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Making agro-export entrepreneurs out of *Campesinos*: the role of water policy reform, agricultural development initiatives, and the specter of climate change in reshaping agricultural systems in Piura, Peru

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Abstract
To increase agricultural exports across the Global South, countries are seeking to transform agrarian landscapes and the nature of campesino or smallholder agriculture. These agricultural reforms, however, do not exist in isolation. They work in conjunction with water policy reform to reshape agricultural systems and the people who manage these landscapes. While there has been significant research on agrarian change under neoliberal reform, few scholars have conducted empirical studies that examine how agricultural policy leverages water policy reform to generate changes across agricultural landscapes. Drawing on the case study of the Piura River basin in Northern Peru, this paper first explores how the IWRM inspired 2009 Water Resources Law furthers the state's agricultural development priorities by shifting water toward agro-export production. Secondly, this study demonstrates how climate change is being discursively mobilized as an emerging driver of water scarcity to legitimize these water reallocations. Thirdly, this case highlights how these water reallocations work in concert with the reinstatement of targeted agricultural support programs that seek to transform smallholder farmers into "agro-export entrepreneurs" but with meaningful exclusions. This study contributes to the limited scholarship on the 2009 Water Resources Law in Peru and also raises broader questions regarding how IWRM water management, climate change adaptation discourse, and agricultural development policy collectively promote the globalization of smallholder agriculture.

Keywords Climate change adaptation · Agricultural development · Water governance · Peru

Abbreviations

AGROIDEAS	Compensation for competitiveness program
ALA	Local water authorities
ANA	National water authority
Ha	Hectare
IWRM	Integrated water resource management
MINAGRI	Ministry of agriculture
NGO	Non-Governmental organization
PECP	Special project Chira-Piura
WEAP	Water evaluation and planning

Introduction

The small room in the municipality building of La Matanza, Peru is packed. Farmers seated in blue plastic chairs listen quietly as a parade of local politicians, government agronomists, and non-governmental organization (NGO) functionaries promote the newest agricultural initiative. This program supports the formation of small agricultural cooperatives in northern Peru with a blend of governmental and NGO financial and technical assistance. The officials seated on the stage are encouraging these farmers, who currently grow flood-irrigated rice or other crops for local or national markets, to become "entrepreneurs" engaged in high value global commodity chains such as organic banana, fair-trade coffee, mango, and cacao. As the speeches end, farmers begin asking questions: What are the requirements? What are the expected benefits? How will they access loans to fund the transition? The farmers are clearly wary; some by the debt that they would need to take on and others by the

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government-issued land titles and water licenses that are required.

This program and others like it reflect the newest efforts of countries across the Global South to transform agrarian landscapes and the nature of *campesino* or smallholder farmer production by promoting agro-export production (Akram-Lodhi and Kay 2009). These agricultural reforms, however, do not exist in isolation. They work in conjunction with water policy reform and broader economic development goals to reshape agricultural systems, and perhaps most importantly, the people who manage these landscapes. While there has been significant research on agrarian change under neoliberalism (McMichael 2006; Kay 2008; Akram-Lodhi and Kay 2009), few scholars have conducted empirical studies that examine how agricultural policy leverages water policy reform to generate changes across agricultural landscapes.

Additionally, this study goes further, by examining how climate change and water scarcity discourses are mobilized to legitimize state efforts to reallocate water and reshape smallholder agricultural production. The discursive mobilization of climate change as a driver of water scarcity is particularly important to study in light of the emerging mandates for state institutions to materially and discursively integrate climate change considerations into their actions.

This discussion draws on the salient case of Peru, which faces serious water resource challenges in its expanding agricultural sector, and, in 2009, passed a water law based on the principles of Integrated Water Resource Management (IWRM). IWRM is a water management paradigm that facilitates cross-sectorial water management with an emphasis on public participation, conducted primarily at the river basin scale. Increasingly, this model has been exported to the Global South (Molle 2009). By adopting the IWRM model, countries imbue water policy reform with a sense of scientific legitimacy (Molle 2009) and are able to attract bilateral and multilateral funding (Mollinga and Bolding 2004).

To examine the linkages between IWRM-based water reform, agricultural development policy and climate change discourse in the Piura River basin, I draw on political ecology as an orienting conceptual framework. Political ecology draws attention to the power relations that shape complex nature-society relationships, particularly the forms of access and control over resources and its implications for livelihoods (Watts 2000; Robbins 2004). Within this study, political ecology lends an analytical focus on the materiality of agricultural livelihoods and water flows, the political economy underpinning Peruvian agricultural development policy, and the agency of farmers in navigating the changing landscape of agricultural and water policy.

This research asks two central questions: (1) How does the 2009 Water Resources Law in Peru work in conjunction with agricultural development initiatives to promote or suppress particular agricultural land uses? and (2) What discursive tools are mobilized by state actors to legitimize this agricultural transformation? This article brings scholarship on the changing role of the state in water management and agricultural development into conversation with critical literature on climate change. In doing so, I demonstrate how (1) the 2009 Water Resources Law through its creation of a River Basin Council has added legitimacy to the reallocation of water to support agro-export production, (2) climate change is discursively used by state actors to legitimize this transformation, and (3) this water policy reform works in unison with agricultural development initiatives to reorient smallholder agricultural production toward global commodity chains.

The changing role of the state in the water and agricultural sector

Latin America has been a pioneering site for neoliberal reform. Within the region, the 1980s debt crisis led to structural adjustment programs, neoliberal reforms, and the so-called "Washington Consensus." The neoliberal reforms that swept across the region sought to drive economic growth through the unfettered efficiency of free markets and decreased regulation (Friedman 1963). States across Latin America dismantled their respective agrarian reforms and retreated in certain regulatory spheres (Kay 2008). This *deregulation,* however, is more accurately characterized as *reregulation* of the agricultural and water sectors where the state creates policies the support market-oriented approaches to agricultural development and water management. This market-oriented regulatory transformation has considerable "variegation" across countries and economic spheres (Jonas and Bridge 2003; Snyder et al. 2001; Peck and Theodore 2007; Renner et al. 2010). Peru, as a salient case of sustained reforms that encourage globalization and market-oriented agricultural development, is used to ground the discussion of the changing role of the state in the agricultural and water sectors.

Agricultural sector

Neoliberal reforms can affect the agricultural sector in a number of ways: the privatization of communal land, agricultural production oriented toward globalized commodity markets, the lifting of trade tariffs on agricultural products, and the withdrawal of state subsidies, credit, marketing support, and technical assistance (Liverman and Vilas 2006). These reforms tended to benefit agribusiness and capitalists with few gains for smallholder farmers (Rubio 2003). As summarized by Kay (2008), neoliberal globalization creates 'agriculture of two velocities' as smallholders continue to

sell into the domestic market while being outcompeted by cheap imported food, and capitalist agriculture expands rapidly by participating in the export market (p. 918). The role of smallholder farmers in market-based agricultural reform, however, is more complex as peasant farmers increasingly engage in global commodity chains, wage labor, and/or forge transnational agrarian movements to contest changes (Kay 2008; McMichael 2006).

