Water Narratives and Power dynamics in Puerto Badel: The Case of the Restoration of Degraded Ecosystem of the Dique Canal Project in Colombia

A Research Paper Design presented by:

Vanessa Clavijo Barboza

Master in Development Studies

Major: Social Policies for Development (SPD)

Members of the Examining Committee:

Supervisor: Luisa Cortesi

Second reader: Irene van Staveren

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Inquiries

International Institute of Social Studies
P.O. Box 29776
2502 LT The Hague

The Netherlands

t: +31 70 426 0460
e: info@iss.nl
w: www.iss.nl
fb: http://www.facebook.com/iss.nl
twitter: @issnl

Location:

Kortenaerkade 12

2518 AX The Hague

The Netherlands

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RDEDCP	Restoration of Degraded Ecosystems of the Dique Canal Project
ANI	National Infrastructure Agency
CDPCDZC	Corporation for the Development and Peace of the Dique Canal and Coastal Zone
NAEL	National Authority for Environmental Licenses
HP	Hydrosedimentological Plan

Abstract

During the last centuries, the Dique Canal has been intervened that end up degrading the ecosystems and causing environmental and social damage among the people living at the canal's bend., especially Afro-Colombian communities. Recently, a new infrastructure intervention aimed to restore the ecosystem: Restoration of Degraded Ecosystems of the Dique Canal Project (RDEDCP), proposing a way of looking a reality that establish environmental design, functions and relations with its water bodies. These particular realities are not natural but codified in specific narratives. As a result, this research investigates how the RDEDCP shapes narratives in Puerto Badel, Colombia, and how these narratives are understood, perceived, and experienced. Through a political ecology approach, three main water narratives are analyzed Ecosystem Restoration; Catastrophic floods; and drinking water resources. The results reveal that narratives originate from a historical perspective, are now facing environmental and social challenges in the pre-construction phase. Similarly, results expose that these narratives reinforce and resist power dynamics among public entities, the private sector, and communities of Puerto Badel, contributing to the pursuit of interests and legitimation of this infrastructure project; while excluding communities, setting agendas, and shaping environmental relations. This research contributes to the ecosystem restoration debate by using a political ecology approach to highlight how the RDEDCP's narratives reveals conflictive ideas about water, and its implications.

Relevance to Development Studies

This topic relevant to Development Studies insofar by offering a critical perspective of how ecosystem restoration projects shape narratives that interacts with power dynamics and environmental justice in the local communities. Through a narrative analysis, this research points out how certain infrastructure interventions to restore historical degraded ecosystem continue to enhance ecological inequities and unequal protection among Afro-Colombian communities, such as access to ecosystem functions, safe drinking water and natural hazards.

This research contributes to the debates in the development sector about environmental justice and disaster risk reduction in the context of a infrastructure project. It highlights the contrast among the public, private and communities sector acknowledge the importance of their perceptions, experiences and interpretations, and how this is portrayed in the narratives shaped by the project. Finally, contribute to the gap in the literature by focus attention to social and political dimensions of restoration efforts.

Keywords

Narratives, Power, Resistance, Ecosystem restoration, Unnatural disasters, Environmental Justice, Drinking Water, Afro-Colombian communities, Dique Canal Project

Chapter 1. Introduction: What is this story about?

I see it and it inspires me, it makes me feel strong, capable… because the blood of people who built the Dique Canal also runs through my veins
Young resident of Puerto Badel

Figure 1: The Dique Canal Ecosystem, Colombia

Source: (La República, 2023)

This research focuses on how the Restoration of the Degraded Ecosystem of the Dique Canal Project (RDEDCP) has shaped water narratives in Puerto Badel, Colombia, illustrating how these narratives are understood, perceived, and experienced within public entities, the private sector, and the communities of Puerto Badel. Through a qualitative methodology, I analyze how narratives emerge and interact in the project's pre-construction phase, and how they reproduce or resist power dynamics. The document is divided into six chapters: i) What is this story about; ii) Theoretical framework; iii) Methodology and methods, iv) The project; v) Main findings and discussion; and vi) conclusions and reflections.

1.1 Background and Context

In this chapter, I introduce the main stories to understand the background of the Dique Canal, the origin of the Restoration of Degraded Ecosystem of the Dique Canal (RDEDCP), and the context of Puerto Badel.

1.1.1 The Dique Canal: A Story of Environmental Degradation[1]

The Dique Canal is a 115 km waterway connection between the Caribbean Sea and the Magdalena River, built in 1650 to facilitate the navigability in the region.[2] This subregion is a flood plain formed by a complex of swamps, wetlands, and floodable soils, characterized by its biodiversity, extremely important for the region's economic, social and ecological life that takes place around the water bodies system.[3]

Currently, the Canal passes through 19 municipalities: 7 in the Atlántico department (Campo de la Cruz, Manatí, Repelón, Santa Lucía, Sabanalarga, Luruaco y Suan); 11 in Bolívar (Cartagena, **Arjona**, Arroyo Hondo, Calamar, Mahates, Maríalabaja, San Cristóbal, San Estanislao, Santa Rosa de Lima, Soplaviento y Turbana); and 1 in Sucre (San Onofre).[4] It serves as a freshwater ecosystem to supply water for aqueducts, a water source for the population's consumption, and a source of irrigation.[5]

Map 1: Dique Canal Subregion and Trajectory

Source: (ANI, 2024)

[1] Some parts of this proposal were part of assignments for Course 3207 Qualitative Interviewing. See: (Clavijo, 2024a)
[2] (Aguilera, 2006, p. 6)
[3] (Sokolewicz et al, 2016, p. 1; Brugman, 2012, p. 31)
[4] (Aguilera, 2006, p. 16)
[5] (Brugman, 2012, p. 33)

Originally, this subregion was a 'cascade of isolated' swamps in dry seasons and large water bodies in rainy seasons. The downstream part was a tidal saltwater lagoon connected to the sea, temporarily closed off by sand bars.[6] However, the Canal has gone through interventions since colonial times. In the 17th and 18th centuries, different connections between swamps were built downstream. In the 20th century, 93 bends in the Dique Canal were cut out, creating a direct connection between the Magdalena River and the Bay of Cartagena; and with it, the proliferation of a sweet water in the ecosystem.[7] It was followed by large-scale works that cut out most of the bends of the Canal, creating a less curves in canal for navigation purposes.[8]

These interventions led to the degradation of the water bodies around it and causing environmental and social damage. It increased the diverted flow from the Magdalena River, and raised the sediment load, reducing its navigability and the deterioration of neighboring ecosystems, including fauna and flora, and the destruction and deterioration of fresh water and coastal swamps, estuaries, mangroves, and coral reefs.[9] It also resulted in social impacts related to the downfall in the well-being of many communities that live in this subregion and make a living from fishing, livestock and agriculture.[10]

Map 2: Sediment load outflow to the Bay of Cartagena, Bolívar

Source: (Mogollón, 2017)

Since then, difficulties in controlling, channeling, and diverting water have become common,[11] evidencing that it has not been possible to control water bodies as expected.[12] In 2007, the Canal transported 85% of the river cargo of the country,[13] nowadays, it only transports 67%.[14]

[6] (Sokolewicz et al, 2016, p. 1)
[7] (Mogollón, 2013a, p. 29)
[8] (Sokolewicz et al, 2016, p. 1)
[9] (Sokolewicz et al, 2016, p. 1)
[10] (Aguilera, 2006, p. 6)
[11] (Camargo, 2020, p. 166)
[12] (Camargo, 2020, p. 158)
[13] (Agencia Nacional de Infraestructura, 2024)
[14] 92% correspond to liquid products derived from petroleum (Castelar, 2022)

One of the reasons is the difficulty that larger boats face during dry seasons and the sedimentation load of the Canal.[15] Finally, the Dique Canal has been affected by *El Niño* and *La Niña* Phenomena, which refers to seasonal droughts and rains, respectively, that impacts local community dynamics yearly due to their vulnerability to disaster risk."[16]

1.1.2 The 2010-2011 Disaster and the Restoration of Degraded Ecosystems of the Dique Canal Project (RDEDCP)

Despite historic demands for works on the Canal, it was not until the 2010-2011 disaster that it became a spotlight at the national level. The intensification of rains during *La Niña* Phenomenon increased water levels and the inflow of sediment load from the Magdalena River, breaking one embankment of the Dique Canal. This break flooded 35,000 ha. of land and affected 3,893,087 people,[17] leading to an economic, social and environmental emergency.

Figure 2: The 2010-2011 disaster

Source: Semana (December 15 of 2010)

The former president of Colombia, Juan Manuel Santos, expressed it as "the worst tragedy in the history" of Colombia, and blamed the effects of climate change for the disaster. For the government, communities' vulnerability, and the consequent degradation of their surroundings, was an unquestionable consequence of global climate forces. However, the disastrous effects were not only a result of the torrential rains but it also intersecting with people or human assets already in very vulnerable conditions and government inactions.[18] This is shown by the repetitiveness of

[15] (Brugman, 2012, 32)
[16] (Institute of Hydrology, Meteorology, and Environmental Studies, 2011; in Sánchez, 2011, p. 7)
[17] (Sokolewicz, 2016, p. 2; Sanchez, 2011, p. 4)
[18] (Mena, 2023, p.15)

the disastrous effects as it happened before in 1984, and again in 2010, 2018, and 2022. This situation highlighted the need to design a solution to prevent disasters in the Dique Canal, supporting the design of the RDECDP.

The RDEDCP aims to improve and optimize the hydrologic and ecologic system, swamps, and coastal areas located in the north of the Caribbean region, between the mouth of the Dique Canal in Calamar and the Bay of Cartagena in the Caribbean Sea (map 1).[19] It was designed by Consorcio Dique (CD) (the temporal unification of Royal Haskoningdhvis and Gómez Cajiao Associates S.A.S) and is now led by the National Infrastructure Agency and Sacyr, a Spanish company. It is a public-private inversion with a deadline of 15 years, divided into preconstruction, construction, and operation and maintenance phases.[20]

1.1.3 Puerto Badel: A Forgotten Village in the Dique Canal

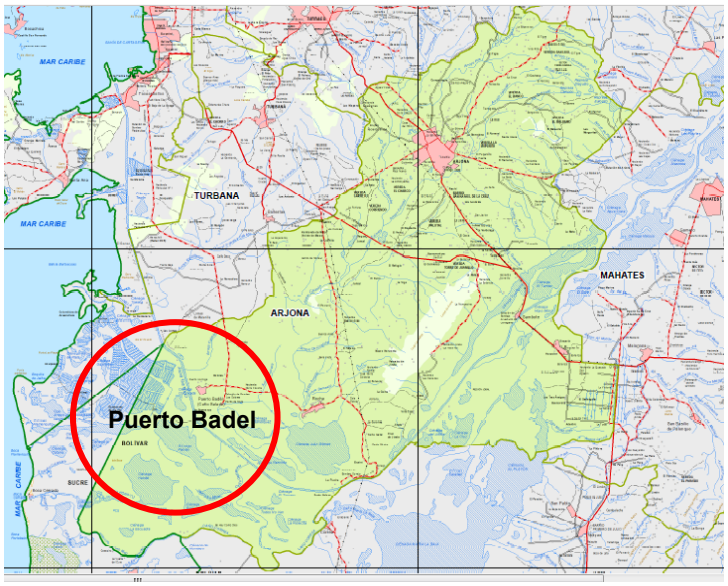
Puerto Badel is in the municipality of Arjona (Bolívar), one of the villages crossed by the canal that will be object of intervention by the RDEDCP.[21] It has a population is 6,125 people (Map 3),[22] mostly inhabited by Afro-Colombians[23] whose arrival is linked to the slave trade through Cartagena.[24] The escapes of enslaved people to remote areas allowed them to build Cimarrones's[25] settlement around the canal.[26] Later, during the 17th century, black and Indigenous people built the opening of the Dique Canal, being forced to work with hoes, axes, machetes, pickaxes and shovels.[27] Currently, Puerto Badel is a candidate for formal recognition as an ethnic territory by the National Land Agency.[28]

Puerto Badel faces economic, educational, public services, and environmental challenges. According to the 2018 National Population and Housing Census, 49,6% of locals lived in multidimensional poverty, and 15,87% with unsatisfied basic needs. The main economic activities are fishing, agriculture and livestock, developed in a traditional or moderately technical way, according to the environmental offer, location, and market conditions.[29] The school dropout is

[19] (Consorcio Dique, 2016, p. 42)
[20] (Agencia Nacional de Infraestructura, 2023)
[21] In Colombia, to execute a project in a territory with Afro-Colombian communities' presence, a Prior Consultant process must be followed. It is a fundamental right for communities to have a collective and intercultural dialogue, ensuring their real, timely, and effective participation in decisions about laws, projects, or activities that directly impact them, to protect their physical and cultural integrity. As a result, the National Infrastructure Agency executed the required consultative process with the Afro-Colombian Communitarian Council of Puerto Badel between 2020 and 2021 (Agencia Nacional de Infraestructura, 2024; Ministry of Interior, 2023, p. 23)
[22] (Alcaldía de Arjona, 2024)
[23] Afro-Colombian refers to human groups present in the national territory (urban-rural), with African historical, ethnic and cultural roots and descent born in Colombia (Grueso et al, 2007, p.14)
[24] (Gutiérrez, 1987)
[25] Refers to those slaves who escaped in a political act of rebellion against the enslavement process
[26] (Commission for the Clarification of the Truth, Coexistence and Non-Repetition, 2022, p. 583)
[27] (Aguilera, 2006, p. 10)
[28] (National Land Agency, Auto 2462 de 2019)
[29] (Consorcio Dique, 2016)

very high due to budget precariousness, deficient infrastructure, and low coverage for the secondary level.[30]

Map 3: Puerto Badel, Arjona



Source: (CDPCDZC, n.d)[31]

Energy service supply's quality is limited due to interruptions and rationings, voltage disturbances, lack of infrastructure maintenance, fraudulent connections, high costs, and infrastructure affected by *La Niña* Phenomenon.[32] Similarly, natural gas coverage is 71%[33] and aqueduct service is covered by Waters of Cartagena company, supplying water comes directly from the Dique Canal and the Bohorquez Swamp without any treatment. Additionally, there is no sewage, causing inadequate management and disposition of wastewater.

1.3 Problem Statement

Ecosystem restoration projects are broadly recognized for their capacity to shape narratives that reflect public perceptions, community engagement, and behaviors. Narratives employ values, norms, and definitions of the problem that legitimize certain solutions while discarding others.[34] They are dynamic and multifaceted, operating at various levels of analysis and being shaped by

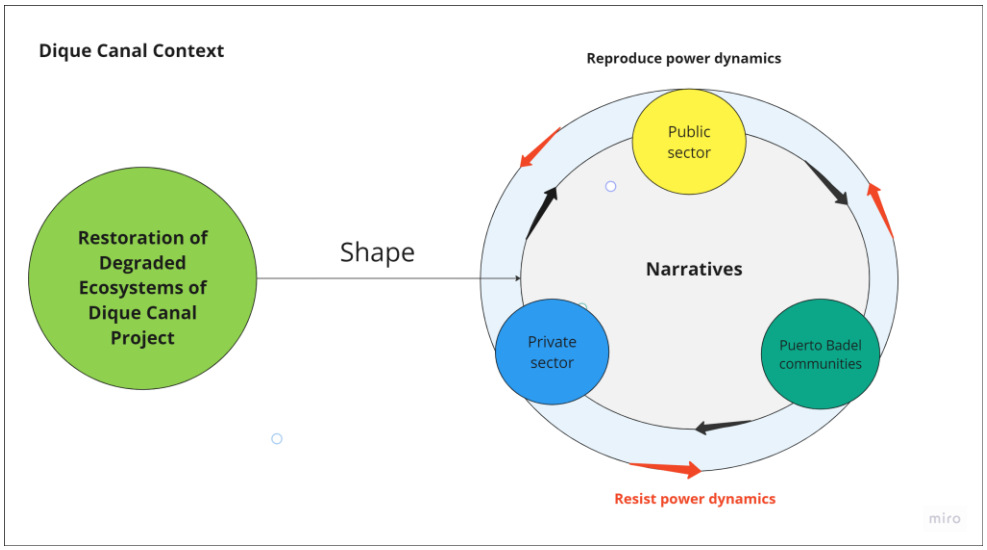
[30] (Consorcio Dique, 2016, p. 299-300)
[31] Corporation for the Development and Peace of the Dique Canal and Coastal Zone (CDPCDZC)
[32] (Consorcio Dique, 2016, p. 97)
[33] (Alcaldía de Arjona, 2024, p. 259)
[34] (Ounanian et al., 2018)

diverse voices and influences.[35] They are not simple stories but mechanisms through which the reality of individuals and communities is reflected and constructed.[36]

The Restoration of Degraded Ecosystems of the Dique Canal Project (RDEDCP) is narrating the Dique Canal Ecosystem as an almighty water body that should be navigable, environmentally restored, restored, controlled, scenario of climate change adaptation, source of drinking water, and so on. This project is per se a narrative that reflect certain understandings, perceptions, and experiences with these water bodies, interacting, opposing and complementing each other.

