Evolving property rights in water and their impact on water allocation and reallocation

Bosch, H.J.

Publication date
2023

Citation for published version (APA):

General rights
It is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), other than for strictly personal, individual use, unless the work is under an open content license (like Creative Commons).

Disclaimer/Complaints regulations
If you believe that digital publication of certain material infringes any of your rights or (privacy) interests, please let the Library know, stating your reasons. In case of a legitimate complaint, the Library will make the material inaccessible and/or remove it from the website. Please Ask the Library: https://uba.uva.nl/en/contact, or a letter to: Library of the University of Amsterdam, Secretariat, Singel 425, 1012 WP Amsterdam, The Netherlands. You will be contacted as soon as possible.
Chapter 1

Property rights in Water and Reallocating Water
1.1 Introduction

There is an ongoing tension between water as a public good versus water as a private good; “a clash between two cultures: a culture that sees water as sacred and treats its provision as a duty for the preservation of life and another that sees water as a commodity, and its ownership and trade as fundamental corporate rights” (Shiva 2002: X). In response to water resources being scarce and becoming scarcer (see 1.2.1), two broad reactions are evoked. On the one end of the spectrum, there is no life on earth without water, and the belief is that water should be treated as holy, as a heritage, a commons, or even as a public good. On the other end, water should be treated as an economic good, as private property, to achieve optimal allocation (Boretti & Rosa, 2019; UN-Water, 2021; Zaag & Savenije, 2006).

Today, the growing globalization and the dominance of neo-liberal capitalism have permeated in public policies in both industrialized and developing countries, and of international agencies (e.g. the World Bank, International Monetary Fund, World Trade Organization, and many United Nations agencies (Navarro, 2007)). This has implied that the “dominant water governance language and logic are deeply infused with neoliberalism” (Roth et al., 2018: 43). The importance of water to society should encourage states to treat water in the public interest, while “water governance reforms are part of [the] broader capitalist transformation under globalization”, encouraging more private control over and establishing property rights in water to achieve greater efficiency in water use and optimal water allocation (Gupta & Dellapenna, 2009; Roth et al., 2018: 43; Shleifer, 1994). Moreover, “water has been so important as an input for economic activities that it has also been treated as a natural resource like oil or minerals” (Cullet, 2021: 391).

This thesis applies a development studies approach to understanding property rights in water law, and aims to understand whether the changing nature and content of property rights in water, as part of the ongoing water law and governance reforms (Burchi, 2019; Cullet, 2021; Dellapenna & Gupta, 2009), support or undermine the efforts of states to allocate and reallocate water. It examines the organisation of water ‘property’ rights in laws, and more specifically, it studies the role of policy instruments, including water use permits and investor-state contracts between foreign investors and host states and its potential effects on water allocation and reallocation. It does so by focusing on Africa and Asia more broadly, with two case studies in South Africa and India.

This chapter first discusses the social relevance of the growing worldwide tensions between water demand and water availability (see 1.2.1); the state of water commodification, privatization, and marketization (see 1.2.2); the conflicts this results in (see 1.2.3); and the need to understand property rights in water (see 1.2.4). Subsequently, it addresses the academic relevance by discussing two gaps in knowledge (see 1.3), the
research questions that this thesis aims to answer (see 1.4), the concepts applied in this thesis (see 1.5), and the policy relevance of property rights in water (see 1.6). Finally, this chatter discusses the structure of the thesis (see 1.7).

1.2 Social relevance: Real-life problem

1.2.1 Increasing demand and decreasing supply calls for reallocating water

Newspaper headlines read: “Mad Max Scenario: Cape Town Will Run Out of Water in Just 90 Days” (Nace, 2018), “Mexican city limits daily water access to 6 hours amid drought” (Gottesdiener & Madry, 2022), and “Water train set to relieve drought-hit Indian city” (Ravikumar, 2019). It is becoming more and more common for headlines like this to make the front pages of newspapers around the world.

By 2050 global water demand is expected to increase by 20 to 30% (Boretti & Rosa, 2019; WWAP, 2009) with an annual growth of 1% (FAO, 2022b). This is mostly due to the increased direct and indirect water needs of the rich minority (Rammelt et al., 2022; Rockström et al., 2014). However, if we are to meet the needs of all people, then we must account for the growing global population which is expected to grow by 1.9 billion (25%) by 2050. Growing population and the increasing generation of wealth worldwide including increased and changing consumption patterns result in higher water demand (Boretti & Rosa, 2019). Domestic use which currently accounts for 12% of the world’s total water use is expected to increase (Wada et al., 2016), and urban water demand is expected to increase by 80% (Flörke et al., 2018), while global agriculture irrigation water demand today accounts for 70% of the total water use (OECD, 2017; Pastor et al., 2019) and may increase by 60% compared to 2005/2007 (Alexandratos & Bruinsma, 2012). Industrial water use accounting for 20% of the total water use is expected to show a steep increase – manufacturing +400% and electricity +140% (Leflaive et al., 2012). As a result, in 2050, 5 billion people (52%) of the world population “may be living under at least moderately stressed water resource conditions” of which 3 billion people could live in areas considered as overly exploited (Schlosser et al., 2014: 359). Economic growth, increasing consumption, and changing consumption patterns (Amarasinghe et al., 2007; Hubacek et al., 2007), have a direct impact on the water cycle as the “interconnectedness of global business, the local consumption of products and services is intervening in the hydrological cycle throughout the world to an unprecedented extent” (Ridoutt and Pfister 2010: 113) (see Figure 1.1). Societies that are dependent on agriculture are particularly sensitive to hydrologic variability, reflected in their Gross Domestic Product (GDP) (Hall et al., 2014: 429).
Moreover, while water demand is increasing, water availability is decreasing. Although the volume of water on earth stays the same (Shiklomanov, 1993; Wade et al., 2017), because 80% of wastewater is untreated (UNESCO, 2017)) and because of changing spatial and temporal distribution (Boretti & Rosa, 2019), many countries already experience, or will experience a decrease in water availability (IPCC, 2018; UNESCO UN-Water, 2020; Veldkamp et al., 2017). In the coming decades, water pollution will intensify as a result of, for example, the use of pesticides, salinization, industrial waste, and municipal sewage (UNDP, 2018; Veolia/IFPRI, 2016). Regarding groundwater, as a result of technological advancements ("geological knowledge, well drilling, pump technology, rural electrification" (Foster et al., 2013: 685)), especially since the 1950s, groundwater abstraction has increased tremendously (Ajami, 2021). Today, many groundwater bodies are overexploited (Molle et al., 2018), resulting in many problems. For example, with groundwater tables dropping, it becomes more difficult to abstract groundwater (Hoogesteger & Wester, 2015), prevent land subsidence (Bagheri-Gavkosh et al., 2021) and salt water intrusion (Alfarrah & Walraevens, 2018), and wells and wetlands dry up (Molle et al., 2018). At the same time, climate change exacerbates the problems (IPCC, 2022): not only does the reliance on groundwater increase (Srinivas et al., 2011), it also affects groundwater recharge. For example, melting glaciers means the water runs through
the country as a constant source of water supply, but because of increased temperatures, glaciers melt faster which does not necessary sink slowly into groundwater and recharge it (Biemans et al., 2019). More extreme weather events including extreme rainfalls in short periods also result in too much water rushing to the ocean and creating floods, but not necessarily recharging groundwater. Moreover, there is a growing call to reserve water for nature to reverse the massive declines in ecosystems and biological diversity (Rockström et al., 2009). Although the issue of water availability could potentially be addressed through new technology, for example air to water technology or desalination (te Wierik et al., 2020), both are really expensive.

