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Re-centering subjectivity in knowledge practices in climate change adaptation research

Su Mae CHUA

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Su Mae CHUA

CENTRAL EUROPEAN UNIVERSITY

ABSTRACT OF THESIS submitted by:

Su Mae CHUA

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The way humans think, feel, and experience the exercise of power matters in climate change adaptation. Climate change adaptation has emerged as a critical agenda in global environmental politics. However, global environmental politics and research practice in climate change adaptation have been dominated by Western scientific institutions and networks. Therefore, it is important to shift and re-center knowledges and research practices beyond Western research paradigms and locations. This thesis project uses a decolonial perspective and approach to analyze the processes of knowledge production, integration, and exchange in climate change adaptation research. Drawing on the perspectives and experiences of 17 climate researchers and practitioners from different countries, including India, Japan, Taiwan, and the Philippines, I analyze their subjectivities in relation to their research practices, perception, and embodied experiences of climate change adaptation research. Overall, I highlight that multiple levels and dimension of power dynamics shape the research practices and the subjectivities of the climate researchers and practitioners. Additionally, I suggest that a decolonial perspective of critical border thinking and relationality is essential for opening-up transformative and collective adaptation possibilities.

Keywords: <Climate change knowledge, power dynamics, subjectivity, decoloniality>

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Chapter 1: Introduction

The way humans think, feel, and experience the exercise of power matters in climate change adaptation. Climate change adaptation has emerged as a critical agenda in global environmental politics. In this thesis, adaptation is understood as the decision-making processes and actions undertaken by individuals, communities, governments, and other organisations to adjust to present and future shocks, stresses, and changing conditions, including "new regimes of knowledge" (Eriksen et al., 2015: p.523). As such, the systems and domains of knowledge(s) are crucial for the opening-up and closing-down of possibilities for climate change adaptation. In recognition of the critical role of knowledges in adaptation processes, knowledge exchange has become an increasingly essential field in environmental research and practice (Fazey et al., 2014; Cvitanovic et al., 2019; Karcher et al., 2022; Westwood et al., 2021). Knowledge exchange focuses on the practice of sharing and exchanging relevant information and knowledges in order to inform decision- and policy-making processes. Additionally, in the last decade or so, the field of climate services emerged as a response of the urgent need for context-specific and usable climate information to better inform processes of adaptation decision-making. Together, these areas of environmental research and practice do not only intersect areas of research, science, and society, but they also exemplify critical spaces for studying power dynamics and power relations in processes knowledge production and integration.

The relationship between knowledge and power has been widely studied (Foucault, 1980, 1995; Mignolo, 2000). From a postcolonial and a decolonial perspective, "knowledge production and everyday relations are informed by European colonial modalities of power and propped up by imperial geopolitics and economic arrangements" (Collard et al., 2015: p.323). Colonial legacies do not only shape the institutions and systems that govern society, but they also influence forms of knowledge and ideas about development, democracy, economy, science, racial-ethnic differences and so on (Radcliffe, 2017). In this sense, the legacies of colonial power and relations permeate most, if not *all*, forms of thinking and knowledges. More specifically, in environmental research, William San Martín (2021) asserts that (post)colonial arrangements and relations do not only "influence the ways in which knowledge is validated or dismissed", but they also have "profound epistemological implications, as settings shape the legitimisation of research networks and determine what and whose knowledge is authoritative" (p.424). Therefore, the power dynamics and relations of environmental research practice and processes of knowledge production are crucial to understanding how current research practices shape uneven social inequalities.

Decolonial scholarship builds on postcolonialism and postcolonial theory (Radcliffe, 2017) and highlights the inextricable relationship between power and knowledge (Mignolo, 2000; Mignolo & Walsh, 2018). Colonialism is not simply a past reality of European empires and Western civilisation in pursuit of conquest and colonization. Rather, the logic and forces of colonialism (re)produce various forms of racism, extractivism, violence, and discrimination in relation to the hegemonic discourse and system of our world (Mignolo & Escobar, 2010; Schulz, 2017). This is known as the coloniality of power and in short, coloniality (Quijano, 2000). Alongside decolonial scholarship, research and activism in areas such as, environmental and social justice critically evaluate and address issues about accountability, justice, and reparations. In the case where the world's most economically developed countries are historically the largest emitters of greenhouse gas emissions (Cohen et al., 2018), the poorest and most-vulnerable communities (often located in countries in the Global South and small island developing states) disproportionately suffer from the impacts of climate change, despite contributing the least to climate change (Sealey-Huggins, 2016). This global paradox can be traced in the historical trajectory of colonialism in the form of western industrialization and colonial appropriation (Holifield et al., 2017; Schulz, 2017). As such, issues of environmental and social injustice do not only exemplify complex issues of power and geo-politics, but they also highlight the colonial roots of climate change.

Moreover, several researchers in adaptation politics have stressed that there is an over-emphasis on technical and managerial fixes in climate change adaptation research and practice (Nightingale et al., 2019). Whereas a lack of research attention on power and politics in adaptation decision-making delimit the design, implementation, and recognition of different adaptation measures around the world (Nightingale et al., 2021; Eriksen et al., 2015). As such, socio-epistemic gaps in environmental research practice have material and discursive implications on what it means to adapt (Eriksen et al., 2015), and what is perceived as 'good adaptation' in one case study may result in maladaptation in another case elsewhere (Barnett & O'neill, 2010; Schipper, 2020). Thus, scholars argued that adaptation is *always* political and subjective (Eriksen et al., 2015; Nightingale et al., 2021; Nightingale, 2017). In this regard, the concept of subjectivity is central in understanding how the exercise of power situates individuals and collectives in relation to one another, and in relation to processes of climate change and adaptation (Eriksen et al., 2015). Thus, this thesis takes a "bottom-up" approach of investigating the intimate interrelationship of power, knowledge, and being by focusing on the subjective-intersubjective perceptions and experiences of climate researchers and practitioners.

In this thesis project, I will explore the interrelationship of power, knowledge, and subjectivity from the individual and collective perspectives and experiences of climate researchers and practitioners who were involved in a knowledge exchange project called, "Stepping-up Knowledge Exchange Between Climate Adaptation Platforms" (KE4CAP). Furthermore, I will use a decolonial lens to and a decolonial approach to conceptualise a theoretical framework to analyse the extricable interrelationship of knowledge, power, and being in relation to the subjectivities of the studied climate researchers and practitioners. Alongside decolonial concepts and scholarship, I will also refer to key literature from adaptation politics (Eriksen et al., 2015; Nightingale et al., 2021) and postcolonial studies.

This thesis analyses processes of knowledge production, creation, and exchange from a decolonial perspective by referring to the KE4CAP project as a case study for examining a global network of researchers and practitioners involved in the development and provision of climate services. The KE4CAP project involved a project consortium of five different university and research institutions from Ireland, the UK, and the Netherlands, which comprised a team of six researchers and project coordinators from those institutions. In general, the KE4CAP network comprised of more than 200 climate adaptation practitioners, platform developers, operators, and specialists, representing 30 climate adaptation platforms across the globe. Subsequently, I will focus on the subjective-intersubjective perceptions and experiences of climate researchers and practitioners in Asia, specifically in countries in India, Japan, Philippines, South Korea, Taiwan, as well as climate researchers and practitioners from Australia, Fiji, South Africa, and Samoa. Overall, the pragmatic significance of this project is grounded in its decolonial methodology and analysis, while engaging with key decolonial concepts and decolonial thinking in relation to examining fundamental aspects of knowledge production, integration, and exchange in climate change adaptation research also underscores the political and academic significance of this thesis project.

1.1 Thesis aims and research questions

In this thesis project, I will explore the interrelationship of power, knowledge, and subjectivity in climate change adaptation research from a decolonial perspective. There are two overarching aims of this thesis project. Firstly, I aim to investigate and understand how power dynamics shape processes of knowledge production, integration, and exchange in climate adaptation research. Secondly, I aim to analyse how might a decolonial methodology and framework improve

environmental research practices. Ultimately, this thesis contributes to the on-going conversations and collective endeavour of decolonizing knowledge and knowledge practices, particularly in the space of climate change adaptation and climate adaptation services. Subsequently, three research questions were identified to meet the aims of thesis. They are:

1. How do power dynamics and relations operate in processes of knowledge production, integration, and exchange in climate adaptation research? And how do those power dynamics and relations influence adaptation decision-making processes?
2. How do individual experiences and perceptions shape the subjectivity and positionality of researchers and practitioners involved in climate change adaptation?
3. How might a decolonial methodology and framework improve specific research practices in climate services and climate change adaptation?

1.2 Introducing decolonization and (de)coloniality

Over the last three decades, "decolonization" has become a buzzword in many academic discussions and public spaces (Grange et al., 2020; Gopal, 2021). Various campaigns to "decolonize the curriculum" and "decolonize education" have circulated universities in Canada, South Africa, the United Kingdom (UK), the United States (US) (Gopal, 2021; Battiste, 2019; Olaleye et al., 2016), and more locally, at Central European University[1] in Vienna, Austria and Budapest, Hungary. Furthermore, recent world events, such as the Black Lives Matter movement that gained international attention in 2020, the Stop Asian Hate campaign, and the removal of colonial statues in the UK and Aotearoa-New Zealand demonstrate a significant rise in concern over persistent systemic racism and inequality.

In recent years, burgeoning academic literature on decolonization have indicated growing interest in the topic. For example, various disciplines have commented on the relevance of decolonial theory and scholarship, including public education (Smith et al., 2018; Lee & Gough, 2020), geography (Radcliffe, 2017; Jazeel, 2017), healthcare (Büyüm et al., 2020); and international relations (Jones, 2006; Sharma, 2021; Scauso et al., 2020) to name a few. Several scholars in the field of environmental research have also expressed an interest in integrating decolonial concepts

[1] Central European University (CEU) is the host institution of this thesis.

and practices into their respective disciplines, such as in ecological sciences (Trisos et al., 2021), geoscience (Klymiuk, 2021), political ecology (Schulz, 2017), and sustainability science (Chilisa, 2017; Gough, 1998). Additionally, since the first Intergovernmental Panel on Climate Change (IPCC) climate assessment report was published in 1988, the IPCC 2022 report on "*Climate Change: Impacts, Adaptation, and Vulnerability*" included the word, "colonialism" [2] for the first time. These examples underscore the relevance of engaging with decolonial concepts and research at an academic and a policy level.

Decolonization is indeed not a simple task. Nevertheless, this thesis views decolonization as part of a collective project (Maldonado-Torres, 2011) - one that builds on postcolonial scholarship and goes beyond the geographical boundaries of postcolonial nation states and the dichotomies of Global South and Global North (Radcliffe, 2017; Mignolo, 2014). Furthermore, the notion that "there are no spaces that are not colonized" suggests that decolonization requires collaborative efforts and collective responsibility (Anderson, 2004, p. 239). Not to mention, decolonization is an unfinished project (Maldonado-Torres, 2011), meaning that new understandings and new expressions of decolonialization, in the form of different figures, moments, and social movements will play a role in various decolonizing projects in the years to come (Mignolo & Walsh, 2018). The "formation of ethnic movements of empowerment and feminisms of color and the appearance of queer decolonial theorizing" also exemplify shifting nuances of decolonization (Maldonado-Torres, 2011: p.2). Subsequently, this thesis does not necessarily represent a straightforward decolonizing project, rather, it draws inspiration from previous and on-going decolonizing projects, and endorses a decolonial perspective of conceptualizing and studying power dynamics in knowledge exchange practice. Thus, the pragmatic relevance of this project is grounded in its decolonial methodology and analysis.

1.2.1 (De)coloniality

The terms, "coloniality" and "decoloniality" were introduced by Peruvian sociologist, Aníbal Quijano, in 1990. In general, decoloniality refers to the logic and ways of understanding and de-linking from the longstanding structures and modalities of colonialism (Mignolo & Walsh, 2018; Maldonado-Torres, 2016). However, conceptualizing decoloniality requires us to first understand its counter-logic, coloniality. As opposed to colonialism, coloniality refers to "long-standing

[2] SPM.B.2 and SPM.B.2.4 in IPCC, 2022

patterns of power that emerged as a result of colonialism" (Maldonado-Torres, 2007: p.243). In Nelson Maldonado-Torres' (2016) "Outline of Ten Theses on Coloniality and Decoloniality", he explained that coloniality "involves a radical transformation of power, knowledge, and being leading to the coloniality of power, the coloniality of knowledge, and the coloniality of being" (p.18). Deriving from Maldonado-Torres' conceptualization of coloniality, we begin to visualize the inextricable links between power, being, and knowledge - see Figure 1.

In this thesis, the term, "subject" is not used to mean an academic discipline or conversation topic, but in an ontological sense referring to the totality of a human being. Subsequently, coloniality of power, coloniality of knowledge, and coloniality of being in relation to the subject highlight the subjective dimension of coloniality. As such, coloniality intersects the political and socio-cultural dimensions of human society, as well as the human dimensions of thinking, knowing, sensing, and feeling. Moreover, Ramón Grosfoguel (2006), a Puerto Rican sociologist, accentuated the salience and persistence of coloniality in the term "global coloniality". Global coloniality refers to a world-system of multiple hierarchies based on "sexual, political, epistemic, economic, spiritual, linguistic, and racial forms of domination and exploitation where the racial/ethnic hierarchy of the

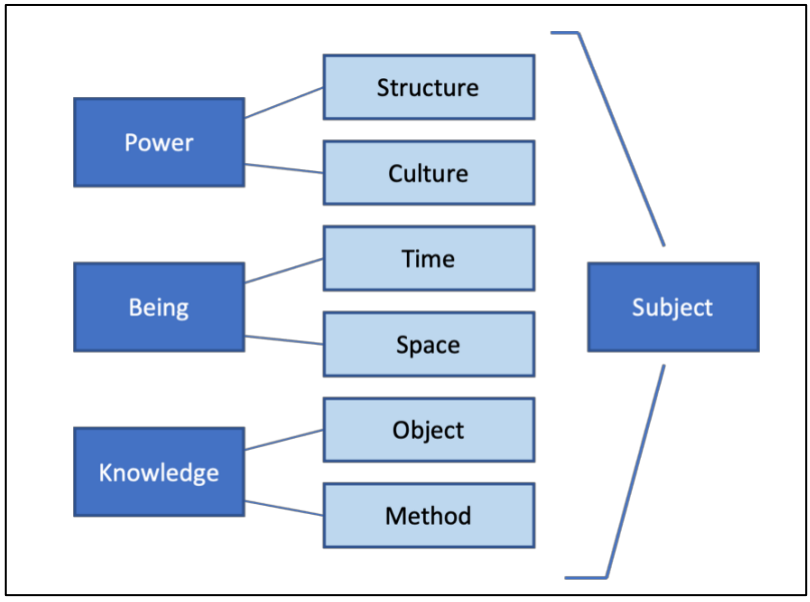

Figure 1-1 Analytics of coloniality – coloniality of power, coloniality of being, and coloniality of knowledge (Maldonado-Torres, 2016: p.19).

European/non-European divide transversally reconfigures all other global power structures" (Grosfoguel, 2006: p.172). Thus, the concept of coloniality is not only pertinent to colonizing or colonized beings, and imperial or post-colonial nation-states. Rather, global coloniality infiltrates

all forms of thinking and doing, intersects conceptual and physical boundaries (Collard et al., 2015; Anderson, 2004).

The counter-logic of coloniality is decoloniality. In short, the concept of decoloniality is twofold. Firstly, decoloniality involves acknowledging the privileging of dominant Anglo-American Euro-centered values and methods in normative research paradigms (Held, 2019). According to decolonial semiotician, Walter Mignolo (2009), decoloniality "emerged from the sixteenth century on, as responses to the oppressive and imperial bent of modern European ideas projected to, and enacted in, the non-European world" (p.39). Thereafter, decoloniality involves the conscious de-linking from the reification of Western research paradigms (Mignolo, 2007). Accordingly, "a necessary condition for delinking from coloniality" involves the process of interrogating the "underlying structure of Western civilization and of Eurocentrism" (Mignolo & Walsh, 2018: p.125). In turn, one way of interrogating coloniality is through the lens of modernity/coloniality. Mignolo (2000) conceptualized coloniality as the "darker side" of modernity. In this view, the rhetoric of modernity is rooted in the ideology of Western civilization and in Anglo-American Eurocentric claims of so-called "universal truths" (Mignolo & Walsh, 2018; Held, 2019). Thus, modernity and coloniality are not just inextricably linked together, but they are constitutive of one another.

In summary, coloniality and decoloniality denote decolonial concepts. On the one hand, coloniality signifies longstanding structures and modalities of power that permeate the ontologies and epistemologies of knowledge, power, and being. On the other hand, decoloniality acknowledges the privileging of hegemonic structures and systems of coloniality. Furthermore, the concept of decoloniality provides a critical conceptual foundation for interrogating modernity/coloniality (Mignolo, 2000).

1.2.2 Interrogating scientific institutions and networks

Global environmental research has been dominated by Western scientific institutions and networks (San Martín, 2021; Hulme, 2010; Held, 2019). In 1985, no researchers from countries outside of the North American and European continents participated in the Villach Conference (Yamineva, 2017). The Villach Conference signified the most influential climate assessment of the decade, and preceded the founding of the IPCC (San Martín, 2021; Yamineva, 2017). Furthermore, the first IPCC report assessing global climate change mostly involved scientific experts from North American and European nations. Thereafter, recent IPCC reports "have been criticized for relying

too much on global models, which do not represent regional and local changes in climate well" (Eriksen et al., 2015: p.528; Beck et al., 2014). Nonetheless, the uneven levels of participation and contribution of scientific actors outside of hegemonic institutions and networks have been highlighted as a structural feature of international assessments, frameworks, and reports (Biermann 2006; Yamineva 2017). In turn, this has led to a "global knowledge base" that predominantly reflects "Western knowledge" (Karlsson et al., 2007), which exemplifies power disparities within and between environmental scientific institutions and networks (San Martín, 2021; Hulme, 2010). This is a significant problem in environmental research because "the diversity of local realities and values are poorly represented for many areas, serving to narrow how problems are formulated and which solutions are considered" (Eriksen et al., 2015: p.528).

Furthermore, structural disparities in the division the labour in global environmental research signify the dominance of Western research paradigms (Held, 2019). A paradigm represents a philosophical stance (Crotty, 1998: p.7), and "is a philosophy, a worldview, that is, a set of metaphysical beliefs, assumptions, concepts, and values that informs [a person's] view of reality, what counts as knowledge and ways of knowing" (Held, 2019: p.1). The proliferation of Western research paradigms is intrinsically linked to colonialism (L.T. Smith, 2012; Held, 2019), in which modernity/coloniality are embedded (Mignolo, 2000). Subsequently, normative research paradigms often endorse Western scientific research methods, wherein the non-Western subject is silenced, subjugated, and labelled as "exotic", "dangerous", "un-changing", and "*Other"* (Said, 1978). In decolonial terms, this phenomenon of imposing subjectivities onto the "*Other*" refers to the colonial difference. "[T]he concept of colonial difference is based, precisely, on imperial/colonial power differentials" (Mignolo, 2005: p.36), which differentiates between "colonizer" and "colonized". Not to mention, the colonial difference has created subjective identities and categories of race, class, gender, sexuality, and so on. According to Nightingale and colleagues (2021), the imposition of subjective categories "is particularly relevant given the labeling of groups such as women, indigenous peoples, or developing countries as 'vulnerable' or lacking 'climate resilience'" (p.528-529).

The discursive and material implications of hegemonic research paradigms are important to highlight and to consider because they exemplify the inextricable relationship of politics, power, and knowledge in environmental research. Additionally, normative research paradigms promote "the privileging of dominant Euro-centered cultural values and beliefs in education, scholarship, knowledge production, the legitimization of intellectual capital, and the networks and systems of

power" (Styres, 2017: p.19). In environmental research, (as well as other research areas), this has "profound epistemological implications […] including our assumptions and institutional structures that delimit who is a valid expert and knower, and the boundaries of academic expertise" (San Martín, 2021: p.424). Moreover, the dominance of Western research institutions and networks, such as the IPCC and the United Nations Framework Convention on Climate Change (UNFCCC) in setting international scientific agendas and frameworks shapes what knowledges are considered as relevant and authoritative in environmental research, policy, and practice (San Martín, 2021). Therefore, it is crucial to interrogate the power dynamics of research institutions and networks and how they shape the knowledges of specific environmental disciplines and research fields.

1.3 Introducing climate services

Climate services is a multidisciplinary field of research and practice. According to the "*Handbook of Climate Services*", climate services are "those related to the generation, interpretation, transmission and application of climate knowledge and information for the decision making and further planning" (Leal Filho, 2020: p.3) – see Figure 1.2. The European Commission's Roadmap for Climate Services (2015) defined climate services as "the transformation of climate-related data - together with other relevant information - into customized products such as projections, forecasts, information, trends, economic analysis, assessments (including technology assessment), counselling on best practices development and evaluation of solutions and any other services in relation to climate that may be use for the society at large" (Street, 2016: p.3) – see Figure 1.3. Subsequently, there has been growing interest in the provision of climate services across multiple sectors, including agriculture, energy, disaster risk reduction, health, and water management (Tall et al., 2018; Leal Filho, 2020).

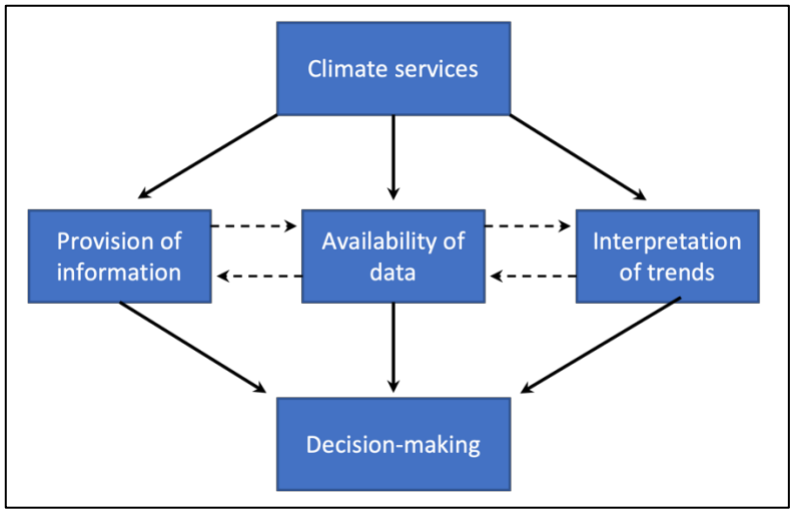

Figure 1-2 Key features of climate services that support decision-making processes (Leal Filho, 2020: p.6).

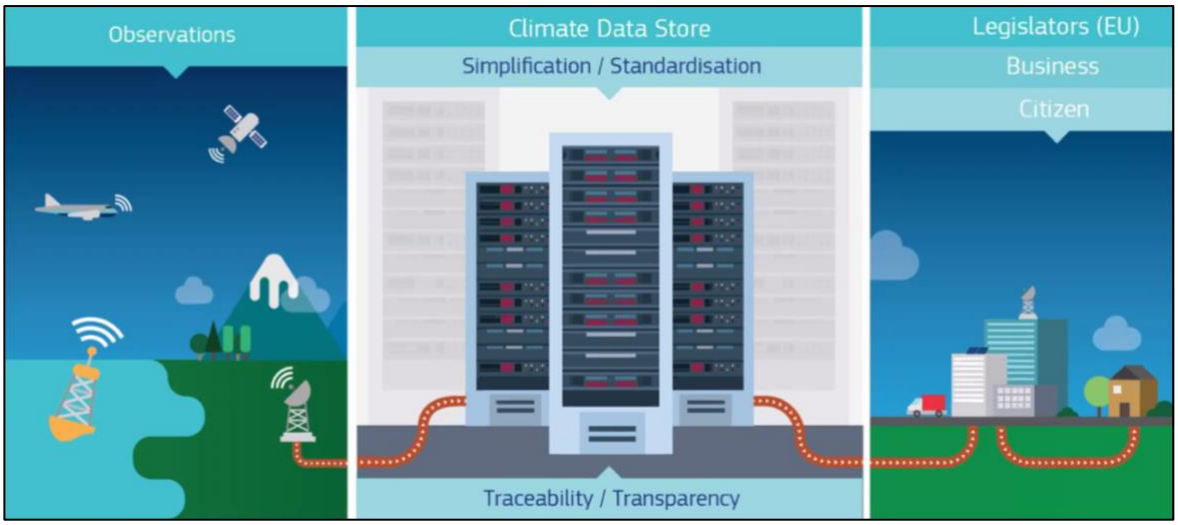

Figure 1-3 Main operations of climate services (CCCS, 2021[3]).

During the last decade, the field of climate services has developed and expanded considerably (Brasseur & Gallardo, 2016). In general, the field of climate services emerged as a response of the urgent need for context-specific climate information when dealing with climate risks and climate variability (Hewitt et al., 2012; André et al., 2021). At the same time, technological advancements in science and innovation have propelled development in climate services. As such, the field of climate services has gained more attention in various policy and research arenas, mainly because of its role in providing stakeholders with "usable" climate information and tools in order to assist processes of decision-making (Hewitt et al., 2012).

[3] Copied with permission from presentation slides from KE4CAP workshop 20/05/2021.

At the international policy level, in September 2009, the Global Framework for Climate Services (GFCS) was launched by delegates of 155 nations "to strengthen the production, availability, delivery and application of science-based climate prediction and services" (GFCS, 2009 in Tall et al., 2018: p.1). One year later, in 2010, the Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC) established the National Adaptation Plan (NAP) process. NAPs were designed to help "Least Developed Countries and other developing countries" to identify climate risks and impacts, and to assist their adaptation planning. Correspondingly, climate services has been promoted as a facilitative tool to support nations in laying the groundwork, preparing elements, implementing strategies, as well as reporting, monitoring, and reviewing their NAP process (UNFCCC, 2022; Cheng et al., 2021; Jacob, 2020). Other climate service tools and products relevant to facilitating processes of adaptation planning include "developing user needs catalogues, climate projections, impact, risk and vulnerability assessments, adaptation modelling, and monitoring and evaluation of adaptation interventions" (Jacob, 2020: p.516).