In Peru, the agricultural sector was subject to sweeping market-based reforms under the regime of Alberto Fujimori (1990–2000). Under the neoliberal reforms of the *Fujimorato,* price controls were abolished, the state agencies that commercialized agricultural products were dismantled, agrarian labor contracts were made flexible and exempted from taxation, and the Agrarian Bank (*Banco Agrario)* was closed (Crabtree 2002). Tariffs (with some exceptions) were lowered in order to make domestic agricultural production more efficient and promote export-led agriculture (Crabtree 2002).

Neoliberal reforms are ongoing. In Peru, while the core reforms that privatized land and opened the agricultural sector to international investment occurred in the 1990s, reforms in the agricultural sector are continuing to evolve. The Peruvian government has set the ambitious development goal of positioning Peru as the largest exporter of agricultural commodities on the Pacific coast of South America (MINAGRI 2008). This goal is following more than twenty years of growth in the agro-export sector within Peru, which was valued at $5.55 billion in 2016 as compared to $60 million in 1990 (USDA 2010; ADEX 2016). The net value of Peru's agro- export products increased by 14% per year from 2002 to 2011, the greatest rate of growth in South America (Cheng and Pintado 2015). While the private sector has driven this development, the state continues to create the conditions for this expansion via the sale of cheap untilled land (*tierras eriazas)*, public–private irrigation infrastructure development, and preferential groundwater and surface water license allotment (Mitchell 2014).

Water sector

Water is a highly contested and inherently political resource (Jensen 2013). One of the key policy prescriptions promoted globally by multilateral funders and international water experts in recent years has been water policy reforms following the principles of Integrated Water Resources Management (IWRM) (Conca 2006). Despite ample literature arguing that IWRM policy reform often has mixed outcomes or simply does not work (Jeffrey and Gearey 2006; Mollinga and Bolding 2004; Molle 2008; Blomquist and Schlager 2005), IWRM, as a powerful discursive tool for reform, continues to reshape water management institutions across river basins in the Global South (Molle 2008).

Since the 1990s, IWRM has become *the* language of water policy reform internationally (Conca 2006). IWRM, as a formalized framework, emerged from the Dublin Principles that were ratified during the 1992 International Conference on Water and the Environment. It was further cemented as a global framework when the European Union used IWRM as the cornerstone of its Water Framework Directive. IWRM, as a concept, underlines the importance of public participation, highlights complex human-nature linkages, and calls for cross-sectoral water management. It is most commonly defined as:

> A process which promotes the coordinated 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. (GWP-TAC 2000, p. 22)

IWRM depoliticizes natural resource governance by emphasizing consensus and integration (Blomquist and Schlager 2005; Medema et al. 2008). The public participation, which is at the core of IWRM philosophy, could be viewed as a referendum on technocratic approaches (Biswas 2004), but in many places, IWRM has led to a re-entrenchment of the expert knowledge base (Molle 2009). Additionally, the focus on collaboration, consensus, and integration often does not sufficiently appreciate unequal power among users and managers, long-standing conflicts, and differentiated resource access among water users and sectorial actors (Blomquist and Schlager 2005; Warner et al. 2008; Saravanan et al. 2009).

Yet, to what extent do IWRM reforms generate market-based reforms in the water sector? The model states that water is an "economic good" and promotes the decentralization of decision-making to the river-basin scale (Ward 2013), but IWRM does not necessarily equate to neoliberal water policy reform. Rather, the apolitical, vague principles of IWRM enable the state, private sector, cooperation agencies, and development banks to hijack water policy reform, using IWRM as "coveted discursive currency" to legitimize and promote their respective macroeconomic agendas and interventions (Molle 2008, p. 134; Giordano and Shah 2014). IWRM policy reform provides an aperture for water managers to re-regulate water resources, and in doing so, to re-shape agricultural landscapes.

Within Peru, the process of privatizing water has proven to be challenging and contested due to the socio-cultural values associated with water (de Vos et al. 2006; Boelens and Zwarteveen 2005). In Peru, water management norms and practices are highly diverse between autonomous systems with plural and something overlapping normative and organizational frameworks shaping collective actions, decision making, and conflict resolution (Boelens

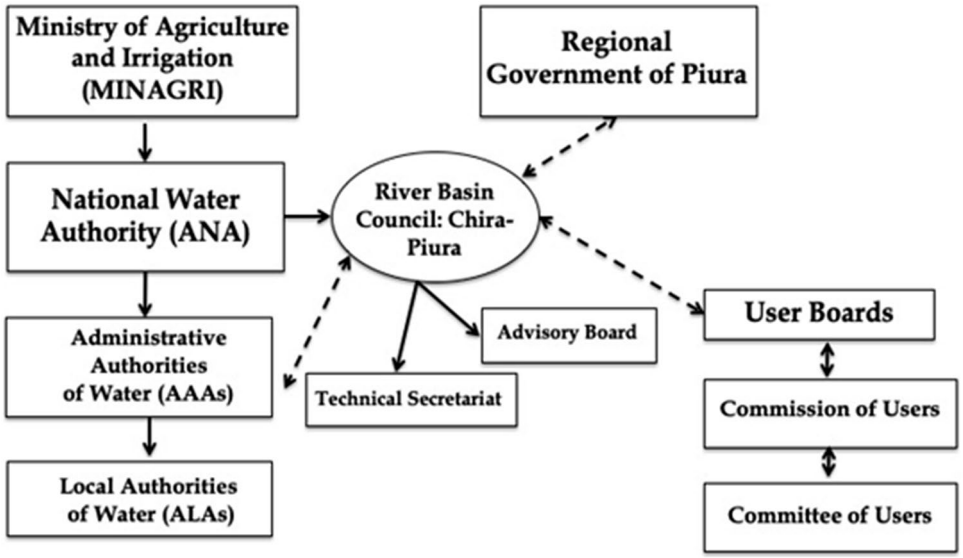

Fig. 1 Organizational Chart of water management organizations in Piura, Peru. Dashed lines signify membership in the River Basin Council and solid lines signify that organizations are subordinate to the higher-level organization. The National Authority of Water (ANA) has decentralized offices, Administrative Water Authorities (AAA) and Local Water Authorities (ALA), that distribute and manage water rights. The River Basin Council is situated within ANA and presided over by the regional government. In addition to the state water management entities, Water Users' Associations (*Juntas de Usuarios)* and Irrigation Commissions (*Comisiones de Usuarios)* are non-profit, non-state collective entities financed through water fees and responsible for certain regulatory tasks. Board members of the Irrigation Commissions are democratically elected and these organizations are powerful civil society actors. Water Users' Associations consist of multiple Irrigation Commissions that are grouped by shared infrastructure. Irrigation Commissions are responsible for cleaning and maintaining irrigation infrastructure

2009; Verzijl 2007; de Vos et al. 2006; Guevara-Gil 2010). Due to the "unruliness" of these irrigation systems, there have been many state-led efforts to reform them. In 1995, the Fujimori regime, with support and sponsorship from the International Monetary Fund (IMF) and World Bank, put forward a proposal to privatize and commodify water following the example of the 1981 Chilean Water Code (World Bank 1995). Similar efforts to export the "Chilean model" occurred across Latin America. However, within Peru, the proposal was met by broad, fierce, and sometimes violent resistance by Peruvian civil society (Oré and Rap 2009), and the law was never passed.

