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Coexistence and Conflict: IWRM and Large-Scale Water Infrastructure Development in Piura, Peru

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ABSTRACT: Despite the emphasis of Integrated Water Resources Management (IWRM) on 'soft' demand-side management, large-scale water infrastructure is increasingly being constructed in basins managed under an IWRM framework. While there has been substantial research on IWRM, few scholars have unpacked how IWRM and large-scale water infrastructure development coexist and conflict. Piura, Peru is an important site for understanding how IWRM and capital-intensive, concrete-heavy water infrastructure development articulate in practice. After 70 years of proposals and planning, the Regional Government of Piura began construction of the mega-irrigation project, *Proyecto Especial de Irrigación e Hidroeléctrico del Alto Piura (PEIHAP)* in 2013. PEIHAP, which will irrigate an additional 19,000 hectares (ha), is being realised in the wake of major reforms in the Chira-Piura River Basin, a pilot basin for the IWRM-inspired 2009 Water Resources Law. We first map the historical trajectory of PEIHAP as it mirrors the shifting political priorities of the Peruvian state. We then draw on interviews with the newly formed River Basin Council, regional government, PEIHAP, and civil society actors to understand why and how these differing water management paradigms coexist. We find that while the 2009 Water Resources Law labels large-scale irrigation infrastructure as an 'exceptional measure', this development continues to eclipse IWRM provisions of the new law. This uneasy coexistence reflects the parallel desires of the state to imbue water policy reform with international credibility via IWRM while also furthering economic development goals via large-scale water infrastructure. While the participatory mechanisms and expertise of IWRM-inspired river basin councils have not been brought to bear on the approval and construction of PEIHAP, these institutions will play a crucial role in managing the myriad resource and social conflicts that are likely to result.

KEYWORDS: Integrated Water Resources Management (IWRM), large-scale water infrastructure, Peru

INTRODUCTION

Every seat in the atrium of the church is taken. Local politicians, clergymen, and irrigation civil society groups face the head engineer of the Special Project for Irrigation and Hydroelectricity of Upper Piura (*Proyecto Especial de Irrigación e Hidroeléctrico del Alto Piura (PEIHAP)*). He clicks through slides chronicling technical schematics and budget estimates for the recently initiated construction of an interbasin transfer tunnel that will bring surface water from the Amazonian slope to the arid Pacific coast of northern Peru. While many of the key players in the region are present, there is a notable absence – the technical secretariat of the Chira-Piura River Basin Council (CRH:CP). This absence speaks to a key tension between proponents of large-scale infrastructure focused on supply-side water management and water managers focused on demand-side water management. This tension is visible not only in Piura, Peru, but in many basins globally.

As state budgets have contracted and the environmental movement has expanded, the water policy reform prescription championed by international water experts and multilateral funders has pivoted away from 'hard' engineered water development toward 'soft path' demand-side management (Gleick, 2000; Conca, 2006). This transition, which began in the 1990s, has been exemplified by the adoption of Integrated Water Resources Management (IWRM) as the nearly ubiquitous language for water policy reform internationally. IWRM, as a concept, calls for cross-sectoral water management, emphasising public participation and highlighting complex human-nature linkages (GWP-TAC, 2000). While IWRM is not inherently incompatible with constructing large infrastructure, the model does place greater emphasis on 'soft' demand-side water management, emphasising water use efficiency through user coordination and other tools.

The binary of supply-side water development versus demand-side water development is increasingly muddled. While many multilateral funders and international experts extol the virtues of demand-side management for addressing escalating water scarcity, many countries in the Global South assert that they must augment and secure their water availability before they focus on 'soft path' demand-side management strategies (WWAP, 2015). Countries in the Global South are accessing multilateral loans and financing by adopting the IWRM model while simultaneously developing large-scale infrastructure projects. There has been substantial research on IWRM, but few scholars have unpacked how IWRM and large-scale water infrastructure development coexist and conflict.

This article explores the case study of the Chira-Piura River Basin in Northern Peru to examine how capital-intensive, concrete-heavy water infrastructure development continues to unfold under IWRM policy reform. Here we draw on the water governance definition proposed by Lautze et al. (2011), "*Water governance* consists of the processes and institutions by which decisions that affect water are made" (emphasis in original: 7) to explore the uneasy coexistence of demand-side and supply-side management in Piura. This case study offers important wide-reaching insights into the differing political-economic forces driving water governance.

In this article, we begin by exploring the scholarly debates on the 'changing water paradigm', the hydraulic mission and IWRM. We then introduce the Chira-Piura River Basin and our research methods. Next, we trace the historical trajectory of the large-scale infrastructure project being implemented in Piura, as it mirrors the shifting water policy priorities of the Peruvian state. Finally, we draw on interviews with the newly formed River Basin Council, regional government, PEIHAP, and civil society actors to understand how and why supply- and demand-side management practices both coexist and conflict under ongoing water policy reform.

A WATER PARADIGM CHANGE(D)

In the late 1990s, scholarly attention coalesced around the 'changing water paradigm' (Gleick, 1998, 2000). This emerging paradigm signified a transition away from centralised, engineered 'hard' water governance solutions such as interbasin transfers, reservoirs, and irrigation canals toward decentralised 'soft-path' solutions such as efficiency improvements through changes in "technology, economics, and institutions" (Gleick, 2000: 132). This demise of the era of 'damming, diverting, draining, and dumping' has been attributed to the overdevelopment of water resources in the Global North, the rise of the environmental movement, new technological advances, high construction costs, dwindling governmental budgets, and the development of alternative water governance strategies (Gleick, 2000; Conca, 2006: 162; Molle et al., 2009). The narrative of a shifting water paradigm has been embedded in scholarly debates, multilateral funding portfolios, and among water manager practices. Yet, large-scale water infrastructure, particularly in the Global South, continues to be developed by the state, private sector, and multilateral funders.

A total of 3700 major dams are planned or under construction, most within the Global South (Zarfl et al., 2015). While the pace of dam construction has slowed since the turn of the century, the

'hydraulic mission' of many water management entities endures (Molle et al., 2009). The hydraulic mission emerged with the intervention of central governments in promoting and constructing water infrastructure in the early twentieth century. This mission was principally carried out by hydraulic bureaucracies staffed by engineers (Molle et al., 2009; Wester, 2009). The construction of large-scale water infrastructure was a powerful political strategy for state formation as well as an important symbol of progress and the domination of nature (Wittfogel, 1957; Worster, 1985; Reisner, 1986; Swyngedouw, 2007; Molle et al., 2009).

Water resources development continues to be a powerful political tool in the Global South to both address water scarcity and build political legitimacy. While the heyday of the hydraulic mission may be waning, it is crucial that we understand how the hydraulic mission continues to shape water governance despite the emergence of a new global water paradigm: IWRM. In the next section, we explore how the hydraulic mission articulates with IWRM, a nearly ubiquitous model for water policy reform internationally.

IWRM AND LARGE-SCALE INFRASTRUCTURE

IWRM, as a formalised framework, emerged from the Dublin Principles that were ratified during the 1992 International Conference on Water and the Environment. While 1992 was a significant moment in the original story of IWRM, its concepts are rooted in decades of scholarship, international meetings, and political transitions that signalled a broader transition away from command and control to complex integrated ecosystem approaches to water resources management (Conca, 2006; Jeffrey and Gearney, 2006).

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 maximise the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems (GWP-TAC, 2000: 22).

The tenets of IWRM are objectively positive but also operationally vague and have translated into a wide range of institutional configurations (Conca, 2006).

While there is ample literature arguing that IWRM policy reform has mixed outcomes or simply does not work (Biswas, 2004; Blomquist and Schlager, 2005; Conca, 2006; Jeffrey and Gearey, 2006; Molle, 2008; Giordano and Shah, 2014), IWRM, as a powerful discursive tool for reform, has been increasingly exported to the Global South (Molle, 2008). By adopting the IWRM model, countries in the Global South imbue water policy reform with a sense of scientific legitimacy (Conca, 2006; Molle, 2008;) and are able to attract bilateral and multilateral funding entities (Mollinga and Bolding, 2004). IWRM-inspired water policy reform has been implemented in many countries such as Mexico (Valencia Vargas et al., 2007), South Africa (Movik et al., 2016), Zimbabwe (Manzungu and Derman, 2016), Brazil (Engle and Lemos, 2010), and most recently, Peru (Oré and Rap, 2009).

An IWRM approach does not preclude the construction of large-scale water infrastructure. The IWRM model, however, does present challenges to water managers and stakeholders who wish to construct large-scale water infrastructure. In particular, the IWRM model has the potential to challenge supply-side interventions in three ways: decentralisation of water management, increased emphasis on the environment, and multi-stakeholder participation.

Within the water sector, the transition away from highly centralised statist forms of water governance toward river basin councils via IWRM reform has synced with broader trends in the decentralisation of state power. This decentralisation, however, has not always translated into a commensurate redistribution of state funds nor has it meant a complete retreat of central authority

(Wester et al., 2003; Scott and Banister, 2008). IWRM is ultimately steered by the state, which is likely to reproduce "paternalistic, technocratic, and bureaucratic top-down conventional approaches, modified by whatever degree of participation is allowed" (Molle, 2008: 134). The decentralisation of water governance has delegated the development and management of large-scale water infrastructure to the regional or river-basin level, but often without the financial resources or technical capacity to undertake ambitious new projects or even perform routine maintenance (Scott and Bannister, 2008).

