



Governmentalities, hydrosocial territories & recognition politics: The making of objects and subjects for climate change adaptation in Ecuador

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ABSTRACT

Adaptation to climate change has become a major policy and project focus for donors and governments globally. In this article, we provide insight into how adaptation projects mobilize distinct imaginaries and knowledge claims that create territories for intervention (the objects) as well as targeted populations (the subjects) to sustain them. Drawing on two emblematic climate change adaptation projects in Ecuador, we show how these objects and subjects are created through a knowledge production process that (a) creates a discursive climate change rationale; (b) sidesteps uncertainty related to climate change impacts; (c) fosters a circular citational practice that (self-)reinforces the project's expert knowledge; and (d) makes complex social variables commensurable based on the project's rationality, interests, and quantifiable indicators. The emerging hydrosocial territories 'in need of intervention' require subjects that inhabit, produce and reproduce these territories, in accordance with specific climate change discourses and practices. To manufacture and align these subjects, projects employ participatory practices that are informed by recognition politics aimed at disciplining participants toward particular identities and ways of thinking and acting. We analyze these distinct strategies as multiple governmentalities enacted through participatory adaptation projects seeking to produce specific climate change resilient hydrosocial territories and corresponding subjects.

1. Introduction

As global action on climate change mitigation remains inadequate (UNEP, 2019), donors are placing increasing emphasis on supporting adaptation projects in developing countries (Khan et al., 2019). Reflecting this trend, public finance for adaptation grew by 35% between 2015 and 2018 to an annual average of \$30 billion (Climate Policy Initiative, 2019). While this level of funding remains well below the estimated \$140–\$300 billion needed annually by 2030 for adaptation (UNEP, 2018), this climate finance translates to hundreds of projects globally with real consequences for the vulnerable communities on the frontlines of climate change.

Across Latin America, this increase in climate finance comes at a time when traditional development aid has contracted as many countries in the region are now designated as middle income. Since 2003, \$2.8 billion USD has been approved for 359 adaptation projects in Latin

America and the Caribbean, \$1.8 billion of which has come in the form of grants (Barnard et al., 2016). Despite the increase in climate finance throughout Latin America, there remains little critical scholarship into the logics and practices mobilized by adaptation projects in the region (e.g. Camargo and Ojeda, 2017; Henrique and Tschakert, 2019).

In this article, we contribute to this emergent field of inquiry by providing a structured analysis of the governmentality embedded in two climate change adaptation projects in the Ecuadorian highlands (PACC: Adaptation to Climate Change through Effective Water Governance in Ecuador and FORECCSA: Enhancing Resilience of Communities to the Adverse Effects of Climate Change Effects on Food Security project). These projects mirror both the multi-scalar governance structure and strategies of many adaptation projects since the same international agencies and donors involved in PACC and FORECCSA are funding, designing, and implementing internationally-funded adaptation initiatives across Latin America and the Global South.

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We argue that these projects bring forward new technocratic knowledge claims that produce a specific imaginary - of a hydrosocial territory (the object) and its inhabitants (the subjects) - that justifies and shapes interventions. Therefore, the distinct knowledge production practices embedded in climate change adaptation projects go hand in hand with sovereign and disciplinary governmentalities aimed at aligning the subjects to become the (re)producers of the envisioned object (Foucault, 1991, 2008). Our analysis, which is informed by Dean's (2009) framework for studying (Foucauldian) governmentality, suggests that the participatory mechanisms in PACC and FORECCSA reflect particular recognition politics that seek to discipline participants toward particular identities, ways of thinking, and acting in relation to their hydrosocial territories (see Boelens et al., 2015, 2016).

Through our analysis of governmentality in climate change adaptation projects, we build on scholarship regarding how authority and recognition are negotiated in climate change responses (Boer, 2019; Eriksen et al., 2015; Nightingale, 2017). Scholars have examined the post-political framing of climate change adaptation (Mikulewicz, 2019; Popke et al., 2016; Smith and Dressler, 2019; Zografos, 2017) and highlighted the techno-managerialism that governs these projects (Paprocki 2018a; Webber 2016). Our article makes an important contribution to these studies by identifying the particular epistemic practices used by project implementors to create regimes of truth and establish a dominant climate change adaptation imaginary. The imaginary embedded in adaptation projects has been explored by others (Henrique and Tschakert, 2019; Mikulewicz, 2020; Paprocki, 2018b; Smith and Dressler, 2019), however, by using hydrosocial territories as an analytic tool, we explicitly unpack the constituent elements of the dominant imaginary promoted within climate change adaptation projects (See Table 1). The notion of governmentality allows us to better describe the intersecting regime of practices developed by project implementors to advance this imaginary and the subjects to sustain it.

The paper is structured as follows: in the second section, we briefly share our methods. In the third section, we present how the concepts of governmentality, hydrosocial territories, and recognition politics inform our analysis. In the fourth section, we introduce the studied climate change adaptation projects in the context of Ecuadorian climate and water governance. In section five, we show how the climate change adaptation projects make visible a particular type of hydrosocial territory. In the sixth section, we unpack the regime of practices employed to produce, legitimize and stabilize specific notions of climate change-threatened territories that contain vulnerable local communities in need of intervention. In particular, we present four approaches to producing knowledge around climate change adaptation: building a discursive frame, employing the politics of ignorance, enacting self-reinforcing practices, and making social variables commensurate. In section seven, we examine the practices and techniques embedded in the recognition politics mobilized in both PACC and FORECCSA, exploring three shared strategies: outsourced participation mechanisms, procedural control of participation outcomes, and state-centered representation. In section eight, we explain how project implementors make adaptation project subjects through capacity-building efforts and project requirements. In the last section, we present our conclusions.

2. Methods

Our analysis draws on 54 semi-structured interviews with state officials ($n = 9$), technical project staff ($n = 12$), project consultants ($n = 18$), international organizations ($n = 6$), and community leaders ($n = 9$). These interviews with key adaptation actors focused on the process and outcomes of designing, implementing, and evaluating climate change adaptation projects in Ecuador. All interviews were transcribed and coded for key narratives in the themes of knowledges, practices/techniques, identities of actors, and goals (Hajer and Versteeg, 2005). These interviews were paired with participant observation in adaptation project sites and project outreach events. We

also conducted a systematic review of PACC and FORECCSA project documents ($n = 52$) including baseline, mid-term, and final evaluations, progress reports, vulnerability assessments, adaptation plans, technical reports, published systemizations of project results, and outreach materials. Our systematic review entailed the selection of documents based on pre-determined criteria (i.e. produced by or for PACC and FORECCSA; see Berrang-Ford et al. (2015)), followed by an examination of these documents in qualitative analysis software. We analyzed these documents based on themes clustered around knowledges, practices/techniques, identities of actors, and project goals.

3. Governmentalities, Hydrosocial Territories & Recognition Politics

Our analysis merges two conceptual frameworks: governmentality and hydrosocial territories. Governmentality provides insight into the regime of practices through which climate change adaptation projects aim to govern local communities and through which communities govern themselves (Dean, 2009, p. 28). In doing so, governmentality enables an analysis of how climate change adaptation is rendered into an object that can be governed, how that object is advanced, and the related subjectivities of both the governed and governors (Strippel and Bulkeley, 2013). Hydrosocial territories, as a complimentary conceptual framework, grounds and bounds the object created through the regime of practices surrounding climate change adaptation projects. Entwining the lenses of governmentality and hydrosocial territories to understand the making of climate change adaptation territorial objects and their subjects is a novel contribution to literature. In particular, it lends precision to our understanding of this object of intervention by drawing analytic attention to the constituent elements of the hydrosocial territorial imaginary (See Table 1) and its boundaries while clarifying the utopian vision underlying climate change adaptation.

3.1. Climate change adaptation & governmentality

Governmentality, or the art of conducting population's conduct, encapsulates an important set of government-rationalities that work to advance policies and projects that order socio-economic, political and cultural relations in given socio-natures (Dean, 2009; Foucault, 1991, 2007, 2008). The different governmentalities that are used to pursue these goals are sovereign, neoliberal, and disciplinary governmentality.

Sovereign governmentality is enacted by the state through mechanisms such as laws and constitutions over subjects. This continues to be an important power mode in government interventions that seek to address climate change impacts. Within water sector adaptation projects, sovereign governmentality is visible in provisions such as requirements for beneficiaries to have state-recognized land titles and water licenses or mandatory financial and labor contributions by water users to demonstrate their commitment to the project. Non-compliance may be responded with actual or threats of punishment or exclusion.

Neoliberal governmentality approaches consider individuals as rational economic actors and work to influence the thoughts and actions of populations to act as economic-maximizing individuals (Fletcher, 2010; Foucault, 1991). This approach manifests in climate change adaptation through strategies such as payment for ecosystem services (PES) programs that financially incentivize conservation actions to facilitate adaptation (Kolinjivadi et al., 2017; Rodríguez de Francisco and Boelens, 2016) or the Clean Development Mechanism that arose from the Kyoto Protocol as a market mechanism for funding mitigation and adaptation projects (Liverman, 2009; Oels, 2005). While neoliberal governmentality is a key feature of some adaptation initiatives, in the case of the two climate change adaptation projects examined in this article, disciplinary governmentality played a more central role.

Disciplinary governmentality uses normalizing power to delegitimize deviant behavior and thinking, creating 'subjectified subjects' (Foucault, 1975). This strategy functions through a dual process

whereby the subject's behavior becomes the object of governmental intervention ('producing subjects') and where governed subjects internalize dominant discourses and self-discipline so as not to be deviant or immoral (Agrawal, 2005; Feindt and Oels, 2005; Foucault, 1975, 1991). Within climate change adaptation projects, the myriad efforts aimed at capacity-building among beneficiaries point to how these projects seek to make new subjects that require the guardianship of project implementors and who will ultimately take up the intervention towards a desirable end (Li, 2007; Radcliffe, 2015).