Following the failure to pass their own water law, the Fujimori administration began to dismantle and gut the water regulatory institutions created under the 1969 General Water Law. It was not until 2009 that a new Water Resource Law was ratified after considerable civil society mobilization and political turmoil. This new law reinserts the state into water management and recognizes indigenous and *campesino* block water rights that have been registered with the state. While the new law maintains water's status as a public good, it also considers water as an "economic good" (Oré and Rap 2009; Roa-García et al. 2015). How these two conceptions of water should be reconciled in practice, however, is hotly debated.

The 2009 Water Resources Law in Peru reflects the shifting role of the state in the regulation of the water sector. A key component of IWRM, as it has been applied in Peru, is the creation of a multi-stakeholder participatory platform within the river basin council. Despite some level of decentralization, the central government has retained control over Local Water Authorities (ALA) and river basin councils in Peru (Roa-García et al. 2015). Additionally, the central government via its National Water Authority (ANA) remains the central entity in water governance despite the rhetorical importance placed on the River Basin Councils (See Fig. 1).

The entanglement of IWRM policy reform, climate change, and water scarcity

IWRM policy reform provides an opening for water managers to reallocate water resources and, in doing so, to re-shape agricultural landscapes. In Peru, the 2009 Water Resources Law codified climate change adaptation into its overarching water management system by embedding the National Program for Climate Change Adaptation into the operations of the National Water Authority (Title V: Chapter 13, Law 29, 338). Climate change adaptation, as a material and discursive practice, can take multiple forms in IWRM institutions such as the integration of downscaled climate models

into planning processes, operations/systems investment to address climate change vulnerability, installation of early-warning systems, or capacity building among managers and users (CapNet: UNDP 2009). By integrating an adaptation mandate into water management organizations, these organizations are given the authority to conduct resource allocation and regulation based on current and future climate change impacts (Eriksen et al. 2015).

Climate change, however, does not occur in a vacuum (Eakin and Lemos 2006). It is entangled in larger political projects that seek to reshape land and water use in order to support state agricultural development priorities such as agro-export growth, often at the expense of less powerful agricultural water users. While climate change poises material challenges to the future of Peru's water resources, climate change is also a powerful naturalizing discourse mobilized by state actors to legitimize interventions into the water and agricultural sectors (Lynch 2012, 2013; Mehta 2013; Mehta et al. 2019; Swyngedouw 2006). Within Peru and elsewhere, climate change discourse evokes the rising specter of water scarcity, sparking governance responses such as IWRM policy reform, economic solutions (i.e. water pricing), and technical interventions that increase water use "efficiency" (Lynch 2012, 2013).

By evoking climate change as *the* driver of water scarcity, state actors obscure the long- standing inequalities in water access (Swynedouw 2006). The techno-scientific discourse of climate change evokes dystopian visions of the future and establishes the "trusteeship" of the state over farmers who lack both the technical capacity to predict future climate change impacts and the financial, technical or social capital to respond to the looming climate crisis (Camargo and Ojeda 2017; Paprocki 2018a, b; Weisser et al. 2013). Thus more powerful actors are able to legitimize interventions, render inequalities ahistorical, and subjugate alternative water ontologies by mobilizing the specter of climate change (Lynch 2012, 2013; Mehta 2013, 2019; Swyngedouw 2006). The case of Piura, Peru demonstrates how climate change discourse is used by state water management entities to sidestep entrenched inequities in water access while further legitimizing reforms aimed at expanding agro-export production.

Methods

In order to explore how the 2009 Water Resources Law is reshaping agricultural landscapes in Piura, Peru, I conducted semi-structured qualitative interviews with key institutional actors within the agricultural sector (n = 40). Specifically, I interviewed representatives from each of the valley-specific Water Users' Associations (*Juntas de Usuarios,* n = 4), irrigation commissions (*Comisiones de Usuarios*, n = 15), agricultural associations/cooperatives (n = 7), *comunidades campesinas*[1] (n = 2), civil society groups (n = 6), National Water Authority/River Basin Council (n = 2), and the regional and national agricultural agencies (n = 4) (See Fig. 1). These key informants were chosen because they represent key civil society, governmental, and private sector actors that bring important insights into agricultural development policy, the implementation of water policy reform, and/or its implications for agricultural land use. The perspective of smallholder farmers was captured through interviews with the leaders of *comunidades campesinas,* civil society organizations, irrigation commissions, and agricultural associations, which are elected by their respective *campesino* constituencies. These informants were identified and recruited through snowball sampling (Biernacki and Waldorf 1981).

I employed iterative qualitative content analysis (Julien 2008) using a priori themes that were clustered around the orienting concepts of political ecology (i.e. materiality of agricultural livelihoods and water flows, political economy of development, and agency of water users).

Themes under these three categories were established from existing scholarship on agricultural land use change and water policy reform in Peru. These themes included: role of River Basin Council, master water plan outcomes, crop conversion initiatives, social conflict, agro-export cultivation, water reallocation, water scarcity, land tenure, state agricultural support, etc. These themes were refined iteratively throughout the analysis as interviews clustered around particular issues. Thematic coding of the interview transcripts was conducted using QSR International's NVivo 10 software (QSR International 2014).

Interview data was triangulated and contextualized through content analysis of legal documents of relevant water and agricultural policies, the official notes of water management organization meetings, water allocation data, and river basin planning documents. I also utilized participant observation of River Basin Council meetings (n = 8), *campesino* events (n = 3), and NGO forums (n = 2) to better understand institutional dynamics.

The case study: the Piura River basin, Peru

While many countries in Latin America and internationally are seeking to increase agro- export, Peru is a salient case study for examining the confluence of water and agricultural

[1] Comunidades Campesinas are legally recognized in Article 89 of the Peruvian constitution. Comunidades campesinas tend to reside in the coastal and Andean region while comunidades nativas are located in the Amazonian region of the country. Both groups have communal territorial rights over their land.

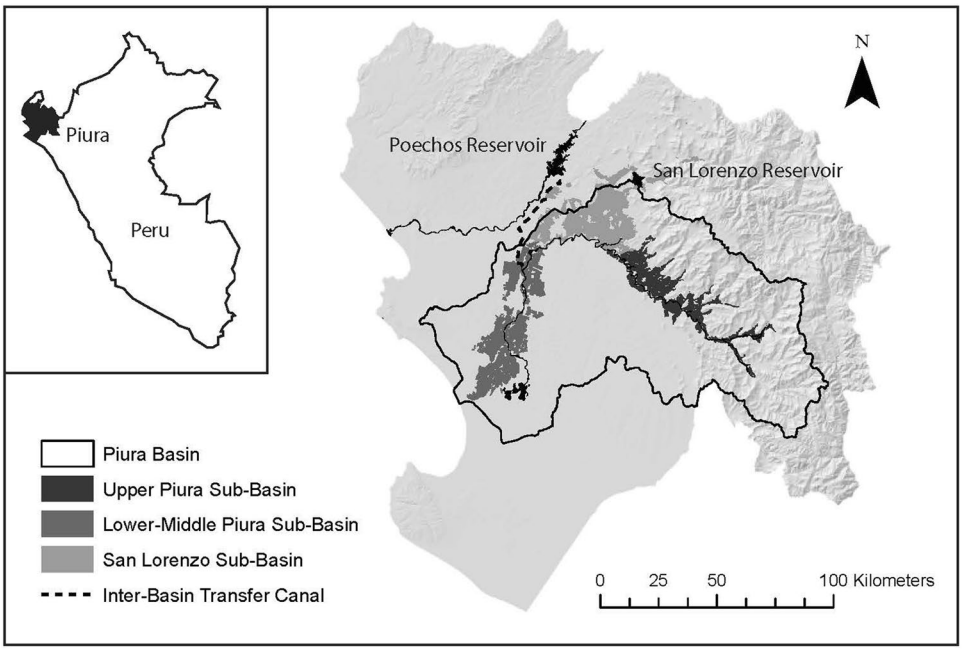

Fig. 2 Map of the Piura river sub-basins, reservoirs, and Chira-Piura inter-basin water transfer

