

Rivers across worlds : A conceptual framework for ontological inclusion & exclusion in participatory water governance

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Rivers across worlds: A conceptual framework for ontological inclusion & exclusion in participatory water governance

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journals.sagepub.com/home/ene**Thomas Rickard** 

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Abstract

Water-related crises and disasters are increasing in frequency and severity. Integrated Water Resources Management (IWRM) has been established over the last few decades aiming to achieve sustainable and participatory water governance. However, this article argues that IWRM is often based on ontological exclusion in the sense that participation is conditional on adopting a dominant ontology of water as a natural resource. Drawing on the Ontological Turn, we present a conceptual framework of ontological inclusion to support the analysis of established water governance. This is engaged in a case study of a participatory process for water-body classification in the Doce River basin. The ontologies of river-as-Watú, of the Indigenous Krenak, and river-as-home, of riverine communities, are shown to be excluded from the participatory process; furthermore, the ontologies of river-as-contested and river-as-state-failure are excluded from the policy instrument. The ontologies of river-as-resource and river-as-state-responsibility are enacted in the participatory process and the policy instrument. While state managers expressed concern for participation and plurality, the process and policy instrument remained ontologically exclusive. The nuances of ontological overlap and partial exclusion are explored alongside reflections on the challenges of plurality in state governance. The conceptual framework provides a normative resource for evaluating ontological inclusion and exclusion in established environmental governance.

Keywords

Ontology, Brazil, water governance, policy, participation

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Introduction

The 1997 Brazilian Water Law (Brasil, 1997) sets out to implement sustainable ‘water resource’ management appropriate to the country’s ‘physical, biotic, demographic, economic, social and cultural diversity’ (1997: 3.II). Yet, critical issues include increasing regional droughts and floods, water supply and quality issues, unplanned urban development, poor planning of large-scale infrastructures, and disasters, such as the mining dam ruptures of Samarco in Mariana, and of Vale in Brumadinho (detailed further below) (ANA, 2020; Fernandes et al., 2016; Silva Rotta et al., 2020). Contributing to these issues are overly technical and exclusive decision-making forums, a lack of funding and policy implementation, conflicts with environmental and development policies, and failures to recognise territorial diversity (Abers and Keck, 2013; Barbosa et al., 2017; Laschefski, 2019; Libanio, 2018; Taddei, 2011). Brazil’s territorial diversity includes many Indigenous and traditional peoples that relate to rivers in ways that governance struggles to acknowledge, let alone support (Furlan, 2009; Krenak, 2020b; Lima, 2020; Valencio, 2009).

Since the 1990s, Integrated Water Resources Management (IWRM) – the basis for the Brazilian Water Law – has become the dominant global paradigm in water management. IWRM asserts that water is a natural resource that should be managed in a participatory and integrated manner at the river basin scale (International Conference on Water and the Environment, 1992). Critiques of the Brazilian policy are consistent with growing literature on global IWRM implementation that highlights top-down, technocratic, inefficient, and risky management. The exclusion of local peoples, knowledges, and governance regimes has been repeatedly documented in nation states that have adopted IWRM without adapting it to diverse local contexts (Biswas, 2008; Schiff, 2010; Shah, 2016). Global institutions have responded to IWRM’s challenges by acknowledging the importance of broader governance issues (OECD, 2015), as well as diverse values and local knowledge regarding water (Unesco and World Water Assessment Programme, 2021). Some scientific and management conceptualisations of water have also shifted to become more holistic and adaptable (Pahl-Wostl et al., 2008; Wantzen, 2023).

However, these innovations do not fully encounter critiques that centre on water issues as sites of ontological conflict, i.e., disputes about the nature of water itself. Briefly stated, ontological conflict refers to the possibility not only of plural knowledges but also of plural worlds or realities. Rather than perspectives or cultures around a single, ‘objective’ river – typically conceived of as a system and resource – rivers are assumed to be plural (Harrington, 2017). The river as an economic resource, the river as an environmental system, and the river as a sentient being are each considered real, even as they may overlap, diverge and conflict (Campbell and Gurney, 2020). Many riverine communities relate to their local and unique stretch of river through subsistence livelihoods, celebrations and rituals; some even relate to the river as a living and sentient being (GWF, 2018; Yates et al., 2017). The Garma International Indigenous Water Declaration, for example, asserts that ‘water has a right to be recognised as an ecological entity, a being with a spirit, and must be treated accordingly... We do not believe that water should solely be treated as a resource or a commodity’ (Indigenous Peoples of the World, 2008).

Innovations to address ontological divergences have appeared on several fronts. Legal innovations include national laws that consider rivers and nature to have legal personhood and, therefore, rights that may be defended in court, along with various institutional arrangements to support governance (Earth Law Center, 2021; O’Donnell, 2020; Takacs, 2022). Concepts of plural ontologies have appeared in a range of fields, including sustainability sciences, international relations, and environmental management (Anderson et al., 2022; Ludwig and El-Hani, 2020; Pereira and Saramago, 2020; West et al., 2020). Such developments have found resource in the Ontological Turn in the social sciences and humanities (Holbraad and Pedersen, 2017). Some critiques, however, assert that the literature and theory on ontology is complex and at times ambiguous,

which can make it challenging to engage in environmental issues (Graeber, 2015; Turska and Ludwig, 2023).

In response, we propose a conceptual framework to support the analysis of ontological inclusion and exclusion in water governance that might ground actionable propositions whilst maintaining the objectives of sustainable and inclusive management. This implies being clear in definitions, and facilitating the visibility of ontological diversity, even as certain trade-offs may be necessary. We consider this proposal to be part of a broader inquiry as to whether concepts of ontology can be effectively operationalised in environmental management while retaining sufficient nuance, complexity, and openness to diversity (Campion et al., 2023; Chilvers and Kearns, 2016; Kenter and O'Connor, 2022; Laborde and Jackson, 2022; Linton and Krueger, 2020; Vogt, 2021). Rooted in the established good-governance principle of inclusion (OECD, 2020), we define ontological inclusion as

The deliberated inclusion of the concepts, practices, relationships, and realities that humans and non-humans may bring to governance spaces and have made into collectively generated agreements and implemented actions, even as plurality and divergences may be included in said agreements.

Defining ontologies as plural realities constituted in practices, we engage a framework of plural ontologies across a policy cycle of (i) a territory, i.e., the governed area of land according to policy, (ii) a participatory forum, i.e., the process designed to engage citizen involvement, and (iii) a policy, i.e., the target of the participatory process. This conceptual framework is demonstrated in a Brazilian case study, in which a state-led participatory process was run to develop the water-body classification instrument – one of five policy instruments in the 1997 Brazilian Water Law – in the Doce River in Minas Gerais (Brasil, 1997; CONAMA, 2005; Engecorps/ANA, 2023). Placing the conceptual framework and case study in conversation offers theoretical and practical insights into the benefits that concepts of ontology can offer to established participatory environmental governance.

Background

While a strict divide between nature and culture grounds many approaches to conservation and environmental policy, many authors of the Ontological Turn have argued that it is a contingent product of Western modernity (Descola, 2013; Latour, 1993; Todd, 2016). Drawing these boundaries has political consequences, as scientists, rather than politicians, citizens, or political processes, are typically granted authority to determine ‘the facts’. Regarding conflicts over rivers, such as those over large-scale infrastructures, rivers as living or sentient beings are often relegated to the less significant category of culture or belief in decision-making, a phenomenon that Blaser (2016) terms ‘reasonable politics’. At various scales, environmental policy and governance conduct reasonable politics by imposing an ontology of nature as a resource to be exploited, while ontologies in which humans are considered integral to nature, or in which natural entities are sentient, are negated (Coscieme et al., 2020; DePuy et al., 2021; Moon and Pérez-Hämmerle, 2022; Pereira and Saramago, 2020).

