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Bodies of water: an intersectional geography of waters in rural Tanzania

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Caterina Pozzobon

Turin, October 10, 2024

Summary

This research investigates the complex interplay between water and gender dynamics in the two rural communities of Chamoroma and Pandambili located in Dodoma, Tanzania. The Tanzanian context contains within it a diverse set of waterscapes and hydrosocial territories shaped by the fact that the country is on the list of countries where water access has several critical issues especially in rural areas. Emerging among these critical issues is that of the presence of inequality dynamics that are reproduced in water-related issues ad run along gender lines. Situated within a political ecology perspective, the study relies on the conceptualisation of water infrastructures as assemblages that go beyond their physical components to include social, political, and cultural elements that mutually influence each other. This perspective allows to explore the interconnectedness of water's physical and social dimensions, emphasizing how material water (physical infrastructure, water sources, etc.) and social water (cultural, political, economic, and social dimensions) influence and define each other. Specifically, this work is grounded in the theoretical framework of Feminist Political Ecology within which the African perspective within the study of intersectional interactions between gender, power, and the environment are investigated. The micro-scale of the body and how this is intertwined with the materiality of water is the key geographical scale at which the analysis was conducted. By focusing on the everyday embodied experiences of women, the study aims to reveal the specificities of how gendered practices and labour shape and are shaped by water access and management. The research questions guiding this study are: How does the intersection of water, gender, and rural water policies influence the waterscapes of rural communities? What are the specific types of places and subjectivities that these intersections produce? In other words, the questions refer to how water – together with what happens around it - forges women's subjectivities and their everyday direct embodied experiences with its materiality. In this sense, the hybrid elements mutually interacting to produce the specific waterscapes are considered as "bodies of water".

Methodologically, the research was constructed through a combination of qualitative methods. Document analysis of national water policies, regulations, and

NGO archives, along with semi-structured interviews with key informants, provided insights into the macro policies and legal frameworks shaping local water access geographies. Photo elicitation, semi-structured interviews, and transect walks were used to understand the spaces, places, and subjectivities created by water-society interactions, focusing on personal and everyday experiences. Participant observation of water practices, uses, management activities, and ethnographic fieldnotes allowed for a deeper investigation of the everyday dynamics of water management, capturing the roles and activities of water users and managers. The research reveals the multiple and intersecting ways in which gender dynamics significantly influence water access and management in the two studied communities, which have different socio-ecological characteristics and water management systems. Ethical considerations and positionality challenges are also addressed, particularly the implications of the researcher's identity as a Western academic conducting fieldwork in Tanzania. The use of a local interpreter was essential for mediating cultural and linguistic differences, ensuring the accuracy and relevance of the data.

The study finds that situated water access geographies are strongly shaped by dynamics that create unique local waterscapes that reproduce, challenge, and complexify gender inequalities. Women's embodied experiences with water infrastructure and management highlight the physical and emotional labour involved in water access that in turn is connected to a perpetration of slow infrastructural violence. The research shows the intersections that emerge in the two waterscapes through the key concepts subjectivity, embodiment, and materiality. The construction of individual subjectivities is mixed with objects, water, infrastructure, cultural norms, labor, emotions, fatigue, slow infrastructural violence, and water management policies that aid in the understanding of how gender dynamics connect to water and its management. The study therefore reveals the intricate relationships between gender, water infrastructure, and everyday experiences, showing how women's bodies and work are integral to the functioning of water systems. In Pandambili and Chamkoroma villages, women's participation in water management is not confined to formal institutions but is embedded in everyday collective practices of knowledge-sharing and environmental care. Through an African feminist lens, the relationship between women, their bodies, and water reveals multiple layers. While women face infrastructural violence and gender-based oppression due to unequal water access, this does not negate their agency. Overall, this research contributes to the fields of feminist political ecology and geography by providing an analysis of the situated intersections dynamics in the two communities of Chamkoroma and Pandambili. The insights gained from

this study highlight the need to rethink gender-sensitive approaches to fit the situated cultural environments that they aim to shape.

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Writing this doctoral dissertation was a long, arduous journey that challenged me both conceptually but also physically. It is a product on which I could have potentially spent years more refining and improving. First, I would like to acknowledge the essential contribution that my supervisor Professor Elisa Bignante has made to this work. It is thanks to her constant encouragement, her timely advice, and the speed with which she read and commented on the drafts I sent her over time that this work has reached a conclusion. She conveyed to me her enthusiasm and love for research conducted with care, precision, and concern for those who take part in it. For this in addition to acknowledging her contribution, I thank her. My co-supervisors Emanuele Fantini and Filippo Menga equally deserve to be recognized and thanked here. They both brought to bear their valuable knowledge related to their long experience in the field of water studies and helped me understand how best to convey through writing the connection between theory and fieldwork. Special acknowledgment goes to Christina J. Mvungi, who was not only an interpreter and field assistant during the months in Tanzania, but also a person to exchange ideas on the research and a friend to share the most difficult and the lightest moments of the research. Without her commitment, the research would not have existed. Always related to fieldwork, I also thank the staff of the NGO Lay Volunteers International Association (LVIA), who hosted and supported me from bureaucratic matters to sharing their long experience in the field. An important acknowledgment to all the women and men who made themselves available to participate in the research by sharing their valuable time with me. Thanks to my fellow PhD colleagues (and now friends) Allegra, Agostino, Jhon, Lorenzo, Luca and Saskia, with whom we shared an intense journey that began in the midst of a global pandemic but with whom exchange, support, frustration, and sharing were never lacking. Thanks to the constant support of my family and friends that never failed, even when I was on the other side of the Equator.

Table of contents

Summary 3
Introduction 15
Field overflow n°1 25
Chapter 1 Water connecting humans and nature 28
1.1 Introduction 28
1.2 The place of water in nature-society nexus debates 29
1.3 Conceptualising water-society relationship: waterscape vs hydrosocial territories 32
1.4 Different perspectives in Feminist Political Ecology 36
1.3.1 Intersectionality and water 40
1.3.2 Studying gender and water relations through a feminist lens 43
1.5 "Water is gendered in every society" but every society is different. 52
Field overflow n°2 56
Chapter 2 Designing the methodology: producing situated knowledge 58
2.1 Introduction 58
2.2 Coupling ethnography with participation 60
2.3 Methods to engage with materiality 63
2.3.1 Walking the field – Transect walks 64
2.3.2 An eye on materiality 68
2.3.3 Grounding research in the field 75
2.4 The matter of translation 76
2.5 Building legitimacy through research practice 78
2.6 Navigating ethical challenges in participatory research 80
2.6.1 Addressing participation's costs 81
2.6.2 Practising informed consent 83

2.7 Concluding remarks 84
Field overflow n°3 85
Chapter 3 86
3.0 Introduction 86
Section I - Managing waters in rural areas: putting the communities at the centre 88
3.1 Unpacking water availability in Tanzania 89
3.1.2 A focus on Dodoma region 92
3.2 The rural water management governance in Tanzania: an history of decentralisation 94
3.3 Tackling the water and gender nexus when it comes to water policies 100
Section II - Chamkoroma and Pandambili: where water, policies, communities and people meet 108
3.4 Pandambili and Chamkoroma 109
3.4.1 Accessing water: infrastructures and practices beyond the network 112
3.4.2 Village water management 127
3.4.3 Damaging the water infrastructure 135
3.4.4 Cultural practices and water 137
3.5 Concluding remarks on Chapter 3 138
Chapter 4 Embodied water practices 141
4.1 Introduction 141
4.2 Participating in village water management between water management entities and water taps 142
4.2 Vulnerable infrastructure make vulnerable bodies 148
4.3 Women know more about water 159
4.3.1 The flow of water knowledge 166
4.5 Wrapping up 169

Conclusions 171
Bibliography 177
Annex section 201
Attachment 1: Participant information sheet in English 202
Attachment 2: Participant information sheet in Swahili 203
Attachment 3: Consent form in English 204
Attachment 4: Consent form in Swahili 205
Attachment 5: Visual consent form in English 206
Attachment 6: Visual consent form in Swahili 207
Attachment 7: Photos taken by the participants in the photo-elicitation activity 208

List of Photos

Photo 1 Water fountain in Dodoma, photo taken by the author in November 2022 15

Photo 2 – The village water committee leader show us a damaged water pipe in the village of Chakoroma. 25

Photo 3 - A plate of traditional food made of ugali, beans and mishkaki..... 56

Photo 4 - Walking with Stannley, one of the people who contribute to set up the Community Owned Water Supply Organization (COWSO) in the village of Pandambili..... 66

Photo 5 - “Muzungu! Piga picha!” : a woman poses as if she was fetching water. 70

Photo 6 - Participants in Pandambili C learning how to take picture with a smartphone 73

Photo 7 - The oldest of the two public water pumps in Pandambili. 113

Photo 8 - The most recent electric water pump in Pandambili. 114

Photo 9 - Seasonal water dam in Pamdambili..... 118

Photo 10 - Hand dug well in Pandambili..... 119

Photo 11 - Agricultural activities in Pandambili: the picture shows a hand-dug well next to a private garden growing vegetables..... 120

Photo 12 - An attempt to build a water tank for irrigation in Pandambili. . 121

Photo 13 - Irrigation canal flowing next to the river in Chamkoroma. 126

Photo 14 - Picture taken by Z. one of the participants in Pandambili that shows one of the small carts belonging to a water vendor who delivers water at home. 132

Photo cluster 15 - Photos taken by participants in both Chamkoroma and Pandambili about the objects they associate with water 133

Photo 16 - Photo by K. showing her garden irrigated by a small canal coming from the closest tap in Chamkoroma..... 147

Photo 17 - Sabotaged water pipe in Chamkoroma. 149

Photo 18 - Writing on the wall about intermittent water service 150

Photo 19 - Photo taken by Angelina, participant in the photo elicitation activity in Pandambili..... 151

Photo 20 - Angelina watering her papaya tree (Pandambili)..... 153

Photo 21 - Photo by Mama Monera 154

Photo 22 - Mama S. looks at an empty pot worrying about how she will be able to cook for her family (Chamkoroma)..... 162

Photo 23 - Mama R. stands with her empty bucket in front of her house (Chamkoroma)..... 163

Photo 24 - One of the children of Mama M. (Pandambili) 163

Photo 25 - Photo by N. showing anger because the pump is not working (Pandambili)..... 164

Photo 26 - Photo by A. showing her clean kitchen (Pandambili) 165

Photo 27 - Photo by O. : My children are happy (Chamkoroma)..... 165

Photo 37 – Photo taken by C. a participant from Chamkoroma depicting a woman going to fetch water to the public water tap……..176

List of Maps

Map 1 - Map of Tanzanian Water Basins..... 89

Map 2 - Location of the two villages of Chamkoroma (blue) and Pandambili (green). The other two villages indicated in black (Mlali Iyegu) and purple (Sejeli) were two of the other village candidates for the study. The map is an elaboration of the author..... 110

Map 3 - Map of the plans for constructing the water infrastructure for the communities of Chamkoroma, Suguta and Manghweta retreived by LVIA Archives..... 123

List of Figures

Figure 1 - Changes in the internal structure of the COWSO turned into CBWSO. 98

Figure 2 – RUWASA organizational structure (source: official website of RUWASA, https://www.ruwasa.go.tz/ruwasa-sm-Organisational-Structure last accessed on 10/19(2024) 99

Figure 3 - “Community meeting discussing development issues: Do you see women?” 105

A note before reading:

Field overflows

At the beginning of each chapter the readers will find an introductory section titled "Field overflow". Its role is to introduce to the chapter by narrating short episodes, stories, vignettes, pieces of field diary that give a hint of the topic that will be treated in the following section. Initially, these sections were called "Fieldwork leaks". These brief pages also have the role of bringing out the specificities of the context at the centre of the research with its situated points of view, unique practices, and also the opacities and contradictions that these can have. The idea was that these pages coming unfiltered from the field would be like drops that escape from the main pipe that is the research as a whole - just like leaks in water schemes - and trickle into the thesis.

Thinking it over, the concept of "leak" is however not the most apt one to render this idea. I encountered many leaks in the water systems of the rural communities in Tanzania at the centre of the research: leaks caused by malfunctioning infrastructure, leaks caused by systematic tampering, leaks caused by wear and tear on pipes and taps. The reaction to these leaks both from members of the rural Tanzanian communities and, more generally, in the multidisciplinary water literature, is always very negative if not exasperated. Leaks are something to be avoided, to be repaired, to be stopped so that the whole water system can function properly. Leaks do exactly the opposite of what I want these pages to bring to the thesis. Instead of contributing to the flow, they drain it and make it lose bits and pieces along the way. Leaks signal that something is wrong, they are the visible manifestation of a problem that needs to be solved. In this sense, it is true that leaks allow the people taking care of the infrastructure to understand where the issue is and act accordingly. Therefore, observing what leaks trigger in the communities that have to deal with them is a privileged point to observe how local water governance works (as was done by Veronica Gomez-Temesio in her research on Senegal rural water governance in which she uses "entrée par la panne" to question the processes through which public authority and political legitimacy are negotiated and constructed (2014)). However, ultimately the aim is always to eliminate leaks, so they do not lend themselves as the right metaphor to use here.

On the contrary, the excerpts from the fieldwork that inhabit these pages represent an overabundance of data, stories, practices, perspectives that emerged from the field and that serve the aim to enter the specific socio-cultural and environmental context where the research was carried out. In this sense then, this overabundance could be better described by another phenomenon related to water management that occurs when there is too much water to be metabolized by the infrastructure. I refer to the phenomenon of the *overflow*, that occurs when the volume of the water inside the accumulation tanks exceeds its designed capacity, leading to the water spilling over the top or through an outlet. Managing the overflow is crucial to maintaining the structural integrity of the tank and preventing water waste and ensure the efficient functioning of water storage facilities. Water channelled in the overflow mechanism is not merely a liquid surplus, it can become an opportunity to be seized. Families can harness the overflow to irrigate small gardens, they can redirected it closer to their homes, channelling it into little furrows that make water more easily accessible for domestic use. The overflow can also quench the thirst of the animals that share the waterscape with human communities. The concept of overflow was used by Michel Callon (1998) and later by Carolina Domínguez-Guzmán and others (2023) as a watery metaphor to indicate the impossibility of containing all the specificities of a context in a single container that encapsulates them all. Overflows can "point to the existence of ways of being and relating that elude prevailing categorisations or dominant narratives; they may therefore also be less amenable to straightforward codification or indeed replication" (Domínguez-Guzmán, Zwarteveen, & Kuper, 2023, p. 3). This powerful conceptualization of the overflow as indicator suggesting the presence of alternative modes of existence and socio-ecological relational dynamics that create a space for a "new engagement with the unexpected, that is, with the complex, the uncertain, the contingent and the context-specific" (Domínguez-Guzmán, Zwarteveen, & Kuper, 2023, p. 3).

Introduction



Photo 1 Water fountain in Dodoma, photo taken by the author in November 2022 [1]

At one of the entrances of the city of Dodoma, capital city of Tanzania, specifically on the road that connects this city with Dar es Salaam (former capital and main urban centre of the country), visitors are welcomed by a fountain placed at the centre of a roundabout depicting an open tap from which a cascade of water falls (Photo 1). Thanks to an ingenious hydraulic trick, the fountain creates the optical illusion that the tap is suspended in mid-air and that water magically flows from the tap into the pool below.

I discovered this fountain thanks to a fortuitous diversions by the *bajaji*[2] driver from the normal route due to the heavy traffic in the capital. The driver explained to me that the fountain is an installation celebrating the work of the Dodoma Urban

[1] All photos are by the author unless otherwise credited

[2] A bajaji is a three wheeled motorised mean of transportation used as a taxi with a small cabin at the front where the driver sits and a cargo space at the back for passengers.

Water Supply and Sanitation Authority (DUWASA) - the government agency responsible for the water supply of the area around the capital- which has its headquarters just a stone's throw away from the fountain. Looking at the fountain and comparing it with what I had seen during the previous months spent in rural areas not far from the city, it seemed to me that this hydraulic representation of how water reaches the people living in the region was missing something. What is missing to make this representation more in tune with the reality of water management, are both the human and non-human bodies that complete in different ways the path that the pipes make to distribute water in the rural communities of Dodoma region. The choice of the tap as a symbol is on the one hand, consistent with a vision of water development that is based on a modernist and techno-managerial view of the relationship between society and water. On the other hand, however, it oversimplifies and does not show the complexity of Tanzanian waterscapes especially with regard to the bodies of the people, mostly women, who in this way are removed from the narrative and considered almost as a passing technology along the road of future development where pipes will replace these bodies in the definition of water networks especially in rural contexts. This modernist vision however, shows its limits as water infrastructures are much more complex than just technical elements. According to a political ecology perspective, infrastructures can be considered as assemblages that exceed their metallic and PVC materiality as they are intertwined with a whole number of other visible and invisible elements that mutually influence each other to shape them (Swyngedouw, 2004). Policy decisions on who and how accesses water, spiritual values practices linked to this resource, a strongly gendered connotation of water management and use by local communities, damaging and tampering actions done in order to continue exploiting the sale of water in informal water markets: these are some invisible elements (with very visible outcomes) linked to both individual and collective behaviour that intertwine and shape these hybrid infrastructures that emerged from the fieldwork of this research.

Taking a step back and moving the gaze from the fountain to its surroundings, a glimpse of this more-than-material value that water and water infrastructure are visible. The grandeur of the suspended shiny tap, the solemnity of the many fluttering green flags of the ruling political national party, Chama Cha Mapinduzi (CCM), the bright blue colour of the fountain pool, and the labelling by Google maps users of the site as a significant landmark, are all elements that seem to recall a concept that for those concerned with the political ecology of water is well established and almost obvious: water is political and controlling it confers power and prestige (Swyngedouw, 2004).

Questioning how water as a resource with its well-defined material characteristics (its cycle, its capacity to assume different states, etc.) and the human values (social, cultural, biological, political) attached to it are connected creates a space for research that, in academic literature, has been inhabited by geography, and in particular by those who have engaged in the political ecology scholarship. Specifically, the literature investigating the relationship between humans and water focusing on how gender issues intertwine with it. This research fits into this space of inquiry in that it seeks to look at how these two dimensions influence and define each other and that pertains to the broader debate investigating the relationship between humans and nature. On the importance and need of conceptualizing water as both a natural resource and something entangled with social life, political ecologists of water have written and interrogated such relationship from different perspectives, coining several useful concepts such as the one of hydro-social cycle (Linton & Budds, 2014) and territories (Boelens, et al., 2016) or waterscape (Karpouzoglou & Vij, 2017). As Erik Swyngedouw states, using water as a point of entry to engage with this debate is extremely effective as "the waterscape is a liminal landscape in which the cyborg character of the transgression between socio-nature and nature's society is perpetually emptied out, filled in again, and transformed" (Swyngedouw, 2004, p. 29). This approach not only aims to underline, deconstruct, redefine, and understand this connection between "material water" and "social water" that interiorizes and reproduce "a series of multiple power relations along ethnic, gender, and class lines" (Swyngedouw, 2004, p. 29). Within the water political ecology perspective, feminist scholarship is the specific theoretical that frames and supports this research. Thanks to the development of the intersectional theory (Crenshaw, 1991), the attention to the production of situated knowledge (Haraway D. , 1988), how it engages with matter (Alaimo & Hekman, 2008), and with the micro-scale of the body (Neimanis, 2017), such scholarship has been effective in opening up novel lines of research about the socio-nature nexus and hydrosocial relations. Then the thesis introduces non-Western feminist perspectives, particularly African feminisms, within the field of feminist political ecology. It explores how African feminist approaches, such as Afro-ecofeminism (Tamale, 2020), Africana womanism (Hudson-Weems, 1994), and nego-feminism (Nnameka, 2003), provide a more contextually grounded understanding of the gender-environment-power nexus. These perspectives challenge Western feminist frameworks and offer alternative ways to address gender inequalities in resource management, highlighting culturally rooted concepts like care, motherhood, and negotiation in the African context, with a focus on micro-level, everyday interactions around water. In this sense, feminist scholarship observes what

emerges from this nexus in terms of hybrid configurations and spatialities that are unique, situated, and rooted in people's daily and bodily experiences of the hydrosocial cycle.

This work is the result of 8 months of ethnographic fieldwork (from April 2022 to November 2022) conducted in Dodoma region located in central Tanzania, specifically in the two different rural communities of Pandambili and Chamkoroma that belong to the same area but that present very different socio-ecological aspects especially in terms of water availability, type of water community management organization and economic profile. The research was conducted with the key support of the Lay Volunteers International Association (LVIA), an NGO that has been actively developing water projects in the area for more than 20 years. The choice of LVIA as a partner that could allow my access to the field was based on a pre-existing relationship as during my Master's degree I participated in a cooperation project with the same NGO with a research activity on the local community management system. This first experience gave me access to the field, to the themes, to the problems that characterize it in terms of access and use of water and I was able to see how the NGO operated. From this experience, I understood that the relationships between gender, water and places, between the material and social aspects of water are not only deeply intertwined with the lives of the communities with whom the NGO works, but could be extremely relevant in contributing to rethink gender-sensitive approaches in water issues to fit the situated cultural environments. Men, women, and all the communities' members of rural villages are affected daily but in different ways by water issues which materialise through the concern of accessing clean water, by the joy of knowing with certainty that clean water will be available for a given day, by the aching bodies of carrying water in buckets of plastic, by the satisfaction of being able to water one's vegetable garden, by the priority position that water management holds in the internal and external politics of the village, etc. I, therefore, decided to continue the research work there, working in parallel with the LVIA projects, discussing especially in the first phase of the fieldwork with the long-experienced staff on both the work they do every day and their insights and experiences around local water issues. The exchanges led me to look at the context of rural central Tanzania by engaging with the NGO presence in the field as a prism through which to investigate some other, smaller things that pertain to the specific relationship that communities have with their resources water, putting the focus on the gender-water relationship.

The NGO's main activities in the last years, concerned the work with local water management bodies - called Community Based Water Supply Organisations (CBWSOs) - operating at village scale. Among other activities, LVIA has been

supporting different village communities in setting up functioning CBWSOs, and working on developing the necessary skills, capacities, and governance structures to manage a water scheme. This specific work of the NGO was key in identifying these water management bodies as one of the touchstones to observe how water is part of the social life of village communities. Moreover, the aptness of considering the CBWSO in my research is also linked to the fact that in 2019 Tanzania passed a sector reform that significantly changed the country's water governance, including the CBWSO. These entities therefore represent the places where development agendas, ideas, and approaches that revolve around water and that concern aspects such as health and gender issues are implemented. In 2019, therefore, a period of change and reassessment of the country's water governance has started, including the role of local communities.

Looking at the specific content of this thesis, it investigates how the residents of two rural communities of Chamkoroma and Pandambili, organize and live their relationships with water. The two villages have different water availability, both in quantitative and qualitative terms, different environmental characteristics, different economic profiles, and different types of water management systems with different water management competences. The choice of Chamkoroma and Pandambili allows for the analysis of water-gender relations in different contexts but a few kilometres apart. This can provide a more comprehensive and nuanced understanding of the dynamics that influence water access and management and how this is intertwined with gender dynamics. Furthermore, working in these specific Tanzanian rural areas meant conducting research in an environment characterised by fast-changing dynamics in terms of economic development, population increase, migration patterns, climate situation, etc. What I expected to find were unique hydro-social geographies poised between a hydraulic and urbanising vision of water promoted by governmental and development agencies, and the everyday experiences of the people who live in these communities and who experience this space daily, caught between policies and strategies that describe it as it should be and as it is. As mentioned above, the theoretical and methodological approach of the thesis relates to the feminist political ecology scholarship. Therefore, to study these aspects, the everyday experiences of different women residents are the main points of entry through which these dynamics are investigated, presented, and discussed. This work finds its place within the feminist political ecology in the research path investigating the construction of ecological subjectivities that include the works of Farhana Sultana (2009, 2020), Andrea J. Nightingale (2013; 2006; 2011), Sapana Doshi (2019), Eden Kinkaid (2019), Yaffa Truelove (2019; 2011), Oyèrónké Oyěwumi (2005) and Sylvia Tamale (Tamale,

2020). By focusing on the micro-scale of the body, the research tries to keep together the ordinary and extraordinary, the formal and informal, the material and non-material, and the human and non-human aspects that contribute to the definition of gendered waterscapes and geographies of water access.

In light of the forces, aspects, entities that are active and shape the water-society context, the research questions guiding the research emerged gradually from the field. How does the intersection of water, gender, rural water policies influence the waterscapes of rural communities? This first question was stimulated by the fact that the geography of water access in rural villages is composed by a complex set of practices, knowledge, behaviours, objects, traditions and strategies that encompass but also go beyond the logics of water management and infrastructure construction defined by policies, regulations and local institutions. Such complexity widens the possible scope of researching water access issues and suggests the presence of unique local dynamics that are linked to people's bodies, beliefs, and specific needs. It therefore implies that how water moves, is moved, absorbed, and used produces unique hybrid configurations that tell and reveal the complex and not obvious network of relationships allowing people to access water. This question is linked to Sultana's call for analysis that integrates embodied intersectionalities of socio-spatial differences and materialities of water (Sultana, 2020), therefore integrating elements such as the location and type of water sources, the quality of water, the water infrastructures, the seasonal climatic peculiarities, the bodies involved in moving and drinking water, and others with other social, political and cultural elements, particularly the dimension of gender. More broadly, the issue is framed within the idea that people are "existentially entangled with the material world, but also that the materials of the world shape, determine and enable humans to be 'humans' in the ways that they are" (Attala, 2019, p. 3). The expectation related to the question was to find socio-water connections that reproduce, challenge, or complexify a certain mode of gender inequality and then - thanks to the adoption of an intersectional perspective that represents the real strength of this question - to observe if and which hybrid configurations characterize the local waterscape.

The second question is directly linked to the first one and it looks at what are the specific types of places and subjectivities that the intersections identified produce. The scales of study here shift to include the micro-scale of the body of the people active in water access and use, who are mostly women. Specifically, the question refers to how water – together with what happens around it - forges women's subjectivities and their everyday direct embodied experiences with its materiality. In this sense, the hybrid elements mutually interacting to produce the

specific waterscapes are considered as “bodies of water”. This expression refers to the ways in which Astrida Neimanis (2013; 2017) figures human bodies as inseparable from the ecological issues that human societies have to face: men's and women’s bodies not only absorb water to survive, but they also actively participate in the hydro-social cycle for example by acting as prolongments of the water infrastructure that takes water from the source to the public taps but fail to bring it into the homes or in the cultivated fields. Linking bodies to the functioning of water infrastructure and water provision systems is something feminist scholarship has engaged with. Specifically, the work of Yaffa Truelove and Hanna A. Ruszczyk (2022; 2019), who have explored in their research on urban settings in Nepal and India, is relevant to this research. They conceptualise women’s bodies as constituting part of the local inadequate water infrastructure in a dynamic that produces what they call “slow infrastructural violence” with strongly gendered connotation.

Through an ethnographic approach intertwined with participatory methods, the research proceeds to comprehend and unpack the intricate interplay between the physical environment, political and legislative frameworks, gendered socio-cultural dynamics, and the everyday experiences of women engaging in various water practices. The study investigates how the geographical, socio-cultural, and economic factors that pertain the water-society relations and that operate at macro-scales are manifested, internalized, and embodied within the lived experiences of men and especially women in the two villages. These macro-scales factors are specifically the ones linked to the climate patterns that scan people’s lives in dry and rainy seasons, the national water laws and policies that govern and regulate how local communities and therefore individuals can use and manage their water access, and finally the way in which water is conceptualized and treated locally.

The chapters of this thesis try to wave together the mundane and everyday stories of community members, mostly and specifically women, in their relationship with water together with the interpretation lenses provided by the contemporary feminist political ecology and geography scholarship around water. In particular, the theoretical underpinnings supporting the analysis are the ones generated at the intersection of political ecology with feminist geography and development geography linked to the use and management of water. The political ecology perspectives that resonate in my work are mainly linked to the debates contesting the purely technical nature of the Western conception of this resource (Linton, 2010), how to make the materiality of nature matter in nature-society relations avoiding deterministic drifts (Bakker & Bridge, 2006), and how technologies and infrastructures of water impact on social life. Moving to the

feminist contributions in the field, the relevant debates within it are related to how gender dynamics shape the access to, control over, and ownership of resources and how it intersects with other axes of difference (Thompson J. A., 2016). Also, the feminist perspective highlights the importance of investigating the "everydayness" (Truelove, 2011, p. 144) of socio-environmental relations: Attention to the every day is linked to the focus on the micro-scales involved in socio-ecological processes and practices like the one of the body, which is considered as a crucial scale to be included because of the importance of both its materiality (Truelove, 2019) and its being the site of emotional responses to environmental aspects (Sultana, 2015) in defining political ecology issues (such as potable water access). African theorizations within feminist studies further contribute to the analysis of water-gender relationship by considering culturally situated elements, experiences, ways of navigating patriarchal norms that are part of women's lives.This theoretical configuration has emerged as a critical place for the intricate dynamics of how social, cultural, and environmental factors intertwine within specific hydro-social contexts. These fields hold the potential to shed light on the nuanced relationship between human communities and the surrounding environment, shaping the people's existence within the realm of development initiatives.

As mentioned above, a combination of different qualitative methods has been assembled to answer the research questions. Even though the methods all concurred to answering to the research questions, each of them was instrumental and connected in exploring specific aspects of them. First, documental analysis of national water policies, regulations, and legal acts, and the NGO archives' documents together with a set of semi-structured interviews with key informants involved in rural water management (CBWSO members, NGO staff, RUWASA officers, and village community members) allowed me to look into what are the macro water policies and legal framework that contribute in shaping the local water access geographies. In this way, I was able to understand the discourses and narratives that create the framework in which particular hydro-social relationships are reproduced. Second, photo elicitation, semi-structured interviews, and transect walks were employed to understand the types of spaces, places, and subjectivities that the water-society contact points create. These methods privileged personal and everyday experiences and allowed to unpack the smaller scales included in the study. Lastly, participant observation and the collection of ethnographic fieldnotes contributed to researching the everyday dynamics of water management in the communities, and the different roles and activities that both water users and water managers have and perform. In the research I tried to study and understand something that is difficult to investigate: the connections between bodies, water

with their material dimensions, the relationship between a water infrastructure conceptualised as a purely technical object with people's bodies, the spaces that these relationships produce, the role of water in creating these relationships, etc. Seeing and recording these aspects posed some challenges because they are not things you can ask directly only by talking and asking direct questions, but they come through experience, living, observing, with indirect questions, and by engaging with languages and modes of communication that go beyond words and include images or walking together. This therefore explains why I decided to use multiple methods for the most part qualitative. Moreover, through the ethnographic fieldnotes, I also took into account and traced what I experienced on my own body with respect to access to water, the relationship with the people I met, the inequalities taking place, etc. These observations were crucial in looking at the nature of the discrepancies between what the policies prescribe and how waterscapes are experienced and constructed by the different communities.

Despite the extended fieldwork that built upon previous experiences in the area and that allowed for this research to be conducted as thoroughly and "slowly" as possible, the study presents some limitations that are linked both to very practical issues that influenced the research conduction, but also and mostly to the fragility of the research areas and to the implications that my being a western white female academic had on the field. This last point relates on the one hand, to the ineliminable biases that pertain to my positionality in the moment of interpreting data and mobilizing theoretical frameworks that partially find their roots in Western thought. On the other hand, to a need of mediation in almost every everyday interaction though a local interpreter, whose work was crucial in translating not only words and concepts from English to Swahili and back, but also specific socio-cultural elements that were key to the research process.

As for the thesis outline, the thesis is structured in four chapters plus an introduction and conclusion. Drawing from a feminist theoretical framework, the research delves into the multifaceted dimensions of the daily lives of the two village community members (especially women's) and the intricacies of their engagement with the surrounding water geography, trying to unravel the interconnections between gender and water.

The first chapter presents and engages with the theoretical debates that have been mentioned above and that are encompassed within the feminist political ecology and geography scholarships that study hydrosocial relations. Such framework sets the scope for investigating the relationship between water, gender, and space in rural central Tanzania by not only considering the gendered power

dynamics that shape water access, use, and management but also the importance of material elements and bodies in such processes.

Chapter two presents the methodology used, reflects on the ethical implications of the study, and discusses positionality issues. It shows how the chosen methods are linked to the research questions and how the two elements have mutually influenced each other in the research process.

Chapter three is divided into two sections discussing the environmental, policy, legislative and local water management framework in Tanzania. By presenting the case of Tanzania in Section I, we will see the forces that water crosses to create the Tanzanian hydrosocial situation, including discourses of political non-neutrality of water infrastructures (Anand, 2017; Truelove, 2019), climatic issues linked to water scarcity (Haddelanda, et al., 2014), socio-cultural power dynamics (Caretta, 2015), international development strategies (Menga, Rusca, & Alba, 2023; Goldman, 2007). The two communities of Pandambili and Chamkoroma are then presented in Section II through their commonalities and differences, their peculiar characteristics, and specific ways in which water access is organised and experienced by the two communities.

The fourth and last chapter discusses the intersections that emerge in the two waterscapes through the key concepts of gendered subjectivity, embodiment, and materiality. Here, the complex ways in which women's bodies and their direct experiences of daily water use and management are integral to the waterscapes emerge.

As explained in the note before the introduction, the Chapters and Sections are interposed with sections titled "fieldwork overflows" composed of anecdotes, stories, photographs, and episodes from the field research. Just like water, these pages have found their way into this work through the porous paths connecting theory and practice, conceptualizations and lived experiences, production of data, and their interpretation.

Field overflow n°1



Photo 2 – The village water committee leader show us a damaged water pipe in the village of Chakoroma.

Behind the complex of buildings housing Kongwa's municipal offices there is the District office of the Rural Water Supply and Sanitation Agency (RUWASA). The agency is responsible for overseeing water management in rural areas and it was created in 2019 through the adoption of a countrywide water sector reform, the new Water Supply and Sanitation Act. RUWASA's staff of engineers, administrators and community development workers were one of the main field gatekeepers and I found myself spending a lot of time with them. Between interviews, informal chats, car rides and meetings, a conversation with one of the team's engineers shed light on the tensions between different ways of understanding and conceptualising water that characterise government institutions and the complex socio-cultural realities of the communities they serve. Some of my questions to the engineer revolved around the episodes of damage to the water

infrastructure that occur periodically in rural communities in the area, why were they happening? How was RUWASA addressing the issue?

In discussing the issue, the engineer's frustration in front of the repeated damages emerged clearly. He did not understand why communities would break the pipes and he would label the behaviour as an anti-development one. As for the strategy to address the issue, he proudly stated that the found solution was to shift from PVC pipes to metal ones, which are harder to break. He did not know the reasons behind the breakages, but he was confident that switching to sturdier water pipes was the most effective thing to do.

The engineer's responses unveiled a techno-managerial view of water management prevailing in the corridors of RUWASA: a pragmatic approach characterised by faith and reliance on technical solutions to physical problems. As the conversation unfolded, such a view of water management as a purely technical task emerged as a perspective deeply ingrained in the institutional fabric of RUWASA: all the reports and documents that were shown to me contained information on the performance of the water schemes in terms of functioning and non-functioning water taps, broken pipes or the type of technology of each water scheme (mainly gravity water scheme or water pumps of a different kind). In the engineer's eyes, water access was framed as a mere technical challenge, a problem solvable through engineering prowess. The disinterest he showed in looking for the root causes of the sabotages, suggested on the one hand, a disconnect in communication and comprehension between the government approach and the communities it serves. On the other hand, it unveiled the short-sightedness of such an approach as beyond the visible infrastructural damages lie intricate sociocultural dynamics that demand a nuanced understanding. It must be however noted that the position of water officers such as this engineer is a complex one to navigate. They find themselves as between a rock and a hard place because on one side, they have to follow national guidelines and implement a specific model that was designed in the 2019 water reform and that defines with a high degree of detail how water use and management must work at village level. In this sense, they have specific targets to achieve in a situation that is understaffed, underfunded, and lacks adequate resources such as cars and fuel to reach all the villages under their jurisdiction. On the other hand, they have to interface with several rural communities that differ - sometimes greatly - in terms of size, needs, beliefs, cohesion, degree of internal conflict, local economy, ecological conditions, tribal composition, etc.

This interview exposed the limitations of a technicist approach in both comprehending and managing the complexities of water management in rural Tanzania specifically and of the water-society nexus in general. It acted as a

gateway to the theoretical framework underpinning the research, showing the cracks between which a space for a critical examination of the overarching technicist paradigm steering water management can be found. Recognising and accounting for the different elements that intersect with the infrastructure merely intended as pipes and pumps and tanks and understanding how this perspective shift seems key to plan better water management practices are central in the research. Questioning the efficacy of a perspective that sees water access as a mere engineering challenge, neglecting the intricate entanglements that it creates with culture, community dynamics, bodies, and the unfolding of human lives is therefore the starting point for this thesis.

In the small office of RUWASA, the engineer's narrative has provided a glimpse into the struggles faced by government institutions like RUWASA in balancing the prescribed and dominant vision with the multifaceted nature of the local waterscapes and shows how blunt the tools derived from this vison are. From here, it was natural for me to wonder how could it be possible to tackle complex water issues with such a one-sided approach? What extra-technical dynamics need to be considered in order to understand and act when dealing with water access? How do technical and extra-technical elements intertwine? Who are the people who are key in shaping local water everyday practices in Tanzanian rural communities?

Chapter 1

Water connecting humans and nature

1.1 Introduction

This first Chapter is dedicated to the presentation of the theoretical framework within which the research has been conducted. The construction of this framework was built throughout the whole research process: the initial theoretical assumptions from which the research was initiated were influenced, shaped, and partially changed during the ethnographic fieldwork by following cyclic approach. The idea was to conduct a literature review that could engage with the leading works in the field of water and gender to understand how what emerged from the fieldwork "refines, challenges, extends or supercedes" (Charmaz, 2006, p. 169) the existing literature. In other words, even though the theoretical frame of the research was since the beginning built within the perimeter of the disciplines of human geography and political ecology, its completion and fine-tuning were carried out by tapping into what the people, the places, and the situations encountered in the months spent in rural central Tanzania suggested. In this way, the theoretical lenses that could contribute to the understanding of the local waterscapes at the centre of the research were enriched, specifically through the feminist perspective.