policy reform in the context of climate change adaptation. Peru is the most recent of many countries who has engaged in IWRM-based reform globally. Furthermore, Peru has a highly diverse, rapidly growing agricultural sector with a patchwork of agribusiness, subsistence farming, and small-scale cash cropping. Peru has also positioned itself as a regional leader in addressing climate change. Reflecting this, it hosted the United Nations Framework Convention on Climate Change Conference of Parties 20 (COP20) and has integrated adaptation mandates into its government bodies particularly in the water sector where Peru is most vulnerable to climate change impacts (Edwards and Roberts 2015).

The Piura River basin is located on the Pacific coast of northern Peru (See Fig. 2) and was chosen as one of six basins to pilot the implementation of the 2009 Water Resources Law. It was chosen due to its substantial water infrastructure, large cultivable land area, and high number of water conflicts (Inter-American Development Bank 2009). The Piura River basin is managed conjunctively with the neighboring Chira River basin. These basins are linked through a 54 km long inter-basin transfer canal that brings irrigation water stored in the Poechos reservoir to Piura River (CRP:C-P 2014, 2015; See Fig. 2). The water resources of the Piura River Basin are managed through a constellation of water management institutions with technical advisement from the newly created Chira-Piura River Basin Council (See Fig. 1).

Following the finalization of the Poechos reservoir and neo-liberal reforms of the 1990s, the agricultural frontier of the Piura Region expanded by 95,000 hectares between 1986 and 2014 (MINAGRI 2014). These regional trends represent an increasing orientation toward agro-export production, though changes in agricultural land use are differentiated across the basin. The differentiated agricultural land use across the river basin provides crucial context for how water is being reallocated away from downstream smallholder farmers producing rice and other crops for the domestic market toward agri-business and smallholder agro-export producers in the middle and upper basin.

The Piura River basin is administratively divided by Water Users' Association: Upper Piura, San Lorenzo, and Lower-Middle Piura (See Fig. 2). The upper basin is located in the foothills of the Andes and has the most informal water users due to the limited presence of state water management entities and strong traditional communal irrigation management practices. Agricultural production in the upper basin is diverse, but largely consists for small-holder farmers engaged in rice (3819 ha), corn (2721 ha) or beans (1168 ha) production destined for local or regional markets or mango (3352 ha), banana (1399 ha), or cacao (811 ha) production for export (CRH:C-P 2014). This area has been subject to state efforts to increase smallholder agro-export production.

Further down the basin, San Lorenzo has its own reservoir that was developed by the Peruvian government with World Bank financing in the 1950s. This project was a testing ground for the Peruvian Agrarian Reform (Lynch 2019) and is largely dedicated to smallholder cultivation of limes (5176 ha) and mangos (16,634 ha) for export (Revesz and Oliden 2012; Lynch 2019; CRH:C-P 2014). Cultivation in San Lorenzo is fairly isolated from water allocation changes across the basin because it has its own fully-allotted and separately managed reservoir.

The middle-lower section of the basin is the most dynamic area of agricultural expansion. Since 2006, there has been a 47% growth (from 19,140 to 28,210 ha) in the land irrigated in this area of the river (Junta de Usuario: Medio-Bajo Piura 2011, 2014). This expansion has been driven by international and Peruvian agro-business investment in large-scale table grape vineyards from 2002 onward that use both surface water as well as poorly regulated groundwater resources (ANA 2012; CRH:C-P 2014, 2015, 2016). While agribusiness is expanding the agricultural frontier in this region, many smallholder farmers are also shifting toward agro-export crop such as mango, banana, and lime for export.

The lower section of the Piura River basin was historically a famous cotton growing region but is now principally dedicated to smallholder production of rice for the domestic market. This section of river basin has extensive irrigation and drainage infrastructure because of its historical significance before and during the Agrarian Reform. The *comunidad campesina* San Juan Bautista de Catacoas in the lower basin is nationally emblematic of the struggle for land rights and enjoyed substantial political power during the 1970s when the state made large investments in agricultural infrastructure (Cruzado Silveri 2001). Farmers here are largely engaged in small-scale rice production (8011 ha) in rotation with beans (1574 ha) and corn (5703 ha) for the domestic market (CRH:C-P 2014). The land use here is intensive with two harvests a year. More recently, this area has been the focus of state efforts to decrease water use.

The River Basin Council, its Master Water Plan, and the war on rice

In this section, I will introduce how Peru's 2009 Water Resources Law affected water governance in the Piura River basin and more specifically the creation of the Master Water Plan, which establishes basin-wide crop allocations for a given year.

The 2009 Water Resources Law and the new Chira-Piura River basin council

The 2009 Water Resources Law, drawing on IWRM principles, created the River Basin Council that is composed of a technical secretariat and a multi-sectorial stakeholder council. In order to build the capacity of its river basin councils, Peru received $27.35 million USD to implement "participatory IWRM in selected pilot river basins," including the Chira-Piura (Inter-American Development Bank 2009, p. 5). This project funded the creation of the Chira-Piura River Basin Council with budget lines for IWRM capacity-building trainings for water managers, the development of multi-stakeholder water resources plans, and hydrological decision-making tools such as the Water Evaluation and Planning (WEAP) water resources model (Inter-American Development Bank 2009).

The Master Water Plan

Among the River Basin Council's responsibilities, the technical advisement and development of the Master Water Plan (*Plan de Aprovechamiento de las Disponibilidades Hídricas*) has the most direct impact on water allocation and agricultural land use. The Master Water Plan, which was formerly known as the Crop and Irrigation Plan, was initiated during the Agrarian Reform in the late 1960s when the central government heavily intervened in the agrarian sector. The Crop and Irrigation Plan was generated first by the Ministry of Agriculture and then by a coordination committee that consisted of ALA and the Water Users' Association following decentralization in 1993. This plan was renamed following the 2009 water policy reform to reflect the inclusion of other water users such as domestic and industrial water users into water resource planning.