Importantly, ontological blind spots are not only a question of democratic inclusion. For example, Linton and Krueger (2020) assert that failures of the European Water Framework Directive in achieving good status for water bodies are contributed to by misplaced ontological assumptions. This is because the ‘reference conditions’ for contaminants, such as phosphorus, that drive water quality standards are set according to estimates of water bodies’ ‘natural state’. Yet, the natural state is assumed here to be in the absence of human activity in a region with human occupation for millennia. These reference conditions generate prescriptive targets, in a

context of limited water testing and modelling capacities, that do not account for diverse European river socio ecologies. Similarly, the signature French policy of ecological continuity along river systems rests on an assumption of undisturbed nature. Yet it creates conflict by failing to recognise the historic and present-day roles of human infrastructures, such as small dams, mills, and hydro energy systems. In contrast to assuming human presence as a distinct and negative impact, Linton and Krueger (2020) suggest integrating functional goals into water management that include human wellbeing, such as ecosystem health (Steyaert and Ollivier, 2007), as well as more meaningful participation in water governance (Jager et al., 2020).

The call for better participation is shared by global networks of activists and academics that mobilise concepts of plural ontologies as normative resources, providing means to argue for otherwise unrecognised forms of impact and governance. Boelens et al. (2022), for example, set out four ontologies of the: *river-as-ecosociety*, i.e., a socio-natural system; *river-as-territory*, i.e., a political, moral and symbolic space; *river-as-subject*, including river rights and sentient rivers; and *river-as-movement*, i.e., the disruptive and emancipating water justice movements. Taking up Boelens et al.'s (2018) focus on plurality and power, Ulloa (2020) engages with the *Wayúu* people in Venezuela and Colombia, who explicitly demand recognition of their relational river ontology in their water justice struggle against mining. For the *Wayúu*, the river and the life around it are not natural resources but formed in continuous interrelation and reciprocity; non-humans are political agents, including the water spirit, *Pulowi*, who is included among those suffering the impacts of aggressive development.

Brazil is host to comparable examples. In the context of centuries of river degradation, two major disasters have occurred in recent years. Most recently, on 26 January 2019, Dam 1 at the Córrego do Feijão iron mine – run by Vale in Brumadinho, Minas Gerais – ruptured, releasing 12 million tons of mining waste into the Paraopeba River and killing over 250 people (Silva Rotta et al., 2020). This occurred not long after the Samarco Disaster of 5th November 2015, in nearby Mariana, Minas Gerais. Operated by Samarco (a Vale and BHP Billiton joint venture), the Fundão Dam ruptured and released 60 million tons of iron-ore mining waste along 600 km along the Doce River out into the sea (Fernandes et al., 2016). The iron-ore mud wiped out most aquatic and much riparian life, smothered the nearby town of Bento Rodrigues, brought toxic heavy metals to the surface, and affected marine life off the coast. In addition to broad and long-lasting impacts on transport, tourism, agriculture, energy, and health, both impacted river basins host many communities that subsist directly on the river via fishing for personal consumption, local trade, or irrigation of garden crops.

Water quality in the Doce River, as measured by the state, has begun to approximate pre-disaster levels (though the river was already degraded), and some species have returned. Yet, for the Krenak Indigenous people – included in our case study below – the impacts were distinct, as they relate to the river as *Watu*, a living ancestor and member of their people (MPF, 2015). In an interview with Caldeira and Amaral (2020: 60), Shirley Krenak emphasises that '*Watu* is more than water, he is life, he is human. Within him, there are many other animal and spiritual lives with which the Krenak maintain an ancestral connection'. According to some, the disaster killed *Watu*, and to others he is in a coma and may return one day (Krenak, 2020a; Torre and Camporez, 2017). In any cases, the impacts go beyond economic loss, displacement, or water quality and flow, concepts accepted by modern environmental conflict management (Caldeira and Amaral, 2020; Fiorott, 2018).

As Walsh and Vogt (2021) highlight, along with our prior examples, the dominance of the singular, biochemical water of modern management over myriad unique waters – embedded in their social, economic, and religious contexts – is rarely complete. Instead, water and waters often exist, albeit in tension, side by side. In the right conditions, some degree of harmony may even be achieved (Vogt, 2021). Yet more explicit propositions for plurality are emerging. At the global

scale, UN Water has gone so far as to emphasise plural values, cultures, and perspectives in relation to water (Unesco World Water Assessment Programme, 2021). Relatedly, prominent scientists increasingly promote integrated conceptualisations of societies and rivers. The River Culture concept, for example, links human and biological diversity through seasonal environmental flows, engaging a holistic view of social, epistemic, cultural and environmental relationships (Wantzen, 2023).

Taking plurality a step further at the global scale, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) has developed a schema of ‘value concepts’ (Pascual et al., 2022). These are: ‘worldviews’, ‘lenses through which individuals and social groups perceive, think about, interpret, inhabit and modify the world’; ‘broad values’, such as life goals and guiding principles; ‘specific values of nature’, e.g., intrinsic, instrumental, and relational; and ‘indicators’, such as economic or biocultural indicators (Anderson et al., 2022: 22). Within this, the Life Frames Approach conceives of ontologies as ‘varying conceptions of the nature of reality’. Drawing on hydrosocial, ontological, and values literature, Kenter & O’Connor (2022: 2531) propose four broad ontological types of ‘living in’, ‘living from’, ‘living with’, and ‘living as’ nature, the latter explicitly involving non-dualist and non-anthropocentric ontologies.

At the national scale, examples of engaging plural ontologies include the constitutions of Ecuador and Bolivia, which grant rights to nature in connection with *Buen Vivir*, an Indigenous-rooted political practice (Merino, 2016). In relation to rivers in particular, several assertions of legal personhood imply rights and protection. However, in comparison to cases from Aotearoa New Zealand, India, Bangladesh, Colombia and Australia, O’Donnell (2020) states that these ‘rivers-as-persons’ still have limited rights and institutional arrangements for planning enforcement. The laws recognise rivers as living beings, entities, or wholes in connection with Indigenous ontologies. However, they have yet to show themselves suited to substantial protection from anthropic impacts, even creating public backlash in some circumstances.

At the local scale, concepts of pluriversality and ontology have been engaged to support collaborative management between the state and Indigenous communities (Almeida, 2013; Campion et al., 2023; Verran, 2013). Drawing on Blaser’s (2016) political ontology, Laborde and Jackson (2022) document the development of social-ecological concept models to describe and compare the modern water of the state and the Living Waters of Traditional Owners in the Murtuwarra/Fitzroy river system in Eastern Australia. Living Water was mapped as a complex set of reciprocal relations between humans, as custodians, and non-humans, including ancestral beings and sentient spirits, as mediated by customary law and ritual. Modern water, in comparison, was mapped as an ontology of resources, property rights, economic sectors, the benefits of water to people, and a management system designed to control and optimise use and conservation. While accepting that the use of abstract, i.e., modern, categories and models is problematic regarding relational ontologies, the authors cite the value of making ontological difference visible with the aim of better supporting negotiation by Traditional Owners in participatory forums.

In summarising this section, we draw attention to the ongoing inquiry across scales and locations as to how concepts of ontological plurality can support more inclusive and sustainable environmental and water governance. Diversity in values and knowledge has become increasingly recognised, and yet, as we have shown, unless the ontological aspects of decision-making are navigated, the risk remains that conflict is perpetuated and opportunities missed. Concepts of ontology have been established in ethnographic accounts and policy analyses. Propositional experimentation is underway in global frameworks, national laws, and local projects. For these propositions to succeed, however, we must also examine state environmental governance in a manner that can facilitate change. It is here, we argue, in the complex and evolving mesh of national and sub-national policies and institutions, that the greatest obstructions and opportunities present themselves.

Case study

The 1997 Brazilian Water Law, developed following the 1992 United Nations Conference on Development and Environment hosted in Rio de Janeiro, adopts the IWRM principles of decentralised, participatory and integrated management at the river basin scale (Brasil, 1997; UNCED, 1992). Five policy instruments are determined as follows: water resource plans, with twenty-year horizons; water-body classification, assigning water quality classes (the focus of our case study); water use rights; water use charging, designed to drive efficient use and fund water management; and water resource information systems, with public access (Brasil, 1997: 5–27).

River basins are divided into those within state boundaries, the state river basins, and those that cross state boundaries, federal river basins. Most state and federal river basins in Brazil have a river basin committee (some have yet to be established), and the committees are made up of public authorities, civil society, and users, which can include water supply, agricultural, and industrial representatives. Besides the committees, the states and federation have water resource councils – also made up of public authorities, civil society, and users – that issue norms and resolutions and approve river basin committee deliberations, including those of the water policy instruments. The instruments then direct executive water agencies (Brasil, 1997: 32–48). See Table 1 for a summary of the governance system with examples from our case study.