Even though classic modes of governmentality such as sovereign power continue to operate in climate change adaptation, modernist modes such as neoliberal and disciplinary governmentality have become more dominant. These modernist modes are generative, relational techniques of governance that tend to be internalized by both the dominant and the dominated (Foucault, 1980). They utilize subtler technologies than overt governmental violence to design, direct, and discipline appropriate behavior among populations (Foucault, 2008).

Across these governmentalities, the strategic (but not necessarily conscious) use of discourse actively *produces* the environment through policy making, development planning, and everyday practices. Discourse, therefore, goes beyond linguistics and the production of meaning; it is constitutive of reality - socially, symbolically, and physically (Feindt and Oels, 2005), it entwines knowledge and power to shape truth regimes (Foucault, 1975, 2007). Discourses thereby build on *practices* that enroll not just speech but also texts, things, as well as human and non-human actors in mutual relationships.

In this article, we draw on Dean's (2009) framework for studying governmentality, organizing our analysis around the visibility of the object of intervention in adaptation projects, the broader goal of these interventions (*telos*), the knowledge production underlying climate change adaptation (*episteme*), the tactics and strategies used to attain the goal (*techné*), and self/identity of the governed and governors. While below these will be presented as independent dimensions, they are in fact not deterministic but overlapping and contingent (Dean, 2009).

3.2. Hydrosocial territorial imaginaries: creating the objects and subjects for intervention

The complementary notion of hydrosocial territories enables us to examine how these governmentalities aim to transform nature, technology and society based on specific territorial imaginaries (See Table 1). Hydrosocial territories, as an orienting theoretical concept, provides an entry point to understanding how climate change adaptation projects create an object in which to intervene. In particular, it adds analytical precision to governmentality by highlighting the constituent elements of the utopian imaginary at the heart of climate change adaptation projects. To begin, hydrosocial territories are conceptualized as being co-constituted spaces or hybrids that fuse the natural and social, locking these indivisible elements into the constant process of 'socio-natural production' (Haraway, 1991; Latour, 1993; Swyngedouw, 2007). These networks include water flows and technologies that exist in dynamic relation to one another, shaping socio-natures (Linton and Budds, 2014). Following Boelens et al. (2016), we define hydrosocial territories as:

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

Key to understanding hydrosocial territories as multi-scalar networks is that these territories are plural (Boelens et al., 2016; Hoogesteger et al., 2016; Porto-Gonçalves and Leff, 2015). Within any

given space, the multiple material and imaginary hydrosocial territories promoted by individual and collective actors are colluding, collaborating, and conflicting (Duarte-Abadía et al., 2015; Hommes et al., 2019; Hommes and Boelens, 2017, 2018). These entangled territories are not just bounded, material territorial projects, but also *imagined* water-based territories promoted through different 'regimes of representation' that interact across scales disempowering and empowering varied actors (Boelens et al., 2016; Harris, 2014; Harris and Alatout, 2010; Hoogesteger et al. 2016). Dueling hydrosocial territorial projects are advanced along ontological and epistemological fault lines such as cultural and political norms or socio-economic institutions (Duarte-Abadía and Boelens, 2016; Goldman and Narayan, 2019; Hulshof and Vos, 2016; Henrique and Tschakert 2019; Zenko and Menga, 2019).

In climate change adaptation projects, donors and project implementers create and promote specific (often imaginary) hydrosocial territories as spaces in need of intervention. These interventions aim to consolidate "a particular order of things" through the deployment of different governmentalities (Boelens et al., 2016, p. 7). But to legitimize and consolidate these dominant territorial imaginaries, specific knowledge claims must be made, reinforced and circulated (e.g., Damonte, 2019; Hoogendam, 2019; Marks, 2019; Usón et al., 2017). In the context of climate change adaptation projects, these knowledge production practices include techno-scientific tools such as scenario-based climate modeling, vulnerability mapping, adaptation measure design etc. The regime of truth produced via these knowledge production practices informs the creation not only of an object (a specific hydrosocial territory in need of transformation) but also of subjects that are to be governed toward desirable conducts (see also Demeritt, 2001; Hidalgo-Bastidas et al., 2018; Paprocki, 2018a).

Project promoters desire to create new 'resilient' and 'adaptive' subjects that are instrumental to and constitutive of their vision of development and climate change adaptation (Beck, 2017; Mosse, 2005). For this, projects need beneficiaries to frame their needs, worldviews, relationships, and approaches in the context of climatic risk, exposure, vulnerability and adaptive capacity (Eriksen et al., 2015; Li, 2007; Mikulewicz, 2020; Usón et al., 2017; Webber, 2016). In this paper, we highlight how the creation of the adaptation project beneficiary who inhabits and reproduces a specific hydrosocial territorial imaginary is a crucial element to solidifying the object of adaptation. This subject is created through an interlocking regime of practices and multiple governmentalities that are operationalized across scales and through the various phases of project design, approval, and implementation as is explored in the section below (Fletcher, 2017).

3.3. Recognition politics as governmentality

Territorialization projects rather than 'obliterating' local or divergent hydrosocial territorial imaginaries commonly employ governing strategies that strategically 'recognize', assimilate, and discipline these alternatives (Duarte-Abadía and Boelens, 2016; Hommes et al., 2016; Seemann, 2016). Selective recognition, as a political strategy for supposedly redressing historical exclusion and marginality, has been a key technique employed over the last fifty years (Boelens, 2009; Jackson, 2018; Simpson, 2017). This process is evident in the Andes, where many states have celebrated multiculturalism through legal and discursive efforts to provide equality for indigenous peoples, but without meaningful redistributive justice (Baud, 2010; Boelens et al., 2015). By embracing multiculturalism with strategic recognition of only 'convenient' local customs, forms of organization and rights-based schemes, states are able to sideline, transform and oppress deviant, contentious local practices and institutions (Boelens, 2009, 2015).

Recognition employs disciplinary governmentality in subtle ways as summarized by Hale (2002, p. 12): "the state does not merely 'recognise' community, civil society, indigenous culture and the like, but actively re-constitutes them in its own image, sheering them of radical excesses, inciting them to do the work of subject-formation that

otherwise would fall to the state itself.” This managed multiculturalism (Assies, 2006, 2012) is carried forward not only by the state, but also by powerful institutions outside the state such as NGOs. Under neoliberalism, professionalized NGOs have become the quintessential agent of discipline (Hale, 2002; Li, 2009; Perreault, 2015), often advocating for recognition of indigenous peoples and communities in policies and projects, only insofar as it reinforces the dominant territorial project (Valladares and Boelens, 2017).

This trend toward selective recognition and multiculturalism, however, is not just the result of state initiatives and NGO advocacy, but also reflects the efforts of the culturally oppressed and excluded (Hale, 2002). In this way, recognition politics have presented a ‘disempowering paradox’, where marginalized peoples successfully gain ‘recognition’ as more powerful actors co-opt this notion, but their more substantive political goals such as redistributive justice are undermined. This selective recognition masks the economic expropriation and dispossession that fundamentally drives marginalized people’s call for recognition (Assies, 2012; Dupuits, 2019; Jackson, 2018). Therefore, it is crucial to look beneath normalizing inclusionary gestures to comprehend how these efforts translate into material accommodation of alternative hydrosocial territories in climate change adaptation (Schlosberg and Collins, 2014).

In the context of climate change adaptation, deliberative participation (vs. simply procedural) has been a key demand of indigenous peoples. The Cochabamba Indigenous People’s Agreement explicitly called for consultations, participation, and the Free, Prior, and Informed consent of indigenous peoples and affected populations in the design and implementation of climate change adaptation measures, asserting that adaptation must be a *process* versus an *imposition* (People’s Agreement of Cochabamba, 2010).

Acknowledging these demands, projects have increasingly made a progressive gesture of recognition to legitimize these initiatives. This inclusive form of government governs people by promoting modalities that include ‘participation’, ‘integration’, and ‘recognition’ (Assies, 2012; Hale, 2002; Li, 2009; Perreault, 2015). Varying participatory mechanisms are embedded in adaptation projects. On one hand, these present spaces for negotiation about divergent territorial imaginaries under climate change adaptation projects. On the other hand, these participation mechanisms can be viewed as strategies of disciplinary governmentality, where project participants are made into ideal adaptation project subjects and messy, inconvenient hydrosocial imaginaries are confined, contained, and neutralized (Beck, 2017; Nagoda and Nightingale, 2017; Nightingale, 2017; Radcliffe, 2015; Valladares and Boelens, 2017). Furthermore, project implementors can employ strategies from sovereign governmentality to altogether exclude particular actors from participatory mechanisms. By drawing on legal classifications of ethnicity, race, gender, and other intersecting identities or by only recognizing leaders from state-sanctioned organizations or communities, project implementors can omit participants outside of sanctioned categories (Radcliffe, 2015).

In this manner, a particular recognition politics has been enacted via disciplinary and sovereign governmentality in climate change adaptation projects. By employing these governmentalities, adaptation project implementors seek to create a specific object (a climate change vulnerable hydrosocial territory in need of intervention) and subjects (local communities that actively participate in making these hydrosocial territories a reality) (Boer, 2019; Henrique and Tschakert, 2019; Nightingale 2017). This is done through the imposition of the climate change project imaginaries and its underlying knowledge claims as is further explored below via the analysis of two climate change adaptation projects in Ecuador.

4. Climate change adaptation in Ecuador: Introducing PACC & FORECCSA

Ecuador is highly vulnerable to climate change because of its

geographical and climatic diversity, sensitivity to periodic El Niño and La Niña events, and reliance on rapidly diminishing glaciers and sensitive highland wetlands. From 1997 to 2002, Ecuador experienced a 27.8% reduction in glacial cover, jeopardizing the future of Ecuador’s water resources (Cáceres and Nuñez 2011). In the highlands, there has been rising annual average temperatures and increasing precipitation variability with an 11–36% decline in precipitation annually (Ministerio del Ambiente del Ecuador, 2000).