Narratives also reveal strategic discourses of power, relationships, and tensions, reproducing and resisting power dynamics among the public, private, and civil society sectors.[37] Narratives illustrates "who decides how and where water flows; who benefits from these decisions; and who enjoys secure water rights (…) and the extent to which the participants—human and non-human—are democratically enfranchised or, at the very least, have their needs and interests represented in decision-making flora."[38]

Figure 3: RDEDCP's narratives interaction



Source: author elaboration

Elias, Joshi and Meinzen-Dick (2021), exposed the UN Decade on Ecosystem Restoration's (2021-2030) lack of sufficient attention to social and political dimensions of restoration efforts, and the need to explore critically power dynamics that reflect those values, meanings, and definitions that drive the process at the national, regional and local context.[39] Ecosystem restoration projects comes with privileges, hierarchy and disparities, creating

[35] (O'Connell & Healy, 2022)
[36] (Weible et al., 2017)
[37] (Dietz, 2019)
[38] (Cortesi & Joy, 2021, p. 17)
[39] (Elias, Joshi and Meinzen-Dick, 2021, p. 1)

experiences of exclusion and inclusion,[40] showing that environmental injustice "is embedded in many intertwined layers of oppression".[41]

I found narratives shaped by the RDEDCP as a way to contribute to this gap from a political ecology approach, highlighting the interactions among these narratives and its implications in the Dique Canal, and more specifically in Puerto Badel. As stated by Czarniawska (2004), "to understand a society or some part of a society, it is important to discover its repertoire of legitimate stories and find out how it evolved".[42]

1.4 Relevance and Justification

While some scholars have researched the influence of media narratives on public perception and policy efficacy,[43] and others have illustrated power dynamics in water governance,[44] there is a need for a better understanding of how ecosystem restoration projects shape narratives that reflect perceptions, identities, behaviors, and decision-making processes.[45] Researching how RDEDCP shapes narratives is crucial not only due to its impact on decision-making, but also because it may go against communities' experiences and perceptions. By understanding narratives, we can identify biases, gaps or misunderstandings that may impact the environment and Afro-Colombian communities' daily lives. The critical analysis of narratives can identify policy-recommendations and promote preparedness and adaptive management practices to respond to social change and environmental dynamics.[46]

Narratives around the restoration of ecosystem processes play a vital role in framing the understanding of the Dique Canal and its ecosystem's history, present, and future.[47] They can justify ecological restoration choices, reflecting values, beliefs, and human-nature relationships,[48] thus affecting the perception of environmental issues, such as floods, droughts, ecosystem degradation, and drinking water.[49] Natural hazards-related disasters are in the memory of the communities of the Dique Canal, a memory that has not gone away and is a permanent through in governments, the private sector and local communities. Therefore, by identifying and analyzing the narratives surrounding RDEDCP, it is possible to uncover interests that drive different actors to participate or resist the narrative shaped.

As mentioned by Yale (2013) understanding the narratives surrounding projects can provide insights into the cultural, social, and economic factors that influence stakeholder

[40] (Swyngedouw and Kaika 2000; in Elias, Joshi and Meinzen-Dick, 2021)
[41] (Elias, Joshi and Meinzen-Dick, 2021)
[42] (Czarniawska, 2004, p. 5)
[43] (Olivier et al., 2021)
[44] (Truelove, 2020)
[45] (Weible et al., 2017)
[46] (Patra & Basu, 2021)
[47] (Robertson et al., 2000)
[48] (Hertog & Turnhout, 2018)
[49] (Rai, 2019)

engagement and support.[50] As a result, this research is not only interested in identifying narratives, but also in analyzing how they emerge and interreacts with power dynamics.

1.5 Research Objectives and Questions(s)

Through this research, I aim to illustrate how narratives are not simple stories about ecosystem restoration efforts but mechanisms that justify a specific understanding of social and environmental problems and their solutions. I use the RDEDCP looking to understand how narratives are conceptualized and explained by different actors, looking to point out their implications at the national, regional, and local levels. As a result, I highlight narratives that can limit the fulfillment of the environmental and socio-economic objectives established by this project, calling attention to the role they have in reproducing and resisting power dynamics in Puerto Badel, Colombia.

Main question: How does RDEDCP shapes narratives in Puerto Badel, Colombia?

Sub-questions:

1. What are the narratives shaped by RDEDCP?
2. How do narratives emerge and interact in the current pre-construction phase of RDEDCP?
3. How do narratives interact with power dynamics among the public and private sectors and the communities of Puerto Badel?

[50] (Yale, 2023)

Chapter 2. Theoretical Discussion

In this chapter, I introduce and articulate a series of concepts that are helpful in analyzing the narratives shaped by the RDEDCP with a political ecology approach.

2.1. Narratives

While there is a long tradition in heuristic analysis of narratives, reflected in studies of the Bible, Talmud and Koran,[51] they have been mostly confined to the interpretation of specific sacred text. However, the interpretation of narratives in social sciences takes place in the nine-tenth century. Foucault (1972) proposes the archeology of discourses to understand them as practices that obey specific rules, uncovering rules, structures, and regularities.[52] Similarly, Geertz (1973) explores the symbolic dimension of social actions, proposing to analyze cultural contexts in order to understand social meanings.[53]

Mitchell (1980) presents the concept of narratives per se, stating their essence and merit as a means by which human beings look forward to representing and making sense of the world.[54] Similarly, Fisher (1987) proposes the term 'narration' as real and fictive fabrications, where narrations mean 'symbolic actions' such as words and performances that have a meaning for those who create, experience, and explain them. He points out that human communications should be understood as historical and situational, where stories compete between each other.[55]

Later, Bruner (1991) illustrates how narratives play a fundamental role in the way we interpret and construct reality and how narratives "operate as an instrument of mind in the construction of reality".[56] Polkinghorne follows Bruner's work, proposing that understand the meaning where humans live, it is necessary to understand narratives as stories that reflect a series of events, whether true or false, but produce and explain human actions.[57] At the same time, Ricoeur (1984-1991) argues there is a interaction between time and narratives where every narrative works in a specific temporality and one mutually reinforces the other,[58] illustrating how people and communities build and rebuild their identities through narratives.[59]

More recently, Czarniawska (2004) summarizes the conceptualization of narratives as "the understanding of particular stories through which societies organize and make sense of their reality".[60] Therefore, narratives should not be considered simple stories, but mechanisms that reflect and construct the reality of individuals and communities, shaping perceptions, identities, behaviors, and decision-making processes.[61] They play a role in the reproduction or resistance of

[51] (Czarniawska, 2004)
[52] (Foucault, 1971, p. 138)
[53] (Geertz, 1973, p. 30)
[54] (Mitchel, 1980)
[55] (Fisher, 1987, 58).
[56] (Bruner, 1991, p. 6)
[57] (Polkinghorne, 1987)
[58] (Ricoeur, 1984, p. 3)
[59] (Ricoeur, 1991)
[60] (Czarniawska, 2004, p. 5)
[61] (Weible et al., 2017)

power dynamics, operating at various levels by diverse voices and influences.[62] For instance, through the development of **counter-narratives**, understood as "stories which people tell and live that offer resistance, either implicitly or explicitly, to dominant narratives".[63]

2.2 Political Ecology

Robbins (2012) offers a broad review of the political ecology term, illustrating different emphasis on political economy, political institutions and environmental change.[64] For instance, Blaikie and Brookfield (1987) refer to political ecology as merging preoccupations about ecology and political economy in a relation between society and land-based resources;[65] Peet and Watts (1996b) make visible how movement emerges from tensions and contradictions;[66] Hempel (1996) explores the local and regional political action of communities in degradation and scarcity at the global level.[67]

Later on, Watts (2000) looks to understand the complex relations between nature and society through the analysis of access and control over resources and their consequences for the environment and livelihoods[68]. He explains that "environmental conflicts [act] as struggles over knowledge, power and practice, and politics, justice, and governance".[69] In contrast, Scott and Sullivan (2000) illustrate environmental narratives and their political dimensions, looking to deconstruct accepted stories of the degradation of ecosystems,[70] particularly those connected to development discourses.[71]

This variety of emphasis is explained by political ecology's interdisciplinarity that shares the interest in questioning the relationship between ecology, economics, and politics. In this sense, Forsyth (2003) points out that it is highly accepted to refer to political ecology as "the social and political conditions surrounding the causes, experiences, and management of environmental problems",[72] where the political process produces environmental and ecological conditions.[73]

2.2.1 Ecosystem Restoration

Initially, ecosystem restoration was confined to re-establishing degraded ecosystems in their previous state.[74] However, interest in restoration has been growing and gathering expertise in the last decades, wondering how much is possible when we put our minds and hearts into undoing

[62] (O'Connell & Healy, 2022)
[63] (Andrew, 2004, p. 1)
[64] (Robbins, 2012, p. 14)
[65] (Blaikie and Brookfield, 1987, p. 17; in Robbins, 2012, p. 15)
[66] (Peet and Watts, 1996, p. 6; in Robbins, 2012, p. 15)
[67] (Hempel, 1996, p. 15; in Robbins, 2012, p. 15)
[68] (Watts, 2000, p. 257)
[69] (Robbins, 2012, p. 16)
[70] (Scott and Sullivan, 2000, p. 5; in Robbins, 2012, p. 16)
[71] (Scott and Sullivan, 2000, p. 4)
[72] (Blaikie and Brookfield, 1987; Bryant, 1992; Greenberg and Park, 1994; Zimmerer, 2000; in Forsyth, 2003, p.1)
[73] (Bryant and Baily, 1997, p. 28-29; in Robbins, 2012, p.19-20)
[74] (Gann, T. et al, 2019; in Sousa, T.; Ries, B. and Guelfi, 2023, p. 1)

mistakes of the past.[75] These days, the concept has been attached to climate change, and the possibility that bringing back the ecosystem to an earlier state may be the answer.[76]

Ecosystem restoration refers "to the process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed."[77] It is focused on actively restoring to a previous state before degradation,[78] building an ecosystem again by stopping the presence of weedy species, reintroducing plants and animals. It acknowledges historical conditions that allowed the degradation, creating or rebuilding soils, eliminating dangerous substances, and bringing back natural processes, and so on.[79]

Currently, the ecosystem restoration literature shows a broad debate about what the main goal of restoration efforts should be. On the one hand, some literature argues it should focus on ecological outcomes, following a 'historical fidelity' approach that emphasizes going back to a previous state.[80] On the other hand, other studies conceive the restoration of ecosystems as an opportunity to improve degraded natural spaces and benefit society through socioeconomic considerations.[81]

In this sense, Jordan and Lubick (2011), critique the idea of recreating an entire ecosystem with all its parts and processes, which is the "literal re-creation of a previously existing ecosystem" as a way to compensate for "outside" influences on it.[82] Bayraktarov et al. (2020) offer a systematic review of empirical results from published research, pointing out that much of the published literature recommends greater efforts to include socioeconomic and cultural elements to achieve an effective ecological restoration; especially for marine coastal restoration.[83]

Efforts to restore the ecosystem can be led at the local, regional, national, and transnational level by local volunteers working with hand tools to large industries processes involving large-scale technology. This research represents the last effort, with RDEDCP being run by the national government and private sector, aiming to restore the structure and/or functions of the degraded ecosystem of the Dique Canal[84], and improve the socio-economic conditions of the population. However, Political Ecology scholarship acknowledges that the cost and benefits of an environmental change are not distributed equally among actors, strengthening or reducing pre-existing inequalities with political implications in the power dynamic[85]

Some environmental researchers and activists are apprehensive of restoration projects that end up having an even more technological relation with nature and wonder if well-structured restoration projects are just an excuse for imposing human interests, causing even more damage. For Higgs (2003), "[t]hese projects often ignore the fact that changing one thing in a complex system can change the whole system".[86]

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[75] (Higgs, 2003, p. 1)
[76] (Sousa, T.; Ries, B. and Guelfi, N.., 2023, p. 1)
[77] (Gann et al., 2019; in Pettorelli and Bullock, 2023, p. 2).
[78] (Pettorelli and Bullock, 2023, p. 2).
[79] (Higgs, 2003, p. 1)
[80] (Hallett et al. 2013; Case & Hallett 2021; in Pape, 2022, p. 2)
[81] (Elmqvist et al, 2015; in Bell, Graham and White, 2020, p.1)
[82] (Jordan & Lubick, 2011, p. 2)
[83] (Bayraktarov et al., 2020; p. 8)
[84] (Hobbs and Cramer, 2008)
[85] (Bryant and Bailey 1997, pp. 28–29; in Robbins, 2012, p 20)
[86] (Higgs, 2003)

In this sense, research about ecosystem restoration projects often draws attention to the need to combine social and ecological elements, underpinning the need to include local communities in the process. Similarly, Fisher et al (2021) state that the most effective way to approach an ecosystem restoration is through the socio-ecological perspective, achieving both ecological restoration and human well-being.[87]

2.2.2 Environmental Justice

Environmental justice is a tool for analysis and a social movement that point out disempowered communities such as racial minorities, are allocated in and around hazardous areas. This approach builds on Robert Bullard's (1990) illustrates how environmental justice has long pressured racism and classism, which involve unfair environments.[88] According to Robert Bullard (2000), environmental justice is the principle that "all people and communities are entitled to equal protection of environmental and public health laws and regulations".[89] It challenges the current 'environmental protection apparatus' and offers a perspective for addressing environmental inequities, different impacts, and unequal protection.[90]

The problem of black communities living in polluted areas is not an anomaly or novel. The articulation of research has shown that they are more likely to live near toxic facilities, carry the weight of ecological degradation and pollution, and experience disproportionate disasters.[91] For instance, Bullard (2000) explains how historically, toxic dumping has been done in black and poor communities, disproportionately burdening them. However, the organized black movement against toxic dumping, municipal waste and discriminatory environmental decisions is becoming a well-known movement today.[92] It involves impoverished populations fighting the state or corporate sector, and fights impacts of growth and unequal distribution of ecological goods and bads.[93]

In this sense, environmental racism refers to "any policy, practice, or directive that differentially affects or disadvantages (whether intended or unintended) individuals, groups, or communities based on race[...]".[94] Environmental racism occurs when black communities "repeatedly suffer disproportionate risks and harms from policies and decisions".[95] This situation is even more evident when the benefits of those policies and decisions harm black communities while benefiting others.[96]

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87 (Fisher et al, 2021, p. 1)
88 (Robbins, 2012, p. 74)
89 (Bullard, 2000)
90 (Bullard, 2008, p. 3)
91 (Mitchell 1993; Boer et al. 1997; Massey 2004; Downey & Hawkins 2008; Davies et al. 2018; in Pape, 2022, p. 2).
92 (Bullard, 2000, p. 3; in Clavijo, 2024b, p. 9)
93 (Gerber, 2024; Clavijo, 2024b, p. 9) Based on the political ecology course.
94 (Mohai, P., Pellow, D. and Roberts, T., 2009; in Clavijo, 2024b, p. 9)
95(Michigan Civil Rights Commission, 2017, p. 93)
96 (Michigan Civil Rights Commission, 2017, p. 93, in Clavijo, 2024b, p. 9)

2.2.3 Unnatural Disasters

The exploration of disasters and the implications for social change started in the early twentieth century when Samuel Prince (1920) explored the case of munitions explosion.[97] However, this approach was not followed until 1983, when Hewitt (1995) introduced social factors, proposing that disasters emanate from social processes developed over long periods and from crises. Later, Oliver-Smith and Hoffman (1999) demonstrate the importance of an anthropological perspective in studying disasters, considering the record of the long-term environmental patterns of catastrophes and the cultural construction of disasters.[98]

With the recognition of vulnerability to hazards like floods, droughts, earthquakes and pollution, a policy approach to research continues to explore unnatural disasters.[99] Within this framework, hazards need to meet vulnerable conditions among communities to become a disaster. Nevertheless, the political sphere often shows them as catastrophic events resulting from the 'result of errors and malfunctions', normalizing the accepted practices and policies that produce them.[100] The term "natural disaster" is still dominant public discourse to refer to these phenomena, despite its growing recognition as a 'misnomer'.[101] Disasters are not natural events but rather "shaped by a complex interplay of socio-political factors has existed for more than a century".[102] This implies that "environmental factors do not solely determine the impact and severity of disasters but are also significantly influenced by social, economic, political, demographic and cultural elements."[103] As mentioned before, floods are natural phenomena, but for it to result in disastrous effects, they need to meet with people or human assets in vulnerable conditions.[104]

This approach aims to provide a deeper understanding of disaster occurrence and prevention to alleviate suffering, especially to prevent causing more harm while attempting to reduce it. In this sense, understanding disasters as not natural is important for appropriately handling them, especially in conflict-prone areas, such as the one where Puerto Bladel is located.[105]

The risk of floods, pollution and environmental degradation in the RDEDCP's area of influence is not equally distributed amongst populations.[106] For this analysis, it is important to understand vulnerability as "human sensitivity to [a] hazard, which is determined by pre-existing social, economic, and political conditions",[107] where the vulnerability degree is linked to social, political, and economic conditions that make the exposure more forbidding, such as inequality, poverty, power dynamics and food security.[108]

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97 (Prince, 1920; in Hoffman and Oliver-Smith, 1999, p. 1)
98 (Oliver-Smith and Hoffman, 1999, p. 12)
99 (Robbins, 2012, p. 33)
100 (Barrios, 2017, p. 1)
101 (Chmutina and von Meding, 2019; in Mena, 2023, p. 15)
102 (Dynes, 2000; Kelman, 2020; in Mena, 2023, p. 14)
103 (Cannon, 1994, 2008; Gaillard et al., 2007; Garcia, 2005; Kelman, 2020; in Mena, 2023, p. 15)
104 (Mena, 2023, p.15)
105 (Mena, 2023, pp. 23-24)
106 (Robbins, 2012, p. 33)
107 (Kelly And Adger, 2000; Reid and Vogel, 2006; in Haalboom and Natcher, 2012, p. 320)
108 (Adger and Kelly, 1999; Kelly and Adger, 2000; Ford and Smit, 2004; in Haalboom and Natcher, 2012, p. 320)