From the end of 2021 to the end of 2022, a participatory process was conducted to develop a proposal for the water-body classification instrument across the federal Doce River and its state sub-basins, including Suaçuí (Engecorps/ANA, 2023). The Suaçuí River basin has a population of around 590 thousand people, spread over an area of 21,555 sq.km. Most land is open cattle pasture, with some remnants of Atlantic Forest, as well as the urban centres in which 74% of the population resides. Dominant economic activities apart from cattle ranching include sugar cane farming, timber extraction, mining, and eucalyptus treatment for construction use (CBH-Suaçuí, n.d.). We include references to the municipalities of Resplendor, where the 4000 sq. km Krenak Indigenous Territory lies, and Governador Valadares, a regional capital in which participatory events took place. Both municipalities are inside the Suaçuí River basin and border the Doce River. See Figure 1 for a hydrographic and political map of the region; the Suaçuí River state basin is the uppermost sub basin, shown in yellow.

Water-body classification is predominantly defined within National Environmental Council (CONAMA) Resolution 357, in which classes 1–4 as well as ‘Special Class’ are laid out with their respective appropriate uses and parameters for water quality (CONAMA, 2005). Rather than describing current water quality, the assigned classes reflect required water quality according

Table 1. Summary of the Brazilian water governance system (author’s elaboration).

SCALE/TYPE	Public authority	Deliberative organ	Executive organ
Federal	Ministry of Environment – MMA	National Council for Hydric Resources – CNRH	National Water Agency – ANA
Federal River Basin – Doce River	MMA; Includes Minas Gerais & Espírito Santo representatives	Federal Doce River Basin Committee – CBH Doce	Doce Water Management Association – AgeDoce
Minas Gerais State	Minas Gerais State Sec. of Environment & Sus. Development	Minas Gerais State Council for Hydric Resources – CERH-MG	Minas Gerais Institute for Water Management – IGAM
State River Basin – Suaçuí	IGAM; Includes state representatives	Suaçuí State River Basin Committee – CBH Suaçuí	AgeDoce

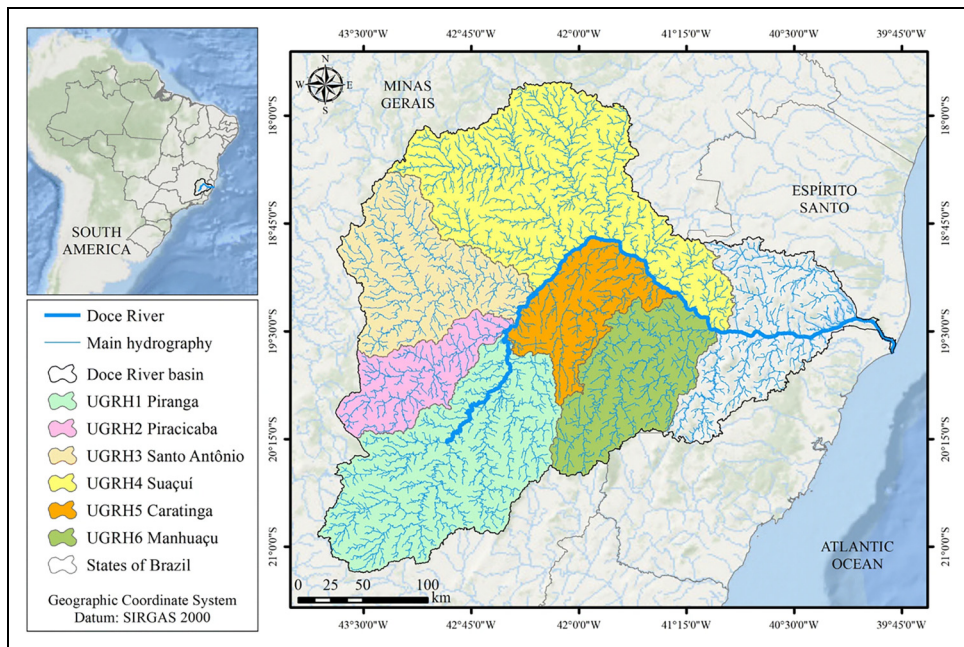


Figure 1. The federal Doce River basin state sub-basins including Suaçuí (Fraga et al., 2020).

to the most demanding current and future uses. For instance, if a current or intended use of water is for direct contact recreation, such as swimming, or the irrigation of crops that are eaten raw, this will determine that the section be set as class 1, even if only class 4 parameters are currently being met, and even if less demanding uses predominate. There are also legally mandated classes for protected areas and Indigenous lands, irrespective of current or intended uses. Given any differences between current quality parameters and assigned class parameters, water resource planning is set out to meet those standards, which can include intermediary targets. A summary of classes and uses is displayed in Table 2.

Commissioned by the Brazilian National Water Agency in collaboration with the federal Doce River and state Suaçuí River basin committees – and in the context of various federal and state norms and resolutions – the consultancy Engecorps was tasked with organising an open participatory process to support the development of this water-body classification. Contracts were signed before the COVID-19 pandemic, and after delays, it was decided to continue with online sessions until the pandemic eased. Hybrid events were then conducted at the end of 2022. In line with relevant water resource council guidance (CNRH, 2008: 91, 2012), Engecorps divided the process as follows: a diagnostic stage, an evaluation of the ‘the river we have’, including current status and uses; a prognostic stage, ‘the river we want’, based on modelling of water quality trends and users intended demands; and a planning stage to integrate these into ‘the river we can have’, a compromise between demands, budgets, capacities, and other factors. Each stage had participatory events for an ‘introduction’, ‘consolidation’ and ‘public audience’, providing information, space for participatory input and debate, and the presentation of results, respectively (ANA, 2021; Engecorps/ANA, 2023).

After the participatory process, the resulting proposal for water-body classification for the federal Doce River basin and its state river basins including Suaçuí was approved by their respective river basin committees, state water resource councils, and the Federal Water Resources Council

Table 2. Water uses and classification according to CONAMA resolution 357 (author’s adaptation from participatory process presentation).

USES/CLASS	Special	Class 1	Class 2	Class 3	Class 4
Natural equilibrium of aquatic communities	Mandatory in integral protection conservation units				
Aquatic community protection		Mandatory in indigenous territories			
Primary contact recreation					
Aquaculture					
Human supply	After disinfection	After simple treatment	After conventional treatment	After conventional or advanced treatment	
Secondary contact recreation					
Fishing					
Irrigation		Fruits and vegetable eaten raw	Vegetables, fruits, parks, gardens, sports fields	Trees, cereals, fodder	
Animal watering					
Navigation					
Landscape aesthetics					

(ANA, 2023). This comprises the first instance of federal water-body classification implementation in Brazil, and one of the few state basin scale examples.

Methodology & conceptual framework

The research was approached as a case study, embracing multiple forms of evidence (Yin, 2018). Policies and documents were collected according to the scales of governance established in the Brazilian 1997 Water Law: federal, state, and river basin. These include federal and state constitutions and water laws, as well as norms and resolutions issued from deliberative environmental and water councils (cited below). These formed the background for the implementation of the participatory process for water-body classification in the federal Doce and state Suaçuí river basins (Engecorps/ANA, 2023).

Twenty-one semi-structured interviews took place with state managers, river basin committee members, water governance researchers, participants, and citizens of Governador Valadares and

Resplendor during and after the participatory process in 2021 and 2022. Interviewees were selected to broadly represent the key water governance institutions, as well as people with diverse relationships to the Doce and Suaçuí Rivers and their river basins. Interviews were designed according to a ‘descriptive/divergent’ orientation, i.e., looking for difference and contrast among participants (McIntosh and Morse, 2015: 5). This entailed some common questions around memories, activities, and understanding of river health and quality, supplemented with questions specific to participants’ relationships to the river basin, institutions, and participation.

