«Top-Down» or «Bottom-Up»? Social Participation, Agriculture and Mining in the Integrated Management of the Chancay-Lambayeque Watershed

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Abstract

This paper assesses the institutionalization of social participation under the Integrated Water Resources Management (IWRM) model being implemented in the Chancay-Lambayeque watershed. First, it describes the biophysical and social conditions in the basin, then the evolution of national and local water institutions, from the Agrarian Reform to further decentralization and economic liberalization. Emphasizing the influence of the agricultural and mining sectors in these processes, four participatory mechanisms of the IWRM model are studied. The conclusions highlight: 1) the limited capacity of the central state to integrate a management model in which agricultural use is widely prevailing, and 2) the political challenge of promoting social participation in a context of conflict with the mining sector over the quality of the resource.

Keywords: agriculture, decentralization, Integrated Water Resources Management (IWRM), mining, social participation.

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Acronyms

AAA	Administrative Water Authority (Autoridad Administrativa del Agua)
AACCH	Autonomous Authority of the Chancay-Lambayeque Watershed (Autoridad Autónoma de la Cuenca Hidrográfica Chancay-Lambayeque)
ADI	Area of direct influence (Área de influencia directa)
AII	Area of indirect influence (Área de influencia indirecta)
ALA	Local Water Authority (Autoridad Local del Agua)
ANA	National Water Authority (Autoridad Nacional del Agua)
ATDR	Irrigation District Technical Association (Asociación técnica del distrito de riego)
BVN	Buenaventura Mining Company (Compañía de Minas Buenaventura)
CRHC	Watershed Water Resources Council (Consejo de Recursos Hídricos de Cuenca)
Epsel	Lambayeque Water and Sanitation Company (Empresa de Agua y Saneamiento Lambayeque)
EQS	Environmental quality standard (Estándar de calidad ambiental)
GWL	General Water Law (Ley general de aguas)
GWP	Global Water Partnership
IAD	Institutional Analysis and Development
IDB	Inter-American Development Bank
IFC	International Finance Corporation
IMAR	North Coast Institute for Water Management Support (Costa Norte Instituto de Apoyo al Manejo del Agua)
Ingemmet	Geological, Mining and Metallurgical Institute (Instituto Geológico Minero y Metalúrgico)
IWRM	Integrated Water Resources Management
JUDRCHL	Chancay River-Lambayeque Irrigation Users Board (Junta de Usuarios del Río Chancay-Lambayeque)
Minagri	Ministry of Agriculture and Irrigation (Ministerio de Agricultura y Riego)
MLZ	La Zanja Mining Company (Minera La Zanja)
Mm^3	Millions of cubic meters
NWRPS	National Water Resources Policy and Strategy (Política y Estrategia Nacional de Recursos Hídricos)
PEOT	Olmos-Tinajones Special Project (Proyecto Especial Olmos-Tinajones)
S.A.C.	Privately held limited liability company (Sociedad anónima cerrada)

SIDA	Swedish International Development Cooperation Agency
SNMPE	National Society of Mining, Petroleum and Energy (Sociedad Nacional de Minería, Petróleo y Energía)
UNDP	United Nations Development Program
UNPRG	Pedro Ruiz Gallo National University (Universidad Nacional Pedro Ruiz Gallo)
USAID	United States Agency for International Development
WB	World Bank
WRL	Water Resources Law (Ley de recursos hídricos)
WWF	World Wildlife Fund

INTRODUCTION

Central state water management policies produce multiple externalities at the local level, because water is needed for various economic activities: energy production, recreation, extractive industries, subsistence agriculture and large-scale export agriculture industries (Ballabh 2008). Besides being an economic good, however, access to water for human consumption and sanitation is a human right, which makes water management a global problem. For that reason, transnational bodies that have substantial influence in water management policies formulated by central states often intervene in local water management (UN 2010; Scholz 2008; Ostrom 2009).