In view of these challenges, Ecuador has built a national policy architecture to attract international climate dollars and address its vulnerability to climate change. Ecuador’s 2008 Constitution, which famously recognized the legal Rights of Nature, explicitly addresses climate change in Article 414 where the Ecuadorian State commits to “protect at-risk populations” and employ “adequate, transversal measures” to mitigate climate change (Gobierno del Ecuador, 2008). Climate change adaptation was also forefront in the National Plan for Living Well (*Plan Nacional de Buen Vivir*) (SENPLADES, 2013; 2017a) and National Development Plan (SENPLADES, 2017b). These planning documents have been coupled with policy instruments such as the 2012 National Climate Change Strategy and the National Adaptation Plan, which is currently under development.

These national level mechanisms have enabled Ecuador to successfully attract and implement numerous internationally-funded climate change adaptation projects. Between 2010 and 2014, Ecuador received \$362 million USD for adaptation projects from international donors (Adaptation Watch, 2017). The majority of these adaptation projects have focused on the water sector because of the vulnerability of this sector and centrality of water to rural livelihoods and cultural identities.

Chronicled extensively elsewhere, water governance in Ecuador is both highly decentralized, polycentric, and plural as well as highly vertical, top-down, and state centric (see Cremers et al., 2005; Roa-García et al., 2015; Warner et al., 2017). Following the neoliberal turn in Ecuador, water governance was decentralized and formerly state-managed irrigation schemes were placed in the hands of local water user organizations (Hoogesteger et al., 2017). Smaller autonomous water user organizations have leveraged relationships with NGOs and sub-national governments for decades to solidify their control and autonomy through funding, strategic alliances, and technical assistance (Boelens, 2015; Hoogesteger, 2013, 2015). Therefore, it is important to note that the incursion of the state and international organizations in autonomous water user organizations under the auspices of climate change adaptation is not novel, but part of a legacy of interventions in the peasant irrigation sector.

Rafael Correa’s *Revolución Ciudadana* (Citizens’ Revolution, 2007–2017) sought to reassert the role of the state in water governance while sidelining unaligned civil society organizations and critical NGOs by utilizing overlapping tactics of “individualizing and state-aligning governance techniques” (Boelens, et al., 2015, p. 289). To strengthen state presence in the water sector, the National Water Secretariat (SENAGUA) was created using the principles of integrated water resource management, but with an emphasis on standardizing requirements for the legal recognition of water users. Despite the creation of SENAGUA, the responsibility to support the irrigation sector was delegated to provincial governments in the constitution (Warner et al., 2017). It was in this plural water governance context that the adaptation projects, FORECCSA and PACC, were implemented.

The two climate change adaptation projects that are the focus of this article, FORECCSA and PACC, are nationally iconic and regionally representative in terms of their governance structure and adaptation measures. Both projects were funded by multi-lateral climate change funds, namely the Adaptation Fund and the Global Environment Facility’s Special Climate Change Fund, which were established in the 2001 Kyoto Protocol and 1992 Rio Earth Summit respectively. Additionally, these projects were implemented by the multi-lateral implementing entities that are responsible for designing and

implementing the majority of internationally-funded adaptation projects across Latin America.

The state also played a crucial role in these projects. The Ecuadorian Ministry of the Environment (MAE) is the designated national focal point for international climate funds meaning that MAE alone has the authority to represent the Ecuadorian state within an adaptation project proposal to these donors. This administrative scheme places MAE at the center of climate change related activities in the country, enabling it to capture international funds and delegate resources to sub-national governments. Thus, MAE served as the executing entity in the two analyzed projects (PACC and FORECCSA) while sub-national governments served as local project partners either at the provincial, municipal or parish level². These sub-national governments acted as key interlocutors between MAE and beneficiary water user organizations.

4.1. PACC

The first case study project is *Adaptation to Climate Change through Effective Water Governance in Ecuador* (PACC). In 2009, PACC was funded by the Global Environment Facility's Special Climate Change Fund and was one of the first multilaterally funded adaptation projects within Latin America. This 3-million-dollar project helped to establish the regional climate change adaptation project model in terms of adaptation measures and administrative structure. Implemented by the United Nations Development Programme (UNDP), PACC worked with communities across five river basins (Babahoyo, Catamayo, Chone, Jubones, Paute, and Portoviejo) to implement community-level adaptation interventions in water governance (see Fig. 1). These interventions directly involved 4455 families across 8 provinces through 20 sub-projects that included: 50 reservoirs, 500,000 native plants sown, 440 ha reforested, 78 drip irrigation systems installed, 1 potable water system built, and 33 wetlands constructed. PACC ended in 2014.

The participation modality of PACC was to disburse funds through two rounds of competitive sub-grants to grassroots community organizations (*Organizaciones Comunitarias de Base*), non-profit organizations, and universities or research centers. These groups were encouraged to prepare applications that “promoted the participation of distinct actors” to ensure that these organizations would create and implement locally desirable and thus sustainable adaptation projects (MAE, 2011, p. 6).

4.2. FORECCSA

The *Enhancing Resilience of Communities to the Adverse Effects of Climate Change Effects on Food Security* project (FORECCSA) was funded by the Adaptation Fund and implemented by the World Food Programme (WFP) from 2014 to 2018. At the national level, it was executed by the Ecuadorian Ministry of the Environment in coordination with the Ministry of Agriculture, Livestock, Aquaculture, and Fishing (MAGAP) as an advisor. This 7.5-million-dollar USD project intervened in the province of Pichincha (which contains the capital city Quito) and the Jubones River basin in Southern Ecuador (See Fig. 1). FORECCSA was principally focused on improving irrigation through enhancing community irrigation (benefiting 4654 families), improving field irrigation (889 families), installing potable water systems (1610 families), and protecting headwaters ecosystems (1751 families) as well as implementing some limited agricultural interventions such as family gardens and agroecology initiatives.

FORECCSA was an explicitly ‘participatory’ project from its outset. Community leaders were included in participatory workshops organized by external consultants. At these workshops, consultants

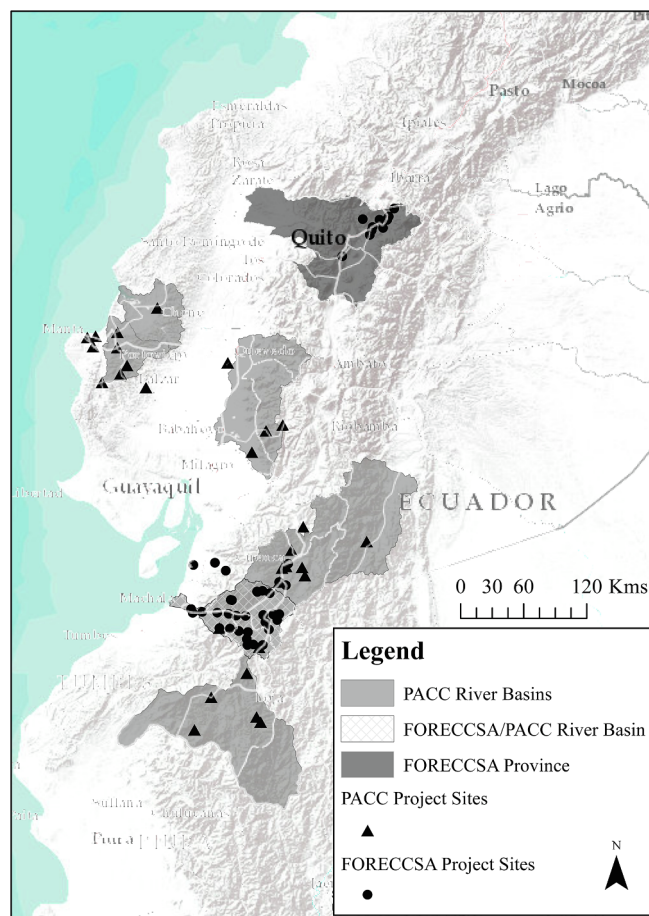


Fig. 1. A map of the river basins included in FORECCSA and PACC projects with the actual projects sites for FORECCSA (circles) and PACC (triangles).

conducted vulnerability assessments and facilitated adaptation planning exercises in select communities. FORECCSA also incorporated a focus on gender to increase female participation in project interventions.

5. Telos: Making the Object of Adaptation Visible

Here we focus on how the object of adaptation, a specific hydro-social territorial imaginary, is created by project implementors within our two case study projects. Within both PACC and FORECCSA, climate change adaptation is imagined at two territorial scales simultaneously: first that of the river basin and second that of local communities. By envisioning adaptation interventions in the water sector across one or multiple river basins, projects leveraged the naturalizing discourse of river basin management (Warner et al., 2017). PACC was designed to intervene across six vulnerable river basins, and thus project proposals were only accepted for actions in these areas. FORECCSA was initially proposed by a consortium of parish presidents from three provinces that proposed interventions across the Jubones river basin, transcending administrative boundaries to self-organize around the territorial unit of the river basin. It was this group that sparked the formulation of the FORECCSA project though the province of Pichincha was later added by MAE and WFP to expand the territorial reach of the project. Discursively, PACC and FORECCSA projects bounded their intervention territories at the river basin scale as the *natural* territory for intervention (Warner et al., 2008). Adaptation interventions such as protection of headwaters, which were included in PACC and FORECCSA, clearly reflect this territorial conceptualization

While project implementors adopted (and naturalized) the river

² Provincial governments are responsible for irrigation development within their jurisdiction. Municipal governments are responsible for potable water. Parish (district) governments are the most local form of sub-national government and frequently served as a counterpart in PACC and FORECCSA.

basin scale during project conceptualization, implementation practice was different. Both projects generated highly fragmented projects in local communities through interventions in irrigation schemes, drinking water supply systems and land management practices (see Fig. 1). A high-level official in SENAGUA, reflects on this disjunction in FORECCSA:

“The problem with FORECCSA is that it ended in the same old thing, you have the theme of adaptation to climate change, but it ended up providing small water projects [...] There are a set of super complex dynamics in the (Jubones) basin that were never discussed. [...] The whole river basin concept stayed in name only.”