The first author – fluent in Portuguese and English – engaged in participant observation, taking part in nine online and hybrid workshops during the process, including participatory dynamics, such as breakout discussion groups and map-based water-use questions. The first author attended the in-person participatory events in Governador Valadares, conducting fieldwork there and in the city (Gobo and Marciniak, 2016). In addition to notes compiled during workshops and fieldwork, official recordings of all events were accessed on YouTube, allowing for the extraction and coding of transcripts (Gravação Oficinas Momento 2, 2022). This supported evidence for river basin ontologies alongside secondary data from academic and artistic works and grey literature (5o Seminário Integrado do Rio Doce - Incertezas dos Desastres Minerários: da lama à pandemia, 2020; Espíndola, 2021; Ferreira, 2022).

Drawing on the Ontological Turn, we conceptualise ontologies as plural, overlapping, conflicting, and diverging realities, as enacted in practices. In this context, Interpretative Policy Analysis (IPA) has been important in drawing attention to diverse policy meanings and perspectives among social groups. Within the IPA ‘practice-based approach’, coherent with methods oriented to material-semiotic practices, a practice has been defined as ‘An ensemble of doings, sayings and things in a specific field of activity’ (Arts, 2013: 9). For example, the practice of conservation might entail the activities of fundraising and planting, a discourse of protection and service, and the various materials required, such as seedlings and fences. Centring practices this way avoids the dualisms of structure and agency and brings materials and non-humans into the analysis.

Conceived this way, ontologies are not distinct from practices – they are not the result of some secondary phenomena – rather, they are constituted by them (Gad et al., 2015). The example practice of conservation cited above, then, enacts nature as separate from humans and in need of protection from them. Nor are ontologies mutually exclusive such that any given ontology can be enacted by diverse practices (see Figure 2). In our conception, the boundaries between ontologies may be more blurred than binary, even as we characterise and visualise them as distinct to make ontological inclusion and exclusion visible (an issue taken up in the discussion).

Coding of interview and video transcripts, notes, and policies and documents proceeded in Atlas.ti (ATLAS.ti Scientific Software Development GmbH, 2022) through a directed content analysis (Hsieh and Shannon, 2005) – in this approach, initial codes are developed with early research and then adapted during the process to reflect the data. First, practices were identified, along with codes for institutions, policies, scale, and location to support analysis. Then, extending the practice-based approach based on a conceptualisation of practices as constitutive of ontologies, practices were clustered according to proximity within data sources (e.g., practices within the water-body classification proposal were considered closer to each other, while practices with Krenak-authored publications were closer to each other) and coherence, i.e., where practices expressed underlying ontological assumptions; for example, the practices of economic modelling and map-based participatory dynamics shared the assumption of the river basin as a system that could be measured. The ontologies were characterised with reference to data sources.

Given prior research on the Doce and Suaçuí river basins and Brazilian state governance, the ontologies of the river as a system and as a living being were expected (Rickard and Ludwig, 2024). Practices that enact the system ontology ranged from numeric and visual presentations to the use of distinct planning strategies, and the division and hierarchisation of responsibilities,

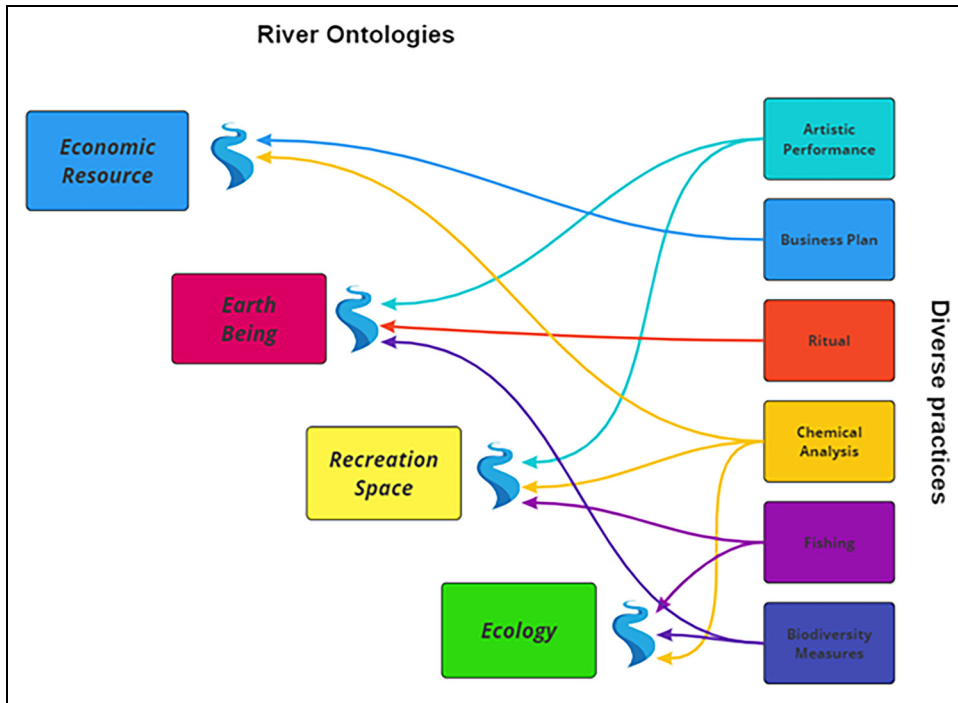


Figure 2. Diverse practices constitute river ontologies in a non-exclusive manner (author's elaboration).

including the design of participatory forums and processes (Campbell and Gurney, 2020; DePuy et al., 2021). Practices that enacted the river as the living being *Watú* included ritual, music, dance, and conservation directed at restoring the Krenak spiritual ecology. Engaging the directed content analysis, further practices and ontologies were identified and refined, such as the distinction between the river-as-resource system and river-as-state responsibility, which were distinguished due to their historical and theoretical independence: that the river is a resource does not require that it be a state responsibility, and vice versa, and they engage divergent as well as overlapping practices.

With practices and ontologies coded, ontologies were mapped across a policy cycle, such that ontological inclusion and exclusion in governance can be considered (see Figure 3), across the three following elements:

1. a territory, the area of land as delimited by policy and operated by the state according to established scales of governance; in our case study, this is the Suaçuí River basin;
2. a participatory forum or process, nominally designed to include citizens who are normally outside of state management in policy design and delivery; in our case, the participatory process for water-body classification for the Suaçuí River basin, open to residents of the Suaçuí River basin;
3. a policy or policy instrument, the target of the participatory process within the territory (see Figure 1), including supporting policies. The case study sets this as the water-body classification proposal (Engecorps/ANA, 2023), as well as policies and norms that define it (Brasil, 1997, 2020: 14; CNRH, 2008, 2012; CONAMA, 2005; COPAM, 2008; COPAM-CERH, 2017; Governo de Minas Gerais, 1999).

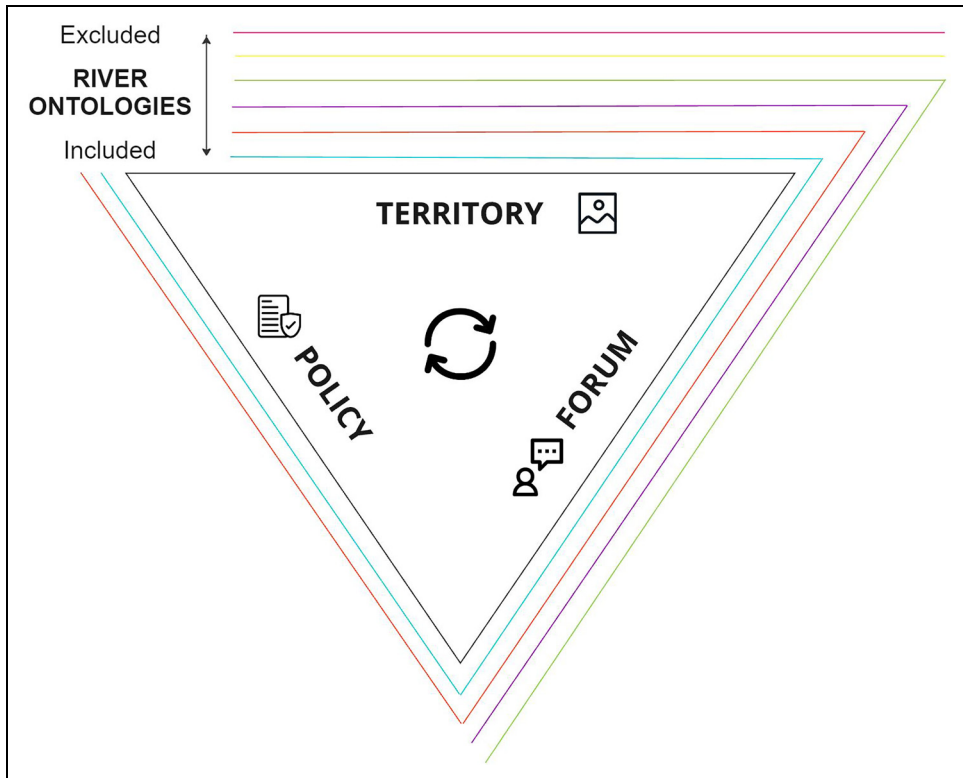


Figure 3. Ontologies across the policy cycle. Each colour represents a river ontology included in policy cycle elements (author's elaboration).

