basin

In this section, we distinguish two main ways of framing the KRB problem. On the one hand, we assess how policies and official government reports frame the water challenges in the river basin. On the other hand, we discuss the problem framed by stakeholders participating in the KRB interinstitutional platform, related to the process of decision making.

#### 4.4.1. Policy Framing

The public policies developed since 2004 have mainly framed the KRB problem as a scenario of water pollution. In 2004, a national congress decreed Bolivian Law 2798, declaring the KRB an "environmental disaster zone" and recalling a "fundamental need to decontaminate" the river basin [31].

Later, in 2010, the Ministry of Water and Environment introduced the KRB Plan. This plan framed the problem of the KRB in terms of water contamination, from which it specifies the "*increasing deterioration of water quality due to its intensive use, insufficient treatment, the disposal of solid waste in water bodies and the organic contamination from agricultural activities in the rural area downstream*" [32]. At the same time, this policy also identifies that the water resources are insufficient to supply the river basin demand.

The 2014 KRB Environmental Audit frames the KRB's problem as water pollution. At the same time, this environmental audit presented three main environmental drivers within the hydrological system: the acid mine drainage linked to the mining region; the urban wastewater, solid waste, land field leachate, and industrial emissions associated with the cities of El Alto and Viacha, which are considered the urban industrial region; and farming organic pollution related to the rural region [33]. In contrast, the 2018 KRB policy frames the situation of the KRB as: (1) the degradation of environmental functions and hydrological micro-river basins; (2) reductions in biodiversity and fish fauna; (3) the degradation of the totora and decreases in its environmental functions and uses; (4) unsatisfied demand for water, water shortages, and conflicts; and (5) life system vulnerability [24]. This shows that until 2018, most policies framed the problem of the KRB as contamination and insufficient water resources, whereas the 2018 policy frames the situation in a rather ambiguous manner, whereby the "critical problems" presented do not have a strong link with the previous policy domain.

4.4.2. Actors' Framing

The interviews with the stakeholders reflect diverse understandings of the problem present in the KRB. Most participants framed the issues of the KRB within a water contamination domain. This gives an opportunity for exploring the common ground as well as negotiating in relation to the KRB situation. On the other hand, the problem frame reflects divergencies (Table 3).

For international cooperation representatives, the water issues were linked with the lack of water regulations. They framed the problem in terms of lack of a water law and the "phenomenal use of antibiotics in El Alto". For community representative 1 and municipal representative 2, the water problem is more related to the city of El Alto. However, community-based representatives frame the problem as a situation of wastewater contamination produced by El Alto. On the other hand, municipality representatives frame the problem as El Alto´s lack of participation, and at the same time, the regional government representative mainly framed the problem as a problem of solid waste management and industry contamination.

Moreover, the different types of pollution linked to the meaning of water issues are also linked with the frames of the stakeholders interviewed based on their institutional contexts and respective backgrounds. For instance, the person responsible for solid waste in the Ministry of Water associates the problem with solid waste, while the representative of the university associates the problem with education. Likewise, a community-based representative framed the problem as based on a sense of community that goes beyond the human being:

> *When we speak of caring for the environment as a central point is the person, the human being, which should not be the case. I believe that we should start from the sense of community, considering that the community is not only a human community, the community is also made up of all the elements of nature, be they stars, animals, plants, the air we breathe, the sun, the coexistence that we have every day, that is the true community* (community representative, 2).

Moreover, stakeholders' perception of the potential solutions also reflects an important fragmentation, although there seems to be a common understanding of water-related issues. In addition, despite the fragmentation of the problem, there is an agreement regarding El Alto's contamination as a pivotal cause of water issues. In relation to the solution perspective, most agree about the necessity to encourage interest, participation, and communication among the actors.

In sum, there is a disconnected issue frame around the KRB among the actors of the platform. This is related to the lack of interactional framing and asymmetrical participation in both platform design and implementation.