(Interview by lead author, 21/1/2019)

The scalar incongruence of working across fragmented projects reflects the scalar politics that are mobilized by project implementors as they negotiate international discourses around river basin management with the practicalities of project implementation in the context of highly diverse, decentralized water management in Ecuador.

Despite the messiness of implementation practice, the hydrosocial territorial imaginary is bounded at the river basin. Within this territory, these project implementors then create an imaginary that is constituted of distinct network elements. Drawing on the elements included in Boelens et al.'s (2016) definition of hydrosocial territories, Table 1 walks through the constituent network elements as evidenced in project documents such as proposals, evaluations, technical reports and planning instruments as well as interviews with project staff.

Fundamental to legitimizing and advancing this newly minted object for intervention, the hydrosocial territorial imaginary, are the knowledge claims made by the epistemic community of project implementors including donors, implementing entity staff, state bureaucrats, consultants, and NGOs. These adaptation experts produce, legitimize and stabilize these imaginaries through distinct calculative practices.

Table 1

Elements of the hydrosocial territories and their transformation following adaptation project intervention as conceptualized by project implementors (own elaboration).

Hydrosocial Territorial Network Elements	Before Adaptation	After Adaptation
Humans	<ul style="list-style-type: none"> ● Exceptionally vulnerable to climate change impacts ● Unable to autonomously respond 	<ul style="list-style-type: none"> ● Adaptive, resilient agents ● Aware of climate change as key threat
Water Flows	<ul style="list-style-type: none"> ● Growing water scarcity due to climate change (not unequal distribution) ● Localized flooding 	<ul style="list-style-type: none"> ● Water scarcity buffered through headwater restoration, increased water storage, and improved water use efficiency
Ecological Relations Hydraulic Infrastructure	<ul style="list-style-type: none"> ● Dystopic ecological crisis under climate change ● Lack of vital and adequate climate resilient water infrastructure for communities ● Vulnerable hydroelectric dams 	<ul style="list-style-type: none"> ● Ecosystem-based adaptation approaches render ecosystems resilient ● Improved water storage and distribution infrastructure for communities ● Improved flood management infrastructure ● Resilient hydroelectric infrastructure
Financial Means	<ul style="list-style-type: none"> ● Communities do not have the financial means to adapt 	<ul style="list-style-type: none"> ● PES for protecting headwater areas ● Users and local governments contribute money and labor to project to demonstrate “ownership” ● International cooperation funds pilot project for later upscaling
Legal-Administrative Arrangements	<ul style="list-style-type: none"> ● Low capacity for adaptation by users, associations, or local governments ● Inconsistent state-recognized land titles and water licenses among users 	<ul style="list-style-type: none"> ● All users conform to state-recognized water licenses and land titles ● Water user associations are formally recognized by the state ● Sub-national governments and water user associations have increased adaptive capacity
Cultural Institutions and Practices	<ul style="list-style-type: none"> ● Chaotic local water management according to outdated customary rules and norms ● Women are marginalized 	<ul style="list-style-type: none"> ● Women are empowered to make decisions and adapt to climate change ● Beneficiaries collaborate to perform project labor through traditional <i>mingas</i> ● Local parish governments and water user associations sustain project interventions in accordance with SENAGUA technical norms firstly and local norms secondly
Geographical Boundaries	<ul style="list-style-type: none"> ● Water management conducted locally with limited connectivity across a river basin 	<ul style="list-style-type: none"> ● Adaptation at a river basin scale, linking downstream and upstream ecosystems and actors
Authority	<ul style="list-style-type: none"> ● Irregular state presence in irrigations schemes ● Water user associations are principally managing irrigation systems ● Little scientific knowledge used to inform water management 	<ul style="list-style-type: none"> ● MAE, as the state authority on climate change, articulates between funders, international agencies, and local orgs ● Sub-national governments and MAE work in concert to implement adaptation projects ● Climate change modeling informs technical water management

6. Episteme: Creating the Object for Intervention

Knowledge production (or *episteme*) is an essential element of the regime of practices that constitute climate change governmentality. Knowledge practices structure the possible field of action and produce particular truths that are essential for advancing the hydrosocial territorial imaginary presented above (Dean, 2009). To better understand the knowledge production practices around climate change adaptation, we explore this process through the lens of four, interrelated processes: (1) building a discursive frame, (2) employing the politics of ignorance, (3) enacting self-reinforcing practices, and (4) making social variables commensurate.

6.1. Building a discursive frame: the climate rationale

Multi-lateral climate funds such as the Global Environment Facility (GEF), the Adaptation Fund, and the newly founded Green Climate Fund all require a clear articulation of the “climate rationale” for aspirant projects. The climate rationale is the “scientific underpinning for evidence-based climate decision making. It ensures that the linkages between climate impacts, climate action and societal benefits is fully grounded in the best available climate data and science” (World Meteorological Organization, n.d., p. 3). This climate rationale, as a distinct techno-scientific discourse, serves two purposes. First, it demonstrates that the proposed project responds to current and future climate change impacts. Secondly, it reflects the particular status of climate change adaptation, differentiating this project intervention from traditional or baseline economic development projects. The climate rationale is drafted by international agencies and state actors, alongside their contracted consultants, by drawing on downscaled climate models to create a territory defined by its exposure to climate change. This calculative act renders technical the question of adaptation interventions, however, like all climate change science is a “very

human enterprise” that is sensitive to national and international political priorities (Demeritt, 2001; Hall and Sanders, 2015, p. 449; Li, 2007).

The climate rationale for PACC and FORECCSA drew on a variety of climate models to make authoritative claims regarding climate change. PACC’s proposal to GEF drew on country-level data from the Tyndall Center Country Scenario produced at the University of East Anglia, which projected 0.5 °C to 6 °C of warming between 2070 and 99 with projected changes in precipitation ranging from –15 to +15%. This modeling was done at a very coarse spatial resolution. PACC’s project proposal explicitly acknowledges the limited utility of these national climate models, asserting that this model “neglects spatial variations in impacts” but goes on to state that regardless these “projections provide a range of values around which planning can take place” (United National Development Program, 2008, p. 7). By advocating for a “flexible planning approach” the PACC climate rationale seeks to diminish the inherent uncertainties of climate modeling while also asserting the urgent need for adaptation, stating that “the water sector should prepare for reduced water availability in the Andean region immediately” (United National Development Program, 2008, p. 8).

FORECCSA, which was proposed several years after PACC, instead draws on four climate models to characterize climate change impacts in 2050 at the provincial scale.³ By drawing on multiple models, FORECCSA’s climate rationale is imbued with added rigor as compared to PACC. The specific findings of these modeling efforts, however, were relegated to a technical appendix of the project proposal developed by WFP. Instead the climate rationale is built around general statements about provincial level trends in temperature and precipitation such as, “A decrease of rainfall is expected for the lower part of the Jubones River Basin [...] Forecasts made up to the year 2050 (A2a HadCM3 Climate World), which are based on statistics recorded between 1950 and 2000, show significant changes in precipitation in the four project provinces (Pichincha, Azuay, Loja and El Oro)” (World Food Programme, 2011, p. 10). In effect, the sophisticated climate modeling used to produce FORECCSA’s climate rationale is simplified in the proposal to create a more cohesive narrative of climate change impacts that support the broader goals of the project.

The climate rationale enables projects to make authoritative claims on the future, projecting the climate and its impacts for decades ahead. By mobilizing the climate rationale as a discursive frame, project implementors are able to make a singular claim on the future to legitimize their interventions to confront the emerging climate crisis. While technocratic knowledge claims have long been used to legitimize development interventions, this orientation towards futurity is distinct to climate change adaptation.

6.2. The politics of ignorance: understating uncertainty

Despite efforts to stabilize technocratic understandings of hydrological futures, there is intrinsic uncertainty in climate change models. These uncertainties exist due to future emission pathways, lack of high-quality, long-term local climatological data, and the intrinsic uncertainty of downscaling complex climate models. Projects, however, tend to deny ambiguity and practice a particular politics of ignorance to obfuscate these compounding uncertainties in order to strengthen their knowledge claims on the future (McGoey, 2012). While the detailed

project technical documents that present climate change modeling results for both PACC and FORECCSA are explicit about uncertainty and the limitations of climate modeling findings, this uncertainty is glossed over in more applied documents that present an unambiguous scientific understanding of the future. As an example, despite the myriad climate models and complex outputs used in FORECCSA’s climate rationale, the vulnerability studies produced by MAE translated these findings into a qualitative index (1–3) for ‘future exposure’ to two climate risks. This highly simplified index spatializes and fixes an understanding of future climate change exposure that sidesteps the uncertainty of downscaling global circulation models and the lack of quality historical climate data across Ecuador. By relegating uncertainty to a technical footnote, projects employ a particular politics of ignorance that denies the level of uncertainty inherent in their understanding of the future climate.

6.3. Circular, self-reinforcing citational practices

Producing and stabilizing official climate change science as fixed knowledge is a *self-reinforcing practice*. This practice is solidified through replication where new climate change impact studies and project documents cite, refer to, and build on former studies. Both PACC and FORECCSA draw broadly from across the technical touchstone documents of the international climate change epistemic community such as national communications to the United Nations Framework Convention on Climate Change (UNFCCC) and Intergovernmental Panel on Climate Change (IPCC) reports. The six river basins targeted by PACC were reportedly selected based on a water balance modeling exercise in Ecuador’s first national communication to the UNFCCC. However, closer examination of this foundational study reveals that only three of the six river basins were even included in the water balance model. The others were chosen based on their vaguely stated ‘willingness to work’ (UNDP, 2008). In turn, PACC’s river basin level vulnerability study was used to justify FORECCSA’s intervention in the Jubones River basin. As succinctly summarized by a MAE official, “PACC’s vulnerability study was the genesis of FORECCSA” (Interview by lead author, 7/2/19).