To visualise the presence of ontological inclusion and exclusion, we present ontologies mapped as colours across the policy cycle, as in Figure 3. The ontologies closer to the centre are the most included, running across all three policy cycle elements. Moving away from the centre, excluded river ontologies appear, included in only one or two policy elements.

We assume that any ontologies enacted in the policy and/or forum are necessarily enacted in the territory by virtue of their setting. Although policy element ontologies are likely presented within a given forum or process, of interest is the opportunity for participants and even process and state managers to enact ontologies beyond those already defined by policy. Thus, for the forum, ontologies enacted *in excess* of those of the policy or policy instrument were identified. Then, in the territory, where we expect the greatest diversity of river ontologies, ontologies enacted *in excess* of the forum and policy were identified. Recalling our definition of ontological inclusion:

The deliberated inclusion of the concepts, practices relationships, and realities that humans and non-humans may bring to governance spaces and have made into collectively generated agreements and implemented actions, even as plurality and divergences may be included in said agreements.

The assumed ideal is that river ontologies of the territory are recognised in the forum and policy. This does not mean a blanket integration of all river ontologies. Rather, we wish to facilitate deliberation that explicitly accounts for ontological inclusion and exclusion with respect to the established policy objectives.

In the end, what we have is a view from the territory, coming to see ontological diversity excluded and unaccounted for within the forum, or then, present in the forum but not in the policy that results from it. From the position of the policy and the forum looking outward toward the territory, it might well appear that the policy and forum have well-enacted ontologies of the territory. This is the view of the state managers that we wish to productively counter.

Results

Territory ontologies

The results are presented beginning with the territory, describing ontologies absent from the forum and policy. Distinct to the territory, two river ontologies deserve attention: one we characterise as river-as-home, and the other as river-as-Watú of the Indigenous Krenak.

The ontology of river-as-home is practised through community building and maintenance, subsistence fishing, communal and recreational activity outside formal tourism, sensory engagement with the riverine dynamics, and recollection of shared and family experiences. In one of our sources, *Ribeirinho* is described by Ferreira (2022) as not simply the fact of living near the river, as many in the larger cities do, but centring daily life in relationship with it, whether for fishing or garden agriculture irrigation, for transport, as the theme of festivities, or simply as the place that people meet and relax. One resident of the Suaçuí River basin town of Tumuritinga along the Doce River states that the river is ‘like a mother’, as it is thanks to her that they could bring up their children with food, sustenance, income, and a place for community (2022: 123). Members of Agrarian Reform Settlements (Robles, 2018), taking part in a local water conference presentation, also express the experience of waking daily to the river, drawing water for small-scale agriculture, and the desire to live and die by the river (5o Seminário Integrado do Rio Doce - Incertezas dos Desastres Minerários: da lama à pandemia, 2020). While some of these activities may be conceived as economic, e.g., subsidising incomes through direct consumption and local trade, an economic description is insufficient to address river-as-home. When the 2015 Samarco Disaster happened, the impacts were emotional, psychological, communal, and, we assert here, ontological, in the loss not only of an income or food source but of a home and way of life, a relationship to the river as one that supports family and community: ‘we always fished in the Doce River, my uncles and cousins did it for some extra money, but all my family would go every weekend. That’s just what we did, where we hung out, by the water, catching up with each other and sharing what we caught.’ (Hotel Attendant, Resplendor) (see also Vilarino et al., 2021: 24).

For those in the larger city of Governador Valadares, such direct relationships with the rivers tend to occur in poorer communities, many of which settle near the river, even at the risk of periodic flooding which has increased in recent years. Yet during fieldwork, city residents were ready with detailed histories of the river, their memories of learning to swim as the family spent the weekends by the water, and the floods that had led to temporary evacuations. These floods were linked to both climatic variability – ‘flooding on the island is like a motorbike rider, he will fall sometimes’ (Araújos Island resident) – but also human mismanagement of the upstream hydroelectric station Baguari, as the overflow gates were opened when waters were high and with little warning. However, different from the *Ribeirinhos*, the river still forms home and community. Materially, the houses are elevated, with granite over the lower walls, and furniture that can be taken upstairs. Communally, on Araújos Island off Governador Valadares, community organisations assess water quality monitoring, clear up rubbish, and support flood preparation and recovery (AMAI, 2013). They rely on close communication and observations beyond water quality classes: a taxi driver commented on the way flooding had previously brought clear water, coming and going over a few days at most. Since the disaster, though, floods brought ‘a wave of stinking mud that caked the streets for days’ before it was mechanically removed at great cost (Araújos Island taxi driver). A high mud line on the buildings was visible on many streets closer to the river.

Overlapping but distinct from the ontology of river-as-home, the ontology of *Watú*, the Doce River as a living ancestor of the Indigenous Krenak, is enacted in rituals, music, dreaming, hunting, fishing, and daily life. For the Krenak, mountains, rivers, fire, and forests are each inhabited by *Tokón*, who elect shaman intermediaries to provide wisdom. The *Tokón* are relational, conscious, intelligent, and communicative. *Watú* is considered a father, mother, and brother, a living being that cares for the Krenak (Caldeira and Amaral, 2020; Fiorott, 2018; Paraíso, 2021). Rituals centre on the cycle of life, as Renaldo Krenak, the Krenak representative on the River Doce basin committee, explains: ‘the eldest female takes the child and washes, bathes them, as a sign of long life, prosperity, the cleansing of sins, and a new child emerges; this is a very sacred ritual for us, through which every child must pass’ (cited in Fiorott, 2018: 121).

The Krenak run conservation projects on their territory, from reforestation, to spring recovery, regenerative agriculture, ecological corridors, and wild honeybee cultivation (Krenak et al., 1997). These conservation practices are driven by the desire to restore the home of their spiritual ecology and by a memory of abundance before colonisation and the aggressive extractivism that followed:

Time in which Jequitinhonha was only the Big River, enchanted and full of fish. When the Mucuri was the River Arakuá, Saint Matheus was the Krikaré, the Doce was *Watú*. Time in which the sounds of the jungles blended with the song of the warriors, the cry of new children and the noise of the building of villages, without cattle, without fences. (Soares, 1992: 17)

For the Krenak, this extractivism is indistinguishable from the history of state-sponsored colonial violence against the Krenak, including forced removals, torture, massacres, and cultural suppression. Despite the Krenak having legal title to their land in 1920, this continued until the 1980s (MPF, 2015). The 2006 installation of the Aimorés hydroelectric dam, which flooded sacred lands, including a cemetery, and the 2015 Samarco Disaster were continuous with this history, as are continuing state conservation projects: while the Krenak lay claim to the neighbouring Sete Salões protected area as a home to their ancestors, state-led conservation planning restricts their freedom of movement in the area. In our river-basin management case study, the presence of the Krenak is formally recognised in the forum and the policy, but this is restricted to the policy obligation to assign formal Indigenous territories as Class 1. There is no reference to *Watú* or Indigenous practices or relationships with the rivers. This is consistent with prior water resource planning for the Doce River, which makes no mention of the Krenak relationship to the river (CBH-Doce/Ecoplan-Lume, 2010; Rickard and Ludwig, 2024).

Ontological conflict persists between the state and the Krenak. Yet besides daily activities, such as subsistence and communal practices, the ontologies of river-as-home and river-as-*Watú* have found some common ground in practices of political resistance, including protest and legal action, such as that against the Aimorés hydroelectric dam (Mapa de Conflitos, 2018). However, the impacts of large infrastructures and disasters diverge. Uniquely for the Krenak – while some claim that *Watú* is in a coma and may return one day (Krenak, 2020a) – many have asserted that *Watú* died in the 2015 Samarco Disaster (Torre and Camporez, 2017). As a result, many practices have been adapted, such as the first bath of a child and the coming-of-age ceremony. Once in the river, these rituals now occur in water tanks and local streams.