Water governance under IWRM and its derivative Integrated River Basin Management is often rescaled to the river basin scale. There has been substantial scholarship highlighting that the river basin as a scale of management is a political *choice* rather than a hydrologic necessity (Blomquist and Schlager, 2005; Molle, 2009; Warner et al., 2008). In the context of interbasin transfer projects, which transport water resources from one basin to another, the construction of large-scale water infrastructure can complicate the scale of water management. The proposal of an interbasin transfer project can place river basin councils in conflict over resource allocation.

Large-scale water infrastructure has far-reaching and long-term environmental impacts. The IWRM model, with its focus on not 'compromising the sustainability of vital ecosystems', calls on water managers to meaningfully incorporate ecological values and human-nature linkages into river basin planning. This increased emphasis on ecological values has shifted scientific support away from large-scale hydraulic engineering solutions towards a more integrated ecosystem approach. This reorientation of water management philosophies, coupled with the rise of a vigilant environmental movement has made the permitting process of large-scale infrastructure more challenging (Conca, 2006).

Public participation, which is at the core of the IWRM philosophy, can often be watered down and only symbolic in practice (Wester et al., 2003; Conca, 2006). And while governments are often hesitant to vest participatory decision-making platforms with real power, these can be important spaces for civil society and private-sector actors to mobilise for or against large-scale water infrastructure projects (Blomquist and Schlager, 2005).

In the following case study of the development of PEIHAP in the Chira-Piura River Basin, we explore the different mechanisms by which IWRM and water resources development articulate with implications for civil society, water managers, and the environment.

SITE SELECTION AND METHODS

Many countries in the Global South are embracing IWRM and also continuing to pursue water resources development to enhance and ensure water availability. Peru is a particularly salient case for studying the confluence of these processes. Peru is one of the most recent countries to reform its water management system under an IWRM framework. One of the key principles of the new law is "integrated and participatory water management at the river basin scale" (Law 29338, Preliminary title, Article 3). In order to achieve this goal, the new Water Resources Law reorients management to the river basin scale, formalises stakeholder participation, and empowers water managers through the creation of a technical secretariat within River Basin Councils, which is housed within the National Authority of Water (ANA) (see Figure 2).

Despite this shift toward IWRM-inspired water management, the hydraulic mission is an important and enduring force in Peruvian water governance. Though Peru's coastal region only covers 11% of its total territory, over 60% of its population resides there (INEI, 2009). The nearly 18 million inhabitants of the coastal region are dependent on a combination of alpine rivers that cross the arid plains and poorly understood aquifers.

In order to increase water availability on the arid Pacific coast, the Peruvian state has invested in a number of interbasin transfers that bring surface water from the Amazonian Basin to the Pacific Coast

to feed mega-irrigation projects. Within the past ten years, three major projects have been undertaken by the Peruvian central government and regional governments: 1) the Chavimochic Special Project that is in its final stage and will irrigate 39,000 additional ha of desert in the La Libertad Region, 2) the Olmos-Tinajones Special project that was completed in the Lambayeque Region in 2014 and provides irrigation to 43,500 additional ha, and finally the focus of this article, 3) the PEIHAP which was initiated in 2013 and will provide irrigation to 19,000 ha of uncultivated land.

The Chira-Piura River Basin, which is explored in this article, was chosen as one of six basins to pilot the implementation of the 2009 Water Resources Law due to its significant water infrastructure, large cultivable land area, and large number of water conflicts (IDB, 2009). Additionally, the implementation of PEIHAP offers the opportunity to study how IWRM water policy reform articulates with the construction of a mega-irrigation project.

The Piura Region,¹ which encompasses the Chira-Piura River Basin is located in northwestern Peru and is the second most populous region in the country. The headwaters of the Piura River are located at over 3000 metres above sea level in the *páramos* or neotropical alpine ecosystems, which are located in the Huancabamba Province (see Figure 1), one of eight provinces within the Piura Region. This highland province is under the jurisdiction of Administrative Water Authority (AAA): Jequetepeque – Zarumilla, a regional office that acts as a representative of the National Water Authority (ANA) (see Figure 2). Huancabamba is represented in the Chira-Piura River Basin Council (CRH:CP) through a User Board that was created in 2008. We will discuss User Boards more fully later in this article, but briefly, User Boards are democratic organisations tasked with the maintenance of irrigation infrastructure and collection of water tariffs within a valley. User Boards, which are state-sanctioned water management organisations, are highly organised and important advocates for *campesinos* in the lowlands. In Huancabamba, however, the User Board is not particularly visible or active because water is principally managed through long-standing communal water management practices based on collective action (Cabrejos, 2011; Taboada, 2016).

From Huancabamba, the Piura River crosses nearly one hundred miles of the low-gradient Sechura Desert before flowing into the Ramon Laguna.

In order to explore how IWRM reform and large-scale water infrastructure are coexisting and conflicting in Piura Peru, we conducted semi-structured interviews with key institutional actors within the water sector. Specifically, we interviewed key members of the *campesino* coalition supporting PEIHAP (n=7), agricultural associations/cooperatives (n=6), *comunidades campesinas* (n=3), National Water Authority/River Basin Council (n=2), Regional Government officials (n=2), PEIHAP officials (n=1), and local conservation groups (n=2). We employed a qualitative content analysis (Julien, 2008) to examine the dynamics shaping IWRM institutional reform and infrastructure development. Thematic coding of the interview transcripts was conducted using QSR International's NVivo 10 software (QSR International, 2014). Interview data were contextualised through content analysis of PEIHAP Environmental Impact Statements, river basin planning documents, archived newspaper articles, and the 2009 Water Resources Law. Lastly, we utilised participant observation of meetings of the civil society coalition supporting the implementation of PEIHAP and River Basin Council meetings to better understand the local politics shaping water governance.

¹ Peru, as country, was originally subdivided into departments. The 2002 Decentralization Law (Law 27680) replaced departments with regions as the secondary territorial administrative level. Regions are subdivided into provinces, and provinces are subdivided into districts.

Figure 1. Location of the Piura Region (upper right) and the three principal river basins: Chira, Piura, and Huancabamba.