The international Climate Services Partnership was established in 2011, which represents a global network of climate services providers and users, non-governmental organizations, financing bodies and local stakeholders. Several global institutions also promote climate services, such as the World Meteorological Organisation (WMO), the IPCC, and the UNFCCC (Brasseur & Gallardo, 2016). Other initiatives of developing climate services include, National Meteorological and Hydrological Services, Future Climate for Africa, the European JPI-Climate, and the Climate Analysis for Risk Information and Services in South Asia project (Harvey et al., 2021; Cheng et al., 2020; Daron et al., 2022). These examples signify various developments and provisions of climate services at international, regional, and national scales.

In recognition of the "urgent need for more context-specific, user-driven and decision-oriented climate information" (André et al., 2021: p.2), the provision of climate services has become increasingly pertinent to informing decision-making processes in adaptation planning and for enhancing action on climate change (Vaughan & Dessai, 2014; Daniels et al., 2020; Jancloes et al. 2014; Hinkel et al., 2019). Correspondingly, a key feature of climate services is the provision of up-to-date climate information that is accessible and easily understood by a range of user groups, such as policymakers, urban planners, investors, locals, and farmers (Leal Filho, 2020). In this regard, climate services are user-oriented and sectoral focused. They have been implemented in

areas such as agricultural risk management (Tall, 2018; Vaughan & Dessai, 2014), disaster risk reduction (WMO, 2012), disease monitoring (Lowe et al., 2020), and infrastructure planning (Vogel et al., 2019; Scott et al., 2011). However, there are significant barriers and limitations to the uptake and provision of climate services.

Behavioral and social scientists have identified many barriers and limitations to climate services (Vulturius et al., 2020). Research has highlighted a "usability gap" in climate services (Lemos et al., 2012), while other barriers include the lack of financing, limited access to technology – both from the supply and demand-sides, - and restricted data availability (Leal Filho, 2020: p.6). Additionally, uptake of climate services has predominantly been by research organizations in science- and data-driven settings, as opposed to demand-driven purposes (Lourenço et al., 2016; Findlater et al., 2021). This has led to a mismatch between the knowledges shared by climate service providers and the specific needs of local people and communities (Brasseur & Gallardo, 2016).

Subsequently, there have been various efforts to overcome barriers to climate services, such as co-design and co-development approaches, of which local stakeholders work directly with climate service providers to identify user needs, while also participating in the decision-making processes (André et al., 2021; Daniels et al., 2020; Bremer et al., 2019; Harvey et al., 2021). For example, co-development approaches to climate services have been implemented for seasonal forecasting tools for agricultural and forestry sector(s) stakeholders (Soares et al., 2018; Gerger Swartling et al., 2019), flood risk assessments (André et al., 2021), and water security and water management initiatives (Daniels et al., 2020). Climate services exemplify a relatively new and evolving research field, wherein lies many areas for improvement. Nevertheless, the existing and potential benefits that flow from the provision of climate services in multiple sectors of society signify a field worth exploring.

In summary, international climate policy calling for strategies to strengthen climate action has promoted the development and provision of climate services at multiple levels (Bisaro et al., 2021). The multifunctional use and multi-sectoral relevance of climate services exemplify the applicability of climate services in informing, monitoring, and enhancing decision-making processes of adaption planning and climate action. While many barriers limit the uptake of climate services, research has increasingly turned to co-development and co-design approaches for climate services.

1.3.1 The role of digital platforms

In chapter 1.3, I introduced the field of climate services, a multidisciplinary research area predominantly science-based, user-oriented, and tailored for specific sectors. In the field of climate services, many climate service providers rely on digital platforms as a key resource. Digital platforms are used for integrating, disseminating, and monitoring relevant climate information. In information systems research, digital platforms denote "a set of digital resources - including services and content - that enable value-creating interactions between external producers and consumers" (Constantinides et al., 2018: p.381). According to Constantinides and colleagues (2018), "[d]igital platforms are created and cultivated on top of digital infrastructure," which is "the computing and network resources that allow multiple stakeholders to orchestrate their service and content needs" (p.381). In this thesis, digital platforms are understood as a set of digital resources that enable climate service providers to develop, integrate, and distribute specific tools and applications for assisting society to adapt to climate risks and climate variability; at the same time, digital platforms create spaces where multiple stakeholders from various sectors can access and make use of climate services, as well as interact with the climate service providers and other stakeholders (Bonina et al., 2021). Subsequently, I will explore the ways in which digital platforms mobilize and facilitate processes that are integral of climate services.

Digital platforms intersect the domains of science, technology, and society. Some scholars refer to these platforms as "climate adaptation platforms" (Palutikof et al., 2019), "knowledge platforms for sustainability" (Esguerra & van der Hel, 2021) and "sustainability-oriented digital platforms" (Hellemans et al., 2021). These terms are treated interchangeably in this thesis project, albeit digital platforms are not viewed as homogenous entities. Nonetheless, a case study focusing on the KE4CAP project will specifically refer to the development and provision of climate adaptation platforms. In recent years, several scholars have commented on the increasing pertinence of digital platforms in decision-making processes of adaptation and climate action (Hellemans et al., 2021; George et al., 2021; Kolk & Ciulli, 2020). This is because "sustainability problems cut across and connect local issues with broader, global problems, by enabling the exchange of localized information," and so, digital platforms "can act as brokers that provide a virtual location for the creation of new linkages" (Hellemans et al., 2021: p.670). Accordingly, it is argued that digital platforms are useful for leveraging strong networks effects and connectivity (Ojala et al., 2018), possessing high levels of scalability (Acquier et al., 2019), and facilitating information sharing,

mobilizing knowledges, and connecting resources and people for adaptation and climate action (George et al., 2021; Bonina et al., 2021).

Moreover, digital platforms provide an interface where communication channels can be established between platform users and platform providers, and among the platform users (Ciulli et al., 2020). Digital interfaces also provide a space where different resources, such as toolkits or training to develop various climate service products can be distributed via the platform (McIntyre et al., 2020). However, there are several drawbacks to digital platforms. In a review paper by Bonina and colleagues (2021), the specific requirements of technological devices and sufficient technical know-how in order to access and use digital platforms limited the uptake of climate services. Several researchers also pointed out that digital platforms can amplify existing social inequalities because the applications of digital platforms often benefit advantaged groups of people, while marginalised and other groups of people are excluded from the same benefits (Toyama, 2011; Friederici et al., 2020). Thus, it is important to also acknowledge the contested role and applications of digital platforms, whereby "digital interfaces can act both as borders and bridges, demarcating the boundaries of interactions and communications among platform participants" (Hellemans et al., 2021: p.670).

In recognition of the exclusionary implications of the social practices and knowledges of digital platforms, several researchers have argued that the participatory design choices of digital platforms are crucial (Hellemans et al., 2021; Esguerra & van der Hel, 2021; Introne et al., 2011). In a study by Esguerra a**n**d van der Hel (2021), the institutional design options for integrating participatory strategies into digital platforms were assessed. Their study included two digital platforms, the "Intergovernmental Platform for Biodiversity and Ecosystem Services" (IPBES) and "Future Earth: Research for Global Sustainability". In their findings, Esguerra and van der Hel (2021) asserted that the different design choices of the IPBES and Future Earth platforms were critical for understanding "the power relations between participants" and how they "bring about specific knowledge products" (p.135). This is because "[d]esign choices affect whose and which knowledge claims are presented as true and relevant by knowledge platforms for sustainability" (p.145). For example, IPBES incorporated "alternative understandings of biodiversity" into their platform (p.145). In comparison, Future Earth invited a combination of scientists and representatives of stakeholder communities to comprise their Advisory Committee, which is the decision-making body for Future Earth's scientific agenda and outputs on the platform (Esguerra & van der Hel,

2021). Subsequently, these examples highlight different methods of co-designing and co-producing digital platforms.

Esguerra and van der Hel (2021) articulated that the integration of specific design choices of the IPBES and Future Earth platforms was not necessarily because of "opening up to a diversity of stakeholders in the development of relevant knowledge for biodiversity and sustainability" (p.145), rather, specific design choices were tailored to "supporting the legitimacy of the platform and enhancing its impact" (p.145). Consequently, "[t]he dynamics of seeking authority continue to reinforce the dominance of actors already involved in global environmental politics rather than supporting less powerful stakeholders to inform or challenge knowledge claims" (p.145). Nevertheless, the IPBES and Future Earth platforms exemplified spaces of contestation of decision-making, where specific design choices for digital platforms either challenged or reinforced dominant knowledge practices (Beck et al. 2014; Turnhout et al. 2012).

1.3.2 A decolonial perspective of climate services and digital platforms

Over the last decade, the field of climate services emerged as a response of the need for legitimate, credible, and salient climate information (Cash et al., 2003; André et al., 2021). Furthermore, I introduced digital platforms in chapter 1.3.1, highlighting their suggested role as the interface of science and society, by bringing together different knowledges, disciplines, and stakeholders (Hellemans et al., 2021). However, the field of climate services is greatly contested, and significant barriers and limitations to the uptake of climate services through digital platforms remain salient. This sub-chapter explores the terminology, processes, and ontology of climate services and digital platforms, specifically from a decolonial perspective. Using a decolonial lens, underlying assumptions, issues, and power dynamics in relation to the field of climate services and the technologies of digital platforms are brought to the foreground.

The notion of the field of climate services as "user-oriented" speaks to the provision of "actionable" knowledge products, tools, and services that meet that wants and needs of the "end-user" (André et al., 2021). In this regard, and to a certain extent, climate services emerged as a "bottom-up" approach of disseminating climate information and knowledges among individuals and decision-makers (the so-called, end-users). However, research shows that in reality, climate services do not necessarily reflect a bottom-up approach (André et al., 2021). Moreover, a decolonial perspective of climate services begs to question who the "providers" and "end-users"

of climate services are? Are the interactions between climate service "providers" and "end-users" as linear as what the terms suggest? How do these terminologies influence the power relations between said "providers" and "end-user"? Also, what knowledges are represented in climate services and how are different knowledges valued in climate services?

The terminology of "providers" and "end-users" of climate services accentuates a "supply-driven, one-directional delivery of climate information from providers (e.g. climatologists, meteorologists) to users (e.g. decision-makers, city planners and extension officers)" (Daniels et al., 2020: p.1). As such, the framing of the provision of climate services reflects a conventional top-down approach to adaptation (Dessai and Hulme, 2004; Lourenço et al., 2016). This is problematic because the needs, reality, and socio-political context of local "end-users" are often subjectivized and imposed by the "climate service providers" (Porter and Dessai, 2017; Vincent et al., 2018). Additionally, a one-directional approach has been found to inadequately consider different understandings of, and approaches to uncertainty, vulnerability, and climate change adaptation (Patt and Dessai, 2005; Porter and Dessai, 2017) let alone, incorporate the wider decision-making context of climate service participants and stakeholders (Vincent et al., 2018). In turn, the very terminology of climate service "providers" and "end-users" exemplifies Lewis Gordon's (2006) notion of "disciplinary decadence", whereby the provision of climate services involves inward-looking research practices that are more concerned about the generation of knowledge products within its scientific domains and through specific scientific methods. Therefore, the terminology used in climate services and digital platforms suggests a significant shortcoming of research practice, where the framing of climate change impacts and adaptation possibilities are chiefly prescribed by the climate service "providers" and imposed on the local "end-users".

Several researchers have highlighted the increasing pertinence of co-development, co-design, and transdisciplinary approaches to climate services and digital platforms (Daniels et al., 2020; André et al., 2021; Bremer and Meisch, 2017, Vaughan and Dessai, 2014). For example, "learning, empowerment, institutional capacity or new representations of nature and society" exemplify some of the benefits that flow from co-producing climate services (Bremer et al., 2019: p.43; Norström et al., 2020). However, co-production processes can also reproduce existing unequal power relations (Turnhout et al., 2020). In many cases, there is an over-emphasis on knowledge products as key outcomes of climate services; this tends to ignore the social, cultural, epistemic, and political differences between participants during processes of co-production (Turnhout et al. 2020).

Subsequently, Daniels and colleagues (2020) conceptualized a "process-centric" approach as a way of re-framing the provision of climate services. Accordingly, a process-centric approach focuses on "the nature of the interaction expands institutional and individual capacities and confidence, relationships, collaborations, communication and networks, across the socio-political and governance landscape" (Daniels et al., 2020: p.4), as opposed to the material outcomes of climate services. As such, Daniels and colleagues (2020) argued that a process-centric approach to climate services "can increase the shared understanding of a problem, build trust and confidence to engage in unfamiliar knowledge spaces, and, in turn, strengthen capacity, relationships and networks over a longer timeframe" (p.4). Hence, recent research highlights multiple and emerging opportunities for co-development, co-design, and transdisciplinary approaches to shifting research practices and re-framing the provision of climate services.

All things considered, the technological foundations of climate services and digital platforms cannot be ignored. In a chapter of the book, "*Pluriverse: A Post-Development Dictionary*" (edited by Kothari et al., 2019), George Caffentzis criticized "the adoption of digital tools in almost every sphere of daily life" (p.37). In his critique, Caffentzis introduced the notion of "blood computers" as an analogy to "blood diamonds", "following increasing evidence of the trail of blood that computer production involves" (p.37). This is linked to extensive reports of armed conflicts and violence in mineral-rich countries such as, the Democratic Republic of the Congo, resulting in deaths, extortion, forced labor, and the displacement of local populations (Dias, 2009; Brophy & de Peuter, 2014). Thus, the extractive and "notoriously exploitative" nature of producing digital electronic products (Caffentzis, 2019: p.39) emphasizes the need to be critically aware of the ecological and social injustices that are embedded within the structures and systems of many digital tools, which are integral to the provision of climate services and digital platforms. Therefore, we cannot simply celebrate the notion of climate services and digital platforms as a potentially inclusive interface of science and society "without accounting for the conditions under which its technologies are produced" (Caffentzis, 2019: p.39).

Overall, the field of climate services is a relatively new and evolving research area. While a growing number of countries and research institutions adopt frameworks and approaches to developing climate services to better inform processes of adaptation decision-making and adaptation planning, I highlighted the increasing relevance of digital platforms in disseminating climate service tools, products, and information. However, there are many barriers and limitations of climate services and digital platforms. Nonetheless, as climate policy frameworks, research agendas, and overall

interests in climate services develop over the years, this thesis project looks to examine the role of climate researchers and practitioners in designing, developing, and administering specific climate services and digital platforms for climate change adaptation.

1.4 Introducing environmental knowledge exchange

Over the last three decades, environmental knowledge has been increasingly influential in guiding climate policy and practice (Fazey et al., 2012; Reed et al., 2014; Posner and Cvitanovic, 2019). At the same time, international climate policy calls on "promoting international and regional cooperation in order to improve climate action" (Paris Agreement, 2015; Glasgow Climate Pact, 2021). As such, the field and practice of knowledge exchange has become increasingly essential (Fazey et al., 2012; 2013; Reed et al., 2014; Provençal, 2011). This is because it involves the interchange between "knowledge producers" (researchers/scientists) and "knowledge users", such as government agencies, non-governmental organisations, and educators (Westwood et al., 2021). Yet, research shows that mobilizing new knowledges into policy, management, and public domains face significant obstacles (Young et al., 2016; Cvitanovic et al., 2016; Hulme, 2015).

Knowledge exchange is neither a new practice nor a novel concept. For example, many disciplines in environmental sciences, policy, and management have conducted extensive research on knowledge exchange (Karcher et al., 2022; Westwood et al., 2021 Cvitanovic et al., 2015; 2019; Nguyen et al., 2017), and many knowledge exchange activities are salient in areas of applied environmental research (Fazey et al., 2014). Thus, researchers have long engaged in various forms of informal and formal knowledge exchange activities, such as through teaching, fieldwork, conducting workshops with practitioners, and the social interactions among colleagues (Fazey et al., 2014). Moreover, the concept of knowledge exchange is wide-ranging. While there are different conceptualizations of the term knowledge exchange, this thesis follows Fazey and colleagues' (2012) understanding of knowledge exchange as a "two- or multiple path process with reciprocity and mutual benefits, but not necessarily recognition of the equitable value of the different forms of knowledge being exchanged' (p.12). In this way, one-way transfers of knowledge such as, delivering a lecture or independently producing a scientific report or paper, are understood as distinct and separate from the fundamental notion of knowledge exchange.

Various academic literature has emphasized an increasing need for participatory methods in processes of environmental knowledge exchange. The adoption of various concepts and practices

such as, evidence-based management (Cvitanovic et al., 2016), adaptive management (Folke et al., 2005), and adaptive co-management (Plummer & Armitage, 2007) corresponds with a proliferation of research practices in knowledge exchange that are increasingly based on methods of co-production, collaborative and democratic processes, and plural knowledge bases (Beier et al., 2017; Karcher et al., 2022; Fazey et al., 2014). At the same time, several researchers have stressed many difficulties of exchanging knowledge across social and epistemic boundaries, even when there is a shared endeavor to exchange specific knowledge (Young et al., 2016). In this regard, the challenge of effectively and successfully exchanging knowledge is comparable to the longstanding debate about the relationship between science and society (Bradshaw & Borchers, 2000; Phillipson et al., 2012). Subsequently, integrating a decolonial perspective of knowledge exchange provides a critical lens to interrogating socio-epistemic differences, power dynamics, and ontological assumptions, which are integral of knowledge exchange processes, but also fundamental in bridging the science-policy-action divide.

1.4.1 A decolonial perspective of knowledge exchange

There is a common assumption in knowledge exchange research and practice, which claims that increasing the level of interaction between knowledge producers (such as, researchers and scientists) and potential knowledge users (such as, decision- and policy-makers) will inherently improve the outcome of knowledge exchange (Young et al., 2016). However, this is not the case and in fact, knowledge exchange involves complex political, social, cultural, and epistemic relations between the knowledge exchange participant. The movement of knowledges is neither linear nor one-directional. Rather, the ways in which people communicate and interact with one another are shaped by institutional arrangements (Dolšak & Prakash, 2018; Hackett et al., 2016; Leach et al., 1999), socio-epistemic discrepancies and hierarchies (San Martín, 2021; Young et al., 2016), and ontological assumptions (Mignolo & Walsh, 2018; Tlostanova, 2019). These underlying issues highlight complex power dynamics, which have profound implications on how and which knowledges get or do not get integrated into processes of knowledge exchange, as well as who's knowledge is considered authoritative the processes of knowledge exchange.

A study by Young and colleagues (2016) highlighted, "the impact of social practices and relationships on how people access and interpret knowledge, and the fact that knowledge can be mobilized in multiple ways [...] depending on context" are key factors of knowledge exchange research and practice (p.381). By drawing our attention to the social practices, perceptions, and

contexts entangled in the processes of knowledge exchange, "the iterative and non-linear nature of knowledge movement" is emphasized (Young and colleagues, 2016: p.381). Young and colleagues (2016) also stressed that issues of politics and power relations in knowledge exchange have "profound political consequences, particularly if knowledge claims imply that certain policy actions are logical or necessary to address a given problem or challenge" (p.381). However, Young and colleagues did not mention that underlying the political disparities and socio-epistemic hierarchies of knowledge exchange are colonially inflected power differentials, which have been conditioned and informed by the rhetoric of modernity/coloniality (Grosfoguel, 2006; Mignolo, 2000; 2007). Thus, a decolonial perspective of knowledge exchange warrants a deeper understanding and a broader conceptualization of the power dynamics and relations shaped by the historical, political, and social structures and systems of modernity/coloniality.

Furthermore, a decolonial perspective of knowledge exchange offers a critical basis of questioning and re-thinking normative research practices and approaches of knowledge exchange. Moreover, who are the "knowledge producers" and "knowledge users" involved in knowledge exchange, and what makes them "knowledge producers" and "knowledge users" as opposed to those who are not? What makes one knowledge authoritative and/or legitimate for knowledge exchange as opposed to other knowledges? These questions do not have a straightforward answer, but they are pertinent to "how individuals, communities, governments and various other organisations interact in adaptation problem framing, the response options considered and whose interests and voices are able to influence such debates" (Eriksen et al., 2015: p.523). Therefore, studying the processes of sharing and exchanging knowledge relevant for climate change adaptation becomes crucial for understanding how the framing of climate issues and adaptation possibilities can reinforce existing social inequalities or empower certain groups of people.

Thambinathan and Kinsella (2021) asserted that "exercising critical reflexivity is a key approach to decolonizing research" and "powerful for examining researchers' epistemological assumptions, their situatedness with respect to the research, and crucial in addressing power dynamics in research" (Thambinathan & Kinsella, 2021: p.3). Correspondingly, studying the processes of knowledge exchange from a decolonial perspective does not simply involve examining the linear movement of knowledge from the "knowledge producer" to the "knowledge user". Instead, a decolonial perspective draws attention to the values, assumptions, and interests of the knowledge that is exchanged, the context in which the knowledge is situated, and the multiple flows and encounters of human and more-than-human interactions that shape the processes of knowledge

exchange. As such, a decolonial perspective of knowledge exchange is not representative of a solution of decolonizing knowledge exchange research; rather, my emphasis is on creating spaces of contestation - allowing and encouraging us to critically question and possibly re-imagine our approach to exchanging and sharing knowledges.

From a different but similar perspective, several scholars in adaptation politics argued that "[t]oo much emphasis is placed on human impacts and behaviors mediated through infrastructure, institutions and individual values, without adequately accounting for how these are always mediated by power and politics" (Nightingale et al., 2021: p.e741). An over-emphasis on institutional measures and perspectives when dealing with issues of climate change has also led to the over-prioritization of technical and managerial fixes, which inadequately consider the experiences and lived realities of people at the local level (Nightingale et al., 2019; Dolšak & Prakash, 2018). From this standpoint, there is lack of research attention on power dynamics in processes of knowledge exchange relevant for climate change adaptation, and how these processes of knowledge exchange are subjected to and shaped by politics and power operating at the institutional, societal, and individual levels. Additionally, there is a need to consider more-critically the experiential and embodied ways of knowing in knowledge exchange research and practice to better inform processes of climate change adaptation.

In summary, a decolonial perspective of knowledge exchange draws attention to the intricate relationship of knowledges and power. Power exists and operates at the level of institutions, wherein formalized institutions and organizations play a significant role in shaping processes of knowledge exchange, including legitimizing and prioritizing certain knowledges over other knowledges and other ways of knowing. It is also important to note that knowledge exchange is inherently a social process, which means that social practices, human perception, and embodied experiences are pertinent to understanding processes of knowledge exchange.

1.5 Chapter conclusion

In this chapter, I introduced the main research disciplines included in this thesis project. Firstly, an introduction to the concept of decolonization, coloniality, and decoloniality provided a brief

overview of decolonial literature. I outlined the conceptual foundations of this thesis project, drawing from decolonial scholarship to conceptualize the interrelationship of power, knowledge, and being. Furthermore, I highlighted the pertinence of coloniality and decoloniality in environmental research by drawing on examples from scholars in Indigenous studies (Held, 2019; L.T. Smith, 2012) and literature from science and technology studies and adaptation politics (San Martín, 2021; Eriksen et al., 2015; Hulme, 2010), to emphasize the material and discursive implications of Western research institutions, networks, and paradigms. Next, I introduced the field of climate services and the role of digital platforms in chapter 1.3. Subsequently, I described key aspects of knowledge exchange research and practice in chapter 1.4. At the end of chapters 1.3 and 1.4, I explored a decolonial perspective of the research areas that were introduced in each chapter. These latter sections of chapters 1.3 and 1.4 exemplify my reflexive approach of writing and conducting research. Those reflections do not constitute the research findings of this thesis project, but they do help to inform my perspective of a decolonial approach to research practice.

Chapter 2: Relevant concepts and theoretical framework

2.1 Decolonial thinking

Decolonial thinking does not align with a single school of thought or universal theory. Instead, decolonial scholarship builds on postcolonial theory (Radcliffe, 2017) and draws from different anti-colonial writers, activists, and artists (Mignolo, 2007) such as, Indigenous scholars Beth Blue Swadener, Kagendo Mutua and Linda Tuhiwai Smith; feminist and queer theorists María Lugones, Freya Schiwy, Sylvia Winter, and Yuderkys Espinosa Miñoso; and political philosophers Enrique Dussel and Franz Fanon. Even though many seminal decolonial thinkers come from South and Central America, decolonial scholarship is wide-reaching. At the same time, decolonial thinking is not restricted to post-colonial nation states or colonized beings. Rather, decolonial thinking is pertinent to all peoples, disciplines, and contexts (Collard et al., 2015; Anderson, 2004).

According to Walter Mignolo (2009), a decolonial semiotician, "de-colonial thinking and doing, emerged from the sixteenth century on, as responses to the oppressive and imperial bent of modern European ideas projected to, and enacted in, the non-European world" (p.39). In this sense, decolonial thinking is twofold. Decolonial thinking involves acknowledging the privileging of dominant Anglo-American Euro-centered values and methods in normative research paradigms. At the same time, decolonial thinking involves the conscious de-linking from the reification of Western research paradigms (Mignolo, 2007). As I take these two aspects of decolonial thinking into account, decolonial thinking to me, exemplifies a critically reflexive undertaking (Thambinathan & Kinsella, 2021). Simultaneously, decolonial thinking provides a way, a methodology, of conceptualizing and analyzing the intricate interrelationship of knowledge, power, and being (Swadener & Mutua, 2014).

It is important to note that the concept of decolonial thinking differs from postmodern and postcolonial theory, even though they share a critical view of modernity. Postcolonial theory emerged from seminal thinkers and scholars such as, Edward S. Said, Homi K. Bhabha, Gayatri C. Spivak, Jacques Derrida, and Michel Foucault (Bhambra, 2014). The main contributions of postcolonialism as a critical theory relate to how postcolonial theory provides "a way of deconstructing colonialism and its historical effects on the colonized" (Getty, 2010: p.7). However, postcolonial scholarship has been criticized for provincializing Western claims and co-opting Western vernacular (Asher, 2013; Jazeel, 2017; Noxolo, 2017; L.T. Smith, 2012). Nonetheless, the

tensions of decoloniality and postcolonial theory is not the focus of this thesis project. Instead, I refer to the postcolonial feminist, Madina Tlostanova, and her transdisciplinary approach of conceptualizing decoloniality. Madina Tlostanova (2019) emphasized that it is "necessary to advance an open critical basis, taking into account the existing parallels between various echoing concepts and epistemic grounds of postcolonial and decolonial discourses" (p.176). Accordingly, decolonial thinking builds on postcolonialism and postcolonial theory (Radcliffe, 2017; Tlostanova, 2019), and offers "an open critical basis" for conceptualizing and conducting environmental research.