Forum ontologies

Here, we describe ontologies present in the territory and enacted in the participatory process but excluded from the policy – those of river-as-contested and river-as-state-failure. Compared to the river-as-resource-system ontology (a policy ontology described below), for which river basin committees and participation serve efficient management and information collection, the river-as-contested

ontology is constituted by diverse political and social groups and interests with distinct histories and power dynamics. The formation and running of river basin committees have taken place in light of political and environmental inequalities, such as those associated with mining and eucalyptus plantations (e.g., Mapa de Conflitos, 2009). The participatory process in our case depended on well-established committee members persuading others to enter the process based on trust and a broader agenda to defend the environment and the water governance forums. Some participants expressed their engagement with the committees as a mode of community formation and activism around socio-environmental issues. The Manhuaçu basin strategy of engaging people beyond formal settings in limited locations was cited as an example: ‘Don’t have meetings, run events, music, fund-raising in every major town of the basin, because that’s how you get people involved, that’s our responsibility’ (River Doce basin committee member interview).

While the word territory was used in the policy-defined aspects of the participatory process, and even with discursive reference to the ‘lived experience of the territory’, this was in the context of data collection via the informational presentations and constrained participatory dynamics. Participants questioned these modes of participation, highlighting the challenge online mapping presented to some social groups who were inexperienced with the technologies; they know where they live, of course, but contributing their experiential and intuitive knowledge was restricted by large-scale and unfamiliar digital maps. For example, a participant pointed out a conflict that had not been recognised at the online consolidation of the diagnostic stage, ‘I have seen small farmers complaining they cannot get water rights because industry and large dairy producers take the water ... we didn’t map this here’ (*Oficina de Consolidação - Estudos sobre o Prognóstico para a Bacia do Rio Suaçuí* (D04), 2022). And while the policy dictated that rivers be modelled as many distinct subsections, the names assigned to the sections in the model did not always match local names. A related concern was that water quality and flow were already diminished due to anthropic causes, restraining current and intended uses of the river. This would consequently limit the quality classes that would be assigned in the instrument and thereby embed historic neglect by successive administrations (informal debate at a hybrid event in Governador Valadares).

Another river ontology of the basin that was well enacted in the participatory process was that which we characterise as river-as-state-failure, i.e., while formally responsible, the state was dysfunctional, underfunded, and potentially corrupt. Though spaces for deliberation were intentionally limited in the participatory process design, participants took opportunities, particularly in the in-person workshops, to express a cluster of practices that included unmonitored industrial waste dumping, unplanned urban development with significant environmental impacts, unregistered water users, and rights granted for rivers lacking sufficient flow (*OFICINA DE CONSOLIDAÇÃO [enquadramento] - Programa de Efetivação para CH do rio Suaçuí* (D04), 2022). Despite an extensive automated and collection-based water quality monitoring infrastructure, the challenge remains that such monitoring necessarily struggles to identify periodic waste releases that monthly or bimonthly sampling cannot capture. Participants and residents of the Suaçuí River basin knew about dumping through local knowledge as well as by seeing and observing water changes; however, a participant at the hybrid event in Governador Valadares complained that ‘we tell IGAM [the Minas Gerais Institute for Water Management], we complain to the public prosecutor, but without a sample, they can’t or won’t do anything. You have all these laws, but it doesn’t work’.

The limitations of the state to meet its policy obligations are partially recognised in the water-body classification instrument document, where municipal implementation of treatment stations, fundamental to water quality, was modelled based on historical data. At current rates, the report states there would be only 36% coverage for waste collection and treatment by the final planning horizon of 2042. In the scenario of ‘moderate management’, this was estimated to be 60% coverage by 2042 (Engecorps/ANA, 2023: 6.1).

Policy ontologies

Here, we describe river ontologies of the policy, including policy constraints on and contributions to the participatory process – river-as-state-responsibility and river-as-resource-system.

Though the governance system is open to the participation of many actors, water is constituted as a state responsibility via myriad policies and institutions. The federal and state constitutions and water laws declare water as ‘public’, i.e., state-owned, along with obligations to ensure safe, sustainable use (Brasil, 1988: 20, 1997: 1; Governo de Minas Gerais, 1989: 12). The concepts of water quality, including the classes, parameters that define it, calculations of minimum flow, and legally asserted minimum classes for protected areas and Indigenous lands are all state-defined (CONAMA, 2005). State responsibility is also constituted through the executive roles of the National Water Agency (*Agência Nacional das Águas* – ANA) and the Minas Gerais Water Agency (*Instituto Mineiro da Gestão das Águas* – IGAM) in registering sources of pollution, user rights, and in running the extensive water quality monitoring infrastructure and databases (Brasil, 1997: 6; Governo de Minas Gerais, 1999: 4). Indeed, it is only through state or state-recognised scientific laboratories that legitimate water quality sampling can take place (CONAMA, 2005: 9). While sensory parameters are included for water quality classes (CONAMA, 2005: 3), they are not operationalised for evaluation or planning. Furthermore, the accession of Non-Governmental Organisations to the river basin committee and water resource council election processes is state-controlled (Governo de Minas Gerais, 1999: 5). The present governor of Minas Gerais, Romero Zema, has gone so far as to replace the civil society election process with state selection for the Minas Gerais Water Resource Council (Parreiras, 2021).

The state acted as the responsible party for funding and defining the participatory process, which was standardised across the nine state sub-basins of the Doce River. While some modelled future scenarios recognised historical failures in expanding waste treatment provision, the scenario that was presumed for participatory dynamics was of ‘intense management’ until 2042 (Engecorps/ANA, 2022a: 6). In this scenario, the national sanitation law 14,026/2020 for the universalisation of services was projected to result in 100% treatment coverage by 2033 (Brasil, 2020: 10.b). For the Suaçuí River basin only, this was calculated to require R\$3.7 million by the first planning horizon of 2027. Although modest in some respects, this would represent unprecedented state investment and capacity. Despite this, participants were tasked with evaluating minimal additional funding for phosphorous treatment based on the assumption of as-yet unbuilt treatment plants. Debate on the probability of the treatment plants being built was not facilitated. In summary, through institutions and policies across the scales of governance, including the policy-determined aspects of the participatory process, the state was enacted as a responsible and capable guardian of sustainable water management.

Overlapping with yet distinct from the above river-as-state-responsibility, the river-as-resource-system ontology was enacted in policy instrument development that rested on extensive quantified and spatial modelling. This notion of a resource system consists of distinct and typically quantified and interchangeable elements in dynamic relationships, even as these are not always fully explored. Whether money, water, data, responsibilities, or people, the system elements are taken to be equal and transferable units. Water is enacted as a resource within the demand for sustainable development through rational management (Brasil, 1997: 2; Governo de Minas Gerais, 1999: 3) (this is consistent with Brazilian state management that dates back to the Military Regime’s large-scale, multi-year development plans (e.g., Brasil, 1975)). In our case study, these systems were subject to projections across multiple time horizons as the basis for the planning within which participation took place.

Some systems followed the divide between nature and culture mentioned in other case studies (Campbell and Gurney, 2020; Linton and Krueger, 2020). At times, the river appears as an

environmental system, in the maps of geology, soil, and hydrogeology which appear bereft of references to present-day or historic human activity. Included here is the assertion of a natural baseline for water quality parameters, which may be outside legally established class limits due to natural features rather than human presence. Levels of iron, for example, exceed legal limits due to pre-existing geology; thus it is excluded from assessing compliance (Engecorps/ANA, 2022b: 5.3.2.4). At times, the system is predominantly social, as in the data and models for urban development, demography, and transport (Engecorps/ANA, 2022b: 5.1.4). The engagement process for the participatory process also performed a socio-digital system through which information campaigns could largely operate through digital promotion, such as WhatsApp, and interaction opportunities centred on online forms designed for individual use.