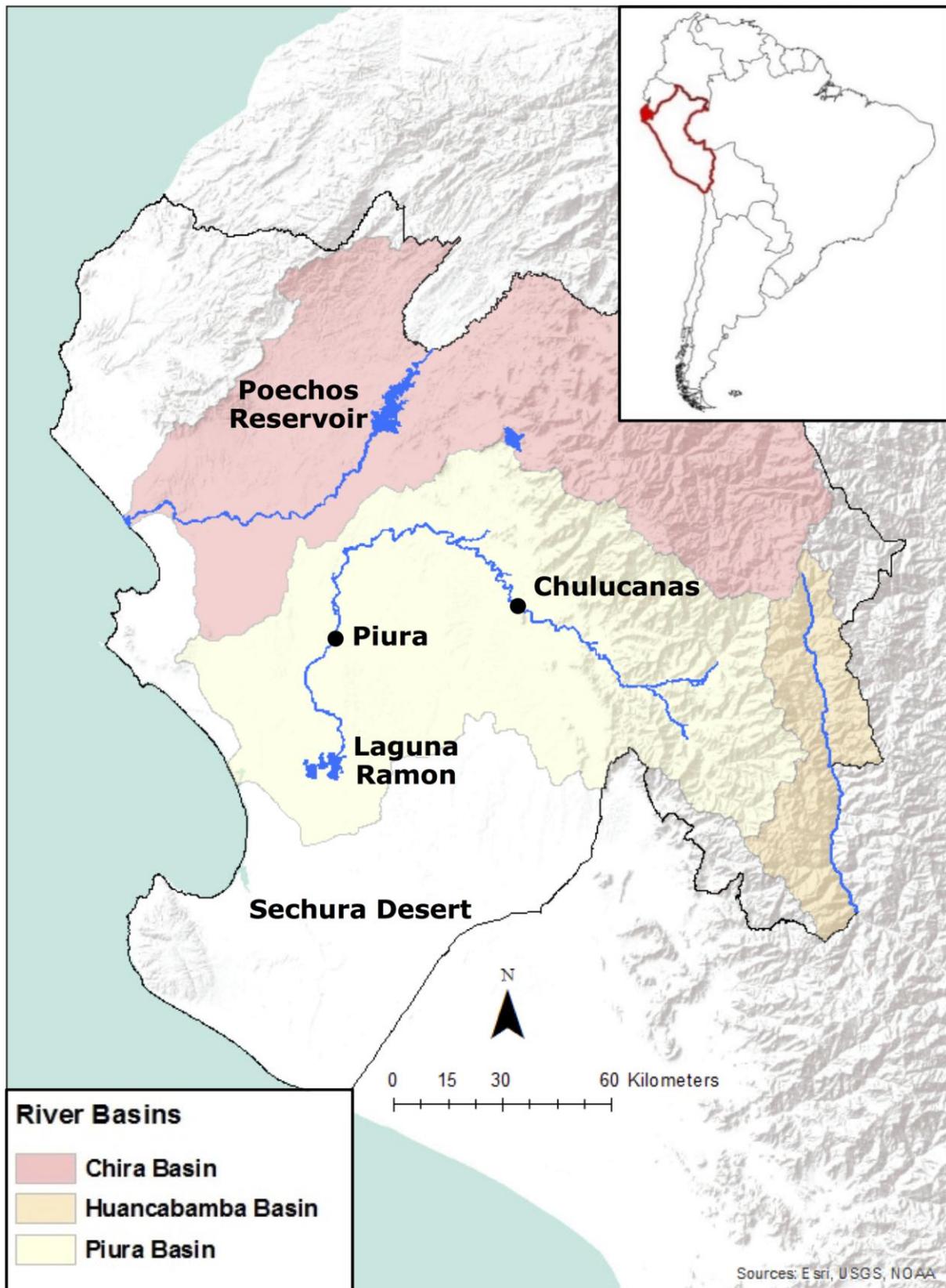
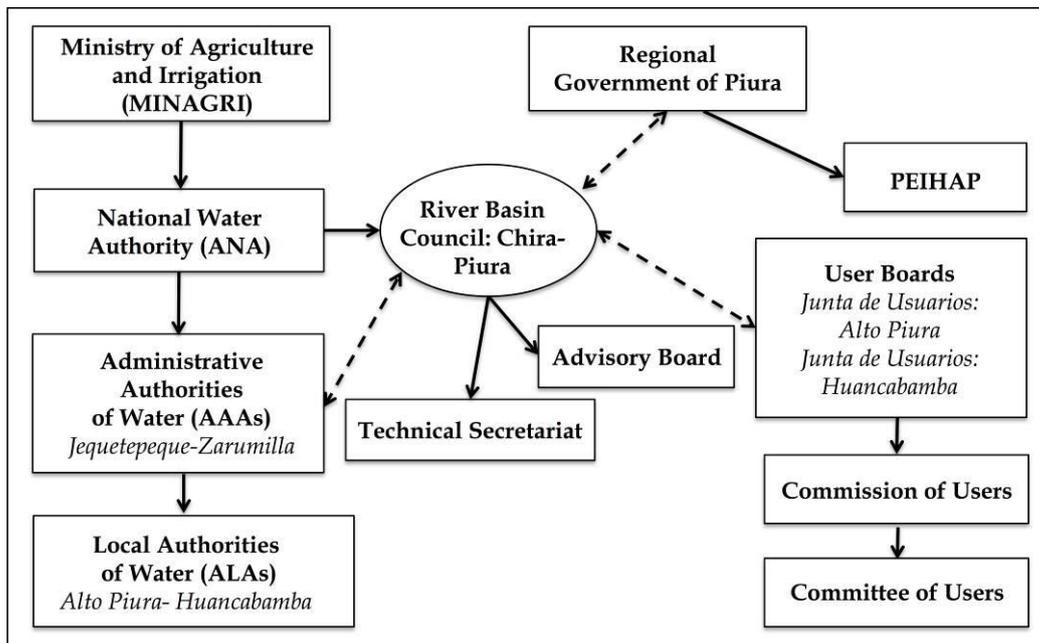


Figure 2. Organisational chart of water management organisations related to PEIHAP.



Note: Dashed lines signify membership in the River Basin Council and solid lines signify organisations overseen by the higher-level organisation. The Regional Government oversees PEIHAP until its completion when ANA becomes its regulator.

UNDERSTANDING PEIHAP THROUGH THE TRAJECTORY OF PERUVIAN WATER POLICY

The trajectory of Peruvian water policy echoes international trends in water governance. This section recounts the development of PEIHAP alongside significant changes in Peruvian water legislation. This historical perspective offers valuable insight into how the hydraulic mission and IWRM came to be important forces shaping Peru’s water resources.

Birth of the Peruvian hydraulic mission

Charles 'Gringo' Sutton, a US-born engineer, was the grandfather of the Peruvian hydraulic mission. Sutton came to Peru in the early 1900s after President Guillermo Billinghurst enacted Law 1794, which established that the promotion and execution of large-scale hydraulic infrastructure was a national priority (Soldi, 1968). Sutton proposed a number of mega-irrigation projects that would transfer water from the Amazon Basin to the arid Pacific coast (Oré and Rap, 2009). Sutton believed that Peru’s development was contingent on agrarian development, but felt that the hacienda system was an obstacle to this development due to the near absolute legal power that hacienda owners held over water and infrastructure (Oré, 1989).

Under Sutton’s leadership, Peruvian hydraulic engineers began to see their work as not just constructing and regulating irrigation, but transforming the very nature of agrarian life (Oré, 2005). By 1965, the coast had 17 irrigation systems functioning, six that were in construction, and 17 that were already proposed and planned (Soldi Le Bihan and Chávez, 1965). As a testament to Sutton’s enduring legacy, his initial project sketches are still used as preliminary blueprints for modern interbasin projects.

The General Water Law and the fight for PEIHAP

The Agrarian Reform of 1969 and the subsequent General Water Law signalled a new way to envision the state's role in administering land and water resources. In 1968, in the context of the highly adversarial and ineffectual populist Belaúnde government (1963-1968), General Juan Velasco Alvarado (1968-1975) seized power and installed himself as president of the Revolutionary Government of the Armed Forces. During his regime, Velasco expropriated 19,000 properties totalling over 9 million hectares. In 1969, the Revolutionary Government ratified the General Water Law, stating "water, without exception, is the property of the State" (Law 17752, Title 1, Article 1).

Velasco, who was born in Piura, gave preferential land and water access to mechanised agriculture in order to expand lowland production of agro-export crops (Oré, 1989). It was during the Agrarian Reform that PEIHAP was formally proposed. The initial proposal was to build an interbasin transfer tunnel to bring water from the eastern slope of the Andes, which drains into the Amazon Basin, over to the Pacific Coast. This water would then be channelled into the Piura River to increase irrigation availability for smallholder farmers and cooperatives.

Through the 1970s, PEIHAP remained relatively unknown. It was in this context that a group of advocates including local clergyman, politicians, and *campesino* civil society leaders catalysed a civil society movement in support of PEIHAP. In the early 1980s, these key leaders organised a 65-km 'March of Sacrifice' from Chulucanas to the regional capital, Piura, with the goal of speaking with President Fernando Belaúnde Terry (1980-1985) (see Table 1). They were not successful in advocating for PEIHAP, but this early social mobilisation in support of PEIHAP set the stage for continued civil society action.

Unlike President Belaúnde, President García (1985-1990) understood the political necessity of *campesino* support in Piura. As part of garnering this populist support, President García met with civil society leaders supporting PEIHAP and established the Autonomous Authority of Upper Piura. He then commissioned a feasibility study for PEIHAP, which was financed by the World Bank for USD2.5 million.

During this time, however, Peru entered a period of hyperinflation and economic depression (Ioris, 2012). In response, President García issued Supreme Decree 037-89AG transferring the administration and regulation of irrigation to non-profit private civil society irrigation organisations called User Boards (*Juntas de Usuarios*). These User Boards continue to be important organisations that maintain local irrigation infrastructure and collect water fees, but more importantly, act as a highly organised and vocal regional and national advocate for smallholder agricultural water users. User Boards are further subdivided into Commissions of Users, which are also democratic organisations, but maintain and collect water tariffs for a subsection of the water infrastructure overseen by the User Board (see Figure 2).

The creation of the User Boards effectively removed the central government from the local administration of water resources (Oré and Rap, 2009). Ultimately, President García was unable to arrest Peru's economic free fall or the rise of violent Maoist guerrilla groups in the South and Central highlands. It was at this moment of extreme instability and insecurity that Alberto Fujimori was elected to power.

The water sector's resistance to the 'neoliberal moment' and the privatisation of PEIHAP

The Fujimori regime (1990-2000) quickly began to implement neoliberal reforms. In 1995, the Fujimori regime, with support and sponsorship from the International Monetary Fund (IMF) and World Bank, put forward a proposal to privatise and commodify water following the example of the 1981 Chilean Water Code (World Bank, 1995). These proposed changes in the water code were met by fierce, and sometimes violent, resistance by both the User Boards and broader Peruvian civil society (Oré and Rap, 2009).

Following its failure to pass a new water law, the Fujimori administration began to dismantle the water regulatory institutions created under the Agrarian Reform in order to reduce the state apparatus. The 1998 Decentralisation Law (Law 26922) further transferred water governance tasks from the Ministry of Agriculture and Irrigation to the regional level.