There are, however, many difficulties in integrating decolonial concepts into research and policy. This is because the concept of decolonization is complicated and contested (Leeuw & Hunt, 2018; Smith, 2012; Tuck & Yung, 2012). Several scholars argue that decolonization - as a concept and as a movement - has been misappropriated in European countries and in the United States (Moosavi, 2020; Banerjee, 2022). These scholars speak to the dangers of mainstreaming decolonization in ways essentialize the colonial and anti-colonial histories of colonialized countries, resulting in "decolonization without decolonizing" (Moosavi, 2020). Moreover, popularized notions of decolonization render the concept "locked in the past, located elsewhere, or confined to specific empirical dimensions" (Maldonado-Torres, 2016: p.6). In this regard, after the collapse of the British and French empires, and post-World War I and II, there was a wave of decolonization across Africa, Asia, the Caribbean, and other territories around the world. Even though these events marked the formal end of the British and French colonial administrations, in a decolonial sense, decolonization is considered a failed project (Maldonado-Torres, 2011).

Nevertheless, decolonial thinking involves probing into contested spaces of knowledge production and knowledge integration. Instead of promoting "the privileging of dominant Euro-centered cultural values and beliefs in education, scholarship, knowledge production, the legitimization of intellectual capital, and the networks and systems of power" (Styres, 2017: p.19), decolonial thinking challenges these ontological assumptions and epistemic hierarchies. According to Karsten A. Schulz (2017), a political ecologist, "subjugated knowledges about ecological, economic, cultural-cognitive and spiritual transformations must be regarded as key points of reference for a decolonial option in the Anthropocene" (p.129). Therefore, in this thesis project, I will interrogate fundamental areas of knowledge production and knowledge integration in environmental research - in particular, in the field of climate services and in processes of knowledge exchange – both of

which are critical for informing decision-making processes in adaptation planning and policymaking.

2.1.1 A relational understanding of knowledge, power, and being

A critical concept in decolonial thinking is relationality (Mignolo & Walsh, 2018). In decolonial terms, "relationality" refers to the Spanish word, "vincularidad". Drawing on Andean Indigenous thinkers, such as Nina Pacari and Fernando Huanacuni Mamani, decolonial scholars denote relationality as the relational and interdependent co-existence of all living organisms on the planet (Mignolo & Walsh, 2018). In this sense, relationality signifies the interconnection of human and more-than-human relations. Furthermore, L.T. Smith asserts that decolonial thinking methodologies involves "a process which engages with imperialism and colonialism at multiple levels" (2012: p.606). Thus, relationality – of coloniality of power, coloniality of knowledge, coloniality of being (see Figure 3.1) – highlights the inextricable interrelationship of power, knowledge, and being. In turn, the concept of relationality becomes key for conceptualizing and studying power dynamics in human and more-than-human relations (Nightingale et al., 2021), while a relational approach becomes useful for examining power dynamics "at multiple levels" of knowledge, power, and being (L.T. Smith, 2012).

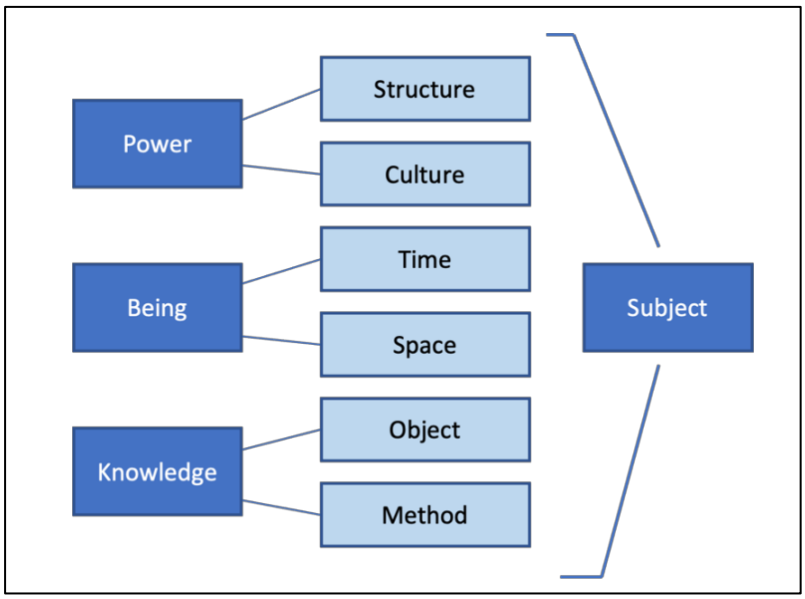

Figure 2-1 Analytics of coloniality – coloniality of power, coloniality of being, and coloniality of knowledge (Maldonado-Torres, 2016: p.19).

Furthermore, a relational understanding of power, knowledge, and being "draws attention to the contradictory outcomes of the practices, relationships and contexts wherein power is exercised (Butler, 1997; Foucault, 1995), rather than trying to pin down whether power is a positive or negative force" (Eriksen et al., 2015: p.13). In this regard, a relational approach of examining the exercise of power draws our attention to everyday interactions, social practices and relations, and context (Nightingale et al., 2021; San Martín, 2021; Argawal, 2005). Moreover, Nightingale and colleagues (2021) argued that a relational approach of conceptualizing and conducting climate change adaptation research necessitates the inclusion of plural ways of knowing, as well as ways of relating. In their view, "[e]motions such as love, hate, anxiety, joy, gratitude, desire, empathy, fear and other affective relations facilitate action as they flow between humans, between human and nonhuman bodies and technologies, and as such are crucial ingredients of politics" (Nightingale et al., 2021: p.e741). As such, relationality signifies a concept that not only aligns with decolonial thinking, but it exemplifies a concept that is also cross-cutting, intertwining human and more-than-human relations, as well as experiential and embodied experiences.

A relational understanding of knowledge, power, and being corresponds with decolonial thinking. As shown in Figure 3.2, a relational approach interlinks the components of decoloniality of power, decoloniality of knowledge, and decoloniality of being. Subsequently, a relational approach helps us to conceptualize processes of knowledge production and integration as spaces of contestation, wherein new and multiple knowledges "emerge relationally from the exercise of power via dominant discourses and practices (Eriksen et al., 2015: p.528). Additionally, the notion of relationality points to the emergence of multiple subjectivities of the exercise of power (Butler, 1997; Foucault, 1995). Accordingly, our attention is not on a singular subjective perception or experience. Rather, the social and individual dimensions of subjectivity become central to connecting the exercise of power to individual agency and uneven social relations, including how new and multiple subjectivities emerge from the acceptance or resistance of the exercise of power (Gibson-Graham, 2002). Hence, a relational ontology of power, helps to mediate a decolonial approach of conceptualizing power, knowledge, and being in relation to studying subjectivity.

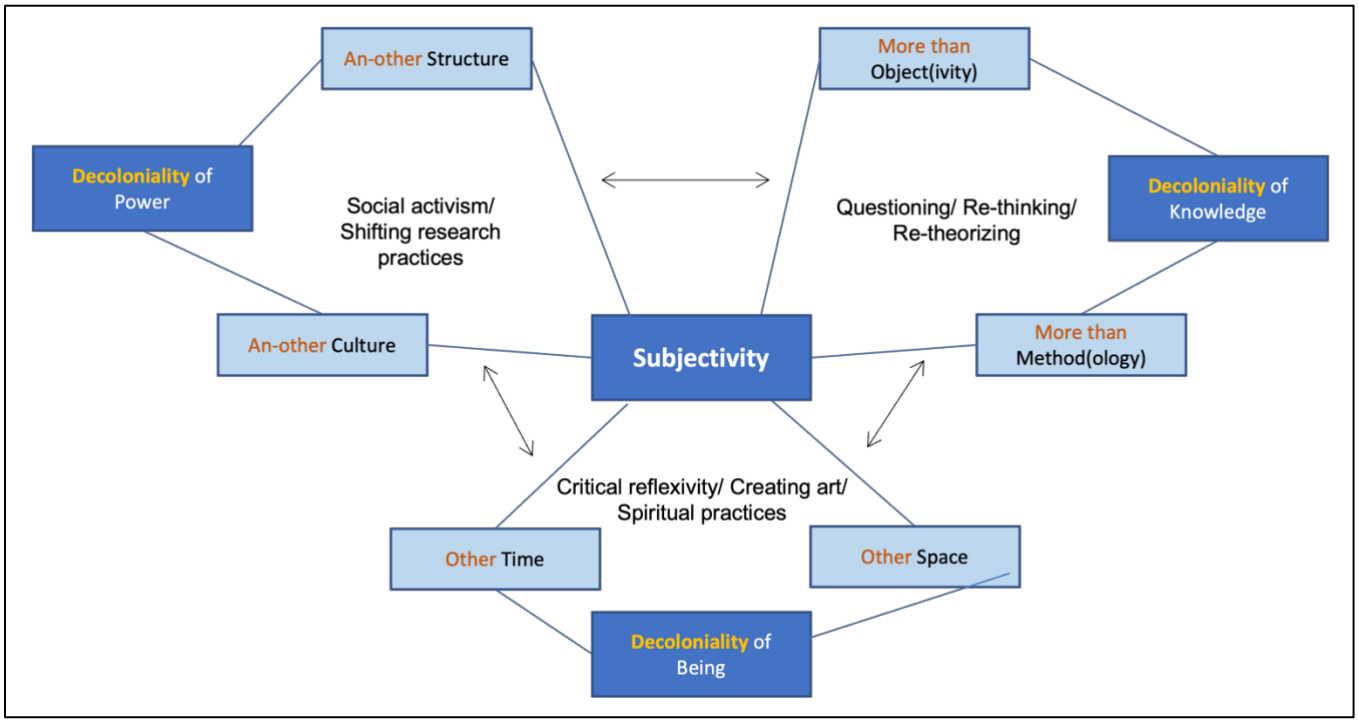

Figure 2-2 Analytics of decoloniality of power, decoloniality of knowledge, and decoloniality of being in relation to subjectivity (Maldonado-Torres, 2016: p.30).

2.2 Shifting the geography of reason

The concept of decoloniality emphasizes the importance of moving away from normative research paradigms, methods, and frameworks (Held, 2019). Recognizing that dominant modes of knowledge production are delimited by Anglo-American Eurocentric methods and ways of knowing is an essential step in this thesis' decolonial approach. Subsequently, "shifting the geography of reason" is the first of three decolonial concepts that constitutes this thesis' theoretical framework. Shifting the geography of reason is a pivotal concept because it involves moving away from a "hubris of zero point". According to Santiago Castro-Gómez (2005), a Colombian philosopher, zero-point hubris denotes a specific Eurocentric positionality of 'observing from above'. A zero-point hubris also signifies a delocalized and disembodied place of sensing, thinking, and describing the world. Thus, moving away from zero-point hubris is a critical step in shifting the geography of reason away from the objective and neutral principles of modern scientific research.

According to Maldonado-Torres (2011), "[d]ecolonizing knowledge necessitates shifting the geography of reason, which means opening reason beyond Eurocentric and provincial horizons, as well as producing knowledge beyond strict disciplinary impositions" (p.10). In this sense, shifting the geography of reason suggests turning attention to the research and researchers from subaltern locations and/or living in marginalized contexts. Furthermore, knowledge production is not isolated in formal institutions, such as the university or research institutions; in fact, knowledge production occurs through everyday social practices. This view of knowledge and society as co-productive is consistent with literature from science and technology studies (STS) (Jasanoff, 2011; Ottinger et al., 2017). Additionally, feminist theory highlights that knowledge is always situated (Haraway, 1988), "both from where a given knowledge-claim is derived, as well as whose interests it will serve, in any evaluation of its historically- and culturally-specific significance and truth-value" (Moya, 2011: p.80). In decolonial terms, the situatedness of knowledge draws our attention to the "locus of enunciation" (Grosfoguel, 2011).

The locus of enunciation denotes the positionality of the individual (the enunciator), which exemplifies "the geo-political and body-political location of the subject that speaks" (Grosfoguel, 2011: p.4; Mignolo & Tlostanova, 2006). In social science research, positionality refers to the social and political context that informs an individual's assumptions, identity, and worldview (Coghlan & Brydon-Miller, 2014). Accordingly, the practice of shifting the geography of reason to the subjectivities and positionalities of the studied individual(s) has been interpreted in several different ways. For political ecologist, Karsten A. Schulz (2017), this involves a political commitment based on new forms of collaboration, including "'"studying *with* subaltern social groups," instead of merely perceiving them as subjects of research" (Mato, 2000: p.487 in Schulz, 2017: p.129). This practice not only involves who or which groups of individuals are studied but also, "[i]n very concrete terms, this means that subjugated knowledges about ecological, economic, cultural-cognitive and spiritual transformations must be regarded as key points of reference for a decolonial option in the Anthropocene" (Schulz, 2017: p.129). In feminist scholarship, Linda Martin Alcoff (2017) provides an example of shifting the geography of reason to the geo- and body-politics of knowledge by highlighting the socio-political dimensions of identity and experience as key elements of knowledge. From these different perspectives and disciplines, shifting the geography of reasons to the geo- and body-politics of knowledge signifies a particular focus on subjectivity and positionality.

2.3 Focusing on subjectivity and integrating an intersubjective approach

Focusing on individual and collective subjectivities is a critical step of shifting the geography of reason to the geo- and body-politics of knowledge. To clarify some unavoidable jargon, the definitions of the terms, "subjectivity" and "intersubjectivity" are provided. Subjectivity is understood and studied as the way in which the individual understands themselves and the world, including their knowledges, perception, and lived experiences (Sithole, 2014). Conceptualizing subjectivity as culturally and historically formed is also considered in this thesis (Rey, 2017). While the term, subjectivity refers to individual level characteristics, in comparison, intersubjectivity relates to "the shared perceptions of the psychological characteristics that are widespread within a culture" (Chiu et al., 2010: p.482). Intersubjective perceptions are pertinent in the understanding of "inner-worlds" of individuals (Iveset al., 2020), that is, the internalized cultural beliefs and values of the individual, which are intrinsic of the individual's emotions, sensory relations, and worldview (Chiu et al., 2010).

When studying the subject, it is argued that "[f]or the colonized subject, objectivity is always directed against him" (Fanon, 2004: p.37). In other words, coloniality has informed and controlled the subject position of the non-Western individual through material and discursive impositions. In turn, decoloniality exemplifies a way, an approach, of research that involves "re-humanizing" the subject (Mignolo & Walsh, 2018), by studying the subject through the individual's own assumptions, lived experiences, and subjective-intersubjective perceptions (Chilisa, 2012). For the Cuban psychologist, González Rey (2017), re-centering the subject in this way involves understanding the social and individual dimensions of subjectivity. Corresponding with the social and individual dimensions of subjectivity, multiple levels of ideas, values, socio-cultural norms, and practices intersect the subjectivity of an individual – from a psychological level of the individual to widespread social practices within a specific culture (Chiu & Hong, 2006). As such, the inward- and outward-looking practices of subjectivity correspond with how "individuals participate actively in the construction and reproduction of the intersubjective reality through their perceptions and actions." (Chiu et al., 2010: p.483). Hence, the entanglement of subjective and intersubjective perceptions exemplifies the different social and individual dimensions of subjectivity (Rey, 2017).

The social dimensions of subjectivity highlight the pertinence of an intersubjective approach to conceptualizing subjectivity. However, intersubjective perceptions have been criticized as

"collective fallacies" (Terracciano & McCrae, 2006); merely representative of "cultural stereotypes" (P.B. Smith, 2006 in Chiu et al., 2010). On another hand, in a study by Chiu and colleagues (2010), they asserted that the intersubjective perception of the individual is both, grounded in an external social reality, and entwined in the "inner-worlds" of the individual. Thus, an intersubjective approach allows me to interlink multiple dimensions of subjectivity.

2.4 Critical border thinking

The notion of critical border thinking was introduced by Walter Mignolo in 2000. Drawing from the works of Gloria Anzaldúa and José David Saldívar, Mignolo conceptualized the notion of critical border thinking while writing and theorizing from his diasporic experiences of living in the US. In theory and in practice, critical border thinking "denies the epistemic privilege of the humanities and the social sciences – the privilege of an observer that makes the rest of the world an object of observation" (Mignolo & Tlostanova, 2006: p.206). This corresponds with the first and second decolonial concept of shifting the geography of reason to the geo- and body-politics of knowledge and subjectivity. Thus, the two decolonial concepts that have been outlined in chapters 2.2 and 2.3 are interconnected with the third decolonial concept of critical border thinking, all of which are integrated into the theoretical framework of this thesis project.

From a border perspective, one's field of analysis is open to the transformation and re-definition of rhetorical concepts that have been imposed by European modernity. In this view, it is important to stress that decoloniality is not the absolute rejection of Western scientific research. Rather, decoloniality exemplifies an "epistemic response" (Grosfoguel, 2006), of which critical border thinking provides a method, a way, of slipping between the borders of coloniality and decoloniality. Furthermore, critical border thinking resonates with Sandra Harding's (2018), an American philosopher of femininity and postcolonial theory, conceptualization of "seeing with both eyes". In this way, one sees the good and the bad in both, Western paradigms as well as other paradigms and knowledges. Harding draws from William E.B. Dubois, American sociologist, and his notion of "double consciousness". According to Dubois (2007), double consciousness involves a critical awareness of the imperial ideology that has permeated in many forms of knowledge as claims to universal truth. In decolonial scholarship, the idea of double consciousness as border thinking (and border thinking as double consciousness) was brought forward by Mignolo and Tlostanova (2006) as a way of analyzing "internalized colonialism", which denotes the internalized subjectivities of

"*Other*-ness". As such, critical border thinking is a decolonial concept that encourages and supports plural ways of conceptualizing and studying multiple subjectivities (Grosfoguel, 2006; Tlostanova, 2019).

In a collective book project edited by Bernd Reiter and titled "Constructing the Pluriverse" (2018), Reiter highlighted the global complexity of the world we live in:

> "Those who live in the Global South directly experience the effects of modernization, globalization, and Westernization in the erosion of local culture and community; those who live in the Global North witness similar trends as local communities in the North have long suffered from the onslaught of capitalist rationality on local communities but also on epistemic communities…In short: none of the authors assembled here sits comfortably in their offices and homes. All inhabit, to some extent, borderlands—even if for some, these are more borderlands of the mind, whereas for others the borderlands affect their bodies along with their minds." (Reiter, 2018: pp.314-315).

If the borderlands - as described by Reiter - is where critical border thinking emerges and proceeds, this thesis project inhabits the borderlands. However, Reiter (2018) commented that inhabiting the border is a result of "consciousness" and "critical awareness" – this runs the risk of assimilating and reproducing the rhetoric of modernity/coloniality based on propagated Anglo-American Eurocentric "Enlightenment" claims. Yet, the modern scientific claims of enlightenment were taken from Buddhism teachings. In the 19th century, the term was popularized and romanticized by German philologist Max Müller. Instead, I propose understanding the concept of enlightenment through the teachings of Theravada Buddhism, where I first encountered the term. Enlightenment is the English translation of the Sanskrit noun, "bodhi" or "buddhi", which refers to mindfulness, intuition, and perception. In this sense, I take a mindful, intuitive, and perceptive approach to critical border thinking.

Chapter 3: Methodology

3.1 Research design

Referring to L.T. Smith's book, "Decolonizing methodologies" (2012; [1999]), "[m]ethodology is important because it frames the questions being asked, determines the set of instruments and methods to be employed and shapes the analysis" (p.143). Accordingly, a methodology comprises of the theoretical foundation, research techniques, and methods for data collection and analysis. Decolonial thinking constitutes the theoretical foundation of this thesis. As such, a decolonial perspective serves as a critical lens for studying the underlying assumptions and structures of knowledge production and knowledge integration in the field of climate services and in processes of knowledge exchange. However, there is no fixed methodology, nor a 'superior' framework used in decolonial thinking and research (Swadener & Mutua, 2014; G.H. Smith, 2012).

Contrary to normative approaches and dominant methods of designing and conducting research, especially in comparison to quantitative research methods, a lack of standardized procedures in decolonial thinking and doing can be problematic. For instance, the level of 'generalizability' of a specific research project is often used as a key criterion to evaluate the rigor of research based on the ability to essentialize or replicate research methods or findings in future studies (Polit & Beck, 2010). However, the concept of generalizability is consistent with the modern scientific agenda, whereby knowledge is extracted and produced in order to make claims that are applicable to essentialized groups of people and settings (De França Sá & Marsico, 2022).

Instead of extracting information for the purpose of this thesis project, I will incorporate an inductive and relational approach of collecting and analyzing qualitative research. In other words, I will first listen to the perspectives, assumptions, and experiences of the research participants and analyze what they say accordingly. This approach aligns with a decolonial approach of shifting the geography of reason to the geo- and body-politics of knowledge (Grosfoguel, 2011; Mignolo & Tlostanova, 2006) – see chapter 2.2. In terms of a relational approach, I draw on feminist theory, emphasizing that knowledge is always situated (Haraway, 1988). I will also use a decolonial perspective of relationality by integrating a relational understanding of power, knowledge, and being into my analysis. Subsequently, my integrated approach of understanding of power, knowledge, and being will allow me to analyze subjectivity in relation to power, knowledge and being (see figure 3.1), and it is consistent with the theoretical framework identified of this thesis.

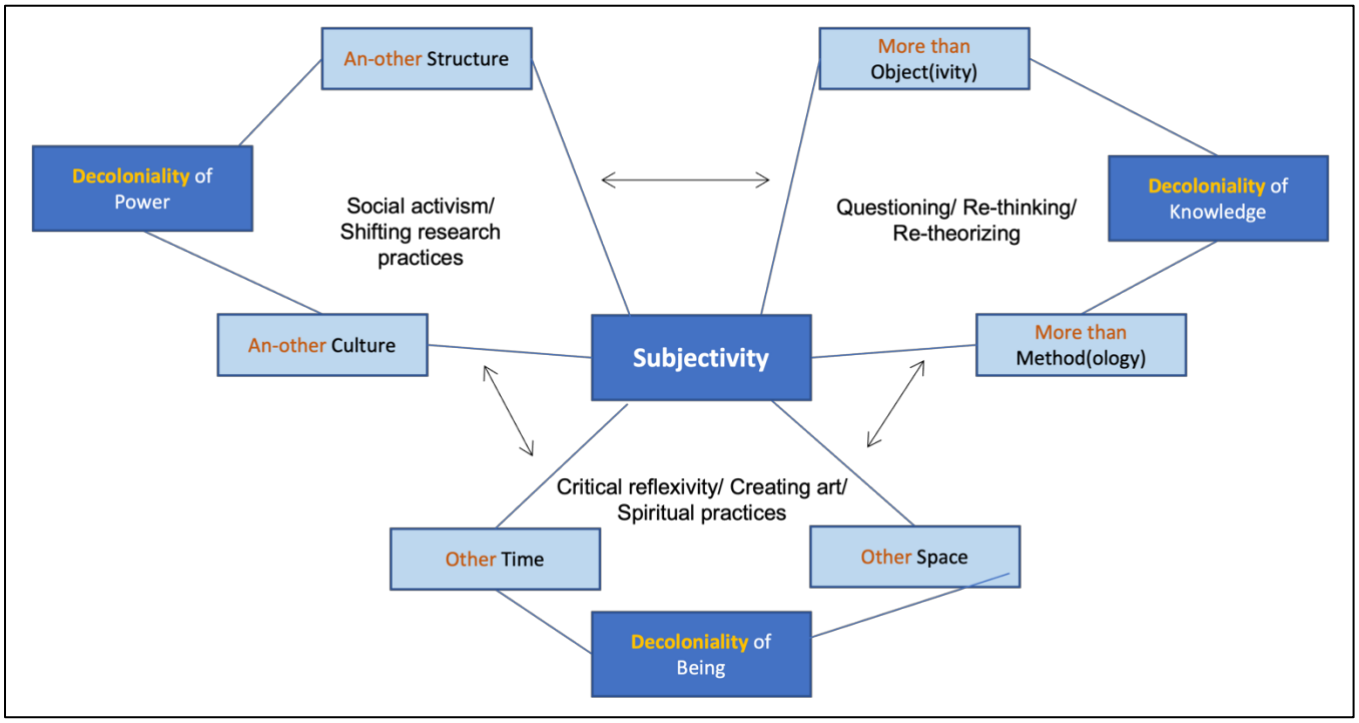

Figure 3-1 Analytics of decoloniality of power, decoloniality of knowledge, and decoloniality of being in relation to subjectivity (Maldonado-Torres, 2016: p.30).

Furthermore, a process of critical reflexivity is a fundamental aspect of this project's design. Critical reflexivity is integral of a decolonial approach (Thambinathan & Kinsella, 2021), and helps to highlight key "epistemic interests" and "blind spots" that may emerge from data collection and analysis (Moya, 2011). Even though decoloniality and processes of decolonization have been argued to be pertinent to all human beings and contexts (Grosfoguel, 2006; Anderson, 2004), different groups of people have different roles to play in processes of decolonization (Held, 2019). In turn, I view my role and position in decolonization from two standpoints: I am a woman from Malaysia, and I exist in the colonial difference[4] as a Chinese/South-East Asian woman from post-colonial/colonized Malaysia. At the same time, I am a student writing a master's thesis at a European-based institution and so, I re-construct and negotiate the colonial difference through this thesis project and its contribution to on-going conversations and projects of decolonization.

The following sub-chapter includes a description of the KE4CAP project case study, which sets the context in which a combination of research methods was employed at different stages of data collection and analysis. Thereafter, the ethical considerations of the research process are described in chapter 3.5.