With water becoming scarcer, competition and conflict over water will inevitably increase and the need to share will grow (Gupta, 2016). “This calls for robust allocation regimes that can adjust, reallocate and reduce water allocation in an organised way” (Hellegers & Leflaive, 2015: 273).

1.2.2 Water privatization and commodification
The water sector is booming business. The Global Water Intelligence (GWI, 2018) forecast shows that the global water market¹ will grow from US$ 770 billion in 2018 to US$ 915 billion by 2023, a growth of US$ 145 billion (+19%). The global bottled water market valued at US$ 281 billion in 2021 is expected to increase with a compound annual growth rate of 6.7% from 2022 to 2030, reaching US$ 509 Billion by 2030 (increase of 81%) (Grand View Research, 2022a, 2022b). This growth is supported by (i) a shift from other sources to bottled water to address the challenge of contaminated water especially in developing countries, (ii) additional health benefits from added minerals and nutrients to bottled water, (iii) a growing fashion, as well as awareness of the health risks of other drinks, to drink bottled water, and (iv) increasing soft and hard drink consumption (cf. Grand View Research, 2022a, 2022b). Private Participation in Infrastructure in water and sewerage in low- and middle-income countries shows a total investment of US$ 9.9 billion (13% of total Private Participation in Infrastructure) across 44 projects (World Bank, 2021c). Since 1990, the database shows 1,161 water and sewerage projects in low- and middle-income countries globally worth a total investment of US$ 102,407 billion (see Figure 1.2). “Through the sale of hydroelectric and water company shares, the building of dams to impound and control freshwater supplies, and via water trading schemes, there is continual acceleration in the privatization of water resources around the world” (Strang, 2014: 121).

¹ “The sum of both operating and capital expenditures by utilities and industrial water users on water and wastewater” (Water Online, 2018)
Since 2000, investors are also gaining interest in land. The Land Matrix (2022: 1) shows that 2,156 land deals greater than 200 hectares have been concluded (i.e. “transfer of rights to use, control, or ownership of land through sale, lease, or concession”) between 2000 – 2022, totalling approximately 64 million hectares. This equals to approximately 4.3% of the 1.5 billion hectares used in crop production (arable land and land under permanent crops) (Bruinsma, 2017; Theesfeld, 2018). The numbers are significant, and these land deals target mainly countries in the Global South. Moreover, since water is crucial in agriculture, these land deals may include water rights as well (see 6.2.3.3). Land grabbing therefore has a strong link with water grabbing (Rulli et al., 2013; Theesfeld, 2018).

Increased water scarcity, and the “view that markets are the best way to manage resources and the economy” has resulted in water becoming a resource that is increasingly subject to corporate exploitation (Dellapenna & Gupta, 2021: 86; Johnson et al., 2016). The (economic) value of water makes it an increasingly interesting investment opportunity. The awareness and recognition of the economic value of water and the fact that it is a crucial and vital resource, makes actors (public and private) want to secure and protect access to it. States and corporates use legal approaches to consolidate their investments in water encouraging them to commodify, commercialise and privatize water (Johnson et al., 2016).
1.2.3 Social movements on water and water litigation

The pressure on available resources results in tension and conflicts around the world (Pacific Institute, 2022). There is a growing social moment demanding the implementation of the human right to water, increasingly resulting in conflicts, and protest; some of these conflicts even end up in court. For example, in Cochabamba (Bolivia), a 40-year concession\(^2\) was granted to the international consortium\(^3\) ‘Aguas del Tunari’, and 1.5 months later a new water and sanitation law was enacted,\(^4\) resulting in the consortium having the exclusive right to distribute water – implying a *de facto* monopoly.

Not long after, a new tariff regime resulted in water bills increasing up to 300% leading to the infamous ‘water wars’ in which a seventeen year old boy was shot and killed (Olivera & Lewis, 2004). The public protest resulted in the government cancelling the concession. The government was subsequently sued at the International Centre for Settlement of Investment Disputes for breaching the concession invoking the Netherlands-Bolivia Bilateral Investment Treaty (BIT) as the basis for jurisdiction, in which US$ 25 million compensation was claimed (ICSID Case No ARB/02/3, 2005; Norris & Metzidakis, 2010). Because of all the commotion and potential reputation damage for the company, the case was settled for two bolivianos (thirty US$ cents). However, other cases against governments resulted in high compensation payments on water cases, for example, the payment of US$ 165 million compensation to Azurix in which the Argentina Republic violated obligations under the 1991 Treaty Concerning the Reciprocal Encouragement and Protection of Investment between the Argentine Republic and the United States of America (ICSID Case No. ARB/01/12, 2006) and the payment of US$ 37 million by Argentina to Suez and Vivendi for breaching its obligations under three BITs (ICSID Case No. ARB/03/19, 2015).