**Table 3.** Actor´s problem frame.

| Stakeholder | Interview Response | Problem Frame |
|---|---|---|
| Community Representative 1 | *El Alto produces a lot of wastewaters that pollute the Titicaca Lake.* | Wastewater pollution from El Alto |
| Community Representative 2 | *For us, who understand the environment, we are worried. Because El Alto is polluting the Titicaca Lake* | Pollution from El Alto |
| Municipal government representative 1 | *River basins have not been considered, or in this case, the micro-watersheds. I'm talking about El Alto.* | El Alto is not taken into account |
| Municipal Government Representative 2 | *Another big problem is that El Alto's municipality seldom participates even though it is the primary source of wastewater, sewage, industrial and solid waste contamination.* <br> *As for pollution, no one was interested in that topic. It was like the fifth wheel. And then, everyone knows that it is an issue of contamination of rivers and solid waste, especially here in Laja, not because of our municipality but because of the surroundings of El Alto.* | El Alto´s lack of participation <br> Lack of environmental interest <br> Pollution from El Alto |
| Regional Government Representative | *activities related to solid waste management* <br> *So far, we have not identified the company that emits the most discharges for this pollution.* | Solid waste contamination coming companies <br> Lack of detection of the company producing solid waste |
| International Cooperation Representative 1 | *The Katari River Basin has most of the population concentrated in El Alto, producing significant effluents from domestic and industrial wastewater* <br> *It is known that in Bolivia, we still do not have a water law that could allow us to have much more rigid control over discharges.* | Industry and urban wastewater produced in El Alto <br> Lack of water legislation <br> Population growth in the city of El Alto |
| International Cooperation Representative 2 | *Water quality could be ( … ) mainly impacted by El Alto in terms of industries. There is no sewage collection ( … ) There is heavy antibiotic use in El Alto .* <br> *It could be due to the lack of water law.* | Industry contamination from EL Alto <br> Sewage infrastructure <br> Large use of antibiotics in El Alto <br> Lack of water legislation |
| Ministry of Environment and Water Representative 1 | *The issues of decontamination and the bloom are the basin's main problems.* | Environmental contamination in the river basin |
| Ministry of Environment and Water Representative 2 | *Also, there is a question of solid waste since these rivers are open. We do not have the [waste disposal] education. Besides, both industries and people dispose of their liquid discharges into rivers.* | Lack of population´s solid waste education <br> Wastewater from industries and citizens |
| Ministry of Environment and Water Representative 3 | *Wastewater from El Alto.* <br> *El Alto does not participate in these roundtables for dialogue and discussion.* | Wastewater from El Alto <br> Lack of participation of El Alto |
| Other Ministries Representatives | *We are interested in saving contaminated sites, but also when they are related to human health ( … ) We are concerned with the lake.* | Environmental remediation linked to human health <br> Environmental problems |
| University Representative | *All the garbage that comes from El Alto.* <br> *The problem of contamination by heavy metals is severe in the Katari basin ( … ). There are also health problems.* | Solid waste from EL Alto <br> Heavy metals contamination |

## 5. Discussion

The KRB case study confirms theories developed by Dewulf [4,19] that the lack of attention to the connection of frames increases the ambiguity present in water-related multi-actor settings. The KRB corroborates that lack of efforts given to connecting frames

resulted in a clear fragmentation of the interinstitutional platform, where participants represent water issues in significantly divergent ways.

Collaborative water governance involves diverse actors with different values related to water, as well as different understandings of the problem. Consequently, effective framing is essential for reducing the ambiguity usually present in these forums. The KRB platform shows an intention to implement a collaborative setting in which stakeholder representatives are involved in governance around water issues and decision-making at the river basin scale. However, the results of this study confirm the findings of Huitema et al. that the institutional prescriptions related to management at a river basin scale, polycentric governance systems, and public participation tend to produce a politized environment and produce high complexities associated with multistakeholder collaboration and participation [39].

We argue that the fragmentation of frames in the KRB is influenced by the lack of interaction among participants due to a weak participatory process design. This design limits the possibilities of discussing and negotiating the different meanings stakeholders attach to water issues, jointly enacting decision making, and implementing actions. The results reveal a fragmentation of frames by design characterized by a significant lack of interaction among stakeholders during the platform meetings, knowledge domains insulated in separate meetings, stakeholder participation asymmetry, and an inaccurate spatial scale. At the same time, the fragmentation of frames can be also explained by the political context's influence on the KRB platform. Furthermore, the fragmentation present in the KRB also leads to conflicts among participants.

These two drivers, the participatory process design and the political context, contribute to better understanding the fragmentation of frames in collaborative water governance forums. These findings are the result of articulating the participatory framework developed by Newig and the cognitive frame and interactional framing conceptual contributions suggested by Dewulf [4,9].

### 5.1. Fragmentation by Design

Confirming the findings of Koontz et al., governments play a key role in collaborative processes in environmental management issues in which they can favour cooperation or be a barrier based on how the process and structures are established [40]. The KRB platform reflects fragmentation by design, the governance structure design clusters the organization´s representation and insulates forms of knowledge, which contributes to the fragmentation of frames. The KRB platform structure and participatory design are divided into three different groups. First, the directive level gathers state representatives. Second, the social forum is only composed of social organizations and community-based representatives. Finally, the technical forum is restricted to academics, researchers, and international cooperation agencies. As we could observe, the meetings of each division were reserved for the members of each group holding strict forms of knowledge.

Without proper consideration for integrating different forms of knowledge in the participatory process design, the interaction and dialogue among participants become fragmented. The KRB shows evidence of a design that limits the co-construction of a collective understanding of the situation in this river basin, limiting any interactional framing. As a result, we suggested that the participatory design consider a process in which the problem framing can be jointly constructed to connect frames, build common values, develop trust, and engage participants in the process, which would confirm the findings of Gray, Dewulf, and Dewulf et al.

At the same time, the KRB 2018 policy developed by the Ministry is the one guiding the participatory process design. This shows a strong link between the policy framework and the process design. The 2018 KRB policy is being employed as a guiding document to structure the KRB interinstitutional platform and the roundtable discussion themes. At the same time, many participants interviewed considered that the KRB 2018–2030 plan was just an assessment and lacked clear objectives. Thus, the lack of precise objectives and

policy ambiguity permeated the participatory process, influencing the effectiveness of this water governance system.