2.2.4 The Idea of Water Conflicts

Cortesi (2021) underpins how conflicting imaginaries of our relationship with water materialize and how ideas and values about water create particular narratives.[109] The author argues there is a common representation of water conflicts as something homogenized among diverse groups of people: "two groups contraposed to each other and in competition for a scarce resource that both groups need and want."[110] Similarly, if an issue involves water, it refers to quantity (scarcity or abundance) or quality.[111]

As a result, the author proposes the concept of 'Social life of ideas', referring to "a process through which ideas gain discursive form, are expressed narratively, visually and performatively, and lead to actions and reactions",[112] where these standardized ideas are consolidated, remain alive and have a life of their own.[113] Through the analysis of ten cases of water conflicts, they demonstrate "how the idea of the conflict itself has been defined, molded, sharpened those conflicts".[114] In fact, water infrastructure is present in many cases directly or indirectly, displaying how water infrastructures are not just dams, embankments, and hydroelectric generation, but household technologies, and the administrative process in charge of the delivery of water supplies and waste removal.[115]

Cortesi and Joy offer three understandings and manifestations of water conflicts: (i) the agential purchase of the idea of water conflict (how the idea has conditioned the conflict per se); (ii) the instrumentalization of water conflict; and (iii) the naturalization of environmental, ecological, technological, and historical relations.[116] In this sense, the idea of water conflicts allows me to analyze what is behind it, what it produces, and how it is instrumentalized to achieve specific interests and legitimize certain historical, technological, and environmental relations.[117]

2.3 Power, Dimensions and Mechanisms

Power has been theorized by numerous authors over time, but Weber (1922), Giddens (1984), and Foucault (1975; 1976; 1980) are considered its major theorists.[118] No definition of power is more recognized than Weber's, according to whom power is *"*the probability that one actor within a social relationship will be in a position to carry out his own will despite resistance, regardless of the basis on which this probability rests*".*[119]

In contrast, Giddens's focuses on its transformative capacity, which refers to the power to intervene casually in events, linking the notion of power to actions, where an individual can 'make a difference' in a pre-existing context or series of events.[120] Giddens focuses on actions, instead of

[109] (Strang; in Cortesi & Joy, 2021, p. xvi)
[110] (Cortesi & Joy, 2021, p. 3)
[111] (Cortesi & Joy, 2021, p. 1)
[112] (Cortesi & Joy, 2021, p. xix)
[113](Cortesi & Joy, 2021, p. 3)
[114] (Cortesi & Joy, 2021, p. 8)
[115] (Strang, in Cortesi & Joy, 2021, p. 18)
[116] (Cortesi & Joy, 2021, p. 9)
[117] (Luisa & Joy, 2021, p. 3-8)
[118] (Gaventa, 2003, p. 1)
[119] (Weber, 1922, p. 152; in Upoff, 1989, p. 299)
[120] (Giddens, 1984, p. 14; in Gaventa, 2003, p. 5)

'historical relations', opening space to the possibility of resistance.[121] However, as stated by Lukes, individuals and communities do not always act, or even have the desire to act according to their interests.[122]

Nevertheless, Foucault is the most influential theory of power in the 20th century. His work is considered radical compared to previous understandings. He argues that power is not concentrated, possessed, and employed but diffused, discursive, and shaping agencies,[123] working through discourses, practices, and institutions that shape and reframe the limits of possibilities of actions. He conceives power as 'a multiplicity of forces' that forms social relations, rather than something executed by one individual or group over another.[124] According to him, "Power is everywhere: not because it embraces everything, but because it comes from everywhere. (…) Power is not an institution, nor a structure, nor a possession.

Foucault also proposes that power can be positive, producing realities, understating objects and truths, where the knowledge gained by an individual is owned by its production.[125] As a result, he conceives power is inseparable from knowledge, where no knowledge can be formed without a system of power, and not power can be exercised without the extraction, distribution or retention of knowledge.[126]

Finally, for Foucault, discourses portray how knowledge is configured. He understands 'discourses' as "essential to the operation of power, as it is the vehicle through which knowledge and subjects are constituted",[127] and not as "a mere intersection of things and words".[128] However, discourses are also essential to resistance, given power's omnipresence, they can find resistance to avoid, destabilize and reply to strategies of power.[129] I find Foucault's useful and explicative of the reality of the RDEDCP, where narratives play a role in reproducing and resisting power dynamics among public and private sectors, and Puerto Badel's communities.

[121] (Foucault, 1979, p. 90; in Gaventa, 2003, p. 5)
[122] (Lukes, 2005)
[123] (Gaventa, 2003, p. 2)
[124] (Foucault, 1979: p. 92; in Gaventa & Cornwall, 2006, p. 4)
[125] Foucault, 1977, p. 194)
[126] (Foucault, cited in Sheridan, 1980, p. 283; in Gaventa, 2003, p. 4)
[127] (Gaventa, 2003, p.2)
[128] (Foucault, 1971, p. 48)
[129] (Gaventa, 2003, p. 2)

Chapter 3. Methodology, Methods and Participants

3.1 Methodology and Methods

To answer the research questions, this study incorporated a qualitative approach, allowing to "examine people's experiences in detail by using a specific set of research methods […] identify issues from the perspective of the participants and understand the meaning and interpretations that they give to behavior, events or objects",[130] through a deductive and inductive approach. This approach was used to understand: i. behaviors, beliefs, opinions and emotions; ii. people's points of view; iii. processes like decision-making; iv. uncover the meaning of people's experiences; v. social interactions, norms and values shared; vi. the context; vi. Give voice to people; and vii. Examine sensitive issues.[131]

3.2 Research Process

I conducted fieldwork in Puerto Badel, Cartagena and The Netherlands from July to October 2024, where I collected primary and secondary data sources in the following ways:

3.1.1 Document Analysis

Through secondary data analysis, including qualitative and quantitative data, I contextualize this research to further identify, understand and analyze the narratives shaped by RDEDCP. The strategy implemented was direct data collection, official online requests, and personal network, collecting the documents relevant to the purpose of this research. Subsequently, I analized narratives in the official documents of the RDEDCP listed in the following table:[132]

Table 1: RDEDCP Documents list

No.	List of documents
1	Recommendations to conform the institutional component (CD.ID.142.AMB.INF.00.001)
2	Inventory of properties affected by the infrastructure (CD.ID.143.GEN.INF.00.001)
3	Hydrosedimentological Plan (CD.IB.240.AMB.INF.00.001)

Source: author elaboration

[130] (Hennink, Hunter & Bailey, 2020, p. 10)
[131] (Hennink, Hunter & Bailey, 2020, p. 11)
[132] The official documents are available on the National Infrastructure Agency Platform (https://www.ani.gov.co/cuarto-de-datos)

3.1.2 Semi-structured in-depth Interviews

According to Hennink, Hunter & Bailey (2020), in-depth interviews facilitate the identification of individual perceptions, beliefs, feelings and experiences, especially in relation to sensitive issues. It allows for gaining in-depth information and identifying the context of the participant's life. In this sense, I designed a questionnaire to explore meanings, experiences, events, relationships, perceptions and concerns.[133] The sampling strategy was structured based on a mix of snowball and purposive sampling,[134] where participants had to meet certain characteristics to participate in the discussion, such as sex, age group, sector, economic and political activities, and location. According to Roulston (2010), the recruitment plan involved a personal network to contact participants through personal introductions, mailing letters, and calling for interviews.[135] Face-to-face interviews were conducted for participants in Puerto Badel, and a mix of face-to-face and online interviews took place for public and private sector participants. All participants were presented with the ethics protocol, a consent form, and complete information about this research. I included a video of the RDEDCP as a strategy for eliciting storytelling, description, and interpretation, and some participants also explained the project, and how they interpret the possible impacts through maps.

I conducted 21 in-depth interviews, distributed among public servants (7), private sector participants (7), and members of Puerto Badel community (6), distributed at the local, regional, and national levels, with key direct or indirect influence around the area of intervention of the RDEDCP, described as follows:[136]

Table 2: Participants in-deep interviews

Sector	Participants	No.
Public Sector	Environment and Sustainable Development Ministry	21
	Special Jurisdiction of Peace	
	Government of Bolívar	
	Regional Autonomous Corporation of the Magdalena River (Cormagdalena)	
	CARDIQUE	
	Planning Secretary of Arjona	
	National Adaptation Fund	
Private Sector	Sacyr	
	Consejo Gremial de Bolívar	
	Cámara de Comercio de Cartagena	

[133] (King, Horrocks and Brooks, 2019, p. 109)
[134] Looking to reduce the risk of having a homogeneous sample
[135] (Roulston, 2010, p. 98)
[136] For participants demography, see Appendix D

	Waters of Cartagena	
	Mardique	
	Expert	
	Consorcio Dique	
Puerto Badel's community	Fish seller	
	Rice farmer	
	Fish-farmer	
	Fisher and craftsman	
	Member of the Black Communitarian Council of Puerto Badel	
	Rancher and farmer who live next to the Dique Canal	
	Farmer who lives next to the Dique Canal	

Source: Self-elaboration (2024)

3.1.3 Focus Groups

Focus groups can "open up an opportunity to obtain a different kind of qualitative data that can reveal the social and cultural context of people's understandings and beliefs".[137] In contrast to in-depth interviews, which provide mostly individual perceptions, this technique allowed me to collect data through group interaction and prepared activities, identifying shared perceptions, memories, knowledge, identities and reinterpretations among participants.

The questionnaire guide was designed for a semi-structured focus group with a 'discussion guide', exploring shared experiences, events, relationships, perceptions, concerns, and participation processes.[138] I included a video of the RDEDCP as a strategy for eliciting storytelling, description, and interpretation, and participants also explained their relationship with the Dique Canal and how they interpret the possible impacts this project may have through maps.

I conducted three focus groups with the Puerto Badel community, including participants with different age groups, sex, and economic and political activities. I used a mix of snowball and purposive sampling, where participants referenced had to meet certain characteristics to participate in the discussion. The recruitment plan involved reaching out to personal contacts in Puerto Badel and asking for recommendations of key informants. I carried out three focus groups were with 8 participants, divided into relatively homogenous groups, looking to balance the power dynamics among gender, age groups and political participation, described below:

Table 3: Focus Group participants' demography

Sector	Participants	Sex	Age group	No.

[137] (King, 2019, p. 94)
[138] (King, Horrocks and Brooks, 2019, p. 109)

Puerto Badel's community	1. Fish farmer 2. Seller 3. Household	W	Adult	8
	1. Employee 2. Pig farming and rice farmer	M	Elderly Adult	
	1. Rancher, farmer and unemployed 2. Farmer 3. Fish farmer and owner of a beauty salon	M-W	Youths	

Source: Self-elaboration (2024)

3.1.4 Participatory and non-participatory observation

Participatory and non-participatory observation facilitates researchers to "systematically observe and record people's behavior, actions and interactions". It enabled me to understand the context, describe specific areas, actions, and interactions, understand how people live in the territory, and complement the other data collection methods.[139] This method allow explores what happens, listens to what is said, and asks questions through informal and formal conversations, collecting documents and artifacts. It collected all kinds of data available that emerge during conversations.

I conducted participant and non-participant observation in Puerto Badel through a series of activities to understand the context, such as taking walks, having informal talks, playing with children, joining economic activities, and doing a boat immersion through the Dique Canal, exploring Puerto Bladel and the Dique Canal from within, described as follows:

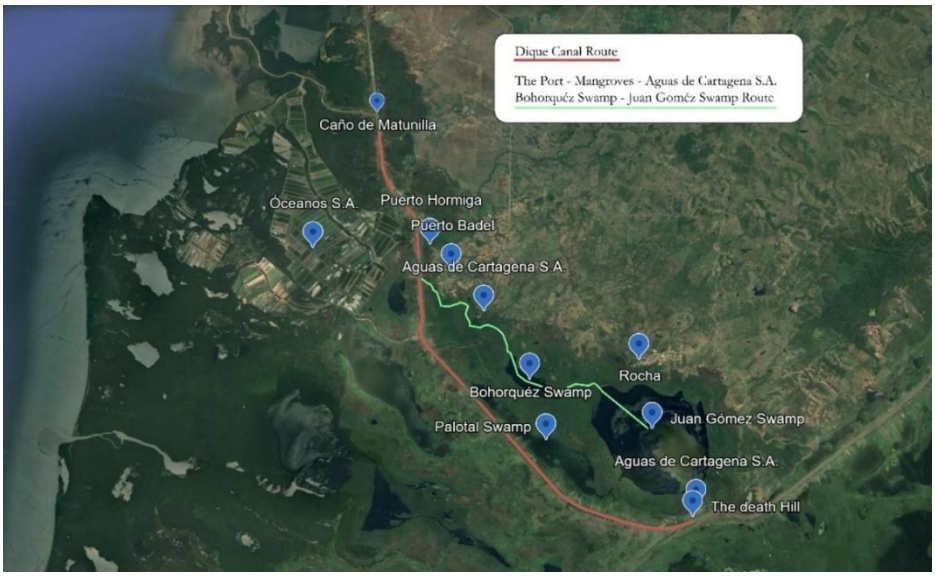
Table 4: : Activities during the participatory and non-participatory observation

Activities	Places	Artifacts collected
Walks and immersion through the Dique Canal with members of the Puerto Badel Community	**Puerto Badel:** The Port, Church, Park, School, Internet Store, Participants homes, Fish farming pool Beauty Shop, Cockpit **Dique Canal:** Puerto Hormiga, Ranchito Swamp, Hill of Death, Waters of Cartagena, Bohórquez and Juan Gómez Swamps, Mangroves, Óceanos, Lomas de Matunilla Canal, and an agriculture private property	Minutes of Prior Consultations History of Puerto Badel Book

Source: Self-elaboration (2024)

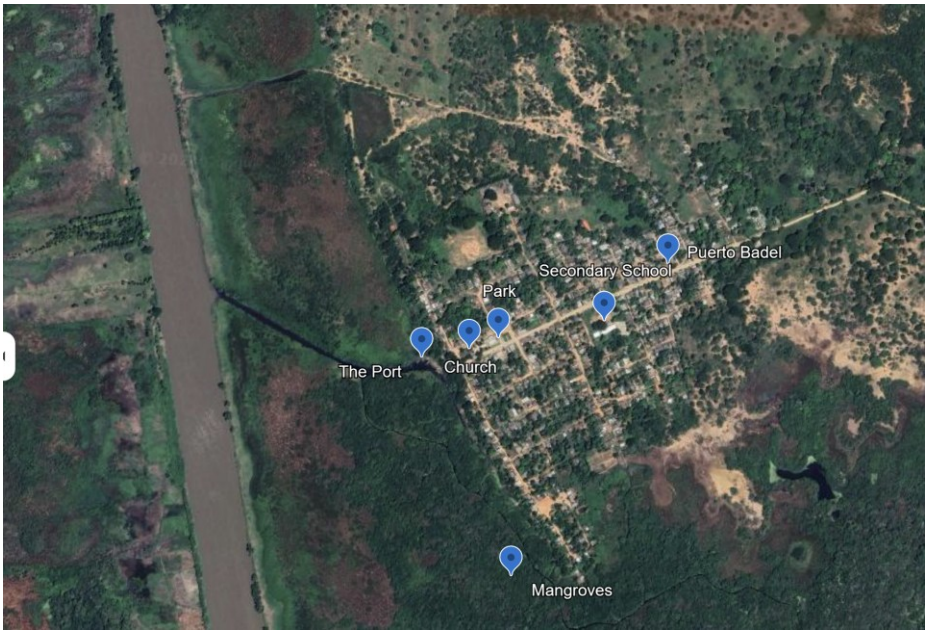
[139] (Hennink, Hunter & Bailey, 2020, p. 170)

Map 3: Boat route and places visited in the Dique Canal



Source: Self-elaboration based on Google Earth (2024)

Map 4: Main places visited during fieldwork in Puerto Badel



Source: Self-elaboration based on Google Earth (2024)

3.3 Thematic analysis

This research conducted both deductive and inductive thematic analysis. From a deductive analysis, key concepts from the theoretical framework (like restoration, disasters, environmental injustice, drinking water and power) and questionnaire guide were included in the analysis; from an inductive analysis facilitating description, discussions, and data comparison through the construction of

categories, meanings, and explanations from the data itself (like catastrophic floods, historical debt, salinization, interpretations). This mix provided the opportunity to 'interplay' the data, building a thematic analysis from the literature but also for the data in a particular context.[140]

To analyze the qualitative data collected, I applied the thematic analysis framework, searching for themes that emerged as important to describe the situation studied.[141] For this, I identified themes by reading carefully the transcripts and fieldnotes in Spanish, recognizing narrative patterns, differences, and intersections.[142], which enabled the categorization for analysis, the selection of main narratives, and the conceptualization of water narratives.[143]

I used Atlas.ti software for the data analysis, "from codes and categories to the theory", better known as the three-step scheme: codes, axial codes and selective codes.[144] I created codes to understand their origins, links, and differences, guiding to topics used to 'construct meaning'.

3.4 Positionality

I found myself between insider and outsider positionality. Insider because, as a native from Cartagena, I share the Spanish language, accent, and Caribbean Coast values and customs with participants. In contrast, I am an outsider because I am not Afro-Colombian and I come from a privileged background and another city reflected on my stratification, education level, and city of birth, widening physical and symbolic divisions between them and me. Similarly, for participants at the national level, I am an outsider given that I was born in the Caribbean region, with a different accent, and represent the academic sector as a Master's student in The Netherlands.