By building a network of documentation or paper artifacts that are fundamental to knowledge production through a circular, additive citational practice, a particular knowledge claim about the object (a vulnerable hydrosocial territory) that is in need of interventions is created and reinforced (Riles, 2000).

6.4. Commensuration: quantifying the social

The social subject is made legible in climate change adaptation practice via the practice of commensuration. Commensuration is the process through which entities with disparate qualities are transformed into a standardized metric (Espeland and Stevens, 1998). Underlying commensuration is the assumption that all entities can be compared, denying the idea of intrinsic value, incommensurability, or pricelessness. This process is not technical but inherently political (Espeland and Stevens, 1998). Within climate change adaptation, the practice of commensuration has been institutionalized through the climate change vulnerability study, which is a key instrument through which the social impacts of climate change are made visible by project implementors.

The PACC vulnerability study drew on three indices to determine social vulnerability to climate change: socio-economic, infrastructural, and institutional. Largely using data from the 2001 Ecuadorian census, socio-economic vulnerability was equated to the percentage of people living below the poverty line and educational attainment data. The infrastructural index drew on a weighted index of water-related infrastructure, equating the spatial coverage of irrigation, climatological station density, existence of reservoirs and water transfers with lower social vulnerability. Institutional vulnerability was considered as a measure of institutional capacity to respond to a disaster. This last indicator had the greatest weight in the index and was based on a

³ These models are: (1) Regional Climates for Impacts Studies, a regional climate model produced by the Hadley center (PRECIS), (2) TL958, a 20-km resolution climate model created by the Japanese Meteorological Service, (3) the Eta climate model with a resolution down to 5km and with specific regional focus on South America since it was developed by the Brazilian Center for Weather Forecasts and Climate Studies, and (4) F-CLIMDEX, a model that produces projections of temperature and precipitation extremes and was developed by the University of New South Wales in Australia.

municipal management index produced by the government for 1990–1998. This institutional index quantified the degree to which risk and water resource management was incorporated into local governmental planning documents or training programs by local universities in order to determine ‘if local governments generated some risk management awareness.’ The PACC vulnerability study adopts a narrow conceptualization of social vulnerability to climate change by only considering state-centered sanctioned institutions, largely ignoring the capacities and capabilities of local water user associations and communal organizations in the six target river basins.

These social indicators were quantified and indexed to create maps of relative vulnerability thus completing the process of commensuration wherein diverse communities and their relative climate change vulnerability could be compared. By creating a highly synthetic vulnerability index, PACC staff obscured the source of the index’s constituent data, which was entirely secondary data that was nearly ten years old. In doing so, PACC’s vulnerability study homogenized social dynamics across six socially and climatically diverse and dynamic river basins.

As compared to PACC’s vulnerability study, FORECCSA’s studies sought to create a more grounded understanding of vulnerability in its thirty-three target parishes. MAE contracted three consultant groups and one in-house team to create participatory climate change vulnerability studies and design associated adaptation measures. All these vulnerability studies used a fundamental equation from the 3rd Assessment of the IPCC:

$$\text{Vulnerability} = \text{Exposure} + \text{Sensitivity} - \text{Adaptive Capacity}$$

Despite this shared conceptual framing, these reports drew on differing analytical approaches to select key social variables that shape climate change vulnerability. Without clear methodological direction from MAE, each consultancy group drew on differing analytical approaches such as rapid rural vulnerability appraisal approaches, the International Institute for Sustainable Development’s (IISD) Community-based Risk Screening Tool – Adaptation and Livelihoods (CRISTAL) model, and Cooperative for Assistance and Relief Everywhere’s (CARE) Climate Vulnerability and Capacity Analysis (CVCB) tool. Based on these approaches, each consultancy team combined secondary data from local planning instruments and the national 2010 census with data gleaned from participatory workshops and semi-structured interviews with local leaders and potential project beneficiaries. Each team diverged in their analytical approach to measuring vulnerability, but all constructed a vulnerability index based on the four pillars of food security in relation to three key climate change impacts: drought, flooding, and frosts.

In these varied vulnerability studies, the consultant teams devote considerable space to justifying their analysis by drawing on technical discourses from their respective analytical frameworks but remain vague about the role of community voices in shaping their understanding of local vulnerability. Ultimately, each report synthesizes local climate change vulnerability into a numeric value between 1 and 3 for comparison across project sites. The role of qualitative data and participatory processes in shaping these numeric values is unclear, and these blanket values obfuscate the considerable diversity within and between communities. Additionally, by synthesizing participatory vulnerability assessments into a simplified index, project implementors silence the local voices that may challenge the very rationality underlying commensuration and the power relations reflected through this process (Duarte-Abadía and Boelens, 2016).

Through commensuration the social vulnerability of these communities is rendered ahistorical and apolitical. The long-standing systemic marginalization that continues to produce poverty and inequality in Ecuadorian highland communities is strategically sidelined as climate change becomes *the* driver of water scarcity and related vulnerability (Lynch, 2013; Swyngedouw, 2006). These vulnerability studies are not simply intellectual exercises. Rather, these studies are the basis for the adaptation measures and plans implemented through the project, and

thus has material impacts for these communities.

FORECCSA’s consultants, like all adaptation experts, cultivate an expertise that articulates between the global epistemic climate change adaptation community via the techno-scientific practices detailed above with the place-based nature of their interventions. This latter sensitivity to place-based context in adaptation projects has manifested into formalized participation mechanisms, which is the subject of the next section.

7. *Techne*: Recognition Politics in PACC & FORECCSA

The above knowledge claims are central to producing the dominant hydrosocial imaginaries underpinning climate change adaptation projects in Ecuador, but it is also essential to understand the specific ways of acting, intervening, and directing that advance the object of intervention (Dean, 2009). Recognition politics and participation mechanisms through which those politics are enacted in adaptation projects employ both disciplinary and sovereign governmentality to legitimize interventions and further subjectify climate change adaptation project beneficiaries within these hydrosocial territories.

The inclusion of local participation into project design and implementation responds to directives from multi-lateral climate change funds such as GEF and the Adaptation Fund, which funded PACC and FORECCSA respectively. GEF explicitly requires that the ‘public’ be involved in project design and implementation through its public involvement policy, which states that effective public involvement “is critical to the success of GEF financed projects” (GEF, 2014, p. 5). GEF asserts that stakeholder participation is a “cornerstone feature” of their work and was first recognized in their 1996 Policy on Public Involvement. In all GEF projects, affiliated implementing entities must have participation guidelines or procedures that are “coherent with GEF policy” (GEF, 2014, p. 3). Similarly, the Adaptation Fund requires that all funded projects provide “adequate opportunities for the informed participation of all stakeholders in the formulation and implementation of projects/programmes” (Adaptation Fund, 2016, p. 4). Stakeholder participation, however, reflects the multi-scalar, selective recognition politics that are embedded in adaptation projects.

In both PACC and FORECCSA, the state, via MAE and the international implementing entity (UNDP or WFP), are important interlocutors in translating international norms around participation into practice within these projects. Within PACC and FORECCSA, there are two distinct modalities for authorized participation by beneficiaries in adaptation projects; PACC sought participation via community sub-grants and FORECCSA included formalized participation processes within its vulnerability assessments and adaptation plans. Despite these differences, the participation mechanisms in both projects share several important facets: outsourced participation mechanisms, procedural control of participation outcomes, and state-based representation.

7.1. Outsourcing participation: maintaining distance from the unruly beneficiary

MAE, as the executing entity for both PACC and FORECCSA, is a centralized state agency with limited presence outside of Quito. To fulfill its participatory mandate MAE outsourced participation processes to sub-grantees and consultants. Within PACC, MAE and UNDP released two calls for competitive sub-grant applications, requiring that the applicants “promote the utilization of innovative tools or technologies and/or the recuperation of ancestral knowledge that have been tested successfully for the efficient use of water in the context of climate change and incorporates beneficiaries in the process” (UNDP, 2011, p. 1). Participation was left to be loosely interpreted with MAE directing applicants to “promote the participation of distinct actors and identify synergies between various public and private actors at distinct levels within the study river basin” (UNDP, 2011, p. 2).

PACC’s open call for applications, which was disseminated through

the local press, led to a set of projects with diverse origins and differing relationships with the beneficiaries. In two of the PACC sub-grants, academics leveraged the grant to implement projects in the small communities where they themselves were raised. This enabled them to “come home” and use PACC dollars to implement water-related projects that responded to long-term needs but under the banner of climate change adaptation (interview by lead author, 13/2/2019; 30/1/2019). Other NGOs and research institutions leveraged sub-grants to continue working in communities where they had long-standing projects and relationships. Alternatively, parish governments combined PACC funds with public funds to fulfill political promises and long-standing irrigation and water storage needs. Thus, participation both in terms of inclusivity and process was strongly biased towards particular stakeholders.

Participation within FORECCSA was more formally integrated into project design and implementation but was also outsourced. As discussed in the previous section, MAE and the WFP hired three consultant teams (in addition to a staff team that filled in once the budget was exhausted) to conduct participatory vulnerability studies and design related adaptation measures. These consultancy teams, however, brought different normative and epistemological perspectives to their work. Corporación Randi Randi, one of these consultants, is an Ecuadorian NGO that is explicitly dedicated to participatory rural development and participatory action research. Their participatory methodology, as presented in their vulnerability studies, involved multiple workshops that included representatives from across different social groups, drawing on tools such as participatory mapping of climate hazards and gender sensitive focus groups. Alternatively, other consultancy groups translated their mandate for participation into a single workshop that included local government officials as the sole voice for the community. In another case, a consultancy group extrapolated findings from a workshop in one parish to another parish they were contracted to assess, homogenizing needs across diverse communities (interview by lead author, 10/12/19).