Despite this long history, the Master Water Plan has newfound relevancy and increased enforcement under the institutional reforms brought by the 2009 Water Resources Law. Before the River Basin Council, a Coordination Committee advised the development of the Master Crop Plan, but the River Basin Council via its technical secretariat brings added scientific legitimacy to this advisory role. The River Basin Council's technical secretariat is responsible for the hydrological modeling of the water balance, imbuing the Master Water Plan with an added sense of scientific legitimacy for implementation. One Water Users' Association president explains:

> [Since the 2009 Water Resources Law] it has gotten better, and now we want to do what they tell us to and sow what they tell us to sow. Why? Because before we thought about it less actively (…) We didn't have information [the water balance] so how could we plan? It was hard to regularize it because there were people that didn't understand…the River Basin Council has given us information to help explain issues. (Interview by Author, 7/24/2015)

In order to create the Master Water Plan, the River Basin Council uses WEAP and water level data from reservoirs and tributaries to forecast the annual water balance based on water supply, multi-sectorial demand, and climate variability and uncertainty. Once the water balance for the year has been forecasted, the River Basin Council advises Local Water Authorities (ALA), which are the local representative for the National Water Authority (See Fig. 1). The ALA, which has the ultimate authority over water allocation, then

develops and finalizes the Master Plan putting forward an allocation for each area of the basin establishing the maximum hectares for each crop that can be grown according to water availability.

While the River Basin Council's Master Water Plan approach relies on the scientific legitimacy of the River Basin Council and its WEAP modeling, the crop allocation process extends beyond the scientific into the socio-political. Following the initial allocation, a series of working group meetings are held where the crop allocations are negotiated by elected representatives from the valley-specific Water Users' Association as well as water managers from the Special Project Chira- Piura (PECP) that operates major irrigation infrastructure, ALAs, and the River Basin Council. Water Users' Associations enter crop allocation negotiations with the stated "sowing intentions" of the farmers in their valley based on water rights. These negotiations seek to reconcile these "sowing intentions" with the water availability forecast as modeled by the technical secretariat. Final decisions are made by the ALAs following negotiations.

The war on rice

Within the crop allocation negotiation, the key point of contention is how much rice acreage, particularly in the dry season, will be permitted in each Irrigation Commission. Reducing the area of rice that is cultivated during the dry seasons has been one of the key goals for the River Basin Council in order to decrease water use. Rice has been the flagship crop for smallholder farmers in Piura since the 1980s when international cotton prices plummeted. Rice production is widely viewed as the least risky short-season crop by producers:

> [Rice] is the only crop that is profitable for farmers. In the case of corn, beans, and cotton they aren't because of the diseases and expensive inputs…With rice, it is something that can sustain the family. (Interview by Author, Irrigation Commission President, 7/31/2015)

Rice production across Piura, however, is done through flood irrigation, requiring 13,000 m^3/ha of water per hectare annually, which is substantially more than other short-season crops such as corn or beans (MINAGRI n.d.).

The Master Plan is a key institutional mechanism that the River Basin Council and ALA has used to constrain the amount of land sown with rice. While historically there has been annual variation in the Master Water Plan based on water availability, overall there is a trend toward restricting cultivation in the lower basin. Since 1990, the total area under cultivation has contracted by 11%. Furthermore, water allocation during the dry season has decreased by 32% from 2007 to 2011 in the lower basin where the majority of smallholder rice production occurs (ANA 2012; CRHCP 2015). A representative from the River Basin Council discusses this process:

> In this plan (Master Water Plan) we negotiate the amount of crops year-to-year. What we look for is the area for each crop that can be produced in each valley. What we always say is, '*muchachos*, please, reduce the area of rice' but there is a tremendous resistance. The people don't want to. They don't want to change crops. (Interview by Author, 7/30/2015)

Ultimately, Water Users' Association and irrigation commissions are legally bound to enforce the crop allocation negotiated with the River Basin Council and authorized by ANA. If farmers do not pay water tariffs or sow the assigned crop for consecutive years, they can lose access to irrigation. Altogether, once the allocation is finalized across the basin among commissions, there is an internal allocation within irrigation commissions. Technical staff and elected officials then have to decide how to internally zone crops among their irrigators based on historical water licenses (vs. permits that are contingent on water availability), level of soil salinization, and cultivation of perennial crops. In examining the crop zoning process, it is essential to remember that crop zoning has major impacts on the income of farmers whose income will be substantially lower in years when they are not permitted to sow a second rice crop.

Social contestation of crop zoning

The pressure on farmers to conform to crop zoning is intense, and some communities have contested their loss of agency by blocking regionally-important roads. When an irrigation commission in the middle Piura River basin banned all dry season rice production, farmers erected a highway blockade until the order was rescinded (Interview by Author, Irrigation Commission Representative, 7/31/2015). Particularly in areas like the middle section of the Piura river basin where agribusiness have greatly expanded the agricultural frontier, smallholder farming communities are deeply skeptical of dry season water restrictions under the Master Water Plan and the arising social conflict here reflects their resistance to this slow dispossession.

This type of social conflict over crop zoning is not widespread, but many irrigation commission officials mentioned the possibility of social conflict if the Master Water Plan further restricts crop allotments. A representative of an agricultural cooperative explains:

> When there is finally a dry, dry, dry year you will see a social conflict, because those small producers are not going to be able to sow crops…When nature is helping, there is no problem, but when there is a year that is very dry then there are going to be enormous conse-

quences. (Interview by Author, Agricultural Cooperative Representative, 6/20/2015)

The looming specter of future water scarcity is grounded in two major forces that are constraining water availability in the model used to develop the Master Water Plan: climate change and reservoir sedimentation in Poechos reservoir due to extreme rainfall events.

Climate change, "water scarcity" and the Master Water Plan

In this section, we will examine the material and discursive sources of water scarcity in Piura, and how these discourses are being mobilized to reallocate water rather than decrease water usage. The Water Resources Management Plan for Piura, which was produced by the River Basin Council, includes an extensive climate change modeling section where future climate change impacts for the river basin are produced using PROCLIM, a climate downscaling software (ANA 2012). In this important planning document, water managers predict that under climate change rain events will occur in more intense bursts in Piura causing flooding, erosion, and sedimentation in irrigation infrastructure (ANA 2012). Additionally, drought risk is expected to rise due to increased evapotranspiration during the growing season, particularly in the lower portion of the basin (ANA 2012).

In addition to these projected climate change impacts, Piura is acutely vulnerable to climatic variability. The 1982/1983, 1996/1997, and 2016/2017 El Niño events led to severe flooding, causing millions in damage. While the relationship between the intensity and frequency of El Niño events and climate change remains unclear in the climate change literature, El Niño is discursively framed as a climate change impact by the regional government of Piura. Within the Piura Regional Strategy for Climate Change Adaptation, El Niño is woven through the document as evidence of how Piura has already dealt with climate change (i.e. anticipatory drainage canal cleaning and post-ENSO event reconstruction) and as the key factor in identifying and addressing social vulnerability to climate change (Gobierno Regional de Piura 2011). Climate variability (i.e. El Niño) and climate change were discussed interchangeably by many of the institutional interviewees.