Yet in other modelling and mapping practices, social and environmental elements are related. In the biota map, human causes of vegetation loss and the impacts on water are included, as are human-caused sources of pollution, such as untreated sanitary waste and sediment and fertiliser runoff. Registered demands for water are compared with current and projected availability, as affected by human consumption and climate change (Engecorps/ANA, 2022b: 5.3). Water quality appears as both a result of and a site for intervention in a socio-environmental system. Throughout the classification policy, and consistent with federal and state policy, the river is consistently performed as a resource. The policy concept of ‘users’ was reiterated through graphics, maps, and discourse, defining people and organisations that use water and the listed uses they can register. The ‘economic sectors’ listed include cattle farming, eucalyptus plantations, and tilapia production, but notably omit subsistence fishing (Engecorps/ANA, 2022b: 5.1.4). Despite its well-known presence in the basin, and especially since the 2015 disaster, subsistence fishing was also not listed in the prior Doce River water resources plan (CBH-Doce/Ecoplan-Lume, 2010). An example from the case study, a map of municipalities in the Suaçuí River basin according to their gross domestic product, is displayed in Figure 4.

Ontological inclusion and exclusion summary

To summarise, the river ontologies of river-as-home and river-as-Watú were enacted in the Suaçuí river basin but not in the participatory process or water-body classification proposal; the ontologies of river-as-contested and river-as-state-failure were enacted in the Suaçuí River basin and participatory process but not in the proposal; and the ontologies of river-as-resource-system and river-as-state-responsibility were enacted in the river basin, participatory forum, and instrument proposal. A graphic representation of this is displayed in Figure 5.

Discussion

IWRM has suffered multiple critiques within and beyond Brazil. Many suggestions involve iterative changes, such as better policy implementation, integration with other policies, technical improvements, and funding. Some proposals are more fundamental, such as the overhaul of participatory practices to include plural values and knowledge in decision-making. Yet issues of inclusion and management are intertwined with questions of ontology – if participation does not extend to acknowledging the ontologies of those that take part, many practices in the river basin remain invisible to policy. In recognition of this, new global frameworks, national laws, and distinct projects weave concepts of ontological plurality into innovative experiments. Established environmental governance is an essential arena for change that brings unique challenges in this respect. Policymakers and managers work through modern conceptual frameworks with distinct categories and entities that often enact a modern ontology. Working with the objective of greater ontological inclusion and exclusion requires engaging comparable frameworks, but with a distinction: they must be open to and make visible ontological differences.

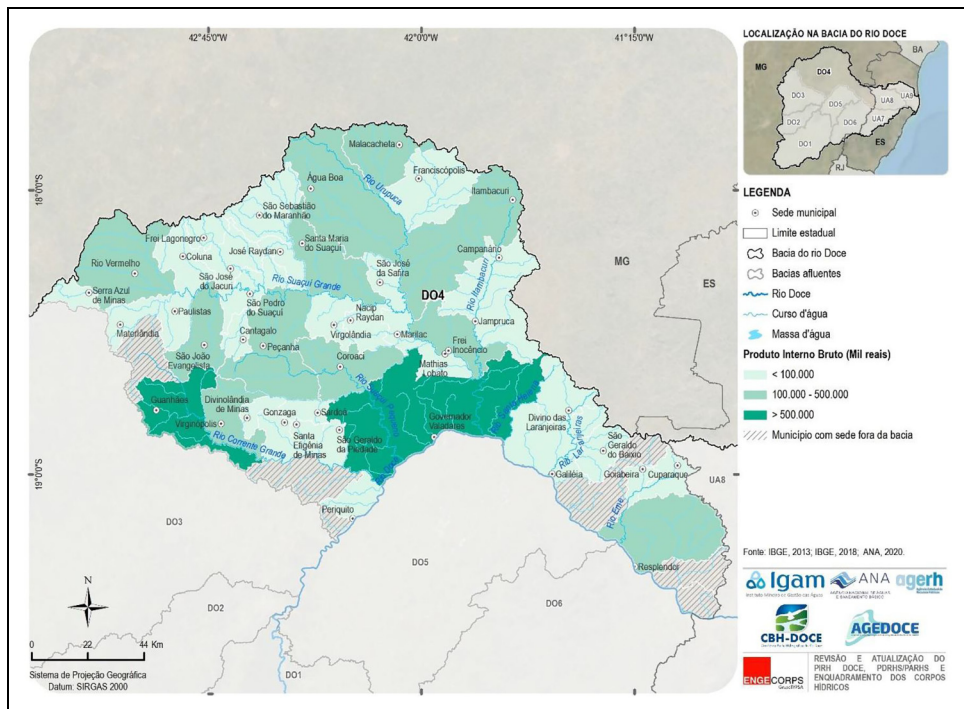


Figure 4. Municipalities of the Suaçuí River basin according to gross domestic product (Engecorps/ANA, 2023: 67).

In our case study, the policy element of the cycle drove the participatory process, performing river-as-resource-system and river-as-state-responsibility. The national and state constitutions and water laws, along with directive norms and resolutions, dictated the scope and nature of the participatory process, including the roles of the consultants, professionals, and participants. With myriad technological practices at the centre – such as automated quality assessments, databases, and modelling – participants were asked to input missing data on present and future ‘uses’. Participants, as such, appeared as extensions of the state’s sensing capacity, brought in to complete the gaps that the technologies might not account for, and bound by the categories of use that the policies and systems embedded. While discursive emphasis was given to the importance of ‘the lived experience of the territory’ and the ‘face of the basin’, space for deliberation outside of policy and system parameters was limited.

Within the participatory process, other rivers sprang forth. The participants brought with them the region’s history, power relations, and the notion of participation within the river basin committees as a political, deliberative act. This river was forced to flow into the unintended spaces left behind, in the short time granted for questions, in coffee breaks, allowing the river-as-contested to find resonance with others involved. Deliberation might have been a remedy for the dominance of the river-as-state-responsibility. Participants brought with them the reality that state plans and state capacity were often wildly at odds. Yet all they knew about how, when and where success had taken place, and the limits to progress, was displaced by participatory dynamics based on a modelling assumption that ignored this. Interestingly, some water managers and participatory process managers easily recognised the practices expressed in the forum that were not taken up in the policy instrument.

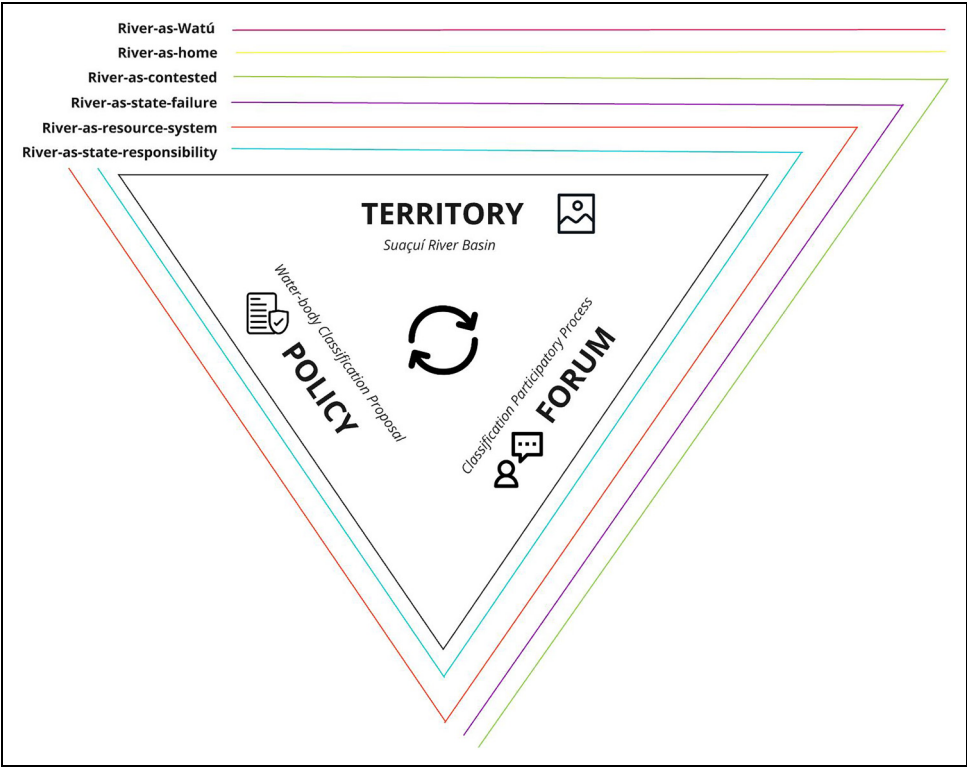


Figure 5. River ontologies across the policy cycle (author’s elaboration).