The chapter therefore first presents the relevant literature on the relationship between water and society on the basis that water permeates bodies and landscapes, embodying power inequalities in its distribution, management and use. Water is not just a biological necessity but plays a vital role in shaping ecosystems, settlement patterns, and cultural practices. In the African context, the nature-society relationship has been deeply influenced by colonialism and neo-colonialism, which framed Africa both as a rich and untouched land, and as a poor, underdeveloped region ripe for exploitation. These perspectives, rooted in power dynamics, continue to shape Africa's environmental challenges today. Water, as an essential resource, is a focal point for political ecology and geography, particularly in debates

about the human-nature divide. The Chapter then elaborates on the consideration on how the element of gender intersects with such discourses. It will show how feminist scholarship, particularly within the realm of Feminist Political Ecology (FPE), critiques Western models that separate human and nature. The contributions of feminist perspectives that combine insights from political ecology, geography, and feminist political economy challenge patriarchal and anthropocentric ideologies by focusing on gendered inequalities in knowledge production, the misuse of science regarding women, and the need for alternative, context-sensitive ways of knowing. In this direction, in the African context, these ideas have been expanded and elaborated through African feminisms in different ways by furthering the critique to Western models and ways of thinking. African eco-feminism, Africana Womanism, Nego-feminism all contribute to decentring and decolonising knowledge production around African women by stressing the importance of collective well-being over individualism, by reframing what does it mean to engage with the scale of the body, by rethinking motherhood as a self-determined and empowering experience, and by underlining the importance of collaborating working and negotiating with men in achieving feminist goals. The Chapter then proceeds in unpacking three core and interconnected concepts of feminist thinking that are central for the theoretical framework of the thesis. First the one of gendered subjectivities and how they fit in the nature-society debate; Second, how the micro-scale of the body can be engaged to study water-gender relations; and third, how to take into account the materiality of water when studying water political ecology issues.

1.2 The place of water in nature-society nexus debates

"All water is embodied water" is a direct quote from the work of Astrida Neimainis (2013), who - through a critical material approach to socio-ecological issues - links the physical flows of water with traditional themes addressed by feminist scholarship, namely the analysis of gendered power inequalities. The author has chosen water as the main element to conceptualise the relationship between the human and the non-human, between our bodies and the bodies of everything around us: according to her, everything on the planet is to be considered a "body of water" because in some way everything is traversed by the infinite cycle of the water that is present on earth in finite quantities. Conceptualising ourselves and the other elements of the waterscapes as bodies of water, not only challenges and nurtures the debate about the separation between human and nature, but also

revitalises attention to water itself which is too often relegated as something in the background in our lives. By recognising how water enters and circulates globally, passing also through our bodies - which are therefore part of this potentially infinite cycle - it might be possible to develop new, more just, and careful ways to manage water and relate to the other non-human bodies of water (Neimanis, 2013). The strength of thinking at all water as embodied water and therefore something that through its cyclical movement permeates all human and non-human, material bodies on our planet, is that it implies that the forms of use, governance, control and management of this element and the spaces these dynamics create represent a privileged entry point for understanding and unpacking the society-nature relationship. The ways in which it moves and circulates and is embodied in different objects, plants, and bodies reflects and incorporate also the inequalities and distortions that its uneven distribution on the planet and its key importance for life on the planet. Water in this sense represents the lens through which we can both understand ourselves and the connection we have with other entities that - just like us humans - depend on the same resource. This conceptualization is the inspiration from which the title of this thesis was formulated. The image of the body of water with its open and undefined boundaries is particularly accurate and effective in indicating the porosity and fluidity of the geographies of water.

The success that water has had as an entry point in the study of the socio-ecological configurations that emerge from the composite relationship between humans and nature is due to the fact that first, water is the lifeblood of ecosystems, influencing biodiversity, nutrient cycling, and habitat dynamics at different scales. Also, the availability and quality of water in fact, directly impact the health of all forms of life on the planet. From a human perspective, water is an irreplaceable resource essential for survival, agriculture, industrial processes, health and sanitation, etc. Second, water is not merely a biological necessity but also a catalyst for settlement patterns, socio-economic activities, and cultural practices, underscoring its central role in shaping aspects of human societies that transcend mere biological survival. Therefore, on the one hand, it is a resource that regulates, sustains, and ultimately shapes places and landscapes in physical terms through its infinite cycle that works through evapotranspiration, condensation, and precipitation mechanisms. On the other, water is also dense with values, symbolism and cultural relevance that have a direct impact on human lives from the point of view of the production and reproduction of economic, cultural, religious, and political practices and systems.

In this sense, when it comes to looking into the nature-society discourse within the African continent, the relationship between nature and human society is deeply

entangled with issues of power and inequality that are strongly rooted in and shaped by colonialism and its legacy. The continent's environmental challenges - whether they concern resource extraction, conservation, or climate change - cannot be understood without considering the political, cultural and economic structures that shape them. As Bini (Bini, 2020) effectively argues, the traditional Western perception of Africa's nature is caught in a paradox that sees the continent on the one hand, as a rich in nature, a natural and pristine land, untouched by human influences and whose populations live in harmony with it and therefore it is a continent void of culture. On the other hand, Africa is viewed as a poor, lacking of resources, and empty continent in need of developed. Both visions served and justified the colonial exploitation, the imperialist control and more recent neocolonial dynamics through the de-humanization of the continent and the conceptualisation of nature as an exploitable resource at the disposal of colonialists. However, Bini guards the reader from the idea that colonialism interrupted a pre-existing idyllic and harmonious relationship between humans and nature in Africa. He states that: "African nature has always been influenced by power relations between different social groups. Think of the competition between nomadic pastoralists and farmers in the Sahel or the expansion of Bantu peoples in Central Africa. What we want to highlight here is that the reduction of African nature to a means of production (Smith, 1984), represents a specific way in which nature has been defined as an exploitable commodity, through which the African continent has been included in the global capitalist economy"[3] (Bini, 2020, p. 14). This shows how the political ecology of natural resources in the African continent intersects and it is shaped by both internal and external dynamics that operate at different scales and assumes different shapes and encompasses different scales.

Exploring how water fits in this debate considering it as one of the elements that keep humans and nature together by assuming different hybrid socio-ecological forms, is something that scholarships such as political ecology and geography that have engaged with water-society research have done extensively. As this thesis engages with water use, access and management and its relationship with gender issues with attention to the socio-material relations between them, it is important here to unpack how these scholarships have contributed to the debate around the

[3] The original text in Italian is here reported: "(…) la natura africana è sempre stata influenzata dai rapporti di potere tra diversi gruppi sociali. Si pensi alla competizione tra pastori nomadi e agricoltori nel Sahel o all'espansione delle popolazioni Bantu in Africa centrale. Ciò che si vuole mettere in evidenza in questa sede è che la riduzione della natura africana a mezzo di produzione (Smith, 1984), rappresenta una modalità specifica di definizione della natura come bene sfruttabile, attraverso la quale il continente africano è stato inserito nell'economia globale capitalista." (Bini, 2020, p. 14)

discussion of the human/nature divide e particularly how they engage with its intertwining with gender issues.

The first part of this review is therefore aimed at looking at how political ecology and geography have developed novel conceptualisations to account for the debate over the need to overcome the dualistic vision between nature and society and how they have imagined novel interpretative tools to read such relationship such as the development of the concepts of waterscape and hydrosocial territory and a novel attention towards materiality when studying water issues. The chapter then moves towards the contributions of the feminist contributions in these fields, giving specific attention to the perspectives given by African feminist authors. In this way we can try to understand what is the place of water within the broader nature-society nexus debates and how do gender issues intertwine with it.

1.3 Conceptualising water-society relationship: waterscape vs hydrosocial territories

There are several authors within the scholarships of water political ecology and geography of water who contributed to the discussion of the human-nature divide. To do so, comprehensive concepts that could account for the different dimensions that give shape to the water-society nexus and its spatial implications were developed. The most influential conceptualizations are the ones of hydro-social cycle and territories on the one hand, and of waterscape on the other. The importance of these concepts is linked to the fact that water is considered as an element capable of combining "the social and the natural as if there were never a distinction between them" (Linton, 2010, p. 67). Erik Swyngedouw states that these two components are two intertwined and mutually shaping entities that produce "a restless "hybrid" quasi-object in which material, representational, and symbolic practices are welded together" (Swyngedouw, 1999, p. 461). The formulation of concepts such as hydrosocial cycle, hydrosocial territories, and waterscape stems therefore from the need to provide a fluid framework that could account for "the socio-spatial inequalities or injustices that characterise them, and the transformations – either radical or incremental – that shape them" (Flaminio, Rouillé-Kielo, & Le Visage, 2022, p. 35).

According to Jamie Linton, the hydrosocial cycle "offers an approach to studying and managing flows of water as phenomena that necessarily involve a mix of hydrological and social processes" (Linton, 2010, p. 229). In other words, it can be used to investigate how the relationship between water and society evolves over

time (Flaminio, Rouillé-Kielo, & Le Visage, 2022). It therefore can be put into work for creating a more comprehensive perspective of the situations in which human behaviours and interventions in connection with water have resulted in unequal, uneven and unjust access to this resource. In this sense, the hydrosocial relations that are framed within this perspective give shape to "the processes by which flows of water reflect human affairs and human affairs are enlivened by water" (Linton, 2010, p. 68). The most influential declination of the hydro-social cycle is the one of hydrosocial territories, introduced by Rutgerd Boelens, Jaime Hoogesteger, Erik Swyngedouw, Jeroen Vos, and Philippus Wester in their 2016 seminal article "Hydrosocial territories: a political ecology perspective". The definition provided by the authors describes hydrosocial territories as

> "the contested imaginary and socio-environmental materialization of a spatially bound multi-scalar network in which humans, water flows, ecological relations, hydraulic infrastructure, financial means, legal-administrative arrangements and cultural institutions and practices are interactively defined, aligned and mobilized through epistemological belief systems, political hierarchies and naturalizing discourses" (Boelens, Hoogesteger, Swyngedouw, Vos, & Wester, 2016, p. 2).

In this sense, water and human societies are seen as embedded in each other, and this recalls the abovementioned work of Whatmore (2002) on hybrid geographies. This is because this concept creates a space to analyse the possible combinations that the elements indicated in the definition of hydrosocial territories can create forming new hybrid configurations. The hydrosocial territory concept opens up research spaces to investigate how these processes unfold in different places and at different scales. Moreover, it provides a perspective to see how such processes intersect with axes of differences that characterize human societies and lived environments. It also implies the fact that human activities are now so intertwined with the water cycle that they are capable of consciously or unconsciously altering it[4]. In their comprehensive review of the use of the concepts of hydrosocial territories and waterscape and how they have been used over time in water literature, the authors Silvia Flaminio, Gaële Rouillé-Kielo, and Seline Le Visage have highlighted the commonalities and differences between the two and

[4] Think about the unregulated disposal of plastic materials in the marine environment. There are several studies showing the presence of microplastics in both human (Ragusa, et al., 2021) (P., et al., 2019) (Amato-Lourenço, et al., 2021) and animal tissues (Fraissinet, De Benedetto, Malitesta, Holzinger, & Materić, 2024). In this sense, human activities have interfered with the hydrosocial cycle by interweaving plastic into the water cycle, down to the composition of living bodies.

formulated a definition of both. They show how the concept of hydrosocial territory has been mostly used to study stakeholders involved in large-scale water projects that transform and re-configure and impact on local contexts. Moreover, as mentioned above, "the hydrosocial territory has been put forward as a conceptual framework specifically designed to unpack the wide range of multiscalar hydrosocial relations" (Flaminio, Rouillé-Kielo, & Le Visage, 2022, p. 49). A final characteristic or this concept is the time scale that it considers that is a short-termed one. This is because the studies engaging with hydrosocial territories focus on ongoing, fast changes linked to the study of spatial changes "embedded in shorter temporalities" (2022, p.48).

The second key concept deriving from the water political ecology scholarship and that works in a similar direction towards the discussion of the boundaries between n human society, nature, culture, and technology is the one of waterscape. This concept is considered to be a product of the interconnections of water and social power (Loftus, 2007; 2009) constituted by "flows, allocation, infrastructure, institutions and framings' or 'instances' of water" (Budds, 2013, p.303) and also by hegemonic ideologies and narratives around how to approach water practically and theoretically. The particularity and strength of the waterscape idea is the fact that "it brings into focus the geographical situatedness of these relations and provides ample scope for detailed empirical observation, using rich ethnographies and detailed case studies" (Karpouzoglou & Vij, 2017, p. 2). Indicating the connections between human and non-human water actors and elements within a territory as a waterscape, not only helps to understand the nature of such connections, but it is also a way of identifying and choosing situated territories to be the focus of analysis. In fact, studies on waterscapes focus on everyday water practices to see how broad social, economic, political, and cultural trends shape unequal dynamics related to water use and access (Flaminio, Rouillé-Kielo, & Le Visage, 2022). It goes hand in hand with the implications of the hydrosocial territories but it broadens its scope by creating space for the inclusion of the (often unequal) power dynamics that gravitate around the use and management of water in specific contexts and that operate at lower scales (Karpouzoglou & Vij, 2017). In Swyngedouw's words

> "the waterscape is a liminal landscape in which the cyborg character of the transgression between socio-nature and nature's society is perpetually emptied out, filled in again, and transformed. This circulation of water is embedded in and interiorizes a series of multiple power relations along ethnic, gender, and class lines." (Swyngedouw, 2004, p.29).

Reading a place as a waterscape, therefore allows to view it as a process made by the ways in which different actors interact and this vision is strictly connected with how places take form in connection with specific human everyday experiences. Looking at the already mentioned review of the two concepts of hydrosocial territories and waterscape by Flaminio, Rouillé-Kielo, and Le Visage, the waterscape "is used to describe spatial outcomes of hydrosocial processes, especially the reproduction of structural socio-spatial inequalities, and their evolution through time" (Flaminio, Rouillé-Kielo, & Le Visage, 2022, p. 48). The time scale covered by the studies on waterscapes is usually long-term as they are the spatial result of socio-ecological processes that occur in specific contexts and produce change incrementally and continuously. The focus of the waterscape is on how the material aspects of water issues intertwines with the production of uneven and unequal water access.

The abovementioned review concludes its reflection by recognising the fact that despite their differences hydrosocial territories and waterscape "should be considered as complementary to better understand the embedded short-term and long-term evolution of water-space-society relationships" (Flaminio, Rouillé-Kielo, & Le Visage, 2022, p. 51). In the conduction of this research, this complementary nature emerged clearly. This is because understanding the spatialities of water-society relations in the two Tanzanian villages of Chamkoroma and Pandambili meant looking at both aspects connected to the two concepts. On the one hand, it was key to look at long-term situated and continuous changes that can be traced at micro-scales and through attention to specific water practices and experiences. On the other hand, it was impossible to ignore the higher-scale projects and policies that shape the territories located in a rural context of a country where such projects and policies are closely - and at times conflictingly - intertwined with local water practices. The shorter, contiguous temporal perspectives regarding studies using the concept of hydrosocial territories and the longer, historical perspectives characteristic of waterscape studies, on the other hand, are therefore linked, as the dynamics they focus on have both relevant impact to the same places simultaneously. In other words, the hydrosocial geographies of the two villages can at the same time be considered continuously evolving waterscapes spatially resulting from long-term socio-ecological processes and territories shaped by short-term multi-scalar and multi-stakeholder dynamics and relations. This simultaneity is also visible because of the inter-scalar nature of the highly decentralized water governance of rural Tanzania. On the one hand, there are communities obliged to create institutional communal entities (namely the Community Based Water Supply Organizations -CBWSOs) by national policies and laws, and on the other the same

communities are historically accustomed to manage and use water in ways that are the result of longstanding socio-cultural practices. Keeping the two processes separated would mean ignoring how they mutually shape the ways in which water related spatialities are made. As mentioned above, beyond the development of the ideas of waterscape and hydrosocial territory, another way in which the complexity of the water-society nexus was theoretically addressed within political ecology and geography is a renewed attention to materiality. The next paragraph will delve into this tendency by looking at how it is relevant to this work.

1.4 Different perspectives in Feminist Political Ecology

One of the schools of thought that has creatively contributed to the questioning of both the human-nature divide and the dominant western-based model connected to it, is the feminist scholarship (Bryant, 2015, p. 70). In the introductory conceptual overview of the book "Feminist Political Ecology. Global issues, local experiences" edited by Dianne Rocheleau, Barbara Thomas-Slayter, and Esther Wangari (1996), the authors explain how the feminist perspective was developed within political ecology through a process of integration of insights coming from feminist cultural ecology and political ecology with those of feminist geography and feminist political economy. Such integration gave life to a novel approach that moved from five critiques advanced by feminist scholarship that were nicely summarized by Sandra Harding (1987). By following the feminist attention to power issues that encompass society and particularly gender relations, these critiques underline the importance of the gendered inequality in participation and power in knowledge production; the risks of abuse and misuse of science on and about women; the problematic assumptions of value-free objectivity and universality in science; the importance of adopting culturally embedded, gendered metaphors in scientific explanation and interpretation; and last the need to develop alternative ways of knowing and ways of learning based on everyday life, women's experience, and explicit statement of values. Such critiques revolve around the idea that the category of gender is one of the key axis of difference (Elmhirst, 2011, p. 130-131) to be taken into consideration when investigating socio-environmental issues. Moreover, they push the discourse further by touching upon how knowledge around socio-ecological phenomena is produced and the importance of subjectivity in such processes. The underlying sense of these critiques is an invitation to find new ways and approaches to look at how science (understood as knowledge production), gender (concerning other social categories with which it is intertwined), and the

environment (conceptualized as all the non-human elements) converge and mutually shape each other both in academic discourses, in everyday life and water policies.

Looking beyond Western approaches within Feminist political ecology, there is a substantial body of non-Western feminist perspectives that offer a more nuanced understanding of the intersection between gender, environment, and power. In the context of this thesis, the African perspective is particularly relevant, as it can provide a critical and more appropriate lens for the study of how local gender dynamics, cultural practices, and socio-economic conditions influence water access and management. Engaging with such literature allows for a more contextually grounded analysis, better suited to understanding the lived experiences around water of communities in rural Tanzania. African feminism follow the goal of enhancing political ecology by highlighting gender imbalances in the distribution of the costs and benefits associated with resource management, ecosystem protection, and the livelihoods that depend on these ecosystems and they do this by drawing and building theory from the direct experiences of African women. This is because, in an African context, purely Western feminist approaches may fall short in addressing the actual needs and concerns of local populations (Barry & Grady, 2019). However, as Obioma Nnaemeka argues, when engaging with African feminist contributions, is better to speak of African feminisms rather than a single African feminism, reflecting the diversity and fluidity of cultural, historical, and local factors that shape women's activism across the continent. This plural term highlights the variety of feminist thought and engagement in Africa, which can involve both complementary and conflicting strategies and approaches (Nnaemeka, 1998).

A first way in which African feminist thought engages with political ecology is Afro-ecofeminism. In her book "Decolonization and Afro-feminism" Sylvia Tamale underlines how the term Afro-ecofeminism is "a new name for an ancient wisdom" as "ecofeminism mimics and recycles ancient African wisdom" (Tamale, 2020, p. 86). Particularly, Afro-ecofeminism draws from indigenous knowledge, "foster communitarian living, relational living, interrelatedness and interdependence between human beings and various aspects of nature" (Chemhuru, 2019, p.1) and it promotes the collaboration with men and the environment. The centrality of community and the rejection of individualistic claims resonates also in the declination of ecofeminism brought on by other scholars that focused on and discussed the concept of "care" within a political ecology framework[5]. The work of

[5] For forther readings on feminists' discussion of the concept of care within a political ecology framework also see: (de la Bellacasa, 2017) (Phillips, 2016)

Mary Phillips elaborates on the concept of "ecofeminist embodied care" (Phillips, 2016, p. 471) by emphasizing the need for care to be practiced not only at an individual level but also socially and politically, in order to transform how we relate to a more-than-human world. This approach rejects the traditional association of women with their so-called natural roles or biological functions. Instead, it challenges and subverts the hierarchical dualisms such as mind/body, reason/nature, masculine/feminine, and human/nature that are central to patriarchal, anthropocentric, and colonial ideologies. Care in this sense is something disruptive for the idea of exploitation of nature as something to control, dominate and bend to the will of human needs. As well explained by Alexandra Hauke (2020) "the intersectional ecofeminist conception of care, as such, not only challenges the simultaneous disembodiment of diverse sets of women, the objectification of the female body, and the absence of female agency. It also undermines the essentialist idea of women as synonymous with nature because of the naturally given disposition of mothering and practices of maternalist care, wherein female corporeality is reduced to biological processes. These notions resonate with the earliest concerns of ecofeminism, namely to decenter, unthink, and reconfigure the interconnected disenfranchisement and commodification of women and nature, which is created and perpetuated by a patriarchal logic" (Hauke, 2020, p. 3).

Within this perspective, we can trace many themes and points shared by different African feminisms. First, the attention to the concept of motherhood mentioned by Hauke, which is one of the most intense debate points between African feminists (Udenigwe, 2024). On the one hand, some feminists argue that the way in which motherhood has been valued within patriarchal cultures reinforces essentialist ideas of female identity. On the other hand, others view motherhood as an experience shaped by women themselves, symbolizing freedom and self-determination. African feminist writers encourage reevaluating mainstream representations of motherhood, centering African women's experiences. However, they challenge the link between motherhood and victimhood, which they argue is rooted in Western binary thinking that separates mind (male) from body (female), leading to oppressive gender roles (Oyěwumi, 2005).

Another element strongly present in African feminisms is the idea that "individual needs are a colonial, patriarchal and westernized concept" (Barry & Grady, 2019). In this sense, strands such as Africana womanism, coined by Clenora Hudson-Weems in the late 1980s place the attention to the importance of guaranteeing the well-being of the family and community before women's concerns. In defining the framework of Africana womanism, Hudson-Weems set eighteen specific characteristics (Family-Centeredness, Wholeness, Role

Flexibility, Adaptability, Authenticity, Black Female Sisterhood, Struggling with males against oppression, Male Compatibility, Recognition, Ambition, Nurturing, Strengthen, Respect, Respect for Elders, Mothering, and Spirituality) that are paramount to interpreting and defining the Africana woman and that are rooted in the Afrocentric perspective.

A final characteristic of African feminisms that has already been mentioned above and that is central in the approach of Obioma Nnaemeka's nego-feminism is the idea that African feminisms challenge gender inequalities through negotiations and compromise. According to Nnameka " first, nego-feminism is the feminism of negotiation; second, nego-feminism stands for "no ego" feminism" (Nnameka, 2003, p. 377), "it knows when, where, and how to detonate patriarchal land mines; it also knows when, where, and how to go around patriarchal land mines. In other words, it knows when, where, and how to negotiate with or negotiate around patriarchy in different contexts" (Nnameka, 2003, p. 378). This approach stands in contrast to the one of Western feminist scholarship that uses a different language and theory making that uses terms such as challenge, disrupt, deconstruct, etc. Also, nego-feminism aims at including men in the feminist struggle and it is willing to negotiate and work with and around men to reach its goals.

The specific approach related to the African contest with which African feminisms contribute to political ecology have a relevant position in this thesis. They propose different means to achieve the common goal of gender equality by pivoting to and reappropriating culturally defined elements such as care, motherhood, and negotiation as tools of feminist struggle strongly rooted in the histories and lives of African women. This is because as Sylvia Tamale states "when engendering knowledge discourse and knowledge production, feminists have to be careful not to fall into the trap of projecting African women as hapless victims of a totalizing patriarchal-capitalist oppression. As Chandra Mohanty pointed out in reviewing mainstream Western feminist research on non- Western women: the focus was "on finding a variety of cases of 'powerless' groups of women to prove the general point that women as a group are powerless." The fact is that women, like all oppressed groups, have agency and always engage in some form of resistance, many times with a lot of creativity. Hence, research on macro structures and processes needs to be complemented with interpersonal (micro) relationships that shed light on people's everyday lives" (Tamale, 2020, p. 58). This is why this thesis has chosen to include and focus on this micro-scale of everyday relationship with water, in order to unpack the water-gender nexus in the two communities. Before doing so in the following chapters, this chapter will delve first into the intersectional way of conducting socio-ecological research, which is one of

the major theoretical contributions of feminist scholarship and then how has been applied in water-related studies.

1.3.1 Intersectionality and water

As mentioned above, feminist political ecology perspectives indicate gender as critical variable in shaping socio-ecological dynamics together with other elements. In order to do so, the concept of *intersectionality* conceptualized by black and postcolonial feminist scholars as an approach that looks at how inequality and oppression move along different configurations of axes of difference (Crenshaw, 1991), represents one of the core concepts and research practice of feminist theory. Intersectionality reveals what is not possible to see when different social categories are conceptualized separately and within water studies, several authors productively engaged with this concept (Thompson, 2016; Nightingale, 2011; Harris, 2018; Sultana, 2009, 2020; Truelove, 2011, 2021). Their works enriched it through their respective research practices by underlining and showing "how the constructions and lived experiences […] in relation to water access are complicated by connections between intersectional sociospatial differences (e.g., gender, class, and migrant status) and materiality (e.g., the specificities of water's materiality, spatiality, temporality, and types of water infrastructure)" (Sultana, 2020, p. 1409). The next pages provide an overview of the works that contributed in further development of intersectionality towards the integration of social and material environmental aspects and that highlight the direction of my conceptual framework.

A first political ecologist that pushed forward the theorising on intersectionality in her work is Andrea J. Nightingale (2011). Even though her focus is not on water issues, in her research on the material production of gender, caste, class and environment in Nepal, she investigates the ways in which material environmental activities concerning the use and management of commons such as forest harvesting, agricultural work, food preparation, and consumption interact with people's bodies She looks at the implications that these interactions have for local societies in terms of social difference, spatial dynamics, and ecological systems. This analysis emphasises the key role that material processes have in the formation of individual subjectivities and nature-society configurations and therefore contributes to intersectional theory by including and actually starting the analysis from the everyday performance of trivial tasks that concretely shape people's subjectivities into broader intersectional social categories connected to unequal power relations.

Another work that has engaged with intersectionality as a theory and a method in the attempt to keep the ecological aspects of water within the analysis of the water-society nexus, is the one of Jennifer A. Thompson (2016). Drawing from her research experiences about water-gender relationship in Sierra Leone and Cameroon and building on feminist water scholarship, she explores the possibility to incorporate the materiality of water (in terms of its spatial and temporal elements) within intersectionality, and therefore investigate the eco-social relations between water and society. Her contribution gives importance not only to the social relations among humans but also takes into consideration their relations with the environment. Thompson highlights how the study of water-society relations among different scholarships (anthropology, political ecology, political, economic, and development studies, etc.) has been increasingly aware of and concerned with considering water not as something detached from society, rather as "intimately and historically enmeshed with social life" (Thompson, 2016). The idea is it to expand intersectional thinking beyond the social realm as, when it comes to water, its "material characteristics and uneven distribution on Earth complicate the social dynamics of power, shaping human experiences of privilege, identity, burden and discrimination" (Thompson, Gaskin, & Agbor, Embodied intersections: Gender, water and sanitation in Cameroon, 2017, p. 14). Engaging with water and sanitation issues by considering them "embodied materialities" broadens the scope of intersectional thinking by offering "opportunities to deepen understandings of human experience, as well as for re-conceptualising and transforming water-society relations in more equitable and sustainable ways" (Thompson, Gaskin, & Agbor, 2017, p. 14). Thompson's proposal engages with intersectionality in a way that distances her work from the risks of falling into environmental determinism. She moves from "the idea that alongside the social, cultural, historic, political, and economic aspects of how human relationships with water are co-constructed, we might also benefit from considering how water is a material force and object that plays into water-society relations. Just as societies act on water, water also acts on societies" (Thompson, 2016, p. 1289).

Building from similar theoretical feminist scholarship foundations, Yaffa Truelove and Kathleen O'Reilly expanded the reflections around intersectionality and water. They enriched the scope within which intersectionality can be used as a lens to understand waterscapes by focusing on the materiality of urban water infrastructures and their intersectional impact on people's lives. Drawing from field research in urban India, the authors developed the concept of "infrastructural intersectionality", which encompasses "differing forms of compounded infrastructural violence and corporeal suffering" (Truelove & O'Reilly, Making

India's cleanest city: Sanitation, intersectionality, and infrastructural violence, 2021, p. 720). The authors argue that water infrastructures are shaped by and therefore embody power relations and intersectional elements (gender, race, class) and vice-versa and therefore are essential in investigating urban waterscapes and their political ecology and geography. Here, they expand the intersectional understanding of the materiality of water by paying specific attention to the water infrastructures in a way that takes into account the fact that such infrastructures can be in different conditions of decay, malfunction, repair, maintenance, etc. They look at how the conditions they are in directly affects other element and dynamics in people's lives by creating unequal personal and shared experiences of everyday water and sanitation services access.

Moving to the last relevant contribution in this sense, the already mentioned work of Farhana Sultana also engaged with the concept of intersectionality in studying the gendered political ecology of water in informal settlements in Bangladesh. Specifically, she enriched the debate by encompassing the emotional component within the "embodied intersectionalities of socio-spatial differences (in this instance, gender, class, and migrant status) and materialities (of water and water infrastructure)" (Sultana, 2020, p. 1408) in order to better understand the relationship between water and urban citizenship. She shows how water intersects unevenly with socio-cultural and bodily elements shaping people's subjectivities creating complex and differentiated experiences of citizenship within the local waterscape.

From these works the productive and fertile ground that intersectional theory can have within political ecology frameworks emerges. The contribution of the political ecology perspective goes alongside the calls of broadening the scope of research of and on intersectionality (McCall, 2005, p. 1775; Valentine, 2007) by integrating it with the need to overcome human-nature dualism that privileges people's bodies and life experiences and leave the environment in the background. Adopting such an approach allows to push the conceptualization that the ideas of hydrosocial cycles and waterscapes about water and society as mutually shaped even further. As Gill Valentine states, "feminist geography can make to advance the theorisation of intersectionality through its appreciation of the significance of space in processes of subject formation" (2007, p.11). New spaces of inquiry that encourage the hybridization between the two and the research of different ways to conceptualise such relationships are here created. This is especially true for those above-mentioned micro-scales of the household or of the body that are firmly embedded in specific places and can produce unique and valuable insights on how people experience the surrounding environment. This is also true for the African

feminist perspectives that were presented in the previous paragraph, as Fatimah Kelleher underlines "intersectional ecofeminism also underscores the importance of gender, race, and class, interlinking feminist concerns with human oppressions within patriarchy and the exploitations of a natural environment that women are often more reliant upon but also its guardians in many cultural contexts" (Kelleher, 2019). The intersectional perspective can be therefore used to understand water-gender nexus thanks to the integrative view it has between people and nature (Tamale, 2020, p. 81). The next paragraph looks more closely into existing water feminist political ecology studies in order to further explain and show the added value that feminist theory and practices bring to the specific field.

1.3.2 Studying gender and water relations through a feminist lens

Looking at how water scholarship has engaged with feminist theory, we can see how tis approach can contribute and has contributed to expand the understanding of the water-society nexus. In this sense, the feminist political ecology framework "supports analyses of who accesses water and sanitation, the practices by which access is achieved, and the physical, social and spatial meanings of the multiple water activities of everyday life" (Truelove, 2011, p. 145). This means that feminist approaches to the study of water practices and management have pushed for unpacking the smallest scales - such as the household - at which water is in direct contact with people's lives and pay attention "not just to differences between, but also within households" (Lahiri-Dutt, 2015, p. 658). In reflecting on the power that feminist research approaches and practices have in studying the water-society nexus, Lahiri-Dutt (2015) shows how unpacking this micro-scale allows to see if and how the individual differences of the household members (gender, age, occupation, being a person with disability, etc.) that are connected to power disparities are reflected on water practices. Gender is therefore not observed in isolation but through its intersectional interactions other categories that ultimately "shape processes of ecological change, the struggle of men and women to sustain ecologically viable livelihoods, and the prospects of any community for sustainable development" (Rocheleau, Thomas-Slayter, & Wangari, 1996, p. 4). Building on the feminist contribution to political ecology presented in the previous paragraphs that rest on some core elements – namely gender, power relations, the production of situated knowledges and intersectionality – we can see how there are scholars who recently focused on how gender is performed and negotiated through "power relations that condition bodies, spaces and

environments" (Sultana, 2015, p. 633). This literature looks at the way in which gender-related subjectivities are defined through their relationship with both social processes and ecological practices. Such processes and practices are also intricately interwoven with other dimensions of identity, including class, race, age, and caste, highlighting the complex intersectional interplay between the various subject characteristics. Some authors focused on water as an entry point to investigate these issues.

The already mentioned Farhana Sultana's research on the gendered politics of access to water resources contaminated by arsenic in Bangladesh is one of the works that have strongly contributed to this field. As mentioned in the paragraph about intersectionality, her work enriches water-gender studies by engaging with the approach of emotional geography. Her interest in assessing water access emotional geography traces a connection between emotions, bodies and places that is aimed at better understanding how such dynamics of "resource politics, struggles and access/conflict" are "about more than the resource itself (and its 'rational' use) or the socio-political power relations involved, but also about the diverse emotions set in motion as these influence the practices and decisions people make in everyday resource use, control and conflict" (Sultana, 2015, p. 644). The author addresses the topic of embodiment of water issues in its both material and emotional dimensions by underlining the influential role of emotional geographies in interpreting experiences of adversity and the significant impact of emotions in the contests surrounding environmental injustices. She underlines that grounding often abstract concepts such as "resource struggles" and "conflicts" in embodied emotional experiences of men and women can better explain how "feeling subjects relate to water and how water mediates social relations of resource management" (Sultana, 2015, p. 634). Sultana's work is particularly relevant to this thesis because it represents a novel approach to studying water issues in a Global South country such as Bangladesh, in which part of the population faces acute safe water scarcity (Sultana, 2011): By emphasising the connections between emotions and water access her work contributes to the conceptualization of more-than-material ecologies of water that are able to keep together the materiality of water, bodies, and infrastructures with immaterial elements that give shape to the ways in which water is used, managed and conceptualised locally.

Another author that recently focused on water access issues within the feminist political ecology field has been also mentioned in the previous paragraph and is Yaffa Truelove. With her longitudinal ethnographic study on the existence of gendered water infrastructures in Delhi, she engages with feminist political geography by conceptualising women' bodies as integral part of the water

infrastructure. She shows how human and nonhuman elements of the waterscape contribute to constructing, developing and maintaining water access through what she calls "gendered infrastructures in the everyday" (Truelove & Ruszczyk, 2022, p. 2). Thinking about water infrastructure as composed by more than pipes, tanks, taps, faucets, therefore unveiling the nontechnical elements that are part of it, contributed to the debate on the need to overcome the technicist approaches to water shows key and intimate dimensions of the waterscapes and give unique insights on how socio-water configurations in different communities work and are built. This attention to the role of the bodies is justified by the fact that it helps the understanding of "the multi-scalar spatial relations that are connected to wider political economic, ecological and social relations" (Truelove & Ruszczyk, 2022, p. 4).

A further interesting work within water scholarship is the one of Ge, Resurreccion and Elmhirst (2011), who investigated the gendered interconnections that migration and everyday practices of community water management have in rural China. The authors used feminist political ecology approach to investigate the implementation of a collaboration between the central government and local NGOs to build community-based water management projects in rural communities characterised by return migration dynamics in order to deal with water scarcity issues. Particularly, the authors focused on how gender norms were reproduced in water management politics of access to and control and found that "return migrants' social remittances and social capital do not convert unproblematically into leadership and collective action. Through a performative and intersectional view of gender and kinship, the study shows that "return migrants in this particular context remain embedded within a strong fabric of gender, class and kinship that constitutes their communities' sense of collectivity in the first place" (Ge, Resurreccion, & Elmhirst, 2011, p. 140). Looking at how these community based water management bodies were formed, showed how in order for the process to be successful, return migrant men and women had to conform and reiterate traditional gender, generational and clan-based social hierarchies. In this sense, the research shows how the relationship between human and water is a product of social, cultural, and political processes that happen "at different scales, and that equally recognize that resource politics and gender asymmetries of power are shaped in often unpredictable ways by migration and migrant practices, as women and men move between and connect multiple spaces" (Ge, Resurreccion, & Elmhirst, 2011, p. 141).

All these contributions engage with the feminist conceptualizations of geographical scale, which is analysed not only though the choice of not so visible

scales such as the body and the household, but is also look at how these scales are interconnected with broader ones that range "from the intimate to the national" (Elmhirst, 2011, p. 131). Sultana connects the body to the socio-ecological distribution of arsenic contaminated water, Truelove links the scale of the body to the one of the city, Ge, Resurreccion and Elmhirst connect national programmes of rural water management to communities and to men and women moving across different spaces. These works picture an intricate set of relationships in which gender-related subjectivities are experienced and embodied through socio-ecological practices and processes while intersecting with other subject positions, such as class, race, age, migrant status, caste, marital status, etc.

From this literature there are three distinct but connected elements that emerge as central in feminist political ecologies of water: the focus on the creation of gendered subjectivities related to water, the importance of materiality, and the body as key scale of inquiry. The next subparagraphs will unpack these three concepts and show how they are relevant for the research. The choice of dedicating specific paragraphs to each concept has been made for the sake of clarity; however, they are highly interconnected. In fact, it is important to keep in mind that talking about the processes defining gendered subjectivities without mentioning the importance that the scale of the body has little sense, meaning that one way or another, subjectivities are all embodied and directly experienced by individuals. Also, focusing on the scale of the body as key scale of analysis requires to consider and engage with discourses on materiality. As Elisabeth Grosz (Grosz, 2010) has convincingly argued, in engaging with these concepts in an interconnected way it means to anchor the creation of subjectivities to the matter, to the physical experiences that are brought by the materiality of the surrounding environment and of the body.

1.3.2.1 Gendered subjectivities

The first concept that holds a privileged position in feminist scholarship is the one of subjectivity, and specifically of gendered subjectivity. According to Landon Schnabel "subjectivity can most simply be understood as the process of becoming, or condition of being, a subject, or actor with agency, in relation with other subjects (or, alternatively, an interpretive frame that highlights the divergent perspectives and actions of subjects). [...] A subject is an entity with a particular experience of reality, an agent acting in relation with other subjects, expressing agency beyond the discursive, an active participant in the social construction of knowledge" (Schnabel, 2014, p. 11). In other words, subjectivity "refers to how one understands oneself in a social context activated by situated power relations" (Clement,

Harcourt, Joshi, & Sato, 2019, p.3). In particular, feminist approaches have focused on the role that the element of gender plays in the process of creation of subjectivities. Critical feminist geographers have analysed the ways in which gendered subjectivities are produced not only by social configurations but also by the material and spatial ones of the environment in which they live.