In an ongoing battle between Nestlé and the State of California, “Nestlé claims it has a pre-1914 water right that originates from an 1865 possessory claim” (Stork et al., 2021). Even though California is experiencing severe droughts, in 2020 Nestlé withdrew 219 million litres of water, for which it paid US$ 524 (Morris, 2016; Singh, 2021). In Ireland as part of the post-depression (2008 – 2012) economic recovery programme, financially supported by the European Union and the International Monetary Fund, the state aimed to privatise water (Roggeband et al., 2018). In Lagos (Nigeria, October 2021),

---

\(^2\) Estimated cost of the contract was US$ 252 million (Bustamante, 2004).

\(^3\) Members: “International Water Limited (UK) (55%), Abengoa Servicios Urbanos (Spain) (25%), ICE Agua y Energia S.A (Bolivia) (5%), Constructora Petricevic (COPESA) (Bolivia) (5%), Sociedad Boliviana de Cemento (SOBOCE) (Bolivia) (5%), and Compania Boliviana de Ingenieria (Bolivia) (5%). International Water is a UK-based company, jointly-owned by the US company, Bechtel (50%) and the UK company, United Utilities (50%)” (Nickson & Vargas, 2002: 106).

\(^4\) Act No. 2029 on the “Prestacion de Servicios de Agua Potable y Alcantarillado Sanitario” (Provision of Drinking Water and Sewage Services).
the ‘Our Water Our Right Africa Coalition’ protested against the water privatization in countries across the continent, which they see as “the most potent threat to Africans’ human right to water” (Premium Times Nigeria, 2021; Vanguard, 2021). The protests specifically target the World Bank, which they mention as the biggest driver of water privatization. Activists joining the protest came from Cameroon, Gabon, Ghana, Kenya, Mozambique, Nigeria, Senegal, Tanzania, and Uganda (Vanguard, 2021). Such protests are occurring worldwide. In 2017, in Baja California there were broad-based protests against the new water law which was widely seen as a move to privatize the distribution of water (Mexico News Daily, 2017). In 2018, in El Salvador a similar situation occurred when the government made moves to put water under the control of the private sector by proposing a new water law (The Guardian, 2018), and in 2018, in Baltimore, United States people voted overwhelmingly (77%) to ban the privatisation of its water systems (Thomson Reuters, 2018).

Such responses call for a better understanding of past and present instruments that transfer property rights or ownership rights to actors and the implications of such transfers on social, economic and environmental issues, and hence for water allocation and water reallocation.

1.2.4 The need to understand property rights

The increased demand for water and the decreasing availability inevitably results in conflict. Often this conflict is between the public that sees water as a basic human need, smallholder farmers who see water as critical for their agriculture, and the private sector that sees water as a commodity needed in production – a human right and community rights versus water privatization. Addressing the conflicts boils down to a question of who gets priority in water allocation. Although in theory the problem could be solved quite easily, practice can be very unruly. In some cases, property rights can create a barrier in solving the conflicts and challenges (Aubin & Varone, 2013). For example, in 2003, the Coca-Cola Beverages Private Limited challenged the refusal of the renewal of a licence for groundwater abstraction in Plachimada, in the southern State of Kerala (India), as a result of protest regarding groundwater issues (deteriorating quality and quantity) (Bijoy, 2006; Koonan, 2010). This resulted in a twelve-year long legal battle which was brought before the Supreme Court for a final decision, when in July 2017 Coca-Cola informed the Supreme Court that it had no plans to start to operate its bottling plant in Plachimada (Koonan, 2010). In this case, the ‘property’ rights Coca Cola held played a key role in the conflict limiting the State in addressing the problem, while in the meantime the local people suffered from dropping groundwater tables and

---

5 It is important to set clear priorities for water allocation due to the limited availability of fresh water for future development, which directs water allocation in case of shortage between conflicting uses of water.
pollute water. The withdrawal of Coca Cola does not in any way address the issue of large
companies who seek water for their production processes in India; it merely postpones
the resolution of the problem. In Spain there are challenges in respect to historical water
‘property’ rights in groundwater, which continue to cause problems today as Spain is
experiencing severe droughts (Berbel & Esteban, 2019). The 1985 Spanish Water Law
declared groundwater as a public property. However, the Spanish Constitution forbids
expropriation of rights without compensation. The 1985 Water Law requires the existing
groundwater uses to (i) be registered as a public concession for 50 years, or (ii) to be
kept as they are in perpetuity, in which the right cannot be modified (Fornés et al., 2007;
Rouillard et al., 2021: 7). Therefore, all wells drilled before January 1st 1986 are considered
private (Burchi & Nanni, 2003). While many scholars and policymakers assume that one
can redistribute water according to public policy goals, they often overlook the historical
and legal property rights to water that have been granted to people and companies and
how this affects the reallocation of water (see Chapter 3).

1.3 Academic relevance: Scholarly gaps in knowledge

The scholarship on water is divided. Many social scientists discuss water justice and
equity issues (Gupta et al., 2022) and many ‘integrated water resource management’
scholars focus on optimal allocations without taking cognizance of the property rights
challenge (Meran et al., 2021). Property rights scholars are mostly legal scholars who
often work isolated from others (see Chapter 3). Hence, this development studies thesis
aims to understand the key legal issues with respect to property rights and how this
affects the allocation and reallocation of water.

Who owns and holds property rights in water has been the central point of conflict
in the development of water law in the past centuries (Dellapenna & Gupta, 2021) (see
Chapter 3). In the context of the Anthropocene, with water demand increasing and
availability decreasing (UN-Water, 2021), the struggle to control water has become more
pronounced. Based on the literature review, two gaps in knowledge have been identified
which are discussed in the two following sections.