This case study revealed that the relation between spatial scale and the participatory process design also holds strong links. The KRB evinces an essential mismatch between spatial problem scale and the participatory design that can be considered one of the meaningful elements behind the fragmentation of frames. The lack of consistency between the river basin spatial scale and the participatory design increases the frames involved. This broad spectrum of frames does not show evidence of interrelations and connections since they live with divergent water problems, realities, and needs. This factor could also increase the ambiguity within the water governance setting.

The participatory process design must consider the interconnections and relationships incorporated in these socioecological systems to identify and select participants for the river basin committee. River basins do not merely connect surface waters but also connect social, political, and economic structures. Without a clear understanding of these interrelationships and the connections among participants, the participatory process design may not be conductive to a collaborative water governance. Furthermore, the lack of interrelations among stakeholders may increase ambiguity and consequently the fragmentation of frames.

This research cannot confirm that the KRB governance structure and participatory process design were premeditated by the Bolivian ministry. However, aligned with Purdy, this structure and participatory design largely contributed to power imbalances in the collaborative water governance process, allowing the public authority to control the content and agenda [41]. The governance structure developed by the Bolivian government not only favours fragmented frames but embeds a context of water injustice considering that decision-making remains at the directive levels and that the voices of rural indigenous communities impacted by the contamination tend to be silenced and excluded through this model. Aligned with Zwarteveen and Boelens, this research confirms that achieving water justice requires a decisive engagement with the struggles of those who are influenced by socioecological changes [42].

*5.2. Political Context*

Aligned with [43,44], this research confirms that conflicts can result between parties when stakeholders continue to defend their bureaucratic sphere. The analysis unveiled a frequent association of the political context with the KRB participatory process. There were 39 references in which the participants recalled a limitation based on the political context or the political interests within the interinstitutional platform. For example, the city of El Alto can be considered the most important stakeholder associated with the water contamination problem and the potential solution at the river-basin level. However, El Alto has not been an active participant in the river basin interinstitutional platform. This can be linked to the strong influence of the political context on the KRB interinstitutional platform because of political differences between the national government and the municipal government of El Alto.

This shows an additional exogenous factor influencing the participatory process design and implementation. The political context influenced the river basin committee structure, informally limiting and restricting the participation of the stakeholders and consequently limiting proper interactional framing. At the same time, the municipal government of El Alto does not seem to perceive water contamination as a main problem within their local scale. In fact, if they acknowledged their role in the contamination problem, they would also be held responsible for resolving this problem, implying high expenditures and investments to reach beneficial results for downstream communities and not even its own inhabitants.

Furthermore, the political context seems to influence the framing in the KRB interinstitutional platform because of staff members are constantly changing due to the changes in the political party of the government (between 2019 and 2021, Bolivia had three different governments; one of them (from December 2019 till December 2020) represented the oppo-

sition to Movimiento al Socialismo (2006–2019/2020–present)). We thus suggest that future analyses incorporate institutional stability and staff turnover in the public sector as another element of analysis in participatory and framing processes.

## 6. Conclusions

Diverse backgrounds, disciplines, cultures, and knowledge usually bring a variety of frames and understandings related to the problems and issues in collaborative water governance. However, the fragmentation of frames that are at stake in these governance settings may impede a common understanding. This can result in controversies that can impede effective decision-making and influence water policy outcomes. This study aimed to understand the causes behind the fragmentation and connection of frames and how the diverse meanings attributed to water issues influence collaborative water governance outcomes. Such understanding may be highly beneficial in managing decision-making ambiguity, building shared values structures, and improving collaborative processes of water resource policy development.

The results reveal a strong link between participation and framing. The KRB platform demonstrates an insulation of frames restricting collective knowledge construction, enhancing potential conflicts, and impeding collective decision-making. This design contributes to the fragmentation of frames in collaborative water governance. This study also shows intricate relationships between the spatial scale, the decision-making design, and the fragmentation of frames. The case of the KRB demonstrates an essential mismatch between spatial problem scale and the participatory design, which can be considered a factor behind the fragmentation of frames.

The political context also holds a strong influence on the framing. This case study highlights the potential political context implications for the participatory and decision-making processes that at the same time influence the framing. The political context may permeate and influence river basin committees, fragmenting the decision-making process and informally limiting and restricting the participation of stakeholders. The frames expressed by stakeholders are thus strongly related to the different meanings they attribute to the water issues. These meanings are part of how the actors develop their sensemaking about water issues, strongly connected with the social, political, and institutional contexts.

The water resources governance structure developed by the Bolivian government not only favours the fragmentation of river basin committees but reproduces water injustice considering that decision-making persists at the public authority directive levels and the voices of rural indigenous communities impacted by the contamination tend to be silenced and excluded through this model.

These findings have some important implications for practice, particularly for decision-makers and water resource managers developing river-basin committees to implement integrated water resource management policies. They may allow practitioners to better manage the fragmentation and connection of frames in collaborative water governance arenas.

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