Beyond climate change, water managers point to the sedimentation of the Poechos reservoir as a key constraint since water stored in Poechos covers over 96% of water licenses in middle-lower Piura (CRP:C-P 2014, 2015). This reservoir, which stores and regulates water for dry season irrigation in the middle and lower portion of basin, is vulnerable to accelerated sedimentation associated with El Niño. The head of the River Basin Council's technical secretariat explains the impact of this sedimentation:

> In addition to climate change, we are concerned about the impending [2016/2017] El Niño phenomenon. In a normal year, we estimate that 5,000-6,000 cubic meters of sediment enter the dam. In a year with El Niño, 70,000 cubic meter of sediment enters…With this reduction in storage capacity, we have to reduce the cultivated area or not sow rice. (Interview by Author, 7/30/2015)

The sedimentation of this reservoir is occurring at rates much higher than initially estimated when it was installed in 1978 with a capacity of 789 MMC. As of 2009, the reservoir had lost nearly half of its capacity, with 441.2 MMC of storage remaining (ANA 2012). The two strongest El Niño events 1982/83 and 1997/98, which delivered approximately 20 times the normal rainfall to the basin, are estimated to be responsible for delivering 40% of the total sediment that has settled behind the dam (Govers et al. 2008). Within the middle and lower basin, water management organization representatives were universally alarmed about the growing sedimentation of the reservoir:

> The reservoir is sedimented and there isn't more water to give. Poechos has been sedimenting for 40 years and has lost 50% of its capacity. We have less water. We feel it in times of scarcity, not during the rainy season. It [Poechos] functions as a regulator… 55% of the capacity is lost, imagine that. Because of this, agro- business is installing wells as a contingency for a dry year. The dry years can happen due to climate change. (Interview by Author, 7/9/2016)

While there are material declines in water availability in Piura, the focus on climate change and reduced water storage for declining downstream water sidesteps the increasing water demand poised by increased agro-export production. The reduction in water allocation chronicled above were not replicated for producers of export-oriented crops such as mango and grape. The allotment for these crops in the Master Water Plan has *increased* in recent years. In fact, water allocation has been decreasing in all areas of the Piura River basin *except* the areas where agro-export crops are being produced by smallholder farmers or agrobusiness.

Exemplifying this trend, the irrigation commission in middle-lower Piura that has seen the greatest expansion in its agricultural frontier by agribusiness was allotted 72% more water by ALA from 2007 to 2011 (14,287 HM^3 to 24,560 HM^3). During this same period, ALA *decreased* the overall water allocation by 11% across all irrigation commissions in the middle-lower basin (424,093 HM^3 to 375,407 HM^3) and by 31% in the lowest section of the basin (215,026 HM^3 to 148,119 HM^3) (ANA 2012). In the upper basin where

smallholder and agribusiness agro-export production is growing; irrigation commissions have been allotted 77% more water from 2007 to 2011 (221,050 HM^3 to 390,871 HM^3) (ANA 2012).

This incongruity suggests that climate change and reservoir sedimentation are being discursively operationalized to shift water allocation toward agro-export agricultural production. Table grapes, which are the key crop expanding in the basin, are grown by large national and transnational agribusiness. The director of a non-profit research center reflected with frustration on this disconnect:

> Climate change adaptation here is as if there was a program to go to the moon. There is nothing more than the discourse and the rhetoric, as well as the concern about El Niño impacts, which is not a product of climate change, but is a phenomenon that has existed forever. But now, rhetorically everything is about climate change and we have to protect the rivers. But if you look behind the rhetoric, there is almost nothing. (Interview by Author, 7/1/2015)

The Master Water Plan does not operate in a political vacuum. The National Water Authority that oversees the River Basin Council is housed within the Ministry of Agriculture (MINAGRI) (See Fig. 2) and works synergistically with a suite of MINAGRI programs that seek to direct smallholder farmers into globally-oriented agricultural systems. Therefore, smallholder rice production in the lower basin is being constrained under the guise of growing water scarcity whilst agribusiness expands in the middle basin and MINAGRI programs incentivize the conversion of smallholder agricultural toward agro-export production in the middle and upper basin.

Examining how the MINAGRI agricultural development programs work in conjunction with the Master Water Plan provides crucial insight into the politics that have been infused into crop zoning.

Water policy as agricultural policy: making "agro-export entrepreneurs" out of campesinos

In this Section, 1 explore the agricultural programs stemming from the 2014 Agricultural Restructuring Law that work in conjunction with the Master Water Plan across the Piura River basin to re-orient agricultural production and water flows toward agro-export crops. On June 30th, 2015 the Peruvian Minister of Agriculture, Juan Manuel Benites, announced that 200,000 additional hectares would be dedicated to agro-exportation in Peru before 2019 (La Gestión 2016). This ambitious goal reflects the Peruvian state's vision of agricultural development. Much of this expansion will be driven by multinational agro-export capital; however, in recent years MINAGRI has devised programmatic interventions that explicitly synchronize with the Master Water Plan to re-orient smallholder agricultural production away from traditional short-season crops and toward agro-export production to further globalize the Peruvian agricultural sector. The Piura River basin reflects both of these dynamics.

In October 2014, the Peruvian Congress ratified the Productive Agriculture Restructuring Law (Ley 29,736; *Ley de Reconversión Productiva Agropecuaria*). This law seeks to facilitate the "voluntary transformation" of smallholder farming from traditional crops such as corn, coca, and rice to export-oriented crops such as banana and quinoa. In a workshop in Lambeyeque to introduce the new law (which was primarily attended by high-level regional government officials and agro-export business representatives), the Vice-Minister of Agriculture & Irrigation Development and Infrastructure, Jorge Montenegro Chavesta, described the socio-political dynamics that underpin this new law:

> Rice consumes a lot of water and when there is overproduction of this grain it has resulted in low prices, and from farmer's point of view the state is responsible for the situation, but the real culprits are the farmers themselves…We don't want a rain-fed farmer, we want a producer, an entrepreneur with a vision of development and to get this we need modern agriculture… What we are looking to do is convert rice to high profit crops such as citrus, grapes, asparagus, quinoa, avocado, and others. (2/16/2015)

In this same workshop, the Vice-Minister further stated that MINAGRI was able to employ two synergistic institutional mechanisms to generate this "entrepreneurial transformation": The Master Water Plan and the Compensation for Competitiveness Program (AGROIDEAS).

AGROIDEAS

AGROIDEAS supports agro-export oriented agricultural cooperatives and associations as a means to increase farmer income and meet national agro-export goals. This program works as a co-financing partner, offering cost sharing for three key purposes: (1) the start-up of agricultural organizations, (2) business management improvement, and (3) production technology improvement. Within Piura, there has been a surge in agricultural associations in the upper basin primarily for organic/fair trade mango, cacao, and banana.

The programs administered by AGROIDEAS, which support agricultural collectives, encourage farmers to activate their social networks to increase membership, therefore expanding and aggregating greater volumes for export. These cooperatives were created initially with financial, technical, and marketing support from international NGOs.

However, as Peru has ascended to the status of a "low middle income" country, these international funds have dwindled (AidData 2016). AGROIDEAS is now filling the void left by international donors by providing technical assistance and financial support.

The Agricultural Reconversion Program

Since the 2014 Productive Agriculture Restructuring Law, the Regional Direction of Agriculture has also been directly funding the reconversion of land. The Agricultural Reconversion Program is a cost share program that incentivizes the conversion of rice to exportable crops such as banana or quinoa. The Reconversion Program, like AGROIDEAS, facilitates access to state guaranteed credit for producers through the state agricultural bank to cover the remaining cost of conversion not covered by state support. This program also provides technical assistance and connects new producers with existing agricultural associations to assist with commercialization. In its first year, this program supported the conversion of 219 hectares (< 1% of total area) from rice to organic banana in the Piura River basin, providing approximately $8350 USD per hectare to rice producers to convert to banana. While this program has been heralded as a success by MINAGRI, interviewees had mixed feelings.