Looking at how water scholars have engaged with subjectivity, their focus was to take into account the material capacities of water and how they can inform the process of subjectivity formation. The complexity of the subjectivities that emerge in the places where human and non-human interface is for instance present in the work of Nightingale, whose main research interests revolve around the management of the commons (such as water, forests, fishery,…) by local communities by putting an emphasis on the personal experiences of the people involved in these processes. Drawing from an extensive ethnographic fieldwork carried out with fishermen in Scotland, she realised that subjectivities including gender, race, class, and identities are equally important to understand how the commons are managed, together with the type of institutional arrangements active in each specific context (Nightingale, 2011). Such subjectivities are an integral part of the power relations that occur in commons' management and include the relationship between human and non-human elements. Nightingale affirms that the ecology of the commons is affected by power relations linked to the ways in which commons are managed and used. In discussing such power relations, she challenges the traditional approach that recognised power only as something either external to the community management institutions, or something that operates within the individual members of the community always in a "rational" way. In this sense, Nightingale shows how this is only part of the story and that there are "alternative rationalities" at play that are essential in understanding how communities relate to their commons such as emotions, values, sensibilities, personal inclinations, or habits. Such alternatives are not only linked to the types of subjectivities that the people that have a role in community management build, but she recognises that emotions have a significant role in this process. The author carries out a conceptual shift that moves the focus from the institutional form of commons' management, towards the everyday spaces, places, and practices in which such management is actually implemented, lived and performed. Overall, Nightingale's work is relevant in understanding what does the feminist scholarship mean when it engages with the concept of subjectivity, by showing how bodily/emotionally and situated experiences are essential in the definition of the subjectivities that are formed by the interaction between people and the surrounding environment.

The relevance of Nightingale's work resonates in the words of Sultana (2009), who, referring to her works on water issues in Bangladesh, underlines how "gendered subjectivities are simultaneously material, social, spatial and ecological in any given context where the source of water, water quality and water technology interact with the ways that gendered subjectivities are re/produced, reconfigured, lived and experienced" (Sultana, 2009, p. 435). In this sense, what emerges is the fact that the definition of individual subjectivities is a process that is performed through everyday practices and in which "gender is not a fixed and stable identity, but rather a process" (Clement, Harcourt, Joshi, & Sato, 2019).

The advantages of adopting a perspective that puts subjectivity at the centre of water political ecology studies was also advocated by Cecile Jackson (1998). In her review of feminist approaches in water studies, she underlined the importance of focusing on "understanding the personhood of women, and gender as lived and personal experience rather than only membership in a social category, [...] offers insights into the encounters of women with water resource interventions" (Jackson, 1998, p.316). Moreover, the author underlines that focusing on subjectivity allows to put an emphasis on agency, as in this way women and men are considered as "a social actor with a capacity for willed and voluntary action that is not simply determined by social structures" (p.313). Jackson also argues that focusing on embodied subjectivity also contributes in overcoming the dualistic Western thought (already mentioned in the previous paragraphs). This is because by doing so, the embodied experiences around water are conceptualised as directly connected with the broader process that shapes people's subjectivities. contributing to the broader debate on the relationship between humans and nature. In the words of Obioma Nnameka: "by injecting issues of subjectivity and location into epistemological debates, feminist scholarship seeks, as it were, to put a human face on what is called a body of knowledge and in the process unmasks this presumably faceless body" (Nnameka, 2003, p. 363). This

1.3.2.2 The body as body of water

The second concept to be discussed is the one of the body as a key scale of analysis. Feminist geographers have long engaged with the body as place, tool, scale, site of analysis through which it is possible to observe how power acts across different scales and places in the world (Mountz, 2018). In this sense, the body is shaped by broader processes and it is "not set apart from, or at odds with space/environment" (Jones, 2009, p. 296). It is integral part of the constructing process of subjectivities. together with other elements. Moreover, the body is not

considered as a passive surface where such processes leave their traces, rather an active element "by which wider processes become collapsed and experienced in the everyday, and by which differing forms of political engagement occur" (Truelove & Ruszczyk, 2022, p. 3). Therefore the body becomes a privileged point of entry to study how broad and inter-scalar relations composed by policies, economic development discourses, socio-cultural norms to be observed through the everyday practices and experiences of people.

As seen in the paragraph above, there are several water scholars that engaged in different ways with the scale of the body. Truelove looks into how women's bodies interact with the urban water infrastructure as integral parts of it through the work they do to secure water access for themselves and their families and unveil the socio-political implications of these embodied experiences. Sultana's work on emotional geographies reveals how the body as a repository of emotions is connected to environmental injustice.

Another recent contribution in feminist political ecology that has put the body right at the centre of the socio-environmental analysis is the work of Alison and Jessica Hayes-Conroy on alternative food movements (Hayes-Conroy & Hayes-Conroy, 2013). Even though the authors do not focus on water issues, it is interesting to see how they developed a Political Ecology of the Body model (PEB for short). Here, they used political ecology to argue that individual visceral feelings that pertain to the bodies are not detached from broader structures and systems of meaning. Their contribution is relevant to understand how the body is considered within feminist scholarship because it shows how starting from the body they combine the attention to those structural forces that reproduce social inequity and that are traditionally included in political ecology scholarship with other two elements. First, the one related to how knowledge production systems produce meanings, narratives and discourses that on specific studied phenomena. Second, the visceral experiences that represent those forces of daily material interaction that account for the micro-scale of the body (Hayes-Conroy & Hayes-Conroy, 2013). According to the authors, "structures influence the capacity of the body to affect change at a variety of scales, whether through global political economic forces, mechanisms of belonging at the community level, or linguistic categories that influence our personal experiences of self and other (Hayes-Conroy & Hayes-Conroy, 2013, p. 83)". The PEB model is therefore one way to recognise and make sense of the inter scalar and trans scalar nature of socio-ecological processes that have direct effect on our bodies. This work contributes to shed light on the inequalities that are directly experienced by the body in relation to what happens at

other specific scales and this includes specific policies, narratives or programs around socio-ecological processes such as water access and management.

Looking at how African feminist authors have grappled with the body as a scale of analysis but also as a site of knowledge production. In this sense, African feminist scholars, such as Oyèrónkẹ́ Oyěwùmí (2005), critique the typically Western separation of body and mind, where the body is often associated with women and irrationality and the mind with men and rationality, and which often has an essentialist view of the female body whose conception is reduced to biological processes such as childbirth, lactation, etc. In African feminism, the body is thus not seen as a passive container, but as an integral part of identity, intertwined with mind, culture and society. African feminisms also place women's bodies in the context of motherhood, often challenging essentialist Western views. Some African feminists claim motherhood as a source of empowerment and self-determination rather than a marker of victimhood, reflecting a positive and culturally embedded connection between the body and social roles (Udenigwe, 2024).

In the light of this body of literature, engaging with what happens at the bodies seem to offer a theoretical lens that "underscores the need for a holistic and intersectional approach to water governance, where the body becomes a key analytical tool for unpacking the complexities of environmental justice, social inequalities, and power differentials within water-scarce contexts" (Truelove & Ruszczyk, 2022). Water scholarship has developed interesting perspectives in which the materiality of the human body is intersected with the materialities of the other "things" that can combine with it in creating unique socio-natural configurations. In the text from where the title of the paragraph is quoted, Neimainins invites the readers to think not only our bodies but also everything else composing the waterscapes as "bodies of water", therefore connecting the term "body" as referred to the human experience, to the expression "bodies of water" as indicating actual water basins. According to Neimainins, recognising how water enters and circulates globally, passing through these bodies, which are therefore part of this potentially infinite cycle does not exhaust its explicative power in the field of theory: through this perspective it might be in fact possible to develop new, more just and careful ways to manage water and build better connections between the non-human bodies of water (Neimanis, 2013).

This way of thinking about bodies of water I believe resonates with works in critical geography dealing with water and using water as an entry point to map and theorise power inequalities starting from the spaces created though "the everyday, the intimate and the mundane" (Piedalue, 2019). By focusing on bodies, the feminist perspective contributes to the bridging of the gap between human and non-

human elements, between the materialities of bodies, water and infrastructures and gendered experiences such as the one od motherhood and care-taker, that very concretely influence and structure the lives of people.

1.3.2.3 Make the matter, matter

The third and final core concept of the feminist political ecology scholarship to be unpacked is the attention to materiality when studying socio-environmental relations. Accounting for the material and recognizing the role that non-living and non-human elements have in this relationship means to move towards the idea that waterscapes are an "assemblage of living and non-living vibrant matter" (Krause, 2021, p. 4). The relevance of the materiality in studying natural resources such as water was discussed by the above-mentioned geographers Karen Bakker and Gavin Bridge, who affirm that this perspective "grapples with the simultaneously biophysical and social character of material existence; and, it provides a method for engaging with the way socially significant distinctions are produced from a richly heterogeneous physical world by, for example, reiterating some physical variations but not others." (Bakker & Bridge, 2006, p. 15-16). In other words, engaging with materiality allows for the recognition of physical and corporeal aspects of a specific socio-environmental configuration without surrendering them to the social and vice-versa. The authors argue that "matter matters" because it is through grounded research that we encounter differences that make a difference. "By inserting 'materiality' into our analyses, we situate ourselves: resistant to binaries, suspicious of master narratives, and plagued with dualisms. Common to the different conceptions and usages of materiality across human geography is an effort to problematize the social production of knowledge" (Bakker Bridge, 2006, p.21).

Looking at how feminists have engaged with the concept of materiality, Stacy Alaimo, author of "Bodily Natures" (2010), underlines that even though attention to materiality is by no means exclusive of feminist scholarship, feminists' contributions to this approach brought a desire "to know how we can define the "real" in science and how we can describe nonhuman agency in a scientific context" (Alaimo & Hekman, 2008, p. 7) and therefore how to take matter seriously. She writes that "the theories emerging from feminists who explore this [material] perspective are redefining our understanding of the relationships among the natural, the human, and the non-human. They are developing theories in which nature is more than a passive social construction but is, rather, an agentic force that interacts with and changes the other elements in the mix, including the human" (Alaimo & Hekman, 2008, p. 7). In this sense, materiality in feminist scholarship investigates these interactions trying not to privilege any of the different elements that have a

role in socio-ecological configurations. A way to do so, is represented by the feminist tradition that focuses on gender and social justice dynamics, through the use of the concept of intersectionality as a theoretical lens and method, which offers a way to include physical ecological dimensions when studying socio-environmental relations.

As for accounting for the materiality of water, this element possesses distinct characteristics that make it more than just something on which cultural meanings or social constructions are bestowed by humans. It rather has an inherent force that actively shapes and contributes to the formation of the same social and cultural aspects of life. Through its uneven distribution on the planet, its stubborn tendency to move downhill, its essentiality for the endurance of the majority of live forms, and the other specifically material characteristics, water consistently exerts its influence in materially distinctive manners, allowing for a comprehensive examination of its role in shaping the human experience (Krause, 2021). In this sense, even seemingly straightforward material concepts such as the one of "water scarcity", when investigated through a material feminist lens can be put into discussion and complicated by observing it starting from the situated experiences (Hellberg, 2020; Mehta L. , 2024). Including also in the analysis the materiality of water in terms of the type, conditions, functioning of the water infrastructures is another way to engage with water materialities (Truelove, 2019, 2022).

1.5 "Water is gendered in every society" but every society is different

To conclude this first chapter that has provided an overview of literature on water political ecology and gender-water nexus, this paragraph aims at presenting a few more relevant existing works and ultimately explaining how this research relates to the rich body of work highlighting the interstitial gaps that it wishes to fill. In this way the importance and the need to refer to the feminist political ecology is further strengthened. This research looks at the types of socio-water intersections that are developed in rural Tanzania and how gender is linked to them in the community water management systems in two different villages. The study engages with the materiality of the waterscapes (water infrastructures, water sources, quality, quantity, bodies, etc.) to see how it contributes to the definition of local gendered subjectivities as defined above. Moving beyond the useful concepts of waterscape and hydrosocial territories defined within the broader water political ecology scholarship, feminist approaches provide a way to fill and understand such

concepts with the direct experiences of the people who experience and shape them everyday. At the centre of the research there are the bodies of women that participate in the everyday water practices and the places that such practices shape. The fact that in rural Tanzania, as in other countries around the world, the use and management of water has a very strong gendered connotation has been widely accepted and discussed within feminist studies and beyond (Crow & Sultana, 2002). In particular, women and girls carry a heavier burden than men and struggle daily to procure the water needed for the household, within patriarchal normative structures and gender norms that predominantly relegate domestic water responsibility to them (Adams, Juranb, & Ajibadec, 2018). These tasks include fetching water from different sources located at different distances, cooking, washing, caring for health and hygiene of the whole family members. But not only that, because at the same time these women have roles that exceed the scale of the household as they are farmers, run small businesses, tend to gardens, and care for animals (Moraes & Rocha, 2013) creating unique sets of local water practices and knowledge. For this reason, as pointed out by Anne Coles and tina Wallace (Coles & Wallace, 2005, p. 8), in much of the literature on gender and water this means to talk exclusively about "women" which are treated as an homogenous and isolated category. This is especially true within the development initiatives, practices, narratives and policies (at all scales including national and international ones) concerning water use and management in Global South communities. To recognise and account for the gendered nature of water access in contexts characterised by insecure water systems is framed in this way because often "women and girls labour daily to fetch water for their homes under patriarchal social norms and the gendered division of labour in the Global South" (Truelove, 2011). However, within the feminist political ecology studies on gender, water and development such simplistic vision have been largely overcome and the attention shifted towards gendered power inequalities and to the construction of multifaceted gendered subjectivities. So even though women are still often at the centre of these studies, the ways in which they are conceptualised as women is different: the intersectional thinking has strongly contributed to this conceptualization shift and to understand the situated nature of what defines the specific experiences of being a woman in different contexts.

There are several case studies that show that despite women's central role in and understanding of local socio-water issues, by shifting the gaze from the household to larger scales, women themselves are not only excluded from decision-making processes that affect water (Masanyiwa, Niehof, & Termeer, Gender perspectives on decentralisation and service users' participation in rural Tanzania,

2014), but also that these decisions have a greater impact on their own lives than on those of men (Adams, Juran, & Ajibade, 2018). Moraes and Rocha (2013) argue about the existence of a paradox that recognises the importance of women in dealing with water on the one hand, and their lack of resources and power to directly have a recognised role in water management on the other. The authors argue that such paradox is often reinforced by development policies and projects that do not consider neither their specific needs and interests, nor their knowledge and skills linked to this resource that is essential for the survival and development of human societies transversally. This body of literature on water, gender (and development) has produced interesting studies that interrogate the topic of the gendered forms of participation in water governance at different scales (Agarwal, 1997; O'Reilly, 2010; Adams, Juranb, & Ajibadec, 2018; Masanyiwa, Niehof, & Termeer, 2014). In this sense, feminists have contributed in studying how gender differences and imbalances are linked to water issues by enriching the approach on the topic that often only focuses on the marginalised and disadvantaged position that produces absences and silences of gendered knowledge that many women experience in water governance, with the underlining of the proactive initiatives and roles that the same women take in it (Buechler & Hanson, 2015). Within this perspective, the authors have challenged the assumptions about what men and women roles and needs and focus instead on the dynamic nature of gender relations, which are context specific, evolving and intersect with other hydro-social elements (Ray, 2007). In this sense, an interesting work is the one of Emily Van Huewling on the impact of the transition from wells to handpumps in a rural community in Mozambique (Van Houweling, 2015). The author shows how the introduction of a new water technology in the village triggered a renegotiation of the use of water-related spaces that have a strong gender component in their use. Although the new hand-pump technology was more efficient and safer, the havoc it caused also led to unexpected negative effects especially for the women in the village who are the ones who deal with water supply on a daily basis. Women chose not to use the new pumps as this new infrastructure interfered with the social value that water fetching practices had for them. Van Huewling's work is one of the few research studies on water, gender, and space that use a feminist approach in rural Africa, along with that conducted by Jennifer Thompson, Susan J. Gaskin and Magdaline Agbor (Thompson, Gaskin, & Agbor, 2017) in Cameroon. Most of these studies (such as the extensively cited ones by Sultana (2009, 2011), Truelove (2011, 2022) but also Faisal and Kabir (2005) were done in the Asian continent and therefore there is room to engage with this perspectives as far as the African continent is concerned. As far as the African context is concerned, recent works such as the one of Dakyaga,

Schramm, Lupala, and Magembe-Mushi (2023) have interestingly explored the local urban geographies of water infrastructures in the urban area of Dar es Salaam, however with no clear focus on gender issues.
This is the space that this thesis aims at occupying by engaging with African feminist literature to try to unpack and understand the dynamics specific to the relationship between gender and water in a rural Tanzanian context.

Moreover, as indicated in the paragraph's title, water is gendered in every society but every society is different. This sentence, despite the banality of its meaning, loses its banality altogether the moment we read it through a feminist lens that - as we saw earlier - privileges situated knowledge production with little aspirations of generalisation. Conducting such a study in the two villages of Pandambili and Chamkoroma in central Tanzania by focusing on the direct experiences of the women who inhabit them and relating them to the different waterscapes in which they live answers the call that the feminist literature makes on researchers. The hybrid configurations arising from the relationship between water and society materialise in unique ways in different geographical contexts that lie on the continuum that goes from remote rural areas to densely populated urban centres. This research situates into the stream of feminist research that questions and investigates the relationship between water and society by locating itself between the geography of water and feminist political ecology. It wishes to expand the scope of the intersectionality approach by including in the analysis of local waterscape if and how the evolution of Tanzanian rural water policies (implemented also through the work of international cooperation actors) contribute in shaping local gendered subjectivities. The multiplicity of socio-environmental components shaping women's experiences in local water use and management is therefore studied by looking at how the different scales of body, village community and water infrastructures interact with each other. The next chapter is dedicated to presenting the methodology of the research, illustrating the methods that have been chosen.

Field overflow n°2



Photo 3 - A plate of traditional food made of ugali, beans and mishkaki[6]

After landing in Julius Nyerere International Airport of Dar es Salaam the bureaucratic hurdles of obtaining a research permit stranded me in the city for a few days. I am eager to move and reach my final destination, the small town of Kongwa, that will be my home base for the coming months of fieldwork in the central region of the country. In the hostel I am staying I find myself sharing meals and free time with different international development cooperation workers.

[6] Spiced cow skewers

During a lunch conversation with an Italian NGO member and her Tanzanian colleague, our plates are full of rice and spiced chicken and the conversation verges on the whether conditions and other small talk, when unapologetically direct, the Tanzanian development worker confronts me with a sharp observation: "You white people come here to do research, how is it to have this privilege? We cannot do the same. For you, it is easy to come here and go around. For us, no."

The words hang heavily in the air, putting me in front of my assumptions, my reading list full of decolonial authors, and casting doubt on the ethical dimensions of my choice to carry out my fieldwork here, in Tanzania. I grapple with implications of her words, questioning the appropriateness of my presence and the potential perpetuation of neo-colonial undertones. Am I unwittingly contributing to an extractive and colonial knowledge production? Could I be just the umpteenth European academic perpetuating a system that upholds hegemonic knowledge production? Couldn't a local researcher do a better job? The basis of the research was called into question as I experience in person for the first time the inherent imbalances of my positionality on the field.

This simple conversation then becomes a mirror reflecting the intricacies of power dynamics, privilege, and the responsibility woven into the fabric of my research. I feel like standing at a crossroads, compelled to address the imbalances that permeate my fieldwork. Will I be able to address and manage them with the needed care? This encounter becomes a catalyst for a mindful engagement with the communities I seek to understand and the academic journey I have embarked upon. In this sense, the methodological choices on how the knowledge contained in this text is produced and constructed play – maybe - the most significant role in the whole research process.

Chapter 2

Designing the methodology: producing situated knowledge

2.1 Introduction

This chapter is dedicated to explain how the methodology to answer the research questions was constructed. As the questions relate to the fields of geography and political ecology, they required a selection of methods that could take account for both spatial, and social dynamics that contribute and combine in the creation of specific water places, spaces, and practices. The focus on the different processes that intertwine at multiple scales creating unique socio-ecological configurations is central in feminist political ecology epistemological tradition. On the one hand, it tries to put into question objectivity, privileging situated points of view, and on the other hand, links knowledge production to the relational dimensions that develop in the field. As we have briefly seen in the previous chapter, at the centre of feminist knowledge production there are dynamic processes, not static truths to be discovered (Braidotti, 2018): feminist geographers have strongly underlined that feminist theory and research design are not mutually isolated (Lahiri-Dutt, 2015) and that reflecting on how knowledge is constructed is essential to the research process. In this perspective, it is key to engage with the people that are involved in the research at various degrees in order to enrich and shape the research themes through different perspectives and analyse them in a comprehensive way. This means to question not only the description, the theoretical underpinnings, and the interpretations of what is investigated, but also the positioning of the researcher within the research flow.

The methodology design ultimately aimed at mitigating both the traditional vertical relationship between the researcher and the participants and the risk of having an extractive knowledge approach. Therefore, the aspect of power relations between the researcher and participants have been taken into consideration in the choice of the most appropriate methods. In fact, the issue of positionality was

central to the design of the methodology given that I am a white, western female researcher doing research in a country in the Global South that is listed among the "Least Developed Countries" (LDCs) and has a history of colonisation. Developing a methodology that also allowed a space for reflection on how this issue influenced the study was essential to understand what biases, power dynamics, differences and commonalities came into play in the research both conceptually and in terms of the practicalities of the field. In choosing the most suitable methods to account for the research's aspirations, ethnography coupled with participatory methods, interviews and documentary analysis emerged and was adopted as the methodological approach that resonated with the will to unveil and account for ground narratives around water management and use. The underlying idea behind the construction of the methodology was to find a way to engage with water in ways that are less spectacular and that can account for "the partiality, contingency, ambiguity and multivocality" (Domínguez-Guzmán, Zwarteveen, & Kuper, 2023, p. 2) of non dominant and situated perspectives. I intentionally dedicated as much time as I could to fieldwork to live in the villages and gain firsthand insights into their lived experiences and realities. This approach was crucial for allowing the participants to inform the research process not by imposing preconceived notions or objectives. Moreover, to make sure that the research was deemed interesting and useful by the communities, before commencing the fieldwork, I organized community assemblies in the villages where I introduced the research team, project, topic and methodology. During this assembly, I sought the community's consent for my presence and for conducting the research. The meeting provided a space for open discussion, allowing community members to express any concerns or ask questions. Ultimately, both communities accepted my presence and showed interest in the research. By engaging directly with the community through interviews, observations, and participatory activities, I aimed to ensure that the research focus evolved organically, rooted in the perspectives of the communities. In this sense, the collaboration with Christina J. Mvungi, interpreter and field assistant, was key in shaping the methodology and carrying out the research activities in a way that could fit the field. Christina was invited to join the research work thanks to an agreement that LVIA has with the Tengeru Institute of Community Development according to which students and young graduates can carry out tranships at the NGO offices. In this way, I recruited Christina and she accompanied me throughout all the fieldwork that lasts 8 months. She was not a member of the communities and I intentionally chose to work with someone from outside the local communities to reduce potential bias or influence that might arise if the interpreter were embedded within the community itself. As an external assistant would be less likely to be

perceived as aligned with specific factions or social groups. This approach supported the credibility and trustworthiness of the research by fostering a more open and objective environment for participant responses. On the other hand, this choice also had limitations. An external interpreter may have lacked specific contextual knowledge of local customs, language nuances, or inadvertently reinforce a sense of "otherness" in the research process, creating a distance between the researcher, the assistant, and the participants. However, these shortcomings were addressed by having a concerted effort to build relationships with several members of the communities who could offer insights into the local context. These community members acted as informal advisors, helping to interpret the subtleties of local practices and providing valuable feedback that enriched the data and enhanced the research's cultural awareness.

2.2 Coupling ethnography with participation

The desire to make the research methodology coherent and clearly connected with both the specific research questions and the socio-cultural context where the research was developed was essential in defining the methodology of this research. In this sense, I tried to construct a methodology in which the voices of the people who made the research possible could find space. This was not only attempted through the information they provided about the functioning of the water schemes, the local uses of water, the local water governance structure, but also through their view of what is important and what is not, what are the things to focus on when analysing their everyday relationship with water, and also through the way their bodies are intertwined with the more concrete and material aspects of this resource.

To do so, I decided to join together the ethnographic approach with participatory methods that aimed at actively involving participants in a generative way in the process of knowledge production (Kindon, Pain, & Kesby, 2007). As for participatory methods, I refer to the tradition stemming from the Participatory Rural Appraisal and the Participatory Action Research ways of conducting research (Chambers, 1994). Such methodologies are based on the premise that the marginalised, the dispossessed have an understanding of their challenges superior to any external researcher, international cooperation agent, or expert (Green, 2000). Also, they recognise that "all knowledge systems carry a number of values and bias" (Rahnema, 2010, p. 134), and therefore participation can create space in order for different perspectives to emerge can contribute in decentring hegemonic knowledge production rooted in northern and western worldviews. The intensity and scale of participation can vary from context to context and it depends on both

the aim of the research and the availability of people to be part of the research activities. There are situations in which aiming for the full participation and ownership of the research is not only unrealistic, but also undesirable[7]. To design a research methodology in this way can account for those voices that are usually absent or marginalised from mainstream knowledge production (Gregan, 2021) and potentially mitigate the extractive character of academic research. As Ingold (Ingold, 2017) states, there is something deeply troubling about engaging people and communities in our research in good faith and then turning them into case studies at the time of writing. According to him, the important aspect is not to confuse observation with objectification of those included in the research and to see research not only as a way of learning but also as a social practice with a potential power to induce change. Such concerns are also linked to the inherent risks of manipulation, or better, facipulation linked to participatory methods: the concept of facipulation combines the two terms "facilitation" and "manipulation" (Botes & van Rensburg, 2000), referring to a situation in participatory research where the facilitator guides the efforts towards a goal they desire. In other words, facipulation entails manipulative facilitation, prioritising the facilitator's interests over those of the participants.

Choosing the peripheries as a starting point of a research process offers certain advantages but it also requires great care. As a matter of fact, the risks of romanticising or appropriating the vision of the less powerful while claiming to see from their position is real and insidious. Also, the positions of the marginalised are not necessarily innocent and are not exempt from critical revision, decoding, deconstruction and interpretation (Braidotti, 2018). Moreover, defining someone as belonging to a marginalised group could be problematic in itself as it requires a to draw more or less defined or permeable boundaries between those who belong to the margins and those who are not. This is why the feminists' calls to beware of objectivity stems into being cautious in conceptualising from the ground and in drawing too stark lines of difference between social groups. These definitions strongly depend on the point of view of the observer, the researcher, who is the one who ultimately chooses the perspectives to be included in the text and sets the conditions within which the participation of people can take place.

Participation is a broad, complex concept and can take different forms and intensities when employed in research. The way participation has been employed

[7] On the characteristics, limitations and possible engagement with participation in research see Arnstein (1969) Chambers(1994), Kesby, Kindon, & Pain (2007), Cooke, Khotari (2001), Sherry R. Arnstein (1969): A Ladder Of Citizen Participation, Journal of the American Institute of Planners, 35:4, 216-224

in this work concerned the research process in all its length, from design to fieldwork, from methods to interpretation. Choosing a participatory approach also meant to deal with a certain degree of unexpected and unpredictable events occurring during fieldwork that could affect the type of engagement of people in the research. Most of the people involved in the research were farmers and there are times of the year - such as the month before rain season - in which they are more busy in the preparation of fields and therefore not available for other activities. On the other side, my own presence on the field had to face a certain degree of uncertainty as I fell quite severely ill for one month and the continuity of my presence on the field was interrupted. This research engages with participation on two levels: On the one hand, I observed how communities - and in particular the women - participate in the management and use of water starting from their everyday experiences. On the other, I employed participatory research tools such as participatory observation, transect walks, and photo elicitation through which I sought to draw on local knowledge to enrich research into local perspectives of how water is conceptualised, experienced and managed on a daily basis. In this sense, engaging with a participatory approach meant to see and account for how both community members' participation and my own intertwined with each other and produced unique types of knowledge.

Selecting the most suitable methods for the research meant being open to continually adjust and readjust the planned activities with the contingencies, people's availability, events, and limitations that the fieldwork presented. It also meant to understand which methods were compatible with each other and how to make everything work in a way that would both respect the ethics of the research, and allow the generation of good quality information, data and insights on the research topics. The choice of methods was aimed at creating welcoming spaces in which participants could feel comfortable in exchanging experiences, information, personal stories about their relationship with water and about their role in maintaining and shaping the local waterscape. Some were designed before the fieldwork and then adjusted in the light of the situation, others were decided after being on the field for a while and triggered by what emerged. The next paragraphs will present the used methods (interviews, participatory observation, transect walks, photo elicitation) in a way that links them to the themes and questions of the research.

2.3 Methods to engage with materiality

In my research I have tried to study and understand the connections between bodies, water with their material dimensions, the relationship between a water infrastructure with human bodies, the spaces that these relationships produce, the role of water policies in creating these relationships, etc. To do so, I worked in two rural communities that belong to the same District of Kongwa[8] that present different characteristics in terms of type of water access including type of sources, management entity, economic profile and environmental profile. In this sense, one of the main challenges was to translate the desire to reconcile the different types of materiality that compose the waterscapes into the methodology. All these dimensions present differences and similarities in terms of rigidity, flexibility, softness and adaptability. For example, water infrastructure planned to be rigid, technically managed, and functionally channel water, when looking at how people use it shows how it is actually prone to be hacked, manipulated, damaged, tinkered with, or creatively fixed. And these characteristics mirror and share many aspects that can be referred to human bodies with their flexibility, strength, weakness, softness, rigidities and emotional responses. These different types of materiality include water, the water infrastructure, bodies, springs, wells, plastic buckets used for transport, pack animals, spirits guarding the water sources,... all these elements have different consistencies, movements, life cycles from one another. Their materiality is not exhausted in their role as vehicles for water but "it expresses limits and capacities and potentialities that in part determine which discourses, ideas, concepts, or figures can emerge" (Neimanis, 2017, p. 184). Seeing and recording these aspects that intertwine such diverse dimensions required combining different research methods that could account for each of these aspects. Finding a way to originate this type of data cannot be done uniquely by relying solely on "the familiar repertoire of humanist methods that rely on talk and text" (Whatmore S. , 2006, p. 606), thus speaking and interviewing with specific and direct questions, but it can be done through experiencing, living, observing, with indirect questions, with the discussion arising from a photograph, etc. this then explains why I decided to use classical qualitative methods such as semi-structured interviews and documentary analysis of water laws and policies, along with methods that also include other ways of constructing knowledge such as transect walks and photo eliciting. Adopting these methods aimed at answering the call by Whatmore to engage with research

[8] On the specificities of the administrative structure of Tanzanian rural areas and the description of the two communities see next Chapter.

"practices that amplify other sensory, bodily and affective registers and extend the company and modality of what constitutes a research subject" (Whatmore, 2006).

2.3.1 Walking the field – Transect walks

Walking an area together with the people who inhabit it, pausing and walking with them through water-related places enriches the search for those material and bodily elements that words can only partly explain. This is especially true in a context in which communication with the participants was mediated by a translator who had her own idea of what might be interesting and useful information and therefore inevitably somewhat filtered the conversations (on the relationship with the interpreter see the following section). Transect walks were an essential part in different moments of the fieldwork in the villages and they were conducted in two rounds. The first round of walks was conducted at the beginning of the fieldwork in both villages together with local leaders (specifically village leader, sub-village leaders and people that were indicated to me as influential people) to whom I asked to walk together to the village's places of water. The aim of this first round was to have an initial activity that could provide an overview of the local waterscapes and start to involve the community in the research activities and themes. The completion of these walks (two per village) informed the way in which the second round of transect walks was organised. This second round was carried out later on in the fieldwork and it was done with different community members that were chosen through a snowballing selection method by asking the initial participants and other key informants that we came to know during fieldwork who were the people we should have contacted for conducting transect walks concerning local water issues. In this sense, the preparation and conduction of the second round of walks intertwined with the other used research methods (semi structured interviews and photo elicitation). Even though the topic and aim of the transect walk was set from the beginning, the trajectories of the transect walks were created in an improvised manner according to the participants' ideas of what was important to see. This happened also because some places were not directly accessible without the permission from the village authorities (such as water sources), because they were too far away, or because the people who were supposed to participate were not easily available. One of the most important aspects of the way the methodology was used is the fact that there were always different participants guiding the walks: men, women, "ordinary" members of the community, people directly involved in the community water management body, leaders, elders, or local environmental experts. The way in which different people belonging to different social groups

experience water can vary significantly and the places that they associate with water can also change. For example, elders and leaders chose to visit the water sources (water pumps, wells, mountain springs), women privileged places such as waterpoints and alternative water access sources (rainwater collection systems, seasonal dams), people responsible for local water management preferred to walk to and along the water infrastructure showing me its functioning and issues.

In Tanzania, such as in many other rural African contexts, the act of accessing and collecting water is strongly connected to the practice of walking, especially as far as women and children experience it (Venkataramanan, et al., 2020). Therefore, transect walks seemed a suitable method to adjust the rhythm of research fieldwork to the rhythm of the residents and their habits. This method is a long-established practice in participatory methods[9] and can take many different forms: it can be a technique for gathering information about an area and mapping it or an opportunity to experiment with one's body in a way of relating to participants that includes dimensions more related to visceral and emotional geographies. In the case of this research, transect walks were chosen with multiple aims. First, they were functional in the collection of data on the local waterscapes in different forms. On the one hand, walking was paired with short unstructured interviews with the participants so that the activity was an opportunity of sharing and explaining the social and physical aspects of the participants' situated experiences related to water. Pairing walking methodologies with interviews has proved to help in accessing the minute details of daily life and promote the emergence of more nuanced and precise aspects of the visited places (Clark, 2017). On the other hand, both photos and field notes were taken in order to keep track of the information that emerged from the walks so that they could then inform and triangulate the other research methods used such as the semi-structured interviews and photo elicitation.

[9] On the use of walking as a research method see Chambers (1994), (Bates & Rhys-Taylor, 2017) (Fink, 2012).



Photo 4 - Walking with Stannley, one of the people who contribute to set up the Community Owned Water Supply Organization (COWSO) in the village of Pandambili.

Photo 3 shows one of the second round transect walks taken with village members. Specifically, here, Stanley, who is one of the people that collaborated in the creation of a community water entity in Pandambili (namely a Community Owned Water Supply Organization- COWSO), is showing to me and Christina J. Mvungi (interpreter and field assistant) the old water tanks of the village that now are no longer in function[10]. Through walking along the water infrastructure, he recollected the history of the village water governance indicating who built what and for how long it was functioning.

Transect walks had also the advantage of involving the physical dimension into the research as it required my body and the bodies of the people walking with me to share fatigue, feelings, discomfort, restorative pauses, etc. In this way visions,

[10] Stanley was one of the key informants in Pandambili and one of the most welcoming and knowledgeable people in the village. He helped us to find a suitable room to rent for the time of fieldwork and made sure that we had everything we needed without asking anything in exchange. He introduced us to many community members and without his contribution this research would not have been the same. Stanley unfortunately passed away a few months after the end of the fieldwork. This note is just a small and largely insufficient way to thank and remember the friendship he showed to me and Christina for the brief time we spent in the village.

smells, tactility, sounds, became part of the research process and were tracked in the field notes and functioned as triggers for questions and sharing of experiences. Walking together proved to be important in getting to know the community members and the way they live the relationship with water. The everyday dimension of dealing with waters (both in terms of managing it and using it) performed by the residents therefore emerged and gave back a picture that ranged from the multiple water sources to the taps, wells and other collection points that reach and serve people's daily needs. In this sense, through walking and taking pictures, the waterscape unfolded in complex directions that spanned from the water sources to the private and public taps and included elements such as water infrastructure, women's, men's and animal's bodies, spirits, etc. Spending the time of the transect walk together with the participants, sharing the fatigue of walking for hours sweating under the sun, following the movements of water, proved to be essential not only to get to know the waterscape through their eyes and bodies but also to anchor our conversations to a common experience that is the shared walk. Walking alongside the water pipes and at times jumping over them, following the thin overflow of the water tanks that was diverted to water family gardens, checking the functionality of all the village taps, avoiding to fall into the deep manually dug wells that pinpoint the village, etc. allowed to experience the ways in which the water infrastructures is entangled with the social fabric of the villages and meet the people who live those places everyday.

Coupling the walking method with taking photos, allowed for a thorough investigation of the waterscape. Such approach unveiled the characteristics of the water places and the water spaces that together articulate the communities' geography of water. In trying to define the difference between water spaces and water places, I refer to the longstanding theoretical debate that has been well presented by Jhon Agnew in the chapter "Space and place" in the Sage Handbook of Geographical Knowledge (Agnew, 2011). By tracing the ways in which these two concepts have been defined and used within geography, he highlights that the concept of space has been historically linked to hard and positivist science approaches, while the one of place has been developed within humanist perspectives. However, he also underlines how this division has rather porous boundaries and "given that both space and place are about the 'where' of things and their relative invocation has usually signalled different understandings of what 'where' means, it is best to examine them together rather than separately" (Agnew, 2011, 314). As this research is framed within feminist geography's perspective, it is key to look at how feminists have positioned themselves within this debate. In her book "Space, place, and gender" (1994), Doreen Massey states that "both

concepts are highly mobile" (1994, p.1) and she discusses and challenges the traditional notions of space and place. She argues and shows how the two are interconnected and constantly in flux, shaped by different social interactions and relations, among which she focuses on the gender ones. She writes that "there are also other levels at which space, place and gender are interrelated: that is, in their very construction as culturally specific ideas - in terms both of the conceptual nature of that construction and of its substantive content - and in the overlapping and interplaying of the sets of characteristics and connotations with which each is associated. Particular ways of thinking about space and place are tied up with, both directly and indirectly, particular social constructions of gender relations. My aim is to unearth just some of these connections (other writers have highlighted others, and there are presumably still more). The implication is that challenging certain of the ways in which space and place are currently conceptualized implies also, indeed necessitates, challenging the currently dominant form of gender definitions and gender relations" (1994, p.2). Writing about both water spaces *and* places therefore means to take into consideration this point of view and keeping together the different elements that give shape to a waterscape. In this way, the research tries to highlight the fluidity and interconnectivity of waterscapes and acknowledge the diverse experiences and voices that shape them. This perspective allows for a more inclusive and nuanced understanding of how water is experienced, valued, and contested.