Fujimori's administration quickly reshaped PEIHAP, abolishing the Autonomous Authority of Upper Piura to create the Special Committee for Privatisation (CEPRI) and reorienting PEIHAP toward privatisation (see Table 1). In order to make the project attractive to private-sector actors, however, it had to be reimagined. The Bishop of the Diocese of Chulucanas, a leader in the civil society group supporting PEIHAP, explains how the project changed during the 1990s:

The whole plan, that whole dream, was changed by President Fujimori. The idea was to bring the water through another tunnel to this side of the mountains (...) and it would irrigate the land already cultivated by smallholder farmers (...) This new project, which is the one that they [the Fujimori administration] were talking about is 19,000 ha of new land. (...) Here, farmers [smallholder farmers in the original valley] would get very little, almost nothing of this water. Instead they would put in 500 groundwater wells. It was a surprise to many people. That was not the original project, that was not the original dream (Interview with both authors, 8/2/2015).

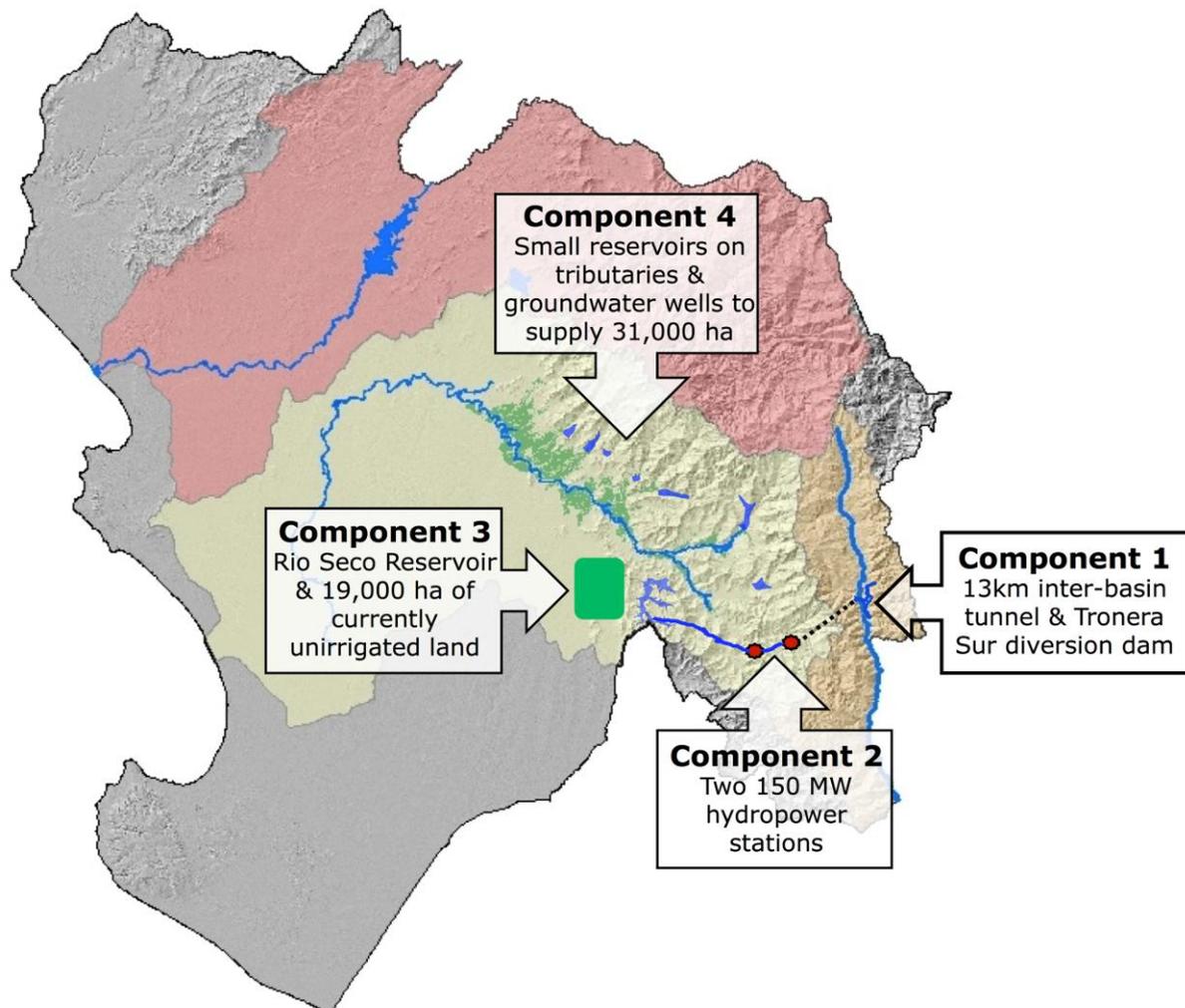
This redesign of the project remains the model for PEIHAP to this day, though complete privatisation was never realised (see Figure 3). The current project begins with the construction of the Tronera Sur Diversion Dam and a 13-km-long tunnel that will transport 335 Mm³ of water per year from the Huancabamba Basin to the Piura River Basin (Component 1). The first component will be publicly funded by the regional and central government. Next, two privately held hydroelectric stations with a total capacity of 300 MW will be installed by a private electric utility along the course of a new canal system (Component 2). The water will then flow into the Rio Seco Reservoir and be used to irrigate 19,000 ha of currently unirrigated land. This 'new valley' will be financed through a land auction and private-sector investment and will likely be managed by a new, valley-specific User Board (Component 3) (GOP, 1999). The 31,000 ha in the Piura River Basin, which are currently irrigated and cultivated by smallholder farmers will be 'improved' through the drilling and electrification of tube wells as well as the construction of six small reservoirs on Piura River tributaries, to increase the capacity of irrigation water storage (Component 4). This component will be funded with a combination of public and private funds though the relative contribution of the government and local water users has not been finalised. The additional complementary water from Component 4 will enable a second crop to be grown annually in the upper part of the basin. The infrastructure associated with Component 4 will be managed under the existing water management organisations for this area. The Alto Piura User Board and its constituent Commissions of Users will manage the newly constructed reservoirs. A committee of the users that share a particular tube well will manage the new groundwater wells.

Despite this redesign, PEIHAP remained paralysed during the remainder of Fujimori's regime and the subsequent presidency of Alejandro Toledo (2001-2006) due to a lack of private-sector interest. The regional and central government continued to form committees, perform studies, and secure the water and land resources necessary to attract private-sector interest in PEIHAP (see Table 1).

The realisation of PEIHAP

Alan García, the formerly centre-left populist president who oversaw the final years of the Agrarian Reform reemerged as a free market enthusiast, winning the Presidency again in 2006. García, unlike Fujimori, understood the central role of political legitimacy in enacting economic reform and moved from a largely economic and technocratic approach to a more subtle coordination between economic and political goals (Ioris, 2012). While pushing forward neoliberal reforms in many sectors, García's administration utilised large public investment to support private-sector growth.

Figure 3. Location of the four components of the Special Project for Irrigation and Hydroelectricity of Upper Piura (PEIHAP).



PEIHAP was reactivated during García's second presidency. PEIHAP exemplifies President García's complex and sometimes contradictory mix of neoliberal policies with large-scale government spending on highly visible infrastructure to build populist support and political legitimacy. In January 2008, the legislature passed Law 29193 stating that the construction of PEIHAP's 'trans-Andean' tunnel and diversion dam were a necessity and would be a public utility (see Table 1). This declaration signified that the state was now willing to fund the first component of the project since the private sector was not. Later that year, civil society actors and local politicians led by the Bishop of the Diocese of Chulucanas led a provincial strike to demand that the Central Government finance the project. It was at this moment that the civil society group Front in the Defense of PEIHAP was created.

In 2009, García's administration approved the Environmental Impact Statement (EIA) for the project, validating the environmental viability of the project. This EIA built on previous studies from 1988, 1996, and, 1998 that focused on water availability, energy production potential, and land quality, respectively. The lengthy EIA focused on erosion as a key environmental challenge, estimating that without erosion control the diversion dam would lose 50% of its capacity in 30 years. In order to

address this concern, extensive reforestation was suggested for the headwaters region. We will discuss the social protocols of the EIA later in the article, but it is important to highlight that the EIA was published with nominal participation from headwater communities and communities that will be displaced by the 'new valley'. Specifically, in November 2009, officials from the Ministry of the Environment along with engineering and environmental consultants met with the public in Huancabamba. They answered 46 questions, over two and a half hours, related to environmental conservation, relocation of families affected by PEIHAP infrastructure, and compensation for the local workforce. With that, the public consultation phase of the EIA was concluded. The EIA was revisited in 2014 in order to approve a new location for the interbasin transfer tunnel and the Tronera Sur diversion dam. The amended EIA states that a Community Relations Plan would be beneficial but leaves the plan undeveloped. Nevertheless, the General Environmental Directorate within the Ministry of Agriculture and Irrigation approved the amended EIA with little debate in 2009 and 2015.

A transition toward IWRM

In June of 2008, García took advantage of the fast-track authority granted him by Congress in order to pass the Free Trade Agreement with the United States and made 99 unrelated, unilateral decrees. Three of these decrees were relevant to water resources: Legislative Decree 997 created the National Water Authority (ANA), Legislative Decree 1081 created the new National System of Water Resources, and Legislative Decree 1083 promoted river basin water management.