The rivers of the territory were not alien to those operating the policies and participatory process. All could name *Watú* as a living being, the river for the Krenak people. Many could recall growing up near rivers, learning to swim, and meeting other families at the riverside, the ontology we characterised as river-as-home. Those experiences were often the very motives that drew them to work in river management. Perhaps this explains something of the discourse of recognising the ‘territory’ and ‘face of the basin’. As managers, however, their duties were clear to them, and they were proud to lead the involvement of the public, even as they were frustrated at times as to the varying turn out for events. Thus, while the state can appear coherent and even monolithic, in our case at least, there are many individuals who can appreciate that their own relationships to rivers were being excluded. Even if the notions of participation varied, the passionate commitment to participatory management was evident. This suggests a future research question of whether innovations for ontological inclusion can be sufficiently familiar and legitimate that state actors can integrate them, allowing individuals to act on their motives and perspectives.

Regarding modern water management, Harrington (2017) makes a strong case for maintaining concepts of ontology in Collaborative Water Governance, stating that water’s irreducible relations to cultural, social, and religious practices need to be recognised. Similarly, Linton and Krueger (2020) challenge the unreflexive enactment of a modern ontology of water, suggesting that European Water Framework Directive reference conditions could be adjusted and participation improved. At the same time, however, ‘For collaboration to occur there needs to exist a shared ontological understanding of water to determine what exactly is being negotiated’ (Linton and Krueger, 2020: 19). Our question then becomes to what degree we can generate a shared *pluri*-ontological

understanding sufficient to ‘assert relational socio-ontologies into the problem space of water governance’ (Yates et al., 2017: 807).

As an experiment in facilitating dialogue between a modern state and Indigenous peoples, Laborde & Jackson (2022) supported the development of conceptual modelling with system diagrams. Our approach is distinct in operating as a policy analysis and evaluation, rather than the in-depth process they engaged in to co-produce and validate the models. Indeed, the framework we present, while demonstrated in a case study, could be appropriate for participatory engagement if it were ever to directly inform decision-making (to be clear, we make no claim to represent the Krenak, state institutions, or communities in this case study). Beyond that, however, there are significant parallels. The Indigenous peoples in each case emphasised respect and care for living, sentient rivers, and they connected the health of the river to broader human and ecological health concerns. Despite claims to ‘integrated’ water management, however, they were met with constrained scope for the deliberation of issues connected to water, such as health and development. Interestingly, Laborde and Jackson (2022: 21) relate that the question of ‘who can speak for the river’ was persistently voiced by Traditional Owners, yet government planners avoided it, focusing on the planning remit within established policy.

Our case study is an effort to think through how to make ontological diversity and exclusion legible for the state and connected actors. This is insufficient alone. Firstly, because the framework might be extended to examine more precisely how ontological exclusion takes place, which could found context-specific propositions; more fundamentally, though, any framework or methodology depends on a broader approach that encounters systemic, distributed, and constructive understandings of participation (Berg and Lidskog, 2018; Braun and Könniger, 2018; Chilvers and Kearns, 2016). In Brazil, arguments for change can be found in constitutional and policy commitments to democratic inclusion and the recognition of social and cultural diversity in environmental management. How far this might be taken given substantial historical and present-day colonial relations between the state, corporations, and the public is open to question (Guimarães, 1991; Oliveira et al., 2017). This is part of the reason that – while proponents of the Ontological Turn might do otherwise – we have chosen to present a framework that works within existing policy objectives and territorial scales. None of this is meant to distract from more radical agendas, such as the continuing need for Indigenous and traditional people’s campaigns for territorial sovereignty (Kramm, 2021; Laschefski and Zhou, 2019).

In contrast to much literature and ethnography engaging concepts of ontology in relation to Indigenous peoples, our results provided the insight into how not only the Indigenous ontology was subject to exclusion. While contrasting Indigenous and modern ontologies is illuminating, in characterising several overlapping but distinct river ontologies, we draw attention toward the ways that ontological inclusion and exclusion can affect diverse people and communities. In the case study participatory process and policy, some *Ribeirinho* and subsistence fisher people’s practices were recognised, such as irrigation; but the less tangible, affective, communal relations with and through the river were granted no space (see also Renck et al., 2022). Relatedly, what might be further developed in our framework are the questions of overlap and divergence. Conservation, in the ontology of river-as-state-responsibility, is of ‘aquatic communities’, as tied to the academic taxonomic concepts of biodiversity and ecology (CBH-Suaçui/Ecoplan-Lume, 2010: 17). In the ontology of river-as-Watú, conservation includes a much broader community of sentient non-humans. Yet, individuals, communities and ontologies are non-mutually exclusive: state managers practised the ontology of river-as-home in the past and beyond their professional roles, and Western concepts of conservation are included in funding applications for Krenak conservation projects. While at present, conservation remains a site of ontological conflict, potentially, at least, there appears to be room for complementarity (Blaser, 2016).

In parallel, the distinction characterised between the ontologies of river-as-resource-system and river-as-state-responsibility suggests that, in the long term, there may be space for retaining

the notion of water as democratically governed while shifting or pluralising a modern ontology of water. This notion of the river as one, as our collective concern, and the river as many, of our diverse river ontologies, underpins the opportunity and the challenge of ontological inclusion. The obligation that the norm of ontological inclusion imposes is that the diverse rivers of the basin are seen and accounted for. But this is not in a vacuum; it is the context of distinct policy objectives, even as these may be changed through greater inclusion. Thus, the classic problems of participation remain: who may speak in the name of what, the power and resources granted to forums, the capacity of participants to take part, and how conflicts are managed. Granted this, learning how to deliberate which river ontologies to include and how is something we can only intend to facilitate through building toward a shared conception of plurality.

Conclusion

In response to water and environmental governance and conflicts, experiments with concepts of ontology are developing across social and natural sciences, state policies, and environmental management projects. We contribute to this debate with a distinct norm and conceptual framework set out to found deliberation for greater ontological inclusion in established participatory water governance.

Conceiving of ontologies as constituted by myriad practices across a policy cycle, we characterised ontologies of the *territory* of the Doce River basin – river-as-Watú, river-as-home; ontologies of the *participatory process* for water-body classification – river-as-contested, river-as-state-failure; and ontologies of the *policy* – river-as-resource-system, and river-as-state-responsibility. Displaying ontological inclusion and exclusion graphically across the policy cycle supported further reflections, including consideration of the overlaps and divergences among river ontologies, as well as contextual challenges and opportunities in participation and established state environmental governance.

The ontologies of river-as-resource system and river-as-state-responsibility were enacted through multiple policies and institutions, heavily constraining the participatory process in opening up to the diversity of the river basin. Policies commit to recognising territorial diversity. Individual state managers demonstrated the recognition of ontological diversity and motivation to better recognise it in planning. We suggest building on this framework for ontological inclusion and exclusion to detail specific practices through which ontologies are excluded, as well as experimenting with context-specific recommendations with a view to testing whether modern management can become more ontologically inclusive.

Pairing a flexible, interpretative, and pluralistic framework with a policy modelling approach can operate as a context-specific bridge between managers and a diverse territorial context. Alongside the peoples, values, and knowledges of the river basin, this can allow the question of plural river ontologies and the practices that make them to be centred as a normative resource.

Highlights

1. Ontological inclusion and exclusion are operationalised for environmental policy analysis across a policy cycle of territory, participatory forum, and policy.
2. This is developed with an empirical examination of a state-led participatory process for water-body classification in the Rio Doce, Minas Gerais, Brazil.
3. The conceptual framework goes beyond indigenous and non-indigenous ontological divergence, overlap and complementarity, providing an adaptable normative resource.

4. Centring materiality and practice adds important insights to epistemic and social inclusion, and diverse values and conceptualisations in environmental governance.
5. Established participatory environmental governance remains the major constraint and opportunity for more sustainable and inclusive governance through ontological inclusion.

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