This diversity in participation processes and outcomes in PACC and FORECCSA reflects how these outsourced participatory mechanisms led to skewed recognition based on the positionality and epistemological approach of the consultant between MAE and the community. Thus, across fragmented project sites there is a highly varied terrain of inclusions and exclusions in project participatory processes and outcomes. By outsourcing participation, MAE and other project implementors are able to maintain a comfortable distance from the ‘messiness’ of participation and the unruly subjects of adaptation.

7.2. Procedural control of participation outcomes: exercising sovereign control

Despite outsourcing participatory processes, MAE did not relinquish control over the outcomes of these processes. Instead, MAE placed these participatory processes within the tight confines of procedural restrictions that enabled them to control outcomes. Within PACC, project grants were subject to multiple rounds of institutional review by PACC's national steering committee, which consisted of functionaries from MAE, UNDP, and the Technical Secretary of International Cooperation. Only once applicants responded to 2–3 rounds of review by the steering committee were projects funded. Through this process, grantees were disciplined into internalizing the discourses and practices of state sanctioned adaptation. The application of one organization, which focused on solar powered pumps for irrigation water, was denied by the steering committee because it was not viable and too focused on the needs of a specific community. The organization was told to modify the proposal to use less expensive and less experimental technologies across more parishes (Interview by lead author, 14/2/2019). PACC only wanted projects that aligned with their pre-conceived set of climate change adaptation interventions, which primarily focused on the construction and modernization of reservoirs and irrigation systems.

Within FORECCSA, all participatory vulnerability reports and adaptation measures were subject to review and approval by MAE, who were able to override findings they did not support. This process of contingent approval was described by one of the consultants who worked on a set of FORECCSA vulnerability assessments: “We would come up with our findings and we'd get comments back from MAE saying we don't approve your report. [...] It was never used because they (MAE) had decided they were going to support irrigation. It didn't matter what we said” (Interview by lead author, 15/1/2019). By working with consultants as epistemic translators between the hydro-social imaginaries of participants and those of the project, MAE was able to retain both a convenient distance and the reins in promoting its preferred climate change adaptation measures.

7.3. By the state for the state: state recognition politics

Participatory mechanisms within both FORECCSA and PACC were constrained by the strongly biased recognition politics of the state, meaning that only actors who internalized state-based norms and visions would be recognized as rightful project participants. MAE required that all organizations awarded PACC sub-grants negotiated implementation agreements with sub-national governments as their local counterparts. This requirement translated into state entities being privileged over indigenous communities or autonomous water management organizations in the distribution of funds and decision-making related to adaptation project interventions. Similarly, FORECCSA's local partners were parish governments within the Jubones River basin and the provincial government of Pichincha. The emphasis on sub-national governments as the organizations best suited to represent community interests in adaptation projects obscures the plurality of water user associations across Ecuador and supports sovereign governmentality endeavors. While water user associations were not approved as direct project counterparts for PACC and FORECCSA, these local organizations were relied on to organize beneficiaries and provide the in-kind labor required by project funders via multiple *mingas* or communal workdays. Additionally, within Ecuador, even parish governments are highly politicized with explicit affiliations with national political parties, opening up opportunities for patronage within adaptation projects.

8. Self/Identity: Making the Adaptation Project Subject

The participation processes within adaptation projects in Ecuador are not only a performative gesture by the state for climate funders, but these mechanisms also employ a disciplinary governmentality to create adaptation project beneficiaries. The ways of forming of these adaptation project beneficiaries is crucial to understanding who is envisioned to inhabit the dominant hydrosocial territorial imaginary enshrining climate change adaptation (Dean, 2009). In both FORECCSA and PACC, capacity building of local leaders and beneficiaries were stand-alone components of the projects. PACC offered capacity-building workshops for sub-national government leaders and other institutions applying for sub-grants. In these workshops, recipients were schooled in how to articulate community needs within the discourse of climate change adaptation. This is most clearly articulated in the final evaluation of PACC:

“In projects involving vulnerable groups, especially representative organizations of Indigenous Peoples and Afro-descendants or direct beneficiaries of impoverished communities, strengthening organizational capacities so (these organizations) articulate and add their interests in planning, administration and participation in dialogue with the government on environment and social or productive themes that affect their daily lives, encourages the generation of leaders trained in the language of projects of both the UN system and the Government, which fosters qualified participation in the design of

strategies and an informed accompaniment with project implementors in each section of the project cycle.”

(GEF-UNDP, 2015, p. 15, emphasis added)

Project evaluators cited this capacity building as a central achievement of PACC.

This approach is mirrored in FORECCSA, which provided extensive capacity building for both local governmental leaders as well as myriad trainings for community members on themes such as climate-smart agroecology, gender equity, nutrition, and sustainable water management. The mid-term evaluation for FORECCSA shares an anecdote where a local leader participating in one of the capacity building workshops states that “to build capacity is to guarantee sustainability” of project interventions (WFP, 2018, p. 54). Underlying this statement as well as the decision of the evaluator to include it in a formal evaluation report, is a shared belief that adaptation interventions will only be sustained if beneficiaries internalize the irrigation project as climate change adaptation and therefore articulate their needs under those particular terms.

This adaptation project beneficiary is also subject to sovereign governmentality via project requirements that mandate beneficiaries hold water licenses, are members of select water associations, and are willing and able to make economic and labor contributions to project interventions so as to demonstrate their ownership. These requirements reflect government-rationalities around water management and also create axes for exclusion within adaptation projects where the most marginalized are ineligible to participate.

Participation processes, project requirements, and capacity building efforts are braided together as sovereign and disciplinary governmentalities in these projects toward a specific goal of creating a new idealized subject, the adaptation project beneficiary, who understands their hydrosocial imaginary in terms of its vulnerability and resilience to climate change, transforming both their subjectivity and their livelihood.

9. Conclusions

Climate change adaptation projects are created and enacted through a regime of practices. PACC and FORECCSA first produced an object for intervention, a specific hydrosocial territorial imaginary of vulnerable river basins, through distinct knowledge practices (*episteme*) and normative regimes. The multi-faceted knowledge production process leverages such practices as establishing a discursive climate rationale, strategically employing (or denying) ambiguity surrounding uncertainty, building a circular, self-reinforcing citational practice across project artifacts, and the commensuration of social variables. These knowledge practices justify state intervention in local irrigation systems and highland territories based on unfolding climate change impacts. This discursive frame empowers the project implementors to ‘see into the climatic future’, while establishing their governance and guardianship over the water users who lack the financial, technical, or social capacities to respond to climate change.

This climate change adaptation hydrosocial territory, however, requires adaptation project beneficiaries who will both inhabit, produce, and reproduce it, responding to the very particular climate change adaptation rationalities (*telos*) beneficiaries are to adopt and that, in turn, will govern them. Therefore, the distinct knowledge practices, normative repertoires, and truth regimes embedded in and steering climate change adaptation projects (*episteme*) go hand in hand with interlocking sovereign and disciplinary governmentalities. By employing both sovereign and disciplinary governmentality via project requirements, recognition politics and associated participatory mechanisms (*techné*), projects simultaneously seek to produce new ‘adaptive’, ‘resilient’ subjects. These adaptation project subjects

correspond with the newly created knowledge about them and assimilate and transform existing hydrosocial territorial imaginaries. In doing so, they articulate their needs and goals in the context of climate change exposure, vulnerability and resilience while also conforming to state-based rationalities around water management (*self/identity*). Furthermore, participation mechanisms in PACC and FORECCSA remained confined and contained by the state who translates international mandates for participation into a process that privileges state-recognized entities as community representatives. In this process, the state continues to wield its sovereign power as all participatory process outcomes must be approved by state actors, to guarantee alignment with the official climate change adaptation project norms, interests, and territorial imaginary.

An analysis of the regime of practices that constituent climate change adaptation governmentality matters because how adaptation is discursively and materially created as well as enacted shapes how this emerging problem is dealt with (or not), and who is in charge of commanding and steering it in particular directions. As communities face the very real impacts of climate change, these adaptation projects have real stakes. They will determine benefits and burdens, winners and losers, power-bearers and governed, particular structures of dependency or autonomy, and the (mis)recognition of specific forms of livelihood and knowledge production. By analyzing the knowledge production and practices that create the object and subjects of adaptation, we can open up space to imagine alternative possibilities in confronting climate change and socio-environmental injustices.

As a final note, it is important to recognize that adaptation project beneficiaries are not passive subjects. Rather, they remake projects and participatory spaces for their own political, social, and material projects. Adaptation project beneficiaries strategically employ their own recognition politics to leverage state recognition and adaptation projects for their own purposes. Thus, an important area for future academic attention is how varied regimes of practice interact, collide, and generate alternative hydrosocial territories and identities that counteract the governmentality endeavors detailed in this article as forms of ‘counter-conducts’ (Foucault, 2007). In another contribution we will explore how PACC and FORECCSA beneficiaries have worked inside and outside these confined participation spaces to shape and remake these adaptation projects to solidify their control over their hydrosocial territory and advance their alternative hydrosocial territorial imaginaries.

Credit authorship contribution statement

Megan Mills-Novoa: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Writing - original draft, Writing - review & editing. **Rutgerd Boelens:** Funding acquisition, Formal analysis, Writing - original draft, Writing - review & editing. **Jaime Hoogesteger:** Funding acquisition, Project administration, Formal analysis, Writing - original draft, Writing - review & editing. **Jeroen Vos:** Funding acquisition, Formal analysis, Writing - original draft, Writing - review & editing.