2.3.2 An eye on materiality

Finding ways to identify and stimulate reflection on the specific water practices, values and personal experiences was another element that was necessary to answer the research questions. The use of visual methods and therefore the use of another type of language was a further way to investigate these aspects. Specifically, photo elicitation with groups of women in the two communities were carried out. Starting with the assumption that embedded within the rural areas of Tanzanian villages lies a dynamic interrelation between women and water that transcends mere utility and extends into the realms of culture, identity, and resilience, this visual method was chosen because of its ability to stimulate personal reflection by using more than one language. As Douglas Harper (2002) states "images evoke deeper elements of human consciousness that do words; exchanges based on words alone utilize less of the brain's capacity than do exchanges in which the brain is processing images as well as words. These may be some of the reasons the photo elicitation interview

seems like not simply an interview process that elicits more information, but rather one that evokes a different kind of information" (Harper, 2002, p.13). Photo elicitation was also chosen because of its potential capacity to unveil the daily ways in which women experience water as it would allow them to take pictures of their surroundings and choose independently what to capture. Moreover, using photo elicitation in a way that would put the camera in the hands of the participants was selected because of its high capacity to involve and capture participants' attention, enthusiasm and curiosity by adding a more playful and fun element to the research activity (Milne, Mitchell, & de Lange, 2012). Many of the residents of the village have seen me take pictures during my stay on the field, and the reactions have almost always been one of curiosity, and several times it has happened that people have posed and asked me to take their picture. Photo 5 is one of the results of these requests. At the moment of the picture, me and Christina (interpreter and field assistant) were passing by the water point and the women asked me who I was and if I could take a picture of her. After chatting for a brief while, I agreed and she prepared herself adjusting her clothes, her buckets and jerry cans for being photographed. The first photo I took left her unsatisfied when she looked at it on the small camera screen, so she asked me to take a new one. I did and she was pleased with the result. She said she liked the picture because she was smiling and it showed how clean her buckets were.



Photo 5 - "Muzungu! Piga picha!" : a woman poses as if she was fetching water.

This was of course only one of similar episodes during fieldwork, but it struck me both because of her eagerness – or better willingness and desire - to be photographed, because of the joyous and proud sense she chose to show in the picture about her daily practices in accessing water. In the light of these episodes, the idea I had of putting the camera in the hands of the participants through photo elicitation seemed therefore promising. The only obstacle was the fact that I only had one camera. To overcome this drawback, I purchased a smartphone in Dodoma that I used in parallel with the camera with the participants. The smartphone turned out to be a less "threatening" tool to handle for some participants, who declared to prefer the small and handy size of the phone over the bulky camera full of buttons.

The photo elicitation activity was structured around four thematic dimensions that were inspired by the everyday fieldwork conducted prior the photo elicitation

activities especially in the activities of participant observation, interviews, and transect walks and also by the literature over gender-water relationship. The first dimension is the one of the *objects* linked to water use and access, meaning all the material and tangible things that belong to the daily water practices. In the everyday life of the villages, dealing with water seemed to be associated with a plethora of objects, things, materials that act as mediators between the resource and people, therefore using photo elicitation to investigate this aspect seemed a promising point of entry to investigate socio-material relationships. The second dimension encompassed the *places* associated with water and it included reflecting on where gendered water practices happen. Are those places linked to the household like much of the literature on water-gender in African rural contexts? Or is it more complex than that? What are the elements that compose such water places? *Emotional responses* to water is the third dimension that the photo elicitation exercise engaged with. The fact that the task of fetching water is something experienced as a burden by all women living in contexts similar to the rural villages considered in the research is very much present in the literature. However, research such as that of Sultana (2011, 2015) and Wutich & Ragsdale (2008) has revealed that there are unique gendered emotional geography linked to water access to be unpacked in different contexts and therefore this part responds to this approach. The fourth and last dimension of the photo elicitation activity was dedicated to explore the *meaning* that water has in the lives of the participants. This aspect was included because of the spiritual practices that emerged - especially in Chamkoroma - around water and the care practices that community members carry out towards their water sources (for example through a series of beliefs on the presence of guardian snake spirits that protect the water sources from ill-intentioned people that is aimed at keeping people from polluting or jeopardising in other ways the precious sources), to the infrastructure (for example the care that women fetching water have in keeping the water-points clean and report any malfunctions to the responsible people) and other practices. Asking the participants to take pictures on these four broad elements, not only allowed the multifaceted roles of water in their lives to emerge, but also captured the emotional, symbolic, and power dimensions that imbue this resource. Within the rural waterscapes of Pandambili and Chamkoroma, an intricate and subtle nexus emerges, binding women (together with other human and non-human elements) and water in a unique socio-environmental picture. To unravel the nuanced contours of this relationship, the activity was thought to look at the everyday experiences of women inhabiting the two villages by discussing through the help of images the manifold roles water plays in their lives. Looking into how the activity was designed and conducted, here I break down the four topics

around which the participants were invited to reflect and discuss. As for the objects, women were invited to document, via photography, objects emblematic of their daily encounters with water. Moving to the element of place, this category was meant to start conversations and reflections on the different types of places that are produced by the contact of participants with water. The third element referred to emotions related to water and it was mostly inspired by the literature on emotional geographies (Sultana, 2011) and here, women were asked to portray emotions linked to their own personal relation with water. The last input given to the participants was to take photos of why water was important to them. Participants were encouraged to capture situations in which water plays a key role within their everyday contexts and starting from there discuss the reasons why. The outcomes showed water as something that goes beyond mere functional utility, that holds together cultural, social and material. What emerges can have implications for developmental initiatives that intend to address gender issues through water projects, underscoring the imperative of affording attention to women's everyday perspectives and experiences in endeavours relating to water resource management.

2.3.2.1 The photo elicitation activity

Operationally speaking, the photo elicitation activity unfolded through several stages, aimed at ensuring a comprehensive and respectful exploration of this topic. First, with the help of Christina, we[11] presented the idea of the photo elicitation activity with the key informants that we met during fieldwork and through a snowballing technique we identified women who were interested in participating. The plan was to involve women from the different sub-village areas (there were 3 sub-villages per village, 6 in total) as each of them presents specific characteristics in terms of type of water access points, number of inhabitants, distance from the water sources and income. The number of women to be involved was set to 4 per sub-village, reaching a total number of 24 women. The number of participants was set to be in line with the qualitative nature of the chosen method that privileges a deeper investigation of participants' experiences, perspectives and points of view on the research topic.

Date and time for the activity was mutually decided and on the day of the activity the participant were presented with the details of the research aim and there was a collective reading moment of the informed consent forms that explained

[11] From now on, whenever in the text the pronoun "we" is used, it refers to me and Christina Mvungi (interpreter and field assistant) if not otherwise indicated.

through both writing and pictures[12] how the activity would work. Participants were then invited to ask for any clarification and eventually sign the informed consent form. This step took some time but as the participants were already interested in taking part in the activity, all of them agreed to participate.



Photo 6 - Participants in Pandambili C learning how to take picture with a smartphone

Then a lighter moment of training to acquire the basic skills to use both the camera and the smartphone to take pictures was carried out. This training was designed to be accessible and user-friendly, empowering participants to wield these tools to articulate their perspectives visually (Photo 6 shows three participants in Pandambili C in this training phase helping each other in understanding how to take pictures with the smartphone). Participants learned about framing, focus, and capturing moments that mattered to them. Then, participants were introduced to the four distinct themes they would explore through photography that were presented in the previous part of the paragraph: objects, places, emotions connected to water, and the importance of water in their lives. The following step was the moment of

[12] The visual consent forms prepared and used for the photo-elicitation activity can be found in Annex section.

taking pictures. Following the introduction to the themes, participants divided into couples embarked on a "photography expedition" within their villages. The choice to make them work in couples was taken for two sets of reasons. On the one hand, the equipment was limited as I had only one camera and one smartphone to conduct the activities and this meant that the tools needed to be shared by the participants. On the other hand, we realised that letting the participants work in couples had several advantages. First of all, working in couples meant that they could consult with each other about the instructions of the activity and the functioning of the camera or smartphone. Second, if they wanted to, they could easily take pictures of each other without having to look for other community members to do it for them. Third, the idea of making them work in pairs was linked to the idea of having them an initial internal discussion and elaboration of the photo elicitation themes from which to build in the group discussion and individual interviews that followed.

Armed with cameras or a smartphone, they roamed their familiar surroundings, capturing moments and scenes that resonated with the four themes. The time frame of the photographic expedition was two hours. This time configuration was chosen on the basis of the pre-surveyed availability of participants, who were available one day for the activity because of their other commitments. Also, dedicating a specific amount of time to taking pictures in a way that participants did not have any other distraction showed to be a fit choice for the specific context. Once they came back, participants gathered for a brief break. This interlude provided an opportunity for relaxation, refreshments, and the printing of the captured images. It served as a moment of relaxation and anticipation for the subsequent group discussion. The culminating phase of the photo elicitation process was the group discussion. Each participant had the opportunity to present and articulate the stories behind their selected images. This interactive dialogue allowed for the sharing of experiences, emotions, and insights related to water within their respective villages. Participants were encouraged in engaging in constructive conversations around the images captured by their peers, fostering a collective understanding of the broader context. This was the most delicate and difficult phase as not all the participants were used to speaking up in front of others or in front of a foreign researcher. At times the discussion was hard to stimulate and the pictures were not enough to start meaningful conversations. In these cases, some extra questions were used to help the participants articulate their thoughts and share their opinions. Personal feedback interviews were then conducted with the participants both to collect feedback on the experience and to go deeper in some of the aspects that emerged during the group discussion. This method not only allowed the specificities of local water practices to emerge with its strengths and weaknesses, but also facilitated critical

dialogue on the research topics. The types of subjects portrayed in the photos indicated material and immaterial elements that according to the participants are important parts of the local waterscapes.

2.3.3 Grounding research in the field

Alongside "participating in people's daily lives for an extended period of time, watching what happens, listening to what is said, and/or asking questions through informal and formal interviews, collecting documents and artefacts" (Hammersley & Atkinson, 2007, p. 3) the ethnographic approach also allowed to trace and record what I experienced with my own body with respect to access to water, gender and power inequalities, etc. Embarking on this research process in rural Tanzania with the aim to comprehend the intricate relationship between the gender dynamics, community water management and ecological aspects of the two communities of Chamkoroma and Pandambili, was therefore accompanied by the meticulous practice of fieldnotes taking. Over the course of eight months of fieldwork, this practice became a trusted - but sometimes tough and frustrating - companion, not only capturing the nuances of water connected aspects but also preserving the personal experiences, emotions, and moments that shaped the research journey. The ethnographic fieldnotes doubled as reflective diaries, acting as a time capsule for our evolving experiences and perceptions. They keep track not just the empirical observations but also the human dimension of engaging with the participants and the people met along the way. The fieldnotes documented the ever-changing dynamics of water availability, accessibility, and quality in the rural waterscapes of the two villages. They captured the conditions of water sources, their reliability, and the daily struggles of women and families in securing this vital resource. Beyond the physical aspects, the fieldnotes recorded though my eyes the lives and stories of the people encountered. Together with my own, I tried to make the voices of community members resonate in the notes, revealing their concerns, aspirations, and the challenges they faced in relation to water. Intertwined with such observations were personal reflections. These reflections chronicled my own growth, moments of frustration, and success during fieldwork. In the analysis and writing phase, they illuminated the emerging themes and the understanding of the field. The fieldnotes also documented the "emotional landscape" of the research journey (Levy, 2016). They captured the highs and lows, the bonds formed with community members, and the impact of shared experiences on the research. After the conclusion of the fieldwork, these fieldnotes stood as a reminder and proof of

the multifaceted nature of research, where empirical observations intertwine with the human experience, creating a composited knowledge that extends beyond the pages of the research text.

2.4 The matter of translation

The issue at stake that makes translation an essential aspect of the research is the fact that I did not speak the local languages but only English, that is the language of the most recent colonizer. The few Swahili phrases and words I studied and then learned in the field, although proved useful for fieldwork, were nowhere near enough to conduct the research alone. Therefore, one of the most important relationships developed in the field was with the interpreter Christina Mvungi who translated from English to Swahili and vice versa. Like all relationships, this one is imbued with power dynamics that I tried to navigate carefully, sharing with her not only information related to the content of the research but also perplexities in understanding certain episodes or aspects observed in the field and doubts on how to explain and interpret them. Her role was not only to translate the language but also to translate the other cultural aspects of the interactions with the people involved. Moreover, by following the idea that the translator has a more deep role to play in the research, I involved her in different parts of the research process because interpreting data is as much about socio-cultural perspectives as it is about language (Larkin, Dierckx de Casterlé, & Schotsmans, 2007). Her observations and ideas therefore informed the research through her familiarity with the cultural context, and also through her own life experience with respect to the research topic. In order to make the most of the capacity of qualitative research to "provide explanations, bring insights into people's experiences, and foster greater exploration in order to generate better understanding of places, geography, and relations between nature and society" (Hay & Cope, 2021, p. 7) , developing effective communication and building a common ground with the person who was the bridge between my words and those of the participants was essential.

There were times during the fieldwork in which the fact that the issue of translating was also influenced by our own cultural biases emerged clearly. In reflecting on the biases of the translators, Hasan Ghazala (2002) argues that translation can never be neutral and a certain degree of cultural, social, religious, gender bias will always be present. At times, when I asked her to translate something, she would refuse and tell me that that specific part of a discourse was not concerning us and the research nor important to know. The fact that she could select what to translate according to

her own sensitivity made me realise how important it is to care for the researcher-interpreter relationship and make sure that it stays as transparent as possible and that the reasons behind the choices about what to translate and what not to are always shared. The relationship with the interpreter belongs to the constellation of aspects that pertain to every methodology based on ethnographic and participatory approaches aimed both at mitigating the traditional vertical relationship between the researcher and the participants and at avoiding a problematic knowledge extraction approach. However, even with these aspects in mind, knowledge extractive practices are inherently present in research. As discussed in literature [13] there is tension between participatory methods and knowledge extraction and risk of co-optation. Using such methods does not automatically eliminate such risks and dynamics: this thesis and the past and future published academic articles based on the research are themselves forms of extractivism. In this sense, the words of Carl Wilmsen (2008) contribute to unpack and address this tension by saying that

> "Assuring that community members are involved as equal partners in negotiating these choices[14] is dependent on the relationship between researchers and community members. Participation alone is not sufficient to nurture such partnerships. Rather we need to focus on developing the elements of strong relationships (reciprocity and other elements) and to use participation strategically to proactively seek better accounts of the world that are of practical value to marginalized peoples" (Wilmsen, 2008, p. 146) .

Specifically, finding the right balance in this sense with the interpreter required time and efforts from both sides: no matter how horizontal and collaborative approaches I tried and desired, ultimately the responsibility for the research activities was mine and I realised how true this was when Christina expressed her expectations for me to be strong and decisive at all times because, as for her words pronounced half jokingly half serious: "you are the boss and the boss should be strong". Christina came to work with me under suggestion of the NGO I collaborated with for the research. In fact, she is a graduated from Tengeru Institute of Community Development, with which the NGO has a longstanding collaboration agreement. I dedicated the first month in Tanzania to share with Christina my ideas

[13] On this topic see, smong others, Bradbury & Reason (2003), Cornwall & Jewkes (1995), Gustafson (2000), and Hayward et al. (2004).

[14] Here, the author refers to the choices on how to conduct the research in terms of the extent of participation of people, the type of participation and roles of the people involved, the contents of the research and of what can be shared and what cannot and all the aspects that need to be negotiated with a community in the process of a participatory research.

around the research topic, aim and methodology. This process contributed in enriching the research questions, methods and structure with her perspectives and grounding them in a way that they would make sense to the people we would work with. This meant to unpack and discuss categories and concepts such as "Global South", "development", "gender" that were coined within a western way of seeing and making sense of the world and that for her were not so clear nor familiar. Those were engaging and hard conversations that made me realise even more how arbitrary these concepts can be, how inconsequential some terms are to the people they refer to, and how complex it is to decolonize our sight, mind and words. We worked side by side throughout the whole fieldwork and the fact that she had previous experience in working with rural communities was key in understanding to whom it was better to talk to first and who could be the more interesting people to involve in the research. The fact that she was someone external from the communities involved in the study turned out to be extremely positive as it avoided potential tensions due to preexisting envy, mistrust and personal dislikes within communities. Also, being a women interpreter turned out to be very helpful as I mainly worked with women and they felt more comfortable to speak with her rather than a man. On the contrary, being both young women resulted at times in reluctance from men occupying leading positions to find time to talk to us and to take us seriously.

2.5 Building legitimacy through research practice

While spending time on the field, conducting research, talking and engaging with different people, I realised that all this can produce unexpected and unique power dynamics that can be read from different perspectives. Thinking about my positionality and the power dynamics that may generate on the field from it, one of the concerns once being there was to understand the mechanisms that legitimised me to do research, or better, the mechanisms that made me feel legitimate to be in the field and do research, and that goes behind the reading and signing of the visual informed consent that I prepared with the interpreter before embarking in fieldwork (more information on this in the next paragraph). When does the field accept our presence? When do we feel at ease in what we are doing? I asked myself these questions to understand the mechanisms by which knowledge production is possible and respectful in the first place. Being there, being respectful and curious, "doing less" or - better - "doing different things" than what expected from a researcher in such a context is something that helped in entering gradually and ease

my way into the field and let people get used to my presence. I realised that the legitimization process is something that starts with filling forms to get a research permit from the Tanzanian government and then continues in ways that are much more difficult to trace than necessary bureaucratic and formal steps. Also, you don't know if the way you are moving it's working until it does. During one of the transect walks in one of the villages, I was brought to see a waterfall that according to local beliefs has healing powers and represents a sacred place. No other visitor was ever brought to see the place and this display of trust on my behalf made me realise that village members started to see me and my research as welcome and as a result I noticed it was much easier to talk to people afterwards. Moreover, the visit to the waterfall was also a test as if my presence was welcomed by the spirits guarding the water source. In the case of a negative response from such spirits through the appearance of certain signs, the availability of the community to share their experiences and knowledge with me might not have been the same. By problematising and giving attention to how the legitimacy of research was constructed, is it possible to take a further step towards decentralising the research process from the figure of the researcher toward the field. In this way, what strongly emerges is that I as a researcher share an agency with the people who make the research possible and who decide what to share, and how much to share about their lives (Mauloni & Pozzobon, 2023).

Analytically, in this way I take into account how the field is not just a space where we land from somewhere else, but it should be understood as a set or evolving relations that we join, embody, study, contest, discuss and, eventually, leave. Although moving within a world where our position is built before our arrival and beyond it, being reflexive here meant that even though it is not possible to eliminate the extractive character of research, we can choose the ways in which we temporarily inhabit and reproduce the field. Also, it means that as researchers we can decide how much care to put into the relationships with the people we meet. These people might be aware of certain processes at play building on the knowledge they had of us, before us, and that exploit, or might exploit, our presence in unknown ways to us. In this way the field puts into question our preconceived ideas of what people need and request. This, results in the production of a new set of field-knowledge - "an-other" knowledge - circulating independently and that can remain somehow unperceivable to us but that is still linked to our presence, our questions or requests. With regard to the positionality of those who watch and study and those who thus generate knowledge, it is necessary to be aware of and responsible for the movements we make as we enter the field. The gaze from which we start and which carries most of what enters into the research is always defined

by power dynamics and perhaps implicit violence. This dissonance between the desire to be attentive and sensitive to mitigating these dynamics on the one hand, and the impossibility of undoing them completely implies that the practice of positioning is mobile, continuous and unique. This applies both to the definition of my positioning as researcher, but also to the definitions and categories we use for who and what surrounds us and makes fieldwork possible, such as the category "woman living in the rural Global South" of the definition of "adequate water infrastructure", or even "what is an infrastructure".

In reflecting on the path of building legitimacy for my presence in the field, my relationship with the NGO that hosted me certainly played an important part. This is because, especially at the beginning of the fieldwork, it was the NGO that introduced me to the local authorities it has been working with for years and also with the communities themselves. Being associated with an entity that is locally recognized and has built over a long time its legitimacy to operate on the ground was definitely a help so that my presence in the field would be accepted and somehow framed and understood within the huge number of people, cooperators, missionaries, researchers, entrepreneurs who come from all over the world to conduct different activities. However, this dynamic also has problematic aspects. This is mainly because although I was hosted and supported by the NGO in my research activities, I was not part of the NGO and was not even framed within a specific cooperation project of theirs. This lateral position of mine in relation to the NGO adds to the complexity of the power dynamics that bind people and entities in the area that pre-exist with respect to fieldwork but may have different influences on it.

2.6 Navigating ethical challenges in participatory research

To ensure and define the ethical perimeter of the research I would reflect and question the things I was doing and saying at all times so that everyday, with the help of the people around me, I would check and discuss the choices made and still to be made with Christina, my supervisor, LVIA staff, ask for suggestions and listen. The rationale of this continuous process was of course based on the respect of the basic ethical principles aimed at avoiding any harm to the participants and at respecting participant's autonomy and privacy in a way that would be in harmony with the context. Conducting ethical research means something more complex than checking a list of boxes indicating the basic criteria for considering ethically sound

research. In this sense, there is a time component that in the case of ethnographic work that implicates the necessity to continuously keep in mind that one the one hand, there are a set of stratified practices and behaviours originating from how other researchers that came before me did and therefore are out of my control. These dynamics could have been negative or unwelcomed by the local communities and in this sense, my presence on the field is somehow already codified in ways that can be unexpected and that could greatly affect the way in which the research will play out. On the other hand, the same thing is also true in reverse, in that the way I conduct myself and interact with people can influence the fieldwork of those who will come after me. Making sure that the research does not "burn" the field for future research is another key ethical concern that gives the measure of the quality of the work. Overall, the aim was to design the ethical framework of the research in a way that could combine and account for both procedural and contextual ethical aspects of research. In this sense, as we will see in the next paragraphs, I had to make sure no-harm to participants, address the issue of the cost of participation, make sure to collect informed consent from participants so that the research aim, topic and methodology would be transparent and clear, and ensure confidentiality when requested.

2.6.1 Addressing participation's costs

I found myself in situations in which I had to negotiate what to do and understand what an ethical choice meant. For example, one of the issues that I had to face was whether or not to give some kind of contribution to the people who spent entire days with me, subtracting precious time from their everyday working activities to answer to my questions and participate in time-consuming research activities such as transect walks and photo elicitation. In these situations, what helped was to go back to the idea that ethics is something situated in the field and therefore something "contextual" (Lancione, 2017) that can assume shades that are always linked to certain basic values (such as the basic principle of non-harming participants) but that are at the same time strictly related and generated by the very specific social, cultural, economic place in which we find ourselves in. As for the specific dilemma whether to give a contribution to participants or not, I wandered which option would have been more ethical. The majority of participants were women living in rural villages with different levels of education (some could read, other didn't), different marital status (some were single mothers, responsible to maintain the household by themselves, other were married or were part of larger households), income levels (some were peasant women with no land of their own,

others owned land and/or a small business), age, and whose houses were located at different distances from the place where the research activities were held (some lived close by the meeting spot, others had to walk long distance or take a "piki piki" – moto taxi – to be there on time). Overall they were all people who could hardly afford to lose a day or more of work to participate in an activity that could only indirectly benefit them. Being away from the crop fields even for only one day it meant to have someone that could work on it in your behalf (and not for free) or it meant that that day the children had to go have lunch somewhere else than home. That said, wouldn't it be more ethical to at least cover the transportation cost and somehow compensate for the inconvenience to dedicate precious time to the research?

In order to answer to this questions I turned to my supervisor, to the NGO that hosted me, to my interpreter. In the end, all were in favour of giving compensation to the participants for different reasons. First, compensation can promote inclusivity and equity by reducing barriers to participation. It ensures that individuals with limited resources or financial constraints can engage in the research process, thereby diversifying the pool of voices and perspectives. Moreover, compensation can help build trust between researchers and participants. When individuals see that their efforts are valued and rewarded, they are more likely to maintain their commitment to the research endeavour. This trust can be particularly important in contexts where scepticism about external interventions exists. Additionally, compensation can serve as a form of insurance in potentially fragile contexts. Participation in research may carry unforeseen risks, and compensation might help participants cope with any negative consequences stemming from their involvement, such as the loss of a day of work. The NGO itself always gives a small compensation for the people who participate in some of its activities: this is mostly because of a cultural aspect connected with the way in which salaries work in Tanzania. Here, the custom is that for any kind of activity linked to an official project (it could be a training, a professional course, a village meeting,…) a fixed allowance is always given to the participants. This money should cover the extra expenses that these participants have to face in order to attend these events such as the cost of food or transportation. In this sense, not conforming to the NGO's standard procedures and practices could have put them in an awkward situation in the future.

On the other hand, offering compensation in participatory research also raises ethical concerns. It may inadvertently lead participants to engage solely for financial gain, potentially compromising the authenticity and depth of their contributions and cause a potential distortion of motivations. Furthermore,

allocating funds for compensation may divert resources from other critical research needs. Striking a balance between compensation and these competing priorities is essential. Compensation can also create a dependency on financial incentives, influencing participants' motivations and expectations for future research. Decisions around these delicate dynamics must be mindful of potential long-term effects on community dynamics. Navigating these ethical concerns while ensuring that participants are appropriately recognized for their contributions required a thoughtful and careful approach based on transparency and fairness. In the end, I decided to offer a small compensation that was in line with the local cultural norms and expectations, the possible fragility of the participants, the practices of the NGO that hosted me, and my limited budget.

2.6.2 Practising informed consent

One of the key issues underlying research is that people must be put in the condition to provide informed consent to participate in research[15]. In this sense, informed consent forms were prepared and printed so that participants could read and sign them. Preparing classic written consent forms, however, loses all its sense in the case in which the participants cannot read them because of illiteracy or unfamiliarity with pens, paper and written documents. And this is precisely the situation I was faced with on several occasions. To face this issue, I was inspired by what was done by Thompson, a Canadian researcher who worked on environmental issues in Sierra Leone (Thompson J. , 2009). She created visual consent forms in which, along with a short and simplified text, she included photographs representing the classic points related to the collection of consent. In this way, the combination of written words and images helped in being more inclusive for the people with different educational levels. In drafting the form and choosing the photographs, I asked for support from LVIA staff, from project managers to the cook to understand if this could be feasible and useful and their feedback was positive. They agreed that adding images could make communication of these concepts more clear and accessible. When Asked, they also volunteered to pose for the photographs to be included on the form (you can find the forms in the Annex section). This was because I wanted to make sure that the images were clear and relatable to the module recipients and in taking the photos the LVIA local staff entrusted me with precious feedback, insights and advice. Eventually, the use of

[15] For interesting and critical reflections on the use of consent forms in qualitative research, see Corrigan (2003), Marzano (2007), van den Hoonaard & Hamilton (2016)

visual consent form was useful because the printed images stimulated questions about its content and the research in general in a way that printed words could not have done. In the following chapters whenever possible as they gave me their consent, I used the names of the people I interviewed and participated in the different research activities. Whenever I could not ensure their consent to be directly quoted in the thesis, I refer to them with by the dotted initial of their name.

2.7 Concluding remarks

With this chapter I have tried to give a complete picture of how I decided to construct the data that shape this research. First, the purpose was to follow the call of feminist theory to think of the development of the research course as something organic that challenges the dualisms that characterise Western thought. This is stated by Doreen Massey in discussing the dualism of the concepts of space and place, showing how this is connected "to the broader Western mode of dualistic thinking which has been widely criticised by feminists and linked into the same system of thought which so sharply distinguishes between masculine and feminine, denning them through continuous series of mutual oppositions" (Massey, 1994, p.6). In this sense, an attempt was made to address and deconstruct through methodology the dualisms involving humanity-nature but also mind-body through an approach that sought to take into account materiality and not only the concepts that make up the waterscapes studied. Second, the choice of methods followed this view by trying to explain how and why the main methods of transect walks and photo elicitation were carried out in the two communities of Chamkoroma and Pandambili within a broader ethnographic approach. Third, another cross-cutting element of the chapter is that of reflexivity and the attempt to accompany the field research with a reasoning about my own positionality, the power dynamics that develop, the necessary linguistic translation that affected the whole research and of all the specific dynamics that insist on the field and influence the research in some way. In parallel, the ethical aspects of the research were discussed by declining them on very concrete aspects of conducting fieldwork such as the cost of participation and the search for informed and free consent. In conclusion, when deciding what to include in this methodology chapter - the extent I realize has an important weight in the balance of the thesis - I attempted to explain the choices made so that the nature of the methodology design as a process and not a static element in this research would emerge. The next Chapter is dedicated to the presentation of the Tanzanian context from the broader national scale to the village one.

Field overflow n°3

After a day spent walking around the village to visit the water points of the main sub-village of Pandambili, we stopped for some food and rest in the small eatery where we usually had lunch. While sitting on the plastic chairs, after enjoying a plate of rice and beans, my attention was drawn to the small television mounted on the wall, where four men were fixated on a news program. The screen projected grand images of a new water dam, inaugurated by the Tanzanian government. The dam, a symbol of progress and promise, was presented as a tool to provide hydropower energy to propel the nation forward and to store and distribute precious water for domestic, industrial, agricultural use. Yet, the expressions on the faces of the men in the restaurant betrayed a lack of enthusiasm. Intrigued by the apparent disconnect, I approached the group and asked what they thought about the broadcast. The response I received opened a window into the complexity of managing water in a country like Tanzania. The men, with a hint of scepticism in their voices, told me that the televised spectacle was not a true reflection of the administration's efforts. In a place like Pandambili, where access to both electricity and water is marked by discontinuity and uncertainty, and where the dry season spanning from April to December strongly impacts water availability, the images of the dam seemed almost surreal and detached from the realities faced by the community. The conveyed image of the water dam hinted to a national development perspective that was not shared by the people watching the screen. As the conversation - as always mediated by translation - proceeded, it became evident that the juxtaposition of the political spectacle of grand infrastructures and the daily struggle had not gone unnoticed by the viewers. The use of water infrastructure as a communication tool for national development efforts stirred a complex mix of reactions. The grandeur of the dam was not lost on the locals, but its symbolism seemed distant, if not wholly irrelevant, to the tangible challenges they faced in securing basic necessities. This single but meaningful exchange was very clear in showing how many different conceptions, experiences, narratives and ideas around water there are in a single country and the tensions that such perspectives can have.

Chapter 3

3.0 Introduction

As we saw in the first chapter, in the Political Ecology literature, the hydrosocial relationships that shape a place can be read as a hydrosocial territory or a waterscape. The two concepts are partly overlapping but at the same time have substantial differences. These differences have been effectively analyzed and discussed by the aforementioned review by Flaminio et.al (2022) and point to several dimensions on which they differ such as the different time scales to which the two concepts refer, the type of hydrosocial relations they focus on, the geographic scales of reference, and the type of power relations they analyze. On the one hand we have the hydrosocial territories that emerge from the review as

> "A space, material or immaterial, whose boundaries are defined or imagined by stakeholders who have converging or opposing views, practices, and are part of different (multiscalar) networks. Different stakeholders define different hydrosocial territories and on different scales, which can overlap and conflict with each other, notably when supralocal stakeholders and hydraulic projects seek to transform the pre-existent hydrosocial territories." (Flaminio, Rouillé-Kielo, & Le Visage, 2022, p. 50)

On the other side, there are waterscapes that are defined as

> "A material space produced through long-term processes involving water and society and generally linked to broader socio-political and economic dynamics, and through the everyday practices of different groups of stakeholders. Although a waterscape is an outcome of processes and practices, it is also constantly (re)produced and undergoing changes." (Flaminio, Rouillé-Kielo, & Le Visage, 2022, p. 50)

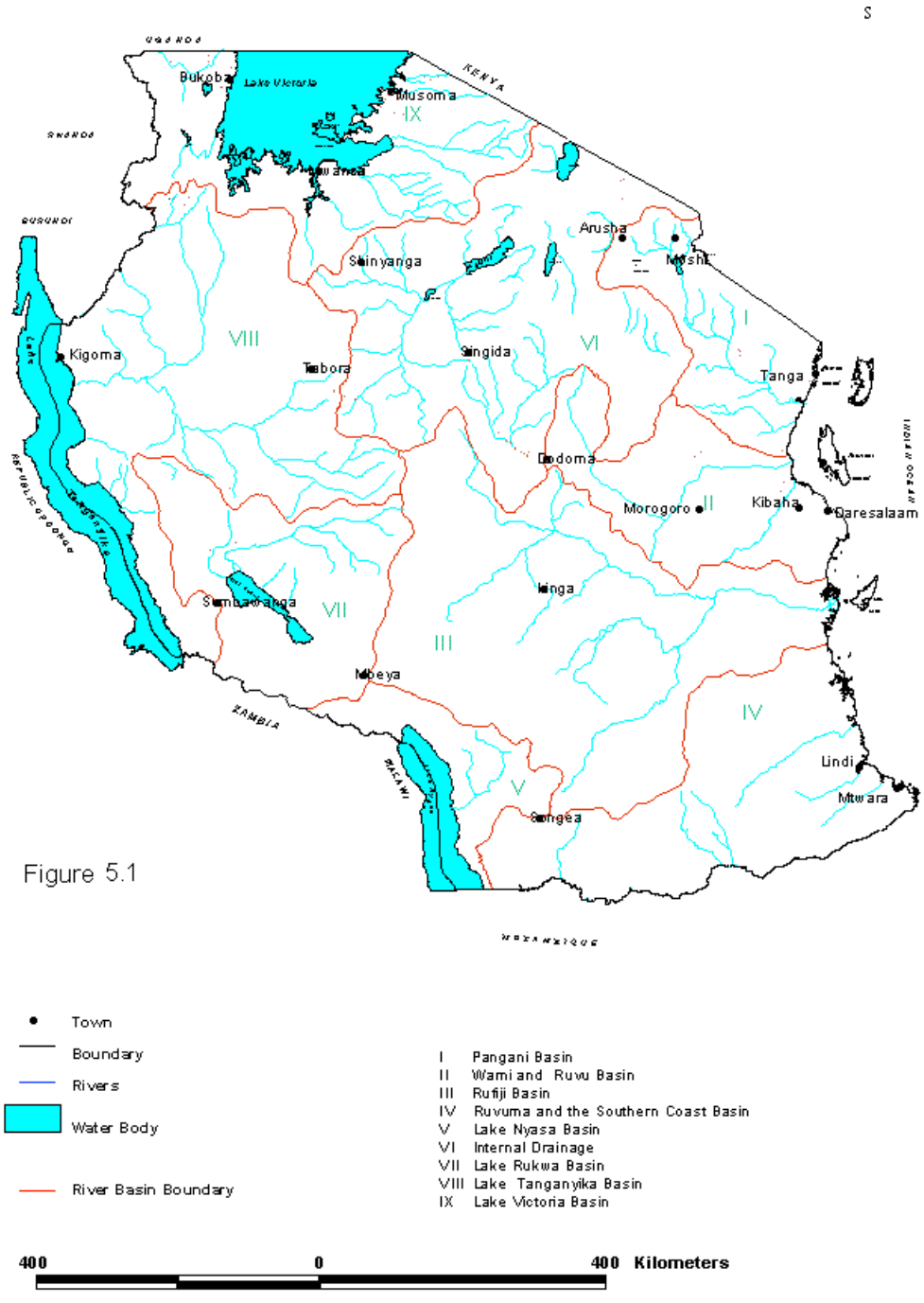
This chapter aims to present the rural water situation of Tanzania both as a hydrosocial territory and of the two villages of Chamkoroma and Pandambili as specific waterscapes influenced by the broader dynamics identified. In Section I, tangible and intangible dynamics that characterize rural water management will be presented. This means looking at aspects of water availability, administrative and

water management divisions and their evolution, and the gender-related content of water policies. In Section II a focus will be made on the specificities of the waterscapes of the two rural villages. This means seeing how water access in the villages develops and how the material dimensions of water (infrastructure, quantity, quality, etc.) are intertwined with local socio-cultural dynamics.

Section I - Managing waters in rural areas: putting the communities at the centre

This Section presents the most relevant aspects of Tanzania water issues and governance. It starts from briefly presenting the environmental profile od the country in terms of water availability in order to understand the environmental constraints and dynamics that shape the rural communities' access to water. Then, it moves to give an overview of the Tanzanian water governance evolution as far as the rural areas are concerned so that the policy, legislative and institutional framework in which rural communities operate are clear. In this sense, the chapter then focuses on the gendered approaches that the Tanzanian government have adopted within rural water management over time. These pages try to wave together material and immaterial water aspects so that the hydrosocial character of the Tanzanian territory emerges as the backdrop against which rural communities intervene in water use and management.

3.1 Unpacking water availability in Tanzania



Map 1 - Map of Tanzanian Water Basins

Tanzania's physical geography is highly diverse, encompassing coastal plains, highlands, and plateaus, with significant mountain ranges such as Mount Kilimanjaro in the north. The country is home to some of Africa's largest lakes, including Lake Victoria, Lake Tanganyika, and Lake Nyasa (Lake Malawi), which are important sources of freshwater and biodiversity. Tanzania's river systems play a vital role in supporting agriculture, hydropower, and ecosystems. The Rufiji River, the largest river basin, supports irrigation and hydroelectric power, while the Pangani River, originating from Mount Kilimanjaro, is crucial for both hydropower and agriculture. The Ruvuma River forms part of the southern border with Mozambique and supports local water transport and livelihoods. Groundwater is a critical resource, particularly in rural areas, though its availability is constrained by issues of sustainable management. Rainfall patterns vary widely across the country, with coastal and lake regions receiving abundant precipitation, often exceeding 1,000 mm annually, while central areas, such as Dodoma, experience semi-arid conditions with much lower rainfall. This seasonal variability in rainfall contributes to challenges such as water scarcity during dry periods and flooding in wetter seasons. Wetlands, including the Kilombero Valley, further enhance water availability by providing essential services such as flood control and water filtration, playing a key role in the management of Tanzania's water resources.

Looking at the water access data on Tanzania, the country ranks among the ten countries with lowest water services access internationally (UNICEF-WHO, 2022), which can be surprising if we look at the data regarding the overall availability of water present in the country. Physical water scarcity does not seem to be an issue in the majority of the Tanzanian regions and the country is not under water stress, meaning that the amount of water resources is theoretically enough to support the population and the country's needs (FAO and UN Water, 2021). However, a different type of scarcity is at play, namely an "economic water scarcity" that refers to cases in which the lack of water available to the population is not caused by its absolute absence, but to the lack of adequate political, technical, infrastructural, social and economic conditions capable of guaranteeing sustainable access to it (Vallino, Ridolfi, & Laio, 2020). The ways in which such elements combine creating unequal water access geographies within a country, a region or an area depend on context specific aspects, but it has been shown that several Global South countries share similar situations where the lack of access does not depend "by immediate physical scarcity, or population pressure or technical incapacity; but by how water services are often organised and managed so as to deprive low-income groups of access" (Linton & Budds, 2014, p. 178). Therefore, it would be more appropriate to talk about different water scarcities - plural - each of which assuming

diverse meanings and caused by different mechanisms that are unique to the single contexts. The way in which water scarcity has been defined and deployed in understanding and shaping global water governance is critical, especially when it comes to Global South countries.