[4] See chapter 1.2.2 on the notion of the colonial difference

3.2 The KE4CAP project case study

From June to September in 2021, I interned at the Oxford Centre of the Stockholm Environment Institute, where I worked on a knowledge exchange project called, "Stepping-up knowledge exchange between climate adaptation platforms" (KE4CAP). The KE4CAP project is used as a case study of a transnational project focusing on the facilitation of knowledge exchange between actors and organisations involved in the provision of climate services through the development and management of climate adaptation platforms (CAPs) at the regional, national, and subnational scales. More specifically, the KE4CAP project brought organisations and CAPs together through a range of knowledge exchange activities and workshops, where different actors shared individual lived experiences, platform tools and approaches, as well as challenges and difficulties regarding the development and management of CAPs and the provision of climate services. It is crucial to highlight that this thesis is an independent projectIt is important to make clear that this thesis is an independent project, and it is not directly affiliated with the objectives and activities of the KE4CAP project. Nevertheless, the main premise of this thesis project originated from a combination of personal reflections and various formal and informal conversations with colleagues.

The KE4CAP project ran from November 2019 to January 2022. The project consortium involved 5 different university and research institutions from Ireland, the UK, and the Netherlands[5], and comprised a core team of 6 researchers and project coordinators. The project was funded by the European Commission's Directorate-General for Climate Action (DG CLIMA) and Deutsche Gesellshaft-für Internationale Zusammenarbeit (GIZ) GmbH under the Strategic Partnerships for the Implementation of the Paris Agreement (SPIPA). The governance and administration of KE4CAP project played a role in determining the participation of specific organisations and CAPs in the project. The ways in which the participation of specific organisations and CAPs were influenced by the administrative boundaries and organisational structure of the project is considered in chapter 6.

The KE4CAP project was planned as a series of in-person knowledge exchange events. On the one hand, the primary focus of the project was to bring together EU climate adaptation platforms (CAPs) with established national platforms from Australia, Canada, and Japan. Targeted

[5] Consortium members include the Stockholm Environment Institute-Oxford, UK; University of Oxford, UK; University of Cork, Ireland; and Climate Adaptation Services, Netherlands.

collaborations with organisations in Argentina, India, Mexico, South Africa were also included as objectives for the KE4CAP project (Street et al., 2019). On the other hand, "[f]ollowing the onset of the COVID-19 pandemic, from early 2020 the programme of activities was moved online and sought to engage a much wider and more international audience of over 30 national and regional CAPs" (Chua & Barrott, 2022: p.7). Overall, the KE4CAP project provided a forum for more than 200 CAP practitioners, developers, operators, and users to come together to share individual experiences and to engage in various knowledge exchange activities (Street et al., 2022).

3.2.1 Scoping and access

A map of the countries and regions of the KE4CAP participants is shown below in figure 3.2. Accordingly, majority of participating research organizations and their respective CAPs were from countries in the European region. Only 10 out of a total of 30 participating CAPs represented countries from Latin America, Africa, Asia, and Oceania. In addition to the geographic distribution of the participating CAPs, most of the participating countries represented high-income economies, including the institutions comprising the KE4CAP project consortium and all three countries of the project partners (Australia, Canada, and Japan) (World Bank, 2022).

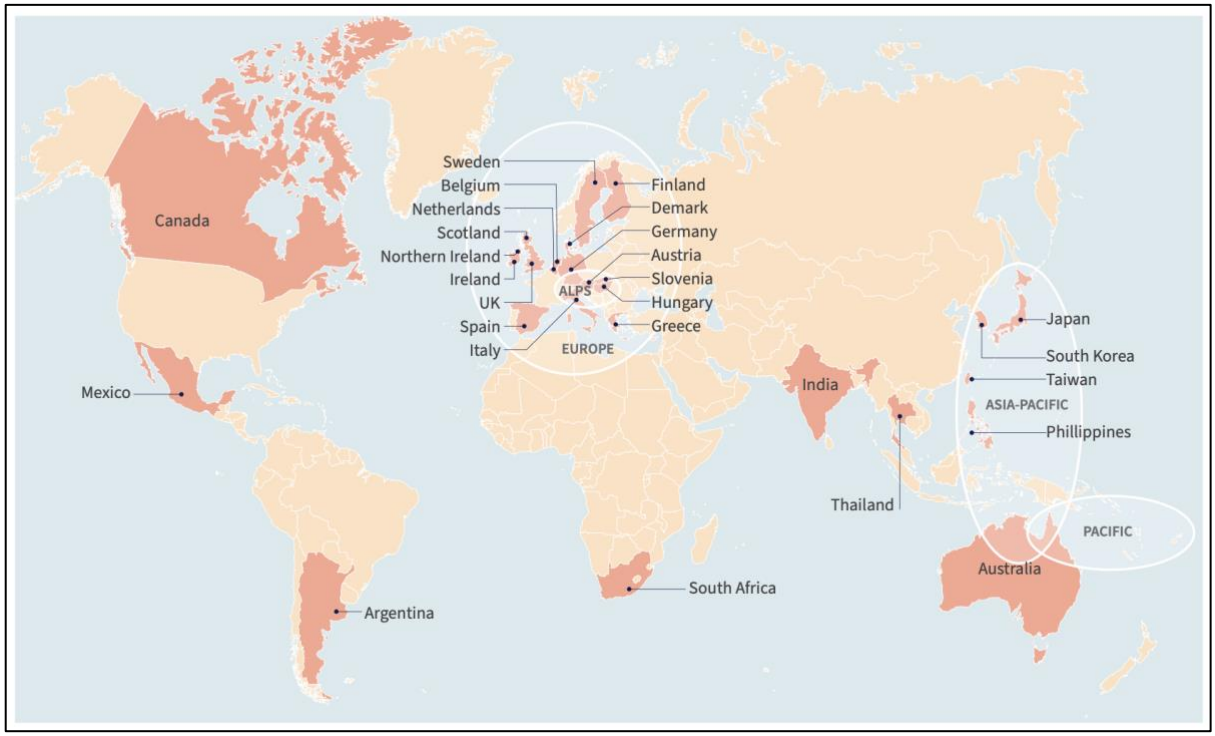

Figure 3-2 Map of the research organizations that participated in the KE4CAP project (Chua & Barrott, 2022: p.23).

During my internship, I conducted an impact assessment of the KE4CAP project. This involved 10 semi-structured interviews with project participants, as well as a review of the participants' responses in a network-wide survey. Subsequently, key findings from the impact assessment outlined several challenges relating to knowledge exchange practice, including "geographic gaps in the representation of climate adaptation platforms involved in the KE4CAP project", a lack of "different narratives and contexts of climate adaptation outside of the EU [European Union] region", and other "subtle challenges relating to a presumed understanding of scientific knowledge and technical know-how" (Chua & Barrott, 2022: p.17). Even though these issues were not fully representative of the views and experiences of all participants that were involved in the KE4CAP project, these challenges were consistent with findings from previous studies that highlighted barriers in environmental knowledge exchange, such as socio-epistemic, geographical, and cultural differences (Cvitanovic et al., 2015; 2016; Young et al., 2016; Fazey et al., 2012). These challenges also insinuated issues of power and politics in knowledge exchange practice, which incited further investigation.

Additionally, I participated in regular project team meetings and in various knowledge exchange workshops. This provided me with first-hand insights into the activities and discussions that took place at different stages of knowledge exchange through the KE4CAP project, such as in the design, implementation, and review stages. Through my involvement in the KE4CAP project, a professional network of researchers and practitioners involved in the provision of climate adaptation services also provided me with the opportunity to connect with researchers and practitioners whose work focused on pertinent issues of climate change adaptation at regional, national, and subnational scales. The professional relationships developed over the period of my internship were vital for building a decent level of familiarity and trust with project participants and project team members. A good rapport with project participants and project team members was also necessary and pertinent in the early stages of this thesis' data collection, such as when reaching out to potential interviewees, and during data collection.

3.3 Empirical research methods

A combination of qualitative research methods was used in this thesis project. Multiple data collection methods were crucial for constructing an understanding of power dynamics and relations that are most often intangible, sensitive, and half-spoken (Burghart, 1996). Moreover, an iterative process of data collection, qualitative coding, and analysis was engendered through a

grounded and an inductive approach (Charmaz, 2014). This approach also allowed me to revisit interview questions, reconceptualize research findings, and aided in the verification, reliability, and rigor of the thesis project (Morse et al., 2002).

In general, the process of empirical data collection was divided into three chronological stages. The first stage involved the scoping of the knowledge exchange activities, discussion topics, and social processes that occurred through the KE4CAP project involved online participant observation. Audio-video recordings and KE4CAP project reports and documents also helped to support and substantiate participant observation notes. The second and third stages of empirical data collection were informed by a total of 18 online semi-structured interviews. In the second stage of data collection, 10 individual interviews and 2 group interviews were conducted with climate researchers and practitioners who were participants of knowledge exchange through the KE4CAP project, from countries in Asia, including India, Japan, Philippines, South Korea, and Taiwan, as well as the countries, Australia, Fiji, Samoa, and South Africa. The third stage of data collection involved 6 individual interviews with researchers and practitioners comprising the "core KE4CAP team". The decision to first conduct the interviews with the participants of the KE4CAP project before turning to the members of core KE4CAP team aligned with my decolonial approach of studying from the "borders" of the KE4CAP project and re-centering the perspectives of the individuals inhabiting the "borders".

3.3.1 Online participant observation

In the months of July, August, and September of 2021, I participated in weekly online meetings with members the core KE4CAP team and performed various work assignments related to project's knowledge exchange activities. As such, my approach to online participant observation consisted of about 10 weeks of notetaking and conscientious reflection. This method was influential for providing foundational insights into the practice of knowledge exchange through the KE4CAP project. Casual group and one-to-one conversations were effective in generating honest and descriptive responses, which also suggests how unstructured interviews can be disguised as part of participant observation (Fife, 2005). In general, online participant observation supported in the scoping of the KE4CAP project, and in the development of interview questions, which allowed for a more in-depth inquiry into particular areas of interest and to clarify certain observations that were made.

Observation notes were documented in a notebook and afterwards consolidated in a Microsoft Word document. The observation notes were divided into three main sections: activity, reflection and emerging questions and analysis. At the end of each day, a process of reflection involved reviewing specific work-related activities (such as 'independent work', 'KE4CAP team meeting' and/or 'check-in meeting with Jenny), and documenting any interesting observations from online interactions in various meetings and knowledge exchange activities. Participant observation notes included three knowledge exchange events that occurred through the KE4CAP project - "Bilateral Knowledge Exchange EU-Canada - Enhancing Connections across Platforms"; "Bilateral Knowledge Exchange EU-Japan - Enhancing connections across international, national and local adaptation actions"; and "KE4CAP/Climate-ADAPT Synthesis Workshop - Climate Adaptation Platforms – Realising the Value of Shared Learning".

Moreover, project event reports and documents, plus audio-video recordings of the knowledge exchange events provided useful secondary material. They also supported in the cross-checking of participant observation notes. Hence, the use of secondary materials alongside empirical data collection helped to reduce the necessity of documenting all my observations at the exact time when those observations were made. In turn, this helped to encourage more natural conversations with the KE4CAP participants and team members, which also facilitated nuanced data collection during online participant observation (Crang & Cook, 2007). Additionally, establishing a good rapport with the participants was particularly important (Weller, 2017). A good rapport with project participants and project team members was also pertinent for supporting more productive interviews in the next stage of data collection (Sultana, 2007).

3.3.2 Interviews

A total of 18 semi-structured interviews were conducted online using the "*Zoom Video Communications*" (Zoom) videoconferencing tool. Each interview was about 45 to 65 minutes long. An initial plan to only conduct one-to-one interviews morphed into a combination of individual interviews and small group interviews, with the latter involving 4-6 participants. This was based on the requests of several interviewees who represented the same research organisation and hence, the same climate adaptation platform (CAP). Even though such a small set of interviews may not achieve the representative coverage of a quantitative approach of gathering multiple viewpoints, it does give more in-depth explorations into individuals' perspectives.

The interviewees were divided into two groups - one group consisting of 17 KE4CAP project participants, while the second group consisted of 6 members of the core KE4CAP team - see Appendix A. Initial scoping of the KE4CAP project and a literature review helped in designing the interview schedules, which were used to guide each of the semi-structured interviews. The interview questions were developed to be open-ended, while initial questions were also followed by 'probing' questions to gain deeper understanding to interviewees' responses (James & Busher, 2006). Two different sets of interview questions were developed according to the two groups of interviewees - see Appendix C. The first group of interviewees involved KE4CAP project participants from countries in Asia and the Pacific, including Fiji, India, Japan, Philippines, South Korea, Samoa, and Taiwan, as well as from Australia and South Africa. In this case, the interview questions were designed to gain an understanding of interviewees' subjective-intersubjective perceptions of climate change adaptation and climate adaptation services, paying close attention to interviewees' local contexts and their subjective-intersubjective perceptions and experiences. These interview questions directly support in answering RQ2 (and RQ1, indirectly). Comparably, the second set of interview questions designed for conducting interviews with the core KE4CAP team members focused on examining the design of the KE4CAP project. These questions investigated the design choices and outcomes of the KE4CAP project, which helped to informing RQ1 and RQ3.

I began each interview with a short introduction of myself (my name and background), also noting my research objectives and the reason for requesting the interview. The interviewees were asked to reaffirm verbal consent for me to record and transcribe the interview. An interview procedure similar to Graham H. Smith's (2002) approach of conducting interviews was used. This involved avoiding the use of scientific jargon, (such as the terms, "subjectivity" and "intersubjective perception") and freedom of the participant to withdraw at any time. This approach also encouraged the interviewees to tell their stories in their own way, while it was my responsibility to listen and to link their stories back to the information needed (G.H. Smith, 2002). Additionally, I expressed my interest in the conversation throughout the interview by nodding and making affirmative remarks to reassure participants that they were being heard and understood. Moreover, a mindful approach of interacting with the interview participants before, during, and after the interviews also helped to ensure appropriate behavior throughout the interview process. A certain level of awareness and knowledge of the interviewee's cultural norms and expectations, as well as a consideration of language sensitivity was also considered before, during, and after data collection.

Careful attention to cultural codes and social hierarchy in terms of age, gender, and status were also pertinent to the interview process. Further ethical considerations can be found in chapter 3.6.

My decision to conduct the interviews using the Zoom platform was based on several reasons, including the geographical spread of the interview participants included in the study, and travel restrictions and uncertainties related to the Covid-19 pandemic at the time of data collection. Several researchers suggested that online interviews may facilitate more reflexive responses from interviewees, with the possibility of mediating sensitive conversations between the participant and the researcher (Deakin & Wakefield, 2014; Archibald et al., 2019). Furthermore, Zoom was found to be a viable research tool due to ease of use, cost-effectiveness, data management, and security features (Deakin & Wakefield, 2014). Even though the method of using Zoom for qualitative data collection critically depended on the participants' and researcher's access to internet connection and technological devices, a certain level of familiarity with using the Zoom platform had been developed through the KE4CAP project since its various knowledge exchange activities were also conducted online using Zoom and Microsoft Teams platforms.

Subsequently, the interviews were transcribed using a speech-to-text transcription software called "*Otter.ai*". Preliminary interview analysis was conducted on the Otter.ai software using the 'highlight' and 'comment' functions, which were later transferred and consolidated in a Microsoft Word document. Overall, a close engagement with the research process, paired with an established and well-maintained professional relationship with the research participants helped to ensure respectful and appropriate behaviour before, during and after online participant observation.

3.4 Research participants

The primary focus of data collection and analysis involved 17 climate researchers and practitioners from countries across Asia, including India, Japan, Philippines, South Korea, and Taiwan, and from the countries, Australia, Fiji, Samoa, and South Africa. A full list of the research participants can be found in Appendix A. Subsequently, a brief introduction of the climate researchers' and practitioners' respective climate adaptation platform (CAP) and research organisations is provided below.

Ayaka Nishida, Haru Yuji, and Hinata Izumi are researchers at the National Institute for Environmental Studies, Center for Climate Change Adaptation in Japan. Their work focuses on

the development and management of The Asia-Pacific Climate Change Adaptation Information Platform (AP-PLAT). AP-PLAT was launched in 2019. It is a web-based platform with the said goal of contributing to the sustainability and resilience of Asia-Pacific region. The platform contains recent information about climate change adaptation, including relevant science for policymakers, researchers, businesses and the public. AP-PLAT covers three main areas: scientific information and knowledge creation by generating data, information and knowledge; tool development by making knowledge visually appealing and accessible to everyone; and capacity development by providing training on policy development, project formation, utilization of scientific knowledge and tools, and creating capacity building material.

Deepan Rastogi and Animesh Gujat are advisors working on the Indo-German Cooperation Project on Centre of Excellence on Climate Finance, focusing on the Climate Adaptation and Finance in Rural India (CAFRI) project in India. They helped to develop and manage the Climate Finance Knowledge Portal. The portal is a web-based platform developed by the Centre for Climate Change and offers knowledge products and supports the conversation about Climate Finance. The portal provides interactive forums, such as discussion forums, queries and text search spaces for different sectors of the economy. Information about climate finance related global events and e-learning links of various organisations can also be found on the portal.

Sung-Ho Kim is a Chief Research Fellow at The Korea Environmental Institute (KEI). KEI established in 1997 in accordance with the Environmental Impact Assessment Act. KEI is involved in environmental policy research and reviewing environmental impact assessments. It aims to contribute to preventing and solving environmental challenges through this work. The research areas to which KEI contributes include environmental economy, environmental assessment, climate change and atmospheric environment, water environment, environment management, resource circulation, environmental health, and international cooperation.

Cassandra Leigh, Seijun Roko, and Christine Richards-Smith work at the Pacific Climate Change Centre in Apia, Samoa, which operates under the Secretariat of the Pacific Regional Environment Programme (SPREP). SPREP was established in 1993, and it represents an inter-governmental organisation. They provided multiple information portals, including the Pacific Environment Portal; the Invasive Species Battler Resource Base Pacific Climate Change Portal; the Pacific Islands Protected Area Portal; the Pacific Meteorological Desk & Partnership; and the Pacific Network For Environmental Assessment.

Grace Wong and Marcus Lee are research assistants at the National Science and Technology Center for Disaster Reduction. Their work focuses on The Taiwan Climate Change Projection Information and Adaptation Knowledge Platform (TCCIP), which is a three-phase project that started in 2010. Its aims are to provide climate change data, information, and knowledge to users, including government agencies, researchers, industries, and the public. TCCIP aims to promote climate change service in Taiwan and follow the global leadership by establishing international connections. The website contains a data store, climate projections, and publications about climate change among other resources.

Valerie Kho is the Associate Director of Programs at the Oscar M. Lopez (OML) Center, which is a non-governmental organisation in Manila, Philippines. Valerie helped to set-up and managed the Climate Knowledge Portal - an interactive tool designed to allow anyone to visualise the Projected Climate (2006-2076) and the Observed Climate (1971-2000) of the Philippines. The aim of this portal is to make climate research accessible and useful for Filipino community. The observed and projected data is made of rainfall and temperature variables and is derived from the Climate Data Section, Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA).

Denise Adisa, Kamogelo Owusu, and Amahle Abbe work for the Republic of South Africa's Department of Forestry, Fisheries, and the Environment, Climate change and Air quality. They worked on a project to develop the National Climate Change Information System of South Africa. The project was designed to track South Africa's efforts in transition to a low carbon and climate resilient economy. The platform offers several decision-support tools for policymakers and decision-makers. It monitors and evaluates various climate change drivers, targets, strategies, and environmental assessments. The platform also provides climate databases and tools such as GHG emissions database, climate trends, climate change projections and various training materials.

Peter Laughlin is the Monitoring and Evaluation focal point in the Hub Program Management Team at The Commonwealth Scientific and Industrial Research Organisation (CSIRO) in Australia. CSIRO government research agency founded in 1916. It aims to solve the most challenging problems the modern society faces through innovative science and technology. The Earth Systems and Climate Change Hub is a digital platform provided by CSIRO.

3.5 Limitations

There are several methodological limitations of this thesis project. Firstly, time commitments in long-term, intensive, personalised qualitative research approaches were a significant limiting factor. Furthermore, there were limitations to using online research methods. During online participant observation, non-verbal communication such as, body language and the more nuanced expressions of the research participants were difficult, if not impossible, to examine entirely from a computer screen. These are important aspects of social interaction and communication, which shape the experiential and embodied experiences of knowledge exchange. Nonetheless, there was a conscientious effort to address this by asking specific questions in the semi-structured interviews. Even though a good rapport and professional relationship was established before and during data collection, solely relying on online interactions and online interviews made it difficult to ask and talk about sensitive and personal topics of power relations in race, gender and so on. Moreover, the implications of having a broad and open scope of analysis led to the interview conversations taking many different conversational directions. Nevertheless, the interview schedule was a useful resource for guiding and steering interview conversations.

3.6 Ethical considerations

This study ensured that participation was voluntary, informed, and consensual. For example, participant information sheets were provided before beginning data collection - see Appendix B. Participant consent for audio-recording and transcribing interviews was confirmed before each interview, and participant confidentiality was also respected and ensured through the use of pseudonyms. Additionally, professional relations and a mutual understanding with the participants were vital for conducting ethical research; this was supported by forming respectful relationships with participants prior and during the research process. Moreover, a soft-copy version of this thesis is made accessible to participants and organisations that were involved in the KE4CAP project or more generally, those who are interested in knowledge exchange and/or climate adaptation services might find this research useful.

An iterative process involving critical reflexivity was a central practice throughout the different stages of this thesis. Critical reflexivity is fundamental practice of this thesis project's decolonial approach (Thambinathan & Kinsella, 2021), and it is also important for highlighting "epistemic interests" and "blind spots" emergent in data collection and analysis (Moya, 2011). This reflexive

approach draws from feminist scholarship and refers to the ways in which knowledge is always situated "both from where a given knowledge-claim is derived, as well as whose interests it will serve, in any evaluation of its historically- and culturally-specific significance and truth-value" (Moya, 2011: p.80). As such, the research participants' positionalities and contexts were considered, along with my own positionality as a student researcher, a South-East Asian woman, whose first language is English, conducting interviews in English, as well as my research interests. Nonetheless, my positionality and experiential understanding of East and South-East Asian cultures were crucial to listening to the views and perspectives of the participants and constructing an understanding of what is being said and what context(s) it is spoken from.

Overall, ethical considerations are fundamental of good research practice. From a decolonial standpoint, the notion of research ethics and codes of conduct also suggest endorsing ethical research practice in ways that do not reinforce hegemonic power relations. Yet, a balance between striving to challenge hegemonic norms and assumptions, recognizing my own positionality, and being respectful of different cultural norms and expectations underscore the reflexive research approach undertaken in this thesis.

Chapter 4: Border thinking

Revisiting the decolonial concept of coloniality, coloniality exemplifies a hegemonic discourse and world system that has material and discursive implications on knowledges, power, beings. This rhetoric of modernity/coloniality embedded within the knowledge practices of climate change adaptation research is what I aim to interrogate and challenge.

In his seminal book, "Encountering Development" (2011), Arturo Escobar interrogated the rhetoric of modernity/coloniality in his critique of the development discourse. Escobar draws from postcolonial author, Homi Bhabha, who highlighted the colonial discourse is "crucial to the binding of a range of differences and discriminations that inform the discursive and political practices of racial and cultural hierarchization" (1990: p.72 in Escobar, 2011: p.9)." In short, Escobar highlighted the inextricable interrelationship of knowledge, power, and being (subjectivity) by analyzing the notion of modern development, including:

> "[T]he forms of knowledge that refer to it and through which it comes into being and is elaborated into objects, concepts, theories, and the like; the system of power that regulates its practice; and the forms of subjectivity fostered by this discourse, those through which people come to recognize themselves as developed or underdeveloped" (p.10).

Accordingly, I draw on Madina Tlostanova's (2019) work and view such proliferation, control, and arrangement of knowledge, system of power, and forms of subjectivity as result of "coloniality of design. From a decolonial perspective, Tlostanova (2017) described the coloniality of design as the "control and disciplining of our perception and interpretation of the world, of other human and nonhuman beings and things according to certain legitimized principles" (p.53). Subsequently, coloniality of design draws our attention to design choices.

In this chapter, I will highlight that design choices shape the hierarchical structures and systems of scientific institutions and networks, in particular the organizational structure of the KE4CAP project, the forms of subjectivity of the climate researchers and practitioners involved in the KE4CAP project such as "knowledge exchange participants", "knowledge producers", and climate service "providers", as well as the knowledges considered relevant and legitimate in the project. Therefore, it is particularly important to not only consider the design outcomes, but also the methodology and processes of decision-making that result in specific design choices.

Furthermore, I assert that border thinking and a decolonial perspective of relationality are critical for slipping between the borders of coloniality/decoloniality. This means that, on the one hand, it is important to recognize and interrogate the material and discursive implications of hegemonic discourses, systems, and structures of the world, including the scientific institutions and networks that dominate climate change adaptation research and practice. On the other hand, border thinking involves shifting the geography of reason from the institutional design of power to the geo- and body-politics of knowledge, which re-centers the subjectivities of the individuals. By recognizing that power dynamics do not only operate on an institutional and a global level, but also at the level of the individual, this draws our attention to the social and individual dimensions of subjectivity. Therefore, a relational understanding of power, knowledge, and being opens up multiple levels and dimensions in which subjectivities and knowledges are negotiated and contested.

4.1 The institutional design of power

The KE4CAP project was funded by the European Commission's Directorate-General for Climate Action (DG CLIMA) and Deutsche Gesellshaft-für Internationale Zusammenarbeit (GIZ) GmbH under the Strategic Partnerships for the Implementation of the Paris Agreement (SPIPA) programme. Furthermore, the KE4CAP project consortium constituted five university and research institutions from Ireland, the UK, and the Netherlands, which were represented by a core team of six climate researchers and practitioners ("core KE4CAP team") – see chapter 3.2. Additionally, three project partners and 30 participating climate adaptation platforms and their respective organizations participated in the KE4CAP project. Subsequently, a representation of the organizational structure of the KE4CAP project is illustrated in figure 4.1. Accordingly, the different roles and level of participation of the research organization – as a funding institution, project consortium member, project partner, or project participant – signify hierarchical power differentials within the KE4CAP project. However, this conceptualization of power dynamics and relations, based on the hierarchal organizational structure of the KE4CAP project renders the operation of power as vertically distributed and homogenous.

As shown in figure 4.1, the creation of multiple levels of power relations and dynamics through the institutional design of the KE4CAP project signifies how the institutional design of the KE4CAP project played a role in shaping the political and social ordering of the knowledge exchange activities. This includes the dissemination of knowledge and information through the

design of knowledge exchange activities, and the formation of subject positions based on the organizational structure of the project (project partner, project participant, or core KE4CAP team member).