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Appendix A. Acronyms

FORECCSA: Fortalecimiento de la resiliencia de las comunidades ante los efectos adversos del cambio climático con énfasis en seguridad alimentaria en la cuenca del Río Jubones y Provincia de Pichincha/ Enhancing Resilience of Communities to the Adverse Effects of Climate Change Effects on Food Security project

IISD: International Institute for Sustainable Development

CARE: Cooperative for Assistance and Relief Everywhere

CRISTAL: Community-based Risk Screening Tool – Adaptation and Livelihoods

CVCB: Climate Vulnerability and Capacity Analysis

GEF: Global Environment Facility

MAE: Ministerio del Ambiente/Ministry of the Environment

MAGAP: Ministerio de Agricultura y Ganadería/Ministry of Agriculture, Livestock, Aquaculture, and Fishing

PACC: Adaptación al Cambio Climático a través de una efectiva gobernabilidad del Agua en Ecuador/Adaptation to Climate Change through Effective Water Governance in Ecuador

PES: Payment of Environmental Services

SENAGUA: Secretaría del Agua/National Water Secretariat

UNDP: United Nations Development Program

WFP: World Food Program

References

- Adaptation Fund, 2016. *Environmental and Social Policy*. Adaptation Fund, Washington D.C.
- Adaptation Watch, 2017. *Toward Implementation*. Adaptation Watch, Providence, Rhode Island.
- Agrawal, A., 2005. *Environmentality - Technologies of Government and the Making of Subjects*. Duke University Press, Durham and London.
- Assies, W., 2006. Land tenure legislation in a pluri-cultural and multi-ethnic Society: The case of Bolivia. *J. Peasant Stud.* 33, 569–611.
- Assies, W., 2012. The limits of state reform and multiculturalism in Latin America. In: Boelens, R., Getches, D., Guevara, A. (Eds.), *Out of the Mainstream. Water Rights, Politics and Identity*. Earthscan, London & Washington, DC, pp. 57–74.
- Barnard, S., Watson, C., Schalatek, L., 2016. Climate finance regional briefing. *Climate Funds Update* 6, 1–4.
- Baud, M., 2010. Identity politics and indigenous movements in Andean History. In: Boelens, R., Getches, A. (Eds.), *Out of the Mainstream: Water Rights, Politics and Identity*. Earthscan, London & Washington DC, pp. 99–117.
- Beck, E., 2017. *How Development Projects Persist*. Duke University Press, Durham.
- Berrang-Ford, L., Pearce, T., Ford, J.D., 2015. Systematic review approaches for climate change adaptation research. *Reg. Environ. Change* 15, 755–769.
- Boelens, R., 2009. The politics of disciplining water rights. *Dev. Change* 40, 307–331.
- Boelens, R., 2015. *Water, Power and Identity. The Cultural Politics of Water in the Andes*. Routledge/Earthscan, London and Washington DC.
- Boelens, R., Hoogesteger, J., Baud, M., 2015. Water reform governmentality in Ecuador: Neoliberalism, centralization, and the restraining of polycentric authority and community rule-making. *Geoforum* 64, 281–291.
- Boelens, R., Hoogesteger, J., Swyngedouw, E., Vos, J., Wester, P., 2016. Hydrosocial territories: a political ecology perspective. *Water Int.* 41, 1–14.
- Boer, H.J., 2016. Deliberative engagement and REDD+ in Indonesia. *Geoforum* 104, 170–180.
- Cáceres, L., Nuñez, A.M., 2011. *Segunda Comunicación Nacional Sobre Cambio Climático, Convención Marco de las Naciones Unidas sobre Cambio Climático*.
- Camargo, A., Ojeda, D., 2017. Ambivalent desires: State formation and dispossession in the face of climate crisis. *Polit. Geogr.* 60, 57–65.
- Climate Policy Initiative, 2019. *Global Landscape of Climate Finance 2019*. Climate Policy Initiative, London.
- Cremers, L., Ooijevaar, M., Boelens, R., 2005. Institutional reform in the Andean irrigation sector: Enabling policies for strengthening local rights and water management. *Nat. Resour. Forum* 29, 37–50.
- Damonte, G.H., 2019. The constitution of hydrosocial power: agribusiness and water scarcity in Ica, Peru. *Ecol. Soc.* 24 (2), 21.
- Dean, M., 2009. *Governmentality. Power and Rule in Modern Society*. Sage, London.
- Demeritt, D., 2001. The construction of global warming and the politics of science. *Ann. Assoc. Am. Geogr.* 91, 307–337.
- Duarte-Abadía, B., Boelens, R., Roa-Avendaño, T., 2015. Hydropower, encroachment and the re-patterning of hydrosocial territory: The case of hidrosogamoso in Colombia. *Human Organiz.* 74, 243–254.
- Duarte-Abadía, B., Boelens, R., 2016. Disputes over territorial boundaries and diverging valuation languages: the Santurban hydrosocial highlands territory in Colombia. *Water Int.* 41, 15–36.
- Dupuits, E., 2019. Water community networks and the appropriation of neoliberal practices: social technology, depoliticization, and resistance. *Ecol. Soc.* 24 (2), 20.
- Eriksen, S.H., Nightingale, A.J., Eakin, H., 2015. Reframing adaptation: The political nature of climate change adaptation. *Global Environ. Change* 35, 523–533.
- Espeland, W.N., Stevens, M.L., 1998. Commensuration as a Social Process. *Ann. Rev. Sociol.* 24, 313–343.
- Feindt, P.H., Oels, A., 2005. Does discourse matter? Discourse analysis in environmental policy making. *J. Environ. Policy Plann.* 7, 161–173.
- Fletcher, R., 2010. Neoliberal environmentalism: towards a post structuralist political ecology of the conservation debate. *Conserv. Soc.* 8 (3), 271–1181.
- Fletcher, R., 2017. Environmentality unbound: Multiple governmentalities in environmental politics. *Geoforum* 85, 311–315.
- Foucault, M., 1975. *Discipline and Punish. The Birth of the Prison*. Vintage Books, New York.
- Foucault, M., 1980. *Power/Knowledge: Selected Interviews and Other Writings*, 1972–1977. In: Gordon, C. (Ed.), Pantheon Books, New York.
- Foucault, M., 1991. *Governmentality*. In: Burchell, G., Gordon, C., Miller, P. (Eds.), *The Foucault Effect: Studies in Governmentality*. University of Chicago Press, Chicago, pp. 87–104.
- Foucault, M., 2007. *Security, Territory, Population*. Picador, New York.
- Foucault, M., 2008. *The Birth of Biopolitics*. Palgrave MacMillan, New York, pp. 78.
- Global Environment Facility (GEF), 2014. *Guidelines for the Implementation of the Public Involvement*. Policy 1–28.
- Global Environment Facility (GEF) - Programa Naciones Unidas de Desarrollo (PNUD), 2015. *Evaluación Final del Proyecto de Adaptación al cambio climático a través de una efectiva gobernabilidad del agua en Ecuador (No3520 de PIMS)*, 1–88.
- Gobierno del Ecuador, 2008. *Constitución del Ecuador*.
- Goldman, M., Narayan, D., 2019. Water crisis through the analytic of urban transformation: an analysis of Bangalore's hydrosocial regimes. *Water Int.* 44 (2), 95–114.
- Hajer, M., Versteeg, W., 2005. A decade of discourses analysis of environmental politics. *J. Environ. Policy Plann.* 7, 175–184.
- Hale, C.R., 2002. Does Multiculturalism Menace? Governance, Cultural Rights and the Politics of Identity in Guatemala.
- Hall, E.F., Sanders, T., 2015. Accountability and the academy: producing knowledge about the human dimensions of climate change. *J. Roy. Anthropol. Inst.* 21, 438–461.
- Haraway, D., 1991. *Simians, Cyborgs, and Women*. Routledge, New York.
- Harris, L., 2014. Imaginative geographies of green: difference, postcoloniality, and affect in environmental narratives in contemporary Turkey. *Ann. Assoc. Am. Geogr.* 104 (2), 801–815.
- Harris, L.M., Alatout, S., 2010. Negotiating hydro-scales, forging states: Comparison of the upper Tigris/Euphrates and Jordan River basins. *Polit. Geogr.* 29, 148–156.
- Henrique, K.P., Tschakert, P., 2019. Contested grounds: adaptation to flooding and the politics of (in)visibility in São Paulo's eastern periphery. *Geoforum* 104, 181–192.
- Hidalgo-Bastidas, J.P., Boelens, R., Isch, E., 2018. Hydroterritorial Configuration and Confrontation: The Daule-Peripa Multipurpose Hydraulic Scheme in Coastal Ecuador. *Latin Am. Res. Rev.* 53, 517–519.
- Hulshof, M., Vos, J., 2016. Diverging realities: How frames, values and water management are interwoven in the Albufera de Valencia wetland, Spain. *Water Int.* 41, 107–124.
- Hoogendarm, P., 2019. Hydrosocial territories in the context of diverse and changing ruralities: The case of Cochabamba's drinking water provision over time. *Water Int.* 44 (2), 129–147.
- Hoogesteger, J., Boelens, R., Baud, M., 2016. Territorial pluralism: water users' multi-scalar struggles against state ordering in Ecuador's highlands. *Water Int.* 41, 91–106.
- Hoogesteger, J., 2013. Trans-forming social capital around water: water user organizations, water rights, and nongovernmental organizations in Cangahua, the Ecuadorian Andes. *Soc. Nat. Resour.* 26, 60–74.
- Hoogesteger, J., 2015. NGOs and the Democratization of Ecuadorian Water Governance: Insights from the Multi-Stakeholder Platform el Foro de los Recursos Hídricos. *VOLUNTAS: Int. J. Voluntary Nonprofit Organiz.* 1–21.
- Hoogesteger, J., Tiaguarro-Rea, Y., Rap, E., Hidalgo, J.P., 2017. Scalar politics in sectoral reforms: Negotiating the implementation of water policies in Ecuador (1990–2008). *World Dev.* 98, 300–309.
- Hombres, L., Boelens, R., 2017. Urbanizing rural waters: Rural-urban water transfers and the reconfiguration of hydrosocial territories in Lima. *Polit. Geogr.* 57, 71–80.
- Hombres, L., Boelens, R., 2018. From natural flow to 'working river': hydropower development, modernity and socio-territorial transformations in Lima's Rimac watershed. *J. Historical Geogr.* 62, 85–95.
- Hombres, L., Boelens, R., Maat, H., 2016. Contested hydrosocial territories and disputed water governance: Struggles and competing claims over the Ilisu Dam development in southeastern Turkey. *Geoforum* 71, 9–20.
- Hombres, L., Boelens, R., Harris, L., Veldwisch, G.J., 2019. Rural-urban water struggles: Urbanizing hydrosocial territories and evolving connections, discourses and identities. *Water Int.* 44 (2), 81–94.
- Jackson, S., 2018. Water and Indigenous rights. *WIREs. Water* 5, e1314–e1315.
- Khan, M., Robinson, S.A., Weikmans, R., Ciple, D., Roberts, J.T., 2019. Twenty-five years of adaptation finance through a climate justice lens. *Clim. Change* 17, 17–19.
- Kolijivadi, V., Van Hecken, G., Almeida, D.V., Dupras, J., Kosoy, N., 2017. Neoliberal performativities and the "making" of Payments for Ecosystem Services (PES). *Prog. Hum. Geogr.* 43, 3–25.