This is because in the first place, countries considered to be developing countries such as Tanzania are among those countries where the global water crisis with which we are all familiar is having the greatest effect. However, as Menga shows well in his book "Thirst" (2024), the roots in which the definition of this global water crisis is to be found in the dynamics of power and Western capitalism that have given it a form congenial to its own reproduction. The way it has been narrated and constructed refers to "a container for a range of water-related issues and refers vaguely to the combined effects of: 1) water scarcity; 2) poor water governance; 3) excessive water withdrawal by the agricultural sector; and 4) overpopulation issues. This interpretation produces an essentially apolitical reading of the many water critiques that are going on around the world at the moment, and is devoid of any reference to inequalities in the distribution of water resources with a view to subsequent appropriation" (Menga, Thirst, 2024, p. 69-70).

Second, the two lenses through which water scarcity is understood, namely the physical and economic scarcity, have their limitations. They say little about the role that human water use practices, the socio-political aspects in producing scarcities for parts of the population along lines of gender, class, economic status, caste and other socio-cultural differences imbued with power relations play within scarcity dynamics (Mehta, 2024; 2010). Critical geographers and political ecologists have shown how water scarcities can be manufactured, meaning that:

> "scarcity is not a natural or neutral phenomenon, but rather socially constructed within the present social and economic order. However, at the same time as being 'constructed', water accessibility, or the lack of it, is also inherently 'material'; the availability, distribution and use of water are central to the organisation of the economy, to survival, health and possible lifestyles, and to the ways in which ecosystems function (or not)" (Hellberg, 2020, p. 187).

Here, the ways in which water scarcity is performed and experienced and its definition is employed to indicate the water situation of a country such as Tanzania can act as the pivot upon which water management strategies are built and implemented, at times with distorted outcomes.

For example, the analysis Barbara Van Koppen, Andrew Tarimo, Aurelia van Eeden, Ennanuel Mazungu and Philip Mathew Sumuni (2016) on the impact of

Integrated Water Management paradigm on the most vulnerable segments of rural population, discusses the implications for Tanzanian water management policies of the way in which physical water scarcity was conceptualised. Specifically the authors explain how the World Bank's push in considering water as a scarce and finite economic good led to a stagnation of water development paths in the country. They underline how:

> "water officials generally accepted the World Bank's conceptual construction of physical water scarcity that ended the earlier primary focus on infrastructure development for all, promoted basin institutions, and invented a new taxation tool to finance water resource management functions by an increasingly under-sourced state to which, nevertheless, a new governance layer of tiered basin institutions was added" (Van Koppen, Tarimo, van Eeden, Manzungu, & Sumuni, 2016, p. 598).

Stressing the physical aspect of water scarcity led therefore to shaping water governance in a way that fostered inefficiency and bureaucratic intricacy. In this sense, scarcity became a regulatory device, "a governing technique aim[ed] at instilling a sense of limitation and at stimulating acting "as if" scarcity prevails in any given moment' (Tellmann, 2013, p. 146)" (Hellberg, 2020, p. 190) . When looking at the situation in Tanzania in terms of water scarcities we can see how they do not act and are not reproduced uniformly. The concerns around water management within scarcity discourses assume significantly diverse shades of the territory. Looking at the physical geography features and processes that shape water availability, Tanzania is composed of a variety of climates that range from humid tropical zones, characteristic of the coastal regions, to semi-arid ones, especially located in the central regions. This means that there are areas of the country in which the above mentioned economic water scarcity intertwines with the physic one and they intertwine with specific access inequalities that relate to socio-cultural dynamics such as income levels, gender, age, (etc).

3.1.2 A focus on Dodoma region

Dodoma region, the region in which the two villages of Chamkoroma and Pandambili that are at the centre of the research are located, sits in one of these places in which water access is complex. As Shemsanga and colleagues (Shemsanga C. , Muzuka, Martz, Komakech, & Omambia, 2015) have shown in

their chapter on the environmental profile of the region and its implication for local livelihoods, Dodoma is located in the semi-arid central zone of Tanzania and has been facing significant climatic challenges that have affected the rhythms and lives of local population who depend for the large majority on rain-fed agriculture. This is particularly due to its scarce and unpredictable rainfall, lack of surface water (rivers are predominantly seasonal, flowing mainly during the wet seasons and persisting for only a few weeks afterwards), and frequent extreme weather events such as droughts and floods. These factors directly impact vital local systems like agriculture, pasture development, and groundwater recharge and quality (Shemsanga C. , et al., 2017). This last aspect of groundwater is especially significant for the region, as it serves as the primary water source for the local population. The rise in water extraction combined with negative climatic shifts such as reduced rainfall and rising temperatures, has been linked to increased salinity of the available groundwater, making this type water source not suitable for all the everyday uses such as drinking, cooking specific types of food like beans and ugali, washing clothes, watering cattle, or irrigating gardens and fields. As a result, people have been accessing water of unknown quality.

Dodoma's region territory while generally reflecting the semi-arid climate of the broader region, contains a diversity of microclimates, particularly influenced by local topography. In the upland areas, such as near the Rubeho and Wotta mountain ranges in the southern-east part of the region, temperatures tend to be slightly cooler and the villages located in the proximity of such ranges benefit of the presence of natural springs fed by the nearby mountains. These springs ensure year-round access to water, making water access in these areas easier and less rain-dependent. As we will see in the next section of the chapter, this thesis has chosen as case studies two villages that are located in two climatically different areas of the region. The two villages, however, are part of the same administrative and territorial District of Kongwa and are located about 35 km from each other. The first village is Pandambili and it is characterized by the semi-arid climate and relying mostly on groundwater during the dry season. The second village is Chamkoroma, which is located near the Rubeho mountain range and it therefore presents a greater water availability in both dry and rain season. As we will see later, the differences in water availability in the two villages shape different experiences of water access for the population. This occurs in a governance and water management environment that is supposed to give individual communities the power to manage their own hydrosocial territory with a certain degree of autonomy. In this sense, it is interesting and important in this chapter to present Tanzanian water governance in

rural areas and how it frames water access and management for individual rural villages. This is because, as we saw in the first chapter, water intertwines with political, social, cultural, and economic dynamics that define how people experience it on an everyday basis. In fact, as Sheridan states in his study on pre-colonial irrigation practices in northern Tanzania, "resource management lies at the intersection of ecological and social processes, the issue of indigenous irrigation In East Africa combines mundane issues like the degree of soil moisture with metaphysical concerns about gender relations and cosmology" (Sheridan, 2002, p. 79). In the next section, we will therefore pay attention to how water management in rural areas of Tanzania is organized, with a focus on how this management system made of laws and policies has addressed the gender-related aspects linked to this resource.

3.2 The rural water management governance in Tanzania: an history of decentralisation

The history of rural water governance in Tanzania is a complex narrative that reflects the interplay of colonial legacies, post-independence policies, and contemporary challenges. This evolution can be traced through several distinct phases, each characterized by differing governance approaches and societal contexts. Within these fluctuations, focusing on how the role of rural village communities in managing their access to water for private use has changed over time is particularly relevant. This is because the village scale is one of the ones that this research considers within the multiscalar water governance of the country. During the period of British colonial rule from 1916 to 1961, water governance in Tanzania was predominantly centralized and designed to serve colonial administrative needs. Most of what is in the current water governance and water access patterns is based on colonial water ordinance and its traces as still visible. The infrastructure developed during this time was limited in scope and largely oriented towards supporting the colonial interests mainly in the agriculture and mining sectors and it created access inequalities by building private household connections for the areas inhabited by Europeans, and by constructing communal standpipes in those places in which local population was living (Hungerford & Smiley, 2016). In this sense, the colonial government's focus on resource extraction resulted in significant neglect of rural water supply. The customary water norms were disrupted leaving local communities largely underserved.

Following independence in 1961, Tanganyika (that became the "United Republic of Tanzania" in 1964 after merging with Zanzibar), under the leadership

of Julius Nyerere, adopted a socialist framework that redefined water as a public good. In the first twenty years of independence, the country followed the socialist model of development of Ujamaa[16] (from 1961-1980s). In this phase, especially after the Arusha Declaration in 1967, water was considered a right to be accessed freely and the state invested greatly in large scale projects to ensure water access in the rural areas. This model on the one hand, put an emphasis on the role of the collective in fostering the development of rural villages in all its aspects – including the management of the water resources that has always been crucial in a society relying on subsistence agriculture and herding (Kjekshus, 1977). On the other hand, it firmly kept the decision-making power in the hands of the central government, who also covered all capital costs of the water infrastructure construction (Maganga, Butterworth, & Moriarty, 2002). This paradigm shift marked a commitment to state responsibility in providing water services to all citizens. The government implemented various rural development strategies aimed at fostering community involvement and enhancing local participation in water management. However, these initiatives were often hampered by challenges related to inadequate infrastructure and limited financial resources, which undermined the effectiveness of these early post-independence efforts.

The Ujamaa model was abandoned starting in the 80's onwards, mainly because these extensive public investments to ensure water access could not be sustained and many water schemes went into disrepair (Grafton, Garrick, Manero, & Nam Do, 2019; Cleaver & Toner, 2006). The 1980s brought about a significant transformation in Tanzania's economic landscape with the introduction of structural adjustment programs, mandated by international financial institutions. In 1985, under the presidency of Ali Hassan Mwinyi, the country undertook a way towards a free-market economic model. In this sense, the country focused on the definition of institutional and governance reforms, decentralisation and community development. These reforms resulted in reduced public spending, leading to increased reliance on privatization and market-based solutions for service delivery. Concurrently, the period witnessed a push for decentralization, granting local governments greater authority over water management. The push for decentralizing and therefore the promotion of the direct participation of local communities in the water governance was also strongly promoted by international development agencies (Razzaque, 2009). As shown by Pallotti (Pallotti, 2008, p. 232), this shift was only partially successful in improving rural water access as the strategies put in place did not give enough consideration to the economic, social implications on

[16] For more details and references about the Ujamaa model see Greco, E. (2016).

the production and reproduction of the rural communities that were rooted in the Ujamaa model. Decentralization often revealed a stark contrast between policy intentions and the actual capacity at the local level, where many communities struggled to manage their newfound responsibilities effectively. However flawed, the decentralisation push continued and in the early 2000s, the country initialised a "decentralisation by devolution" process in the water sector (Masanyiwa, Niehof, & Termeer, 2014, p. 101). Specifically, this type of decentralisation implicated the transfer of power in the form of specific sets of functions, from the central to the peripheral government bodies, namely to the village communities. The state became therefore not a direct investor, but a facilitator and a regulator in the implementation of national water access strategies. In this sense, a cost-recovery strategy towards rural communities and consequent measures were put in place (Mashauri & Katko, 1993).

The advent of the 1990s heralded a new phase in rural water governance with the formulation of the National Water Policy in 1991. Together the implementation of the integrated water resource management (IWRM) concept, this policy underscored the importance of community participation. The document clearly indicates among the objectives of the policy for the rural areas the fact that it is necessary "to manage water supplies at the lowest appropriate level as opposed to the centralised command control approach" (NAWAPO, 2002, p. 30) and that "communities should pay for part of the capital costs, and full cost recovery for operation and maintenance of services as opposed to the previous concept of cost sharing" (NAWAPO, 2002, p.30). Community ownership of water schemes became central as seen a way to ensure long term sustainability, which should be further stimulated by encouraging the communities to cooperate with the private sector. However, the devolution to rural communities to ensure cost-recovery, promote equity and increase efficiency of water infrastructures was not effective and contributed to the erosion of customary water-sharing principles that were already in place instead (Van Koppen, et al., 2004).

In 2006, a specific long-term programme for addressing rural water supply was approved, namely the Water sector Development Programme (WSDP), covering the period from 2006 up to 2025. Within it, the specific National Rural Water Supply and Sanitation Programme (NRWSSP) was included and among its specific objectives it promoted 'community ownership and management', meaning that rural communities should be responsible for all aspects linked to water supply and management, reinforcing once again the centrality of communities in managing and ensuring water access. In 2009, the first legal framework institutionalising this decentralised water management idea was approved in the form of a "Water Supply

and Sanitation Act" (2009 WSSA). Throughout the implementation of this reform, the reinforcement of the scale of the village community as central actors in rural water governance emerges again. This was the first legal recognition of the role and responsibilities of local community entities as the only responsible to govern water access locally by owning the water scheme, maintain its functionality, collecting revenues from water users, decide on expenditures, and being accountable to the citizens through communal mechanisms (Marijani, 2017). This moment can be considered the highest decentralization point within rural water management and it was operationalised through the creation of the new locally elected entities named Community Owned Water Supply Organizations (COWSO).

Turning the traditional Water User Associations operating in the villages into COWSO, was a process that suffered of an often insufficient support by the central government in the provision of the needed skills and competences (Ringo, Khamis, Peter, & Pazi, 2013) of the reluctance of some villages to establish this new type of water management entity because of a general suspiciousness towards governmental attempts to reform local institutions (van Eeden, Mehta, & van Koppen, 2016). Another issue was the lack of harmonisation in the implementation of the new governance system based on COWSOs: while for urban areas already in the 90's the government established for every urban area a specific water agency to manage it and supervise it, rural areas did not have a counterpart that could support rural communities in dealing with water issues. This role was performed by the public District water department, which had other duties that were considered a priority over overseeing rural water access and management and providing support to the communities. In support to these activities, a coordinated approach involving multiple stakeholders, including more prominently non-governmental organizations and the private sector was promoted. One relevant example is the one of Lay Volunteers International Association (LVIA), the Italian NGO that has been promoting international development projects in Dodoma region for more than 30 years and that supported the fieldwork of this research.

The most recent rural water governance adjustment was carried out with the 2019 systemic water sector reform, namely the "Water Supply and Sanitation Act" (from now on referred to as the 2019 WSSA). The reform rationale was to reorganise the whole sector both in terms of legislation and policies in order to deal with the shortcomings of the previous governance structure and to systematise the rural water supply situation. In doing so, the state saw fit to take a step back from the high decentralisation that had been realised with the establishment of COWSO, and transfer some specific functions and competencies back to the central government. The major reform elements that show this movement are two: first, the

reorganisation of the internal structure of the COWSOs, second, the creation of the Rural Water Supply and Sanitation Agency (RUWASA in short).

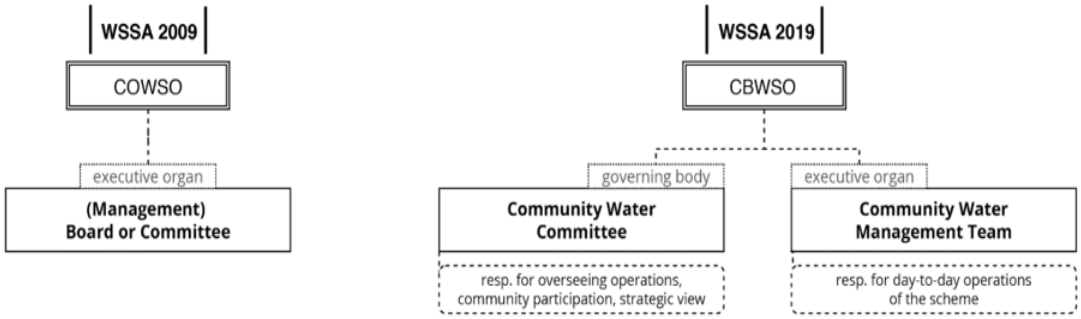


Figure 1 - Changes in the internal structure of the COWSO turned into CBWSO.

The first aspect refers to the update of the COWSOs into Community-Based Water Supply Organizations (CBWSO). As shown in Figure 1, this entailed a change in the internal structures of these entities by separating the operational/ technical activities from the governing ones. The Community Water Committee (CWC), is the governing political body of the organisation and its members are responsible for the strategic choices regarding water management. Besides the members elected by the village, the CWC also counts other figures such as the Village Executive Officer (a non-elected government officer whose role is a parallel to the one of the traditional Village leader), the Diwani (Ward representative[17]), the elected Village leader and a Representative of women to be elected by the community. The other element of the reformed CBWSO is the Community Water Management Team (CWMT), whose members are responsible for the day-to-day management of the water scheme and unlike the CWC members are not elected but chosen according to their skills. The underlying idea of these changes was on the one hand, to ensure a certain level of the expertise on water management. On the other, to make the process less vulnerable to local power (political) dynamics and therefore more predictable and systematic. In this sense, the CWMT members are paid a percentage of the total revenues they manage to collect from water users and this mechanism is thought of as an incentive for revenues collection against the risk of misappropriation of the money collected.

The second major element of the 2019 reform was the creation of the Rural Water Supply and Sanitation Agency (RUWASA), a new institution responsible for

[17] The Ward is an administrative level that governs a group of villages in the same area.

supervising, supporting and organising the water situation in the rural areas of the country. The entity's organizational structure can be seen in Figure 2 and it has an hierarchical structure starting with the Minister of Water at the top, followed by a Board of Directors and a Director General. Under the Director General, the structure is divided into several units and directorates, including the Planning and CBWSOs Coordination Directorate. Each of these divisions has subordinate sections led by directors and managers responsible for various areas such as operations, maintenance, sanitation, and construction.

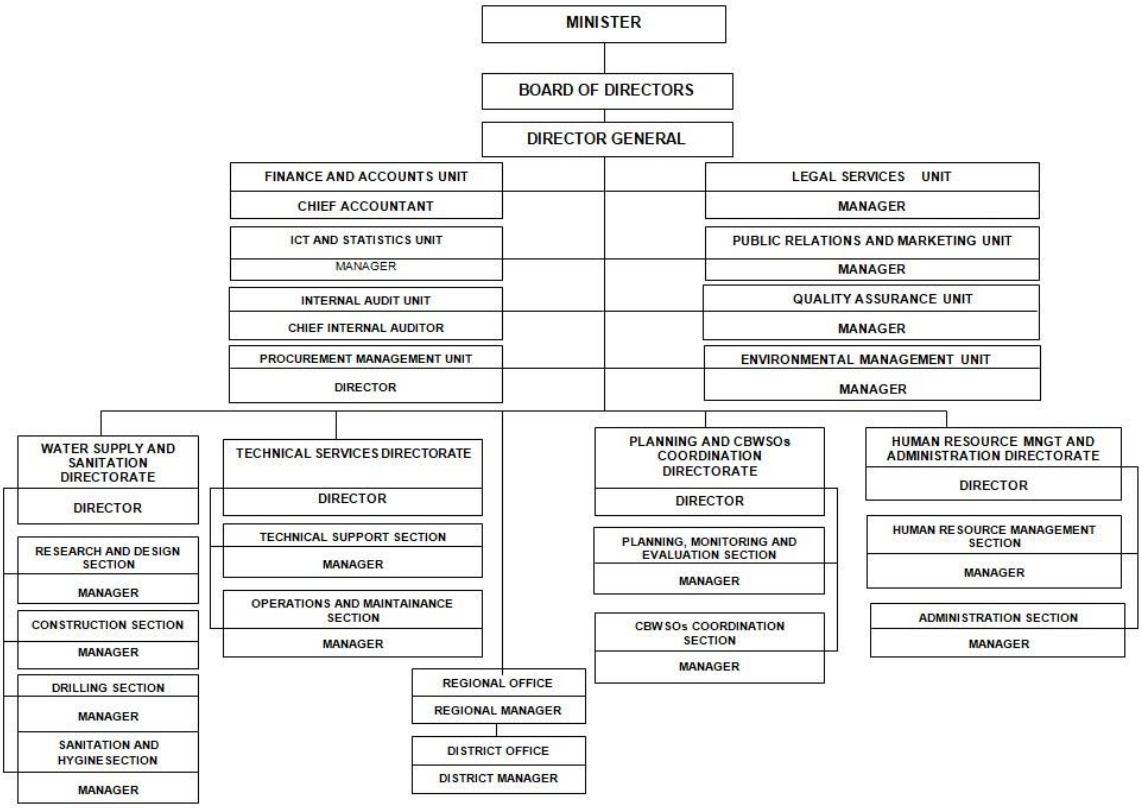


Figure 2 – RUWASA organizational structure (source: official website of RUWASA, https://www.ruwasa.go.tz/ruwasa-sm-Organisational-Structure last accessed on 10/19(2024)

Before the reform, this role was fragmentedly performed by the District offices, each of which had a specific Water Department dedicated to water management issues. Also, each District Water Department depended on the directions of three

different actors with their own agendas namely the Ministry of Water and Irrigation, the Prime Minister Office for Regional Administration and Local Government and the Regional Secretariat. The co-supervision of these three major entities on the Water Department work, created bureaucratic inefficiencies and blurry roles and responsibilities within rural water governance. The creation of RUWASA represent the beginning of a "process of re-centralisation whereby District and Regional Water Engineers, who were operating within the Local Government structure […] start reporting directly to MoW [Ministry of Water] through RUWASA" (Ministry of Water, 2020, p. 20). In this way, the control over the organisation and operation of rural water management from the rural communities back towards the central state institutions that are supposed to provide guidance, support and strategic vision to the single communities.

This brief overview of the history and of the latest reform to the Tanzanian rural water governance has put into perspective the policy and legislative framework in which rural communities carry out their water management and use activities. Village communities have clearly emerged as key actors as they have been asked to directly participate in water supply management under different forms (Water Users Associations, COWSO, CBWSO) over time. As we saw, the evolution of rural water governance in Tanzania has been marked by a transition from colonial administrative structures to a more decentralized framework. In light of the historical development and organization of the water governance, as far as this thesis is concerned, it becomes important to proceed to examine how Tanzanian water policies and legislation have specifically addressed gender issues linked to water access and management. In this sense, Tanzanian water policies and legislation have increasingly risen their attention to gender considerations in water governance and various frameworks have been established to promote gender equity in access to water resources.

3.3 Tackling the water and gender nexus when it comes to water policies

Looking at how the discourse on gender has been tackled within rural water management and how this aspect has been defined at the scale of national water policies and other institutional documents falls back on the need to consider the narratives around the relationship between gender and water at different scales, all contributing in shaping local waterscapes.

As seen in Chapter 1 the water sector is a highly gendered one. This means that focusing on how water access is regulated, experienced and managed at home, school, work and in public spaces is an essential point of entry in addressing - directly and indirectly - gender equality issues (Coles & Wallace, Gender, water and development, 2005). Overall we can see how the approach to gender issues within Tanzanian water policies and programmes has mirrored the way in which it evolved at international level within the main actors of the international water sector – such as World Bank, UK Department for International Development, Global Water Partnership, World Water Forum, and the United Nations – who influence and shape the development approaches implemented in different countries. In this sense, the approach to gender issues refers in Tanzanian water policies reflects a framework that mirrors a predominantly Western conception of gender equity and which are the best strategies to reach it. This perspective, often shaped by a specific white Western feminist discourse, tends to universalize gender issues, overlooking the complex, localized realities of Tanzanian women that would need to take into consideration and engage also with non-western and specifically African feminist perspectives. As a result, the policies may not fully account for the intersectional dimensions of gender, culture, and socio-economic conditions that shape women's experiences with water access and management in rural Tanzania and often relegate them into victimisation discourses that assume the category of "rural third world women" to be a homogeneous, oppressed and in need for empowerment group. As Tina Wallace and Anne Coles show in their introduction to the book "Gender, Water and Development" (2005), the gender approaches within the development of water management policies and guidelines have started with a first approach called WID, which stands for Women in Development, that identified gender with women and that aimed at shifting the focus of development from women as passive recipients of water development to active ones, concentrating on women's economic participation. This approach was soon overcome and criticised for neglecting strategic gender goals, such as women's political emancipation. The subsequent Women and Development (WAD) model therefore, aimed to establish "women only" development projects, emphasizing women's strategic goals and collective organization. (Davies, Arriagada Oyarzún, & Harris, 2023) Finally, the Gender and Development (GAD) framework brought attention to unequal power relations, relational dynamics between genders, and intersectional differences among women. Tensions persist between WAD and GAD models, with debates on whether a specific focus on women leads to gendered conflict or if a broad gender focus overlooks women's specific needs. Gender mainstreaming, seeks to integrate gender considerations into all development aspects for gender equality. However,

critics argue that it tends to depoliticize gender, relying on simplistic notions of inclusion, particularly in the context of water development (Coles & Wallace, 2005). As mentioned above, all these approaches have a common western matrix and in the following part of this paragraph we will see how such approaches resonate in the Tanzanian water policy and legislative framework.

First, this tendency can be traced in how the National Water Policy has changed from its 2002 version to the lastly reviewed draft published in 2023. In fact, in the 2002 NAWAPO, there are several mentions of women playing "a central role in use, management and protection of water resources" (NAWAPO, 2002, p. 15) and that "recognising women as being among the principal actors in the provision of rural water supply services" (NAWAPO, 2002, p. 32) should be one of the principles and prerequisites for a sustainable water access strategy in rural areas. The policy also advocates to adopt a gender sensitivity approach in rural water supply programs and it does so by underlining that "women bear the burden of searching for water and are guardians of the living environment" (NAWAPO, 2002, p. 35-36). However, this pivotal role has seldom been reflected in institutional arrangements for the development and management of rural water supply and sanitation services as emerges from the available literature on the topic (Masanyiwa, Niehof, & Termeer, 2014) (Mandara, Niehof, & van der Horst, 2017). Here the policy refers to the paradox described by Moraes and Rocha (2013) about the mismatch between the recognised importance of women in the use, management and care of water, and their absence when it comes to seat on the decision-making centres concerning the resource. Moreover, defining women as guardians of the environment, recalls an ecofeminist position that recognises a "natural" connection between women and nature (Mies & Shiva, 1993). Such conceptualization has been strongly criticised by third wave and post structural (mainly western) feminists, who contended that ecofeminism put all women into one category by connecting them with nature, reinforcing the very social norms that feminism seeks to subvert (Jackson, 1998). The text then goes on by listing the actions that will be undertaken "in order to improve gender participation in rural water supply programs" (NAWAPO, 2002, p. 36). Here it is interesting to see how the terms "gender" and "women" are used as interchangeable, as if talking about gender should directly and only interest women and women alone, reflecting a WAD approach. Looking at how the policy evolved, the latest version of the National Water Policy published in 2023 shows a perspective change towards a GAD approach. The focus solely on women is significantly scaled back, with only one reference in the text to the number of women employed in water sector institutions (NAWAPO, 2023, p.23). Gender is indicated as a cross-cutting issue and the policy aims at "promoting

equity, equality and empowerment of women, men and vulnerable groups" (p.23), it is indicated as playing "a pivotal role in the management and development od water resources as well as water supply and sanitation services" (p.42). The 2023 policy contains explicit references to the adoption of a gender mainstreaming approach in the water sector aimed at "ensuring equity and equality in managing water resources and services related to access to clean and safe water and adequate sanitation services" (p.23), and there is also a reference to the preparation of a specific gender strategy by the Ministry of Water to be implemented. As said above, this 2023 version of the NAWAPO contains a shift towards a GAD approach in which there is no specific focus on women and the conceptualization of gender is inclusive of the society as a whole. A similar evolution can be seen in the three phases of the most relevant program of the Tanzanian water sector, namely the Water Sector Development Program (WSDP)[18].

The First phase of the Programme (WSDP I), published in 2006, contains a direct reference to the existence of a "natural bias for schemes to favour the more powerful and better off at the expense of the poor. Women and marginal groups are being left out of the decision-making process" (WSDP I, p.1-6), recalling the 2002 NAWAPO in underlining the need to address gender equity by "ensuring the effective and active participation of both women and men in the provision of RWSS [Rural Water Supply and Sanitation]. The active participation of women will be promoted" (p.3-5). Women are not defined as guardians of the living environment like in the NAWAPO, but they are referenced as "drawers of water" (p.10-13), underlining their physical role in water access dynamics. Among the list of benefits of implementing the WSDP, it states that "improved water supplies will, in particular, benefit girls and women who bear the brunt of collecting water. It is likely that some of the saved time and energy will be released for increased education of girls who would otherwise have been kept from school for the purpose of collecting the family's water" (p.10-9). Overall, the WSDP I shows a transition form a WAD approach towards a GAD one: in writing about gender, the text always uses variants of the expression "both men and women" and at times it also enriches it referencing "marginalized groups".

The next phase of the Water Sector Development Programme, namely the WSDP II published in 2014, shows a lower attention to gender-related issues within the water sector but it mentions again that "women play a central part in the provision, management, and safeguarding of water" (WSDP, II, p.4) and recognizes

[18] In the text this document is indicated as WSDP I while in the bibliography you can find this document indicated as (United Republic of Tanzania, 2006, Water Sector Development Program I). This choice was made to make the text cleared and more reader-friendly.

that "the lack or inadequate provision of WASH facilities (…) downgrades dignity and above all is oppressive to women and elderly" (p.18). It also references gender mainstreaming but only about climate change measures regarding water.

Tuning now to the third and most recent phase of the water program, WSDP III published in 2022, the shift to a GAD approach is more evident as gender mainstreaming in the water sector is described as "imperative and necessary in ensuring gender empowerment and equity for managing water resources and access to clean and safe water and sanitation services" at all levels. Like the 2023 NAWAPO, gender issues are indicated as cross-cutting issues to be addressed from multiple perspectives, including the conduct of gender impact studies and assessments, sensitizing and advocating gender equity among the different stakeholders, preparing a specific water sector gender strategy, and facilitating women participation in decision-making.

Looking at how this shift from WAD to GAD has been translated into the rural water sector's legislative framework including the operative guidelines, the abovementioned 2019 Water Supply and Sanitation Act states that at the higher administrative level of the RUWASA Board, a gender quota shall be adopted. Specifically, it is stated that a third of the board members should be women. Looking at how this gender perspective was applied at the local scale – namely the village community level - the gender quota mechanism was extended in the CBWSOs. In the "Capacity Building Guide for Water Service Providers at Community Level in Tanzania", there is a vignette (Figure 2) whose description (translated into English from Swahili) reads: "Community meeting discussing development issues: Do you see women?" (RUWASA and Ministry of Water, 2022, p. 22).



Figure 3 - "Community meeting discussing development issues: Do you see women?"

The vignette visually shows the requirement stated in the guidelines according to which women should have equal representation on the Water Committee, and that at least one-third of the elected CBWSO's members should be women. Moreover, the guidelines also prescribe that among the different figures elected in the CBWSOs, there must be one Representative of women[19].

Gender quota seems to be the preferred tool to implement the principles and objectives contained in national policies and development programmes, even though it has been proven that making sure that women are physically present in the spaces and institutions where decisions are made is not enough to achieve their

[19] The requirements for being chosen as Women's Representative are, translated from the guidelines on the creation of CBWSO (RUWASA and Ministry of Water, 2022, p. 55):

- Be a resident of the relevant area.
- Be able to read and write.
- Be honest and fair.
- Be confident and have good relations with the community.
- Be willing to volunteer and participate in social issues.
- Be able to present the opinions and priorities of the relevant group - women and water users (domestic use, breeders, farmers, traders and institutions).
- Be a woman

active participation into the process (Mandara, Niehof, & van der Horst, 2017; Masanyiwa, Niehof, & Termeer, 2014). The choice of quota as the only tool to be implemented to tackle gender inequality within the water sector looks too weak to have an effective impact on granting balanced participation of both men and women within the water governance, and also it does not seem to reflect the more comprehensive GAD approach that has been gradually adopted within the policies, laws, and strategies. It also shows the types of gendered subjectivities that the institutional framework aims to promote: By being defined as "guardians of the living environment" to "drawers of water" and more generally by recognising several times that women play a central role in water-related issues, the institutional policies and laws seem to indicate that women's life in rural areas seems to be highly defined by their relationship with this resource. In light of this aspect, it seems there is a disconnection between this vision that stresses and highlights these roles that women have in connection to water as something not only to be recognised but also enhanced and a western vision that tends to universalise women's experiences, needs, desires and perspectives towards an idea of equality that mirrors western feminisms. As Sylvia Tamale states in her edited book "Decolonization and Afro-feminism"(2020), most western feminists still "viewed African women through the essentialist prisms of victimization and/or objectification of the exotic "Other" " (Tamale, 2020, p. 48). As we have seen in Chapter 1 for the field of political ecology, there is a rich African feminist tradition that has produced a strong "feminist epistemology and a form of rhetoric that has provided arguments, which validate the experience of women of Africa and of African origin against a mainstream feminist discourse. It is a justice that aims to create a discernible difference between women who were colonised and those who were deemed the colonisers, and a social movement that aims to raise a global consciousness which sympathises with African women's histories, present realities and future expectation" (Goredema, 2010, p. 34). So, if we analyse water management policies and legislation connected to gender issues through the lens provided by African feminist epistemologies, the expressions seen above that are included in the National Water policy such as "guardians of the living environment" and as "drawers of water" assume different meanings and value.

The next section of this Chapter 3 - dedicated to the presentation of the Tanzanian context in which the research has been conducted - aims at putting together the insights of the elements that emerged in the transect walk and in the photo elicitation activities. The waterscapes of the two villages of Chamkoroma and Pandambili result in an intricate network of relationships that link water to bodies,

infrastructures, objects, spiritual elements, cultural norms, and everyday activities of the communities.

Section II - Chamkoroma and Pandambili: where water, policies, communities and people meet

This second Section of Chapter 3 presents the specific characteristics of Pandambili and Chamkoroma focusing on the scale of the communities involved in the research by reconstructing local waterscapes. This Section aims at making the perspective of studying the hydrosocial spatialities of a place as a waterscape emerge. In this sense, recalling the definition of waterscape discussed in Chapter 1, it can be defined as

> "a material space produced through long-term processes involving water and society and generally linked to broader socio-political and economic dynamics, and through the everyday practices of different groups of stakeholders. Although a waterscape is an outcome of processes and practices, it is also constantly (re)produced and undergoing changes". (Flaminio, Rouillé-Kielo, & Le Visage, 2022, p. 50)

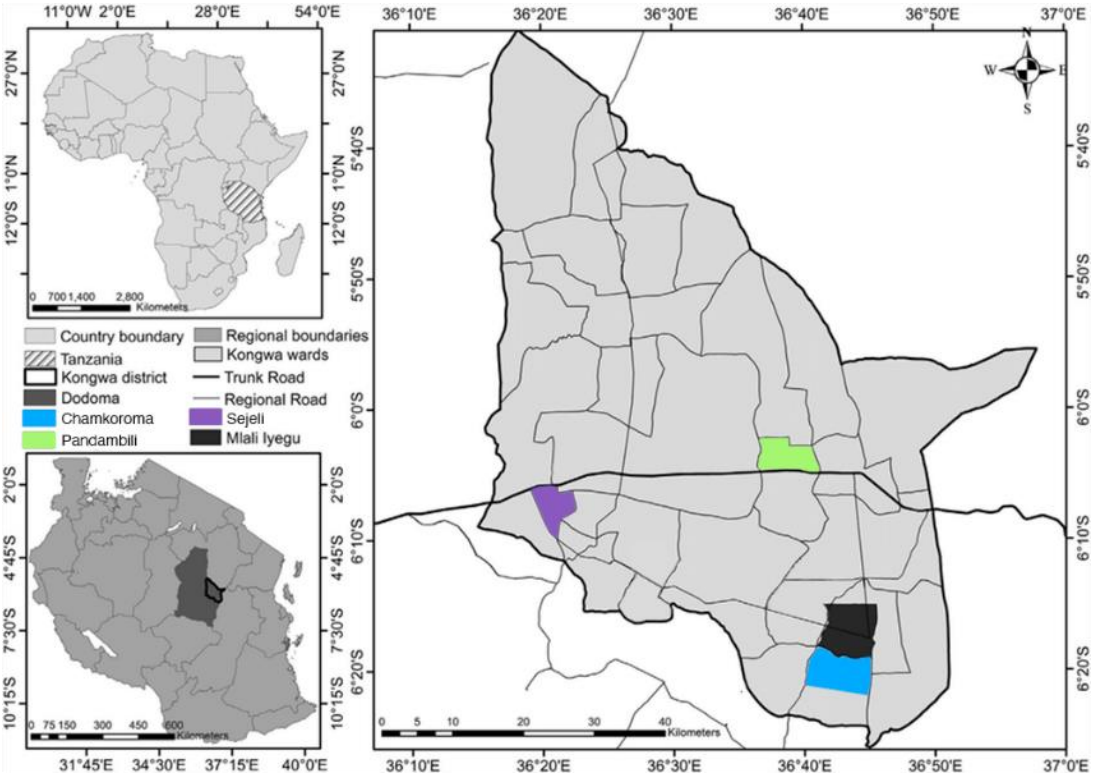
The information contained in this Section was built through the process that unfolded throughout the ethnographic work, started with the understanding of what actually happens in the villages when it comes to water issues. This meant talking to the water users, the CBWSO members the women waiting in line to fetch water at the public taps, to observe what happens at the water sources, at the public and private taps, inside the households, at the village meetings, to conduct transect walks with different community members around the village to see water access places, to listen to the everyday experiences of the ones that have to ensure access clean and safe for themselves and their families together with their own business and income generator activities. This Section draws mainly from the rounds of transect walks conducted in the two villages to present the main dynamics shaping the waterscapes of the two villages of Pandambili and Chamkoroma, interviews

with community members, plus data from the 2022 Census carried out in Tanzania. These pages have the aim to present specific environmental, social, economic and political aspects of the two communities that represent the framework within which community members experience their relationship with water. This section is instrumental in paving the way for the next Chapter, in which the specific intersections that emerge in the two waterscapes will be discussed and therefore contribute in answering the research questions. The discussion will draw from this Chapter, using the specific characteristics of the villages' waterscapes as entry point to identify how they connect to each other and to into forming what Sultana (2020) defines as "embodied intersections of sociospatial differences […] and materialities (of water and water infrastructure)". As shown and argued in the previous chapters, such embodied intersections emerge to be strongly influenced by the gender dynamics that characterise water access, use and management in Tanzania and this happens in both expected and unexpected ways.

3.4 Pandambili and Chamkoroma

The two communities of Pandambili and Chamkoroma, were selected as case studies because they offer two unique points of entry in studying the geography of the gender-water nexus in Tanzania rural areas. First, as shown in Map 2 below, the two villages belong to the same District of Kongwa, located in Dodoma region, therefore they carry out their water-related activities in the same institutional framework as they both refer to the Rural Water Supply and Sanitation Agency (RUWASA) office located in Kongwa town. As we have seen in paragraph 3.2, RUWASA is the latest administrative creation that aims at monitoring and guiding the implementation of the 2019 Water Supply and Sanitation Act in rural areas of the country and therefore ensure that every village forms a Community Based Water Supply Organization (CBWSO) in line with the guidelines released by the Ministry of Water. With these conditions related to the District governance environment being equal, the two villages were then chosen for their inherent differences in terms of type of water access (groundwater or surface springs), type of managing entity (CBWSO or traditional water commission) with a different reputation in water management ability according to the RUWASA, and environmental and economic profiles. This was done to investigate how different environmental conditions intersect with the specific experiences related to water access and use in the everyday lives of the communities, specifically in terms of gendered norms and roles. This approach, which is not comparative but rather cumulative, not only enriches the qualitative data collected but is also related to the intention not to consider these two waterscapes as independent and isolated from the administrative and environmental context in which they are located. In this

sense, the movement of water flowing in and between the two villages, along with the presence or absence of the same resource allow to understand the connectedness of the two waterscapes both to each other and to the broader hydrosocial cycle connecting all waters. The choice of working in these two villages allowed the research to focus on context-specific elements linked to community members' personal experiences of the ways in which local dynamics are connected to and shaped by multi-scalar aspects of the waterscapes.