Within the lower basin, the Agricultural Reconversion Program worked with a number of irrigation commissions to convert rice production to quinoa. Quinoa was zoned into the Master Water Plan for the chosen commissions, technical assistance workshops were held for producers, and quinoa was planted. One irrigation commission representative reflects on the outcome of the program:

> In Piura, they created a production association of quinoa because quinoa was at 10-14 soles ($3-4 USD) a kilo. There was a lot of optimism and a lot of farmers sowed quinoa. When they entered the stage of production, the detail came out that there wasn't a way to process it, and they had to sell it for 4 soles a kilo [$1.20 USD]. Sadly, we don't have a state policy that is thoroughly planned, and they want to convert to other crops, but where will it go? Now not a single farmer will sow quinoa. (Interview by Author, 7/24/2015)

Many of the irrigation commission representatives in the lower basin relayed this same narrative, suggesting that the reconversion program has, in some cases, failed to appreciate the challenges of production in a coastal environment, processing, and commercialization, resulting in negative outcomes for farmers. Additionally, when quinoa is grown in warmer lowland areas such as Piura it requires substantial agro-chemicals, which presents commercialization challenges since the principal market for quinoa is health-conscious consumers in the Global North.

Reinstating state agricultural support for agro-export entrepreneurs

AGROIDEAS and the Agricultural Reconversion Program are two initiatives that partially reinstate the state-subsidized financial and technical assistance for small-holder farmers that was rescinded during the 1990 neoliberal reforms. However, these programs make this financial and technical assistance (i.e. state agricultural loans, subsidies, and technical advisors) contingent on the participation of smallholder farmers in agro-export markets.

This analysis reveals dueling processes in the Piura River basin. On one hand, the Master Water Plan reallocated water to the crops and areas engaged in agro-export production be it agribusiness or smallholder. On the other hand, agricultural reconversion programs work across the basin to explicitly convert production to agro-export crops among smallholders. The coordination of the Master Water Plan and these agricultural programs is explicitly coordinated as evidenced by the comments of Vice-Minister Montenegro who envisions these two mechanisms as the two key levers in transforming smallholder agriculture. Together these mechanisms work across the Piura River basin to shift water flows and increase net agro-export production.

Efforts to reduce water usage through conversion from short-season crops like rice to export-oriented crops, however, is contradictory. The shift away from rice may be rhetorically tied to reducing water use, but the reallocation of water toward export-oriented fruit is actually increasing water consumption within the basin, reducing downstream surface water flows and increasing dependence on groundwater pumping. To illustrate this point, grapes consume 15,500 m^3/hectare (gravity-fed irrigation) or 9500 m^3/hectare (drip irrigation) and bananas consume approximately 15,000 m^3/hectare while rice consumes around 13,000 m^3/hectare (MINAGRI n.d.; Asociación de Productores de Banano Orgánico 2012; MINAGRI n.d.). Additionally, agro-export crops like mango, banana, and table grape require water consistently throughout the year as opposed to rice where dry season and wet season water availability can be taken into consideration.

Who doesn't get to become agro-export entrepreneurs?

In this section, I explore the axes of exclusion embedded into the water and agricultural policy described above and its implications for which farmers are able to access state support and become "agro-export entrepreneurs." The bundling of water management and agricultural development initiatives under the discourse of rising water scarcity is drawing stark lines between the farmers who are or are not

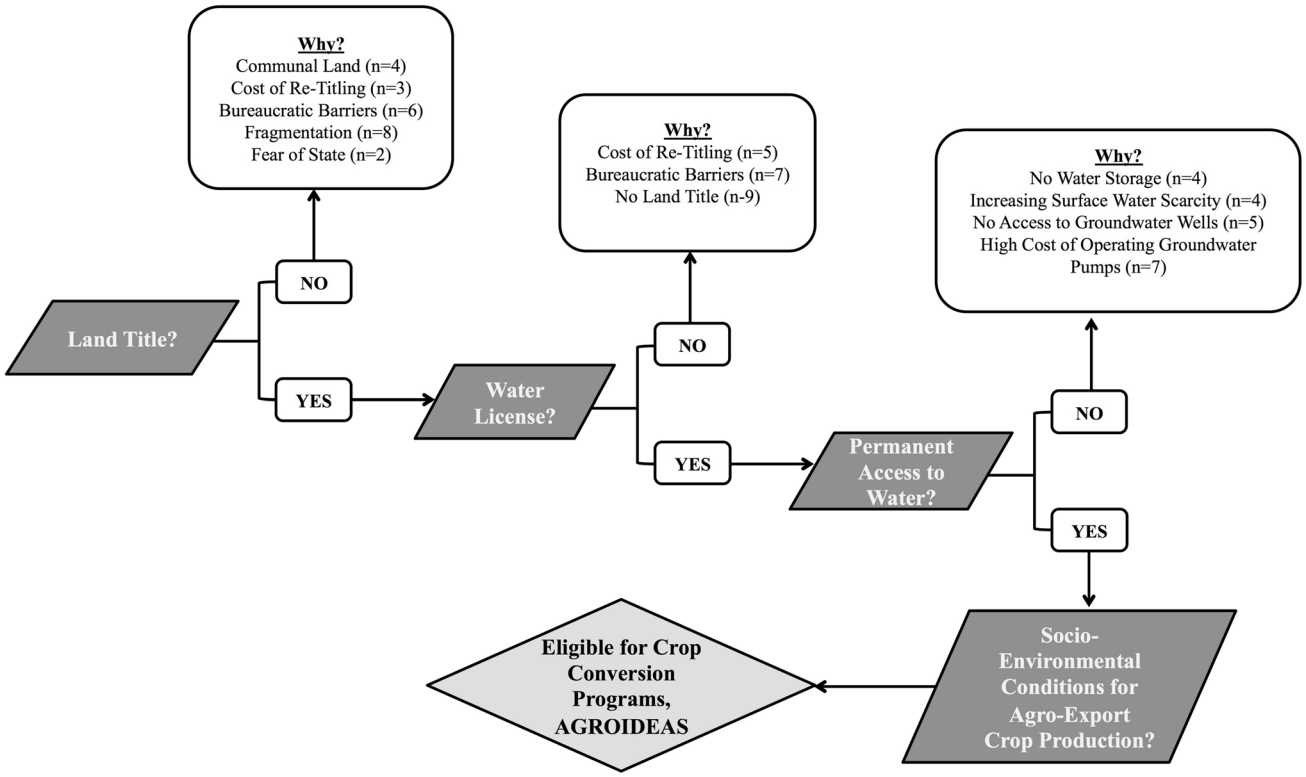

Fig. 3 Axes of exclusion with number of stakeholders (n) that referenced each factor

successful, adaptive, profitable, and/or deemed worthy of state support.

While the state network of agricultural credit institutions, risk management tools, technical assistance, and input provisioning was dismantled by the neoliberal reforms of the 1990s, the Agricultural Restructuring Law signifies a partial reinstatement of some of these programs. Both AGROIDEAS and the Crop Reconversion Program offer producers able and willing to engage in the production of agro-export crops state guaranteed credit, technical assistance, and subsidies. This reinstatement of state support, however, is limited to the producers who align with the Vice-Minister's vision of the agro-export entrepreneurs.