1.3.1 Legacy of historical property rights and the creation of new quasi-
property rights in water in the Global South

The literature review on how rules on water ownership and property rights in water
have evolved (see Chapter 3) reveals that there is confusion regarding who ‘owns’ and
who holds ‘property’ rights in water (Dellapenna & Gupta, 2021). Despite the contextual
differences and variations in legal regimes worldwide, the importance of water to society
should encourage states to put water in the public domain, with the government being
the custodian of the nation’s freshwater resources. This, in theory would allow states,
as the only legitimate authority to promote the public interest, to control, allocate, and reallocate the limited water available for the benefit of its people and nature. But in order to do so, states will first have to understand, recognize and, if necessary, abolish existing water property rights systems (e.g. riparian rights and groundwater rights linked to land ownership). There is inadequate knowledge on a country-by-country basis of how states are dealing with this and what has been the approach adopted. Moreover, a key question is whether the relatively new water allocation instruments such as ‘modern’ water use permits (Hodgson, 2006), tradable water permits (Wheeler, 2021), and contracts, leases, and concessions (Marin, 2009) create new types of quasi-property rights which may hamper the ability of states to allocate and reallocate water. Property rights in water are mostly discussed by legal scholars who appear to be less interested in the development outcomes, and development scholars rarely understand how property rights regimes work of how new quasi-property rights emerge in instruments such as permits and investor-state contracts (or contracts between foreign investors and the state). Furthermore, while development scholars focus on Global South water challenges, property rights scholars tend to study cases in the Global North (see Chapter 3). The literature review on property rights demonstrates this lack of understanding of both what is happening in the Global South with respect to property rights in water and the role of new quasi-property rights created through permits and contracts. Hence, this thesis focuses on trying to understand such property rights regimes in Asia and Africa with a more detailed focus on India and South Africa.

1.3.2 A lack of understanding of the relationship between ‘property’ rights and water allocation and reallocation

The second gap in knowledge follows up on the first gap in that there is limited understanding on how quasi-property rights in water affect water allocation and reallocation in the era of the Anthropocene. In the allocation of the limited fresh water resources available, most decision-makers focus on the optimal allocation of water to maximize profit and economic benefits (Rezaee et al., 2021). However, states cannot simply allocate the water at their own discretion, without considering the existing system and allocation of property rights and quasi-property rights in water. Most countries in the Global South inherited a situation in which some, if not most of the water was already allocated to local communities, Indigenous people and as water rights were often linked to land ownership.\(^6\) Property rights and quasi-property rights in water can also affect the ability of states to reallocate water as a response to increasing uncertainty in hydrological conditions, rainfall patterns and extreme weather events as a result of climate change and changing socio-economic conditions.

\(^6\) In both common and civil law, the right to access water derived from land ownership (see 3.2.2 and 3.2.3).
Since each country has a limited volume of water which can be utilised, countries may have a water 'budget' in place – the “accounting of the rates of water movement and the change in water storage in all or parts of the atmosphere, land surface, and subsurface” (Healy et al., 2007: iii). This in turn informs how much water is available throughout the year, and how much can be allocated. Because water demand is increasing, and availability is decreasing, the pressure on freshwater availability will only increase, which requires water sharing and the ability to (re)allocate water among competing uses and users (Jackson et al., 2019). However, states are not able to (re)allocate water as they see fit if (quasi-)property rights are rigidly allocated. Hence, it is crucial to understand the interaction between the development of quasi-property rights in water through new water allocation instruments (including e.g. through water use permits and investor-state contracts), and how this affects the ability of states to reallocate the water.

Current evidence is anecdotal, and the magnitude of the quasi-property rights in the Global South is not looked at. An understanding of the relationship between ‘property’ rights in water and the ability to reallocate water is crucial to develop “a legitimate, equitable, and effective governance system” (Gupta et al., 2013: 575). Although many papers discuss adaptive and integrated water governance, the challenges countries face regarding the control of water is overlooked, especially the case of property rights. We assume here that the state (or sub-national authorities) is the only legitimate authority within a country that can redistribute water in the public interest.

1.4 Research question, approach, and limits

1.4.1 Question and sub-questions
This thesis investigates property rights in water in relation to water allocation and reallocation, through the following overarching question:

How are property rights in blue water (surface- and groundwater) organised in Africa and Asia and what water allocation and reallocation problems, as part of the broader concept of water governance, does it create now and in the future?

The overarching question will be answered through two sub questions: (1) How have property rights in water evolved including through existing policy instruments in Anglophone and Francophone Africa and Asia? And (2) How do property rights in water through existing policy instruments (i.e. water use permits, investor-state contracts, and historical water entitlements) in Anglophone and Francophone Africa and Asia affect water allocation and reallocation? These sub-questions will be answered in chapters 4 – 8, see Table 1.1).
Table 1.1  Questions answered in the chapters, and the gaps they address

<table>
<thead>
<tr>
<th>Chapter questions</th>
<th>Addresses gap</th>
</tr>
</thead>
<tbody>
<tr>
<td>4: How is water ownership organised in Anglophone and Francophone Africa and Asia, and how do states allocate their freshwater resources?</td>
<td>1</td>
</tr>
<tr>
<td>5: How have property rights in water evolved including through granting water use permits in Anglophone and Francophone Africa and Asia, and what are the implications for water allocation and reallocation?</td>
<td>1, 2</td>
</tr>
<tr>
<td>6: How have property rights in water evolved through investor-state contracts on minerals, petroleum and land in Africa and Asia, and what are the implications for water allocation and reallocation?</td>
<td>1, 2</td>
</tr>
<tr>
<td>7: How are property rights in water access and allocation instruments organised, and how do these instruments affect water reallocation in India?</td>
<td>1, 2</td>
</tr>
<tr>
<td>8: How are property rights in water access and allocation instruments organised, and how do these instruments affect water reallocation in South Africa?</td>
<td>1, 2</td>
</tr>
</tbody>
</table>

1.4.2  Scope and limitations

The spatial limitation of this thesis is that it: (i) focusses on developing countries in the Global South, more specifically, Anglophone and Francophone African countries and Asian countries that have their laws written in French and English. It excludes the countries in Latin America, Oceania, the Global North, and Middle East; (ii) examines investor-state contracts when written in English, French, Portuguese, or Spanish and publicly available.

The temporal limitation of this thesis is that: (i) the literature review ranges from the period 1990 – 2021; (ii) the inventory is a snapshot of the water laws and policies on property rights in place in 2021; (iii) the investor-state contracts are included when signed between 1 January 2000 and 1 September 2021.

The substantive limitations include: (i) a focus on property rights in water as evidenced by documents (water legislation and policy, and investor-state contracts). I do not ground truth the material to see what is actually happening on the ground since the Covid-19 pandemic did not allow me to undertake fieldwork, other than conducting online interviews; (ii) that this thesis is not a legal analysis (see 2.4) but an international development perspective on property rights in water, and water allocation and reallocation; (iii) the thesis does not cover issues of property rights in water in relation to transboundary issues. (iv) I also did not focus very much on the issue of indigenous rights to water in this thesis and this deserves more attention in follow-up research. Finally, (v) this thesis is not a discursive thesis in that it does not discuss debates extensively, nor is it a political exploration as the politics in the countries is not investigated. It is primarily
focused on analysing the primary data of laws and policies, permits and contracts to uncover a rich empirical basis that can be the foundation of analysis in the future.