In a paper by Esguerra and van der Hel (2021), they argued that "[i]nstitutional designs define the power relations between participants and bring about specific knowledge products" (p.135). More specifically, the design choices of the KE4CAP project shaped how and which knowledges are considered legitimate and authoritative in the processes of knowledge exchange (San Martin, 2021). For instance, the conceptual design of the 12-topic framework used to guide the knowledge exchange activities of the KE4CAP project delineated which knowledges are prioritized and considered relevant. This has implications on how knowledge exchange activities are planned and conducted, but also, which knowledges are then shared and used to inform processes of adaptation planning in specific climate adaptation platforms (CAPs). Thus, the institutional design and arrangement of processes of knowledge exchange, such as through the KE4CAP project, are influential in shaping processes that legitimize and prioritize the knowledges of certain actors. Therefore, I argue that the design choices of knowledge exchange projects are critical spaces in which power dynamics and relations shape how and which knowledges are considered relevant and authoritative in processes of exchanging and sharing knowledges. While the social practice of exchanging and sharing knowledges become increasingly pertinent in climate change adaptation, in terms of bridging the research-science-society and the science-policy-action gaps, it is vital to recognize and interrogate the material and discursive implications of design choices in knowledge exchange projects.

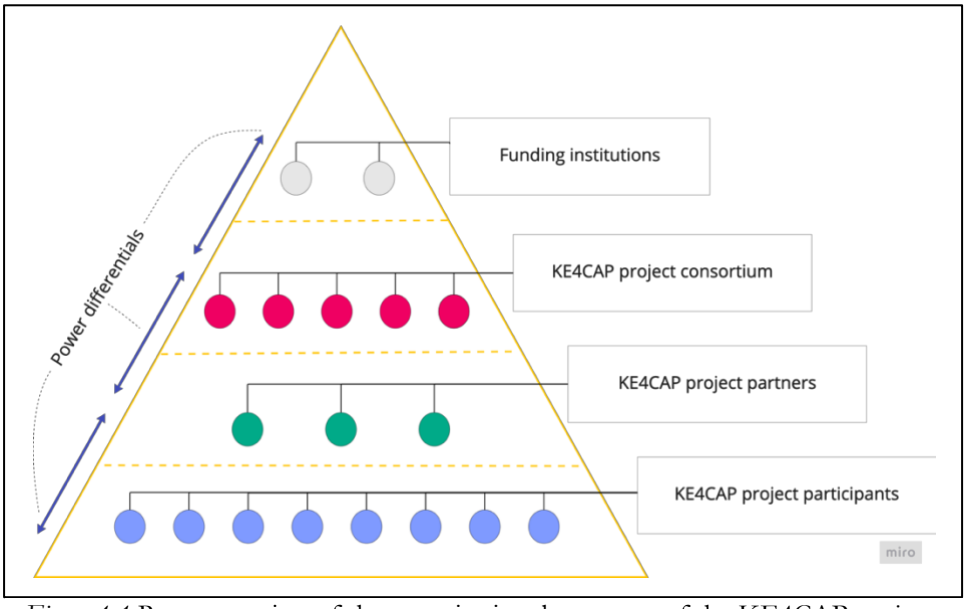

Figure 4-1 Representation of the organisational structure of the KE4CAP project.

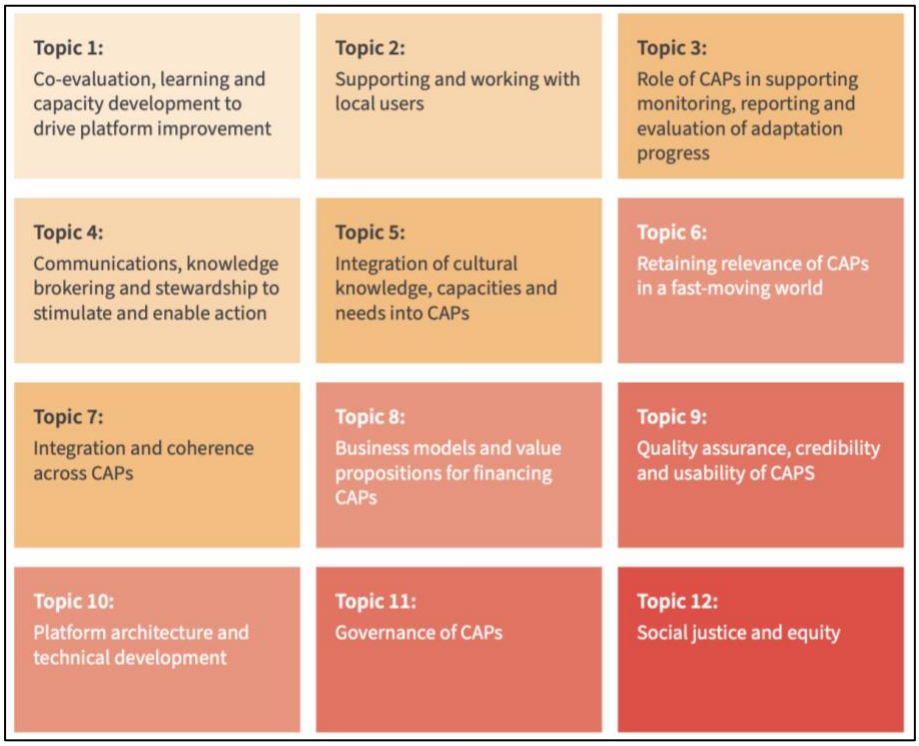

Figure 4-2 The KE4CAP project's 12-topic framework (taken from Chua & Barrott, 2022: p.24).

4.2 Theorizing from the borders

The operation of power within and between institutions played a role in shaping processes of knowledge exchange (Eriksen et al., 2015). However, an institutional perspective only provides a top-down approach of configuring power dynamics and relations, which also corresponds with the ontological design and approach of "the hubris of the zero point" (Castro-Gómez, 2005) – see chapter 2.2. Instead, a decolonial approach of focuses on studying power dynamics and relations from the perspective and experiences of the individuals is endorsed. A border perspective may imply studying examining the administrative and research boundaries of the project. Instead, I interpret the notion of border thinking, not in terms of the material or discursive borders of the project, but as way of re-centering the perspectives and experiences of the climate researchers and practitioners who were not part of the core KE4CAP team. This also includes shifting the geography of reason to the subjectivities of those individuals.

4.3 Chapter conclusion

The design choices of the KE4CAP project shaped the organizational structure of the project, the forms of subjectivity of the climate researchers and practitioners involved in the KE4CAP project, such as "knowledge exchange participants", "knowledge producers", and climate service "providers", as well as the knowledges considered relevant and legitimate in the project. While it is important to acknowledge the material and discursive implications of the institutional design of power, a decolonial approach warrants shifting the geography of reason, meaning that it is also crucial to consider study and understand power dynamics and relations from the perspective and experiences of the individuals. Therefore, I argued that critical border thinking is essential for slipping between the borders of coloniality/decoloniality – recognizing and interrogating the material and discursive implications of hegemonic discourses, systems, and structures of the world, including the scientific institutions and networks that dominate climate change adaptation research and practice on one hand, while also re-centering research attention on the subjectivities of the individuals on the other.

Chapter 5: Contesting knowledge practices in climate services

This chapter explores the processes of knowledge production and integration in the field of climate services from the perspectives and experiences of 17 climate researchers and practitioners[6]. These processes of knowledge production and integration involve the individual approaches used by the climate researchers and practitioners to develop climate service tools, products, and information. I focus specifically on three climate researchers and practitioners – Deepan Rastogi, who is a technical advisor of the "Climate Adaptation and Finance in Rural India" project in Uttar Pradesh, India; and Marcus Lee Chen-Wei and Grace Wong Xu-Chia who are both, research assistants of the Taiwan Climate Change Projection Information and Adaptation Knowledge Platform (TCCIP) at the National Science and Technology Center for Disaster Reduction in Taipei, Taiwan.

I will make two main arguments in this chapter. Firstly, power dynamics are not only embedded in the hierarchical structures and systems of specific research institutions, but the processes of decision-making at an individual level can also reinforce or challenge existing power relations. As such, I will highlight the operation of power at multiple levels – from the institution to the individual. Furthermore, by examining the socio-epistemic differences of conceptualizing and understanding climate change adaptation in relation to the intersubjective experiences of disaster risk reduction and management in Taiwan, I will argue that processes of knowledge production and integration critical for adaptation planning are shaped by formalized institutions, ontological assumptions, and intersubjective perceptions. By doing so, I highlight processes of knowledge production and integration are not only shaped by disciplinary traditions of scientific research and by the hierarchical structures and systems of global scientific institutions, but they are also conditioned and informed by the ontological assumptions and perceptions of the knowledge that is being produced and/or integrated.

[6] I refer to the 17 interview participants as "climate researchers and practitioners" because they all have professional roles, albeit different ones, in climate change and/or adaptation research.

5.1 Methodologies of developing climate services

This chapter explores the scientific practices of and approaches to developing climate services. Many of the climate researchers and practitioners engaged with a science-driven approach of developing climate service tools, products, and information. For example, Deepan Rastogi is a technical advisor involved in an Indo-German cooperation project called, Climate Adaptation and Finance in Rural India (CAFRI). Deepan identified three steps of developing climate services for the Climate Finance Knowledge Portal. Firstly, Deepan identified key stakeholders, which comprised of four target groups - farmer producer organisations, financing institutions, government departments, and civil society organisations. According to Deepan, "[o]nce we identified the stakeholders, the next step was this whole 'needs assessment' and specific to what kind of core knowledge would they need? So, then we categorized everything in that boundary". Categorizing the "core knowledge" represented Deepan's third step of developing climate services for the Climate Finance Knowledge Portal. As such, Deepan's method of designing and implementing a 'needs assessment' of individual target groups indicated a scientifically-driven method of delineating knowledges that were predetermined as relevant and essential for local stakeholders.

Furthermore, the process of categorizing "everything in that boundary" insinuated an exclusionary process of delimiting "core knowledge" from other knowledge systems and ways of knowing. The results of the 'needs assessment' also determined how and which knowledges were integrated into specific climate service tools and products; "be it case studies, be it success stories, be it climate finance related instruments, be it funding opportunities, be it schemes and guidelines, everything." After, Deepan mentioned that he "arranged the knowledge in such a way that it could cater to multiple sectors; it could cater to multiple stakeholders based on their needs." On the one hand, catering to multiple sectors and multiple stakeholders corresponds with the notion of climate services as user-oriented and sector-specific. At the same time, "we kept it very open and not too specific […] because we don't want to prescribe the information". In this sense, Deepan highlighted a deliberate effort of producing and integrating knowledge in a non-prescriptive and open way, in order to maintain the "user-friendly-[ness]" of the Climate Finance Knowledge Portal.

On the other hand, Deepan's framing of users' needs based on scientific assessments indicated the dominance of scientific methods over other knowledge systems and other ways of knowing.

Moreover, the inclusion and exclusion of specific target groups based on categories of "farmer producer organisations, financing institutions, government departments, and civil society organisations" delimited the provision of specific climate service information, tools, and products. Additionally, the process of delimiting "core knowledge" from other knowledges exemplified exclusionary practices of knowledge production and integration. Subsequently, these practices of developing climate services highlighted the subjection of knowledges based on the approach and decision-making processes of the climate researcher, who delimited the boundaries of "core knowledge" and delineated the categories of local stakeholders.

5.2 Socio-epistemic hierarchies of knowledge

The climate researchers' and practitioners' approach of developing climate services draws our attention to the socio-epistemic hierarchies of knowledge (San Martín, 2021). In an interview with Marcus Lee, a research assistant for the Taiwan Climate Change Projection Information and Adaptation Knowledge Platform (TCCIP) at the National Science and Technology Center for Disaster Reduction in Taipei, Taiwan, Marcus described a science-driven approach of developing climate services to inform Taiwan's National Adaptation Programme (NAP). For Marcus, "it all starts with literature reviews, of course. And I think the first step we've been looking at is the adaptation policy framework [...] by the UNDP [United Nations Development Programme] and UNFCCC [United Nations Framework Convention on Climate Change]". He commented that he mainly refers to the UNFCCC guidelines "because it's been so widely used, and being implemented by so many countries, or most of the countries in the world, in fact."

Marcus also identified "more recent frameworks [such as] the international standard of organisation, the ISO 14090" which includes "a standard document that's focused specifically on adaptation." As such, Marcus' approach of developing climate services exemplified the way in which institutions such as the UNFCCC and the International Organization for Standardization (ISO) shaped "which kinds of knowledges are considered authoritative and of universal relevance to climate change responses" (Eriksen et al., 2015). Therefore, these "global kinds of knowledge" (Hulme, 2010), in the form of adaptation policy frameworks and standardized documents do not only signify the institutionalization of epistemic hierarchies (Kidd et al., 2017), but they have epistemic implications of which knowledges are considered legitimate and authoritative to informing national adaptation strategies.

Referring to secondary literature, researchers in the field of science and technology studies stressed that "expertise does not simply lie in specific exercises of knowledge-making", but also in "the institutional dynamics in which knowledge is rendered authoritative" (Beck et al. 2017, p.1069). In other words, the social practices of developing climate services do not only define the exercise of power in processes of knowledge production and integration, but the institutional structure and system in which climate researchers and practitioners develop various climate service tools, information, and products also shape how and which knowledges get integrated into the provision of climate services. As such, knowledges and information that are integral of the provision of climate service tools and products are inherently subjected to institutional hierarchies and systems of decision-making.

In the interview, Marcus noted a mismatch between Taiwan's adaptation policy arena and international adaptation policy frameworks. "In the UNFCCC, the NAP guidelines have four stages of A, B, C, D. And on the first stage, it recommends to engage decision-makers or key players at the very beginning to make them understand what adaptation is, or the importance and necessity of it." However, "it doesn't work that way in Taiwan". Instead, Marcus mentioned that "it usually starts with the work in reverse". This signified a misalignment of adaptation knowledges, such as UNFCCC adaptation guidelines, which have been designed at an international level, but the adaptation knowledges and information are intended for implementation at the national level. At the same time, Marcus commented that the sequence of approach of developing climate services for adaptation planning in Taiwan often led to "common problems" of "bottlenecks" because "you need to get [adaptation strategies or goals] approved by the higher officials." Subsequently, the need for adaptation strategies and goals "to get approved by the higher officials" exemplified hierarchical structures and processes of decision-making in relation to TCCIP, which influenced and shaped the process of developing a national adaptation program for Taiwan.

The operation of power within organizations, such as TCCIP, draws our attention to the concept of authority within institutions. Eriksen and colleagues (2015) conceptualized the notion of authority in scientific institutions and networks, "wherein legitimacy to make decisions about environmental governance is claimed" (p.527). In this sense, an institutional perspective of power dynamics in the form of authority implies a hierarchical structure and system of governing processes of knowledge production and decision-making. Simultaneously, adopting a relational understanding of authority denotes authority as "contested or reinforced, imposed and accepted by different actors" (Eriksen et al., 2015: p.527). As such, power dynamics are not only embedded

in the hierarchical structures and systems of institutions, but the processes of decision-making at an individual level can also reinforce or challenge existing power relations. Correspondingly, Eriksen and colleagues (2015) asserted that a relational understanding of authority "provides a tool to understand the mechanisms through which different actors are able to further their particular interests in adaptation actions, and how adaptation actions may both reinforce unequal power relations but in other cases open up space for contesting existing inequities" (p.527).

5.3 Adaptation planning in relation to "our mentality about disaster risk reduction"

The flow and integration of specific knowledges into processes of adaptation planning in TCCIP were not only subjected to the governing systems and hierarchical structures of the National Science and Technology Center for Disaster Reduction, but they are also shaped by intersubjective perceptions of climate change and adaptation knowledge and information. In an interview with another climate researcher from Taiwan, Grace Wong mentioned that TCCIP "operates under the National Science and Technology Centre for Disaster Reduction", which is "the main national thinktank for disaster reduction". According to Grace, the primary research focus on disaster risk reduction and management is because "Taiwan is prone to natural disasters". However, this also shapes the "research agenda" of TCCIP, where "we focus our work a lot on DRR [Disaster Risk Reduction]." Nonetheless, this has allowed them "to sharpen our skills and to sharpen our policy and responses" of disaster risk reduction and management. In turn, Grace highlighted that this is a "good thing for us in climate research" because "in terms of DRR, [...] we have a very solid ground" and "in a way we are quite well-trained, all of us, including the citizens are well trained in terms of that." Hence, "disaster response and disaster prevention mechanisms in Taiwan is extremely well constructed."

According to Grace, Taiwan's existing institutional mechanisms and intersubjective "mentality about how DRR should be practiced" were perceived as enabling factors, which empowered the citizens of Taiwan with knowledges, strategies, and collective experience of dealing with natural disasters, whilst also facilitating processes of adaptation planning in TCCIP. Therefore, the adaptive capacity and power to act on "disaster response and disaster prevention mechanisms" in Taiwan, on an individual and a societal level, were not only shaped by the institutional and policy mechanisms of the National Science and Technology Center for Disaster Reduction, but also, conditioned by experiential and embodied knowledges and ways of dealing with natural disasters.

Marcus noted, however, the occurrence of natural disasters in Taiwan has led "to the assumption that as long as we keep this disaster risk under [control and] managed, there wouldn't be any problem." In other words, there is an assumption that effective disaster risk reduction and management will solve climate change impacts and issues. However, these ontological assumptions signify epistemological gaps in climate change and adaptation (San Martín, 2021). In turn, the epistemological implications of such assumptions may in fact, legitimize knowledges and strategies already in place for disaster risk reduction and management, while also delegitimizing emergent knowledges and strategies critical for climate change adaptation. For example, Marcus commented that adaptation knowledges and strategies are "more difficult to communicate, because most of our analysis was based on climate projections." Marcus continued by stressing that "I can personally say that it's already difficult to communicate with our colleagues that who's dealing with [natural] disaster[s]." In this regard, the practice of producing and integrating adaptation knowledge in processes of national adaptation planning were subjected to ontological assumptions about adaptation knowledge as well as, socio-epistemic differences within scientific communities.

Marcus highlighted that "putting all sorts of assumptions and hypotheses into it [climate projections] to see what happens and building storylines of future development pathways" diverged from the normative approaches and methods of "experts who built their lifetime editions on historical experience and observations" and so, "it's very challenging to convince them". Consequently, "sceptics call it 'playing video games with data"'. This issue highlights the prevalence of socio-epistemic discrepancies in climate change adaptation politics and research. The critical notion of developing climate projections as "playing video games with data" also point to the perception of hegemonic modes and assumptions of knowledge production as authoritative to producing scientific knowledge is 'more accurate' or 'objective', while other forms of knowledge production, even within the domains of 'scientific knowledge', are delegitimized.

Socio-epistemic differences of producing knowledges relevant for climate change adaptation did not only exist within scientific communities, such as TCCIP and the National Science and Technology Center for Disaster Reduction, but socio-epistemic differences of climate change adaptation were also pertinent among local stakeholders outside of scientific communities. Despite having "a solid ground[ing]" of dealing with natural disasters, Grace mentioned that people tend to "detach" from information and concepts about climate change adaptation because "we are talking about something that happens maybe, 20 years, 30 years later." Furthermore, questions

such as, "how is this [climate change adaptation] different from disaster prevention? Why can't I just focus on now? Why do I have to think about 20 years later?" exemplified "a back pull about how to communicate the concept of adaptation." In other words, conceptual and epistemological discrepancies of short- to medium-term natural disasters and long-term climate change impacts did not only denote "a major challenge" of integrating climate change adaptation knowledge into public and policy domains, but they also signified contested intersubjective perceptions of time. As such, the intersubjective perception of time, in terms of the sense of urgency and embodied ways of knowing and dealing with natural disasters, as opposed to future climate change impacts, influenced which knowledges, such as knowledge and strategies related to disaster risk reduction and management, get integrated more easily into public spheres than other knowledges involving longer timescales, such as climate change adaptation.

Overall, socio-epistemic differences of conceptualizing and understanding climate change adaptation highlighted the social and individual dimensions of power. Taiwan's history of natural disasters shaped the dominant decision- and policy-making processes of the National Science and Technology Center for Disaster Reduction; in turn, this influenced processes of adaptation planning in TCCIP. At the same time, the intersubjective experiences of dealing with natural disasters in Taiwan conditioned and informed assumptions and perceptions of climate change adaptation in relation to legitimized knowledges and strategies of disaster risk reduction and management. Therefore, a relational understanding of power dynamics enabled us to analyse the contradictory nature of power in the sense that intersubjective experiences of dealing with natural disasters and policy mechanisms of disaster risk reduction helped to facilitate processes of adaptation planning in TCCIP; however, intersubjective assumptions and epistemological discrepancies of climate change adaptation delegitimized certain knowledges and information crucial for adaptation planning, as well as restricted the integration of adaptation strategies into policy and public domains.

5.4 Chapter conclusion

The analytics of this chapter was rooted in the theoretical foundation of this thesis project, which emphasized a decolonial perspective of relationality. In short, the climate researchers and practitioners mostly demonstrated a scientific approach of developing climate services. Dominant scientific approaches of developing climate services signified the prevalence of "global kinds of knowledge" (Hulme, 2010) as authoritative and legitimate in processes of knowledge production

and integration. These processes of knowledge production and integration were also shaped by decision-making processes at the level of the individual climate researcher, as well as within the institutional structure and system in which the climate researcher worked. Subsequently, the different processes of decision-making highlighted multiple levels and dimensions of power, operating at the heterogenous levels of formalized institutions, intersubjective perceptions, and collective experiences. At the same time, the outcome of the exercise of power had contradictory effects on the processes of producing and integrating knowledges for climate change adaptation. This highlighted that a relational understanding of power was essential for studying power dynamics at multiple levels. Overall, a decolonial approach of conceptualizing knowledge, power, and being in relation to the climate researchers and practitioners, and in relation to their individual approach and method of knowledge production and integration, made it is possible to investigate the multiple levels and dimensions of power from the perspectives of the climate researchers and practitioners.

Chapter 6: Multiple subjectivities

This chapter focuses on the geo- and body-politics of knowledge of 17 climate researchers and practitioners who were involved in processes of knowledge exchange through KE4CAP project. I will make two interrelated arguments in this chapter. First, I will argue that it is important to consider the different subjective-intersubjective perceptions and embodied experiences of the climate researchers and practitioners. This is because the subjectivities and positionalities of the climate researchers and practitioners were not fixed within specific subject positions, nor were they isolated within the boundaries of the KE4CAP project. Rather, each of the 17 climate researchers and practitioners articulated multiple subjectivities that interconnected them to different institutions, lived experiences, and socio-cultural contexts. Therefore, using a decolonial approach of shifting the geography of reason to the geo- and body-politics of knowledge highlighted the nuanced subjective-intersubjective perceptions and embodied experiences of the climate researchers and practitioners, which shaped their subjectivities and positionalities.

The heterogeneity of subjectivities brings me to my second argument. I will assert that studying the subjective-intersubjective perceptions of climate researchers and practitioners is critical for understanding how they situate themselves in various processes of adaptation decision-making, including the framing of climate services and adaptation. Subsequently, the subjective-intersubjective perceptions of the climate researchers and practitioners will be discussed as key enabling factors of engendering collective subjectivities, which is essential for opening-up possibilities of transformational climate action (Nightingale et al., 2021).

6.1 Beyond the subject positions of "participant" and "observer"

The subjectivities and positionalities of 17 climate researchers and practitioners were studied in relation to the KE4CAP project and by exploring their subjective-intersubjective perceptions and experiences. During the interviews, two specific questions were asked: "how do you perceive your role/position in the processes of knowledge exchange?" and "how did you feel during those processes of knowledge exchange?" These questions looked to examine the subject position of the individual through their own subjective-intersubjective perception; simultaneously, considering the experiential and embodied ways in which the individual perceived and configured their specific subject position. In general, 15 climate researchers and practitioners viewed themselves as a "participant" of knowledge exchange, while two climate researchers and

practitioners commented that they were an "observer" of knowledge exchange and "observing the [knowledge exchange] activities that were happening" through the KE4CAP project. For the climate researchers and practitioners who viewed themselves as a "participant" of knowledge exchange, their expressed subject position was consistent with the KE4CAP project reports and documents, which identified the climate researchers and practitioners and their respective research organisations as "participants" of knowledge exchange activities. However, the way in which each of the climate researcher or practitioner conceptualised their subject position, as "participant" or "observer", exemplified different configurations of subjectivity and positionality.

For example, Hinata Izumi is the Head of Asia-Pacific Climate Change Adaptation Research Section, as well as a Senior Researcher at Climate Change Adaptation Strategy Research Section at the Center for Climate Change Adaptation (CCCA) in the National Institute for Environmental Studies in Tokyo, Japan. Hinata attributed his subject position of a "participant" of knowledge exchange to his "colleagues at CCCA" working on the Asia-Pacific Climate Change Adaptation Information Platform (AP-PLAT). Hinata mentioned that "[t]hey joined the KE4CAP [project] first. They were participants, so, I automatically joined the KE4CAP project two years ago." In this regard, Hinata's approach of configuring his subject position as a "participant" of knowledge exchange exemplified an intersubjective approach, of which his colleagues joined and participated in the KE4CAP project, thus, Hinata "automatically joined" as a participant of the knowledge exchange network.

In parallel of an intersubjective approach of subject formation, scholars in science and technology studies emphasized the influential role of institutions, wherein the political and social ordering of individual 'subjects' are defined by institutional norms, social practices, and values that guide the research organization (Leach et al., 2010; Ostrom, 1990). In turn, the institutional design of the KE4CAP project denotes a significant arena in which the exercise of power over the social organization of subjectivities and positionalities are embedded within the organizational structure of the KE4CAP project (see chapter 4). However, in this chapter, I will argue that the formation an individual's subjectivity and positionality is not defined by the institutional structures and systems which they inhabit. Rather, the climate researchers and practitioners expressed dynamic subjectivities and positionalities that that were not necessarily delimited by the institutional design of the KE4CAP project, albeit several of the climate researchers and practitioners grounded their subjectivity and positionality in relation to their experience of participating in processes of knowledge exchange through the KE4CAP project, but the climate researchers and practitioners

also interlinked different embodied experiences, practices, and socio-cultural contexts to the configuration of subjectivity and positionality. In order to support this argument, I draw upon secondary literature by Arun Argawal (2005) and Eriksen and colleagues (2015).