- Latour, B., 1993. *We Have Never Been Modern*. Harvard University Press, Cambridge, MA.
- Li, F., 2009. Documenting accountability: environmental impact assessment in a Peruvian mining project. *PolAR: Polit. Legal Anthropol. Rev.* 32, 218–236.
- Li, T.M., 2007. *The Will to Improve*. Duke University Press, Durham, NC.
- Linton, J., Budds, J., 2014. The hydrosocial cycle: Defining and mobilizing a relational-dialectical approach to water. *Geoforum* 57, 170–180.
- Liverman, D.M., 2009. Conventions of climate change: constructions of danger and the dispossession of the atmosphere. *J. Historical Geogr.* 35, 279–296.
- Lynch, B.D., 2013. River of Contention. *Georgia J. Int. Comparative Law* 42, 70–92.
- Marks, D., 2019. Assembling the 2011 Thailand floods: protecting farmers and inundating high-value industrial estates in a fragmented hydro-social territory. *Polit. Geogr.* 68, 66–76.
- McGoey, L., 2012. Strategic unknowns: towards a sociology of ignorance. *Econ. Soc.* 41, 1–16.
- Mikulewicz, M., 2020. The Discursive politics of adaptation to climate change. *Ann. Am. Assoc. Geogr.* 1–24.
- Mikulewicz, M., 2019. Thwarting adaptation's potential? A critique of resilience and climate-resilient development. *Geoforum* 104, 267–282.
- Ministerio del Ambiente del Ecuador (MAE), 2011. Bases 2da Convocatoria Iniciativa de Financiamiento Comunitaria de Adaptación e Innovación frente al Cambio Climático en el Sector Agua para Consumo Humano, Agrícola, Recursos Hídricos y Hidroelectricidad. Quito, Ecuador.
- Ministerio del Ambiente del Ecuador, 2000. *National Communication Republic of Ecuador*. Ministerio del Ambiente.
- Mosse, D., 2005. *Cultivating Development*. Pluto, London.
- Nagoda, S., Nightingale, A.J., 2017. Participation and power in climate change adaptation policies: vulnerability in food security programs in Nepal. *World Dev.* 100, 85–93.
- Nightingale, A.J., 2017. Power and politics in climate change adaptation efforts_ Struggles over authority and recognition in the context of political instability. *Geoforum* 84, 11–20.
- Oels, A., 2005. Rendering climate change governable: From biopower to advanced liberal government? *J. Environ. Plann. Policy Manage.* 7, 185–207.
- Paprocki, K., 2018a. Threatening dystopias: development and adaptation regimes in Bangladesh. *Ann. Assoc. Am. Geogr.* 1–19.
- Paprocki, K., 2018b. All that is solid melts into the bay: anticipatory ruination and climate change adaptation. *Antipode* 51, 295–315.
- People's Agreement of Cochabamba, 2010. Presented at the World Peoples Conference on Climate Change and the Rights of Mother Earth.
- Perreault, T., 2015. Performing participation: mining, power, and the limits of public consultation in Bolivia. *J. Latin Am. Caribbean Anthropol.* 20, 433–451.
- Popke, J., Curtis, S., Gamble, D.W., 2016. A social justice framing for climate change discourse and policy: Adaptation, resilience and vulnerability in a Jamaican agricultural landscape. *Geoforum* 73, 70–80.
- Porto-Gonçalves, C.W., Leff, E., 2015. Political Ecology in Latin America: The Social Re-appropriation of Nature, the Reinvention of Territories and the Construction of an Environmental Rationality. *Desenvolvimento e Meio Ambiente* 35 (1), 65–88.
- Radcliffe, S.A., 2015. *Dilemmas of Difference*. Duke University Press.
- Riles, A., 2000. *The Network Inside Out*. University of Michigan Press, Ann Arbor.
- Roa-García, M.C., Urteaga-Crovetto, P., Bustamante-Zenteno, R., 2015. Water Laws in the Andes: A promising precedent for challenging neoliberalism. *Geoforum* 64, 270–280.
- Rodríguez de Francisco, J.C., Boelens, R., 2016. PES hydrosocial territories: de-territorialization and re-patterning of water control arenas in the Andean highlands. *Water Int.* 41, 140–156.
- Schlosberg, D., Collins, L.B., 2014. From environmental to climate justice: climate change and the discourse of environmental justice. *WIREs Clim. Change* 5, 359–374.
- Secretaría Nacional de Planificación y Desarrollo, 2013. *Plan Nacional para el Buen Vivir*. Secretaría Nacional de Planificación y Desarrollo. SENPLADES, Quito.
- Secretaría Nacional de Planificación y Desarrollo, 2017. *Plan Nacional de Desarrollo 2017–2022*. SENPLADES, Quito.
- Seemann, M., 2016. Inclusive recognition politics and the struggle over hydrosocial territories in two Bolivian highland communities. *Water Int.* 41, 157–172.
- Simpson, A., 2017. The ruse of consent and the anatomy of “refusal”: cases from indigenous North America and Australia. *Postcolonial Stud.* 20, 18–33.
- Smith, W., Dressler, W., 2019. Governing vulnerability: The biopolitics of conservation and climate in upland Southeast Asia. *Polit. Geogr.* 72, 76–86.
- Stripple, J., Bulkeley, H., 2013. *New Approaches to Rationality, Power and Politics. In: Governing the Climate*. Cambridge University Press, Cambridge.
- Swyngedouw, E., 2006. *Power, Water, and Money*, Human Development Report. United Nations Development Program.
- Swyngedouw, E., 2007. Technonatural Revolutions: the scalar politics of Franco's hydro-social dream for Spain. *Trans. Instit. Br. Geograph.* 32, 9–28.
- United Nations Development Programme, 2011. Bases 2da Convocatoria Iniciativa de Financiamiento Comunitaria de Adaptación e Innovación frente al Cambio Climático en el Sector Agua para Consumo Humano, Agrícola, Recursos Hídricos e Hidroelectricidad. UNDP, Quito.
- United Nations Environment Program (UNEP), 2018. *Emissions gap report 2018*.
- United Nations Environment Program (UNEP), 2019. *Emissions gap report 2019*.
- United Nations Development Program, 2008. *PIMS 3520 – Adaptation to Climate Change through Effective Water Governance in Ecuador*. PNUD, Quito.
- Usón, T.J., Henríquez, C., Dame, J., 2017. Disputed water: Competing knowledge and power asymmetries in the Yali Alto basin, Chile. *Geoforum* 85, 247–258.
- Valladares, C., Boelens, R., 2017. Extractivism and the rights of nature: governmentality, ‘convenient communities’, and epistemic pacts in Ecuador. *Environ. Polit.* 26 (6), 1015–1034.
- Warner, J., Wester, P., Bolding, A., 2008. Going with the flow: River basins as the natural units for water management? *Water Policy* 10, 121–138.
- Warner, J., Hoogesteger, J., Hidalgo, J.P., 2017. Old Wine in New Bottles: The Adaptive Capacity of the Hydraulic Mission in Ecuador. *Water Altern.* 10, 322–340.
- Webber, S., 2016. Climate change adaptation as a growing development priority: towards critical adaptation scholarship. *Geogr. Compass* 10, 401–413.
- World Food Program Ecuador, 2018. *Decentralized Evaluation FORECCSA Project*. WFP, Quito.
- World Food Program Ecuador, 2011. *Climate Change Adaptation Proposal to Adaptation Fund*. WFP, Quito.
- World Meteorological Organization, n.d. *Climate Rationale: Strengthening evidence-based adaptation planning and decision making*. WMO, Geneva, Switzerland.
- Zenko, M., Menga, F., 2019. Linking Water Scarcity to Mental Health: Hydro-Social Interruptions in the Lake Urmia Basin. *Iran. Water* 11, 1092.
- Zografos, C., 2017. Flows of sediment, flows of insecurity: Climate change adaptation and the social contract in the Ebro Delta, Catalonia. *Geoforum* 80, 49–60.

Further reading

- Rodríguez de Francisco, J.C., Boelens, R., 2014. Payment for Environmental Services and Power in the Chamachán Watershed, Ecuador. *Human Organiz.* 73 (4), 351–362.
- Fletcher, R., Breitling, J., 2012. Market mechanisms or subsidy in disguise? Governing payment for environmental services in Costa Rica. *Geoforum* 43 (3), 402–411.