1.5 Property rights in water, water allocation and reallocation, and inclusive development

This thesis draws on the key overarching concept of water property rights, and how this affects water allocation and reallocation for inclusive development – as part of the broader concept of water governance. In this thesis I take an inclusive development angle as a theoretical vision in relation to water allocation and water reallocation and return to it in my last chapter. I also discuss it briefly in the case study of South Africa (see Chapter 8).

1.5.1 Property rights in water

The fluidity of water rights makes it hard to comprehend whether water rights can be seen as property rights (Saxer, 2010: 60). Property rights in water do not imply owning the physical water itself (i.e. the water molecule), but holding property in a right to use a certain volume of water (Dellapenna & Gupta, 2021; Johnson et al., 2016; Solanes, 1999), which can be seen as “a possessory interest in the right to use water” (Caponera, 2007: 127). We distinguish water ownership from water property rights: ownership is vested in the state (or by subnational jurisdictions, e.g. Canada and India), and property rights are held by the users. Dispute the ±195 national legal regimes today have specific characteristics (see 3.2), generally the right to use water is defined “in terms of the relationship of the use to the water source” (Dellapenna & Gupta, 2013: 9). Water property rights include a bundle-of-rights – for example, the right to use, sell/ alienate, inherit, manage, commercialize, exclude, store, divert/restrict/alter water flows, use sewage water for irrigation, and/or discharge wastes into watercourses. The bundle ranges from a minimum right of use, to having all the rights in full, including ownership rights (Bannon, 2017; Honoré, 1961; Saxer, 2010; Waldron, 1988; Zellmer & Harder, 2008). In the case of state water ownership, the state owns all the rights in the bundle. When other actors acquire water property rights, these ‘encroach’ on state water ownership; although the state can expropriate such water rights subject to compensation (see Chapter 5 and 6).

Whether a water right is defined as a property right is determined by legislation and case law (Saxer, 2010). Most states avoid mentioning property in relation to water (Dellapenna & Gupta, 2021), in practice, however, different legal water use entitlements

---

7 This section is included in a paper: Bosch, H.J., & Gupta, J. (2022). The tension between state ownership and private quasi-property rights in water. WIREs Water, e1621. doi: https://doi.org/10.1002/wat2.1621.
can imply ‘quasi-property rights’ (Hodgson, 2006; Zellmer & Harder, 2008). When an actor holds a quasi-property right, de jure the state still owns all the property rights, while de facto the state has privatized the water by granting a bundle-of-rights that resemble property rights in water. With quasi I mean “[a]s if; as it were; analogous to. … [Indicating] that one subject resembles another, with certain characteristics, but that there are also intrinsic differences between them” (Black's Law Dictionary, 1991: 977). Balganesh (2012: 1891) refers to quasi-property as “situations in which the law seeks to simulate the idea of exclusion, normally associated with property rights…”. Hodgson (2016: 16-17) states that: “quasi-property rights … are capable of being asserted against third parties and the state … [and] they may not be expropriated by the state without the payment of compensation”. The current state of knowledge on property rights in water is further discussed in Chapter 3.

1.5.2 Water allocation and reallocation problems as part of water governance

In this thesis I specifically focus on how ‘property’ rights affect administrative water allocation (hereafter referred to as water allocation) and administrative water reallocation (hereafter referred to as water reallocation), as a key component in the broader concept of water governance. Here, water allocation can be understood as “the process of assigning rights to the use of water” through administrative water entitlements (e.g. water rights, water use permits, licences, contracts, concessions) (Kreutzwiser et al., 2004: 136). Water allocation follows the determination of water budget, i.e. the water that is available for distribution in a society. Water allocation determines how the available freshwater resources, informed by a water budget, are allocated between, for example, agriculture, industry, urban water services supplies and nature (Hellegers & Leflaive, 2015). Water reallocation can be understood as both the transfer of administrative water entitlements by a government authority between users and uses who are formally allocated a certain volume of water (e.g. from industries to urban water supplies) (Marston & Cai, 2016; Meinzen & Dick & Ringler, 2008), and reducing the volume of water allocated through an administrative water entitlement (e.g. reducing the allocated water to farmers to ensure enough water is left for nature) (Rezaee et al., 2021).

With water becoming scarcer (see 1.2.1), it is more difficult for states to satisfy all demands, including meeting the water requirements of existing, new and emerging users as well as the needs of nature. Drivers of water demand include new or increasing water demand...
Chapter 1

demands due to (i) technological advances, (ii) socioeconomic development, (iii) changes in societal understanding or values, and (iv) population growth (Marston & Cai, 2016: 660). Examples include: a change to more water intensive crops for biofuel production, water use for hydraulically fracking of oil and gas (Hitaj et al., 2020), changing diets, recognition of the importance of water for nature (e.g. environmental flow requirements) (Gerten et al., 2013; Johnson et al., 2001), the recognition of the water rights of Indigenous peoples (Jackson, 2018) (see Chapter 3), and the redress of historical water inequality, as seen in South Africa (van Koppen & Schreiner, 2014b) (see Chapter 8.2.2).

However, we are already facing a major supply crunch. Around the world river basins are already ‘closing’, meaning no water is left to be allocated (Gleick & Palaniappan, 2010; Maxmen, 2018; Molle et al., 2010; Venot & Courcier, 2008). Approximately 1.4 billion people live in areas that have to deal with the effects of basin closure (de Fraiture et al., 2007; Falkenmark & Molden, 2008). Without reallocating water, the Sustainable Development Goals will never be achieved. This means that, beyond the issue of the inequities in water distribution, if and when demand exceeds supply and/or because of the impacts of climate change, at a certain point water reallocation becomes necessary and inevitable (Falkenmark & Molden, 2008: 201), or new developments in society will no longer be possible. In fact, the process of allocation and reallocation will be annually recurring governance challenges for many countries worldwide.