As a result, this research was conducted keeping in mind emic and ethic perspectives. In the emic perspective, I acknowledge the relativeness of behaviors and actions in a specific context in which they take place, recognizing their experiences, rationality and meanings[145]. In the ethic perspective, by describing the diversity across cultural factors, using and testing theories in the analysis.[146] In this sense, my main goal was to make participants feel safe, facilitating the observation, listening, and experiencing of the participants' narratives.

The selection of the RDEDCP was influenced by my position as a Cartagena native with previous experience in Puerto Badel, providing closeness to key actors involved in the Dique Canal context. Additionally, this project was designed by the temporal unification of a Colombian company (Gomez Cajiao and Associates) and an international Dutch company (Royal Haskoning), and as a Colombian student living in the Netherlands, it awakened in me a curiosity of exploring this case. The Colombian government and private sector argue this project is an "unique in sustainability terms in Colombia and Latin America";[147] therefore its study can potentially bring considerations to the actors in charge of the implementation. In this sense, I recognize my

140 (Hennink, Hunter & Bailey, 2020, p. 10)
141 (Daly, Kellehear, & Gliksman, 1997; in Fereday and Muir-Cochrane, 2006)
142 (Rice and Ezzy, 1999, p. 258, in Fereday and Muir-Cochrane, 2006)
143 (Fereday and Muir-Cochrane, 2006)
144 (Saldafia 2009, p. 4; in Williams and Moser, 2019)
145 (Fetterman, 2008; in Darwin, 2020, p. 5)
146 (Darwin, 2020, p. 5; in Clavijo, 2024, p. 3)
147 (Sacyr, 2023)

responsibility in this research, contributing to the 16% of the development research done by Global Researchers about their own region of origin.[148]

3.5 Risks and ethical considerations

I completed the CERES Safety and Security Course offered in June 2024, learning strategies to execute a well-planned fieldwork that considers the context of study and the risk environment. The course provided an overview of how to do research in hazardous, remote or complex environments,[149] presenting the relevance of safety and security considerations in research and the connection with integrity and quality of research through everyday situations in situ. It made me acknowledge the importance of preparing before, during and after fieldwork, and how safety and security considerations interact with research practices, from the design and methodology itself to research results. I learned about context analysis and risk assessment, while integrating tools to manage personal security with preventive and reactive approaches.

I followed the recommendations and early warning of the Institute of Hydrology, Meteorology and Environmental Studies of Colombia. I also asked for permission to enter Puerto Badel to the Black Community Council, given the possibility of encountering the presence of the criminal group known as *Ejercito Gaitanista de Colombia*.[150] Once there, I followed locals' recommendations, such as a curfew after 9 pm and being accompanied by a community member. All the information was anonymized immediately, the treatment of personal data was informed through oral consent and the collected information was stored and locked by password, allowing only me to have access to it.

Additionally, I read the research purpose and topics in the oral consent and emphasized that participants were not expected to answer questions that made them uncomfortable and could conclude the interviews whenever they wanted. I identified some participants in a distressed situation, especially when sharing armed conflict memories, and I gave them some minutes before resuming the interview. Finally, according to the Research Ethics review (Appendix A) I will design an infographic piece that summarizes the main findings and share it with the participants.

3.6 Challenges and limitations

One of the main challenges I encountered was accomplishing data collection that evenly represented the different narratives, points of view, and experiences among the public and private sectors, and the communities of Puerto Badel. Each sector shared stories about their interests and priorities that often-generated different perspectives about the project and its impact on the subregion. This challenge required me to implement strategies to ensure that the voices of each sector were presented, allowing me to identify contrasting narratives among participants.

[148] (Amarante et al, 2022, p. 1.662; in Abasli & Elassal, 2023, p. 3)
[149] (Hilhorst et al, 2016, p.5)
[150] (Gil and Valencia, 2024)

One of the main challenges is related to locals' participation in Prior Consultants Process. I identified that some community participants were fully aware of the project, while others did not know much about it other than what they had heard from other community members.

Finally, a significant limitation was the lack of participation of the National Agency of Infrastructure, national entity in charge of the RDEDCP, due to the recent requirement of an environmental license to continue the pre-construction phase. The entity acknowledged they were interested in participating, but they were facing different administrative and political decisions to achieve the approval of the Hydrosedimentological Plan (HP) by the National Authority for Environmental Licenses. This situation created an uncertainty and prudence atmosphere, restricting the participation of the entity in interviews. In this sense, even though it fulfilled the participation of the key actors at the national, regional and local level, the lack of a voice of the RDEDCP limited the access to a broad vision of the narratives shaped by it beyond written documents.

Chapter 4. The Restoration of Degraded Ecosystems of the Dique Canal Project (RDEDCP)

4.1 The project

The origin of the RDEDCP took place in 1997 when the Ministry of Environment required Cormagdalena to design a solution to restore the degraded ecosystems of the Dique Canal.[151] However, this resolution was extended repeatedly due to new requirements, and it was not until the 2010-2011 disaster that the national government pushed Cormagdalena to evaluate and present the final design to be approved, resulting in the presentation of the RDEDCP to the National Adaptation Fund,.[152] Decding to structure it as a tripartite agreement between National Infrastructure Agency, Cormagdalena and Adaptation Fund in 2019.[153] Finally, in 2022 the National Infrastructure Agency awards the contract to the company Sacyr, and in 2023 the preconstruction phase started.

The RDEDCP consists of actions to control, regulate, stabilize and/or maintain an adequate liquid and solid level, guaranteeing the optimal functioning of the Dique Canal System. It looks to optimize the provision of ecosystem functions through the diminution of the continental inflow to the Caribbean Sea (especially that derived from sediments) in a way that:

> …prevents the damaging effects on ecosystems and strategic areas, promoting its recovery; guarantee among others, the port activity in the Bay of Cartagena without setbacks the navigability through the Dique Canal, the provision of water to the settlements in the area of influence and no saline intrusion; the improvement of quality-of-life indicators of the settlements near by the Dique Canal System, prevent the catastrophic effects of floods and eliminate those considered undesired. (Consorcio Dique, 2006, p. 4)

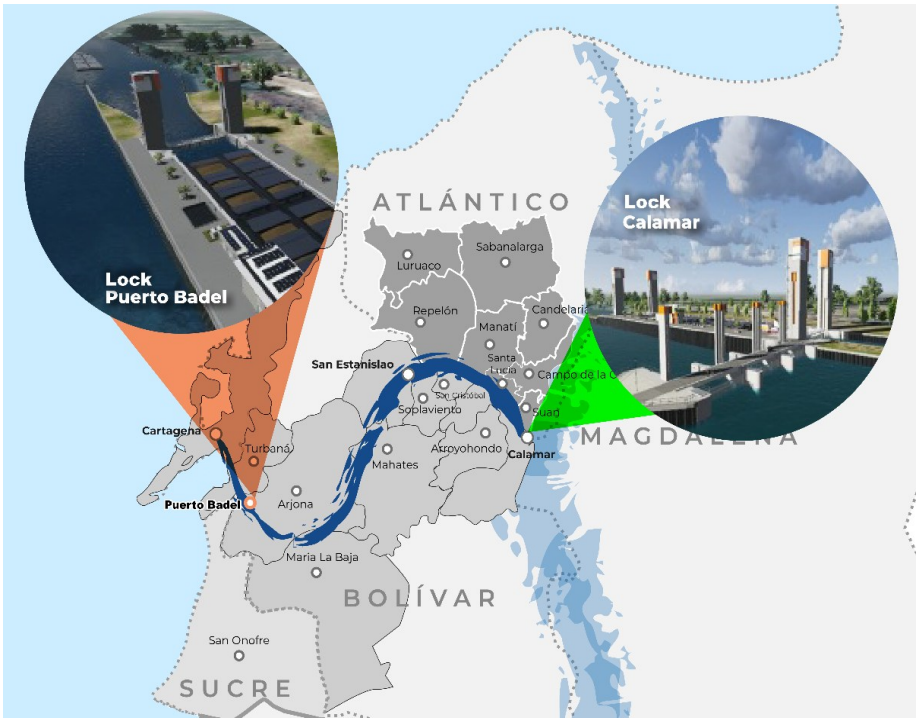
It is based on environmental, infrastructure, and social components, divided into the following objectives: i) Active water flow regulation; ii) Control sediments between the canal, Bay of Cartagena and Barbacoas; iii) Regulate the flow of water; iv) Floods and water level control; v) Control of salinity intrusion, especially in the Juan Gómez Swamp, where it is taken the water for the aqueduct of Cartagena; vi) Scenarios for climate change adaptation; vii) Improvement of connections between swamp-swamp and swamp-canal; viii) Restoration of the Ecosystem of Corals of Indias and San Bernardo National Natural Parks; ix) Restoration of swamps, canals, and Dique Canal; x) Ensure hydric resources for drinking water, irrigation, cattle, fishing and other services; and xi) Navigability through the canal.[154]

[151] (Ministry of Environment and Sustainability, 1997)
[152] (Adaptation Fund, 2024)
[153] (Interview 16 Cormagdalena, 2024)
[154] (Fondo de Adaptación, 2024)

First, the design consists of constructing an infrastructure composed of locks and gates to prevent uncontrolled entry and sediment flow into the Dique Canal. One lock and floodgates are located in Calamar, and another lock is next to the populated center of Puerto Badel. This infrastructure aims to control the flow of water that enters the Dique Canal, avoiding overflow situations or possible flooding.[155]

According to HP (2016), hydraulic behavior and sediment flow in the Canal are expected to be influenced by the gate that controls the entry of water flow and sediment into the Canal. The gate in Puerto Badel would cut off the outflow to the Bays of Cartagena and Barbacoas and the water would be redistributed through the deltaic area. In both Calamar and Puerto Badel, a lock is proposed to ensure navigation in the Canal from the Magdalena River to the Bay of Cartagena (see map 6). [156]

Map 4: RDEDCP: Calamar and Puerto Badel Locks

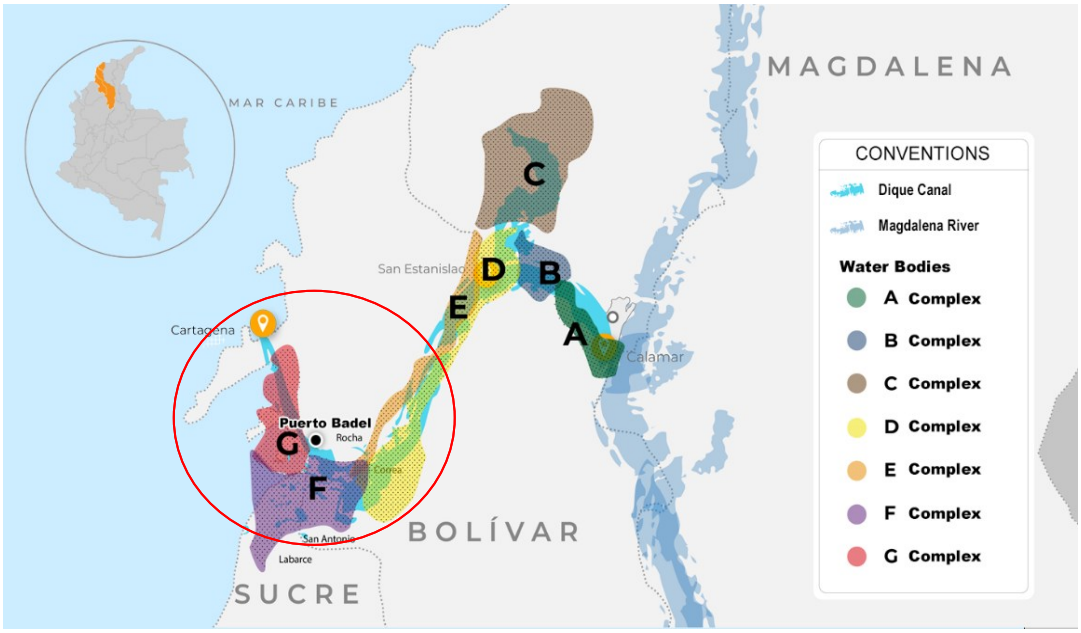


Source: ANI (2024)

Second, since the swamp system is affected by the inflow of sediments that get stuck when water levels go down, the project proposes the restoration of connections between swamps and the Dique Canal. To fulfill this goal, it proposes organizing the ecosystem into a complex system.[157] According to this model, **Puerto Badel** is in **Complex F**, conformed by Juan Gómez, Bohorquez and Ranchito Swamps (map 7):

[155](Consorcio Dique, 2016, p. 323)
[156] (Fondo de Adaptación, 2024)
[157] (Agencia Nacional de Infraestructura, 2024)

Map 5: Complex system to restore swamps



Source: ANI (2024)

Third, the RDEDCP includes works to mitigate flood risk in the context of an extreme event in the populated centers of the banks of the Dique Canal and swamps. These works consist of the construction of walls and drainage systems (sewage and pumping stations), placed according to flood risk maps, and identifying areas with a high probability of flooding.

Finally, to distribute sediments and keep the navigability connection between bays, the RDEDCP will reopen the sedimented Caño Lequerica and Caño Estero,[158]and will maintain the connection of the Caño Matunilla to the Bay (see map 9).[159]

[158] (Consorcio Dique, 2016, p. 323)

[159] (Mogollón, 2013b, p. 29)

Map 6: Main connections to the Bay of Cartagena and Barbacoas

Source: Adjusted version of (Cortes, 2021)

Chapter 5. Findings: This is a story about water

When I was exploring, reading, and rereading the RDEDCP's documentation, I was looking to understand the main story behind this project. Once the data collected started, I noticed this was not a story about adaptation to climate change or development, but about **water** (agua). It was corroborated by the fact that, in the recorded conversations, participants mentioned this word more than any other topical word (3.050 times), followed by words like "Dique," "Canal," "level," and "swamp," all of them referring to water in one way or another. looking to represent and make sense of their reality in the Dique Canal.[160] As a result, I propose to share these stories as water narratives.[161]

Water narratives refer to a variety of vital, dramatic and symbolic stories that reflect realities, imaginaries and experiences with water, and whether true or false.[162] It understands water not only as an element, component of the landscape or an object of human manipulation, but also as the main character, multidimensional and multipurpose in contemporaneous histories and social processes.[163] For Camargo and Camacho (2019), when we talk about water, usually it is in a singular way, but behind this singularity, there are a multiplicity of forms and states of water in a world of millions of people who live, work, and depends economically on water bodies, such as swamps, rivers, seas, deltas and floodplains. They argue that sometimes living with water entails the desire and need to control, modify, or get rid of it through irrigation, aqueducts or embankments, but the experiences with water are not the same between genders and not even between societies.[164]

Looking to explore their understanding and relationship with water, I asked participants what water was for them. I found that most participants from the public and private sectors, and communities of Puerto Bade referenced water as "life", "a blessing" and "a need", showing that even though participants experience water in different ways (quantity and quality),[165] they have a similar understanding of what water means to them. For example, a fisherman and craftsman said, "Water is the source of life. It is essential for life. For both my body and livelihood… for me, water is the beginning, I mean, the beginning of human existence".[166] Similarly, the participant representing the company in charge of water supply to Cartagena stated "I define it in one word: water is life. We depend on this for human existence".[167]

Nevertheless, when analyzing the different experiences among actors, water narratives illustrate this multiplicity proposed by Camargo and Camacho (2019), showing that water is understood as a variety of identities, a friend and an enemy, a resource and water body, and a liquid we need to live. These narratives allow actors to organize and make sense of their historical and situational reality, and sometimes compete or complement each other.[168]

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160 (Mitchel, 1980)
161 These narratives illustrate a variety of relationships with water bodies, notions of water control, water identities, flood prevention, water supply, water treatment, and their experiences in natural hazards-related disasters,
162 (Polkinghorne, 1987; Ricoeur, 1991; Camargo and Camacho, 2019, p. 7)
163 (Camargo and Camacho, 2019, p. 8)
164 (Camargo and Camacho, 2019)
165 (Cortesi, 2021, p. 1)
166 (Interview 3 Man, adult, fisherman and craftsman, 2024)
167 (Interview 13 Waters of Cartagena, 2024)
168 (Czarniawska, 2004, p. 5; Fisher, 1987, 58).