Map 2 - Location of the two villages of Chamkoroma (blue) and Pandambili (green). The other two villages indicated in black (Mlali Iyegu) and purple (Sejeli) were two of the other village candidates for the study. The map is an elaboration of the author.

According to the last 2022 Census, Pandambili has a population of 13079 and the main tribal groups that compose its population are Wakaguru, Wabena and Wagogo. Chamkoroma counts a bigger population of 18990 and has similar tribal composition. Rural villages have an administrative structure composed by a Village Assembly, which is the main decision-making institution in the village and is composed by all the residents over the age of 18 and it convenes on a quarterly basis. The Village Assemble is responsible for electing and dissolve it in case of poor performance or other issues the executive body of the village, namely the

Village Council. This entity comprises 25 members (of which at least 8 must be women) and it nominates Village committees that mange different aspects of the community life such as education, social welfare, land use and planning, health, etc. (The Local Government (District Authorities)Act, 1982) .
The villages' government is co-led by an elected Village Chairman and a government appointed Village Executive Officer. Both villages composed in further sub-villages and hamlets with their own leader. Pandambili is composed of three subvillages, Pandambili A (composed by the hamlets of Mnadani, Majengo, Nehmbo), Pandambili B (divided in the hamlets of Mapocho, Mission, Ikulu), and Pandambili C (that includes only one hamlet called Silwa) each of which has its own local leader. Chamkoroma on the other hand, counts a population of 18990 and it is divided into three hamlets (Kitovuni, Shuleni and Mhongwa) each of which has its own leader.

Even though Chamkoroma and Pandambili are only a few kilometres apart (less than 30 km), reaching the two communities meant having two very different experiences. The village of Chamkoroma lies at 1100m above sea level in a valley in the middle of three mountain ranges (Kibodian, Mlima Mlali, and Ilundi) located at the south-eastern border of the District of Kongwa and that belong to the Ukaguru Mountains. The public transportation linking the village with the rest of the territory is very sparse: the small bus that runs through the village has no fixed timetable, which in order to find out you have to call the driver who runs the route and ask what time it will pass by. The village is surrounded by mountains rising on either side of it and the roads are populated by carts filled with sugarcane ready to be transported to be sold either in neighbouring villages or along the road. Such a lush view is due to the fact that the village benefits from the several water sources streaming down from the surrounding mountains and by the presence of a river that crosses the village. Looking at the climatic and geographical conditions, Chamkoroma differs significantly from the majority of the other villages of the District, which are mostly located on the flat, hot, and dry central Tanzanian plateau, such as Pandambil. As mentioned above, this community is located around 30 km north of Chamkoroma and it lies along one of the roads that has become one of the busiest roads in the region that connects the city of Morogoro (Morogoro region) to the capital city Dodoma, and getting there by bus or car is easy.

Subsistence agriculture is the main economic activity in both villages together with livestock keeping. Rain-fed fields of sunflower, cashew, and ground-nuts are the main cultivated cash crops. As far as the produced food crops is concerned, the production includes sorghum, millet, maize, and cassava. However as far as agriculture is concerned, there are some differences between the two due to the diverse environmental profiles of the two villages. While Pandambili's flat landscape, once covered by woodlands (Allen, 1985), is now cultivated in its

entirety crops with a rain-fed system[20] with small number of manually irrigated gardens, Chamkoroma has also an all-year round production of sugarcane and horticulture crops irrigated through a system of traditional canals.
Despite these differences, both villages are characterised by a growing local economy that is attracting internal seasonal migrant workers and therefore increasing the anthropic pressure on the local environment: Pandambili is attracting interest and investments in the agricultural sector (especially for the sunflower production), Chamkoroma because of its new mining sites of semi-precious stones. As for climatic events, both villages, face significant environmental challenges primarily driven by climate change but also by intense economic activities such as mining and farming. On the one hand, they frequently experience extreme weather patterns, such as floods and droughts, which disrupt agricultural activities and threaten local livelihoods. On the other hand, deforestation linked to mining and agricultural activities in Chamkoroma has exacerbated these issues, as the loss of trees reduces the land's ability to retain water, intensifying the impacts of both flooding and drought.

The next paragraphs present the specific characteristics of the villages' waterscapes, encompassing the type of water infrastructure, the water management system, the available water sources. All these elements frame the way in which the village residents access to water in different ways that keep together conceptualizations of water as a common good to care for as a community, as an economic good to be bought and sold, as a spiritual resource with intrinsic value, and as a political resource that gives power to the one who manages and control it. For every village the main local water features are presented and this includes information about the history and condition of the water infrastructures, the type of water sources, presence of irrigation activities, and the way in which community water management operates and cultural practices linked to water.

3.4.1 Accessing water: infrastructures and practices beyond the network

3.4.1.1 The water infrastructure in Pandambili

The day in which me and Christina Mvungi, interpreter and field collaborator, arrived, the village had been without water for seven days: There was a problem with one of the electric pumps that extract groundwater for the village, and the

[20] However, because the cost of the land is lower than the neighbouring bigger villages like Kibaigwa and Gairo, this is attracting external investors (from Dar es Salaam and other regions) in the agricultural business, who are willing to invest in irrigation systems that currently are not present in the village.

community was waiting for the technician to come from the RUWASA's office in Kongwa and fix it.



Photo 7 - The oldest of the two public water pumps in Pandambili.



Photo 8 - The most recent electric water pump in Pandambili.

The broken pump is one of the two serving the villages. Both the pumps and tanks are located in Pandambili A, making Pandambili B and C more vulnerable in case of water shortage as the water is not enough to reach the taps placed farther from the sources. Especially during the dry season, to access clean and safe water the community depends almost exclusively on water that two water pumps extract from underground and distribute to the population through a water network consisting of metal pipes bringing water to private and public taps. The older of the two pumps (Photo 7) was built by an Italian missionary priest who founded a centre for disabled children in the village of Mlali, located 20 km south and had come to Pandambili in search of fertile land to grow food for the centre's children. Instead of paying rent for the land, he proposed to the village that he builds a well at his own expense to irrigate his field with the promise that once built, he would make the well available for use by the local community. The Pandambili community agreed the water pump was built between the 80s and 90s, and to this day it is still in operation. The second, more recent, water pump (Photo 8) was built with World Bank funds - probably linked to the P047762 project[21] - around 2005. There is a

[21] I was not able to retrieve any official documents from the village and district offices about the details of the project but crossing the information retrieved from the interviews with villagers,

third smaller water pump active in the village, which is privately owned and operated, but is not connected to the public water scheme.

This water scheme is composed of both public and private taps and there are 21 public and 129 private ones. Fetching water from the first ones costs 50 TZS per 20 litres and the money is collected by a tap attendant, who is a person living close by the tap and that has the task of distributing the water and collecting the money from water users. In theory, the tap attendant's role is to open the tap at 6.00 a.m. and close it at 6.00 p.m. In reality, it often happens that people go to the taps in the evening as they cannot go at the scheduled times. In some of the taps, the person in charge takes the tap switch home in order to avoid water stealing, and in others s/he shuts off the water upstream where the water meter is. The meter is used to set the monthly water bill that is paid with money collected from the tap attendant: The attendants are very precise and careful in distributing water and making sure that there is no waste and this is mainly because if some money is missing, the tap attendant is supposed to cover it with their own funds. The tap attendant tasks are shared with their family members and most of them are women as they are the ones that are usually at home and also they are considered more trustworthy than men. Over time, attendants have put in place creative ways to run this service (for which they are not paid): some wrote their phone number on the tap so that s/he doesn't have to be physically at the tap 24/7 but if someone needs water the users can call her/him. Others have built little huts that protect them from sun and rain when distributing water to other residents. According to the Pandambili CBWSO members, this is because women are believed to be less likely to run away with the water bill money as most of them are long-standing members of the community who have their families, children, land and income generator activities that make them well-rooted in the village and therefore more reliable. This preference for giving financial roles to women to handle the community revenues is also reflected in the CBWSO choice of members for the Community Water Management Committee (the executive organ of the CBWSO). At the time of fieldwork the positions of accountant, secretary and technician were all held by one single man because the CBWO could not find in the village anyone with the right educational certificates that was willing to take the positions. In particular, they underlined that finding a woman with accountant skills was also very hard as many people after getting diplomas leave the village to move to urban areas where they feel they have

water managers, elders and RUWASA officers with the data available in the World Bank database, I was able to trace the construction of the scheme back to the WB PO47762 project, whose budget was of 26 million USD dollars (XDR 20.2M) and it lasted from 2002 to 2008. The project's objective was to ensure access to clean water and sanitation services in communities in rural Tanzania.

more opportunities. However, these claims were somehow clashing with the internal gender dynamics of the CBWSO in which, as we will see in the paragraph dedicated to the functioning of the water management entity, the only woman that is part of the entity, who holds the position of Representative of women, does not have any substantial role in the decision-making processes. This to show the way in which gender norms affect water management practices is complex and at times contradictory. Women are trustworthy with money, but they should operate only at the lowest level, leaving the decision making processes within the CBWSO to men.

The population of Pandambili is booming and the village is quickly expanding mostly towards the southern part of the village, where a new hospital is under construction. This trend is inevitably shaping water availability, uses, and practices: On one hand, the number of people having to rely on unsafe water sources is increasing, on the other, the number of constructed taps (especially for private use) is increasing. If a community member wants to build its own private tap, they have to prepare and submit a written request to the CBWSO, pay 100.000 shillings (which includes the technician's salary for construction and installation) and once the construction is approved, they will be allowed to sell the water at the same price as the public tap. Private taps owners pay a monthly bill according to the meters reading done by the same person that collects the water bills from the public taps, who is either one of the two members of the CBWSO or an external collaborator. Apart from advantages related to the reduction of time and distance from the taps, the possibility of having a private tap, usually located in the house courtyard as there is no sewage system, has opened new opportunities for some families like having small house gardens or fish farming (there are five families in Pandambili who have tanks in their backyards for this activity that contributes to household income). However, the construction of more and more private connections is creating structural issues: building increasing private taps without increasing the number of water pumps is causing water pressure problems as there is not enough water to reach all the taps equally

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3.4.1.2 Pandambili's alternative water sources

The public water infrastructure extracting groundwater is not the only water source used by the villagers. Most households differentiate their water access habits by using four different sources based on different uses. This happens for several reasons: first, because the piped groundwater is saline and therefore not suitable for all uses, second, because not everyone in the community can pay for water or is willing to (Kaliba, Norman, & Chang, 2003). The saline nature of Dodoma region's groundwater has been recorded by several studies (Elisante & Muzuka, 2017;

Shemsanga, et al., 2017) and this characteristic makes this water unsuitable for cooking certain types of food that are at the base of local nutrition such as *ugali* (a corn meal made from maize) and beans, washing clothes and -according to some people – this water is also not suitable for drinking. The alternative water sources normally used are rainwater (often collected with pipes and tanks integrated into the houses), private manually dug boreholes (an example is shown in photo 12), and seasonal dams (in the Pandambili area there are two and they are rainwater surface pools that are created every year and - depending on the intensity of water withdrawal by the population and the duration of the rain season - can last between three and five months. One is portrayed in photo 11).



Photo 9 - Seasonal water dam in Pamdambili.



Photo 10 - Hand dug well in Pandambili

The quality and safety of these informal sources are of course lower than the piped one and the consumption of these waters represent the main cause of dysentery, cholera and other water-borne diseases. In 2015 a delegation of the Ministry of Water conducted a study on the groundwater resources in Pandambili and found out that some of the manually dug wells were contaminated with health hazardous elements and therefore dangerous for human consumption. They closed the contaminated well with cement but then they did not test other existing informal wells used by the population to check the water quality. As far as water dams are concerned, the risk is also heightened by the fact that they are used also to water cattle, and by other wild animals. Alongside these alternative water sources, several families in Pandambili purchase water coming from villages such as Chamkoroma or Sagara, which is transported by private water vendors. The presence of this water market will be presented in the next paragraphs dedicated to the village of

Chamkoroma because it is one of the villages (rich in water) from which the water market originates.

3.4.1.3 Irrigation in Pandambili

In terms of the use of water for agriculture, Pandambili does not have large-scale irrigation systems. At the time of fieldwork, the only irrigation activities carried out by residents concern small private gardens and the rest of the production relies on rainwater.



Photo 11 - Agricultural activities in Pandambili: the picture shows a hand-dug well next to a private garden growing vegetables.

Photo 9 shows on the left a private small garden, irrigated with the water extracted manually from the shallow well that is portrayed in the centre of the photo. The bicycle belongs to the family that owns and cares for the garden: everyday when they finish to irrigate their crops, they fill the yellow jerrycan with the water left in the shallow well and bring it home for domestic uses. As mentioned above, the use of unimproved and unsafe water sources such as this shallow well is very

common among the residents. In the background right of the photo, there is a rain-fed sunflower field. The owners were waiting for the end of the dry season to plow the land and plant the new seeds.



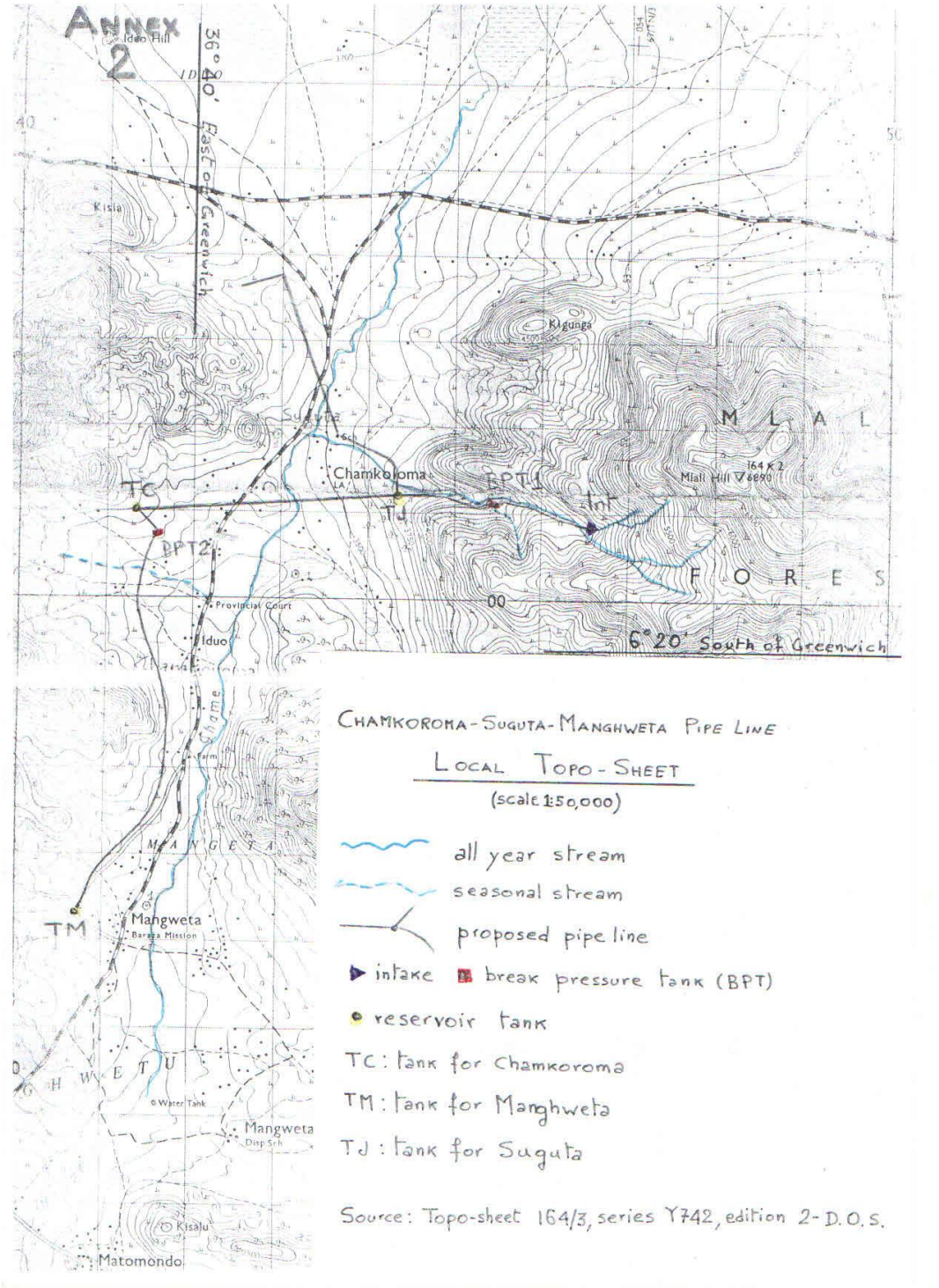
Photo 12 - An attempt to build a water tank for irrigation in Pandambili.

For some local farmers, the absence of irrigation systems is not due to a lack of trying to build one: Photo 10 shows an attempt to construct a water accumulation tank from a group of landowners. They explained that they had tried to fill a newly constructed water tank via a PVC pipe connected to a gasoline-powered water pump that extracted water from a well they had dug manually. The water would then be used to water the crop field with the help of another plastic tube instead of having to manually fetch water with buckets from the well and then irrigate the field manually. However, when they filled the tank with water, the pressure was too high and the structure collapsed. As briefly mentioned above, this situation in which the land is fertile but there are no large water irrigation systems is attracting investors. During fieldwork, one day having breakfast, we met a man from Dar Es Salaam who told us that he recently bought 50 hectares of land in Pandambili and planted maize. He was satisfied with the result but he was looking for ways of cultivating

beans and soy and of setting up an irrigation system. He stated: "People here are behind. They could gain much more by cultivating the same crop on a large scale. But they don't. They are behind" and he showed us YouTube videos on how to cultivate beans that he is using to learn more about this possibility. After a few days, a group of Italian and Swiss managers that have been investing in the local sunflower oil production arrived to visit the little sunflower production facility owned by a member of the village to discuss possible business collaborations. When they arrived in the village, the owner of the sunflower business came to the small house and invited me to meet the other Italian *wazungu* who had arrived. They explained to me that they were exploring the area to find local partners to expand their international sunflower trade activities. When they understood my research was about local water issues, they gave me their business cards and asked me to keep in touch as they were very much interested in investing in local irrigation systems linked to sunflower production. I tried to explain that I was not an agronomist nor an engineer, but they did not really care and after a few minutes they jumped on their pickups and left. There is no space here to reflect on the possible implications (both positive and negative) that the national and international interests in potential local agricultural investments represented by these two encounters, could have for the community water access. However, the fact that these interests exist and can be actualised over time underscores how delicate it is to manage water in a context such as Pandambili that is not only characterised by a water scarcity condition of economic nature but also of a physical one. Directing the scarce water resources available for extensive agricultural use conceals possible water supply problems for residents as has been documented in several other cases, especially in the Global South (van Eeden, A.; Mehta, L. and van Koppen, B. 2016.). These trans-scalar dynamics and linked to market-related development ideas reveal even more how water issues are inherently complex. They cross-cuttingly affect different sectors and areas of human societies (agriculture, water access rights, economic development, etc.) and thus require special attention and care when intervening to alter them.

3.4.1.4 Chamkoroma water infrastructure

With water sources available year-round, the village does not suffer from water shortages during the dry season months (usually spanning from April to November).



Map 3 - Map of the plans for constructing the water infrastructure for the communities of Chamkoroma, Suguta and Manghweta retreived by LVIA Archives.

Chamkoroma's water infrastructure has a history of connection with international cooperation and aid projects similar to the Pandambili's one, as it was built by the NGO Lay Volunteers International Association (LVIA) in 1997. As we can see in Map 3 (retrieved in LVIA's archives), the water project brought water to three different villages namely Chamkoroma, Suguta, and Mang'weta and it drew water from one of the mountain sources around the village.

Instead of relying on water pumps extracting groundwater, Chamkoroma's water infrastructure is a "gravity scheme", meaning that it takes advantage of the slope of the mountainous terrain over which the water flows from a water intake that channels it into pipes (metallic and made of PVC) that carry it to accumulation tanks and then to public and private taps. As mentioned above, the village is divided into three sub-villages - Kitovuni, Shuleni and Mhongwa - each of which has its own sub-village leader. Kitovuni is the more central and densely inhabited sub-village and it is where the office of the village leaders is located, where the weekly market takes place (every Wednesday), and the one served by more public water points. In fact, Kitovuni has 5 water taps from the oldest scheme, plus 2 more that were built more recently, against the 3 taps of Shuleni and the zero taps serving Mhongwa. Kitovuni also counts the highest number of private water connections that reach the houses' courtyards (there is no sewage system). Apart from the public taps, in Kitovuni and Shuleni there are also around 12 private ones that people have been constructing over the years. Having a private one entails the payment to the Water Committee of a bill of 10 000 shillings per month. Often, people who build their own tap also allow others to use it for free. The procedure of getting a private tap entails the applicant sending a request to the water committee and pay them to hold a meeting in which her/his application is discussed. The procedure is slightly different if the person advancing the request is someone who was born in the village or someone that moved from somewhere else. Specifically, the requirements to get a tap for a person born here include being an active member of the village, being able to pay the monthly fee of 10000 shillings, and having a good reputation. For an outsider (meaning someone who was not born in Chamkoroma), all the previous conditions are in place plus it is required to concretely show support to the community by for example by donating money for the construction of a new public building (school, hospital, etc.). In addition to this, the water committee sends a technician to the house of the applicant to verify technical feasibility.

3.4.1.5 Irrigation canals in Chamkoroma

In terms of water access and water irrigation, in Chamkoroma the sub-village of Mhongwa represents an interesting exception. Even if it is located closer to the mountains and therefore closer to some of the water sources, Mhongwa residents have no access to improved water sources. The sub-village system of irrigation canals not only provides water to irrigate the fields, but also represents the main water source for domestic use. Even though the water at the spring is clean, on its way to the houses it can be easily polluted and contaminated by both human activities and animals as it passes through several farms. In order to have clean water, people in Mhongwa have to fetch it really early in the morning, before farming and other activities that can contaminate the water take place. However, this practice is not enough to protect the population from health issues linked to the consumption of contaminated water as people report suffering from dysentery and other water-borne diseases. The maintenance of the irrigation canals is carried out by the whole Mhongwa community. If someone of the farmers, for any reasons, does not contribute to such maintenance, he or she will have to pay a variable amount of money to the community to compensate. However, there are no fixed compensation rates nor fixed rules in this sense: in describing this system, people looked taken aback by my questions and struggled to give specific answers because they told me that every situation is different and that there are different ways to make sure that every member of the community contributes equally to the management of the commons. The main maintenance of the canals is done once a year to repair the damages done by the rains that every year shape the soil in different ways depending on the intensity and the duration of the rains. The farmers face these changes by modifying year by year the direction, shape and size of canals, adapting them to the changing environment.



Photo 13 - Irrigation canal flowing next to the river in Chamkoroma.

Throughout the year, minor adjustments and maintenance is carried out by the single farmers, who are responsible for keeping the water flow steady. After maintenance, the farmers agree on a timetable for water use. In 2021, the timetable was arranged so that in the morning water flows in one of the two main channels coming from the spring and in the afternoon it flows in the other. The timetable then is divided on hourly quota among the farmers. The system works but since the canals are also the water source for drinking, washing, cooking, etc. the part of the village that uses the second canal finds itself having to travel every morning to the first canal to get clean water. Mhongwa is not the only part of Chamkoroma to use irrigation canals. Kitovuni also has its own system that draws water from the river flowing in the middle of the village and that separates Kitovuni and Shuleni from Mhongwa (Photo 14). However, these canals are used and owned by the 21 farmers who own the land along the river. Thanks to the availability of water, different crops are cultivated such as onions, cabbages, tomatoes, and different types of greens that are used mainly for internal consumption in the village and sold during the weekly Wednesday market. The 21 farmers, both men and women, take turns in watering their crops and, similarly to what happens in Mhongwa, collaborate for the maintenance of the canals.

3.4.2 Village water management

3.4.2.1 Pandambili: the best performing CBWSO

Currently, Pandambili A,B, and C have a CBWSO and according to the RUWASA staff, it is one of the better performing in the District. In December 2019, the village began the process to establish the CBWSO according to the latest national water management regulations. Before the CBWSO, there was a traditional village water commission called "Chombo cha watumia Maji" (CCM) that managed both water schemes: the one built by the Italian missionary priest and the one by the WB. This CCM was not functioning well and soon the funds collected in the previous years and used for maintenance and expansion of the water scheme disappeared, being embezzled by the committee members. In fact, during the CCM period, only 4 million remained after 4 years instead of the 14 million previously collected. In 2019, RUWASA proposed to the communities to update water management by adapting it to national regulations by establishing a CBWSO. However, initially, the community was against it. The resistance to the new system came not only from the CCM members, who wanted to maintain the status quo and that with the new CBWSO system, they would lose access to the funds collected from users but also from the rest of the residents who did not know whether to trust the new system that was perceived as forcefully imposed by the institutions. At this point, RUWASA sent some of its officers to Pandambili, who told the community that they had no choice and were legally obligated to adopt the new system. The initial reticence of the residents in setting up a CBWSO was overcome only when, at the end of the first month of operation, the CBWSO raised 3 million shillings proving that it had the potential to raise the necessary funds to manage the water and that how the CBWSO operated were trustworthy. According to RUWASA's staff, since the beginning Pandambili was an exceptionally well working CBWSO with very good performance. What I soon realised is that the way in which Pandambili was presented as the best performing in the district was strictly linked to its ability to have good revenues from the management of the scheme rather than achieving an actual improvement in water provision. However, while revenue generation is surely a key aspect, the other factors (for example service quality, equity and affordability, maintenance skills, community satisfaction, or the impact of water quality on public health) that should contribute to accurately assess the work of the CBWSO were not really considered. Such an approach unveils a certain managerial, and technical way of conceptualising water and its management by RUWASA that characterises its modes of intervention and that I have traced in the

interviews with its staff members and that clashed with the complex dynamics linked to water that emerged throughout the research.

With respect to the other aspects of water management mentioned above, there are mechanisms aimed at making the CBWSO of Pandambili accountable to the community regarding water service. The entity must give an account of its actions to the village assembly. This body represents the highest authority for all general policy decisions concerning the village and is composed of citizens over 18 years of age who are permanent residents of the village. The assembly meets on a quarterly basis, and at these meetings, the CBWSO presents the status of the water scheme to the residents and what it intends to do to manage it as best as possible. However, in investigating how the CBWSO works on a day-to-day basis, interviews with members of the organisation's operational arm, the Community Water Management Team (CWMT), revealed internal fragilities that clash with the CBWSO's label as the best performing CBWSO in the district. As for the aspect regarding the ensuring of equal access to good water quality, despite the presence of several people especially the elderly but also people with disabilities who do not have a fixed income, the CBWSO has not established any system that takes these differences into account. Thus, the water access of the most fragile people depends on the help of neighbours, family members or friends who give them a few buckets of water that they buy or more often collect for free from unsafe alternative sources. This means that the most fragile people are more likely to be exposed to unsafe water and therefore to potential diseases linked to the use and consumption of such water. On the same topic of ensuring fair accessibility to good quality water, even though the members recognise the fact that people cannot use salty groundwater for all their needs, the CBWSO has not yet addressed this issue. Accessing non-salty water remains connected to individual initiative, ability, and possibilities.

Another issue connected to the CBWSO operational activities, is the fact that one person alone holds the three positions of secretary, technician and accountant of the CBWSO. According to the interviews with the CBWSO members, this is due to several reasons; First, the organisation could not find people with the profile and training required by the Water Supply and Sanitation Act of 2019 (presented in Section I above). What is more, the CBWSO would not have the funds to hire and then pay other people than the man who holds the three positions. In addition, the CBWSO finds that having one person fill all these roles lowers the level of conflict within the CBWSO. Moreover, the two members that hold the positions of chairperson on the one hand, and secretary, accountant, and technician on the other, are both men who have been in charge of water issues for years, even before the

establishment of the CBWSO. Even though the organisation should by law ensure a balanced composition in terms of competencies and gender, Pandambili CBWSO seems to struggle to implement such balance. The only woman who is part of the CBWSO is B. the Representative of Women. In one of the interviews held with her, I asked if she could explain in her own words what her role of a women's representative entails. After pondering the question she said, "I don't really know what it means." She says that she attends meetings and collaborates with her colleagues. She said that "if there's a problem with water taps they [community members] call me to ask why the water isn't coming out. Then, I call the secretary who instructs me what to say and so I call back as I have an answer to give to them". Her answer is only partially surprising because even if, as presented in the previous chapter, the role she holds in the CBWSO was precisely designed by the 2019 reform of community water governance as a way to make sure that the requests, proposals, needs and ideas of the women are taken into account, there are several accounts of these gender quota systems to be a form of tokenism (Mandara, Niehof, & van der Horst, 2017; Adams, Juran, & Ajibade, 2018). This made me reflect that maybe I was looking in the wrong place, or better that maybe the centrality of the CBWSO as predicated by the policies in promoting gender equality was just a little piece of the story of the dynamics connecting water and gender.

3.4.2.2 Chamkoroma's Water Committee

The situation of water management, but more generally of leadership in the village, is particularly delicate for Chamkoroma in the moment in which the fieldwork was carried out. In fact, during July and August 2022, the village is emerging from a difficult phase as far as the village leadership is concerned that started in 2002. According to several interviews with local leaders, residents, elders and water management committee members, during this 20 years period, the leadership was characterised by corruption and privilege of personal interests over the community ones. This situation was possible because of the political protection of the village leaders from influential people at higher administrative levels. Recently, the support of these people went missing so a group of people of the village could ask the intervention of the District to dismiss the corrupted leadership and proceed with new elections. In June 2022, a new unofficial Water Committee is carrying out the management of the water scheme. It is composed of 8 people: one chairman, one secretary, one accountant and five regular members (6 men, and 2 women). Some of these people were the ones that were dismissed by the previous leadership, others have been appointed only recently. The Water committee had

contacts with the RUWASA and together with the village leaders they agreed to establish a CBWSO with the RUWASA's staff support. The establishment of the CBWSO is proceeding hand in hand with the plan to build a new water scheme that will be financed with government funds and whose construction will begin later this year. This project will address the main issue in Chamkoroma, namely the fact that even though water is enough, the infrastructure does not match the growing number of people. Similarly to what is happening in Pandambili, the increasing number of private water taps stemming from the main line doesn't allow the water to reach all water points with the same pressure leaving some taps dry most of the day and forcing people to fetch water during the night or to move to further taps. This new construction would address the community's voiced need to serve the increased and increasing number of people by making sure that no water gets "wasted" from the intake and all is channelled in the water pipes. The water committee members of Chamkoroma seem enthusiastic about the promise by the government to build a new water infrastructure. However, at the time of fieldwork, this "wasted", overflowing water is used by the farmers whose houses and fields are located along the stream on which the intake was built to create an informal irrigation canal system that in case of emergency is also used for domestic activities. The construction of the new water system will therefore impact the lives of these families and this element is just one of the many that shows how complex the waterscape of Chamkoroma is and the different specific and conflicting interests that surround this resource. In light of this delicate situation, water emerges as one of the key aspects of the village affairs on which the new leadership will take action to gain the residents' broader support and recognition. The reactions of the community members to the possibility of having a new water scheme saw this promise as an interference with the internal affairs of the village because the construction was linked to the conditional establishment of a CBWSO. Improving the local water access for some is seen as a political strategy to jeopardise the village autonomy in deciding how to better manage their internal affairs. Moreover, other community members did not believe the words of the CBWSO members reporting the imminent construction of a water scheme from the governmenrs.

3.4.2.2.1 Selling and buying water

Unlike in Pandambili, where as described above there is an established system of water tariffs that are calculated through water meters, in Chamkoroma everyone can fetch water for free from the public taps and this includes not only Chamkoroma's villagers, but also people from the neighbouring villages that have

no water access of their own. As it is also possible to buy water at the taps and resell it both within the village and outside, a local water market has flourished whose revenues are collected by the Water Committee, who keep the money in its bank account for maintaining the scheme. Some members of the Water Committee who live close to the water taps in which it is possible to buy water (there are two in the whole village but at the time of fieldwork only one was in use because the second one was used to provide water to the construction of a new health centre) are responsible for collecting the revenues, keeping the water point area clean, renting small plastic hoses to fill bigger tanks of water, and monitoring the water point conditions. Similarly to Pandambili, the person who collects money is a married woman because she spends most of her time in the household and is considered more reliable than any man. As we will see in the next paragraph, this local water market has become so important as economic activity to push some vendors to sabotage the efforts to bring water to waterless neighbouring villages.

3.4.2.3 Pandambili and Chamkoroma: clean plastic buckets and rolling barrels

In Pandambili, in the sub-village of Mapocho, F. one of the residents is waiting for a delivery of water from a nearby seasonal well (seasonal dam) at a price of 3,000 shillings for 240 liters, which corresponds to 12 20-liter plastic buckets. She explains that since the tap water is salty, she uses it only for cleaning up on the ground or in case she has no other. For drinking, cooking and other uses she and her family collect rainwater, which they collect in large quantities during the rainy season, while during the season they buy barrels of water from villages such as Sagara or Chamkoroma that have fresher water available year-round, or water that comes from the seasonal dam. The rate at which water is bought and collected depends on several factors. These include the economic availability at the time, the season, and the intensity of use. To transport water from the tap, she uses buckets or small yellow jerry cans. Purchased water, on the other hand, is transported in usually blue plastic barrels on cow-drawn carts, or in the same yellow jerry cans loaded on motorcycles or bicycles.



Photo 14 - Picture taken by Z. one of the participants in Pandambili that shows one of the small carts belonging to a water vendor who delivers water at home.

Buckets, jerry cans, plastic barrels: these ordinary objects are part of the "everyday water life" of the people and especially the women of Chamkoroma and Pandambili. In most of the photographs produced by the women who participated in the photo elicitation activities, of which photo 32 is an example, where they were asked to reflect, take pictures, and discuss four themes that included the materials elements they associated with water access, these objects were present, often as protagonists, in the discourses related to the use and meaning of water. They were depicted inside homes, at public taps, in cultivated fields, on the backs of animals or loaded onto bicycles. Here you can see other pictures taken by the participants on this topic (Photo cluster 15).



Photo cluster 15 - Photos taken by participants in both Chamkoroma and Pandambili about the objects they associate with water

These plastic containers take the place of water pipes that do not reach buildings and are an integral part of the waterscape. However, they are not regulated by the state or local government, which stops with their management the moment the water leaves the tap. These in combination with women's bodies, fixed infrastructure, uncontrolled and temporary sources, and the work of animals help define material and self-managed practices in which rules, practices, relationships, exchanges, and patterns are embedded in the space in autonomous ways that coexist with the official and "safe" system of water managed by the local CBWSO or the governing body. Plastic items are thus an integral part of both villages' waterscapes, and all households have at least one. These are relatively inexpensive, depending on the

type of plastic they are made of, and are often recycled containers that previously held seed oil used for cooking. In some cases and especially by children, smaller containers that previously held soap or detergent inside are used. The fact that there is no type of regulation of the characteristics that these containers must have, as is the case in other contexts with water access issues (as in the case of Tijuana as shown by Meehan (Meehan, 2014) where the state distributes containers to store water for domestic use, undermines the concept of guaranteeing water access to people that often stops at the tap or well. In reality, guaranteeing this right in full would mean worrying about what happens between the tap and people's homes, including water storage systems. Some attempts to make transportation easier and to control what happens on this journey have been made such as the design of the rolling water container "Q- Drum" by South African architect Hans Hendriks. This "wheel reinvented" - as the official Q Drum website[22] calls these containers - could ideally make the transportation of water from the different sources easier, faster, and safer for people. However, manufacturing these drums internationally in a cost-effective way is not as easy because of both technical and economic reasons. The result is that the populations that might benefit from this technology can't afford it and those who could be able to afford it do not ultimately need it.

The type of jerrycans and buckets and their state of cleanliness and maintenance are also linked to the economic status of the women who use them and to a reputational system within the village. This is because the washing of clothes and dishes takes place in open spaces, often in the company of other people and under the eyes of passersby. Showing that one has clean and undamaged buckets and containers is one of the ways to demonstrate and assert one's social status and desirability, which comes through cleanliness and the opportunity to have many quality buckets. As mentioned in a previous paragraph, the issue of being clean, having clean buckets, clothes, body, house, or dishes is something that emerge frequently in the photo elicitation activities. Being clean is therefore associated not only with positive emotions but also with a good reputation in the community. On the type of water containers, richer households can afford the yellow jerrycans that have a handle and can be closed with a plastic lid. This vessel has the advantage of minimising the water spilling along the route between the tap and the house, it functions best as a water storage unit because it reduces the risk of contamination and is less prone to breaking. Owning therefore this type of container indicates higher status. The central infrastructural task that these objects have in the daily lives of local households represents on the one hand that it is not possible to reduce

[22] The website was lastly accessed on 05/04/ 2024 and it is reachable here: https://www.qdrum.co.za/

the concept of water infrastructure to mere pipes. On the other hand, needing to be transported, they combine with the (often female) bodies of the inhabitants to form a hybrid and unique waterscape.