In a study of environmental subjectivities of villagers in Kumaon in northern India, Arun Argawal (2005) asserted that "[f]ocusing attention on specific social practices relevant to subject formation along a given dimension or facet of identity creates the opportunity for learning more about how actions affect ways of thinking about the world and produce new subjects" (p.166). As such, "specific social practices relevant to subject formation" exemplify a key area for analyzing dynamic subjectivities and positionalities beyond fixed subject positions. Furthermore, Eriksen and colleagues (2015) noted that "subjectivities are never stable categories, but rather reflect the dynamic exercise of power, and as such can have contradictory and unpredictable outcomes" (p.525). Considering Argawal's (2005) and Eriksen and colleagues' (2015) lines of reasoning, I will examine how dynamic subjectivities and positionalities of the climate researchers and practitioners departed from the static subject positions of "participant" and "observer" of knowledge exchange. During the interview with Grace Wong, she mentioned that she viewed her subject position as "more of a participant rather than a contributor" because "I feel that we were listening more than contributing". Grace then alluded, "our experience or our side of the story about climate change, or at least adaptation services, […] and sometimes Asian cultures are really different from the Western ones." In this view, Grace's subject position in knowledge exchange was mediated by the socio-cultural context of Taiwan. Grace also highlighted the different cultural values, embodied experiences, and narratives of climate change in respect to her positionality in Taiwan, which did not only differ "from the Western ones" but they also shaped her subjectivity and positionality in relation to the KE4CAP project.

In another interview, Valerie Kho, who is an associate director of programs at the Oscar M. Lopez Center (OML Center) in the Philippines, commented that "I see us more of an observer." According to Valerie, this is because "we are kind of 'newbies' in our role - if I can say - in climate adaptation platforms [...] compared to others in the world – the European, Dutch, Canadian platforms had many more years of experience than us. And we are just starting". Valerie also mentioned feeling a sense of "hesitation" during the processes of knowledge exchange. She then retracted this comment and explained "that feeling of; I'd rather watch first, and observe, and see". Accordingly, Valerie and her team would "always spend the first 10-15 minutes or even, the first hour just trying to assess the entire situation," as well as ask themselves questions such as, "where

are we at? What are we doing here?" For Valerie, these deliberate processes of discussion and critical reflexivity were crucial for "assessing our position and where we are at."

Subsequently, these examples highlighted that, even though the subjectivity and positionality of both, Hinata, Grace, and Valerie were contingent of participating in the knowledge exchange activities of the KE4CAP project, their subject positions also interlinked various social practices, socio-cultural contexts, and subjective perceptions, which existed within and alongside the boundaries of the KE4CAP project. These socio-cultural contexts, embodied experiences, and subjective perceptions draw our attention to the dynamic nature of subjectivity. Thus, studying and analyzing the subjectivities and positionalities of the 17 climate researchers and practitioners requires shifting the geography of reason, from a singular or a fixed subject position to the geo- and body-political dynamics of subjectivity; in turn, this opens-up a 'black box' of subject formation, while also directing research attention to more-critically examining the dynamic nature of subjectivities and positionalities beyond fixed subject positions. This is particularly important for understanding how subjectivities of climate change adaptation are not only dynamic, but they also situated in specific contexts and linked to human perception and embodied experiences.

6.2 Drawing on emotional and embodied experiences

Diverse emotional and embodied experiences constitute the lived experiences of the 17 climate researchers and practitioners. However, this sub-chapter provides only a snapshot of those experiences by focusing on the climate researchers' and practitioners' academic backgrounds, as well as some key moments and events that were perceived to be particularly influential for the individual. By paying attention to the emotional and embodied experiences of the climate researchers and practitioners, the formation of subjectivities and positionalities of the individual is interconnected and considered in relation to multiple flows of social, cultural, political, and more-than-human encounters.

During the interviews, the climate researchers and practitioners were asked to describe their academic backgrounds. They highlighted a range of different research disciplines, including specialized environmental fields such as, "agricultural meteorology" and "civil engineering in water management and water quality control", as well as other fields such as, "astrophysics", "environmental sciences", "economics and policy", and "cultural studies and development studies". These different academic disciplines correlate with the interdisciplinary nature of climate

services (Leal Filho & Jacob, 2020). Furthermore, all the climate researchers and practitioners mentioned that they had a master's degree, while ten of the climate researchers and practitioners also completed or are in the process of completing a doctoral degree (PhD). Moreover, most of the climate researchers and practitioners studied locally, in universities located in their respective countries; whereas six of the climate researchers and practitioners from India, Japan, Fiji, and Taiwan mentioned that they completed their graduate-level degrees abroad in universities either, in the U.K or the U.S.

On the one hand, scholars in science and technology studies argued that the disciplinary traditions of academic research and university institutions have shaped the knowledges and decision-making approaches of scientists and researchers (Hackett et al., 2016). At the same time, the operation of power "within and between these different formal and informal organizations and institutions […] shape who is authorized in what ways to promote adaptation and mitigation efforts" (Eriksen et al., 2015: p.527). Accordingly, it can be argued that the subjectivities and positionalities of the climate researchers and practitioners are constituent of and subjected to global scientific networks and institutions that have been dominated by Anglo-American Eurocentric research paradigms (Held, 2019). On the other hand, shifting the geography of reason away from an institutional perspective of power to the geo- and body-politics of the individual is an important decolonial step of re-centering my analysis of subjectivities and positionalities to the subjective experiences and perceptions of the climate researchers and practitioners. Subsequently, feminist scholars in adaptation politics remind us that "[p]eople's experience of the exercise of power is always situated, and relationally produced from their social political and more than human interactions, producing multiple subjectivities" (Nightingale et al., 2021: p.e743; Gonda, 2019). Thus, the power dynamics between and within university and research institutions alone, do not define or shape the subjectivity and positionality of the climate researchers and practitioners.

Ayaka Nishida is a climate change adaptation coordinator at the Center for Climate Change Adaptation (CCCA) in Japan's National Institute for Environmental Studies. Ayaka highlighted that, through her master's degree in the London School of Economics and Political Science, she "could have more opportunity to learn more [about the] theoretical background of environmental economics, and environmental policy, and developing countries". Plus, "those experiences supported me and pushed me up to, you know, go to the next step. And I joined one research institute in Japan after I came back to Japan." Ayaka also mentioned, "my schoolteacher in high school, suggested [for] me to join one volunteer activity to plant the trees in the desert area, in the

north China, for the summer, vacation time, and joining those activities and that experience, [was] kind of shocking to me. […] that experiences helped me to have more interest in global warming". In turn, Ayaka said that her experience of volunteering and tree planting in northern China was "one of the milestones" and a "turning point" in her life. These examples highlight how the institutional design of knowledge, including specific disciplines of "environmental economics and environmental policy" and geographical divisions of "developing countries" and developed countries shaped the subjectivity of Ayaka. From Ayaka's perspective, the power dynamics of those knowledges "pushed" her "up" in her professional career. Yet, Ayaka's embodied experiences of learning at university and through her experience of volunteering in China highlight influential factors of forming and configuring subjectivity based on recollected memories and embodied experiences.

Referring to a paper by Nightingale and colleagues (2021), the scholars asserted that "experiential and embodied ways of knowing climate" are influential in spurring transformative change and climate action. However, Julie Cruikshank (2005), a Canadian anthropologist who works with Indigenous communities in the Yukon, cautioned that "knowledge embedded in local history, tradition, and life experiences has to be appreciated in its totality, rather than fragmented into data, if we are to learn anything from it" (p.359). As such, Ayaka's subjective configuration of different embodied experiences and recollected memories of attending university in London and volunteering in China provides only a glimpse of her geo- and body-politics of subjectivity. Nonetheless, Ayaka's embodied experiences connected and grounded her current subjectivity and positionality to specific geographical locations. According to the scholars Chiu and colleagues (2010), and McKenzie (2008), an individual's emotional and embodied experiences connect them to a particular physical place that comprises the "where" of the experience. Simultaneously, these experiences are constitutive of, and reconfigured in relation to "experiences of friendship, art, literature, irony, cultural difference, community." (Chiu et al., 2010: p.362). In other words, it is crucial to integrate a relational ontology of the human and more-than-human encounters, from which experiential and embodied experiences relevant to the configuration of specific subjectivities and positionalities are enunciated.

In summary of this sub-chapter, the geo- and body-politics of subjectivity of the climate researchers and practitioners interlinked multiple storylines and lived experiences. Although the experiential and embodied experiences of the climate researchers and practitioners included in this study did not investigate the totality of lived experiences of any one individual, drawing attention

to the experiential and embodied experiences of the climate researchers and practitioners corresponds with recent research highlighting the significance of affective experiences and emotion in adaptation and sustainability (Nightingale et al., 2021; Bond & Barth, 2020; Brown et al., 2019), and the importance of studying the "inner-worlds" of actors involved in processes of adaptation (Ives et al., 2020). Studying the experiential and embodied experiences of climate researchers and practitioners in relation to climate change adaptation is important for allowing more space for embodied ways of knowing, in the form of recollected memories and relating to our socio-natural environments, such as Ayaka's experiences in the desert in northern China, as valid forms of knowledge in environmental research practices, which can help in promoting the development of methodologies that better capture the lived experiences of individuals and communities in processes of climate change and adaptation.

6.3 Re-imagining categories of "*me*" and "*us*"

The previous sub-chapters highlighted the importance of exploring the dynamic nature of subjectivities based on the subjective-intersubjective perceptions, embodied experiences, and the different socio-cultural contexts of the climate researchers and practitioners. In this sub-chapter, I focus on the emergence of fluid and plural subjectivities and positionalities of the climate researchers and practitioners. At the beginning of each interview, the climate researchers or practitioners were asked to introduce themselves, including their role and responsibilities in climate services. All the participants responded by specifying their job title, such as "climate change adaptation coordinator", "specialist", "environmental consultant", "chief research fellow", and "senior researcher" to name a few. Furthermore, nine of the climate researchers and practitioners referred to themselves as a "scientist" or "research scientist". In those instances, the climate researcher or practitioner had both a master's degree, and a doctoral degree (PhD) in a specific field of research. Even though these social categories such as scientist or non-scientist, level of education, and prescribed job title are relevant for studying the subjectivities and positionalities of the climate researchers and practitioners, according to Argawal (2005), [t]o end analysis there, however, is to fail to attend to the many different ways in which people constitute themselves, arrive at new conceptions of what is in their interest, and do so differently over time" (p.166). These social categories also do not tell us how and why climate researchers and practitioners do or do not draw upon their subjectivity of "scientist" or "specialist" and so on in processes of knowledge production and exchange.

Nightingale and colleagues (2021) highlighted that "[s]ubjectivities emerge from the simultaneous acceptance of and resistance to power; it allows for agency and the possibility of power to be both disciplining and emancipatory" (p.e743). In this sense, the subjectivities of the climate researchers and practitioners are, on one hand, situated in and shaped by the institutional domains, structural contexts, and the specific social practices of the individual climate researcher or practitioner, including that of the KE4CAP project and the research institutions that they work. For instance, several climate researchers and practitioners mentioned that the institutional capacity and objectives of their respective research organisations determined the availability of specific resources for developing and providing climate services. This also determined the resources available for hiring a team of climate researchers and practitioners. In those cases, the institutional boundaries and capacities were pertinent for shaping the subjectivities and positionalities of the climate researchers and practitioners.

Yet, the climate researchers and practitioners were not subjugated or subjected to fixed subjectivities and positionalities within the capacity and structure of their research institutions or within the boundaries of the KE4CAP project. Instead, the climate researchers and practitioners negotiated and reconfigured their own subjectivities and positionalities through specific subjective-intersubjective perceptions of themselves and the various ways in which they situated themselves in the world. This influenced how the climate researchers and practitioners perceived their own role, work, and responsibility in climate change adaptation, and how the movement of knowledges become contingent of the multiple subjectivities that the climate researcher and/or practitioner draw upon.

For example, Grace Wong mentioned, "we usually consider ourselves like, not just me, but most of my colleagues […] We think of ourselves as an interpreter and translator, not from one language to another, but how to interpret the idea of scientists, and interpret their professional language, and translate their professional language into something that are publicly understandable." In this regard, Grace viewed her role in relation to "interpreting" and "translating" scientific knowledge relevant to developing and providing climate services. In parallel, by revisiting Argawal's (2005) assertion that "[f]ocusing attention on specific social practices relevant to subject formation [...] creates the opportunity for learning more about how actions affect ways of thinking about the world and produce new subjects" (p.166), we examine the subjectivities of Grace as "an interpreter and translator" as emergent of her specific social practices of developing and administering climate services for TCCIP.

Moreover, Grace emphasized an intersubjective approach of conceptualizing her subjectivity and positionality in TCCIP. In doing so, Grace's perception of herself and her role in climate services was entwined with an intersubjective perception of sharing mutual practices with her colleagues, concerning the development and provision of climate services for TCCIP. Subsequently, an intersubjective approach corresponds with Rey's (2017) conceptualization of the individual and social dimensions of subjectivity, where the perception of "*we*" and "*us*" situate the individual in relation to specific cultural codes, values, beliefs, and social practices that are perceived to be widespread within a community (Chiu et al., 2010). During the interview, Grace also conveyed a sense of mutual responsibility among her and her colleagues, regarding the integration of specific knowledges and climate adaptation information on TCCIP. Accordingly, Grace's sense of mutual responsibility exemplified an intersubjective approach of conceptualizing the subjectivity and positionality of herself and her colleagues. In turn, an intersubjective approach of conceptualizing subjectivity reflects the social dimension of subjectivity, wherein processes of internalizing dominant cultural codes, discourses, and expectations, Grace situated herself and her colleagues in a common position of shared responsibility.

Subsequently, Grace's intersubjective perception of mutual responsibility of being responsive - 'response-ability' (Klenk et al., 2017) - to her specific audiences of climate services shifts the analysis of individual responsibility to the intersubjective perception of a community of climate researchers and practitioners, including "collectives and their responsibilities - without losing sight that collectives are never homogeneous, and the relations within them always embedded in and imbued by power." (Nightingale et al., 2021: p.e745). Thus, considering intersubjective approaches and perceptions of subjectivity and positionality opens-up the analysis to both, individual and social dimensions of subjectivity, while also acknowledging the different social relations that interlink and entangle an individual's subjectivity and positionality within and between collectives.

Moreover, the integration of specific knowledges into climate services is said to be influential in shaping how local stakeholders come to see, plan for, and adapt to climate change (Eriksen et al., 2015). Thus, the way in which climate researchers and practitioners frame climate change impacts and adaptation has material and discursive implications on the adaptation decision-making processes that follow (Eriksen et al., 2015; Nightingale et al., 2021). In this regard, the subjective-intersubjective perceptions of climate researchers and practitioners is argued to be critical for understanding how a community of climate researchers and practitioners position themselves in

relation to adaptation efforts, and how specific knowledges either get integrated into, or get excluded from processes of decision-making in adaptation planning through the provision of climate services. Additionally, the subjective-intersubjective configurations of climate researchers and practitioners allow us to question how specific scientific practices enable or constrain possibilities for adaptation and climate action (Nightingale et al., 2021). This is because research practices in climate services are not isolated to their specific research disciplines - viewing research practices in contrary to this would exemplify what Lewis Gordon (2006) described as "disciplinary decadence". Instead, research practices in climate services are embedded in wider societal processes, and interconnected to human and more-than-human relations.

Valerie Kho stressed that the problem of our climate crisis is linked to "the way we think about '*us*', the way we think about the world, and how the whole thing works, and operates." In this sense, Valerie reiterates the importance of an intersubjective approach and perception of "us". Valerie continued and said, "I think that's where the problem lies, you know, just in fact, when we say 'man' and 'environment' as if they're two separate things. […] I think that's what got us into trouble. […] we *do* think the Earth revolves around Man." While Valerie highlighted the danger of viewing humans and the environment as separate entities, scholars in adaptation politics also argue that climate change and society are constitutive of one another. This co-productive point of view climate change and society resonates with decolonial thinkers, such as Mignolo (2018), who expressed "the invention of nature" as a result of coloniality (p.156) – whereas from a **de**colonial perspective, the domains of "economics, politics, knowledge and subjectivity, racism and sexism, the domain of the living (or "nature") cannot be grasped in isolation, for they are all interconnected" (p.169). Similarly, the problem of viewing climate change as an external threat to humankind (Nightingale et al., 2021) is synonymous of "think[ing] of '*us*' as separate from the planet" as Valerie highlighted. These different points of view, of Valerie, Mignolo, and Nightingale and colleagues – emphasize a need to shift from thinking of "us" as exclusionary and separate from other groups of people, let alone distinct from the environment. Thus, broadening our intersubjective perception of "us" points to the significance of relationality, whereby the relational and interdependent co-existence of humans and more-than-humans constitutes "us".

Valerie also questioned, "is there an '*us*'? Should there be an '*us*'? It's a point of view, right?" This perception of collective subjectivities and intersubjectivities as a human construct, as "a point of view", is a result of humans "drawing a line". In turn, this line demarcates superficial dichotomies of "*me*", "*us*" and "*them*". Subsequently, Valerie asked, "who drew the line? Why is there even a

line?" and deliberated, "[w]e've been drawing this line as if there was one." From a decolonial perspective, the demarcation of such boundaries, including the categories of species, race, class, gender, and ethnicity, exemplifies a globalized colonial discourse that produces and re-produces social inequalities and subjectivities of the subjugated "*Other*" (Mignolo & Walsh, 2018; Said, 1978).

If "climate change knows no boundaries. […] All these other categories we have, they don't really matter, right?" Valerie also mentioned, whether "you're rich, or you're poor, you're deaf, or you're not, [climate change] doesn't take that into consideration. […] This '*us*', '*we*', '*you*', […] they don't matter, because everyone and everything that exists, or at least to our knowledge exists, is affected by it." In this sense, boundaries of "*us*", "*them*", and "*Other*", based on different categories of race, class, gender and so on, become obsolete in the context of climate change. This is not to say that climate change is homogenous, and its impacts are equally felt or experienced across different political, social, economic, and geographical contexts. Rather, the ways in which climate researchers and practitioners construct and configure specific categories of "*us*", "*them*", and "*Other*" exemplify critical cognitive and social spaces of contestation for re-imagining and re-configuring our relationships with one another, including human and more-than-human relations. Subsequently, Nightingale and colleagues (2021) assert that the interface of subjective-intersubjective boundaries is central in opening-up and closing-down possibilities for climate action, adaptation, and societal transformation.

Furthermore, Valerie contemplated that "maybe we're not asking the question correctly, and that's why we're not arriving at the answers we really need. […] So, the questions are coming from that paradigm, therefore, it to me, it leads to nowhere, because the question is still in that paradigm, and will always be answered in that paradigm." If the "*we*" that Valerie speaks of is of climate researchers and practitioners, the subjective-intersubjective perceptions of the researchers and practitioners are central in the framing of specific questions, the integration of scientific and other knowledges in processes of adaptation and climate action, and the creation of new subjectivities-intersubjectivities of other individuals and communities. At the same time, conceptualizing "*we*" in other ways that include a wider and more-inclusive perception of humans and more-than-humans, opens up multiple possibilities and plural trajectories for thinking differently and acting collectively against climate change. Therefore, the subjective-intersubjective perceptions of climate researchers and practitioners involved in processes of adaptation decision-making and planning become particularly important for shifting exclusionary perceptions of "we" to more inclusive ones.

Subsequently, Valerie suggested that "we have to shift that paradigm. […] and if we change how we are thinking about the whole thing, you change the question, [and] it'll force you to come up with a totally different answer." Shifting from normative research paradigms to different ways of thinking, different ways of asking questions, and different ways of framing solutions is consistent with a decolonial perspective of shifting the geography of reason to the geo- and body-politics of knowledge. Therefore, the subjective-intersubjective perceptions of climate researchers and practitioners are critical avenues for the creation of spaces and shaping processes of adaptation and climate action that can either be exclusionary or inclusive, with outcomes that can either reinforces or challenges existing social inequalities.

6.4 Chapter conclusion

In summary, this chapter explored the subjectivities and positionalities of 17 climate researchers and practitioners. The climate researchers and practitioners constructed heterogenous subjectivities and positionalities within, alongside, and beyond the boundaries of the KE4CAP project. From a decolonial standpoint, the field of climate services is not a silo of knowledge creation and production. This means that the social practices and processes of the climate researchers and practitioners, integral to developing and provisioning climate services entwined different human and more-than-human interactions and encounters. At the same time, shifting the geography to the geo- and body-politics of subjectivity emphasized the dynamic nature of subjectivities and positionalities.

Additionally, the socio-cultural contexts and specific experiential and embodied experiences of the climate researchers and practitioners connected the "inner-worlds" of the climate researchers and practitioners to their specific subjectivity of and positionality in processes of climate change (and adaptation) research (Ives et al., 2020). Nonetheless, the climate researchers and practitioners also emphasized that tailoring specific climate service tools and products was essential for informing processes of adaptation planning. As such, the subjectivities and positionalities of the climate researchers and practitioners were discussed in relation to how they situated themselves in processes of adaptation decision-making and planning.

On the one hand, the subjective-intersubjective perceptions of the climate researchers and practitioners can reinforce existing power dynamics of human and more-than-human relations,

such as delimiting subjective categories of "me" and "us", and "drawing a line" between humans and "the environment". These subjective categories have material and discursive implications on how and which groups of people are considered "vulnerable" or "resilient" in adaptation processes, and shape the opening-up and closing-down of the possibilities of collective climate action. On the other hand, by recognizing that these subjective categories and boundaries exemplify cognitive constructs, such as in the case of Valerie Kho, this opens up new ways of thinking, questioning, and relating to processes of climate change adaptation, let alone relating to our world. Therefore, the subjective-intersubjective lenses that climate researchers and practitioners used to perceive themselves in relation to their role in the climate change (and adaptation) research, and in relation to the world they inhabit, exemplify spaces of contestation of subjectivities and knowledges critical for climate change adaptation and societal transformation.

Chapter 7: Conclusion

In this thesis project, I explored the interrelationship of power, knowledge, and being from a decolonial perspective, and in relation to the subjectivities of 17 climate researchers and practitioners. Before I conclude, I would like to revisit the three research questions that were identified in chapter 1.1. Firstly, how do power dynamics and relations shape processes of knowledge production, integration, and exchange in climate adaptation research? Secondly, how do individual experiences and perceptions shape the subjectivity and positionality of researchers and practitioners involved in the production of climate change adaptation research? Lastly, how might a decolonial methodology and framework improve specific research practices in climate services and climate change adaptation?

In chapter 1, an interdisciplinary review of academic literature from decolonial scholarship, climate services, and knowledge exchange introduced key concepts and issues related to the different fields of research. Seminal literature from adaptation politics and science and technology studies also assisted in tying together a decolonial critique of current research practice in the fields of climate services and knowledge exchange. In chapter 2, I highlighted the relevant concepts and the theoretical framework used in this thesis project. The theoretical framework comprised of three interrelated components: (i) shifting the geography of reason; (ii) focusing on subjectivity and integrating an intersubjective approach; and (iii) critical border thinking. In chapter 3, I described the methodology of the thesis project. A decolonial perspective grounded the methodological and analytical approach of this project. By referring to the "Stepping-up Knowledge Exchange between Climate Adaptation Platforms" (KE4CAP) project, a combination of qualitative online research methods included online participatory observation and 18 semi-structured interviews.

To conclude, there are five main research findings in this thesis project. Firstly, there is an emphasis on wider engagement of research focusing on power dynamics in processes of knowledge production, integration, and exchange relevant for climate change adaptation. This is because power dynamics and relations shape how and which knowledges are prioritized, and considered relevant and authoritative in those processes of production, integration, and exchange. Power dynamics and relations also influence which actors are considered valid "knowers", such as the "knowledge producers" and "climate service providers" in climate change adaptation. Therefore, I reiterate the scholars in adaptation politics who argue that research attention needs to focus on

politics and power more critically (Nightingale et al., 2021; Eriksen, 2015), and to analyze the dominant discourses and systems of knowledge production, integration, and exchange.

Subsequently, I highlighted that there are multiple levels and dimensions of power dynamics, operating within and between scientific institutions at the international and national scale, as well as at the individual level. The operation of power within national research institutions exemplified various decision-making processes that can either restrict or facilitate the production and movement of knowledges relevant to informing adaptation planning and policymaking. However, future research is required to better understand how power dynamics shape the adaptation decision-making processes beyond the domains of research institutions, and to include the livelihood domains of local actors and communities involved in and affected by adaptation processes. Moreover, I highlighted the institutional design of research boundaries and agendas shaping processes of knowledge production, integration, and exchange epitomize crucial avenues of re-imagining how we choose to see the world, including how climate researchers and practitioners situate themselves in processes of adaptation decision-making and planning.

Additionally, the operation of power within and between the research institutions were also mediated by the subjective experience and perception of the climate researchers and practitioners. This reflects how subjectivity and positionality not fixed or static, instead they interlink different social practices, socio-cultural contexts, and unique lived experiences. Thus, the social and individual dimensions of subjectivity highlight how the subjectivity and positionality of the climate researchers and practitioners are shaped by context, social practices, embodied experiences, and perception. Studying the dynamic and heterogenous nature of subjectivity is not only essential to shifting the geography of reason to the geo- and body-politics of knowledge and subjectivity, but also it is particularly important in highlighting experiential and embodied ways of knowing as valid knowledges; simultaneously, promoting the development of research practices and methodologies in climate change adaptation research that better considers the lived experiences and emotions of individuals.

Finally, a decolonial approach of conceptualizing relationality and the interdependent nature of all humans and non-humans is essential for opening-up collective spaces possible for transformational adaptation and climate action (Nightingale et al., 2021). I also assert that border thinking and a decolonial perspective of relationality are critical for slipping between the borders of coloniality/decoloniality. This means that, on the one hand, it is important for researchers to

recognize and interrogate the material and discursive implications of hegemonic discourses, systems, and structures of the world, including the scientific institutions and networks that dominate climate change adaptation research and practice. On the other hand, shifting the geography of reason to the geo- and body-politics of knowledge re-centers the subjectivities of the individuals. This includes studying the nuanced perspectives and the experiential and embodied ways of knowing of climate change and adaptation.