As a result, I organized the stories into four main water narratives: i) Ecosystem restoration: Let's repair the damage by simulating how the Dique Canal was; ii) Stop catastrophic floods: we do not want another catastrophe like the one in 2010-201; and iii) Ensuring drinking water but not for all. I argue that these narratives are not simple stories, but they are mechanisms through which the reality of individuals and communities is reflected and constructed, shaping perceptions, identities, behaviors, and decision-making processes.[169] They reflect experiences in creating stories that interpret and construct realities,[170] producing and explaining human actions.[171] Moreover, they play a role in the reproduction and resistance of power dynamics, operating at various levels by diverse voices and influences.[172]

5.1. Ecosystem restoration: Let's Repair the Damage by Simulating How the Dique Canal Was

The ecosystem restoration is referenced as **repairing the damage** caused by historical interventions that degraded the ecosystem through the simulation of previous conditions with an infrastructure approach.[173] According to HP, the gates and locks in Camalar and Puerto Badel will allow the simulation of conditions in Bay's ecosystems, deltas, and coast before 1951, by reducing the outflow of sweet water and discharge of sediments to the Bays of Cartagena and Barbacoas, but also allowing the salinization of the coast of the Bay of Barbacoas, and Caño Matunilla and Caño Lequerica, as they were before 1951 (map 7).[174] For instance, Sacyr narrates the purpose in the following way:

> "what I am going to execute in Puerto Badel is the restoration of the previous condition that existed in the deltaic… the history and knowledge about the Dique Canal shows that the water from the Magdalena River did not enter the bays, why? Because there was a geologic structure, in this case, a barrier named Pariquica that stopped the flow of water from the Magdalena River" (Interview 11 Sacyr, 2024)

[169] (Weible et al., 2017)
[170] (Bruner, 1984; Bruner, 1991, p. 6; Czarniawska, 2004, p. 5)
[171] (Polkinghorne, 1987)
[172] (O'Connell & Healy, 2022)
[173] (Interview 20 Consorcio Dique, 2024; Consorcio Dique, 2016, p. 342)
[174] (Mogollón, 2013b, p. 12; Consorcio Dique, 2016, p. 633-634)

Map 7: The previous intertidal lagoon known today as the delta

Source: (Mogollón, 2013b, p. 13)

Second, it was frequently mentioned through the conversations with public and private sector participants that the ecosystem restoration is justified as solving a **historical debt** with the ecosystems and the socioeconomic condition of the communities who live in it. The recognition of the damage caused by human hands was an integral part of explaining the need to restore the ecosystem, showing the project as an opportunity to guide a process that in all the history of the Dique Canal, it had not been done:[175]

> "The macro project has a goal to compensate an environmental and social debt that the State has generated over time with the prevalent communities throughout the Dique Canal, and this compensation consists in being able to create, in the medium and long-term, an improvement of the ecosystem services under the model of restoration. (Interview 11 Sacyr, 2024)

Finally, the ecosystem restoration is conceived to be achieved through an **infrastructure solution** that has three main functions: i) **Reduction** the water level in the system, and therefore, reduce the outflow in the coastal area; ii) **Distribution** of fresh, sediment-rich water to a determined part of the coastal area, closing the canal in Puerto Badel, including a closing dike in the coastal area, stopping the flow of water to the Bay of Cartagena and Barbacoas; and iii) **Restoration** of the swamp system based on the natural situation that stimulates the ecologic productivity and human activities.[176] In this sense, these functions aim to simulate the conditions of the Dique Canal before 1951. These functions were similarly explained by one participant who is an expert in the history of the Dique Canal, pointing out that the role of these two main infrastructures is the diversion of excess water through the south of the Dique Canal, which was

[175] (Consorcio Dique, 2016, p. 32)
[176] (Consorcio Dique, 2024, p. 316)

the only exit in the Dique Canal until 1951, as expressed by the historian participant: "It means, based on the environment, it is going back to how it was historically".[177]

5.1.1 Emergence and Interaction in the Pre-construction Phase

Even though the ecosystem restoration started to emerge around 90's when the project finds its origin, this narrative started to be known after the 2010-2011 disaster among the national, regional and local territory, later on spread during the socialization processes and pre-construction phase. However, since the beginning of the pre-construction phase in 2023, the project has been facing different challenges concerning the interaction with national, regional, and local entities. One of them started in January of 2024 when the National Authority for Environmental Licenses required RDEDCP to present an updated impact study aimed to obtain an **environmental license**,[178] indicating that the HP presented does not specify the extent of the impacts this project may have on the ecosystem because it is based on secondary information from 24 years ago. They pointed out possible implications the project may have in marine-coastal ecosystems, where there are mangroves, coral reefs, and seagrasses in protected areas of the National Natural Park System.

This situation contrasted with the ecosystem restoration narrative in a way that opened spaces for questioning and doubting the real impacts it may have, arguing that the project must fulfill the main objective required, the restoration of the degraded ecosystems, but protecting preventive and precautionary collective rights.[179]

Later on, the requirement ended up becoming a national debate between the national entities in charge of the project (National Infrastructure Agency and Sacyr), and regional and local allies (such as Government of Bolívar, Consejo Gremial de Bolívar, Cámara de Comercio of Cartagena); vs National Authority for Environmental Licenses and allies (Ministry of Environment, Natural National Parks, Institute of Marine and Coastal Research). In the middle, we have regional and local participants like Cardique, Municipality of Arjona and members of the communities of Puerto Badel, who expressed they neither know the real impacts of the project in the subregion so they will leave this debate to the entities in charge of this decision.[180] In the end, the National Infrastructure Agency and Sacyr accepted the order and are currently working on the requirements to complete the studies; thus, different actors continue to question the ecosystem restoration narrative, such as the communities of Puerto Badel.

5.1.2 Power dynamics in the ecosystem restoration narrative

The RDEDCP is shaping a narrative about ecosystem restoration that reflects ways of interpreting the reality, decision-making processes, political and economic interests, and the possibility of facing new environmental and social risk, integrating certain understandings and experiences with water

[177] (Interview 19 Historian, 2024)
[178] (ANLA, 2024a, P. 110; ANLA; 2024b)
[179] (ANLA, 2024a, P. 110
[180] (Interview 9 Cardique, 2024; Interview 15 Municipality of Arjona, 2024; Interview x community, 2024)

bodies, and excluding others from the mainstream. I argue that this narrative reproduces power dynamics in Puerto Badel, but it is also challenged by counter-narratives that resist it. Following Foucault conceptualization of power as productive (1977),[181] the ecosystem restoration narrative reflects a certain reality and understanding about the Dique Canal as an artificial and adjustable object among the public and private sectors.

First, while the ecosystem restoration narrative justifies the environmental conditions selected in 1951, other alternatives with different implications could have been made. For instance, the HP illustrates two previous studies which proposed to restore the 1982's and the 1984's conditions.[182] In contrast, conversations with the historian and Consorcio Dique illustrates another two possibilities: the conditions before the construction of the Dique Canal in the 16th century;[183] and the conditions at the beginning of 1900, before the first cuts.[184] In the end, the evaluation decided to restore the conditions before 1951, establishing that communities in the delta area will be surrounded by salty water bodies (like before 1951), instead of sweet water (80's conditions) with its consequent impacts.

Second, this narrative is presented as solving an environmental and social debt with the communities who live around the Dique Canal. However, the role of protecting the Bay of Cartagena and its economy was a permanent factor highlighting during the conversations, reflecting the influence of **political and economic interest** in setting the restoration agenda,[185] arguing that without this intervention the Bay of Cartagena would sediment and therefore generate an economic crisis in the port and tourist activities of the city.[186]

In this sense, some Puerto Badel's participants pointed out that even though the project's name is "Restoration of Degraded Ecosystems of the Dique Canal", the main goal of this project is to restore the navigability and the Bay of Cartagena, protecting the main city's interest.[187] A young cattleman expressed: "Hey, this is the Project for the Navigability of the Dique Canal… that is the name they should put to the project… it is not going to restore anything here".[188] This reflects Foucault (1971) conceptualization of resistance, where another discourse that calls things by another name, have another moral, tradition, rule to follow, or make another true, is resistance.[189]

Third, this narrative present itself as **repairing the damage** caused by historical interventions;[190] however, different Puerto Badel's participants, the Ministry of Environment and Cardique repeatedly express serious concerns about the **impact** this infrastructure may have on the ecosystem and communities. They express that while restoring ecosystems like the Bay of Cartagena, it may also decrease the ecosystem and social well-being of communities like Puerto Badel due to the possible salinity intrusion.

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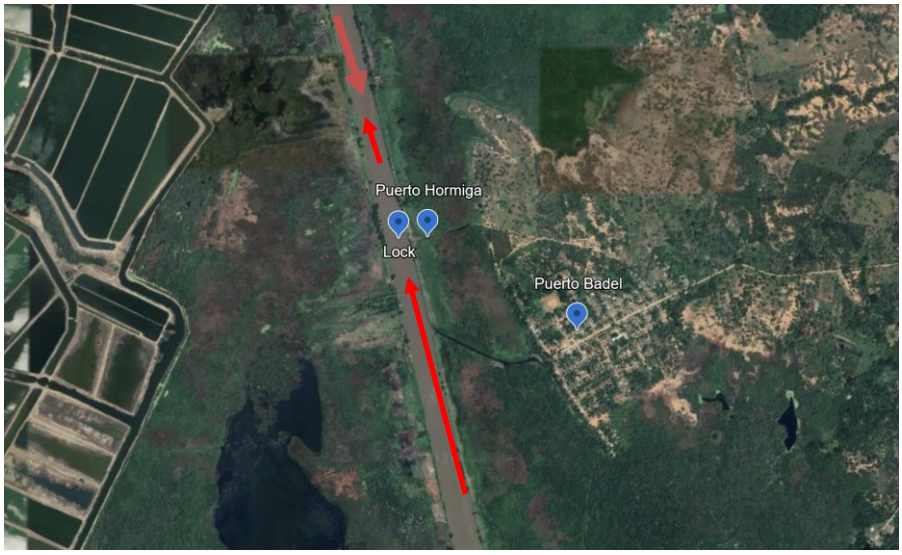
181 (Foucault, 1977, p. 194)
182 (Consorcio Dique, 2016. p. 19-23)
183 (Interview 19 Historian, 2024)
184 (Interview 20 Consorcio Dique, 2024)
185 (Elias, Joshi and Meinzen-Dick, 2021, p. 9)
186 Interview 16 Cámara de Comercio de Cartagena
187 (Focus group 3 Men, women, young adults, cattlemen and craftswoman, 2024)
188 (Focus group 3 Men, women, young adults, cattlemen and craftswomen, 2024)
189 (Gómez, 2023)
190 (Interview 20 Consorcio Dique, 2024)

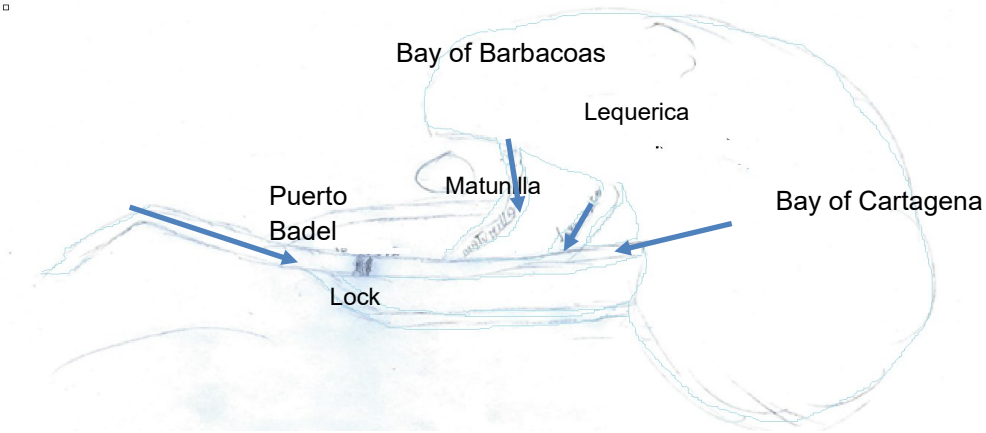
In this sense, Puerto Badel's participants explains that while the HP states that saline intrusion will effective until Puerto Hormiga, where the lock of Puerto Badel will be constructed;[191] they argue the salinity intrusion will get into the area in front of the populated center of Puerto Badel due to the increasing Caribbean Sea force facilitated by the reopening of Caño Lequerica and Caño Estero, and the inflow of water from Caño Matunilla (figure x).[192]

Map 8: Flow of water after the construction of the Lock of Puerto Badel in Puerto Hormiga



Source: Self elaboration based on Consorcio Dique (2016) and Puerto Badel's participant (2024)

Map 9: Salinity intrusion in the Dique Canal due to the RDEDCP



Source: Focus group 2 men adults

[191] (Consorcio dique, 2016, 321)

[192] All the community members who shared, explained, and drew how the RDEDCP would increase the salinity intrusion were men, while women explained it more superficially. Men, and especially those who make a living from fishing, develop a full storytelling of how this will happen, despite what they heard during or outside the socialization processes. According to a woman who makes a living from aquaculture, there are certain roles for women and men in the community, where men go fishing through the Dique Canal and women commercialize the products in the village or around it. Therefore, the interaction of men with the water bodies is more frequent and direct.

The narration of the possible salinization of the water bodies awakens a set of emotions like fear, worry, and uncertainty among Puerto Badel's participants, who did not have a voice in deciding how they conceive a desired restoration. They repeatedly expressed that the salinity intrusion means the end of many of their economic activities, livelihoods, source of drinking water, food security, customs, and so on. As stated by several participants: "What would happen if this water got salty?" Crops, cows, fishes and soil would die, it would make impossible to farm at the bends of the canal, leading to the possession of unproductive lands and making difficult to barter resources,[193] and therefore, feeling themselves excluded from the restoration narrative.[194]

Finally, this ecosystem restoration narrative **pushes aside** the profound, intimate and historic relationship between the Dique Canal and the communities of Puerto Badel. While the HP and the public and private participants systematically referenced to the Dique Canal as artificial water body that can be readjusted with a new infrastructure; many community members referred to the Dique Canal as a patrimony and inherited by their ancestors, who constructed the canal with picks and shovels and left it to the next generations. They refer to the Dique Canal as a river where they belong and that means everything, as stated by one fisherman: "It is my life, it has everything… it is where I started and what I am going to leave, and many people see the river as a personal something, with a sense of belonging."[195] For example, the following figure illustrates the way a participant perceive and see the Dique Canal: as a river.

Figure 4: Meaning of the Dique Canal for Puerto Badel

Source: focus group 1xxxx

This water body is expressed as 'the **life** of these communities'[196] that has given everything to them. It is the place where they grew up, were raised, built a life around it, and constructed both an individual and communal identity. It is the '**lung**' of their lives, as a vital organ that if they do

[193] (Focus group 2 Men, seniors; Interview 9 Cardique)
[194] (Focus group 3 Men, women, young adults, cattlemen and craftswoman, 2024)
[195] (Interview 3 Man, adult, fisherman and craftsman, 2024)
[196] (Focus group 1 women, seniors, 2024)

not have, will stop breathing and therefore die. They do not imagine their communities without their swamp, without the Dique how it is.[197] For them, the Dique Canal provides the opportunity to make a living from the natural resources, depending of this water bodies for their **economic activities**,[198] the way they **communicate** and **transport**,[199] which represents their **culture**, where they developed themselves in social terms, and where their parents or any member of the family come from.[200]

Figure 5: Typical Saturday morning in The Port of Puerto Badel[201]

Source: Photo taken during fieldwork

In general, the ecosystem restoration narrative proposes a new reality that explains how the Dique Canal should be restored, reproducing power dynamics that determine which communities benefit or suffer from this decision, who decides and how, and what the boundaries of such restoration?.[202] However, this narrative also encounters local identities, perceptions and interpretations that constitute themselves as counter-narratives, "stories which people tell and live that offer resistance, either implicitly or explicitly, to dominant narratives".[203]

[197] (Interview 6 Woman, adult, aquiculture and social leader, 2024)

[198] (Interview 2 Woman, adult, rice farmer, 2024)

[199] (Interview 6 Woman, adult, aquiculture, social leader, 2024; Interview 2 Woman, adult, agriculture rice, 2024)

[200] (Focus Group 3 Men and women, young adults, 2024; Interview 6 Woman, adult, aquiculture, social leader, 2024; Focus group 3 Men, women, Young adults, cattlemen and craftswoman, 2024; Interview 4 Man, adult, agriculture, cattleman, live next to the canal, 2024; Interview 4 Man, adult, agriculture, cattleman, live next to the canal, 2024)

[201] I remember I woke up on a Saturday ready to go for a guided tour around the canal. Once I arrived to The Port (El Puerto), I was touched by this scene in which a group of 10 children were playing, fishing, swimming, and dancing around this water body (figure x). I understood that one of the ways the Puerto Badel community resists the narratives that determine what the Dique Canal should be or not, is by living and building their understanding, experience, and traditions around the water bodies reflected in their counter-narratives.

[202] (Elias, Joshi and Meinzen-Dick, 2021, p. 9)

[203] (Bamberg and Andrews, 2004, p.1)

5.2 Stop Catastrophic Floods: We Do Not Want Another Catastrophe Like the One in 2010-2011

To start with, I point out the HP consistently highlights the categorization of two types of floods: **desired** and **undesired floods**. Desires floods are understood from the perspective of flood plains dynamics, providing benefits to the human population, since they receive the excess overflow water produced by the increase of water levels due to rainfall and other physical factors.[204] In contrast, **undesired floods** refer to high torrentiality and overflows that cause catastrophes. In this scenario, there is no flood control to secure the adequate functionality of the Dique Canal system,[205] therefore, it requires management through a direct intervention that redirects no desired situations from the hydraulic and ecologic point of view.[206] In the current situation, the Dique Canal has an open connection with Magdalena River, meaning that during rainy seasons and high levels of water, floods are frequent, and sometimes catastrophic, where in the last 30 years, there have been two or three large-magnitude events.[207]

This categorization is fundamental to understanding how the RDEDCP defines floods in the Dique Canal Ecosystems. For instance, the HP states that the project is focused on the prevention of the catastrophic effects of floods and the elimination of those considered undesired."[208] Similarly, when talking about floods with participants from the public and private sectors, conversations did not focus on explaining desired floods, but on explaining the urgent necessity to prevent "**catastrophic floods**".