The gap between the demand for, and supply of, water requires governments not only to carefully allocate water, it also requires states to have to ability to reallocate water among competing uses and users (Marston & Cai, 2016; Pahl-Wostl, 2007). If water availability is further constrained, states need to be able to reallocate between uses and users (Marston & Cai, 2016). The ability of states to accommodate uncertainties associated with changes in economic, social and hydrological conditions, through the reallocation of water among uses and users, is a crucial component in water governance and becomes a serious problem when states are unable to reallocate water (Kreutzwiser et al., 2004; Marston & Cai, 2016; Pahl-Wostl et al., 2013), assuming that they knew how they wanted to reallocate the water. States are not able to reallocate water if (quasi-) property rights are rigidly allocated (Larson, 2019; see Chapter 3), except through water markets which bring their own challenges. Thus, actors holding water ‘property’ rights may affect the state’s ability to govern water.

In this thesis I will look at the laws and policies that allow for the allocation and reallocation of water, the development of ‘property’ rights in water – what are the elements of water ‘property’ rights, and how these rights affect water allocations and reallocation of water.
1.5.3 Inclusive development and water allocation and reallocation of water

The concept of sustainable development has been widely accepted by the global community (e.g. the Sustainable Development Goals, see 1.6) as the main approach to development. It is defined in the Brundtland report as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987: 16). Sustainable development is about balancing the economic, social, and ecological goals – finding this balance results in strong sustainability (Gupta & Vegelin, 2016). However, the concept has been criticized for often leading to trade-offs in favour of economic growth (Gupta & Vegelin, 2016). Because the economy is measured in quantitative terms, the social and ecological issues largely get ignored (Rammelt & Gupta, 2021). Moreover, economists often address the problem of scarcity by seeing water as an economic good, pricing it, and making it subject to market-based approaches, in order to ensure efficient water use and optimal water allocation (see 1.6). This often leads to decisions where economic approaches are prioritized over social and ecological ones, which often comes at the cost of the poor and marginalized (Gupta & Lebel, 2010; Gupta & Pouw, 2017). If the goal of states is to maximize GDP, then this system of water allocation may do the trick. But if the goal is to be inclusive towards those furthest behind, then states may need a different system. To counterbalance the economic ascendancy, I use the concept of inclusive development in relation to water allocation and water reallocation (Gupta & Lebel, 2010, 2020; Rammelt & Gupta, 2021).

The ability to allocate and reallocate water is key in water governance, however, this does not guarantee the equitable sharing of water. Taking an inclusive development approach allows for more just and equitable patterns of water allocation and reallocation of water (Gupta & Lebel, 2010; Joy et al., 2014; UNECE, 2021). Because today’s water policy is strongly influenced by the predominant worldview of neoliberalism (Hurlbert & Diaz, 2013), an inclusive approach to water allocation and reallocation includes both social, ecological, and relational principles.

Inclusive development questions the goal of continuous economic growth as an approach to reduce poverty and improve living standards, and instead focuses more on social, ecological, and relational goals which allows to balance the fixation on, and dominance of to the goal of economic growth (Gupta & Vegelin, 2016). Through this perspective I look at the water economy, and how this has to change. “Inclusiveness is not an adjective, it redefines development” (Rammelt & Gupta, 2021: 144) implying a need to re-examine what kind of development societies should aspire to. As stated

---

9 “The term water economy represents a hydro-socio-economic arrangement consisting of (i) water sources, (ii) water users, (iii) the physical infrastructure connecting sources and users, and (iv) the institutions governing water allocation, e.g., property rights and allocation rules” (Dinar & Tsur, 2021: 45).
by the United Nations Secretary-General Mr António Guterres at the Stockholm+50 international meeting, in Stockholm in June 2022:

“… Today, I urge countries to embrace the human right to a clean, healthy environment for all people, everywhere — especially poor communities; women and girls; Indigenous peoples; young people and the generations to come.

To rescue the global environment — and humanity’s future — we must transform the accounting systems that reward pollution and waste.

We must place true value on the environment and go beyond Gross Domestic Product as a measure of human progress and well-being. Let us not forget that when we destroy a forest, we are creating GDP. When we overfish, we are creating GDP. GDP is not a way to measure richness in the present situation in the world. …” (Guterres, 2022)

Social inclusiveness is about ensuring equitable access to water and allocation of the remaining water, and “aims at empowering the poorest” by focusing on the “furthest behind first” (Gupta & Lebel, 2010; Gupta & Pouw, 2017; 97; Gupta & Vegelin, 2016: 436). At the national level, this means taking into account marginalized groups and communities by ensuring access to safe water. Water should be socially inclusive, because access to safe drinking water, sanitation and hygiene is a basic human right and essential to lead life in human dignity. The global community is aware of the importance of water to a society and people shown, for example, by the adoption of the Human Right to Water and Sanitation (UNGA, 2010) and their efforts to bring water in the public domain (see Chapter 3). Nevertheless, water is still subject to privatisation, commodification, or grabbing, often affecting the poor and marginalized people the most (Franco et al., 2013). When water is taken away (e.g. because of higher water prices, dropping groundwater tables, polluted water or privatization), or even when there is the fear that water is taken away, this may result in social unrest and conflicts (see 1.2). Social inclusiveness is thus not only about access (minimum needs), but also about water allocation (allocation of the remaining water) – ensuring water is allocated in a fair and equitable manner (Gupta & Lebel, 2020; Gupta & Pouw, 2017). Access cannot be guaranteed without fair allocation (Gupta et al. 2020). Property rights or quasi-property rights in water affect social inclusiveness because it impairs a state’s ability to reallocate water, since the water is already ‘owned.’ Equitable water-sharing is crucial because it is the only way to address the increasing water scarcity and related water-sharing challenges between different uses and users, including domestic water use, commercial (e.g. industry and famers) water use, and water for nature.
Ecological inclusiveness reflects the “the relation between environmental issues and the marginalized” in the Anthropocene epoch (Gupta & Vegelin, 2016: 438). The Anthropocene can be understood as a “new human-dominated geological epoch” (Lewis & Maslin, 2015: 171). It reflects the relationship between people, the Earth system, and the recent global environmental changes – including the effects on the hydrological cycle (see 1.2.1). The literature shows that the effects of climate change are generally heavier on the poor than on the rich (Ahmed et al., 2009; Skoufias et al., 2011). Because “[f]resh water – the bloodstream of the biosphere – is at the centre of the planetary drama of the Anthropocene” (Gleeson et al., 2020: 2), the consequences are especially felt through water (Levy & Patz, 2015). The increasing demand and decreasing supply, exacerbated by climate change and growing water pollution requires states to have the ability to reallocate water when needed. Protecting water, and maintaining ecosystem services are the main objectives of ecological inclusion (Gupta & Vegelin, 2016: 438). Property rights or quasi-property rights in water affect ecological inclusiveness because it impairs a state's ability to ensure enough water is left for nature. States can be hindered in reallocating water from commercial actors to nature.