Overall, by recognizing that power dynamics do not only operate on an institutional and a global level, but also at the level of the individual, a relational understanding of power, knowledge, and being opens up multiple levels and dimensions in which subjectivities and knowledges are negotiated and contested. However, closer attention to the historical timelines, cultural and traditional values of the research participants (be it climate researchers, policymakers, or farmers) and their contexts will help to enhance the value of the research. Nonetheless, this provides the opportunity for future research to build on my decolonial approach and theoretical framework to investigate these issues of politics and power in environmental knowledge practices in a systematic and holistic manner.

Chapter 8: References

Acquier, A., Carbone, V., & Massé, D. (2019). How to create value (s) in the sharing economy: Business models, scalability, and sustainability. *Technology Innovation Management Review*, *9*(2).

Agrawal, A. (Ed.) (2005). Environmentality. In *Environmentality*. Durham: Duke University Press.

Alcoff, L. M. (Ed.) (2017). Decolonizing feminist philosophy. In M. McLaren (Eds.). *Decolonizing Feminism: Transnational Feminism and Globalization*, pp.21-36.

Anderson, J. (2004). Lessons from a postcolonial-feminist perspective: Suffering and a path to healing. *Nursing Inquiry*, *11*(4), pp.238-246.

André, K., Järnberg, L., Gerger Swartling, Å., Berg, P., Segersson, D., Amorim, J. H., & Strömbäck, L. (2021). Assessing the quality of knowledge for adaptation–experiences from co-designing climate services in Sweden. *Frontiers in Climate*, *3*, p.11.

Archibald, M. M., Ambagtsheer, R. C., Casey, M. G., & Lawless, M. (2019). Using zoom videoconferencing for qualitative data collection: perceptions and experiences of researchers and participants. *International Journal of Qualitative Methods*, 18, 1609406919874596.

Asher, K. (2013). Latin American decolonial thought, or making the subaltern speak. *Geography Compass*, *7*(12), pp.832-842.

Banerjee, S.B. (2022). Decolonizing management theory: A critical perspective. *Journal of Management Studies*, 59(4), pp.1074-1087

Barnett, J., & O'Neill, S. (2010). Maladaptation. *Global Environmental Change*, *20*(2), pp.211-213.

Battiste, M. (2019). Decolonizing education: Nourishing the learning spirit. UBC press.

Beck, S., Borie, M., Chilvers, J., Esguerra, A., Heubach, K., Hulme, M., ... & Görg, C. (2014). Towards a reflexive turn in the governance of global environmental expertise. The cases of the IPCC and the IPBES. *GAIA-Ecological Perspectives for Science and Society*, *23*(2), pp.80-87.

Beck, S., Forsyth, T., Kohler, P., Lahsen, M., & Mahony, M. (2017). The Making of Global Environmental Science and Politics. In U.F. Felt, Rayvon Lauré, Clark A. Miller and Laurel Smith-Doerr (Eds.). *The Handbook of Science and Technology Studies*. Massachusetts: MIT Press.

Beier, P., Hansen, L. J., Helbrecht, L., & Behar, D. (2017). A how-to guide for coproduction of actionable science. *Conservation Letters*, *10*(3), pp.288-296.

Bhambra, G. K. (2014). Postcolonial and decolonial dialogues. *Postcolonial studies*, *17*(2), pp.115-121.

Biermann, F. (2006). Global governance and the environment. In *Palgrave advances in international environmental politics* (pp. 237-261). Palgrave Macmillan, London.

Bisaro, A., Hinkel, J., Le Cozannet, G., van der Pol, T., & Haas, A. (2021). Global Climate Services: A Typology of Global Decisions Influenced by Climate Risk. *Frontiers in Marine Science*, *8*.

Bond, S., & Barth, J. (2020). Care-full and just: Making a difference through climate change adaptation. *Cities*, 102, p.102734.

Bonina, C., Koskinen, K., Eaton, B., & Gawer, A. (2021). Digital platforms for development: Foundations and research agenda. *Information Systems Journal*, *31*(6), pp.869-902.

Bradshaw, G. A., & Borchers, J. G. (2000). Uncertainty as information: narrowing the science-policy gap. *Conservation ecology*, *4*(1).

Brasseur, G. P., & Gallardo, L. (2016). Climate services: Lessons learned and future prospects. *Earth's Future*, *4*(3), pp.79-89.

Bremer, S., & Meisch, S. (2017). Co-production in climate change research: reviewing different perspectives. *Wiley Interdisciplinary Reviews: Climate Change*, *8*(6), p.e482.

Bremer, S., Wardekker, A., Dessai, S., Sobolowski, S., Slaattelid, R., & van der Sluijs, J. (2019). Toward a multi-faceted conception of co-production of climate services. *Climate Services*, *13*, pp.42-50.

Brophy, E., & de Peuter, G. (2014). 'Labor Mobility: Communicative Capitalism and the Smartphone Cybertariat'. In Herman, A., Hadlaw, J., & Swiss.T., (Eds.), *Theories of the Mobile Internet: Materialities and* Imaginaries. New York: Routledge.

Brown, K., Adger, W. N., Devine-Wright, P., Anderies, J. M., Barr, S., Bousquet, F., Butler, C., Evans, L., Marshall, N., & Quinn, T. (2019). Empathy, place and identity interactions for sustainability. *Global Environmental Change*, 56, pp.11–17.

Burghart, R. (1996). The conditions of listening. In C.J. Fuller and J. Spencer (Eds.) *The Conditions of Listening: Essays on Religion, History and Politics in South Asia.* pp.300-318.

Butler, J. (1997). *The psychic life of power: Theories in subjection*. Stanford University Press.

Büyüm, A. M., Kenney, C., Koris, A., Mkumba, L., & Raveendran, Y. (2020). Decolonising global health: if not now, when?. *BMJ Global Health*, *5*(8), p.e003394.

Caffentzis, G.C. (2019) Digital Tools In Kothari, A., Salleh, A., Escobar, A., Demaria, F., & Acosta, A. (Eds.). *Pluriverse: A Post-Development Dictionary.* (pp.37-40). New Delhi: Tulika Books.

Cash, D. W., Clark, W. C., Alcock, F., Dickson, N. M., Eckley, N., Guston, D. H., ... & Mitchell, R. B. (2003). Knowledge systems for sustainable development. *Proceedings of the National Academy of Sciences*, *100*(14), pp.8086-8091.

Castro-Gómez, S. (2005). *La Hybris Del Punto Cero: Ciencia, Raza et Ilustracion En La Nueva Granada. (1750-1816)* [The Hubris of the Zero Point: Science, Race and Illustration in New Granada. (1750-1816)]. Bogota: Editorial Pontificia Universidad Javeriana.

Charmaz, K. (2014). Grounded theory in global perspective: Reviews by international researchers. *Qualitative Inquiry*, *20*(9), 1074-1084.

Cheng, C. P., Lin, H. I., Wang, S., Dean Liu, P. T., & Camyale Chao, K. Y. (2020). Climate Services in Asia Pacific: Emerging Trends and Prospects. *Bulletin of the American Meteorological Society*, *101*(9), p.e1568-E1571.

Chilisa, B. (2012). Postcolonial indigenous research paradigms. *Indigenous Research Methodologies*, pp.98-127.

Chilisa, B. (2017). Decolonising transdisciplinary research approaches: an African perspective for enhancing knowledge integration in sustainability science. *Sustainability Science*, *12*(5), pp.813-827.

Chiu, C. Y., & Hong, Y. (2006). *Social psychology of culture*. New York: Psychology Press.

Chiu, C. Y., Gelfand, M. J., Yamagishi, T., Shteynberg, G., & Wan, C. (2010). Intersubjective culture: The role of intersubjective perceptions in cross-cultural research. *Perspectives on Psychological Science*, *5*(4), pp.482-493.

Ciulli, F., Kolk, A., & Boe-Lillegraven, S. (2020). Circularity brokers: Digital platform organizations and waste recovery in food supply chains. *Journal of Business Ethics*, *167*(2), pp.299-331.

Climate Services Partnership. (2015). What are climate services?. Climate Services Partnership. Retrieved on 13 December 2021, from http:// www.climate-services.org/about-us/what-are-climate-services/.

Coghlan, D., & Brydon-Miller, M. (Eds.). (2014). Positionality. *In The SAGE Encyclopedia of Action Research*, pp.1-2.

Cohen, G., Jalles, J., Loungani, P., & Marto, R. (2018). The Long-Run Decoupling of Emissions and Output: Evidence from the Largest Emitters. *IMF Working Papers*, *18*(56), p.1.

Collard, R. C., Dempsey, J., & Sundberg, J. (2015). A manifesto for abundant futures. *Annals of the Association of American Geographers*, *105*(2), pp.322-330.

Collard, R., Dempsey, J., & Sundberg, J. (2014). A Manifesto for Abundant Futures. *Annals Of The Association Of American Geographers*, *105*(2), pp.322-330.

Constantinides, P., Henfridsson, O., & Parker, G. G. (2018). Introduction—platforms and infrastructures in the digital age. *Information Systems Research*, *29*(2), pp.381-400.

Crang, M., & I. Cook. (2007). *Doing ethnographies*. Sage: London, UK.

Crotty, M. J. (1998). The foundations of social research: Meaning and perspective in the research process. *The Foundations of Social Research*, pp.1-256.

Cruikshank, J. (2005). *Do Glaciers Listen?: Local Knowledge, Colonial Encounters & Social Imagination.* British Colombia: UBC Press.

Cvitanovic, C., Hobday, A. J., van Kerkhoff, L., Wilson, S. K., Dobbs, K., & Marshall, N. A. (2015). Improving knowledge exchange among scientists and decision-makers to facilitate the adaptive governance of marine resources: a review of knowledge and research needs. *Ocean & Coastal Management*, *112*, pp.25-35.

Cvitanovic, C., Howden, M., Colvin, R., Norström, A., Meadow, A., & Addison, P. (2019). Maximising the benefits of participatory climate adaptation research by understanding and managing the associated challenges and risks. *Environmental Science &Amp; Policy*, *94*, pp.20-31.

Cvitanovic, C., McDonald, J., & Hobday, A. J. (2016). From science to action: principles for undertaking environmental research that enables knowledge exchange and evidence-based decision-making. *Journal of Environmental Management*, *183*, pp.864-874.

Daniels, E., Bharwani, S., Swartling, Å. G., Vulturius, G., & Brandon, K. (2020). Refocusing the climate services lens: introducing a framework for co-designing "transdisciplinary knowledge integration processes" to build climate resilience. *Climate Services*, *19*, p100181.

Daron, J., Soares, M. B., Janes, T., Colledge, F., Srinivasan, G., Agarwal, A., ... & Corbelli, D. (2022). Advancing climate services in South Asia. *Climate Services*, *26*, 100295.

De França Sá, A. L., & Marsico, G. (2022). Decoloniality and Disruption of the Scientific Status Quo: Dissemination of Universal Theoretical Assumptions in International Research. *Review of General Psychology*, 10892680211065169.

De Leeuw, S., & Hunt, S. (2018). Unsettling decolonizing geographies. *Geography Compass*, *12*(7), p.e12376.

Deakin, H., & Wakefield, K. (2014). Skype interviewing: Reflections of two PhD researchers. *Qualitative Research*, 14(5), pp.603-616.

Dessai, S., & Hulme, M. (2004). Does climate adaptation policy need probabilities?. *Climate policy*, *4*(2), pp.107-128.

Dias, E. (2009). *First Blood Diamonds Now Blood Computers?*. Time Magazine. Retrieved 20 May 2022, from http://www.time.com/time/world/article/08599,1912594,00.html.

Dolšak, N., & Prakash, A. (2018). The politics of climate change adaptation. *Annual Review of Environment and Resources*, *43*, pp.317-341.

Du Bois, W. E. B. (2007). Black Folk Then and Now: An Essay in the History and Sociology of the Negro Race: The Oxford WEB Du Bois, Volume 7 (Vol. 7). Oxford: Oxford University Press on Demand.

Eriksen, S., Nightingale, A., & Eakin, H. (2015). Reframing adaptation: The political nature of climate change adaptation. *Global Environmental Change*, *35*, pp.523-533.

Escobar, A. (2011). Introduction: Development and the Anthropology of Modernity. In Encountering Development. (pp.3-20). New Jersey: Princeton University Press.

Escobar, A., Mignolo, W., & Taylor & Francis. (2010). *Globalization and the Decolonial Option*. Oxon: Routledge.

Esguerra, A., & van der Hel, S. (2021). Participatory designs and epistemic authority in knowledge platforms for sustainability. *Global Environmental Politics*, *21*(1), pp.130-151.

Fanon, F. (2004). *The Wretched of the Earth*. 1961. *New York: Grove Press*, *6*.

Fazey, I., Bunse, L., Msika, J., Pinke, M., Preedy, K., & Evely, A. et al. (2014). Evaluating knowledge exchange in interdisciplinary and multi-stakeholder research. *Global Environmental Change*, *25*, pp.204-220.

Fazey, I., Evely, A. C., Reed, M. S., Stringer, L. C., Kruijsen, J., White, P. C. L., Newsham, A., Jin, L., Cortazzi, M., Phillipson, J., Blackstock, K., Entwistle, N., Sheate, W., Armstrong, F., Blackmore, C., Fazey, J., Ingram, J., Gregson, J., Lowe, P., ... Trevitt, C. (2012). Knowledge exchange: A review and research agenda for environmental management. *Environmental Conservation*, *40*(1), pp.19–36.

Fife, W. (2005). *Doing fieldwork: Ethnographic methods for research in developing countries and beyond*. New York Springer.

Findlater, K., Webber, S., Kandlikar, M., & Donner, S. (2021). Climate services promise better decisions but mainly focus on better data. *Nature Climate Change*, *11*(9), pp.731-737.

Folke, C., Hahn, T., Olsson, P., & Norberg, J. (2005). Adaptive governance of social-ecological systems. *Annu. Rev. Environ. Resour.*, *30*, pp.441-473.

Foucault, M. (1980). *Power/knowledge: Selected interviews and other writings, 1972-1977*. New York: Vintage.

Foucault, M., Stastny, P., & Şengel, D. (1995). Madness, the absence of work. *Critical Inquiry*, *21*(2), pp.290-298.

Friederici, N., Wahome, M., & Graham, M. (2020). *Digital entrepreneurship in Africa: How a continent is escaping Silicon Valley's long shadow*. Massachusetts: MIT Press.

George, G., Merrill, R. K., & Schillebeeckx, S. J. (2021). Digital sustainability and entrepreneurship: How digital innovations are helping tackle climate change and sustainable development. *Entrepreneurship Theory and Practice*, *45*(5), pp.999-1027.

Gerger Swartling, Å., Tenggren, S., André, K., & Olsson, O. (2019). Joint knowledge production for improved climate services: Insights from the Swedish forestry sector. *Environmental Policy and Governance*, *29*(2), pp.97-106.

Getty, G. A. (2010). The journey between Western and Indigenous research paradigms. *Journal of transcultural nursing*, *21*(1), pp.5-14.

Gibson-Graham, J. K. (2002). Beyond global vs. local: Economic politics outside the binary frame. In A. Herod and M. Wright (Eds.). *Geographies of power: Placing scale*, pp.25-60.

Gonda, N. (2019). Re-politicizing the gender and climate change debate: The potential of feminist political ecology to engage with power in action in adaptation policies and projects in Nicaragua. *Geoforum*, 106, pp.87-96.

González Rey, F. (2017). The topic of subjectivity in psychology: Contradictions, paths and new alternatives. *Journal for the Theory of Social Behaviour*, *47*(4), pp.502-521.

Gopal, P. (2021). On decolonisation and the university. Textual Practice, 35(6), pp.873-899.

Gordon, L. R. (2006). Theorizing race and racism in an age of disciplinary decadence. *Shibboleths: Journal of Comparative Theory*, *1*(1), pp.20-36.

Gough, N. (1998). Decolonising sustainability: subverting and appropriating mythologies of social change. *Southern African Journal of Environmental Education*, *18*, pp.3-13.

Grosfoguel, R. (2006). World-systems analysis in the context of transmodernity, border thinking, and global coloniality. *Review (Fernand Braudel Center)*, pp.167-187.

Grosfoguel, R. (2007). The epistemic decolonial turn: Beyond political-economy paradigms. *Cultural studies*, *21*(2-3), pp.211-223.

Grosfoguel, R. (2011). Decolonizing post-colonial studies and paradigms of political-economy: Transmodernity, decolonial thinking, and global coloniality. *Transmodernity: Journal of Peripheral Cultural Production of the Luso-hispanic World*, *1*(1).

Hackett, E., Parker, J., Vermeulen, N., & Penders., B. (2016). The social and epistemic organization of scientific work. In U.F. Felt, Rayvon Lauré, Clark A. Miller and Laurel Smith-Doerr (Eds.). *The Handbook of Science and Technology Studies*. Massachusetts: MIT Press.

Haraway, Donna (1988), 'Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective', *Feminist Studies* 14:3, pp.575–99.

Harding, S. (2018). One Planet, Many Sciences. In B. Reiter (Ed.) *Constructing the Pluriverse* (pp. 39-62). Durham: Duke University Press.

Harvey, B., Cochrane, L., & Van Epp, M. (2019). Charting knowledge co-production pathways in climate and development. *Environmental Policy and Governance*, *29*(2), pp.107-117.

Harvey, B., Huang, Y. S., Araujo, J., Vincent, K., Roux, J. P., Rouhaud, E., & Visman, E. (2021). Mobilizing climate information for decision-making in Africa: contrasting user-centered and knowledge-centered approaches. *Frontiers in Climate*, 39.

Held, M. B. (2019). Decolonizing research paradigms in the context of settler colonialism: An unsettling, mutual, and collaborative effort. *International Journal of Qualitative Methods*, *18*, p.1609406918821574.

Hellemans, I., Porter, A. J., & Diriker, D. (2022). Harnessing digitalization for sustainable development: Understanding how interactions on sustainability-oriented digital platforms manage tensions and paradoxes. *Business Strategy and the Environment*, *31*(2), pp.668-683.

Hewitt, C., Mason, S., & Walland, D. (2012). The global framework for climate services. *Nature Climate Change*, *2*(12), pp.831-832.

Hinkel, J., Church, J. A., Gregory, J. M., Lambert, E., Le Cozannet, G., Lowe, J., ... & van de Wal, R. (2019). Meeting user needs for sea level rise information: a decision analysis perspective. *Earth's Future*, *7*(3), pp.320-337.

Holifield, R., Chakraborty, J., & Walker, G. (Eds.). (2017). Introduction: The worlds of environmental justice. In The Routledge Handbook of Environmental Justice (pp. 1-11). Oxon: Routledge.

Hulme, D. M., & Pedersen, A. R. (2015). Fragmented work stories: Developing an antenarrative approach by discontinuity, tensions and editing. *Management Learning*, *46*(5), pp.582-597.

Hulme, M. (2010). Problems with making and governing global kinds of knowledge. *Global Environmental Change*, *20*(4), pp.558-564.

Intergovernmental Panel on Climate Change. (2022). Climate Change 2022 Impacts, Adaptation and Vulnerability: Summary for Policymakers. Working Group II Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change.

Introne, J., Laubacher, R., Olson, G., & Malone, T. (2011). The Climate CoLab: Large scale model-based collaborative planning. In *2011 international conference on collaboration technologies and systems (CTS)* (pp. 40-47). IEEE**.**

Ives, C. D., Freeth, R., & Fischer, J. (2020). Inside-out sustainability: The neglect of inner worlds. *Ambio*, 49(1), pp.208–217.

Jacob, D. (2020). Future Trends in Climate Services. In Leal Filho, W. & Jacob, D (Eds.) *Handbook of Climate Services* (pp. 515-519). Springer, Cham.

James, N., & Busher, H. (2006). Credibility, authenticity and voice: Dilemmas in online interviewing. *Qualitative Research*, *6*(3), pp.403-420.

Jancloes, M., Thomson, M., Costa, M. M., Hewitt, C., Corvalan, C., Dinku, T., ... & Hayden, M. (2014). Climate services to improve public health. *International journal of environmental research and public health*, *11*(5), pp.4555-4559.

Jasanoff, S. (Ed.) (2011). Designs on nature. In *Designs on Nature*. New Jersey: Princeton University press.

Jazeel, T. (2017). Mainstreaming geography's decolonial imperative. *Transactions of the Institute of British Geographers*, *42*(3), pp.334-337.

Jones, B. G. (Ed.). (2006). *Decolonizing international relations*. Rowman & Littlefield.

Karcher, D., Cvitanovic, C., van Putten, I., Colvin, R., Armitage, D., & Aswani, S. et al. (2022). Lessons from bright-spots for advancing knowledge exchange at the interface of marine science and policy. *Journal Of Environmental Management*, *314*, p.114994.

Karlsson, S., Srebotnjak, T., & Gonzales, P. (2007). Understanding the North–South knowledge divide and its implications for policy: a quantitative analysis of the generation of scientific knowledge in the environmental sciences. *Environmental Science & Policy*, *10*(7-8), pp.668-684.

Kidd, I.J., Medina, J. & Pohlhaus, G. (2017). *The Routledge Handbook of Epistemic Injustice*. New York: Routledge.

Klenk, N., Fiume, A., Meehan, K., & Gibbes, C. (2017). Local knowledge in climate adaptation research: Moving knowledge frameworks from extraction to co-production. *Wiley Interdisciplinary Reviews: Climate Change*, 8(5), p.e475.

Klymiuk, A. A. (2021). Addressing unconscious coloniality and decolonizing practice in geoscience. *Nature Reviews Earth & Environment*, *2*(11), pp.745-746.

Kolk, A., & Ciulli, F. (2020). The potential of sustainability-oriented digitalplatform multinationals: A comment on the transitions research agenda. *Environmental Innovation and Societal Transitions*,34, pp.355–358.

Kothari, A., Salleh, A., Escobar, A., Demaria, F., & Acosta, A. (Eds.). (2019). *Pluriverse: A Post-Development Dictionary*. New Delhi: Tulika Books.

Le Grange, L. (2020). Decolonising the university curriculum: The what, why and how. In *Transnational Education and Curriculum Studies* (pp. 216-233). Oxon: Routledge.

Leach, M., Stirling, A. C., & Scoones, I. (2010). *Dynamic Sustainabilities: Technology, Environment, Social justice*. Earthscan.

Leal Filho, W. (2020). Introducing climate services and their applications. In Leal Filho, W. & Jacob, D (Eds.) *Handbook of Climate Services* (pp. 3-9). Springer, Cham.

Leal Filho, W., & Jacob, D. (Eds.). (2020). *Handbook of Climate Services*. Berlin: Springer.

Lee, J. C. K., & Gough, N. (Eds.). (2020). *Transnational Education and Curriculum Studies: International Perspectives*. Oxon: Routledge.

Lemos, M. C., Kirchhoff, C. J., & Ramprasad, V. (2012). Narrowing the climate information usability gap. *Nature climate change*, *2*(11), pp.789-794.

Lourenço, T. C., Swart, R., Goosen, H., & Street, R. (2016). The rise of demand-driven climate services. *Nature Climate Change*, *6*(1), pp.13-14.

Lowe, R., Ryan, S.J., Mahon, R., Van Meerbeeck, C.J., Trotman, A.R., Boodram, L.L.G., Borbor-Cordova, M.J., & Stewart-Ibarra, A.M., (2020). Building resilience to mosquito-borne diseases in the Caribbean. *Plos Biology*, *18*(11), p.e3000791.

Maldonado-Torres, N. (2007). On the Coloniality of Being: Contributions to the Development of a Concept. *Cultural studies*, *21*(2-3), pp.240-270.

Maldonado-Torres, N. (2011). Thinking through the decolonial turn: Post-continental interventions in theory, philosophy, and critique—An introduction. *TRANSMODERNITY: Journal of Peripheral Cultural Production of the Luso-Hispanic World*, 1(2).

Maldonado-Torres, N. (2016). Outline of Ten Theses on Coloniality and Decoloniality. Fondation-Frantz Fanon. Retrieved 13 December 2021, from http://fondation-frantzfanon.com/outline-of-ten-theses-on- coloniality-and-decoloniality/.

McIntyre, D., Srinivasan, A., Afuah, A., Gawer, A., & Kretschmer, T. (2020). Multi-sided platforms as new organizational forms. *Academy of Management Perspectives*.

McKenzie, M., (2008). The places of pedagogy: Or, what we can do with culture through intersubjective experiences. *Environmental Education Research*, 14(3), pp.361-373.

Mignolo, W. (2000). Introduction: From cross-genealogies and subaltern knowledges to nepantla. *Nepantla: Views from South*, *1*(1), pp.1-8.

Mignolo, W. (2009). Coloniality: The darker side of modernity. *Modernologies. Contemporary artists researching modernity and modernism*, pp.39-49.

Mignolo, W. & Walsh, C. (2018). On Decoloniality: Concepts, Analytics, Praxis. New York: Duke University Press.

Mignolo, W. D. (2005). Prophets facing sidewise: The geopolitics of knowledge and the colonial difference. *Social Epistemology*, *19*(1), pp.111-127.

Mignolo, W. D. (2007). Delinking: The rhetoric of modernity, the logic of coloniality and the grammar of de-coloniality. *Cultural Studies*, *21*(2-3), pp.449-514.

Mignolo, W. D. (2014). Further thoughts on (de) coloniality. *Postcoloniality-decoloniality-black critique: Joints and Fissures*, pp.21-52.

Mignolo, W. D., & Tlostanova, M. V. (2006). Theorizing from the Borders: Shifting to Geo- and Body-Politics of Knowledge. *European Journal of Social Theory*, *9*(2), pp.205–221.

Moosavi, L. (2020). The decolonial bandwagon and the dangers of intellectual decolonisation. *International Review of Sociology*, 30(2), pp.332-354.

Morse, J. M., Barrett, M., Mayan, M., Olson, K., & Spiers, J. (2002). Verification strategies for establishing reliability and validity in qualitative research. *International Journal of Qualitative Methods*, *1*(2), pp.13-22.

Moya, P. M. (2011). Who we are and from where we speak. *Transmodernity: Journal of Peripheral Cultural Production of the Luso-Hispanic World*, *1*(2).