The User Boards sought legal recourse to cancel these decrees, while also mobilising a national agrarian strike to call for a new water law. García's administration, which viewed the User Boards as private entities that did not represent civil society, worked to sideline them by not including User Boards in the new National System of Water Resources (Oré and Rap, 2009). Additionally, the User Boards felt the decrees were a step toward privatising water because García introduced private 'operators', which were private companies that would have assumed the operational tasks of water management formerly relegated to the User Boards (ibid). Following extensive mobilisations in the central and southern Andean regions, numerous press conferences, and general strikes, the Ministry of Agriculture and Irrigation announced that a new water law would be introduced with no delay.

The new Law of Water Resources was released in March 2009 amidst an adverse political context with heavy lobbying from the User Boards and political coalitions within the Congress and the executive branch (Oré and Rap, 2009). The new law was originally drafted by state officials, but proposals from the National Mining Society, the National User Board, and industry were added and then modified by different political coalitions within Congress (ibid). President García touted that "this new law should bring modernity to water use in our country" and was a "radical change" (as quoted in Gestión, 2009a). The Press widely promoted the IWRM focus of the new Water Law, stating, "The Water Resources Law, ratified on March 30th 2009, guarantees the integrated management of water" (El Gestión, 2009b). In particular, the National Water Management Strategy and Policy refers to IWRM as the framework for water management 32 times in the course of the document, stating that the overall goal of the strategy is to conduct "integrated management that is intentionally institutionalised" (ANA, 2009: 5) and the "river basin is the natural basic unit for integrated management" (ANA, 2009: 31). The main institutional vehicle for river-basin scale, IWRM was the creation of River Basin Councils, which are 'multi-sectoral spaces' (Gestión, 2009c).

In order to implement the 2009 Water Resources Law, Peru leveraged the international credibility of IWRM to acquire loans from development banks and investment from multilateral funders. In Peru's application to the Inter-American Development Bank (IDB), they stated, "[t]he new Water Resources Law contains the necessary elements for sound WRM [Water Resource Management] as stated in international good practices namely, *integration of sectoral policies, participation of stakeholders, decentralisation of management to the river basin level* and the recognition of water as a *social and*

economic good" (emphasis in original, IDB, 2009: 8). Specifically, Peru received USD27.35 million to implement "participatory IWRM in selected pilot river basins", including the Chira-Piura (IDB, 2009: 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 (ibid). The IDB funds supported the CRH:CP for the first five years, but as of 2016, the River Basin Council became solely funded by users' water fees and supplementary funding from ANA.

The River Basin Council is tasked with the "integrated and multi-sectoral management of water resources" (Bylaw 29338: Title 2: Article 31) and is situated within the National Water Authority (ANA). ANA, however, continues to be housed within the Ministry of Agriculture and Irrigation, suggesting the continued prioritisation of agricultural users (see Figure 2). In particular, the River Basin Council is responsible for promoting the participation of stakeholders in the formulation and implementation of the River Basin Water Resources Plan. They also "implement actions to achieve consensus and establish compromises between members" in order to enact the Water Resources Plan (ibid).

The River Basin Council is composed of a technical secretariat and an advisory council consisting of multi-sectoral stakeholders. The president of the advisory council is a representative of the Regional Government. By holding the presidency, the Regional Government retains disproportionate power in relation to other stakeholders. The remaining representatives of the advisory council of multi-sectoral stakeholders include: 1) director of the AAA for the basin, 2) a local government official, 3) a president of a local user board who is elected by the other presidents to represent agricultural users, 4) a representative of non-agricultural users, 5) a representative of the regional professional association, 6) an academic representative elected by the deans of regional universities, and 7) the president of a *comunidad campesina* that is elected by other presidents. Additionally, the CRH:CP is required to include a representative from all operators of special irrigation projects within the basin. Currently, the Council includes the operator of the 1970s-era Poechos Reservoir located in the lowlands but not PEIHAP because it is still in development.

While the 2009 Water Resources Law focuses on IWRM principles and 'soft-path' management strategies such as multi-scalar planning and stakeholder coordination, it also creates mechanisms by which hydraulic projects can be approved and implemented. The Law states that large hydraulic projects are considered an "exceptional measure for national public interest" (Bylaw 29338: Title 8: Article 213) and will be subject to three criteria for approval: the magnitude of investment, water demand, and the public interest (Bylaw 29338: Title 8: Article 211). The language of exceptionality surrounding large-scale infrastructure is reflected in the historical justification of PEIHAP as a key 'stimulating agent for the economy' (see Table 1). PEIHAP and other large mega-irrigation projects are touted as being vitally important because they are the only way to generate regional employment via "a massive reactivation of the agricultural sector" (Explanatory statement, *Draft Law N°01340*). These discourses of exceptionality and necessity are adopted to drive forward PEIHAP over time (see Table 1). This new law does not challenge this pro-development discourse since it does not create clear criteria for infrastructure development, enabling 'public interest' to be easily co-opted.

In this next section, we examine who benefits from PEIHAP. This analysis enables us to better understand the key forces propelling continued large-scale irrigation infrastructure development in Peru.

WHO BENEFITS AND WHAT DRIVES PEIHAP FORWARD?

As PEIHAP unfolds, a concrete set of beneficiaries is emerging, revealing the broader political drivers behind the promotion of large-scale infrastructure in the context of the new 2009 Water Resources Law.

Table 1. Historical trajectory of PEIHAP with excerpts from relevant policy documents that reflect the discourses used to justify the project.

1982	<p><i>Civil society 'March of Sacrifice' from Chulucanas to Piura</i> President Fernando Belaúnde Terry rejects civil society's proposal for PEIHAP</p>
1988	<p><i>President Alan García creates the Autonomous Authority of Upper Piura to implement and manage PEIHAP (Law N°24977 – Article 341°)</i></p>
1989	<p><i>Transfer of PEIHAP to Región Grau (Piura) (Legislative Decree N°556 – Article 413°)</i></p>
1996	<p><i>Deactivation of PEIHAP by the Transition Council for Regional Administration (CTAR) (Presidential Resolution N°426-96-CTAR-RG-O)</i> Feasibility studies were completed.</p>
1997	<p><i>PEIHAP Draft Law</i> "Due to its socioeconomic relevance for the development of the country and as a stimulating agent for the economy in accordance with the political guidelines of the Government, it is necessary to declare the execution of the Upper Piura Project [PEIHAP] as a top priority [...] The execution of the project is important in order to ensure private investment is directly involved in this public interest work, not only for the Grau Region [Piura Region], but also for the whole country, due to its multiplier effect in the economy (...) it is important to give a clear signal to national and international capital that Peru has a special interest in executing the works of this project" (Explanatory statement, Draft Law N°03137). <i>Ratification of PROMCEPRI (Commission for the Promotion of Private Concessions) agreement for the concession of the execution and use of PEIHAP by the private sector (Supreme Resolution N°623-97-PCM)</i></p>
1999	<p><i>Incorporate 'terrenos eriazas' [untilled lands] into the promotion for private investment in PEIHAP</i> "It is the policy of the Government to promote an increase in agricultural production and productivity through the incentives and the promotion of private investments in the expansion of the agricultural frontier by establishing public domain over lands" (Supreme Resolution N°076-99-PE).</p>
2001	<p><i>Draft law to declare the public necessity of and preferential interest in PEIHAP</i> "It is a priority for the government to generate employment and this can only be achieved through a massive reactivation of the agricultural sector, which is why it is vitally important to execute and conclude the important agricultural projects that have been taking place throughout the country (...) Since the draft law has a declarative nature it prioritises the public need for execution of the PEIHAP works, it does not create or increase public expenditure. However, it entails the benefit of expanding the agricultural frontier, solving the electricity shortage in Piura and Tumbes and generating thousands of new jobs in agriculture" (Explanatory statement, Draft Law N°01340). <i>Draft Law proposing the creation of a more decentralised Autonomous Authority of PEIHAP</i> "The centralism in the government that turned into hypercentralism, forgot during the last 10 years, the provinces and their possibilities for development and their capacity to contribute to national development (...) Facing the failure of the COPRI [Agency for the Promotion of Private Investment] and confronting the immense need to initiate the</p>