As a result, this narrative proposes the construction of the Lock and Gate of Calamar to control water level inflow from the Magdalena River. This infrastructure determines the amount of water that can get into the Dique Canal, preventing the inundation of swamps that cause catastrophic floods. According to the HP, flood control allows better land organization, making clear the limits between swamps and dry land, improves water circulation, and reduces the drainage in swamps when there is too much water. In this way, the natural dimensions of swamps are recovered.[209]

5.2.1 Emergence and Interaction in the Pre-Construction Phase

The 2010-2011 disaster marked the history of the Dique Canal in the last 30 years and remains as a reference in the participants' memory. Experiences such as this one set the scenario for developing the catastrophic floods narrative. It emerges from previous experiences and

[204] In this scenario, floods are desired because floodplains play a fundamental role in determining the nutrients, since water flows from terrestrial landscapes to the canal, crosses vegetarian soils, immobilizes toxic substances, nutrients, and sediments, and so on.[204] Therefore, the RDEDCP cannot go against these functionalities.[204] (Bayley, 1995; in Consorcio Dique, 2016)
[205] (Consorcio Dique, 2016, p. 145)
[206] (Consorcio Dique, 2016, p. 1)
[207] (Consorcio Dique, 2016, p. 242)
[208] (Consorcio Dique 2016, p. 4)
[209] (Consorcio Dique, 1016, p. 3)

understanding of floods in the Dique Canal, combining two common expressions when referring to these events: flood and catastrophe. When referring to this disaster, most participants, especially in the private and public sectors, refer to it as a **tragedy** they do not want to face again and have not forgotten.[210]

However, after the National Authority for Environmental Licenses suspended partially the project and the consequent debate about this situation at the national, regional and local level, entities in charge of and in collaboration with the RDEDCP stand up for the project based on the need to prevent catastrophic floods in the Dique Canal as soon as possible, given the possibility of facing new devastating effects of the *La Niña* from June 2024 to January 2025, as stated by Consejo Gremial de Bolívar:

> "Now we are going to enter to a hard moment, of course we know there is a high risk of facing (disasters) at the end of this year, and the beginning of next year" (Interview 8 Consejo gremial)

Similarly, public and private sector's participants highlighted this risk that communities would face due to climate change and the need to create scenarios for prevention and adaptation, justifying the RDEDCP is the best solution to tackle this problem, which should be resumed as soon as possible, as follows:

> "We are facing the effects of climate change. We will have an increasingly stronger rainy season in the country. While there is no definitive solution, we will keep a population at high risk." (Interview 18 Government of Bolívar, 2024)

As stated by Ricoeur (1984) there is a cycle of interaction between time and narratives, where every narrative works in a specific temporality and one mutually reinforces the other.[211] The increasing risk of floods and climate change put this narrative at the mainstream of the national debate, as one of the main benefits of its implementation. However, this narrative portrays interpretations that reproduce power dynamics.

5.2.2 Power Dynamics in the Catastrophic Flood Narrative

The catastrophic floods narrative and the perception of disasters as tragedies constitute a discourse that reflects how we understand, prepare, and prevent floods. This **discourse** illustrates the operation of power in a way that serves as a vehicle through which a particular knowledge about objects is shaped and reproduced.[212] According to Foucault (1977), discourses show the reality, domains of objects, and truths produced,[213] portraying how **knowledge** is configured about a

[210] (Consorcio Dique, 2016, p. 264; Interview 18 Government of Bolívar, 2024)
[211] (Ricoeur, 1984, p. 3)
[212] (Gaventa, 2003, p. 2)
[213] (Foucault, 1977, p. 194; in Gaventa, 2003, p 4)

specific theme. In this case, discourses about catastrophic floods illustrate a particular reality, true, and knowledge about floods, and bring attention to the implication of such understandings.

First, it is important to start with pointing out that the RDEDCP is reproducing a narrative that conceives undesired floods as catastrophic per se, implying that the main cause of catastrophes in the Dique Canal are natural hazards due to the increase of rains during the *La Niña* Phenomenon. This is illustrated by the HP when explaining how it propose to prevent catastrophic floods in the Dique Canal, showing their understanding of 'undesired floods' as the cause of catastrophes in the Dique Canal, as follows:

> "…to prevent torrentiality and overflows that cause catastrophes (undesired floods)" (Consorcio Dique, 2016, p. 145)

> "…the generic solutions are: maintain the dimension of the inflow coming from the river which inundates the swamps, except for those that cause catastrophic floods" (Consorcio Dique, 2016, p. 313)

Nevertheless, **floods are not catastrophic**. They are natural hazard processes or phenomena - like earthquakes, droughts, and storms-, that can lead to negative impacts on society, economy, and ecology;[214] and it is only when interacting with certain conditions that it can lead to disaster, or even worse, to a catastrophe.

According to United Nations Office for Disaster Risk Reduction – UNDRR (2024), disasters are defined as "a serious disruption of functioning of a community or a society due to hazardous, events interacting with conditions of **exposure**, **vulnerability** and **capacity**, leading to human, material, economic, and environmental losses and impacts".[215] In the same direction, a catastrophe is "a massive disaster that requires significant expenditure of money and a long time (often years) for recovery to take place".[216] Both terms are often used to refer to "a situation where an expected course of events becomes catastrophically disrupted by factors considered to be beyond people's control", or when there is a disruption in the functioning of a group that surpasses their capacity to keep a "sense of normalcy".[217]

In this sense, it is the set of exposure, vulnerability, and capacity conditions the elements that determine the level and impact that a natural hazard may have on societies, not the natural hazard. These narratives implies that natural hazard like floods determine the impact on communities in the Dique Canal, characterizing disasters and catastrophes as natural, when in fact the natural factor is the hazard, not the effects:

> "Catastrophic floods are restricted because even though it is a natural dynamic of the system, it does not fit in the current uses" (Consorcio Dique, 2016, p. 321)

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[214] (Shi, 2019, p. 1-2)
[215] (United Nations Office for Disaster Risk Reduction - UNDRR, 2024)
[216] (Keller and DEVecchio, 20165, p. 7)
[217] (Alexander, 1997; in Barrios 2017 p. 152)

Regardless statement shown above, disasters and catastrophes are **not natural events** but rather "shaped by a complex interplay of socio-political factors that have existed for more than a century",[218] meaning that environmental factors are not the only factor that determines the impact and severity of disasters, but the influence of social, economic, political, and cultural factors.[219] For example, if communities in the Dique Canal Subregion had better "social, economic, and political conditions[220] that make the exposure more forbidding"[221], and similarly, the sensibility to hazards and level of impacts of the 2010-2011 disaster would have been different.

Second, the catastrophic flood discourse is embedded especially in the political sphere, reproducing an understanding that such events result from **errors or functioning,** like the break of one embankment in 2010,[222] stated by the HP in the case of a possible future catastrophic flood: "Just in the case of a large failure of a dike or embankment, it is expected to have catastrophic floods similar to that of 2010/2011, yet the effect would be less thanks to preventive works and mitigation works".[223] However, this understanding takes attention away from the practices or inactions that produce them.[224] For example, weak investment in socioeconomic conditions in flood-prone areas where communities live in poverty conditions, inaccessibility to drinking water, and food insecurity, making them more vulnerable to natural hazards and to recover from them, such as Puerto Badel. Instead, for the political ecology field, disasters and catastrophes are "the end result of historical processes by which human practices enhance the materially destructive and socially disruptive capacities of geophysical phenomena, technological malfunctions, and communicable diseases and inequitably distribute disaster risk".[225]

Based on Foucault (1971) this narrative is not a 'mere intersection' of things and words", but portrays how knowledge about floods in the Dique Canal is configured.[226]In general, the catastrophic floods narrative promotes the understanding of natural hazards like floods as the cause of catastrophes in the Dique Canal. I argue that naming a natural hazard as "catastrophic" reproduces a 'natural disaster discourse' among society and policy-making because the way we name and understand floods reproduces discourses with knowledge that determine how we deal with these challenges in a "global flooding era".[227]

5.3 Ensuring Drinking Water, But Not For All

[218] (Dynes, 2000; Kelman, 2020; in Mena, 2023, p. 14)
[219] (Cannon, 1994, 2008; Gaillard et al., 2007; Garcia, 2005; Kelman, 2020; in Mena, 2023, p. 15)
[220] (Kelly And Adger, 2000; Reid and Vogel, 2006; in Haalboom and Natcher, 2012, p. 320)
[221] (Adger and Kelly, 1999; Kelly and Adger, 2000; Ford and Smit, 2004; in Haalboom and Natcher, 2012, p. 320)
[222] (Consorcio Dique, 2016, p.606)
[223] (Consorcio Dique, 2016, p. 328)
[224] (Barrios, 2017, p. 1) Also, Cortes (2021) calls attention to the fact that the Locks and Gates in Calamar and Puerto Badel will increase the water levels in the municipalities where water will be distributed. For approximately 50 days per year, there will be high levels of water that can inundate four populated centers in the delta area before the Lock, one of them is Puerto Badel
[225] (Barrios, 2017, p. 1)
[226] (Foucault, 1971, p. 48)
[227] (Cons, 2017, 1)

When thinking about fieldwork, one of the things that made me reflect the most was my positionality about drinking water in Puerto Badel. I was afraid of drinking the same water that members of the community drink and end up sick, but also about being perceived as a complete outsider if I bought commercial water at a store every day. However, I was sure I could not offer unsafe water to the participants of the research, nor put myself at risk during fieldwork, just like the Course Safe and Security taught me, so my decision was taken, but I was just waiting to confirm my thoughts in fieldwork.

I went to the local store every day to buy one tank of water for drinking, taking a shower, brushing my teeth, cooking, refreshing my face, providing water for participants, and so on. Today I can say that in this specific factor, I felt like an outsider. Everybody knew what kind of water I was using and drinking, drawing an imaginary and physical line between them and me, making it even more obvious I was not part of the community dynamics, not only due to my skin color but because I did have the priority of growing up with access to safe drinking water, water that comes from their territory. It became evident once we finished the boat tour around the Dique Canal, when one young woman offered me a bottle of water, but not the same treated and commercial water I was drinking, but the one that she treated by herself. I had not replied to her offer when another adult woman replied to her "No, remember she cannot drink that water, she would get sick", then the other woman saw me with a face that I understood, like saying "Oh right, she is from Cartagena". Through this, it became clear that I needed to highlight the drinking water narrative, the environmental injustice found, and the voices of resistance in Puerto Badel.

According to the HP (2016), one of the specific objectives of the RDEDCP is ensuring the use of the hydric resource in the Dique Cana for drinking water, irrigation, livestock and other services,[228] looking to guarantee water supply to the settlements in the area of influence.[229] However, the drinking water aspect was one the main stories shared when walking about water among participants.

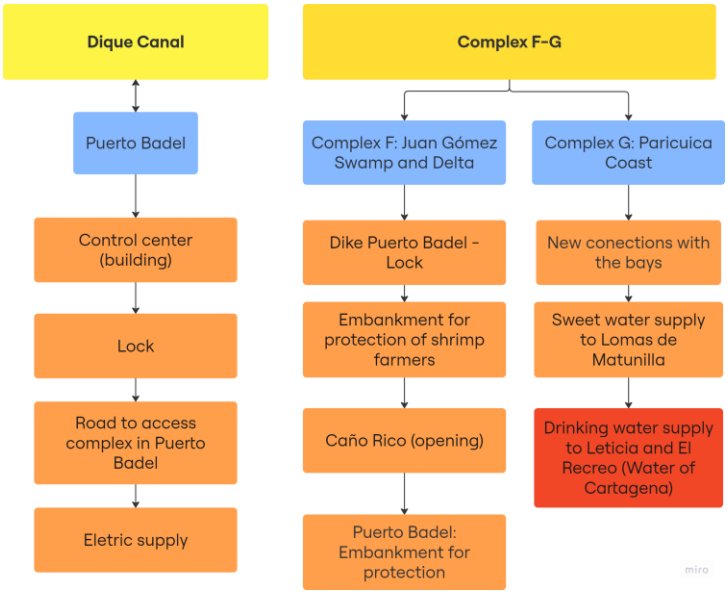
To ensure drinking water, the Dique Canal is organized among complexes,[230] assigning Puerto Badel to **Complex F**, known as the Juan Gómez Swamp and Delta complex. This area is expressed as containing one of the most ecosystem functions in the Dique Canal, since the extracting, treatment and supply of drinking water to Cartagena city takes place here by Waters of Cartagena aqueduct. In this sense, one key objective of this complex is to **ensure sufficient** water in the Juan Gómez and Bohorquez swamps for its extraction by the Water of Cartagena.[231] According participants in charge of this project, this is one of the main objectives and benefits of the RDEDCP.[232]

Participants like Consejo Gremial de Bolívar, express that there is an urgent necessity to ensure water resources in the Dique Canal, given the increasing degradation of the ecosystem where it is extracted.[233] In this sense, the RDEDCP proposes to ensure the necessary resources to produce drinking water for those municipalities that already enjoy drinking water supply services, and for two new municipalities: Leticia and El Recreo, located in complex G. In the following

[228] (Consorcio Dique, 2016, p. 301)
[229] (Consorcio Dique, 2016, p. 4)
[230] The distribution of the swamp system from complex A to complex G.
[231] (Consorcio Dique, 2016, p. 399)
[232] (Consorcio Dique, 2016, p. 3)
[233] (Interview 8 Consejo Gremial, 2024

figure, I list the specific activities to be executed by the RDEDCP in Puerto Badel (Complex F) and Complex G, where in red, I marked those related to the drinking water supply.

Figure 6: Activities in Puerto Badel and Complex F and G contemplated by RDEDCP



Source: Self-elaboration based on (Consorcio Dique, 2016, p. 343)

In this sense, the RDEDCP will only ensure the sufficient availability of **sweet water** in Juan Gómez and Bohorquez swamps, where Waters of Cartagena extract the hydric resource, but Puerto Badel will not have drinking water supply. Instead, only Leticia and El Recreo municipalities will have a drinking water supply from Waters of Cartagena as a way to compensate for the salinity intrusion in this downstream.

5.3.1 Emergence and interaction in the pre-construction phase

The first study, executed in 1997, acknowledged the necessity of ensuring water resources for aqueducts that extract water from the Dique Canal. Later on, the following studies also included this component as a specific objective of the RDEDCP.[234] However, it was not until the socialization processes and pre-construction phase that the drinking water narrative was widespread among the national, regional and local territory.

At the national level, the National Authority for Environmental Licenses and Ministry of Environment and Sustainability put a magnifying glass on the project and checked what they meant by ensuring water resources for drinking water. They underpinned the fact that the project should be careful and explicit by separating "drinking water" and "sweet water supply" components because the project was not securing drinking water to all the municipalities of the Dique Canal,

[234] (Consorcio Dique, 2016, p. 19)

but ensuring the availability of sweet water for specific municipalities. They emphasized that **only** two new municipalities would have a drinking water supply, Leticia and El Recreo, and for example, Puerto Badel will have sweet water in the Juan Gómez and Bohorquez Swamps, but not drinking water, expressed as follows:

> "In many cases, we have told them that they must not indicate that they want to supply drinking water because it is too complex… what they want to secure is a parallel canal to the Dique Canal that can direct sweet water; however, we still do not have reference of how it is going to be done." (Interview 14 Ministry of Environment and Sustainability, 2024)

In relation to the drinking water narrative, Puerto Badel's participants expressed how disappointed and angry they felt about their exclusion of the drinking water supply. They express that even though this resource is extracted from their territory, they have never had the privilege of having treated water.[235] For them, the drinking water supply is a story in which they are not the participants.[236]

In general, the drinking water narrative is a way to **communicate** a delicate story that interacts with the communities in the area of influence of the Dique Canal; communities that have been historically excluded from drinking water supply. This story is reopening historical wounds or even awakening certain expectations that may lead to a weak community support and enhance resistance actions in the Dique Canal, and more especially in Puerto Badel.

5.3.2 Power dynamics in drinking water access:

The narrative about ensuring drinking water is part of the specific objectives of the RDEDCP; however, in this story, Puerto Badel has never had safe drinking water access, and even with this project they will not have future access either. As a result, I use the environmental justice approach to point out this narrative is reproducing historical **environmental inequities** and **unequal protection** in Puerto Badel, making visible an **environmental injustice** story[237]

According to Robert Bullard (2000), environmental justice refers to the principle that *"*all people and communities are entitled to **equal** protection of environmental and public health laws and regulations."[238] While concepts like equity and equality seem similar, their interpretation and implementation lead to different outcomes. Equality means that each individual/group receives the same resources or opportunities, making no difference among their physical, political, cultural, and administrative conditions. In contrast, **equity** recognizes that each person/group lives under different circumstances, proposing the allocation of the "exact resources and opportunities needed

[235] (Interview 2 Woman, adult, agriculture rice, 2024)

[236] Still, I identified one participant who live at the bends of the Dique Canal that expressed they had heard the project would bring them drinking water ((Interview 4 Men, adult, agriculture, cattleman, live next to the canal, 2024)

[237] (Bullard, 2008, p. 3)

[238] (Bullard, 2000)

to reach an equal outcome."[239] I argue that not everyone in the Dique Canal is in the same place in society and faces diverse conditions, especially those historically disadvantaged, such as the community of Puerto Badel.[240]

First, the drinking water narratives reproduce **environmental inequities** discourses that determine who have access to environmental goods such as water, and how they are distributed or not among the communities. The lack of drinking water is one of the most common issues expressed by participants in the three participants sectors, explaining that instead of treated water, Waters of Cartagena supplied them water directly from the swamp to their houses.[241] They underline the ironic fact that even though they have one pumping station of Water of Cartagena one and a half kilometers away from the village (Map 11), Puerto Badel consumes raw water.[242]

Map 10: Puerto Badel, Waters of Cartagena company and water bodies location

Source: Google Maps (2024)

Second, the drinking water narrative does not only establish who enjoys the 'resources or opportunities' to access drinking water, but ignores that these communities are living in different socioeconomic conditions; and not having access to drinking water makes communities **unequal and protected** to certain hazards such as environmental degradation, pollution, and diseases.