Nguyen, V. M., Young, N., & Cooke, S. J. (2017). A roadmap for knowledge exchange and mobilization research in conservation and natural resource management. *Conservation Biology*, *31*(4), pp.789-798.

Nightingale, A. (2017). Power and politics in climate change adaptation efforts: Struggles over authority and recognition in the context of political instability. *Geoforum*, 84, pp.11-20.

Nightingale, A., Eriksen, S., Taylor, M., Forsyth, T., Pelling, M., & Newsham, A. et al. (2019). Beyond Technical Fixes: climate solutions and the great derangement. *Climate And Development*, *12*(4), pp.343-352.

Nightingale, A., Gonda, N., & Eriksen, S. (2021). Affective adaptation = effective transformation? Shifting the politics of climate change adaptation and transformation from the status quo. *Wires Climate Change*, *13*(1).

Norström, A. V., Cvitanovic, C., Löf, M. F., West, S., Wyborn, C., Balvanera, P., ... & Österblom, H. (2020). Principles for knowledge co-production in sustainability research. *Nature sustainability*, *3*(3), pp.182-190.

Noxolo, P. (2017). Introduction: Decolonising geographical knowledge in a colonised and re-colonising postcolonial world. *Area*, *49*(3), pp.317–319.

Ojala, A., Evers, N., & Rialp, A. (2018). Extending the international new venture phenomenon to digital platform providers: A longitudinal case study. *Journal of World Business*, *53*(5), pp.725-739.

Olaleye, Y., Kyarisiima, H., & Omollo, C. (2016). Decolonising education is reflexive, deliberate, and necessary. Africa at LSE. Retrieved 15 March 2022, from http://eprints.lse.ac.uk/id/eprint/76315.

Ostrom, E. (1990). *Governing the commons: The evolution of institutions for collective action*. Cambridge: Cambridge University Press.

Ottinger, G., Barandiarán, J. & Kimura, A.H. (2016). 'Environmental justice: Knowledge, technology, and expertise'. In U.F. Felt, Rayvon Lauré, Clark A. Miller and Laurel Smith-Doerr (Eds.). *The Handbook of Science and Technology Studies*. Massachusetts: MIT Press.

Palutikof, J. P., Street, R. B., & Gardiner, E. P. (2019). Decision support platforms for climate change adaptation: an overview and introduction. *Climatic Change*, *153*(4), pp.459-476.

Patt, A., & Dessai, S. (2005). Communicating uncertainty: lessons learned and suggestions for climate change assessment. *Comptes Rendus Geoscience*, *337*(4), pp.425-441.

Phillipson, J., Lowe, P., Proctor, A., & Ruto, E. (2012). Stakeholder engagement and knowledge exchange in environmental research. *Journal of environmental management*, *95*(1), pp.56-65.

Plummer, R., & Armitage, D. (2007). Crossing boundaries, crossing scales: The evolution of environment and resource co-management. *Geography Compass*, *1*(4), pp.834-849.

Polit, D. F., & Beck, C. T. (2010). Generalization in quantitative and qualitative research: Myths and strategies. *International Journal of Nursing Studies*, *47*(11), pp.1451-1458.

Porter, J. J., & Dessai, S. (2017). Mini-me: Why do climate scientists' misunderstand users and their needs?. *Environmental Science & Policy*, *77*, pp.9-14.

Posner, S. M., & Cvitanovic, C. (2019). Evaluating the impacts of boundary-spanning activities at the interface of environmental science and policy: A review of progress and future research needs. *Environmental Science & Policy*, *92*, pp.141-151.

Provençal, J. (2011). Social sciences and humanities research and the public good: a synthesis of presentations and discussions. *Scholarly and Research Communication*, *2*(2).

Quijano, A. (2000). Coloniality of Power and Eurocentrism in Latin America. *International Sociology*, *15*(2), pp.215-232.

Radcliffe, S. (2017). Decolonising geographical knowledges. *Transactions Of The Institute Of British Geographers*, *42*(3), pp.329-333.

Reed, M. G., Scott, A., Natcher, D., & Johnston, M. (2014). Linking gender, climate change, adaptive capacity, and forest-based communities in Canada. *Canadian Journal of Forest Research*, *44*(9), pp.995-1004.

Reiter, B. (2018). *Constructing the Pluriverse: The Geopolitics of Knowledge*. Durham: Duke University Press.

Said, E. (1978). Introduction to Orientalism. New York: Vintage.

San Martín, W. (2021). Unequal Knowledge: Justice, Colonialism, and Expertise in Global Environmental Research. *Global Environment*, *14*(2), pp.423-430.

Scauso, M. S. (2020). *Intersectional Decoloniality: Reimagining International Relations and the Problem of Difference*. Routledge.

Schipper, E. (2020). Maladaptation: When Adaptation to Climate Change Goes Very Wrong. *One Earth*, *3*(4), pp.409-414.

Schulz, K. (2017). Decolonizing political ecology: ontology, technology and 'critical' enchantment. *Journal Of Political Ecology*, *24*(1).

Scott, D. J., Lemieux, C. J., & Malone, L. (2011). Climate services to support sustainable tourism and adaptation to climate change. *Climate Research*, *47*(1–2), pp.111–122.

Sealey-Huggins, L. (2016). Depoliticised activism? Ambivalence and pragmatism at the COP16. *International Journal Of Sociology And Social Policy*, *36*(9/10), pp.695-710.

Sharma, A. (2021). Decolonizing international relations: Confronting erasures through Indigenous knowledge systems. *International Studies*, *58*(1), pp.25-40.

Sithole, T. (2014). *Achille Mbembe: Subject, subjection, and subjectivity* (Doctoral dissertation). Retrieved on 13 March 2022, from https://uir.unisa.ac.za/bitstream/handle/10500/14323/thesis_sithole_t.pdf?sequence=1&isAllowed=y.

Smith, G. H. (2012). The politics of reforming Maori education: The transforming potential of Kura Kaupapa Maori. *Towards Successful Schooling*, pp.73-87.

Smith, G. H. (ed.). (2002). *Guardianship, custody and access: Māori perspectives and experiences*. Auckland, New Zealand: Ministry of Justice, Government Publications. Retrieved on 13 March 2022, from http://www.justice.govt.n/pubs/custody-access-māori/chapter-4.html.

Smith, L. T. (2012). *Decolonizing methodologies: Research and indigenous peoples*. 2nd ed. London: Zed Books.

Smith, L. T., Tuck, E., & Yang, K. W. (Eds.). (2018). *Indigenous and decolonizing studies in education*. Routledge.

Smith, P.B. (2006). When elephants fight, the grass gets trampled: The GLOBE and Hofstede projects. *Journal of International Business Studies*, 37, pp.915–921.

Soares, M. B., Alexander, M., & Dessai, S. (2018). Sectoral use of climate information in Europe: A synoptic overview. *Climate Services*, *9*, pp.5-20.

Street, R. B. (2016). Towards a leading role on climate services in Europe: A research and innovation roadmap. *Climate Services*, *1*, pp.2-5.

Street, R., Barrott, J., Gault, J., O'Dwyer, B., & van Nieuwaal, K. (2019). Stepping-Up Knowledge Exchange between Climate Adaptation Knowledge Platforms (KE4CAP). Position Paper.

Street, R.B., Barrott, J., Gault, J., O'Dwyer, B., van Nieuwaal, K., & Hayman, V. (2021). *Stepping up knowledge exchange between Climate Adaptation Platforms: Synthesis report from the KE4CAP project*. Oxford: University of Oxford.

Styres, S. D. (2017). *Pathways for remembering and recognizing Indigenous thought in education: Philosophies of iethi'nihstenha ohwentsia'kekha (land)*. University of Toronto Press.

Sultana, F. (2007). Reflexivity, positionality and participatory ethics: Negotiating fieldwork dilemmas in international research. *ACME: An international E-journal for Critical Geographies,* 6(3), pp.374-385.

Swadener, B. B., & Mutua, K. (2008). Decolonizing Performances: Deconstructing the Global Postcolonial. In N. Denzin, Y. Lincoln, & L. Smith, *Handbook of Critical and Indigenous Methodologies* (pp. 31–44). SAGE Publications, Inc.

Tall, A., Coulibaly, J. Y., & Diop, M. (2018). Do climate services make a difference? A review of evaluation methodologies and practices to assess the value of climate information services for farmers: Implications for Africa. *Climate Services*, *11*, pp.1-12.

Terracciano, A., McCrae, R.R. (2006). How to measure national stereotypes? Response. *Science*, 311, pp.777–779.

Thambinathan, V., & Kinsella, E. A. (2021). Decolonizing methodologies in qualitative research: Creating spaces for transformative praxis. *International Journal of Qualitative Methods*, *20*, p.16094069211014766.

Tlostanova, M. (2017). On decolonizing design. *Design Philosophy Papers*, *15*(1), pp.51-61.

Tlostanova, M. (2017). On decolonizing design. *Design Philosophy Papers*, *15*(1), pp.51-61.

Tlostanova, M. (2019). The postcolonial condition, the decolonial option, and the post-socialist intervention. In M. Albrecht (Ed.) *Postcolonialism Cross-Examined: Multidirectional Perspectives on Imperial and Colonial Pasts and the Neocolonial Present* (pp. 165-178). New York: Routledge.

Toyama, K. (2011). Technology as amplifier in international development. Proceedings of the 2011 IConference, Seattle, WA. pp.75–82.

Trisos, C. H., Auerbach, J., & Katti, M. (2021). Decoloniality and anti-oppressive practices for a more ethical ecology. *Nature Ecology & Evolution*, *5*(9), pp.1205-1212.

Tuck, E., & Yang, K.W. (2012). Decolonization is not a metaphor. *Decolonization: Indigeneity, Education & Society*, 1(1) pp.1–40.

Turnhout, E., Bloomfield, B., Hulme, M., Vogel, J., & Wynne, B. (2012). Listen to the voices of experience. *Nature*, *488*(7412), pp.454-455.

Turnhout, E., Metze, T., Wyborn, C., Klenk, N., & Louder, E. (2020). The politics of co-production: participation, power, and transformation. *Current Opinion in Environmental Sustainability*, *42*, pp.15-21.

United Nations Decision Framework Convention On Climate Change. (2021). *Glasgow Climate Pact*. Draft decision -/CMA.3. Conference of the Parties serving as the meeting of the Parties to the Paris Agreement. 31 October to 12 November 2021. (FCCC/PA/CMA/2021/L.16). Retrieved on 03 March 2022, from https://unfccc.int/documents/310475.

United Nations Framework Convention On Climate Change. (2015) National Adaptation Plan. WWW. Retrieved on 03 March 2022, from https://unfccc.int/topics/adaptation-and-resilience/workstreams/national-adaptation-plans.

United Nations Framework Convention On Climate Change. (2015). *Paris Agreement to the United Nations Framework Convention on Climate Change*, Dec. 12, 2015, T.I.A.S. No. 16-1104. (FCCC/CP/2015/10/Add.1). Retrieved on 03 March 2022, from https://unfccc.int/process/conferences/pastconferences/paris-climate-change-conference-november-2015/paris-agreement.

Vaughan, C., & Dessai, S. (2014). Climate services for society: origins, institutional arrangements, and design elements for an evaluation framework. *Wiley Interdisciplinary Reviews: Climate Change*, *5*(5), pp.587-603.

Vincent, K., Daly, M., Scannell, C., & Leathes, B. (2018). What can climate services learn from theory and practice of co-production?. *Climate Services*, *12*, pp.48-58.

Vogel, E., Donat, M. G., Alexander, L. V., Meinshausen, M., Ray, D. K., Karoly, D., ... & Frieler, K. (2019). The effects of climate extremes on global agricultural yields. *Environmental Research Letters*, *14*(5), p.054010.

Vulturius, G., André, K., Gerger Swartling, Å., Brown, C., & Rounsevell, M. (2020). Successes and shortcomings of climate change communication: insights from a longitudinal analysis of Swedish Forest owners. Journal of Environmental Planning and Management, 63(7), pp.1177-1195.

Weller, S. (2017). Using internet video calls in qualitative (longitudinal) interviews: some implications for rapport. *International Journal of Social Research Methodology,* 20, pp.613–625.

Westwood, A., Hutchen, J., Kapoor, T., Klenk, K., Saturno, J., & Wang, J. et al. (2021). A systematic mapping protocol for understanding knowledge exchange in forest science. *Ecological Solutions And Evidence*, *2*(3).

World Bank. (2022). World Bank Country and Lending Groups. Retrieved on 20 April 2022, from https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups.

World Meteorological Organization (WMO). (2012). Global Framework for Climate Services. World Meteorological Organization, 61(2). Retrieved on 13 December 2021, from https://library.wmo.int/doc_num.php?explnum_id=6970.

Yamineva, Y. (2017). Lessons from the Intergovernmental Panel on Climate Change on inclusiveness across geographies and stakeholders. *Environmental Science & Policy*, *77*, pp.244-251.

Young, N., Nguyen, V. M., Corriveau, M., Cooke, S. J., & Hinch, S. G. (2016). Knowledge users' perspectives and advice on how to improve knowledge exchange and mobilization in the case of a co-managed fishery. *Environmental Science & Policy*, *66*, pp.170-178.

Chapter 9: Appendices

Appendix A

Research participants list

Research subject (pseudonym)	Organisation's role in relation to the KE4CAP project	Country	Organisation
Peter Laughlin	Project partner	Australia	The Commonwealth Scientific and Industrial Research Organisation (CSIRO), Earth Systems and Climate Change Hub
Deepan Rastogi	Project participant	India	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH - GIZ India / National Bank for Agriculture and Rural Development (NABARD), Centre for Climate Change at Bankers Institute of Rural Development (BIRD),
Animesh Gujat	Project participant	India	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH - GIZ India / National Bank for Agriculture and Rural Development (NABARD), Centre for Climate Change at Bankers Institute of Rural Development (BIRD)
Haru Yuji	Project partner	Japan	National Institute for Environmental Studies, Center for Climate Change Adaptation (CCCA)
Hinata Izumi	Project partner	Japan	National Institute for Environmental Studies, Center for Climate Change Adaptation (CCCA), Asia-Pacific Climate Change Adaptation Research Section
Ayaka Nishida	Project partner	Japan	National Institute for Environmental Studies, Center for Climate Change Adaptation (CCCA)
Valerie Kho	Project participant	Philippines	Oscar M. Lopez Center
Denise Adisa	Project participant	South Africa	Republic of South Africa's Departmnent of Forestry, Fisheries, and the Environment, Climate change and Air quality
Kamogelo Owusu	Project participant	South Africa	Republic of South Africa's Departmnent of Forestry, Fisheries, and the Environment, Climate change and Air quality
Amahle Abbe	Project participant	South Africa	Republic of South Africa's Departmnent of Forestry, Fisheries, and the Environment, Biodiversity and Conservation

Research subject (pseudonym)	Organisation's role in relation to the KE4CAP project	Country	Organisation
Sung-Ho Kim	Project participant	Republic of Korea	Korea Environment Institute, Korea Adaptation Center for Climate Change (KACC)
Cassandra Leigh	Project participant	Fiji	Secretariat of the Pacific Regional Environment Programme (SPREP)
Seijun Roko	Project participant	Japan	Japan International Cooperation Agency (JICA)/ SPREP
Christine Richards-Smith	Project participant	Samoa	Secretariat of the Pacific Regional Environment Programme (SPREP), Pacific Climate Change Centre
Grace Wong	Project participant	Taiwan	National Science and Technology Center for Disaster Reduction, Taiwan Climate Change Projection Information and Adaptation Knowledge Platform (TCCIP)
Marcus Lee	Project participant	Taiwan	National Science and Technology Center for Disaster Reduction, Taiwan Climate Change Projection Information and Adaptation Knowledge Platform
William Bernard	KE4CAP project lead	UK	University of Oxford
Pascal van Beek	KE4CAP project core team member	Netherlands	Climate Adaptation Services
George Bailey	KE4CAP project core team member	Ireland	MaREI, the Science Foundation Ireland (SFI) Research Centre for Energy, Climate and Marine
Dean McColm	KE4CAP project core team member	Ireland	MaREI, the Science Foundation Ireland (SFI) Research Centre for Energy, Climate and Marine
Fiona Dale	KE4CAP project core team member	UK	Stockholm Environment Institute - Oxford (SEI)
Patricia Neuman	KE4CAP project administrator	UK	University of Oxford

Appendix B

Thesis project information sheet provided to KE4CAP project participants.

CEU Department of Environmental Sciences and Policy
Masters in Environmental Sciences, Policy and Management 2020-2022

MESPOM
Masters in Environmental Sciences, Policy and Management

Co-funded by the Erasmus+ Programme of the European Union

CEU CENTRAL EUROPEAN UNIVERSITY

Information sheet

Student researcher:
Su-Mae Chua
sumae.chua@mespom.eu | +43 677 643 94838

Thesis supervisor:
Professor Guntra Aistara
aistaraG@ceu.edu | +43 660 368 4072

Thesis topic:
A Decolonial Option for Knowledge Exchange: Politics and power relations in climate adaptation governance

I am interested in studying different people's understanding and perception of climate change adaptation, and how these various perceptions are integrated at regional and global levels. Subsequently, I would like to investigate power dynamics and relations among various participant and knowledge systems in the provision of climate change adaptation services. Additionally, I would like to consider how power relations are influenced by colonial histories and global North-South dynamics. Thus, I refer to the "Knowledge Exchange Between Climate Adaptation Platform" (KE4CAP) project as a case study for studying a global network of researchers and practitioners involved in various knowledge exchange activities pertinent in facilitating and informing decision-making processes in climate adaptation strategies and policies. However, this thesis is independent from the KE4CAP project, and is not directly affiliated to the KE4CAP project consortium.

Why you?
Individuals' perceptions of climate change adaptation differ across the world, and they link to different geographical, cultural, and social contexts. I want to learn about your understanding and perception of climate change adaptation services. In particular, I am interested in learning about your role and experiences in this field and as a person from a country in the Global South. This study involves 15-20 interview participants.

Central European University
Central European University Private University
Quellenstraße 51 | A-1100 Wien, Austria | Vienna Commercial Court | FN 502313 x

Must I participate?
No. The decision to participate is entirely your own. You can withdraw from the study at any time before June 2022. If you withdraw, your data will be deleted and not used. You may also pause or stop the recording of the interview at any time and skip any questions that you do not wish to answer.

What will happen if I participate?
I would like to conduct a 30–60-minute interview with you. There will be no compensation of any kind available for your participation, which is completely voluntary. You do not have to disclose any personal information if you do not wish to. If permitted, interview recordings will be taken and used only for the purpose of this thesis. Interview transcription and analysis will be conducted on the student researcher's laptop, which is password protected while using secure software and data storage. Only the student researcher and thesis supervisor will have access to the interview data files, which will be destroyed upon completion of the thesis project.

Confidentiality
All information collected is strictly confidential. The privacy of individual participants will be respected. Participants will be referred to by pseudonyms and without explicit permission, the results will not include any information or direct quotes that could identify an individual directly.

Results of the study
The results will contribute to my master's thesis, submitted to Central European University for marking. At your request, I will provide you with a copy of the final draft. I will present the findings of my thesis to my fellow students and department on June 21-22, 2022. A copy of the paper is stored by the department and will be available to students online. The thesis will not be published, although articles from it may be published.

If you have any questions about this project or your participation in it, please do not hesitate to contact me. You can find my student email and contact number on the page above. Thank you for your participation and assistance!

Sincerely,
Su-Mae Chua

Thesis project information sheet provided to core KE4CAP team members.

CEU Department of Environmental Sciences and Policy
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Information sheet

Student researcher:
Su-Mae Chua
sumae.chua@mespom.eu | +43 677 643 94838

Thesis supervisor:
Professor Guntra Aistara
aistaraG@ceu.edu | +43 660 368 4072

Tentative thesis topic:
A Decolonial Option for Knowledge Exchange: Politics and power relations in the provision of climate adaptation services

I am interested in studying different people's understanding and perception of climate change adaptation, and how these various perceptions are integrated at regional and global levels. Subsequently, I would like to investigate power dynamics and relations among various participant and knowledge systems in the provision of climate change adaptation services. Additionally, I would like to consider how power relations are influenced by colonial histories and global North-South dynamics. Thus, I refer to the "Knowledge Exchange Between Climate Adaptation Platform" (KE4CAP) project as a case study for studying a global network of researchers and practitioners involved in various knowledge exchange activities pertinent in facilitating and informing decision-making processes in climate adaptation strategies and policies. However, this thesis is independent from the KE4CAP project, and is not directly affiliated to the KE4CAP project consortium.

Why you?
Design and implementation of knowledge exchange initiatives through the KE4CAP project influence the processes and outcomes of knowledge exchange practice. I want to learn about your understanding and perception of climate change adaptation services, and how that shapes practices of knowledge exchange between climate adaptation platforms through the KE4CAP project.

Must I participate?

No. The decision to participate is entirely your own. You can withdraw from the study at any time before June 2022. If you withdraw, your data will be deleted and not used. You may also pause or stop the recording of the interview at any time and skip any questions that you do not wish to answer.

What will happen if I participate?

I would like to conduct a 30–60-minute interview with you. There will be no compensation of any kind available for your participation, which is completely voluntary. You do not have to disclose any personal information if you do not wish to. If permitted, interview recordings will be taken and used only for the purpose of this thesis. Interview transcription and analysis will be conducted on the student researcher's laptop, which is password protected while using secure software and data storage. Only the student researcher and thesis supervisor will have access to the interview data files, which will be destroyed upon completion of the thesis project.

Confidentiality

All information collected is strictly confidential. The privacy of individual participants will be respected. Participants will be referred to by pseudonyms and without explicit permission, the results will not include any information or direct quotes that could identify an individual directly.

Results of the study

The results will contribute to my master's thesis, submitted to Central European University for marking. At your request, I will provide you with a copy of the final draft. I will present the findings of my thesis to my fellow students and department on June 21-22, 2022. A copy of the paper is stored by the department and will be available to students online. The thesis will not be published, although articles from it may be published.

If you have any questions about this project or your participation in it, please do not hesitate to contact me. You can find my student email and contact number on the page above. Thank you for your participation and assistance!

Sincerely,
Su-Mae Chua

Appendix C

Interview schedule provided to KE4CAP project participants.

Guiding questions for interviewees

**The interview does not have to cover all questions*

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Introduction
☐ Role and responsibilities ○ How did you get involved in the KE4CAP project? ○ What role did your organisation have in the KE4CAP project?
Discussion topics and follow-up questions
☐ **Local organisation** - NCCIS (South Africa) ○ Can you tell me about some of the work, objectives, and priorities of NCCIS? ☐ **Interviewee's experience and perception related to climate change and adaptation** ○ Why are you working in the field of climate change and climate adaptation services? ○ How have you noticed climate change affecting your area? ☐ **Interviewee's perception of the provision of climate adaptation services** ○ How is the provision of climate adaptation services relevant in climate adaptation governance? ○ What knowledge (or kinds of knowledge) needs to be prioritised in climate adaptation services? Where and who does this knowledge come from? ○ How is this knowledge considered in climate adaptation services and on NCCIS? ○ How have decisions to focus on specific knowledge areas in NCCIS been influenced by the history (colonial, national, regional etc.) of NCCIS/ South Africa? ☐ **Interviewee's perception of knowledge exchange and the KE4CAP project** ○ From your understanding and experience, what is knowledge exchange? And who does knowledge exchange involve? ○ How do you view your position in knowledge exchange? ○ In the KE4CAP project, the important role of local users of climate adaptation platforms was emphasised. Who are the local users? Who are not local users? ☐ **Interviewee's experience of knowledge exchange in the KE4CAP project** ○ What were your contributions in the KE4CAP project? Can you give an example of when your contribution made a difference and/or influenced decision-making? ○ Can you give an example when your priorities and/or perception of climate change adaptation did not align with the knowledge shared through KE4CAP project? ☐ **Geographical classifications of climate adaptation platforms (CAPs)** ○ What role and position does NCCIS & South Africa have in a global network of CAPs? ○ Do you see the knowledge relevant to your CAP and country as distinct from other countries? ☐ **Social and cultural contexts of CAPs** ○ In what ways are social, technical, and cultural contexts of NCCIS and South Africa relevant in knowledge exchange for climate adaptation services and/or governance? ○ How does this relate to other countries or communities involved in the KE4CAP project? ☐ **Improvements to knowledge exchange** ○ How should knowledge exchange be designed in the future to enhance the effectiveness of sharing knowledge for climate services? ○ What capacities and resources do you think are required to enable more effective knowledge exchange strategies in the future?
Conclusion

Interview schedule provided to core KE4CAP team members.

Guiding questions for interviewees

**The interview does not have to cover all questions*

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Introduction

- What role and responsibilities did you have in the KE4CAP project?
- How did you get involved in the KE4CAP project?

Interviewee's perception of knowledge exchange and climate adaptation services

- In your own words, what is knowledge exchange? Who does knowledge exchange involve?
- How do you view your position in knowledge exchange?
- Which knowledges (or kinds of knowledge) need to be prioritised for the provision of climate adaptation services? Where and who does this knowledge come from?
- How was this knowledge considered and/or included in the KE4CAP project?

Project-focused questions

- **Project objectives**
  - In your own words, please describe the main objective(s) of the KE4CAP project.
  - To what extent were these objectives achieved or not achieved?
- **Project activities**
  - What activities were included in the KE4CAP project's knowledge exchange initiatives?
  - In your opinion, why activity(s) did you find most useful/successful? And why were they useful/successful?
  - Were there any unexpected outcomes from the knowledge exchange activities? What were they?
- **Project team**
  - How would you describe your experience working with the KE4CAP core team members? Did you work with any of them before and/or familiar with their work?
  - How were individual tasks and/or responsibilities designated?
- **Project partners and participants**
  - How and why were specific KE4CAP partners chosen? (i.e., Australia, Canada and Japan)
  - How did you get participants involved in the KE4CAP project? Were there specific participants or organisations that you had particular interest in joining the KE4CAP project?
  - How did you decide on specific participants/organisation on presenting or contributing to a specific knowledge exchange workshop?
  - Could you briefly describe to me how many participants and/or organisations you knew or were familiar in your professional network, as opposed to those that were not?
- **Potential challenges**
  - Were there any challenges and/or difficulties when designing and implementing the knowledge exchange activities through the KE4CAP project? If so, please provide an example.

Conclusion