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- execution of [PEIHAP], in order to overcome the poverty of the populations and stimulate regional development, CTAR [Transition Council for Regional Government] Piura elaborated an alternative project (...) the construction of a diversion dam, interbasin tunnel and access to the works, with public resources(...)" (Explanatory statement, Draft Law N°01564).
- 2003 *Draft Law for creation of Autonomous Authority of PEIHAP* (Draft Law N°06058)
This proposed Autonomous Authority draws on a more participatory approach than previous Authorities by including members of civil society.
Reactivation of the Autonomous Authority of PEIHAP
Declares the reactivation of the AA as a "decentralised public organism of the Regional Government of Piura (...) with technical and economic autonomy" (Regional Ordinance N° 04-2003/GOB.REG.PIURA-CR).
Declaration of the public interest of PEIHAP and the reserve of water from the upper basin of the Huancabamba River (Regional Ordinance N°005-2003/GOB. REG.PIURA.CR)
Draft law to establish a 335 MMC water resource reserve from the Huancabamba River for PEIHAP (Draft Law N°06094)
- 2005 *Creation of multi-sectoral commission to evaluate technical, economic, and financial alternatives for PEIHAP* (Supreme Resolution N°345-2005-PCM)
"[PEIHAP] is economically profitable from the private and social points of view(...)the presence of agricultural investors makes it imperative to guarantee permanent water availability so that they can invest and generate income and bring development to this sector of the country" (Agrarian Commission of the Peruvian Republic, 2007, p. 11).
- 2007 *Creation of the 'executing entity' for PEIHAP* (Law N°29142)
The Autonomous Authority is made the executing entity with greater autonomy.
- 2008 *Provincial strike for PEIHAP*
More than 1000 people participated in the strike, blocking the road to Chulucanas and Huancabamba.
Declaration of the public need and utility of the construction of the Tronera Sur Diversion Dam and the Trans-Andean Tunnel for the diversion of water for PEIHAP (Law N°29193)
It means the transference of public funds for the First Component of PEIHAP.
Draft Law that established the water reserve for the Olmos Project and PEIHAP (Draft Law N°02781)
The Regional Government transfers eight large landholdings to PEIHAP (Directorial Resolution N°841-2008-GOB.REG.PIURA-DRA-P)
- 2009 *Law to expropriate land for construction of the remaining components of PEIHAP* (Law N°29386)
PEIHAP Environmental Impact Assessment approved
- 2011 *Creation of a Multi-sectoral Commission to evaluate the sustainability of PEIHAP* (Supreme Resolution N°153-2011-PCM)
"This Commission proposes the most technical and efficient scheme with a high social impact, upholding the use of public resources and commitments made by the State" (Article N°1, Supreme Resolution N°153-2011-PCM).
President Humala travels to Huancabamba to light the first stick of dynamite for the perforation of the trans-Andean tunnel
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Transnational and national construction firms

Within Peru, lucrative government contracts for constructing publicly funded irrigation mega-projects are sought after by a network of national and global construction companies. These deals have been the subject of controversy due to numerous instances of construction companies illegally paying Peruvian politicians for contracts. In response to these allegations, Congressman Juan Pari chaired the Lava Jato Investigative Commission, which spent six months investigating corruption in infrastructure development across Peru. This report, which is over 650 pages, reveals key financial irregularities in the contracts and regulation of construction companies tasked with constructing PEIHAP.²

The initial contract for the construction of access roads and the interbasin tunnel for PEIHAP was awarded to the Brazilian company Camargo Correa by the Regional Government in 2010, with the support of then-President Alan Garcia. In December 2010, however, it was revealed that a previously contracted consultant company had developed low-quality technical schematics for the retention dam and interbasin tunnel, which caused delays. In 2011, the Regional Government (after a change in administration) cancelled Camargo Correa's contract due to 'irregularities'. After a protracted legal battle, Camargo Correa was given 52% of the monetary value of their contract for completing 29% of the physical work they were contracted for (Pari, 2016).

In December 2015, the contract for completing the interbasin tunnel was awarded to two concessionaries: Astaldi, an international construction group based in Italy (51% of contract) and Obrainsa, a Peruvian construction firm (49% of contract). Obrainsa-Astaldi's five-year contract is valued at approximately USD144 million of public money (Pari, 2016). Astaldi, which is the 5th largest global developer of hydroelectric infrastructure, has already won the contract for two other hydroelectric plants in Peru. As of February 2017, Obrainsa-Astaldi had completed approximately 5% of the tunnel, and has already requested USD7.6 million in additional funds (later reduced to USD4.5 million) from the Regional Government without justification (RPP Noticias, 2/3/2017). Congressmen Pari's investigative commission raised concerns that the new contract does not indicate the percentage of the total project to be completed by Obrainsa-Astaldi for the money awarded, summarising that, "the investigation has led us to conclude that, the Regional Government, and especially [the executing entity for] PEIHAP, has not been supervised with the rigor or precaution necessary to guarantee that the progress of the project matched the valorisation of [financial] advances" (297).

Some may attribute the above 'irregularities' to the managerial ineptitude of the executing entity for PEIHAP and the Regional Government that oversees PEIHAP until its completion, while others may feel they are indicative of systemic corruption. Congressman Pari's corruption investigation underscores the prevalence of the mismanagement of public funds and the enrichment of construction companies through major public works. Perhaps most damning is that following the completion of Congressman Pari's inquest in June 2016, none of his congressional colleagues were willing to sign the document, forcing Pari to be the sole signatory of the report. The media is now charging the government with burying the report because it implicates a wide range of public officials and institutions as being poor managers of public funds at best, and embezzlers at worst (El Comercio, 1/2/2017; La República, 2016).

Agro-export capital

The implementation of PEIHAP has roots in the economic development goals of the Peruvian state. The Peruvian government has long sought to expand agro-export production as a means of economic development (see Table 1). Despite groundwater depletion and escalating scarcity of surface water, the Peruvian Ministry of Agriculture and Irrigation (MINAGRI) has pledged to develop 200,000 additional hectares of land dedicated to agro-export crops by 2021 (Gestión, 2017). This ambitious goal is

² Report available at: <http://diariouno.pe/wp-content/uploads/2017/01/Inf%20Lava%20Jato%20-%20Pari.pdf>

contingent on the aggressive expansion of irrigation on the arid Pacific Coast, which necessitates interbasin transfers and mega-irrigation projects such as PEIHAP. These economic development goals provide a powerful incentive for the continued development of large-scale water infrastructure development in Piura and beyond.

Unlike the beneficiaries of the first component of PEIHAP, the agricultural beneficiaries are not specifically known because this component is still pending. That being said, by drawing on the experience of the neighbouring Olmos project and our conversations with key stakeholders in Piura, we can extrapolate who is likely to profit for the expansion of irrigation in the 'new valley'.

By law, all lands owned by the state that are developed with public funds will be awarded via public auction and all costs for drainage or irrigation (excluding the interbasin tunnel) must be repaid in proportion to the investment by the state (Bylaw 26505, article 13). In the case of the Olmos mega-irrigation project, the state invested USD445.5 million and generated USD117 million in revenue via the sale of land, energy, and water fees (Eguren, 2014). The newly irrigated land within the Olmos project was auctioned in 2011 and 2012. This sale made national news because Grupo Gloria, a large Peruvian capital group, purchased 15,600 ha of land at USD4,500 per ha to cultivate sugar cane and cattle feed as part of their vertically integrated dairy processing business (La Gestión, 2011; Escobedo, 2015). This purchase, which represented over 40% of the 38,000 ha of the available land developed in the project, served as a strong signal of the type of landholders who are able to purchase new lots.

Within PEIHAP, the land has yet to be auctioned off. The irrigation infrastructure for the 'new valley' is estimated to cost USD104.38 million, which is entirely funded by the private sector. If this cost is offset entirely through land sales then the per-hectare price tag would be approximately USD5,500. The Regional Government will sell land in lots of 500 ha, which presents a major barrier to interested smallholder farmers in upper Piura who currently cultivate an average of 2.2 ha and could not afford the hefty price tag. Additionally, a consultancy estimated the area of specific crops that will be grown in the 'new valley' in order to estimate water demand. Of the 19,000 ha that will be irrigated in the 'new valley' – which might be managed by a new user board –, 7,000 ha are slotted for table grape production, which is exclusively grown by large agro-export enterprises within Piura. The remaining crops are also agro-export-oriented including mango, citrus, and tomato (Piura Región, 2013).

The leader of the civil society group, Front in Defense of PEIHAP, is highly aware of these challenges and believes that it is only through pooling resources via agricultural cooperatives that *campesinos* will be able to purchase land, "you have to change the [land] laws and better associate the people, because the [agricultural] associations are weak, so people just throw in the towel to the big landowners" (Interview with both authors, 08/02/2015). Based on the current constraints, it is unlikely that smallholder farmers, even farmers in cooperatives, will be able to outbid agro-export groups like Grupo Gloria. While *campesinos* may find employment as labourers in agro-export enterprises, it is the fourth component of the project that has continued to animate civil society participation in advocating for the project.

Campesinos

Many times [politicians] have used [campesinos] as a warhorse to fight for PEIHAP (Agricultural Cooperative President, Interview with first author, 6/24/2015)

Campesinos have been the engine behind PEIHAP, both before and after the modifications of the Fujimori regime. The Front in Defense of PEIHAP, which includes the presidents of many of the Commissions of Users in Upper Piura, mobilises its constituents to ask for governmental funding and keep PEIHAP a political priority. A key question is why, in light of the changes made to PEIHAP during

Fujimori's regime, do they continue to push for the project? We argue that there is both a material and symbolic reason.