Relational inclusiveness is about power relations, how the relations between rich and poor, or powerful and less powerful are accounted for, and “questions the underlying structural power politics that influence problem solving” (Gupta & Pouw, 2017: 99). “Relational inclusiveness looks at the underlying mechanisms that perpetuate concentration of power, inequality and environmental degradation and at how downward accountability can be improved” (Ros-Tonen et al., 2019: 14). Looking at inequality from a relational perspective means considering both the historically inherited inequality which has been institutionalized in social rules, as well as contemporary policy which can exacerbate inequalities, either explicitly or implicitly (Pouw & Gupta, 2017: 105). A key element of relational inclusiveness in respect of the access and allocation of water is who owns the water and who holds property rights in water (Gupta et al., 2013). In this thesis I focus on the role of water property rights within relational inclusiveness and how it affects social and ecological inclusiveness.

Property rights in water create relations between different users, and users and the state, which in turn affect both social and ecological inclusiveness. This in turn can hinder a state's development, or development for certain groups of actors, resulting in perpetuating and increasing inequality. Property rights regimes constrain social, ecological, and relational inclusiveness when the government cannot, or when the state's control of the water resources is limited to such an extent that it cannot reallocate the freshwater resources according to the priority of use principle. Understanding the changing patterns in water 'property' rights, and the implications for inclusive reallocation of water is “critical to developing a legitimate, equitable, and effective governance system”
(Gupta et al., 2013: 575). I use the concept of ‘water property rights’ and how this affects inclusive water allocation and reallocation.

1.6 Policy relevance: Water property rights and water allocations and reallocation

This thesis is by definition policy relevant; the issue of ‘property’ rights and water ownership is embedded in national and international policy, economy and law. In this section I only focus on international policy. First, six pivotal moments are discussed that show how international policy paved the way for the development of stable, secure and enforceable water rights (see 1.6.1). This is followed by discussing the link between property rights and Integrated Water Resources Management (IWRM) and the Sustainable Development Goals (SDGs) (see 1.6.2).

1.6.1 International policy

First, the ‘Report of the United Nations Water Conference’ (Mar del Plata, 1977 – the first summit on water) was already aware of the importance of water to the development of states, and of the water crisis many countries face. The report (UN, 1977: 33, 11) reads that “[l]egislation should define the rules of public ownership of water.” On “[i]nstruments to improve the efficiency of water use”, it reads: “[s]ince water is a limited and valuable resource and since its development requires high investment, its use must be efficient and must secure the highest possible level of national welfare” and “[e]ffective legislation should be framed to promote the efficient and equitable use … of water.”

Second, the International Conference on Water and the Environment (ICWE, 1992), adopted four guiding principles on governing fresh water. It recognises that: “[f]resh water is a finite and vulnerable resource, essential to sustain life, development and the environment” (Principle 1); “[w]ater has an economic value in all its competing uses and should be recognized as an economic good” (Principle 4) (ICWE, 1992: 2). This has led to major water law reforms since the 1990s, and a push for “water sector reforms centred on commodification and privatisation” (see 1.2.2), which “went alongside the broader neoliberal reforms” (see 1.1) (Cullet, 2021: 393).

Third, the Watercourses Convention (1997) talks about state sovereignty in terms of territorial integrity, abandoning the idea of absolute territorial sovereignty. Article 8 reads “Watercourse States shall cooperate on the basis of sovereign equality, territorial integrity, mutual benefit and good faith in order to attain optimal utilization and adequate

10 Principle No. 2 – “Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels”; Principle No. 3 – “Women play a central part in the provision, management and safeguarding of water.”

11 Convention on the Law of the Non-Navigational Uses of International Watercourses
Property rights in Water and Reallocating Water

This acknowledges the limited power states have over their national water resources.

Fourth, the principles of water as an economic good in turn influenced Agenda 21 (UN, 1992), and are the guiding principles of the concept of IWRM (GWP/TAC, 2000; Meran et al., 2021; Snellen & Schrevel, 2005). IWRM is defined by the Global Water Partnership (2000: 22) as “a process which promotes the co-ordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.” It was developed as a response to global (emerging) water crisis, emphasising efficiency and specifically in the Global South (Shah & van Koppen, 2016). IWRM supports the development of strong enforceable rights, as an answer to the inefficiency in water use and suboptimal water allocation. The three pillars of IWRM are: social equity, economic efficiency and environmental sustainability (Peña, 2011), with sustainability right at the centre (Purvis et al., 2019).

Fifth, the development of the eight Millennium Development Goals in 2000 united the global community to “reduce poverty, improve health, and promote peace, human rights, gender equality, and environmental sustainability” (Idowu & Mermod, 2013: 2). The road map towards the implementation of the United Nations Millennium Declaration includes the goal to “stop the unsustainable exploitation of water resources by developing water management strategies at the regional, national and local levels which promote both equitable access and adequate supplies” (UNGA, 2001: 34) and develop “policies, guidelines and management tools for environmentally sustainable integrated water management” (UNGA, 2001: 35). The specific target on water, Target 7C, reads: “By 2015, halve the proportion of people without sustainable access to safe drinking water and basic sanitation.”

And sixth, the Millennium Development Goals were followed up by the SDGs. In September 2015, 193 Members States of the United Nations General Assembly adopted the ‘the 2030 Agenda for Sustainable Development’, including 17 goals and 169 targets (UNGA, 2015). This was the result of a global effort to identify and highlight the focus areas for the global community to work on and setting out the policy agenda for the fifteen years to come. Despite the fact that each SDG has a distinct focus, water acts as a common thread through all SDG’s (OECD, 2018:2). Goal 6 on Water reads: “Ensure availability and sustainable management of water and sanitation for all” (UNGA, 2015). Target 6.5. reads: “[b]y 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate.” In addition, target 6.4 reads: “By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity.” Target 6.5,
Indicator 6.5.1 and the metadata strongly focusses on the implementation of IWRM (see Table 1.2).