The environmental degradation in the Dique Canal results from historical processes and political practices that impact the communities of Puerto Badel. According to Tosic (2018), water

[239] (County of Marin Department of Health and Human Services, 2021, p. 3; and Cortesi, 2024)
[240] (County of Marin Department of Health and Human Services, 2021, p. 3)
[241] (Interview 6 Woman, adult, aquiculture, social leader, 2024)
[242] (Focus group 2 Men, seniors, 2024) For instance, Waters of Cartagena expressed they extract around 92-94% of the water from Juan Gómez Swamp and 6% is taken from the Dique Canal to be sent to an intermediate station where they mix both sources of water, and then supplies to Cartagena (Interview 13 Water of Cartagena, 2024)

in the Dique Canal is contaminated by terrestrial waters, sediments, nutrients, organic material, and metals that members of the communities consume.[243] As a result, Afro-Colombian communities in the Dique Canal live in degraded areas and consume polluted water every day. This is not a rare or new event, but instead, environmental justice studies demonstrate that black communities are more likely to live near toxic facilities, carry the weight of ecological degradation and pollution, and experience disproportionate effects.[244]

This unequal protection is also visible in the water treatment methods that members of Puerto Badel communities share. I identified two local options to treat water mainly in charge of females among households:[245] The ancestral one consists in treating water with a plant called *Opuntia ficus-indica*, popularly known as "*tuna*". They put water in a tank or bucket, introduce crushed *tuna*, and wait for the water to lighten and eliminate the impurities. Once the water is less turbid, it is optimal for consumption (see image 6).[246] The other option consists of introducing some drops of chlorine into a tank with water and letting the water rest for some hours, which would then be optimal for consumption.[247] These techniques are transmitted from one generation to another as a response to the lack of safe drinking water.

Figure 7: Local water treatment with tuna

Source: fieldwork

According to the World Health Organization (2022), water treatment with chlorine destroys pathogens like bacterias; and *tuna r*educes the turbidity and eliminates the suspended particles in water; however, neither of them address contaminants like heavy metals or deal partially with

[243] Heavy metals like mercury, arsenic, copper, cadmium, chromium, lead, and nickel (Tosic, 2018, p. 56-57; BASIC Cartagena, 2017, p. 11)
[244] (Mitchell 1993; Boer et al. 1997; Massey 2004; Downey & Hawkins 2008; Davies et al. 2018; in Pape, 2022, p. 2).
[245] (Transcript Interview 6 Woman, adult, aquiculture, social leader, 2024))
[246] (Interview 1 Woman, elder, fisher seller, 2024; Personal notes)
[247] (Interview 6 Woman, adult, aquiculture, social leader, 2024)

sediments, nutrients and organic material.[248] As a result, Puerto Badel communities are exposed to insalubrity conditions, deficient sanity, and diseases, such as respiratory and skin infections, fever, dengue, and diarrheal diseases.[249] One woman aquaculture participant states:

> "I do not know if they (Water of Cartagena) do not put a filter or what happens there, but water gets here with part of dead fishes, everything that you think the less comes here…. Then you see spots in the skin… kids go to the school and they drink that untreated water there and then have diarrhea". (Interview 6 Woman, adult, aquiculture, social leader)

Even though Puerto Badel is not the only populated center that does not have a drinking water supply in the Dique Canal,[250] it is one of the villages whose resources are exploited but does not have access to the same opportunity of having this service nor is protected based on the different characteristics the population has. From a political ecology perspective, water does not just flow downhill until the Dique Canal "but alongside with social power and capital".[251] One fisherman expressed this injustice in the following way:

"For me, this is one of the main forms of violence…. taking the water from here in Puerto Badel, that belong to us, and we do not have drinking water" (Interview 4 Men, adult, agriculture, cattleman)

In the same way, the drinking water narrative is also interacting with Puerto Badel's resistance movement. Participants manifested that stopping the water supply to Cartagena by blocking and turning off machinery of Waters of Cartagena has served as an important resistance resource over time.[252] Now, with the coming implementation of the RDEDCP and the exclusion of Puerto Badel from drinking water benefits, they have stated demand drinking water to the public entities, resulting in a new commitment of the Government of Bolívar and Municipality of Arjona to raise fund to finance this basic need.[253] It is not the first time a government made such promise, thanks to the public interest put in this project, Puerto Badel may find a found a way to destabilize and reply to strategies of power[254] to achieve eventually drinking water supply.

5.4 Final discussion: Embedded ideas of water conflicts

[248] (World Health Organization, 2021; Song et al, 2024; Saénz, Sepúlveda and Matsujiro, 2004)
[249] (Consorcio Dique, 2016, p. 259)
[250] (Consorcio Dique, 2016, p. 639)
[251] (Swyngedouw 2004; in Thompson, 2015, p. 1288).
[252] Historically, protest in Waters of Cartagena led by Puerto Badel's community has demanded the improvement of the main access road to the village. The reason why they used to demand only this, instead of drinking water, is because they have tried to achieve through different mechanisms, but until now it has not been possible because the regional and local always argues they do not have enough fundings to finance it.
[253] (Caracol Cartagena, 2024)
[254] (Gaventa, 2003, p.2)

Even though there is a distinction between narratives and ideas, I found the interaction between those concepts useful to illustrates what these main three water narratives reflect. Since narratives are forms of representation referring to an object, selecting and setting certain elements to construct a message attached to a speech/written act, they portray and have embedded certain ideas about how we understand something.[255]

In this sense, I argue that these three main water narratives analyzed portray the **idea of water conflict** proposed by Cortesi (2021), taking certain ideas and values about water to create particular narratives, and reflecting how conflicting imaginaries of our relationship with water are materialized.[256] It is a "discursive form, expressed narratively, visually and performatively"[257] that leads to certain actions and reactions, for example, the design and implementation of the RDEDCP.

Even though the Dique Canal is fundamental for the ecosystem functions and human activities that take place here, it has been historically perceived as a problem to solve for the national, regional and local government. The main water narratives shaped by RDEDCP mirrors these conflictive imaginaries about water in relation to quantity (scarcity or abundance) and quality.[258] For instance, these narratives explain the need to control water levels in the canal due to the high inflow of water from the Magdalena River and *La Niña* phenomenon (abundancy); restore the ecosystem to ensure water availability (scarcity); and ensure drinking water supply for some municipalities in the Dique Canal (quality).

RDEDCP's water narratives showcase as if everyone in the Dique Canal lived in conflict with water, given the experiences in "catastrophic floods", the salinity intrusion from the Caribbean Sea, and the possibility of running out of water in the future. This narrative dominates the public and private sectors, prescribing an infrastructural approach to control water.[259] This water conflict idea is embedded in narratives that end up splitting water ideologically, for example, through categorizing "desired and undesired floods", instead of just floods that are part of the natural dynamics of a floodplain subregion.

This does not mean that all of these individuals in the Dique Canal share the meaning of a conflict over the quantity of water and the need to control it, but that such individuals belonging to particular sectors are socialized into a specific way of interpreting the idea of water conflict.[260] Therefore, the idea of conflict is **purchased,** mobilized, and **instrumentalized**, mainly by the state and private sector, to pursue a specific set of political and economic interests.[261]

As a result, given this conflictive idea is communicable through narratives[262] (written and spoken), therefore it can be resisted. For instance, while the RDEDCP narrates the Dique Canal as an object that can be an enemy or a friend that needs to be tamed, especially due to the increasing effects of climate change; communities in Puerto Badel narrate it as a river and their everything,

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[255] (Entman 1993; Cortesi, 2021, p. 6-8) While an idea is a given name, a substance, and a form that matters connected to a cognitive process; narratives are forms of representation referring to something, selecting and setting certain elements to construct a message attached to a speech/written act.
[256] (Strang; in Cortesi and Joy, 2021, p. xvi)
[257] (Strang; Cortesi & Joy, 2021, p. xix)
[258] (Cortesi and Joy, 2021, p. 1)
[259] (Cortesi, 2021, p. 18)
[260] Cortesi, 2021, p. 8)
[261] (Cortesi, 2021, p. 11)
[262] (Cortesi, 2021, p. 8)

where they as "amphibian beings"[263] live and secure their livelihoods, looking to protect themselves from the new reality designed by the RDEDCP.

[263] (Interview 6 Woman, adult, aquiculture, social leader

Chapter 6. Conclusion and reflections

This research aimed to illustrate how the RDEDCP shapes narratives in Puerto Badel, Colombia. Through examining the perceptions of participants from public entities, private sector and Puerto Badel's communities, I found that all stories and their components refer to water in one way or another. In this sense, I proposed to understand the narratives shaped by the RDEDCP as water narratives, referring to those dramatic, vital, symbolic, and relational stories about imaginaries and experiences with water.[264] I identified three main narratives that plays a symbolic role, a way of knowing and communicating about water subjects and issues. I argue that these narratives are not simple stories, but they are mechanisms through which the reality of individuals and communities is reflected and constructed, shaping perceptions, identities, behaviors, and decision-making processes.[265]

Firstly, the **ecosystem restoration** narrative consists of repairing the damage caused by historical infrastructure interventions that degraded the ecosystem through the simulation of the conditions before 1951, when the direct connection between the Dique Canal and the Bay of Cartagena was constructed.[266] It recognizes a historical debt to the environment and communities caused by human hands, justifying the need for infrastructure to reduce, distribute and restore water to achieve the restoration in the project's pre-construction phase. This narrative reproduces and resists power dynamics among the different sectors, where the public sector decides which conditions should be restored and therefore the implication for communities who live in this area, but also where communities highlight their experiences, perceptions, and reinterpretations of the project based on local knowledge.

Secondly, the **catastrophic floods** narrative refers to the understanding that floods cause catastrophes and the need to prevent them through a direct intervention that redirects no desired situation from the hydraulic and ecologic point of view.[267] It emerges from the 2010-2011 disaster experience in the Dique Canal, setting the scenario for developing the catastrophic floods narrative. This narrative is a mode of knowing that reproduces power dynamics, where I highlight floods are not catastrophic but natural hazards, and to become a disaster of a catastrophe, they need to meet vulnerable conditions among the population, such as exposure, vulnerability and weak capacities. Disasters and catastrophes are not natural events but rather "shaped by a complex interplay of socio-political factors that have existed for more than a century".[268]

Thirdly, **ensuring drinking water resources** reveals there is an idea that communities in the Dique Canal will enjoy drinking water supply as a benefit of the RDEDCP, when in fact, the responsibility of the RDEDCP is to ensure the resource to produce treated water, and water treatment is in charge of the aqueducts that supply this service. This narrative is only applicable to those municipalities that already enjoy this service and only two new ones as a way to compensate for the salinization of their territory. It constitutes a way to communicate a delicate story that interacts with communities in Puerto Badel which water is extracted in their territory, but do not have a drinking water supply. In this sense, this narrative reproduces historical power dynamics in

[264] (Camargo and Camacho, 2019, p. 7)
[265] (Weible et al., 2017)
[266] (Interview 20 Consorcio Dique, 2016)
[267] (Consorcio Dique, 2016, p. 1)
[268] (Dynes, 2000; Kelman, 2020; in Mena, 2023, p. 14)

Puerto Badel that underline environmental inequity and unequal protection within communities, making the environmental injustice **story visible** they resist.[269]

This research spotlights the need to reframe dominant narratives that understand, explain, reflect conflictive ideas about water within the past, present and future of the Dique Canal Ecosystem. I suggest the RDEDCP can must join forces with the public and private sector to strengthen the vulnerable conditions in which this communities live, be involve in this articulation, and use the environmental license requirement as an opportunity to review the weaknesses it may contain. Afro-Colombian communities in Puerto Badel are still waiting to access complete and adequate information about the ecosystem restoration and its environmental impact, to be compensated by the extraction of their water resources with drinking water supply, and to be better protected so they never have to face a disaster like the one 2010-2011 again. Finally, I call attention to for environmental justice efforts in Puerto Badel, and all the communities living in the Dique Canal

[269] (Bullard, 2008, p. 3)

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In depth-interviews:

Participants residents in Puerto Badel:

Interview 1 Woman, elder, fisher seller (2024)
Interview 2 Woman, adult, agriculture rice (2024)
Interview 3 Man, adult, fisherman and craftsman (2024)
Interview 4 Man, adult, agriculture, cattleman, live next to the canal (2024)
Interview 5 Man, Adullt, Consejo Comunitario (2024)

Interview 6 Woman, adult, aquaculture, Social leader (2024)
Interview 7 Man, senior, agriculture, cattleman who lives next to the canal (2024)

Private sector participants:
Interview 8 Consejo Gremial de Bolívar (2024)
Interview 11 SACYR (2024)
Interview 12 Cámara de Comercio de Cartagena (2024)
Interview 13 Aguas de Cartagena (2024)
Interview 17 Mardique (2024)
Interview 19 Historiador (2024)
Interview 20 Consorcio Dique (2024)

Public sector participants:
Interview 9 Cardique (2024)
Interview 10 Special Jurisdiction of Peace (2024)
Interview 14 Ministry of Environment and Sustainability (2024)
Interview 15 Municipality of Arjona (2024)
Interview 16 Cormagdalena (2024)
Interview 18 Government of Bolívar (2024)
Interview 21 Adaptation Fund (2024)

Focus groups

Focus group 1 - Women, seniors (2024)
Focus group 2 - Men, seniors (2024)
Focus group 3 - Men, women, young adults, cattlemen and craftswoman (2024)

Appendices

Appendix A: ISS Research Ethics Review Form for RP research carried out by MA students

Aim:[270]

This Form aims to help you identify research ethics issues which may come up in the design and delivery of your Research Paper (RP). It builds on the session on Research Ethics session in course 3105 and subsequent discussions with your peers and RP supervisor/reader. We hope the form encourages you to reflect on the ethics issues which may arise.

The process:

The Ethics Review process consists of answering questions in the following two checklists: B1-Low-sensitivity and B2-High-sensitivity. Depending on the answer to these questions you might need to fill section **C-Statement of Research Ethics** too.

The background document "ISS Research Ethics Guidelines for MA Students" provides advice and detailed information on how to complete this form.

Step 1 - Fill checklists B1 and B2

Step 2 - After answering checklists B1 and B2, the process proceeds as follows:

- **If you answer 'yes' to one or more low-sensitivity questions (checklist B1):** please discuss the issues raised with your supervisor and include an overview of the risks, and actions you can take to mitigate them, in the final design of your RP. You can refer to the ISS Research Ethics Guidelines for MA Students for help with this.
- **If you answer 'yes' to one or more high-sensitivity questions (checklist B2)**, please complete section 'C' of the form below describing the risks you have identified and how you plan to mitigate against them. Discuss the material with your supervisor, in most cases the supervisor will provide approval for you to go ahead with your research and attach this form to the RP design when you upload it in canvas. If, after consultation with your supervisor, it is felt that additional reflection is needed, please submit this form (sections B1, B2, and C) to the Research Ethics Committee (REC) for review as follows:

When submitting your form to the REC, please send the following to researchethics@iss.nl:

1) the completed checklists B1 and B2 (or equivalent if dealing with an external ethics requirement)
2) the completed form C 'Statement of Research Ethics'
3) a copy of the RP design
4) any accompanying documentation, for example, consent forms, Data Management Plans (DMP), ethics clearances from other institutions.

[270] This checklist and statement is adapted from the Institute of Development Studies (IDS) Research Ethics Committee and informed by the checklists of two Ethics Review Boards at EUR (ESHCC and ERIM) and the EU H2020 Guidance – How to complete your ethics self- assessment.

Your application will be reviewed by a reviewer who is not part of your supervisory team. The REC aims to respond to ethics approval requests within a period of 15 working days.

Step 3 - Integrating the Ethics Review process into the RP:

- This Ethics Review Form (checklists B1 and B2) needs to be added as an annex in your RP Design document to be uploaded in the Canvas page for course 3105 and to be presented in May.
- If, as a result of completing sections B1 and B2 of this Review Form you also need to complete section C , add section C 'Statement of Research Ethics' and Section D 'Approval from Research Ethics Committee' (if available) as an annex to your final RP design to be to be uploaded in the Canvas page for course 3105 in July.

Project details, Checklists, and Approval Status

A) Project/ Proposal details

1. Project/Proposal Title	Water narratives and power dynamics in Puerto Badel, Colombia: The case of the Restoration of Degraded Ecosystems of the Dique Canal Project
2. Name of MA student (applicant)	Vanessa Clavijo Barboza
3. Email address of MA student	709372vc@student.eur.nl
4. Name of Supervisor	Luisa Cortesi
5. Email address of Supervisor	cortesi@iss.nl
6. Country/countries where research will take place	Colombia

7. Short description of the proposed research and the context in which it is carried out:

Research question:

How does The *Restoration of Degraded Ecosystems of the Dique Canal Project* shapes narratives in Puerto Badel, Colombia?

Sub-questions:

1. What narratives are shaped by *The Restoration of Degraded Ecosystems of the Dique Canal Project*?
2. How do narratives emerge and interact in the pre-construction phase of *The Restoration of Degraded Ecosystems of the Dique Canal Project*?

3. How do narratives reproduce or resist power dynamics among the community of Puerto Badel and the public and private sectors?

Research objectives:

- Identify the narratives shaped by the RDEDCP and its implication
- Illustrate how the RDEDCP is shaping water narratives in the Dique Canal and Puerto Badel
- Highlight and contrast the narratives among different sectors
- Demonstrate how RDEDCP's water narratives reproduce or resist power dynamics in the Puerto Badel

Context:[271]

The Dique Canal is a 115 km waterway connection in the Caribbean Sea of Colombia, built since 1.650 to facilitate the navigability between Cartagena de Indias and the Magdalena River. The Canal has been the object of interventions since colonial times, degrading all the water bodies around it and causing environmental and social damage. This subregion has been the scenario of seasonal floods, droughts, tropical storms, and drinking water challenges that have shaped different narratives about its causes, consequences, and solutions.