As mentioned earlier, Component 4 of PEIHAP consists of drilling tube wells throughout Upper Piura, potentially constructing six small reservoirs in tributaries of the Piura River. This infrastructure, which is slotted to cost USD40.11 million, will be funded through 'mixed investment' meaning it will be paid for partially by the state and partially by users. The exact percentage paid by the users is unknown and the mechanism for irrigator payment has yet to be negotiated. Component 4 is meant to increase the water availability for smallholder farmers who are already part of the Upper Piura User Board and its constituent Commissions of Users. When we asked key leaders in the Front in Defense of PEIHAP why they didn't pursue the fourth component separately, they replied that it was only through generating private-sector and public-sector interest in the more profitable components would there be political will to complete Component 4 (Interview with second author, 11/9/2016). This view is supported by a 2014 agreement between the Regional Government, local municipalities, ANA, Ministry of Agriculture and Irrigation, and PEIHAP, stating that they would collectively support Component 4. The Regional Government, in particular, agreed to finance all pre-investment profiles and feasibility studies necessary for private or public investment in small reservoirs and tube wells, which have yet to be conducted for all six potential small reservoirs. By bundling their infrastructure demands within PEIHAP, the *campesinos* in Upper Piura were able to achieve regional support for local water resources development.

Beyond the material benefits of PEIHAP, *campesinos* in Upper Piura have been advocates for the project through three generations. Multiple stakeholders referred to PEIHAP as the 'dream of their grandparents' and view it as a historical goal that may result in specific benefits for some producers as well as more general regional economic development that would bring vital services and jobs to the area. In the next section, we examine the stakeholders who have the most to lose under PEIHAP, in order to highlight some of the looming challenges facing Piura's new CRH:CP, which will be tasked with addressing these grievances.

WHO LOSES?

PEIHAP, like all mega-irrigation projects, will dramatically reshape the landscape. While some will benefit, others stand to lose critical access to land and water. Through examining who is likely to be harmed by PEIHAP, we can better understand both the equity implications of this project as well as potential future conflicts.

Residents of the 'new valley'

The 19,000 ha 'new' valley that will be developed with water from PEIHAP (see Figure 2) was referred to as "empty and available land" by an engineer in PEIHAP, but in reality there are over 400 families that use that land for dryland goat and cattle grazing (Interview with first author, 6/24/2016). These communities have no legal rights to the land, but have been there for generations. The president of the region's coalition of *comunidades campesinas* describes the potential impact of PEIHAP on these communities:

There is going to be a social conflict there, because those people are living with their small agriculture and livestock and the new property owners are going to come and say, 'this land is mine'. They are going to dispossess the people. The people are almost unseen... This should inform the process. It should be known that these people, with their ancestry and customs live there, they need to be considered but the state is not taking that precaution (Interview with first author, 6/16/2015).

The Front in Defense of PEIHAP is concerned with these communities and has helped facilitate a number of community meetings about compensation. The 2009 Environmental Impact Assessment for

the project states that qualifying families will be given 3 ha each with irrigation and a house. Despite these initial promises, no final commitment has been made to these grazing communities by PEIHAP.

Headwaters communities

Within discussion of PEIHAP, little attention is given to highland users that will be affected by construction and water diversions for Olmos and PEIHAP. This lack of attention is common within the Piura Region where the Huancabamba Province is often viewed as the uninhabited headwaters region, ignoring the rich sociocultural significance of water and its centrality to upstream livelihoods (Mills-Novoa et al., 2017). In reality, Huancabamba is home to approximately 124,000 residents who are primarily reliant on land-based livelihoods such as cultivating coffee and subsistence crops as well as raising goats and cattle. The Huancabamba Province resides entirely within the Piura Region, but hydrographically Huancabamba encompasses the watershed divide between the coastal watershed of the Piura River and the Amazonian Basin.

Within Huancabamba Province, irrigation users and local authorities expressed a sense of extreme pessimism in relation to PEIHAP, "In Pingula [a headwaters community] they are opposed [to PEIHAP] because they say that in exchange for water they should do public works here, but they do nothing" (Interview with second author, 12/21/2014). Some highland users expressed concern about the possibility of diminishing water in the channel as a consequence of water diversions for PEIHAP, but fear that if they oppose the project they will jeopardise their rights to water resources. This situation was made worse by a lack of clarity about whether and how affected communities will be compensated (Taboada, 2016).

In the Environmental Impact Assessment that PEIHAP completed in 2009, there is a Compensation and Involuntary Relocation Plan that "complies with the legal norms in Peru" and provides criteria for the compensation of dislocated populations due to flooding from creation of reservoirs or construction of tunnels (Gobierno Regional Piura, 2008: 185). Compensation for affected people is determined by reviewing the formal land titles. This compensation criterion is highly exclusionary, since many communities in the headwaters region and pastoralist communities do not have formalised land titles due to the high costs associated with the legal process of attaining them and the prevalence of communal landownership. By tying compensation to land titles, the most marginalised communities will likely be uncompensated for losses.

PEIHAP, like all large water infrastructure projects, will create substantial environment and social impacts. The CRH:CP will be at the front lines of confronting these impacts since they are tasked with facilitating conflict resolution and promoting compromise between their advisory council and membership around water resources challenges. The CRH:CP will struggle to meet its water governance goals and cope with the unfolding impacts of PEIHAP if it continues to inadequately appreciate unequal power among users and managers, long-standing conflicts, and differentiated resources access among water users and sectoral actors. These challenges are going to become salient as PEIHAP materialises and the benefits and negative impacts are distributed unevenly across the basin.

RESCALING WATER GOVERNANCE: DECENTRALISATION AND LARGE, CAPITAL-INTENSIVE WATER INFRASTRUCTURE

Within Peru and globally, IWRM reform has rescaled water governance to the river-basin scale. This trend has complimented a broader trend in the decentralisation of state functions to the regional scale. Decentralisation presents challenges to the development of large-scale water infrastructure both financially, technically, and spatially. In this section we first examine the legal underpinning for the decentralisation of water governance in the Chira-Piura River Basin and the related financial and

technical ramifications of these changes for development of water infrastructure. We then delve into the spatial challenges presented by interbasin transfers to river basin councils.

Decentralisation and diminished financial and technical capacity

In accordance with the 2002 Decentralisation Law (Law 27783), regional governments in Peru have been saddled with financing and overseeing the construction of mega-irrigation projects within their territory. While the Regional Government of Piura views PEIHAP as an essential "stimulating agent for the economy", it does not have sufficient discretionary funds to fully fund large-scale water infrastructure development (Draft Law 03137). Within the Chira-Piura River Basin, there is a discussion of the future funding mechanisms for PEIHAP, which follows a familiar annual rhythm. The civil society group, the Front in Defense of PEIHAP, meets with the regional governor to request that public funds be allocated to support the project. The regional governor, in turn, goes to the central government to request supplementary funding for PEIHAP.

The members of the Front in Defense of PEIHAP are continually concerned that the central or regional government will cease to financially support the project and seek a private-public partnership. Civil society actors fear that private-sector intervention will jeopardise the '*rostro social*', or 4th component of the project. The president of the Front describes this concern:

I am all in favour of keeping all the alternatives open. The first alternative is the Peruvian government invests in [PEIHAP] so it is the central government and regional government. It is the Peruvian people's government that has put in the tunnel and everything. That for me is number one because it would guarantee that you could maintain a *rostro social* to this project. It won't become a neoliberal or capitalist project – it will remain a social project (...) [A public-private partnership] would be our second alternative, but the regional government would have to truly commit themselves to monitoring the project to make sure that it is going to be helpful to the poor farmers (Interview with both authors, 8/2/2015).

This annual budgetary debate has become increasingly fraught in recent years as the construction costs of the interbasin tunnel have ballooned and accusations of corruption within the executing entity for PEIHAP have surged. PEIHAP has been plagued by a number of managerial scandals such as the overpayment of an excessively large staff, the dismissal of multiple head engineers, and the contractual irregularities with the construction companies Camargo Correa and Obrainsa-Astaldi as mentioned above.

PEIHAP's technical, financial, and managerial scandals reveal the weak technical and regulatory capacity of the regional government in overseeing the project. The precariousness of funding and poor regulatory oversight reflects some of the challenges that decentralisation of water management poses for large-scale infrastructure development. The potential conversion of the project to a public-private partnership would provide more secure funding mechanisms, but would also likely alienate civil society actors who have been key advocates for the project.

Interbasin transfers challenging river basin management

Interbasin transfers challenge the 'naturalness' of the river basin as a scale of management. ANA, in agreement with the appropriate River Basin Council, approves the implementation of public or private infrastructure. In the case of large hydraulic projects that overlap several river basins, such as the case of PEIHAP, ANA alone approves the project, thus circumventing the River Basin Council's advisory council and technical secretariat altogether (Law 29338: Title 8: Article 104). While the CRH:CP was bypassed in the PEIHAP approval process, the technical secretariat of the CRH:CP will be responsible for incorporating the new project into their river basin plan, water allocation decisions, and coordinating new users, as well as working with the multi-sectoral stakeholder advisory council to resolve conflicts arising from the project.