Table 1.2  Goal 6: Ensure availability and sustainable management of water and sanitation for all

<table>
<thead>
<tr>
<th>Target</th>
<th>Indicator</th>
<th>Metadata</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate</td>
<td>6.5.1 Degree of integrated water resources management</td>
<td>“The concept of IWRM is measured in 4 main sections, each representing key dimension of IWRM:</td>
</tr>
<tr>
<td></td>
<td>6.5.2 Proportion of transboundary basin area with an operational arrangement for water cooperation</td>
<td>– Enabling environment: this includes the policies, laws, plans and strategies which create the ‘enabling environment’ for IWRM.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>– Institutions and participation: includes the range and roles of political, social, economic and administrative institutions that help to support the implementation of IWRM.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>– Management Instruments: The tools and activities that enable decision-makers and users to make rational and informed choices between alternative actions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>– Financing: Budgeting and financing made available and used for water resources development and management from various sources.”</td>
</tr>
</tbody>
</table>

Source (UNGA, 2015; UNSD, 2021: 2)

1.6.2 Property rights in water IWRM and the SDGs

In this section I argue that Agenda 2030 is an enabling environment for the development of quasi-property rights in water, since the concepts of water as an economic good and IWRM are embedded in target 6.5.

1.6.2.1 Property rights Integrated Water Resources Management

From an economic point of view, inefficiency in water use is one of the fundamental problems (Ditwiler, 1975: 669). In finding solutions to this problem, property rights[12] are seen as the answer (Garrick et al., 2020). The idea behind this is that “[c]lear property

---

[12] “Lawyers and economists adopt different definitions to property rights, they share a common idea that a property right must have ‘social recognition, enforcement and protection of the holder’s powers given under the right’” (Jiang, 2018: 24).
rights define allocation rules for who may use how much water, in what ways, at what time and place. By clarifying expectations, these rules can help reduce conflicts … [and] provide incentives for efficient use and water conservation” (Meinzen-Dick, 2014: 26).

IWRM supports the development of strong enforceable rights, as a report of the Global Water Partnership (2000: 59) reads: “Stable and secure water rights should be pursued because they are an important incentive for private investment…. IWRM has proven to be very influential, and has been internationally accepted as “the way forward for efficient, equitable and sustainable development and management of the world’s limited water resources and for coping with conflicting demands” (UN-Water, 2008: 1).

In the past decades, most states have enacted comprehensive water law in line with the notion of IWRM (Harou et al., 2009; Hodgson, 2006). A common feature of the water laws is the establishment of clearly defined rights to use water (water rights) (Dellapenna & Gupta, 2021; Giordano & Shah, 2014), together with the introduction of water allocation instruments which aim at the optimal allocation and sustainable use of the valuable water resources. As stated by the OECD (2015: 1): “[w]ell-designed allocation regimes contribute to multiple policy objectives: economic efficiency, by allocating resources to higher value uses.” The ‘strength’ of water rights are thus seen as proxy of efficiency, in which the development of secure (tradable) property rights supported by the rule of law is the ultimate goal (Dellapenna, 2005; Holden & Thobani, 1995; Moran, 2003).

1.6.2.2 Property rights and the Sustainable Development Goals

There are three challenges with the SDGs in relation to water property rights. First, the problem with the 2030 Agenda is that it recognises and supports the principle of water as an economic good as part of IWRM through target 6.5, and thus supports the development of clearly defined water rights which may imply quasi-property rights in water. Target 6.5 reads: 'By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate' (UNGA, 2015). Water has an economic value, which supports the continuous search for ‘efficient’ or ‘optimal’ allocation of water. Although there is a focus on access to water and sanitation, other issues of access and allocation are scarcely covered by the targets.

The second problem of IWRM is that it focuses largely on optimal and sustainable allocation of water, and less on water reallocation (Nel et al., 2022). In discussing IWRM, there is little understanding on how property rights affect water allocation and water reallocation. Water cannot be governed in an integrative way when actors hold property rights over water. Scenario builders on water ignore the existence of water ‘property’ rights.
Chapter 1

The third problem is that IWRM has no regard for the challenges that the development of quasi-property rights poses to water allocations. The development of quasi-property rights in water as an (in)direct consequence of policy instruments that are developed in accordance with international policy principles, including IWRM and water as an economic good, are not only poorly understood but also remains largely underexposed. A good understanding of the consequences is not only relevant for implementing the SDGs, but for all water related policies, from the local to the global level, especially since IWRM remain very influential in the development of water policy and legislation today.

1.6.3 Inferences
This brief review of international policy shows that the international community’s response to shared concern over water scarcity has led to the idea that water should be used productively, with a focus on efficiency and optimal allocation, striving for the highest value of water use. This is justified from the perspective that water is an economic good, a rhetoric which was and continues to be supported by the global community. Although not directly mentioned, it is this ‘efficiency’ and ‘optimal allocation’ thinking underlying the development of stable, secure and enforceable water rights which may imply quasi-property rights in water. This thesis aims to understand how ‘property’ rights in water come about, and whether these support or undermine the efforts of states to allocate and reallocate water

1.7 Structure of thesis
Building on this chapter’s articulation of the problems, gaps in knowledge, and questions, chapter 2 discusses the methods applied in this thesis. Chapter 3 discusses the literature on property rights in water and water ownership and identifies the gaps in knowledge. The five following chapters discuss the findings from the empirical research, including an inventory of (i) water ownership in 60 countries and policy instruments (see Chapter 4), the organisation of water property rights through (ii) policy instruments in 47 countries (see Chapter 5) and (iii) investor-state contracts of 80 contracts (see Chapter 6). Chapters 7 and 8 discuss the findings from the research on two case studies in India and South Africa, and discusses the organisation of property rights in practice and how these rights affect water allocation and water reallocation. Chapter 9 synthesizes the analysis, integrates the results of both case studies, draws conclusions of the research, and provides policy recommendations on designing permits and contracts.