Carrying out works on the Canal del Dique was local demand for about 50 years in the country, but it was not until the 2010-2011 disaster that the national discussion started. The ex-president of Colombia, Juan Manuel Santos, expressed this was "the worst tragedy in the history" of Colombia, and blamed climate change as the cause of the Dique Canal's flood.[272] For the government, communities' vulnerability, and the consequent degradation of their surroundings, was an unquestionable consequence of global climate forces; however, to have disastrous effects, intense rains need to meet with people or human assets in vulnerable conditions,[273] just like it happened in 1984, and it will happen again in 2010, 2018 and 2022. This "tragedy" highlighted the need to design a solution to prevent disaster in the Dique Canal, supporting the design of the Restoration of Degraded Ecosystems of Dique Canal Project (RDECDP), another infrastructure intervention that aims to control water and sediment inflow, secure water resources, restore ecosystems and guarantee navigability.

Puerto Badel is one of the first populated centers where the project's pre-construction will start. However, these community members live in poverty and inequality conditions, with the lack of drinking water supply, even though one of the water treatment stations of Waters of Cartagena company is allocated here.

This research will illustrate how this project shapes narratives about water, reproducing and resisting power dynamics among the different actors. In general, this case study illustrates how these narratives are helping to pursue interests and legitimize this infrastructure intervention, reproducing power relations, setting agendas, and shaping environmental relations.

[271] Based on RP Design Draft May 2024.

[272] (Kraul, 2010; in Memelink, 2023, p. 19)

[273] (Mena, 2023, p.15)

Researching how RDEDCP shapes narratives is crucial not only due to the impact that they have on decision-making, but also because they may go against communities' experiences and perceptions. By understanding narratives shaped by decision-making processes, we can identify biases, gaps, or misunderstandings that may impact the environment and Afro-Colombian communities' daily lives.

B) Research checklist

The following checklist acts as a guide to help you think through what areas of research ethics you may need to address. For explanations and guidance please refer to the background document 'ISS Research Ethics Guidelines for MA students'. Please complete both sections (B1 and B2)

Please tick the appropriate box	**YES**	**NO**
B1: LOW SENSITIVITY		
1. Does the research involve the collection and or processing of (primary or secondary) personal data (including personal data in the public domain)?		**X**
2. Does the research involve participants from whom voluntary informed consent needs to be sought?	**X**	
3. Will financial or material incentives (other than reasonable expenses and compensation for time) be offered to participants?	**X**	
4. Will the research require the cooperation of a gatekeeper for access to the groups, communities or individuals to be recruited (e.g., administrator for a private Facebook group, manager of an institution, or government official)?		**X**
5. Does the research include benefit-sharing measures for research which takes place with people who could be considered vulnerable? – please revise the background document (Guidelines) for more information.	**X**	

If you have ticked 'yes' to any of the above boxes (1-5), please discuss with your supervisor and include more information in your RP design describing the issue raised and how you propose to deal with it during your research.

Please tick the appropriate box	**YES**	**NO**
B2: HIGH SENSITIVITY		
6. Does the research involve the collection or processing of sensitive (primary or secondary) personal data? (e.g. regarding racial or ethnic origin, political opinions, religious or philosophical beliefs, trade union membership, biometric	**X**	

data, data related to health or a person's sex life or sexual orientation)		
7. Does the research involve participants for whom voluntary and informed consent may require special attention or who can be considered 'vulnerable'? (e.g., children (under 18), people with learning disabilities, undocumented migrants, patients, prisoners)?		**X**
8. Will it be necessary for participants to take part in the research without their knowledge and consent (covert observation of people in non-public places)?		**X**
9. Will the research be conducted in healthcare institutions, in healthcare settings, or will it involve the recruitment or study of patients or healthcare personnel?		**X**
10. Could the research induce psychological stress or anxiety or cause harm or negative consequences for research participants, researchers, or persons and institutions connected to them?	**X**	
11. Could the situation in one or several of the countries where research is carried out put the researcher, individuals taking part in the research, or individuals connected to the researcher, at risk? Presence of an infectious disease such as COVID-19 is considered a risk – please provide information as outlined in the background document (Guidelines).	**X**	
12. Does the research require ethical approval or research permission from a local institution or body?		**X**

If you have ticked 'Yes' to one of the above (5-11), please complete section 'C' below describing how you propose to mitigate the risks you have identified. After discussion with your supervisor, please submit the form to the Research Ethics Committee. In addition, if you have ticked 'Yes' to a question on any kind of personal data, please also complete the privacy questionnaire.

YOU ONLY NEED TO COMPLETE THIS SECTION IF YOU HAVE ANSWERED YES TO ONE OF THE QUESTIONS IN SECTION B2 ABOVE (Questions 5-11)

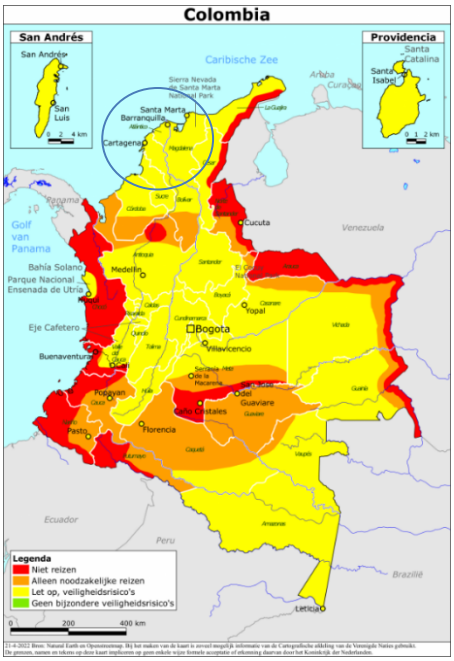
C) Statement of Research Ethics

Using the background document 'ISS Research Ethics Guidelines for MA students', please address how you are going to deal with the ethics concern identified, including prevention measures to avoid them from manifesting, mitigation strategies to reduce their impact, and preparedness and contingency planning if the risks manifest.

Please number each point to correspond with the relevant checklist question above. Expand this section as needed and add any additional documentation which might not be included in your RP design, such as consent forms.

[TO BE COMPLETED BY MA STUDENT AND DISCUSSED WITH THE SUPERVISOR.

IF THE SUPERVISOR FINDS IT NECESSARY TO SEEK FURTHER REVIEW, THE STUDENT MUST SUBMIT THE FORM TO THE RESEARCH ETHICS COMMITTEE]	
B1.2	I will create a written concern form for the semi-structured in-depth interviews, focus groups and participant observation. These forms include the research description, objectives, how the information will be treated, contact, recording consent, and some clarifications about the participation. Using written consent may not be appropriate for the target population of this research. First, I acknowledge that written consent can affect people's participation, inhibiting them from expressing complete and honest opinions or experiences during the conversation. Second, some participants of the Puerto Badel community may be illiterate. Therefore, I will read the written consent and ask for oral consent from the participants. Finally, unless considered necessary, participants of non-participatory observation will not be asked to fill out the consent.
B1.3	Focus group participants of Puerto Badel will be compensated for their time with the payment of an economic incentive. This information will be announced before starting the data collecting, ensuring participants agree to participate and feel comfortable with the monetary compensation. I choose this modality because I acknowledge that during the time I am having conversations with participants, they may be using this time on their economic activities. Participants from Puerto Badel live in socioeconomic conditions that I consider it is important to recognize the time they are investing with me.
B1.5	This research looks to contribute to the literature and the public discussion in the Dique Canal subregion, highlighting the voices of the Puerto Badel community, and providing recommendations for the implementation of the Restoration of Degraded Ecosystem of the Dique Canal project. In this sense, the research will be presented in an infographic and shared with the participants who ask me to share it. For example, some members of Puerto Badel already told me they are interested in having the results of my research. For this reason, the consent form will also include my contact information. Additionally, recognizing possible limitations of an academic research language, I am considering doing a storytelling video of how my experience was during this research and the main findings. This also eliminates the literacy barriers. However, this is still an option in exploration.
B2.6	All the information will be anonymized immediately. The treatment of personal data will be informed through oral consent. Additionally, the collected information will be stored and locked by password, allowing only me to have access to it.
B2.10	The research could imply inducing psychological stress or anxiety or cause harm or negative consequences for all the people involved in it, specifically related to ethnicity, trauma memories of the Armed Conflict, and political opinions. In this order, I will specifically detail during the oral consent that participants are not expected to answer questions that they are not comfortable with, and they can stop or finish if they no longer want to continue. I will be prepared to suspend interviews if it is causing distress to the

	participant. I acknowledge I have to be able to handle the situation with sensibility and compassion. Additionally, during the questionnaire design, I will be careful, considering the pros and contras of each question and the distress it may generate. For this research, it is important to identify and analyze those water narratives that may be marginalized from the dominant ones. In this sense, it is important to include some questions about topics such as floods, droughts, drinking water, disaster experiences, armed conflict, and the way the government and private sector have approached it. In this sense, I will share with participants topics of discussion. However, once I share topics of conversation, I consider participants will be open to participate and talk about some topics that may be difficult or uncomfortable.
B2.11	On the first hand, Puerto Badel is located in the North of Bolívar Department, an area that in 2020 was included in the early warning system of Colombia due to the presence of armed groups who are fighting for control of the territory, especially after the demobilization of the guerrilla group FARC-EP in 2016. However, their control over the territory is not complete and their presence is not permanent. I will follow the recommendations of the Black Community Council of Puerto Badel, which is the group in charge of approving the entry of people into the community. According to the Dutch Ministry of Foreign Affairs (2024), the area of study faces security risks, establishing that I can travel to this region, But I should be aware of security risks (see illustration below):  Source: https://www.nederlandwereldwijd.nl/reisadvies/colombia Nevertheless, I acknowledge that La Niña Phenomenon and its increasing precipitations on the

	Caribbean Coast will start in June. For this reason, I am registered for the Safety and Security Course offered by the International Institute of Social Studies on the 26, 27 and 28 of June. 2024. Additionally, I will follow the recommendations and early warning of the Institute of Hydrology, Meteorology and Environmental Studies, the institution in charge of informing climate risks in Colombia. In case of an extraordinary risk situation, regular transport services are offered to visitors in Puerto Badel to Cartagena de Indias, where I come from, which is one hour away from Puerto Badel. On the other hand, Cartagena is the capital of the department of Bolívar, a highly touristic and safe place where I grew up and my family is currently living. Some interviews with public or private actors may be conducted online in this location. COVID-19 protocols will take place during fieldwork.

D) Approval from Research Ethics Committee

*To be completed by the Research Ethics Committee only if

Approved by Research Ethics Committee:

Approved by email **Date: 25/05/2024 and 12/11/2024**
Additional comments for consideration from Research Ethics Committee:

If the REC needs more information before approving, the REC secretary will be in touch with the MA student. If after requesting more information the REC still has concerns, the REC secretary will ask the supervisor to discuss these with the student. In the unlikely event that there is still no resolution, the REC will refer the application to the Institute Board.

Appendix B: Informed consent

Formato de información y consentimiento

Narrativas sobre el macroproyecto del canal del dique en Puerto Badel, Colombia

Usted está invitado a participar en una entrevista como parte de un proyecto ejecutado por Vanessa Clavijo de la Universidad Erasmus de Rotterdam. Durante la entrevista, datos personales serán recolectados de usted.

En la Universidad Erasmus de Rotterdam, nosotros ejecutamos investigación científica. Nosotros hacemos esto para aprender, ayudar a la gente , y contribuir a la sociedad. Dado que somos una institución académica haciendo investigación científica, nosotros procesamos sus datos personales para investigación sobre la base de interés público.

Tu participación es completamente voluntaria. Toda la información será mantenida anónima y confidencial. No habrá referencia hecha oral o escrita en reportes que puedan conectarte con este estudio. No necesitas decir tus nombres reales o nombres de otras personas diferente a tu propia firma en el formulario de consentimiento informado. Si tienes alguna pregunta, por favor pregúntame. Mientras lees, puedes marcar las partes del texto que no son claras.

Esta entrevista busca entender las narrativas construidas alrededor del Macroproyecto del Canal del Dique en la comunidad de Puerto Badel. Esta entrevista será realizada cara a cara. Usted podrá ser preguntado sobre su experiencia y perspectiva sobre el Canal del Dique y el macroproyecto.

Usted podrá detener su participación en esta investigación en cualquier momento sin ninguna penalidad o pérdida de beneficios. No se espera que responda preguntas con las cuales no se encuentra conforme.

Será de ayuda tener grabación de audio de la entrevista sin datos personales para el análisis. Sin embargo, si usted se siente incómodo sobre tomar grabación, apagaremos el equipo y tomaremos notas a mano.

Guardaremos sus datos segura y confidencialmente, accesible solo para investigadores envueltos en el proyecto. Cualquier dato personal identificable será eliminado. Todos los datos serán guardados por 10 años antes de ser dispuestos con seguridad.

Esta investigación ha sido revisada y aprobada por un comité de revisión interno de la Universidad Erasmus de Rotterdam. Este Comité se asegura que los participantes de la investigación estén seguros. Usted puede llamarnos al +31 616424011 o mandar un correo al 709372vc@eur.nl para solicitar una copia de los resultados del estudio o alguna pregunta sobre el estudio o sus derechos privados, como accesibilidad, cambios, eliminación o actualización de datos. ¿Tiene usted alguna queja o preocupación sobre su privacidad? Por favor Data Protection Officer (fg@eur.nl) o visite www.autoriteitpersoonsgegevens.nl. (T: 088 - 1805250).

Appendix C: Risk analysis

Reference:

1 to 3 = Low Risk (L)
4 to 6 = Medium Risk (M)
7 to 9 = High Risk (H)

Threat	Likelihood (1-10)	Impact (1-10)	Level of risk (LxI)	Final level of risk
Floods	2.5	3	7.5	H
Presence of illegal armed groups	2.5	3	7.5	H
Transportation issues	2	3	6	M
Harassment	2	2	4	M
Diseases/ Illness	2	3	6	M

Appendix D: Participants demography

In-depth interviews

Sector	Participants	Sex	Age group	Ethnicity identification	No.
Public Sector	Environment and Sustainable Development Ministry	M	Adult	None	21
	Special Jurisdiction of Peace	W	Adult	None	
	Government of Bolívar	W	Adult	None	
	CORMAGDALENA	W	Adult	None	
	CARDIQUE	M	Adult	Afro-Colombian	
	Planning Secretary of Arjona	M	Adult	None	
	National Adaptation Fund	M	Adult	None	
Private Sector	Sacyr	M	Adult	None	
	Consejo Gremial de Bolívar	M	Adult	None	
	Cámara de Comercio de Cartagena	M	Adult	None	
	Waters of Cartagena S.A.	M	Adult	None	
	Mardique	M	Adult	None	
	Expert	M	Elderly adult	None	
	Consorcio Dique	M	Adult	None	
Puerto Badel's community	Fish seller	W	Elderly Adult	Afro-Colombian	
	Rice farmer	W	Adult	Afro-Colombian	
	Fish-farmer	W	Adult	Afro-Colombian	
	Fisher and craftsman	M	Elderly Adult	Afro-Colombian	
	Member of the Black Communitarian Council of Puerto Badel	M	Adult	Afro-Colombian	
	Rancher and farmer who live next to the Dique Canal	M	Adult	Afro-Colombian	
	Farmer who lives next to the Dique Canal	M	Elderly Adult	Afro-Colombian	

Focus Groups

Sector	Participants	Sex	Age group	Ethnicity identification	No.
Puerto Badel's community	4. Fish farmer 5. Seller 6. Household	W	Adult	Afro-Colombian	8
	1. Employee 2. Pig farming and rice farmer	M	Elderly Adult	Afro-Colombian	
	4. Rancher, farmer and unemployed 5. Farmer 6. Fish farmer and owner of a beauty salon	M-W	Youths	Afro-Colombian	

Appendix E: Pictures taken during fieldwork

The Dique Canal

Communities' old water tank out of service at the entrance and road of Puerto Badel

Economic activities: aquaculture and livestock

Sediment load Dique Canal vs in the Port of Puerto Badel

Canoe tour through the Dique Canal and Mangroves ecosystem near by Puerto Badel

The Port of Puerto Badel, Colombia

The pumping station of Waters of Cartagena in the Dique Canal, next to Puerto Badel

Appendix F: Summary

Narrative	Category	Sector	Reproduction of Power dynamics	Counter narratives (Resistance)
Ecosystem Restoration	Symbolic	Public and Private	Repairing the historical human-made damage with a another infrastructure intervention Solving a historical debt by impacting environmental and social wellbeing of the communities Pushing aside historical relationships with the canal among communities	Alternative perceptions, interpretations, names, truths about the ecosystem restoration Alternative relationships with water bodies
Catastrophic floods	Mode of knowing	Public and private	Human categorization between desired and undesired floods, instead of just floods in a floodplain area Interpretation of floods as the cause of catastrophes, not taking accountability for historical processes and decision that leaded to it	Identity as amphibian communities
Ensuring drinking water	Communication	Public sector	Environmental inequity in accesing drinking water based on different conditions Enqual protected to environmental degradaition, pollution and hazzards Environmental injustice in accesing drinkgin water	Lack of drinking water is an injustice Protest in Waters of Cartagena as environmental justice movement