The formal interlocking mechanisms of the Master Water Plan and the Crop Reconversion programs require beneficiaries to have formalized land titles and water licenses to access water or participate in governmental agricultural programs (See Fig. 3). While reliable data on the number of informal water users is limited, ANA estimates that they have been able to formalize 63% of the outstanding water license petitions within the Chira-Piura basin (ANA 2015). In an effort to formalize water use and users, during May–August 2015, ANA initiated a three-month, time-limited campaign to issue water licenses to informal irrigators who had a land title and could provide proof of sustained water use. This campaign, unlike past water licensing campaigns, required farmers to pay for water licenses. The fee-for-license structure reflects a larger state transition toward financial autonomy within decentralized state organizations. Representatives within the Irrigation Commission who sought to assist farmers in applying for licenses noted that the fee is prohibitively high for many subsistence farmers. The price for a water permit is $35 USD and $56 USD for a water license. Additionally, applicants must also pay the costs associated with generating a descriptive report (conducted by commissioned engineers), a visual inspection, and the formalization of land titles (MINAGRI 2014).

Through placing water licenses and land titles as barriers to entry for farmers seeking to access state agricultural support programs, the Ministry of Agriculture is drawing explicit lines of exclusion that prevent farmers from accessing support programs. Water users in Piura that do not have state recognized, individual land titles and water licenses have been a source of conflict within the Master Water Plan process. In the January 2016 Master Water Plan working group meeting, regional water managers suggested immediate actions to penalize Upper Piura for their lack of regularization and "*mal uso*" (poor use) of water by reducing its allocation in the Master Water Plan. This meeting reflected the intense political pressure placed on *comunidades nativas* and *comunidades campesinas* to comply with state water policy following the 2009 Water Resources Law.

Due to the social mobilization of *campesino* and indigenous communities and organizations around the development and ratification of the 2009 Water Resources Law, the law recognizes and allows for ALA to issue block water licenses to these communities (Art. 91 of supreme decree N. 001-2C-10-AG) (Oré and Rap 2009). Despite this communal recognition, ANA paradoxically requires that communities who register a communal water license with the state must also register individual water users within their communally held block license (Art. 78 N. 001-2C-10-AG). These individuals are allotted a fixed amount of water. The requirement that water users must individually register in the block may conflict with the values held by many *comunidades campesinas* and *comunidades nativas* around collective action and governance (Urteaga 2011; Boelens and Zwarteveen 2005; Roa-García et al. 2015).

Within both the 2009 Water Resources Law and the 2014 Agricultural Restructuring Law, the above axes of exclusion are poised to deepen class divisions in agricultural communities. Those who are able to become agro-export entrepreneurs can enjoy the renewed support of the Peruvian state. Those, however, who are unable to conform due to a lack of capital, state-recognized water and land rights, or socio-environmental conditions will remain subject to the whims of the market and a changing climate.

Conclusion

The case of Piura, Peru provides important insights into the extensive literature on neoliberal reform in the water sector and the emerging critical literature on climate change. Firstly, much of the literature on neoliberal reform in the water sector (Oré and Rap 2009; Roa-García et al. 2015; Bakker 2007; Bauer 2015; Crabtree 2002; Oré 2005) and agricultural sector (McMichael 2006; Kay 2008; Akram-Lodhi and Kay 2009) have tended to focus extensively on their respective sector of interest. This research, however, highlights how reforms across sectors are braided together. This research highlights the importance of looking at the interlocking mechanisms between IWRM water policy reform and agricultural development initiatives in transforming smallholder farming systems in accordance with state-led visions of development.

The variegated nature of on-going neoliberal reforms within Peru and globally necessitates an analysis across sectors to the ways in which agricultural and water policy reforms are linked (Jonas and Bridge 2003; Peck and Theodore 2007; Renner et al. 2010). While there is a rich literature on the shortcomings and promises of IWRM policy reform (Giordano and Shah 2014; Blomquist and Schlager 2005; Warner et al. 2008; Saravanan et al. 2009; Molle 2008, Biswas 2004; Medema et al. 2008; Mehta 2014; Lautze et al. 2011), it is only through detailed scholarship on how emerging IWRM policies reinforce or potentially contradict policies in related sectors that scholars can begin to untangle the material impact of IWRM reform on water users and the landscapes they manage. The case of Piura, Peru reflects the complex relationship between technocratic IWRM policy reform and agricultural development as well as its major implications for agricultural communities.

By looking at the way in which policies and programs across the water and agricultural sector work to transform *campesino* agriculture, we can better understand how the state employs a varied set of strategies that alternatively employs neoliberal rationality while also strategically reinstating agricultural support programs that run counter to neoliberal orthodox. While this "variegation" has been chronicled elsewhere (Peck and Theodore 2007), this case study reveals the axes of inclusion and exclusion that run through agricultural and water policy reform dictating for whom and in what ways state support is reinstated.

I do not want to suggest that the idealized entrepreneurial *campesino* is a new concept in agricultural development within Peru or elsewhere. Rather, these ideas reappear over time. The Agrarian Reform also sought to connect smallholder farmers and cooperatives to global commodity markets. What is new, however, are the ways in which the Peruvian state is strategically and sophistically operationalizing IWRM water and agricultural development policy reform to reshape smallholder agriculture. Furthermore, I also do not wish to romanticize *campesino* agriculture or deny the desire for development across rural areas. This development, however, needs to be founded on transparent and democratic processes that provide varying types of support for *campesinos* with varied resources.

As evidenced in Piura, however, these top-down development initiatives do not go uncontested. The highways blockades that arose following the dry season moratorium on rice production in the middle basin signifies the contestation of farmers to their slow dispossession of water and traditional livelihoods. As the specter of climate change and water scarcity begins to materially manifest and the frontier of agro-export production advances, conflicts of this type are also likely to escalate. The ways in which communities contest their loss of agency and work toward their own vision of development in the face of state-led agro-export development is an important topic of future inquiry.

Furthermore, the case of Piura, Peru highlights how climate change is being discursively employed by the state to justify the dispossession of smallholder farmers. In doing so, entrenched inequalities in water access are made ahistorical and these inequalities are naturalized as being the consequence climate change alone (Swyngedouw 2006). While water scarcity discourses have long been utilized by state entities to justify water reallocations (Boelens and Vos

2012; Usón et al. 2017; Mehta 2013; Mehta et al. 2019), climate change adaptation is an emerging discourse that evokes a particular sense of inevitability of impacts and urgency for action (Paprocki 2018a). By evoking climate change as a new driver of water scarcity, Peruvian technocrats strip water inequalities of their history. This is happening worldwide. Beyond Piura, climate change discourse is becoming an important legitimizing force for everything from water re-allocation in the Southern Andes (Lynch 2012, 2013) to the dispossession of smallholder farmers for the expansion of shrimp farming in Bangladesh (Paprocki 2018a,b) and the proliferation of development projects in East Africa (Weisser et al. 2013).

While climate change is a real phenomenon with real implications for communities and their livelihoods, it is crucial that scholars and communities retain a critical gaze toward the vision of development underlying dominant climate change discourses. The case of Piura highlights that climate change adaptation discourse can be mobilized toward maladaptive ends such as the expansion of water intensive agro-export crops and the further marginalization of *campesinos* who aren't able to conform to the state-led ideal of the "agro- export entrepreneur."

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