While ANA has approved PEIHAP, it was not without conflict between three neighbouring regions, Cajamarca, Lambayeque, and Piura, which all assert rights over the Huancabamba River. This conflict reached a zenith in 2007, when the Regional Government of Cajamarca requested the postponement of congressional discussion at the national level on the PEIHAP project, which would effectively block the central government from funding PEIHAP. Additionally, the Regional Government of Lambayeque felt threatened by PEIHAP because their mega-irrigation project, Olmos, is also dependent on the Huancabamba River:

We want to make clear that the Regional Government of Lambayeque does not oppose and has never opposed the claim of the Piurano people to make the irrigation of the lands of Alto Piura a reality, but we consider it essential to carry out a technical-hydrological analysis that favours complementarity with the Olmos (Regional Government of Lambayeque, 2008, Office No. 026-2008-GR.LAMB / PR).

In response to the concerns of Cajamarca and Lambayeque, Marisol Espinoza, a congresswoman from the Piura region, stated:

A number of obstacles have arisen due to the alleged claim of a third actor, which is the Cajamarca Region. But from here we confirm that the waters of Alto Piura, which will also be used by the Olmos Project, are born in Huancabamba, which is a Piurano Province (Congressional Debate, 2008: 19, emphasis added).

As a result of this contestation between regions, the central government, through ANA, commissioned an interregional technical committee in order to evaluate the availability of water for both PEIHAP and Olmos. The report found that:

At an annual level, for the simulated period [1965-2008], PEIHAP's [water] reserve (335 MMC), is 100% covered under the distribution system. PEIHAP should pose and secure within the legal framework, the option to divert larger volumes for its reserve (Comité Técnico Interregional Piura, Lambayeque y Cajamarca, 2009: 124).

This study silenced regional challenges to PEIHAP, but it did not consider highland water users in its model because the majority of these users do not have state-sanctioned water rights. There are no estimates for the amount of water used in Huancabamba, but smallholder farmers and pastoralists in the province rely on a mix of rain and surface water for their livelihoods. Additionally, 21% of drinking water demand in the province is met through springs and streams (Valladolid and Portilla, 2014). The technical secretariat of the CRH:CP has challenged the scientific legitimacy of the report, but has not directly engaged with PEIHAP on this issue. This disconnect reflects an underlying tension between the technical secretariat of the CRH:CP and executing entity of PEIHAP, which centres on claims of scientific legitimacy.

THE TECHNICAL SECRETARIAT OF CRH:CP vs. PEIHAP

The technical secretariat of the CRH:CP has undergone millions of dollars of technical capacity-building through the World Bank's Water Resources Modernisation Programme and the IDB-funded project mentioned above. This group of hydrologists and agronomists set the terms of water resources planning, allocation, and distribution in the basin by creating the hydrological models that are used as decision-support tools. Despite the importance of the technical secretariat in the basin, they are disengaged from PEIHAP and were bypassed in the approval process for PEIHAP. The head of the technical secretariat reflects on his disapproval of PEIHAP, "[t]hese are not the political conditions for doing it and also we are not convinced that there is sufficient water for this project and Olmos" (Interview with first author, 13/1/2016). The staff of the technical secretariat CRH:CP undermine the credibility of PEIHAP through dismissive comments such as those shared above.

The president of the Upper Piura User Board, who is a key advocate for PEIHAP, expands on the challenges posed by the technical secretariat of CRH:CP:

We have a dispute with the [river basin] council. First, the council is extremely important, it is fundamental...the dispute that we have is the council's approach. It is too technical. I do not want to say anything bad, but they leave out the socio-political part and it becomes a problem (...) We don't agree with their [water resources management] plan because it isn't a plan...A plan has vision and this plan doesn't have vision. There is not even PEIHAP in the plan (Interview with second author, 11/9/2016).

Ultimately, the perspective of the technical secretariat is superseded by a number of more powerful actors. The technical secretariat can only offer suggestions to ANA and is presided over by the Regional Government, which is a key promoter of the project. Additionally, the River Basin Council itself is divided. Its multi-stakeholder advisory council favours the project, but has remained relatively inactive in promoting PEIHAP because its membership has broader basin-wide and cross-sectoral concerns and is tasked with shorter-term water allocation and planning duties. This tension, however, does reflect some of the internal challenges occurring between IWRM water managers and large infrastructure promoters at the regional and national level, though it is clear that the power remains firmly in the hands of the latter.

The disconnect between the CRH:CP and the executing entity of PEIHAP will inevitably dissolve as conflicts and inequities in water distribution materialise when PEIHAP is completed. Natural resources challenges such as sedimentation of infrastructure or overestimation of water availability, as the technical secretariat of CRH:CP currently estimates, have the potential to spark conflict between users. The River Basin Council will be tasked with confronting these tensions.

The 2009 Water Resources Law did create a substantial reconfiguration of water users and water managers via the River Basin Council. The executing entity for PEIHAP, which will continue to manage PEIHAP once it is operational, will assume a seat on the advisory council of the River Basin Council and this space will become the forum for conflict resolution between users. The capacity of ANA and River Basin Council to cope with conflicts within CRH:CP's multi-stakeholder advisory council, and the basin more broadly, via conflict resolution and planning processes will be tested by the consequences of PEIHAP.

CONCLUSION

In 2016, ANA released the five-year progress report for the 2009 Water Resources Law. In this document ANA announced that they had achieved the goal of implementing IWRM and that "for the first time in the history of water resources management, Peru has a National Water Resources Plan, as an instrument for planning, at the medium and long term, that will permit, at the national level, the realisation of integrated water resources management (IWRM), preferably with a vision toward demand" (ANA, 2016: 30). Despite the pervasive demand-side IWRM discourse that surrounds the 2009 Water Resources Law and its implementation, the reality of water management in Peru differs greatly.

In the Chira-Piura River Basin and across the arid coast of Peru, the transition toward IWRM-inspired water policy has not meant a transition away from large-scale infrastructure development. In the wake of the 2009 Water Resources Law in Peru, the development of large-scale irrigation infrastructure is justified as an 'exceptional measure' with the IWRM framework. The exceptionality of PEIHAP and other mega-irrigation projects relies on the discourse of infrastructure as a public necessity and infrastructure as a critical economic catalyst with positive reverberations for national and regional development. Project promoters and politicians paint large-scale infrastructure as the only means to generate employment and stimulate regional economic growth.

The exceptionality of interbasin transfers justifies bypassing the newly formed River Basin Council altogether. Instead of fostering decentralisation, the 2009 Water Resources Law delegates decision-

making power over interbasin infrastructure projects to the central government, while leaving regional actors to cope with the myriad environmental and social conflicts that are likely to result. The exclusion of CRH:CP from the approval and implementation of PEIHAP reflects how the discourses of, and mechanisms for, IWRM and water infrastructure development remain siloed in Peru. It is not until PEIHAP is fully operational that its executing entity becomes part of CRH:CP's advisory council and is overseen by ANA. This late inclusion of PEIHAP into the participatory river basin planning process facilitated by CRH:CP precludes any proactive or preventive actions to address the negative consequences of PEIHAP.

Despite the discursive shift toward basin-scale water management, the central government remains a key promoter of large-scale infrastructure in Peru. The economic development goals of the state are predicated on dramatically expanding agro-exports. ANA, which is housed within the Ministry of Agriculture and Irrigation, is responsible for the realisation of that goal. In order to meet this goal, ANA continues to support the expansion of the agricultural frontier through interbasin transfer projects as long as agribusiness foots at least part of the bill. Additionally, the Congressman Pari's Lava Jato Investigative Commission underscores that collusion between construction companies and public officials and rampant mismanagement of public funds are commonplace in the development of large-scale water infrastructure development in Peru. These construction companies and their political allies are powerful proponents for the continued development of PEIHAP and other projects like it.

Perhaps most surprising in the case of PEIHAP is the key role of the civil society group, Front in Defense of PEIHAP, in pushing forward the project despite their relatively meagre and uncertain benefits from the entirely independently 4th Component. This 4th Component is far from certain. Olmos, the neighbouring mega-irrigation project was proposed after and completed before PEIHAP, partially because social considerations were swept aside and a public-private partnership facilitated project financing. While the Front in Defense of PEIHAP is vocal about wanting to avoid the experience of Olmos, Olmos is an important signal that the socially oriented components of large-scale water infrastructure can easily go unfunded for the sake of expediency and to the benefit of agribusiness.

While it may appear that the new IWRM-inspired law is only a hollow strategy for garnering international credibility and multilateral funding, we argue that the new law still matters. The 2009 Water Resources Law has generated real organisational changes in the regions where River Basin Councils have been created. More than signalling a real transition to the 'soft path' water management, the River Basin Council has generated a reconfiguration of stakeholders and a structured planning process. While the participatory mechanisms and the expertise of the technical secretariat of the CRH:CP have not been brought to bear on the approval and construction of PEIHAP, this organisation will be left to cope with the negative impacts and resulting conflicts. It is unlikely that CRH:CP will have the funding, technical capacity, or authority to confront and resolve the conflicts arising from the poor technical design, environmental mismanagement, community displacement, and water allocation disparities that are likely to arise from PEIHAP. Large-scale water infrastructure, such as PEIHAP, will test the limits of River Basin Councils, and the aspirations of IWRM more broadly, in Piura and across Peru.

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