3.4.3 Damaging the water infrastructure

The dynamic of water infrastructures breakages is something that occurs in both Pandambili and Chamkoroma and it strongly affects the community water access. In Pandambili, the community does not have an even access to water. The different sub-villages hold significant differences in terms of water access. In fact, Pandambili C has only one tap that is meant to serve the whole population which is around 3000 people and that has not been working for years. The reason for this malfunction is not clear but there appears to be a mix of different environmental, political, and social dynamics that are voiced by different people that have some role in the maintenance and management of the village's waterscape. According to the CBWSO secretary, the tap is not working because the water line is continuously destroyed by Pandambili C residents or on purpose for no reason or accidentally when they plow the land to prepare the crop fields. According to Pandambili C leader, the damage to the water line is caused by the strong rain during rainy season months and the residents have nothing to do with its damage. Lacking taps conveying safe water, Pandambili C residents access water via hand-dug wells, via purchase or freely from a seasonal water dam that is also used for watering the cattle and that is extremely unsafe for health. However, residents affirm that because the water coming from the infrastructure has high salinity, they would use alternative sources even if it was working properly. On the other side of the village, the hamlet of Nehmbo faces a similar situation. The area (which is almost one hour away by walking from the village centre) was served by one water tap but it hasn't been working since 2020. Also here the reasons behind the breakages are narrated by different actors in different ways. One version that was given by one of the founders of the community water management committee of the village is that the breakage happened because in 2020 a new village leader belonging to the Wabena tribe was elected, while the sub-village is inhabited by a majority of people belonging to the Wakaguru tribe. The people of Nehmbo in an act of protest destroyed the water pipe because, he said: "they didn't want to have water from a Wabena". According to some members of the Nehmbo community, the water pipe reaching their homes was damaged by water pipes thieves, who stole pieces of the infrastructure to resell or reuse them in their homes. Others claim that the breakage was carried out by the members of other sub-villages who believed that the water infrastructure was too

big and the size of the pipeline reaching Nehmbo was affecting negatively the water pressure for the rest of the taps. The inhabitants therefore fetch water from the closest seasonal water dam and from manually dug boreholes and have found a way to make it clean by using a white powder that they call "shab" that once mixed with muddy water it makes it clean by making the mud precipitate eliminating residues that could be potentially harmful for human consumption. They buy it from Morogoro, the closest major town. As this powder is used in the water tanks to keep them clean and it usually used only in large water plants, it is unclear how it reaches the little shop located in Nehmbo, nevertheless, it does and it mixes with and further complexifies the local water access practices. The political and social value of water and its infrastructure is therefore testified by such intricate reasons behind the breaking down of pipes or taps.

In the village of Chamkoroma, the issue of people damaging water infrastructure stems from both similar and distinct reasons compared to Pandambili. On the one hand, like in Pandambili, political motivations play a role, with adversaries of the Water Committee sometimes sabotaging the system as a form to undermine their leadership. On the other hand, unlike Pandambili, where a dedicated watering point has been constructed for cattle, cattle owners in Chamkoroma cut the water pipes during the dry season to provide water for their animals when other sources are unavailable. This illegal practice worsens during periods of drought, as livestock owners prioritize their herds' survival over the maintenance and respect of communal infrastructure. Moreover, Chamkoroma faces a unique challenge given by the presence of the abovementioned water market. Water vendors also participate in the damaging of the pipes because if the water schemes performs well and reaches all the people it is supposed to serve, it would mean making the vendors lose a lot of customers to which they sell water they buy for 50 TZS per 20 litres for 500 or 700 TZS and eventually lose their income generator activity. By sabotaging the pipes. they create an artificial scarcity, driving up the demand for water and allowing these sellers to profit at the expense of the community. Several people in the neighbouring villages (such as Makole, Suguta and Iduo) however, cannot afford to pay the water sellers, and so they have to move to fetch it by foot or bike covering large distances. During one of the second round of transect walks, a woman coming from Makole reported that there are times when she has to wake up at 3.00 am in order to fetch free water for her family and be back in time to carry out all the other activities. Sometimes people rent bicycles and instead of paying the owner with money they use water as currency. So in the end, the damage to the water scheme in order to keep the market running affects the poorest and most vulnerable people, who couldn't afford to pay for water anyway.

While both villages deal with infrastructure sabotage, the involvement of water sellers in Chamkoroma introduces an economic incentive that complicates efforts to manage the issue.

3.4.4 Cultural practices and water

While in Pandambili there are no traditional practices sourrunding water, Chamkoroma's community has preserved a set of traditional beliefs that are instrumental to protect its water sources and ensure their sustainable management. The mountain water springs providing Chamkoroma are located in secluded places in the surrounding mountains. Of the 12 springs that originally existed, only 4 survived the environmental and climate changes of the last 40 years caused by the increasing human activities such as the cutting of trees, cattle grazing and farming. Up to time of fieldwork, the fields reach almost the top of the mountains even though it is illegal by the village laws. The first spring we visited is not piped and the water is channelled into the above-mentioned irrigation canal system dug into the earth that runs down the mountain and reaches the farmers' crops of Mhongwa's hamlet. The second source is the one that provides water to the hamlets of Shuleni e Kitovuni. Through the intake built by LVIA, the water is channelled into pipes that go downstream passing through a compensation chamber for when the water pressure is too strong. Compared to the others, the third water source we visited was even more inaccessible and far from the village. The place they showed me is not the spring per se, but a large waterfall that is believed to have specific powers. When we arrived, the chief of the sub-village accompanying us made us wait and went alone behind a rock to perform a ritual prayer to ask the spirits of the elders and the spirit of the water source for permission to access the spring. The ritual is something that is passed from one sub-village leader to the next one and known also by the elders of the village. If these entities had expressed their dissent, we would have had to leave immediately. The ritual was successfully performed when the water infrastructure was built and fortunately, the dissent sign did not show during my visit and therefore I was allowed, indeed encouraged, to observe the waterfall, touch its waters, and take pictures. The sacrality of this place is linked to the belief that the waterfall is thought to have healing powers. Also, according to several people, all the water sources on the mountains including this one are protected by the spirit of giant snakes that can sometimes be seen by people who wander the woods in which the water sources are located. Access to the different water sources is forbidden to citizens and activities such as farming, cutting trees, and livestock breeding are prohibited. However, as mentioned above, not everyone observes the

rules and there is a set of fines and punishments for the transgressors. Moreover, the all the water sources on the mountains are believed to be guarded by a Snake Spirit that protects them and discourages people to access and pollute them. Such belief aims at protecting water source and reinforces the presence of a specific cosmology linked to water and water sources that is based on traditional set of practices and beliefs that have been built over time and that have been shaping the local society-water nexus and regulate the human activities and impacts towards the environment.

3.5 Concluding remarks on Chapter 3

The two sections of this Chapter aim to give the reader an overview of what is the water context in Tanzania at different scales considering the characteristics that make the hydrosocial spatialities of the country comparable with the concepts of hydrosocial territory and waterscape. This overview is informed on the one hand by the study of policies and laws concerning rural water management and on the other by the country's broader water situation characterised by specific forms of scarcity, economic and physical. This represents the framework in which situated realities such as the villages of Chamkoroma and Pandambili insist, of which an attempt has been made in the second section to provide a thick description through images and information gathered mainly during transect walks and the overall ethnographic work. In this sense, through a feminist methodological approach, the Chapter aimed at providing a description and an understanding of how the different elements composing local hydrosocial relations are intertwined and mobilised to define the embodied ecological subjectivities that will be discussed in the next Chapter. The provisional conclusion at the end of this chapter, and one that will accompany the reading of the next, is that the specific context of the two villages insists on a broader rural water governance that moves in the continuums of dualisms such as human-nonhuman, urban-rural, developed-developing, man-woman, scarcity-abundance, body-infrastructure, but also formal-informal that are often linked to Western visions of knowledge construction. From this position, the rural Tanzanian water governance in question puts village communities at the center through a decentralisation that as we have seen peaked before the last reform in 2019. Through this reform, the central government sought to regain some control over the rural water issue with a view to a broader strategy of harmonising water access management. Through the rebalancing of the decentralisation structure of rural water governance, the reform could tackle the issues linked to the fact that the

participation of communities implemented so far within water management were criticised as only cosmetic strategies that hide other agendas privileging the private sector and big investors (Van Koppen, Tarimo, van Eeden, Manzungu, & Sumuni, 2016).

One of the points that the reform chose to work on was the focus on the gender dimension. This is because, despite national programs and international cooperation projects aimed at promoting gender equality through water use and management, the current situation still sees women at a disadvantage in formally taking part in decisions on how to administer water, and this occurs at different scales. However, as we have seen then the tools that have been put in place such as women's quotas or the creation of women's representatives who are necessarily women have had limited impact. This research therefore confronts this problem by deciding to address it with the tools that feminist thought offers. From an intersectional perspective, as explained in the first theoretical chapter, this work aims to hold together different elements that shape people's and women's subjectivities in particular including the materiality of infrastructure and water that are intertwined with the bodies and lives of those living in the villages. This research therefore approaches the mentioned problem in a more complex way, privileging the specificities of local waterscapes that were presented in the second section of the chapter. This work sought to see how community management promoted by national policies insists on the two communities of Pandambili and Chamkoroma and how it is intertwined with water sources, infrastructure, and activities of different kinds that make up them.

What do we learn from reading this chapter? We have seen how the waterscapes in which the residents of the two different villages live and which the residents themselves shape. We have also seen how in both villages the conditions of water availability in terms of quantity and quality but also in terms of infrastructural functionality, spiritual value, lead the residents to depend on alternative sources that go beyond the linear path that water infrastructure draws. Pandambili residents dig wells by hand, buy water from other villages, or collect it from surface sources. Chamkoroma residents who do not have access to taps use irrigation canals and rainwater. We glimpsed how international cooperation and religious missions are linked to the issue of village water supply in that in both cases water schemes were built by NGOs, in the case of Chamkoroma, or by missionaries and the World Bank in the case of Pandambili. Community water management in turn takes on specific characteristics that implement or do not implement what is indicated in the rural water governance designed by the 2019 reform. In Pandambili, water management is in the hands of two men who cover four of the positions

provided for CBWSOs. In addition, the only woman attending the organization's meetings said she is unclear about her role and responsibilities within the organization and sees her presence as an opportunity to gain leadership skills. Chamkoroma, on the other hand, has refused to establish a CBWSO and is trying to form a new water commission after the village leadership collapsed over a case of embezzlement and corruption. Now, how does this intertwine with the research questions? Having presented (certainly in a partial way) the minute workings of local waterscapes takes us one step closer to being able to analyse and understand how does the intersection of water, gender, rural water policies influence the waterscapes of rural communities and what are the specific types of places and subjectivities that the intersections identified produce. Focusing on the aspects concerning the making of places and subjectivity is key to unpacking the relationship between water and gender dynamics in the waterscapes in a way that can enrich the debate with the situated experiences of women living in Chamkoroma and Pandambili. This claim is linked to Cecile Jackson argument which states that

> "a focus on embodied subjectivities brings together discourses too often separated, of labor and production on one hand and health and well-being on the other. Thus I argue that physical work intensity is a characteristic of the bodily experience of work that influences well-being, both physical and perceptual, generates working experiences that pattern the subjectivities, preferences, and perceptions of individual women, and feeds into the social relations of gender in intra-household "bargaining" producing divisions of labor, and extra-household gendered social relations of work" (Jackson, 1998, p. 322).

The waterscapes of the two villages have histories and characteristics that make them unique, and in the next chapter they will be discussed through a water-gender lens and through engaging with the key concepts of embodiment, gendered subjectivity, and materiality.

Chapter 4

Embodied water practices

4.1 Introduction

In the previous Chapter, the main characteristics of the Tanzanian hydrosocial territory and of the waterscapes of the communities of Pandambili and Chamkoroma shape water use and access practices were presented. Environmental conditions, water infrastructure, quantity and quality, local water governance systems are all elements that contribute in the definition of how people experience water access for private uses. This chapter aims to connect what was observed in the field and discuss it in light of the theoretical and methodological framework presented earlier. The chapter discusses the topic of the thesis from answering research questions that due to their breadth fit the fluidity and richness of the fieldwork. In other words, this chapter attempts to discuss how the relationship between gender and water unfolds in the two communities while keeping in mind the interpretive caution that is required by working in a context such as rural Tanzania from a European, white, and cultural biased positionality such as my own. To do this, I will draw from the African feminist political ecology perspectives that guided me in reading, analysing, and discussing what emerged from the fieldwork. The photographs with their comments, the interviews, and the field notes that resulted from the transect walks brought back a picture of two communities in which women occupy a position that is both central and peripheral at the same time in the management and use of water. On the one hand, they are those who proudly claim to be the ones who "know the most about water," who handle it, search for it, and transport it often using their own bodies as a conduit. Over time they have developed specific practices and knowledge regarding their waterscapes (the right time and places to fetch clean water, the repair needed by a public water tap, how to efficiently use water for domestic use, where to find water in dry season, which are the wells with less saline water, which are the taps with better pressure, etc.) and use them to procure water for their family for all domestic uses, to tend their gardens and fields, and they share this knowledge with both their daughters and

other women in the village. These practices passed down between generations, the social value they have, and the way they are intertwined with women's daily lives make the relationship between water and gender an essential locus for the definition of local gendered subjectivities that is characterized by women's claim to this privileged but also strenuous relationship they have with water. On the other hand, women residents in villages do not have institutionalized roles in all levels of water management. While women's presence is very low in bodies such as the CBWSO or Water committee, the role of tap attendant (taking care of public taps, collecting and guarding money from water takers, and reporting breakdowns to those in charge) is almost always filled by women. I believe that these two characteristics are yes contrasting and show the lines of inequality already explored in the literature that see women struggling to have a place in management decision-making centres historically occupied by men, but also very revealing as to how despite the fact that women have not established institutionalized modes of struggle or water management that overturn the status quo and claim their formal place in water governance, they exert their firm influence in terms of everyday practices of care, negotiation, and community work that resonate with African feminist perspectives seen in Chapter 1. The Chapter concludes with a final discussion that wraps up the different strands that the different presented aspects have in common. This chapter tries to engage with feminist theory that considers the micro scales like the one of the body as a privileged scale to investigate and better understand "how embodied experience may register, mediate, shape, reproduce, resist, or disrupt broader social, environmental, and economic dynamics and trajectories" (Kinkaid, 2019, p. 3).

4.2 Participating in village water management between water management entities and water taps

In Pandambili, the two CBWSO members that hold the positions of chairperson on the one hand, and secretary, accountant, and technician on the other, are both men who have been in charge of water issues for years, even before the establishment of the CBWSO. Even though the organisation should by law ensure a balanced composition in terms of competencies and gender, Pandambili CBWSO seems to struggle to implement such balance. The only woman who is part of the CBWSO is Batuli that holds the position of Representative of Women. In one of the interviews held with her, I asked if she could explain in her own words what her role of a women's representative entails. After pondering the question she said, "I don't really know what it means." She says that she attends meetings and

collaborates with her colleagues. She said that “if there's a problem with water taps they [community members] call me to ask why the water isn't coming out. Then, I call the secretary who instructs me what to say and so I call back as I have an answer to give to them”. Her answer is only partially surprising because even if, as presented in the previous chapter, the role she holds in the CBWSO was precisely designed by the 2019 reform of community water governance as a way to make sure that the requests, proposals, needs and ideas of the women are taken into account, there are several accounts of these gender quota systems to be a form of tokenism (Mandara, Niehof, & van der Horst, 2017; Adams, Juran, & Ajibade, 2018). What we see in Pandambili is how the idea that having a women's representative within the managing entity could make it act as an aggregation factor for the advancement of women's demands did not actually materialise. The naïve idea that putting women in positions of power would then guarantee the protection of the interests of the entire 'women' category betrays a stereotyping and conception of women as an absolute category within which there are no significant differences (Radcliffe, 1994). This expected automatic connection very often does not occur but rather there are cases where placing a woman in a position of power does not bring with it any particular attention to the dynamics of gender inequality. The other side of the coin is the fact that Batuli was able to join the management entity is having an empowering and learning impact on a personal level. When I asked if she liked to be part of the CBWSO she answered “I like to be part of it because I can learn what is going on in the community regarding water and I gain the skills to be a leader”. In this sense, the policy of having a representative of women, even if it did not really lead to the consideration of gender-specific needs in formulating local water management strategies, allowed a person who would normally never have joined the CBWSO to have a role in it. This dynamic is particularly interesting because it complexifies the notions of space linked to the idea that community water management entities are either “spaces of exclusion” (Adams, Juran, & Ajibade, 2018) or spaces of empowerment (as aimed by the gender quota system in place). The way in which Batuli is experiencing her position in the CBWSO highlights the complexity of social dynamics within these organizations, where inclusion initiatives may have varying degrees of impact and significance for different individuals and communities. The way in which Batuli takes part in the CBWSO unknowingly recalls what Obioma Nnaemeka describes the African nego-feminists’ posture as the one of the chameleon: “when the chameleon comes into a new environment, it takes the color of the environment without taking over. The chameleon adapts without imposing itself. Whatever we choose to call our feminism is our prerogative. However, in this journey that is feminist engagement,

we need to walk like the chameleon—goal-oriented, cautious, accommodating, adaptable, and open to diverse views" (Nnameka, 2003, p. 382). In this sense, she walks like a chameleon in the CBWSO, adapting and negotiating her presence within it and at the same time learning as much as she can so that in the future she can aspire to higher leadership positions in the community. By looking at the role of women in the CBWSO, it was clear that institutional water management places are only a part of the places where to look for answers to understand and discuss the nexus between water and gender and to what are the spaces both physical but also political that connect these two elements by gendered shaping subjectivities. This is perhaps because structures such as CBWSOs repurpose and reproduce management models rooted in Western thought with its society/nature dualism and which have very clear definitions of who should manage water, with what skills, and from what places. Water management is conceptualised as technical, financial, rational and it struggles to create space for alternative cosmologies and approaches within it.

In Chamkoroma, talking to Samueli the leader of the water committee of the village that has not been in office for long, I asked him about his duties and he says that he has to make sure that water comes out of every tap, that the revenues coming from the local water market and from private connections to the main line are managed transparently and carefully, and finally that those who are assigned to draw water from the tap are careful and considerate of all the water users. He also tells that apart from the formal meetings of the water committee that are hold every three months and the reports to the village assembly, he tries to be available for the community by walking around the water taps and collecting complaints, requests, suggestions over the conditions of the water scheme. The public taps in Chamkoroma are not all the same. On one side, there are two main taps, from which water flows most abundantly and where water is sold to vendors who sell it outside the village or to the homes of those who can afford water service at home, to builders who have to construct local houses and buildings, and to people who come from other villages that do not have a local water supply. The users of these taps are mostly men who fill large barrels transported in carts pulled by cows or jerrycans tied to motorbikes, or mules. On the other side, there are all the other taps that are distributed in the village and are used by the inhabitants of Chamkoroma who live far away from the main taps. These taps are characterised by a lower water pressure and therefore a poorer and more irregular water service and are frequented mostly by women who collect water in 20-litre buckets for domestic use. Looking at what happens at the water taps through the work that S. does as leader of the water committee, it turns out that one of the reasons why he periodically visits all

the water points, both the main and the secondary ones, is that in this way he can talk to the people who crowd the public taps on a daily basis, and these are mostly women. At village assemblies, where among the various topics of the day the village water situation is discussed, the women who are present often do not speak out of shame and modesty. These visits to public taps therefore make the water points places where the same women who normally do not actively participate in public assemblies situations feel comfortable expressing their opinions. Taps therefore become more than water collection points where women with their bodies carry the heavy buckets of water, acting as an extension of the water infrastructure, but also places of participation in a structurally unequal water governance unbalanced in favour of men. This happens thanks to the familiarity they have with these places that they have helped to form through their daily practices, which mix water access, moments of leisure, exchanges of confidence and shared fatigue and frustration for an intermittent water service. This means that water taps emerged as one of the most interesting water places strictly as they are the ones where part of the ordinary life of the residents happens and the ones where the majority of residents (mainly women) access and collect water both for domestic and other uses (selling water, irrigating small gardens, cooking, doing laundry, or building activities) and also participate informally in the village water management.

Despite their ecological and environmental differences, Chamkoroma and Pandambili have not so different socio-spatial configurations in this sense. In both villages, public taps are much more than just water distribution points and they are among the most densely lived places of the villages, the difference is that while in Chamkoroma water flow non-stop during day and night and therefore there is almost always someone fetching water at all times, in Pandambili the public taps close at 6pm and open at 6am. By spending hours observing and talking to the people coming and going from the water points in both villages it is clear that these are places that occupy a relevant place in the daily activities of villagers, especially for women and children. Here, the social nature of water and how it mixes with the everyday life of the communities powerfully emerges as the resource becomes an opportunity and at times an excuse to meet others, or to talk to the water tap attendant who has regular contact with the people in charge of community water management (like CBWSO members or Village Water committee members) about issues regarding the water network. Here, women, children and adolescents, socialise while waiting for their turn to fill their buckets as they are often involved in the water fetching activities for their families. When the queue to the water tap is too long, and this can happen because of malfunctions in the water scheme or because it is peak hour, water users use their buckets to hold their place in the queue

and patiently wait for their turn sitting in the shadow of a nearby tree. In the case of quarrelling about the order of arrival, the tap attendant is the one that mediates and solves the conflict as his or her responsibility is to keep the water supply service running and the surrounding area under control.

Being widely populated, the taps are not experienced by everyone in the same way. In Chamkoroma, even if water is available at all times at the public taps and it is free for all, water pressure is very different among the water points because of the proliferation of private taps that have been built over time without a corresponding enhancement of the water intake at the source. There are some smaller taps that are almost hidden among the houses that are used almost exclusively by the households living around them and to which almost only women go. They patiently stand in line and wait their turn with the hope that the pressure will be good for the time it takes them to fill their buckets or they strategically go to fetch water during night when there are less people fetching water. When asked the reason why they don't go to the main tap with better water pressure, their answer is that they do not go to the main tap where the pressure is better because the area around the tap is dirty and too busy with men and carts and cows passing by and is it also too far from their houses. Looking around the water tap and chatting with the women, I realised that these women have created a protected and quiet space where they can fetch water in peace, without the risk of being harassed or passed by the (mostly men water vendors) users of the main tap. They feel comfortable in sitting down and chatting with other women far from other people's ears and they all care for the water point in case it breaks or it needs to be cleaned. Public water taps are also places in which the fatigue of carrying heavy buckets on the head or on bicycles is shared between women, forms of collaboration are enacted, and care for both other community members and water infrastructures is practised. Women struggling to lift the buckets know that at the water points they will always find someone that can help them.

In Chamkoroma, some women have dug small canals from the majority of water taps in order to collect the excess water that inevitably spills from the various buckets and containers used to fetch and runs freely between the filling of one bucket and the next one. These canals have a number of essential functions: they are used to irrigate small gardens of the households that are near to the taps or to fetch water for cleaning floors and watering small animals. In this way, women find new functions and uses for this water that otherwise would be "wasted". From the photos taken by the participants during the photo elicitation activities, the theme of the importance of water for the crops they personally care for at different scales emerged as central. Photo 16 shows a picture taken by K. in which she shows her

garden watered by a small hand-dug canal she made from the nearest public water tap. This practice of digging such small superficial canals to capture excess water illustrates how women have developed situated knowledge and adaptive strategies to optimize water use in resource-scarce environments. By redirecting water that would otherwise be wasted, they reduce the physical labour of manually fetching water for multiple tasks. These canals not only partially ease the burden of repetitive manual work but also demonstrate a creative, embodied intelligence, allowing them to sustain small-scale agriculture and household activities.



Photo 16 - Photo by K. showing her garden irrigated by a small canal coming from the closest tap in Chamkoroma

In this sense, women exhibit forms of self-organisation and interaction related to domestic water distribution that extend beyond the visible infrastructure and beyond their own particular needs. To fully comprehend this realm of practices, it's crucial to move beyond a simplistic division between formal and informal, between body and infrastructure. Within what may appear as chaotic as what happens at the village water taps, there are well-established modes of cooperation, mutual support, and resource distribution practices at a community level.
Their ability to learn, adapt, and devise strategies contributes significantly to reducing the weaknesses and the fragilities of the water landscape. In this sense, the development of water knowledge encapsulates forms of resilience and care that exceed the linearity of water schemes and make the most of the overflows and leaks of the local scarce waterscapes.

4.2 Vulnerable infrastructure make vulnerable bodies

The two villages of Chamkoroma and Pandambili are both characterised by a water access pattern that goes beyond the water infrastructure that brings water to the network of public and private taps. What that the two villages have in common is the fact that the water infrastructure that is supposed to provide clean and safe water to the community is characterised by failures, leaks, breakages, wear and tear conditions and intermittent service caused by several aspects. The use of alternative and often unsafe water sources by the population is something that belongs to the everyday access practices of locals and such practices intensify in those occasions in which the official water infrastructure fails to work. In this sense, the intermittency of water service contributes to increased water scarcity in terms of economic scarcity (see Section I of Chapter 3 for the distinction between economic and physical water scarcity) in both villages.

However the he malfunctioning of the water pumps, pipes, taps, or tanks is linked to dynamics that even though are somehow similar in the two villages, they assume unique forms due to the different socio-environmental configurations of the two communities.



Photo 17 - Sabotaged water pipe in Chamkoroma.

As seen in Section II of the previous Chapter, one of these dynamics is the sabotage of water infrastructure allegedly (as the actual perpetrators are not always clear and not easy to recognise) at the hands of vendors, political opponents, or cattle farmers (an example in photo 16). But sabotage is not the only issue concerning the functioning of the water scheme.

In Pandambili for example, the water system relies on the workings of electric water pumps that extract groundwater and convey it in the pipes. Since the electricity grid is often subject to power cuts, failures, sags and overloads, this has an impact on the operation of the pumps. Whenever there is an electric failure, it means that the residents have to rely on alternative sources to get enough water. Someone felt they should write on a wall next to one of Pandambili main taps about the intermittent water service in the village as shown in photo 18.



Photo 18 - Writing on the wall about intermittent water service

Accessing water does therefore not only depend on how much water is available or whether someone cut the pipes, but also on the electricity lines that are vulnerable to other dynamics that often happen far away from the village. By walking the local waterscape looking for water sources and places and by elaborating on what emerged from the transect walks and photo elicitation activities carried out with groups of women in both villages, what emerged was a connection between such vulnerability of the water infrastructure to electric failures and other issues (intentional breakages, missing maintenance, wear and tear,…) and the vulnerability of the bodies of the women responsible for water fetching in their households. How? When water pumps, pipes, or taps don't work, women's bodies that are already the ones involved in water fetching activities, act not only as prolongation but as replacement of the broken infrastructures. They have to walk longer distances to fetch water from alternative sources, carrying heavy containers that strain their physical health and well-being and this means that other everyday activities need to be rearranged. Even though most of the research participants in the photo elicitation activity declared they could afford to buy water from sellers from time to time, they stated that they prefer to walk themselves to fetch water from alternative sources instead of spending money to buy it. Unfortunately, the

safety of the alternative water they access is often compromised, exposing them and other household members to increased risks of waterborne diseases and other health hazards as the alternative water sources - such as water dams and hand-dug wells - are not suitable for human consumption without being treated. When the already inadequate water infrastructure does not work, the gendered lines along which water labour moves emerge stronger, and the female bodies are found to be at the centre of the intersection of these lines.



Photo 19 - Photo taken by Angelina, participant in the photo elicitation activity in Pandambili

The implications for women's bodies in connection to water access and use emerged strongly in the photos taken by the women in the villages. Photo 19 was taken by Angelina a resident of the Nehmbo, a sub-village in Pandambili that, as mentioned in the previous chapter, has not been having functioning water points for

almost a year. In the picture, she chose to portray herself with her youngest child and an empty bucket to show the effects that having no water or bad water has on herself and on her family. She explained the photo shows that she is worried that her daughter will be sick and stay dirty, and angry for the lack of water. In talking about her picture she stated that "the absence of clean water makes you feel like you are not even a human". For her, there is a direct connection between being human and having access to clean and safe water. She explained that it is not only a matter of having drinking water to stay alive that makes her feel human, but also when she can use the same water to wash her body, clothes, house, children, and dishes then she feels good. The importance of being clean, having clean clothes, house, dishes and buckets was mentioned repeatedly by the participants. This attention towards cleanliness was not only connected to health issues but also to the positive feeling connected to being able to ensure a clean environment for themselves and their family. The association between water-cleanliness-positive feelings and on the other hand its counterpart concerning lack of water-dirtiness-negative feelings is something that emerged consistently in women's photographs.

The centrality of women's bodies in the waterscapes emerged strongly from the photos as portraying their own bodies or the bodies of other women is something that the majority of the participants chose to do. This happened without any indication on my part in the type of pictures that they could have taken to represent and discuss the water situation in their village and their relationship with water. When I asked why they decided to include themselves and other women in the pictures, one participant from Pandambili said: "I have photographed women because for a large percentage of women, we do domestic activities and we are the ones who are in need of water for the most part, because all household activities need water. Men find the water already at home when they come home and go to shower, but the woman is the one who has the most responsibility to go to find water so that she can fulfil her household duties such as cooking, washing, bathing children, cleaning the house and toilet, washing dishes". But domestic duties are not the only ways in which the work of women is involved: among Angelina's pictures there is one in which she is watering her papaya tree (photo 20) showing how accessing water allows her to care for her tree that in turn gives her fruit.



Photo 20 - Angelina watering her papaya tree (Pandambili)

A participant in Chamkoroma (Mhongwa sub-village) took a picture of a woman farming (photo 20) and said: “I took the picture because it shows that the woman is sad because her plants have all dried up because she could not irrigate her garden. So the woman is sad and pained because she has spent a lot of money to buy seeds and care for the garden but the lack of water makes her not get the crops and will cause hunger in her family”. The intensive farming work is therefore wasted on the lack of water. Similarly, in photo 19 taken by one of the participants from the sub-village of Kitovuni in Chamkoroma, the participant has chosen to take a picture of herself. In discussing her photo, the photographer Mama Monera explained: “I've taken a picture feeling worried because when I arrived at the farm I found my plants dried up and my watering time had not yet arrived”. She said she

chose to take this picture in this way because like many other women she works hard every day to make sure that her fields are growing well, but if there is no water then all is for nothing.



Photo 21 - Photo by Mama Monera

Choosing to portray women in the pictures was therefore a deliberate choice by the participants, who felt that it was important to include their bodies in showing their experience with water access and use. An embodied political ecology of water was captured and portrayed by the photos that link water access for consumption, washing, irrigation, and food production with cultural and social norms producing an ecological model that supersedes the dualism between nature on one side and human society and bodies on the other.

In both Pandambili and Chamkoroma, women were very aware and vocal about water issues in their village: water shortages brought by different causes affect their everyday activities and this is true for both the women who own their crop fields or small businesses and those who belong to the most fragile section of the population, who cannot afford to purchase water from the local water market. The peculiarity of this situation is that the high frequency of infrastructural failures and breakages is something that belongs to the everyday water access situation for the communities. Instead of being the norm, having a functioning water scheme is the exception and this has had heavy effects on women's bodies and everyday lives.

For example, most of the women have normalised the neck and back pain that derives from carrying 20 litres buckets on their head from the water access point (tap, seasonal dam, well, or canal) to home several times every week. When asked if they experience any physical discomfort in carrying water, L. a 33-year-old resident of Pandambili said "The problem is there because there are times when the neck is tight you find you can't even move it. This is because sometimes you have to carry water with the baby on your back so when you get home you stay put for like half an hour so the neck stays straight and then the pain goes away". In Chamkoroma, H., 22 years old, stated: " When I carry twenty litres on my head and add another bucket of ten litres in my hand so that it is almost thirty litres in total, I get pain for a while and after some time I stay still and the pain is gone". When asked if she ever got treated by a doctor for this discomfort, she added that "There is no reason for going to the hospital for this". Pain linked to water fetching is considered normal. Other participants when recounting their life stories in the interviews that followed the photo elicitation activities, said that they have been carrying 20 litres on their head since they were 10 or 12, so their body is strong. They are used to the work and can carry the buckets without any problem. Some of them when asked about neck or back pain linked to carrying water were amused by my question and dismissed the issue by saying that they are used to this, it is part of their life. The strain and pain that the women's bodies experience is therefore normalised by the women themselves. Being able to fetch water and having a strong body that can support this chore is something that women claim and consider key in the construction of their subjectivity in relation to water. This situation strengthens the argument put forth by Truelove and Ruszczyck (2022), according to whom women's bodies act as water infrastructures through "the social and material work of the body helps to build, develop and maintain cities through gendered infrastructures in the everyday" (Truelove & Ruszczyk, 2022, p. 2) and therefore make the circulation of water possible in the context they inhabit.

In particular, it shows the direct impact on women's physical and social vulnerabilities not only of the structural issues and inadequacy of the water infrastructure but also when the same water infrastructure fails and breaks for other reasons. Considering the implications for women's bodies linked to the presence of vulnerable infrastructures, women's water knowledge of water issues is also recognised in Tanzanian water laws and policies - remember the definition of women contained in the National Water Policy as "guardians of the living environment"-, seems to be a result of an unequal condition and the presence of a "slow infrastructural violence" (Truelove & Ruszczyk, 2022). As the authors state, this concept is based on Nixon's definition of slow violence as "a violence that

occurs gradually and out of sight, a violence of delayed destruction that is dispersed across time and space, an attritional violence that is typically not viewed as violence at all" (Nixon, 2011, p. 2) and the idea of "infrastructural violence" (Rodgers, 2012) according to which different types of infrastructures can create spatial inequalities and structural violence.

Focusing on the scale of the bodies of the women involved in water issues within the gendered inequalities that shape the village's waterscapes, has meant working with the distinctive materialities of the water schemes with their pumps, pipes, taps, and tanks on the one hand, and of the women's bodies. Keeping together these two elements that are similarly passed through by water, created an interesting space of inquiry on the topic concerning the materiality of water. The binomial distinction between infrastructure and body in this sense appears blurred. The water infrastructure just like human bodies is porous, it leaks, it can break or be broken, it gets old, and it depends on the availability of water to function properly. A stark contraposition of the two recalls the binary vision of water and its use by human communities linked to the dualistic vision of humans and non-humans, human and nature that have been increasingly being challenged within political ecology scholarship and its feminist contributors as discussed at the beginning of the thesis. Such distinctions appear inconsequential when framing the water use, access and management issues in a critical perspective that sees the body as a part of the plurality of integrated parts that compose the water infrastructure. The presence of slow infrastructural violence here materialises on women's bodies making them more vulnerable to injuries and health issues than the rest of the population. The slowness but also the silence that this type of violence has is so effective that it brings the same women to normalise the pain their body feels in connection to water issues. This perspective enriches the debate on water-gender relations and the inequalities that are imbued in such relations by engaging with the material implications on women's bodies. In this sense, incorporating in the debate a perspective that unpacks the discourses around water infrastructure through a feminist intersectional perspective, can contribute to understanding what could work better in terms of implementing more effective gender equality strategies. Making sure that women have a say in where and how the water infrastructure is built or extended seems to be a key aspect to take into consideration when addressing water access issues in these areas. This also recalls the work of Van Houweling (2015), cited at the end of Chapter 1, who showed how in a village in Mozambique the construction of new and more efficient water pumps was not well received by local women. This is because the new technology interfered too heavily in the women's experience of drawing water. This activity allowed them on the one

hand to meet other women, exchange news, stories, advice, etc., on the other hand, to bathe undisturbed away from the men's eyes and ears. This is not the case for Chamkoroma and Pandambili, however, as emerged in photo elicitation and interviews, the centrality of women's bodies in shaping local water access. But the physical implications of this type of slow violence concerning women's bodies that act almost as the support system of a water infrastructure that is frail and easily malfunctions is just one of the aspects that emerge from this research

4.2.1 Water is free but you can sell it

Unlike in Pandambili, where as described above there is an established system of water tariffs that are calculated through water meters, in Chamkoroma everyone can fetch water for free from the public taps and this includes not only Chamkoroma's villagers, but also people from the neighbouring villages that have no water access of their own. As it is also possible to buy water at the taps and resell it both within the village and outside, a local water market has flourished whose revenues are collected by the Water Committee, who keep the money in its bank account for maintaining the scheme. Some members of the Water Committee who live close to the water taps in which it is possible to buy water (there are two in the whole village but at the time of fieldwork only one was in use because the second one was used to provide water to the construction of a new health centre) are responsible for collecting the revenues, keeping the water point area clean, renting small plastic hoses to fill bigger tanks of water, and monitoring the water point conditions. Similarly to Pandambili, the person who collects money is a married woman because she spends most of her time in the household and is considered more reliable than any man.

Spending a few hours everyday for nearly a month at the selling water tap in Chamkoroma, looking at and talking to who participates in the water market, a strong gendered dynamic emerged, that unveils the intersections between water access, gender dynamics and income levels. The water market reproduces traditional gender dynamics within water use and management. From the first days of observation, men seem to be the undisputed protagonists in the water market. Men are the ones driving motorbikes and cow-pulled carts, men are the ones herding donkeys loaded with water buckets and jerrycans to be sold. However, by having a closer look, the activity develops along two different levels: an inter-village scale and an intra-village one. The selling of water between Chamkoroma and other villages (inter-village scale) is a male-dominated activity. Usually, the men who take part in this business can afford the means of transportation, the buckets and the

personnel to collect and sell large quantities of water, therefore water selling represents a significant business opportunity.

On the other side, the intra-village water market includes the use of bicycles, smaller carts, and people's bodies to carry water from the taps to the local houses and is carried out especially by women especially but also children. After a few days after our arrival in Chamkoroma and once settled in the rented rooms, we found ourselves having to figure out how and where to get water for washing, cleaning, laundry, and cooking. Just like the majority of the local buildings, the place that would have been our home for the following month did not have any running water just like the rest of the local houses as there is no sewage system in the area. Within minutes, five young women showed up at our door and offered to help us get water from the nearest tap. The price was 200 shillings per trip and we accepted. Among very surprised looks from the people we met at the water point, I also tried to carry water by myself in the same way as the other women did (carrying a 10 litres bucket on my head) but after only two rounds my neck hurt, my arms were sore and my head wet from all the spilling due to my poor carrying technique. Between water fetching trips, the young women told us that some other women in the village get some money by offering to bring water to the homes of people who can afford to pay the water delivery. Not only that, when there is a house under construction, there are new opportunities to be paid to carry water as the builders need water to create bricks with the soil or to mix cement and pay women to carry it to the construction site. The volume of both water and money that the smaller scale intra-village water market moves is much smaller than the intra-village one however is an opportunity for raising income for the poorest. The women that are active in the water market in this way are a minority. Looking at who takes part in the activity, it is mainly young girls and older women who have little or no other income generator activities. Age and income level are therefore significant in women's participation in the water business. Engaging in this activity is therefore something that usually people with low-income conditions who use their own personal buckets and means to transport and sell water. The exploiting of time and bodies of fragile women becomes, therefore, one of the basis on which water access is ensured in the village, complexifying the traditional gender dynamics that have been discussed in the literature review on the water-gender nexus in Tanzania that mostly reflects on the men- women relationships.

4.3 Women know more about water

"Women know more about water" is a direct quote from the fieldwork and it is a phrase that was repeated to me several times by both men and women who participated in the research. It somewhat represents the lens through which to read this paragraph that reflects on the role that knowledge has in shaping gendered subjectivities in the rural communities of Pandambili and Chamkoroma. On first look, having greater knowledge about a phenomenon, a resource, or an object translates into something positive that harks back to the famous saying "knowledge is power". The participants in photo elicitation and the other people who took part in the research in different ways (through interviews, transect walks, and other informants met during ethnographic fieldwork) shared the knowledge and experience they gathered throughout their lives about water access, use, and practices. A first set of skills is linked to know which are the safest and cleanest alternative sources and what are the best times of the day to collect water there. In the sub-village of Mhongwa in Chamkoroma where there is no piped water but only irrigation canals that are also used for domestic purposes, consumption, cooking, bathing, and cleaning, H. shared that "in the dry season, when the sun burns you should not drink water from the canals because some people may take bath in the canals making water unsafe. s o you should drink the water that you already have stored at home". Ogila another participant from Mhongwa added that she only fetches water from the canals very early in the morning, around 5.00 am, because at that time she is sure that water is not contaminated by other people. In the sub-village of Kitovuni which is instead served by the water scheme, as we have seen in Section II of the previous Chapter, several water taps only work when the water pressure is high enough to reach them. The women living close to these taps have learned that at night -around 9 pm- there are fewer people that draw water from the other taps and therefore the pressure of the nearby taps is better and they can fill their buckets quicker. In Pandambili, women indicated the first hours of the morning, from 4.30 am, to be the best time to fetch water from the hand-dug wells because the sooner you arrive, the less muddy water is. If a well that usually has good quality water is dry because of too intensive use that does not allow a swift recharge of the aquifer or because its owners don't allow people to fetch water from it, women know their second best choice. In the case in which the selected water source requires a longer distance, they organise groups to reach them in order to minimise the risk of assaults, injuries and other problems that would be hard to manage alone. Attending this task collectively also contributes to the passing of knowledge from one generation to the next, from women who have lived in the

village for a long time to newcomers. Such rich practical water knowledge and its key importance for everyday water access however, intersects with strong gender norms that follow a patriarchal structure. This dynamic frames the development of water knowledge in a way that needs to be unpacked to see how it contributes to the shaping of gendered subjectivities within the waterscapes.

As we have seen in the previous Chapter, both villages are equipped with water infrastructure that provides safe water. However, the precarious conditions, the intermittence of the service, and the presence of multiple alternative free water sources complicate even further the gendered unbalances linked to water access, especially in Pandambili where water is scarecer and of lower quality. Not using safe water remains a common practice that is linked to different causes such as the financial situation of households and people - the poorer the household, the harder it is to afford clean and safe water-, the presence of water access habits developed over time and passed down from one generation to the next, and also the fact that the more distant the water tap providing safely managed water is, the less women are willing to reach them to collect water and therefore rely to closer but unsafe sources. On the other side, alongside these dynamics, something more nuanced has emerged that shows a way in which gender issues intersect with financial status and water access. What often happens is that families that own a private water tap, and therefore hold a higher financial status, rely on unimproved water sources as much as the other poorer households. At times, in some male dominated households, the head of the family puts a lock in the tap so that it stops from giving water in order to prevent the rest of the family from using it. By blocking the tap and hiding the key, the water bill is not so high but this implies that the women of the family and children (who often share the responsibility for domestic water collection with the women) have to draw water from other free sources. The reasoning behind this dynamic is, in the words of a male community member in Pandambili "Why do I have to pay for water if I can have it for free or for less?". In these situations, the control over how the household income is spent and on when it is possible to open the water tap goes together with the power to control and influence the family's health.

This aspect is linked to the discourses on slow violence presented in the previous paragraph of this Chapter. Slow infrastructural violence here is masked with common sense about minimising household expenditure and this is done by taking for granted that women are the ones who should collect water for everyone. Putting a lock in the water tap exposes the gendered lines within water practices that put pressure on women to have to find clean water that can safeguard their own health and the one of their household. It is therefore essential when discussing

geographies of water access through a gender lens, to consider the aspect of water quality alongside the quantity and the distance of sources: The fact that there is a connection between the quality of the water accessed by people, the location of water access points, and gender dimensions is what has emerged from studies such as those of Farhana Sultana in Bangladesh (2009) where the completely accidental presence of arsenic in some wells led to women responsible for collecting water for their families being particularly exposed to the risk of finding themselves consuming polluted and dangerous water rather than dying of thirst. Especially in the case of Pandambili, the situation runs along similar lines to the ones identified by Sultana. As presented in Chapter 3, some of Pandambili's groundwater resources were found to be dangerous for human consumption and as a result, a concrete cast was used to close the contaminated wells. However, just a few metres away, someone has dug another well that is still being used by local residents for domestic purposes. Even the water distributed by the taps is groundwater and although it was tested when the infrastructure was built, as it was presented in the previous Chapter, is characterised by this peculiarity of being saline (Elisante & Muzuka, 2017) and therefore cannot be used for all domestic uses. For example, it is not suitable for cooking ugali, beans and other vegetables, which remain hard and unpalatable to eat when cooked with that water. It is also not suitable for washing clothes because in the long run the water would ruin the fabric, and also using that water requires more soap to wash them effectively. Because of this, even households who have private taps when they have the chance they buy water from muddy seasonal dams of rainwater created in the rain season or barrels that are transported from villages like Chamkoroma where there are freshwater springs. Even though the water is not safe as the one of the water scheme, it is considered of better quality by the residents because it has better taste and can be used to carry out more tasks.

Among the different wells that dot Pandambili's waterscape, there are some with more saline water and others with less saline water. There is no way of knowing before digging whether or not a well will be saline (*maji ya chumvi,* that means water with salt) or not (*maji baridi,* that means cold/fresh water). As indicated in the initial part of this paragraph, knowing which well to go to for the best water, at what time you are most likely to find water, and other tricks are all decision-making strategies that women have developed over time through the construction of a practical knowledge of the waterscapes. Such a body of knowledge was then passed from mother to daughter and from woman to woman as the participants in the photo elicitation activities explained in relation to their own stories of water knowledge construction. However, lacking systematic water quality control, when fetching water from alternative unprotected sources means to

accept the risks that the selected source is contaminated. Making these decisions is almost always up to women who are expected to provide enough water for all the household members. However, they are at times placed in front of the impossible choice of choosing to collect possible polluted water that will affect her and her family's health, or not to collect water at all. Here is how the slow infrastructural violence exceeded the physical implications on women's bodies seen in the previous Chapter and becomes an emotional violence. Discussing this point with the research participants, what emerged was a shared sense of anger, guilt, and sadness for the times in which they are not able to ensure clean and safe water for their household. Photo 21, 22, 23, and 24 are some of the pictures they took that showed such feelings connected to physical and economic scarcity at play in the villages.



Photo 22 - Mama S. looks at an empty pot worrying about how she will be able to cook for her family (Chamkoroma)



Photo 23 - Mama R. stands with her empty bucket in front of her house (Chamkoroma)



Photo 24 - One of the children of Mama M. (Pandambili)



Photo 25 - Photo by N. showing anger because the pump is not working (Pandambili)

With Photo 21, Mama S. said that she chose to represent as one of the main concerns about not being able to fetch clean water the fact that she doesn't know how will be able to cook for her family. She said that in the dry season there is little fruit and little vegetables available for consumption and even if you have vegetables but you don't have water it is all useless. Photo 22 portrays Mama R., standing with an empty bucket under her arms. She says that in the photo the woman is angry because after a day working in the field, she went all the way to the closest tap only to find that it is not working. Now she will have to fetch water from a further waterpoint. Another participant, Mama M. decided to take a picture of one of the children of her household to show her concern for the child's health when she cannot afford good quality water (photo 23). The child will risk being ill and staying dirty. The last photo of the previous page (photo 24) was taken by N. who at times works in support of the water attendant of one of the main water taps in Pandambili. With her picture, she wanted to show frustration from not being able to fetch water because of electricity cut-offs that stopped the water pump. Not only now she has to buy water from vendors, but also the absence of water does not allow her to work as assistant to the water tap attendant and gain some money from this activity. All the photos give back different nuances in the experiences of dealing with water scarcity by the different participants. Such nuances are given by the different

income levels of the participants, the environmental seasonal characteristics of the village they live in, the size of the household, the type of income generator activity they carry out (small businesses, farming, etc.). It is interesting to see how the personal worries and issues with water of the women living in two villages with such different characteristics in terms of water availability are very similar. Photo 25, taken in Pandambili by M. shows her proudness to be able to have a clean kitchen (shown in the photo) thanks to availability of clean and safe water. She is relieved because for that day she can prepare enough food for her family. With Photo 26 another participant from Chamkoroma chose to portray the emotional burden of the responsibility to fetch water for her children by taking a picture of them, happy because they have a fresh cup of water to drink. She is happy and relieved as well and in looking at the picture she feels she is a good mother.



Photo 26 - Photo by A. showing her clean kitchen (Pandambili)



Photo 27 - Photo by O. : My children are happy (Chamkoroma)

Yet, a disconnect and inconsistency between women's embodied experiences and worries linked to water access practices and the actual actions undertaken in this sense seem to emerge. For example, in Pandambili C and in the subvillage of Mhongwa in Chamkoroma, several women reported not boiling water when they collected it from alternative sources even though they knew that it would be the right thing to do to reduce the risk of contracting waterborne diseases. They know the potential benefits and risks of boiling or not boiling water before drinking it or using it to cook. However, many of the poorest households still don't do it and

choose to risk their health. In investigating the reasons behind this choice, the most common answer was that boiling water was a waste of time. In recounting their daily activities during the photo elicitation activities, participants underlined how their days are full of demanding tasks both in terms of time and physical effort such as collecting firewood, farming activities or working in small businesses, cooking meals for the whole household, doing laundry, cleaning, etc. Among all these activities, they do not have time to make the water boil and also many of them see this activity as a waste of firewood. Here therefore, the situated and rich knowledge that women have on water issues clashes with the complex process that shape their individual subjectivities. The risks of using access unsafe water, the bodily implications and feelings, habits, environmental conditions, and expectations linked to gender norms are all elements that intertwine in contradictory ways and that contribute in reproducing unequal water access in the communities that run alongside strong gendered lines. It shows that even though women know more about water, a critical awareness of the health risks and environmental conditions linked to water access does not always lead to changes in water practices and that the idea of tackling gender inequality within water access only by working on ensuring the presence of women in the village's Community Based Water Supply Organizations overlooks the complexity of the dimensions that concur to it.

As we have seen, water knowledge, its production and the constraints within it operates, is another key element in shaping women's subjectivities. Such knowledge is instrumental in allowing women to navigate the waterscape at best but at the same time it is connected to diffused unequal dynamics that run along gender lines and intersect with other axes of difference such as the financial status of the household or the environmental characteristics. We have seen that water knowledge moves both vertically between generations and horizontally among women that live in the same area. But how does this knowledge circulate? What are its boundaries?

4.3.1 The flow of water knowledge

One of the opening questions asked at the beginning of the interviews and conversations with many of the participants who made themselves available for this research turned out to be more important than anticipated. Participants were simply asked where they were born and, in case they were not native from the specific village of their current residence (either Pandambili or Chamkoroma), when and why they moved there. In analysing the interviews carried out with women, one

aspect that most of the married ones had in common was the fact that they had to move to their husband's village after marriage. This is due to a tradition that is still in use in both Pandambili and Chamkoroma according to which - once married - the bride leaves her parents' house and moves into the groom's household. In many cases, even though the husband was no longer part of the household, the woman and her children often remain to live in the new village by themselves. How is this dynamic relevant in the creation and circulation of water knowledge?

Being someone that has always lived in the same village and therefore is a longstanding member of the community can directly influence your water access. For example, interviews with members of the water commission in Chamkoroma revealed that there are different rules regarding the possibility of having a private tap for those who are natives and those who immigrated to the village. The system is based on reputation and origin. If you are a native of the village and your family is well-known, it will be easier to get approval to have a private faucet near your home. In this case you only need to prove that you can afford the infrastructure connection payment from the central water line. In the event, however, that arrival in the village occurs later, the applicant must demonstrate his or her goodwill and commitment to be part of village life by, for example, making a donation of money or materials for the construction of a building of public utility (the school, health centre,...).

Moreover, the same dynamic has effects from the perspective of formal participation in water management. Being an outsider decreases the chance to be able to be part of the village's decision-making bodies regarding water or other internal affairs. This dynamic is intertwined with the issue of gender in that at the time when many women have to move, uprooting themselves, and following their husbands, it affects the chance they have to participate and play relevant roles in society, especially at a younger age. One levelling element that fits into this mechanism is the moment when women assume the status of Elder. At this moment, the division given by gender is attenuated since in the communities (but also in the borader Tanzanian society), respect for older people is one of the most relevant characteristics mediating social relations. The opinions of village Elders are highly respected within village assemblies where a space is always reserved for these people to speak and influence decisions regardless of being male or female. In all the village assemblies I have attended, there were at least two Elders, a man and a woman, sitting in the front rows who spoke and were carefully listened to by everyone present.

Returning to the implications of being considered an insider or outsider in the village of residence, the interviews and discussions that followed the photo-eliciting

activities unveiled that more than one woman found herself living in a village where the waterscape was very different from the original one in terms of water quantity, quality, ease of access, and management mechanisms. This dynamic poses a challenge especially when the relocation takes place in a context such as the one of Pandambili where water access dynamics are more difficult than in other villages and groundwater salinity forces residents to adopt diversified supply strategies ranging from rainwater harvesting to purchasing barrels from more or less nearby villages that have a higher availability of good quality water like Chamkoroma. This is especially true given the familial nature of the passage and construction of knowledge related to water use, management, and access within households that often follows a matrilineal path. The refrain "Women know more about water" resonates here one more time as it was repeated to me over and over again by the participants. In this sense, water practices are linked to a range of feelings and perspectives that complexify the view of the activity of water supply as an always unwelcome and overwhelming task. Women were somehow proud of their familiarity with water issues even though, as we have seen in the previous paragraph, the construction of such knowledge is partially entrenched into patriarchal norms that are linked to slow infrastructural violence dynamics. The connection between the frequent movement of women from one village to another and the development of more equitable water management lies in the often untapped potential related to the circulation, sharing, and building of knowledge related to water practices. Speaking with the Lay Volunteer International Association (LVIA) staff, the NGO that supported the fieldwork, one of the activities they have been trying to pursue over time that has shown promise in promoting better local water management is the organisation of visits and meetings between different managing bodies (CBWSOs) to share practices, strategies, and ideas on how to effectively manage water in different villages. The presence of a high number of women moving from village to village, waterscape to waterscape, bringing with them different types of experiences and knowledge regarding water management and use, represents an unrecognised resource that brings benefits in the circulation of practical knowledge about water. In this sense, women's bodies act not only as the living infrastructure of the assemblage that are the local waterscapes, but also as nodes in a network of knowledge that is extended through even painful and difficult experiences of relocation from one waterscape to another. This circulation of practices, information, methods of use, and strategies fits into and enriches the body of knowledge that each community has of its waterscape. Situated gendered water knowledge in this sense exceeds the specificity of the individual and household scales in which it is mainly generated. Through women's

mobility it creates interscalar connections between waterscapes that cross administrative, tribal, and water scheme boundaries.

4.5 Wrapping up

The interweaving of relationships that make up the role of women within the management bodies of the villages (CBWSO in Pandambili and Water Committee in Chamkoroma) and the water taps results in the creation of spaces that resemble the idea of care promoted within recent feminist and African eco-feminist literature such as the work of Maria Puig de la Bellacasa (de la Bellacasa, 2017) and Mary Phillips (Phillips, 2016) . In discussing what care means, de la Bellacasa starts from the definition given by Joan Tronto according to whom care "includes everything that we do to maintain, continue and repair "our world" so that we can live in it as well as possible. That world includes our bodies, our selves, and our environment, all of which we seek to interweave in a complex, life-sustaining web" (Tronto, 1993, p. 103). In arguing for treating the human-nature relationship on the basis of care she recognises the tensions that this concept carries as unpacked by feminist scholarship and she invites researchers to engage with it by "keeping it grounded in everyday situations to expose its unresolved tensions and contradictions" (Tozzi, 2021). Thinking back at the idea of "ecofeminist embodied care" (Phillips, 2016, p. 471) that supports the idea that care must be practiced not just on an individual level, but also within social and political spheres, to reshape how we engage with the environment in a feminist perspective, the way in which women define their role and participate in the water issues of Pandambili and Chamkoroma waterscapes is extremely interesting. The practices women enact in water stewardship are not carried out by and do not produce atomized bodies but agent bodies of a set of collective practices that are not institutionalized in the creation of a local organization or the like but are collective in the way they are carried out in everyday life through shared knowledge and care for the environment, family, and community.

Reading the relationship between women's bodies, water, and water practices through an African feminist lens adds a crucial layer of interpretation to this dynamic. On one hand, the notion that their bodies are subjected to a form of slow infrastructural violence reveals a part of the story, exposing lines of oppression that operate along gendered divides. It highlights how inadequate access to water and the burden of water collection disproportionately affect women. On the other hand, there in stopping the analysis here there is a risk of devaluing the agency that women have within local water issues, which is nonetheless something that women

have appropriated over time. However, this is only one dimension of their reality. I cannot simply frame the women I worked with as passive victims without agency in this dynamic. Many of the women I spoke to are heads of their households or single mothers, actively supporting and caring for their families through farming, running small businesses, and navigating spaces within the water management that are traditionally male-dominated through negotiation and compromise. Their roles demonstrate resilience and resourcefulness, showing that these women are not just recipients of oppression but also active agents who negotiate, adapt, and thrive within the constraints they face.

The perspective on the construction of knowledge about water use and management with observations from the field, particularly the role of women's mobility as an opportunity for the circulation, sharing, and creation of water-related knowledge is the last element. Emphasis is placed on the relational nature and the role that motherhood plays within the construction and sharing of this knowledge, which informs and contributes to shaping the local water governance structures in the two villages. Through an intersectional lens, the socio-material connections driving the creation of this knowledge come to the forefront, revealing how it is embedded in dynamics of socio-environmental inequality and injustice—such as water quality and the unequal distribution of resources. The women who participated in the study navigate this complex reality by using their lived experiences and daily practices to both adapt to and challenge these inequalities. Their mobility and involvement in community networks not only facilitate the dissemination of knowledge but also actively shape their roles within the water governance systems, reflecting how knowledge and governance are co-constructed in contexts marked by intersecting layers of gendered and environmental inequities.

Conclusions

The introduction of this thesis opened with an image of a fountain formed by a huge water tap suspended in mid-air that pours water into the basin located below. In order to conclude this thesis and reflect on its conduct and the results that were presented through the information, experiences, and data constructed during fieldwork I would like to start again with the element of the water tap which as we have seen is one of the key elements that make up the waterscapes of Chamkoroma and Pandambili. In the introduction, I wrote that in looking at the fountain I realized that it conveyed an image of water management that was very much tied to a techno-managerial view and power that comes from controlling, extracting, and intubating this resource. I also wrote that I felt other elements were missing from this image, such as the bodies of the women who daily intertwine with the water infrastructure to make it work at its best but also the other intersecting elements that together with gender shape the human-water relations.

By reviewing the relevant literature on water geography and the ethnographic fieldwork, the path that seemed most promising to investigate this issue was to engage with the specific theoretical perspective of feminist political ecology. I tried to connect what amounted to an eight-month fieldwork in two rural villages not so distant from each other but with distinct characteristics to a rich water feminist literature from which I drew to identify research questions.

This work has a number of limitations rooted in the choice to conduct the research in the context of rural Tanzania, a context spatially and culturally distant from that of the writer and intertwined with historical dynamics of colonialism that still make its legacy felt. As Ariano et. al (2007) write, doing research in such contexts requires particular caution in reassembling and presenting research findings within the constructed theoretical and methodological framework that lays the foundation for interpretive intent. It is precisely this caution that has led to moments of interpretive paralysis whose subtext is that as outsiders it is not possible to pursue an interpretive and critical discourse on the African context in general and Tanzanian specifically without falling into the limitations, partiality and imbalances given by the European and white positionality from which I come. This reluctance to interpret has fuelled the temptation to stop at the description of the fieldwork and thus miss the opportunity to read the theoretical and methodological framework laboriously put together in the light of what was detected, experienced and

discussed in the field to provide a fresh perspective and new analytical and interpretive perspectives. In this sense, I decided to engage with the feminist scholarship because it seemed the approach that could better provide tools to win such interpretative fear. In fact, feminists invite us to deconstruct what is in front of us and then reinterpret it by putting the pieces together differently and expanding the scopes from which these pieces can be taken. This invitation is present for example in the work of Donna Haraway with her idea of Cyborg (1991), of Sarah Whatmore with her focus on Hybrid geographies (2002), and of Astrida Neimanis with conceptualisations of Bodies of Water (2017). To do this, on one hand, the research focused on micro-scales focusing on the lived experiences of women in the communities they belong to. Such a narrow focus,t allowed me to focus on the embodied experiences of women in relation to water, offering a more intimate and nuanced understanding of how water access, use, and management intersect with gendered labour and responsibilities. By cantering the body, I was able to examine how the physical labour of collecting, carrying, caring and using water impacts women's health, mobility, and daily routines. This approach also highlighted the social and symbolic significance of the body, as it relates to water in specific cultural and environmental contexts, revealing how the material and different realities of water availability are lived and negotiated at the most personal level. Additionally, this focus on the body drew attention to the gendered power dynamics within households and communities, where control over water resources is often linked to broader social structures of authority and inequality. By adopting this micro-scale perspective, I could explore the intersectional dimensions of women's experiences, including how factors such as age, marital status, and social position influence their access to water and participation in decision-making processes. However, this choice also meant that broader, macro-level structural factors, such as national water policies or regional infrastructure, were analyzed more indirectly, through their effects on the bodies and daily lives of women.

On the other hand, it relied on qualitative methods that held together an ethnographic approach with participatory methods such as transect walks and photo elicitation. In this way, the research made the most of the ability of the qualitative method to prioritize details and specificities that characterise the everyday lives of people in relation to water. Using photo-elicitation as a method has allowed me to gather richer data by eliciting deeper emotional and cognitive responses from participants. It provided them with the opportunity to express complex experiences that may not have emerged through verbal interviews alone. It empowered participants by giving them control over the narrative, fostering greater engagement and offering insights that are deeply rooted in their cultural contexts. This approach

was particularly helpful in navigating cross-cultural differences, as visual representation helped bridge language or conceptual gaps. However, while photo-elicitation provided valuable data, I had to be mindful of the challenges in interpreting visual materials. I was careful to navigate the subjective nature of image interpretation and trying to avoid projecting my own assumptions onto the photos.

Discussing the elements that emerged from the fieldwork and the data constructed together with the participants in the light of and against such ambitious feminist agenda required to embrace the complexity of the two waterscapes, resisting to generalisation ambitions. Therefore, here I am to review what this research has done and what this research has uncovered in terms of future themes to be explored. The purpose is to highlight expectations met and unmet with respect to answering the research questions and to highlight limitations and possible steps forward where the research can be extended.

Looking at how the research answered the questions that were aimed at understanding how the intersection of water, gender, and rural water policies influence the waterscapes of rural communities and what are the specific types of places and subjectivities that these intersections produce,

We can see that CBWSOs have emerged as places where women like Batuli in Pandambili use as a tool for personal empowermnet on the one hand by learning new skills to serve as one of the leaders of the village tomorrow, and on the other hand by navigating the patriarchal nature of that place in a smart way and negotiating their presence with the men who are part of it in a way reminiscent in Nnemeka's nego-feminism. Second, public water taps but also hand dug surface wells have since emerged as places where the intersections between water gender, policies, and community of show as they are where part of the ordinary life of residents takes place and where most residents (mostly women) access and collect water either for domestic or other uses (selling water, irrigating small gardens, cooking, laundry, or building activities) and informally participate in village water management.

Having chosen women's bodies as a lens through which to investigate the human-water nexus and its connection to gender dynamics allowed to explore the role that water plays within the shaping of women's subjectivities. Looking into how bodies are part of the local waterscapes brought out the workings of what Truelove and & Ruszczyk (2022) have called "slow infrastructural violence" operating along strong gendered lines. Such slow violence shows its effects on several levels as it affects women's bodies both physically and emotionally. On the one hand, women are in the condition of stress by the by the fact that they have to find strategies to ensure

safe water access for themselves and their families. They are often put in front of choosing between the impossible choice of having unsafe water or no water at all. Tackling water access issues emerges therefore as something much more complex than just a policy and techno-political task as the emotional burden that is connected to it did not disappear with the implementation of water developmental strategies that dismiss such dynamics as vulnerabilities to fix. On the other hand, from this systemic and subtle type of violence, women had to build a specific set of practical and strategical knowledge that allow them to navigate the waterscapes the best way possible. Reading the relationship between women's bodies and water practices through an African feminist lens reveals both oppression and agency. On one hand, inadequate water infrastructure disproportionately burdens women, exposing gendered lines of oppression. On the other, focusing solely on this victimhood risks overlooking women's resilience. Many women actively support their families through farming, business, and navigating traditionally male-dominated water management spaces. They demonstrate agency by negotiating and adapting, showing they are not passive recipients of injustice but active agents within these constraints.

This leads to the second aspect which is the nature of this water knowledge. The construction of such knowledge has emerged to be deeply relational as built both vertically across generations and horizontally among women who live in the same village. Such knowledge is therefore rooted in the individual experience of specific waterscapes but at the same time is highly mobile across scales through the internal migration patterns that see married women moving from one village to the other. On the one hand, developing such an understanding of water issues become care practices in a way that can be only seen for example if we focus on the ways women make experience of the water taps that are accessible to the whole community. Women are the ones who call the CBWSO in case of malfunctions and therefore contribute to the maintenance of the water infrastructure. In Chamkoroma, S. the water committee leader has recognised this practice e and it has modified its activity by making sure to periodically visit all water taps of the village to get insights, complaints, and ideas from the women that use them everyday. On the other hand, building water knowledge is a slow shared process that encompasses very practical aspects that lead to the performance of water access practices for example where are the best functioning taps, which alternative sources are better in terms of safety and quality, the importance of boiling water before consuming it to decrease health risks. However, despite the development of such water knowledge, women often face impossible choices when it comes to their water access practices. Especially in the poorer households, but not exclusively, participants reported to

have to choose whether to access unsafe water for themselves and their family or have no water at all. Moreover, in discussing practices such as boiling water, even though they know the risks connected to not doing so, several women refuse to do it because it is a practice that is seen as incompatible with their daily tasks and duties and that represents a waste of firewood, whose collection is an extremely physically and time demanding work. This disconnect shows the complex interplay of factors that include bodily experiences, expectations linked to gender norms, emotional distress, survival and care and that are visible only by focusing on how ecological subjectivities are formed at the body scale. The research tried to illuminate the deeply intertwined relationship between water access, gender dynamics, and socio-political structures in the rural Tanzanian communities of Chamkoroma and Pandambili. It contributes to the broader discourse on water governance from a Feminist Political Ecology perspective by emphasizing the importance of integrating gender and materiality into our understanding of water access and management, and it does so by remaining grounded in the specificities of the two waterscapes.

As for the research themes that this research has opened and that could be further developed by starting and continuing fieldwork in the two villages, the topic of how international development practices can operationalize the insights coming from feminist scholarship is the main one. One contribution that goes in this direction is the work of Arianna Tozzi (2021) who argues for the need to reimagine development starting from de la Bellacasa conceptualization of "matters of care" (2017). She builds on a body of literature that moves in the same direction, (among others: Eriksen, et al., 2021; Nightingale, et al., 2020) and she states that "rethinking development as "matters of care" stands for creating alternative modes of accounting, able to value the whole set of labours involved in the production, implementation, maintenance, and repair of solutions currently discounted by dominant methods quantification" (Tozzi, 2021, p.160).

I believe it is relevant and interesting here in the conclusions to briefly explain why such research path would be an interesting one to pursue with reference to the Tanzanian hydrosocial context. First, the reason is that the research was conducted with the support of the NGO Lay Volunteers International Association who have been active in the development of projects concerning the water and sanitation sector for more that fifty years. Even though the role of LVIA was not at the centre of the research, while observing the work that its staff carries on a daily basis, while observing their work I realized that there are potential contact points between the feminist conceptualization of development that builds on the concept of care and their way of working. The most striking aspect that resonates with this

conceptualisation is the fact that the NGO operates in close contact with communities, its members, and local water entities on one side, and on government institutions such as RUWASA on the other; and it does so by maintaining a dense network of relations with both parts. In this sense, water governance seen through the work of the NGO emerges as a *relational* governance. Effectively working within such network requires a continued relational work that creates a potentially suitable space to practice and construct development strategies that could turn the so-called "neutral and undisputable 'matters of fact' of which many developmental discourses are imbued of into "necessary and non-innocent 'matters of care' " (Tozzi, 2021, p.156). Adopting this perspective would help unpack how relationships, emotions, and care practices develop among different actors acting at different scales. This specific reflection pertains to the question of how to make feminist scholarship relevant for practitioners and what concrete implications feminist thinking can have in the field of international development represents the main element that this research has uncovered and that would require further investigation. Moreover, something that this research has unveiled I the fact that in order develop water management strategies that genuinely tackle inequalities in the nexus between water and gender, it is essential to move beyond institutional frameworks like CBWSOs, which often reproduce Western models that separate nature and society. With their emphasis on technical and rational approaches, they limit the inclusion of alternative, community-based knowledge systems, especially those driven by women. To shape development strategies that reflect the complexity of rural women's experiences, it is vital to challenge narratives that frame them solely as victims. While women face infrastructural and social inequalities, they also demonstrate agency, resilience, and resourcefulness. Development practices should embrace this complexity, acknowledging women not just as beneficiaries or victims but as key actors who contribute to water management through negotiation, local knowledge, and practical solutions. The use of creative methods such as photo-elicitation, could enrich the overarching technicist vision over water with local and personal insights and it could be a way to tackle the issues of participation of women within rural water management and at the same time to reframe such issues by switching the focus on the richness of knowledge and practices that is already there instead on what is missing.

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Annex section

Attachment 1: Participant information sheet in English

Research title:

Water and gender in rural management practices:
an intersectional water geography in central Tanzania

PARTICIPANT INFORMATION SHEET

1. You are invited to participate in a research project. The aim is to study and learn how water is used and managed by both men and women in the community.

2. The participants will be adult men and women that are active in water management and that are water users in the village.

3. Your participation is voluntary and participants are free to withdraw at any time, without giving a reason.

4. The research will include different activities and you will be asked to participate in some of them:
- Interviews
- Focus groups
- Transect walks
- Participatory mapping
- Use of photography

Your consent to take part in the activities will be taken orally or in written form. Also, consent to be recorded and photographed will be asked.

5. All participants can choose to remain anonymous in the research.

6. While there are no immediate benefits for those people participating in the research project, it is hoped that this research will lead to an improvement in the water management in the village

7. If you have a concern about any aspect of this study, please contact Caterina Pozzobon and Christina Mvungi and we will do our best to answer your questions.

Contacts

Researcher: Caterina Pozzobon
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Polytechnic of Turin and University of Turin

Field associate and translator:
Christina Mvungi
e-mail: christinamvungi212@gmail.com

Attachment 2: Participant information sheet in Swahili



Jina la utafiti:

Maji na jinsia katika shughuli za usimamizi wa maji vijijini:

jiografia ya makutano ya maji katikati mwa Tanzania

KARATASI YA HABARI ZA MSHIRIKI

1. Unaalikwa kushiriki katika mradi wa utafiti. Lengo ni kusoma na kujifunza jinsi maji yanavyotumika na kusimamiwa na wanaume kwa wanawake katika jamii.

2. Washiriki watakuwa wanaume na wanawake watu wazima ambao wanahusika katika usimamizi wa maji na ambao ni watumiaji wa maji katika kijiji.

3. Ushiriki wako ni wa hiari na washiriki wako huru kujiondoa wakati wowote, bila kutoa sababu.

4. Utafiti utajumuisha shughuli mbalimbali na utaombwa kushiriki katika baadhi yao:
- Mahojiano
- Makundi ya kuzingatia
- Matembezi ya kupita
- Kuchora ramani shirikishi
- Matumizi ya upigaji picha

Idhini yako ya kushiriki katika shughuli itachukuliwa kwa mdomo au kwa maandishi. Pia, idhini ya kurekodiwa na kupigwa picha itaombwa.

5. Washiriki wote wanaweza kuchagua kutokujulikana katika utafiti.

6. Ingawa hakuna manufaa ya haraka kwa watu wanaoshiriki katika mradi wa utafiti, ni matumaini yetu kuwa utafiti huu utaleta uboreshaji wa usimamizi wa maji katika kijiji.

7. Ikiwa una wasiwasi kuhusu kipengele chochote cha utafiti huu, tafadhali wasiliana na Caterina Pozzobon na Christina Mvungi na tutajitahidi tuwezavyo kujibu maswali yako.

Mawasiliano

Mtafiti:
Caterina Pozzobon
Mwanafunzi wa PhD katika Idara ya Chuo Kikuu cha Mafunzo na Mipango ya Mikoa na Mijini
barua pepe: caterina.pozzobon@unito.it
simu: 0716089431
Polytechnic ya Turin na Chuo Kikuu cha Turin

Mshiriki na mfasiri:
Christina Mvungi
barua pepe: christinamvungi212@gmail.com

Attachment 3: Consent form in English

CONSENT FORM TO TAKE PART IN THE RESEARCH

Research title
Water and gender in rural management practices:
an intersectional water geography in central Tanzania

	Please tick each box if you agree with the statement
I understand who is involved in this research.	☐
I understand that my participation is voluntary and that I am free to withdraw at any point, without giving any reason.	☐
I understand who will have access to personal data provided, how the data will be stored and how they will be used.	☐
I understand that I have the possibility to remain anonymous and therefore not identifiable from any publications and research outputs.	☐
I consent to being audio recorded.	☐
I consent to having my photo taken.	☐
I understand how audio recordings and photos will be used in research outputs.	☐
I agree to take part.	☐

_____	_____/_____/_____	_____
Name of participant	Date	Signature
_____	_____/_____/_____	_____
Name of person taking consent	Date	Signature

Researcher: Caterina Pozzobon
PhD student at the Interuniversity Department of Regional and Urban Studies and Planning
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phone: 0752416379
Polytechnic of Turin and University of Turin

Field associate and translator:
Christina Mvungi
e-mail: christinamvungi@gmail.com

Attachment 4: Consent form in Swahili

FOMU YA IDHINI YA KUSHIRIKI KATIKA UTAFITI

Jina la utafiti

Maji na jinsia katika shughuli ya usimamizi wa maji vijijini.
Jiografia ya maji yenye makutano katikati mwa Tanzania.

Tafadhali weka alama ya tiki katika kisanduku kilichoachwa wazi ikiwa unakubaliana na taarifa hiyo.

	Wewe ni mkazi wa eneo hili.	✓
1.	Ninathibitisha kuwa nimesoma na kuelewa karatasi ya taarifa ya utafiti. Nimepata fursa ya kuzingatia habari, kuuliza maswali, na kujibiwa kwa njia ya kuridhisha.	
2.	Ninaelewa kuwa ushiriki wangu ni wa hiari yangu na niko huru kujiondoa wakati wowote bila kutoa sababu yoyote.	
3.	Ninaelewa ni nani atapata taarifa ya kibinafsi iliyotolewa, namna taarifa itahifadhiwa na namna taarifa hiyo itatumiwa.	
4.	Ninaelewa kuwa nina uwezekano wa kutoa taarifa bila kutaja jina kwa hivyo siwezi kutambulika kwenye chapisho lolote na matokeo ya utafiti.	
5.	Ninakubali kurekodiwa kwa njia ya sauti.	
6.	Ninakubali nipigwe picha.	
7.	Ninaelewa jinsi rekodi za sauti na picha zitatumika katika matokeo ya utafiti.	
8.	Nakubali kushiriki.	

.....	.....	.....
Jina la mshiriki	Tarehe	Sahihi
.....	.....	.....
Jina la mtu anayekubali	Tarehe	Sahihi

Mtafiti:
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Mshiriki na mfasiri:

Christina Mvungi
Taasisi ya Maendeleo ya Jamii Tengeru-Arusha
Barua pepe: christinamvungi212@gmail.com

Attachment 5: Visual consent form in English

CONSENT FORM TO TAKE PART IN THE RESEARCH

Research title:
Water and gender in rural management practices: an intersectional water geography in central Tanzania



I understand who is involved in this research.



I understand that my participation is voluntary and that I am free to withdraw at any point, without giving any reason.



I understand the topic of the research.



I understand that I have the possibility to remain anonymous and therefore not identifiable from any publications and research outputs.



I understand I will be asked to participate to activities like walks, interviews, focus groups, and photographic activities.



I understand that if my voice is recorded, the recording will be kept private and confidential and that my photo may be taken.
I agree to be audio-taped ☐
I agree to be photographed ☐



If I sign this form, I agree to participate.

Date: _____

Name of the Participant:

_____

Person taking consent:

_____

Signatures

Researcher:

_____

Participant:

_____

Field associate:

_____

Attachment 6: Visual consent form in Swahili

FOMU YA RIDHAA YA KUSHIRIKI KATIKA UTAFITI

Jina la utafiti:
Maji na jinsia katika shughuli ya usimamizi wa maji vijijini:
jiografia ya maji ya makutano katikati mwa Tanzania



Ninaelewa ni nani anayehusika katika utafiti huu



Ninaelewa kuwa ushiriki wangu ni wa hiari na kwamba niko huru kujiondoa wakati wowote, bila kutoa sababu yoyote.



Ninaelewa mada ya utafiti



Ninaelewa kuwa nina uwezekano wa kutojulikana jina na kwa hivyo sitambuliki kutokana na machapisho na matokeo yoyote ya utafiti.



Ninaelewa nitaombwa kushiriki katika shughuli kama vile matembezi, mahojiano, vikundi vya kuzingatia, shughuli za kupiga picha.



Ninaelewa kuwa ikiwa sauti yangu itarekodiwa, rekodi itawekwa kuwa ya faragha na ya siri na kwamba picha yangu inaweza kupigwa.
- Ninakubali kurekodiwa kwa sauti ☐
- Nakubali kupigwa picha ☐



Ninaweka saini fomu hii, ninakubali kushiriki.

Tarehe: _____

Jina la mtafiti:

_____

Jina la mshiriki:

_____

Sahihi / Dole gumba

Mtafiti:

_____

Mshiriki:

_____

Msaidizi

_____

Attachment 7: Photos taken by the participants in the photo-elicitation activity

Pandambili A and Pandambili B:












Pandambili- Nehmbo











Safi
Maisha

Pandambili: Silwa










CLASSIC HAIR CUT


Chamkoroma - Kitovuni





Chamkoroma – Shuleni





Chamkoroma – Mhongwa