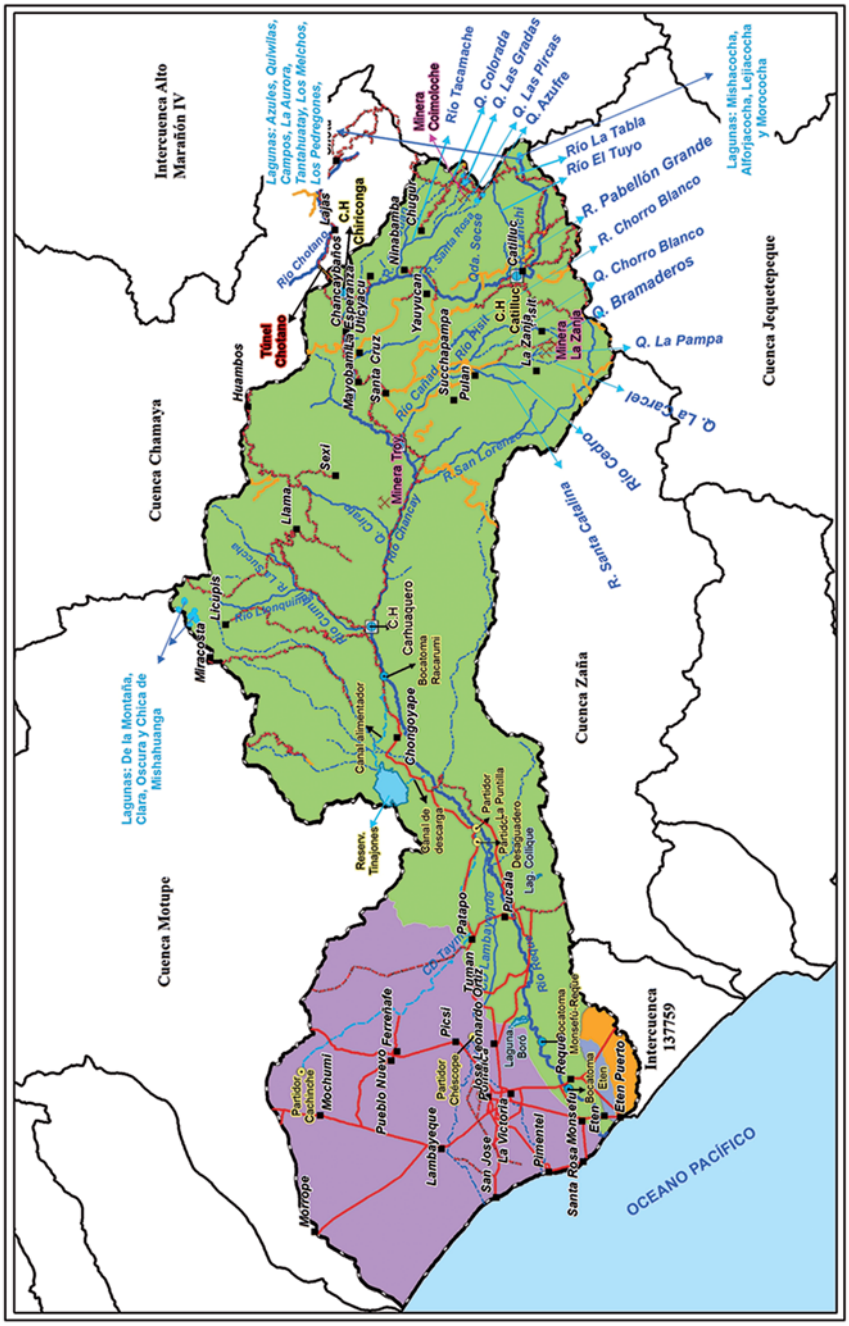
It should not be surprising, therefore, that a significant number of socio-environmental conflicts in developing countries stem from water management: when economies grow, economic activities also expand and competition between different water uses is exacerbated (Akhmouch 2012). To take problems of cooperation to an extreme, these multiple demands extract resources from the same source: a local river.

If a system like the one described above is able to supply water for all economic activities while preserving the quantity and quality of the resource, the system is environmentally sustainable. But if the decision-making process for distributing water is also participatory (involving all interest groups), then the system is oriented toward **sustainable development.** Understood in this way, sustainable development «is a function of economic growth, environmental sustainability and participation»[2] (Dourojeanni 2001).

This paradigm, however, avoids the issue of economic growth strategies that depend on the exploitation of natural resources. In developing countries, the lack of institutions for oversight and economic management reduces the possibility of protecting natural resources (in other words, sustainability). And if economic growth depends on the export of minerals and agricultural products, for example, the state's incentives for promoting social participation (that is, equity) in water management are even lower (Barnett and Low 2004). Where mining and agriculture coexist, communities feel that their main means of subsistence, water, is threatened (Bebbington 2012; Boelens *et al.* 2012). Sustainable development there is elusive because mining is needed for economic growth, but the institutions necessary for guaranteeing sustainability do not exist, nor are there incentives to encourage participation.

2. Translation by *Apuntes*.

Map 1
Area of the Chancay-Lambayeque watershed



Source: ANA (n.d.a).

The Chancay River watershed in the departments of Lambayeque and Cajamarca illustrates these challenges. This watershed is home to activities that require intensive use of water and land, with a high degree of competition, but also interrelationship: energy production, irrigation in the valley, extractive operations in the highlands, human consumption and other specific industrial uses. It also receives the discharge of waste from towns and industries located throughout the watershed. Map 1 shows some points of empirical evidence for this discussion. The watershed's main urban centers – Ferreñafe, Lambayeque and the regional capital, Chiclayo (with 650,000 inhabitants) – are located in the valley; 60 kilometers east is the city of Chongoyape, from which the Tinajones reservoir (the largest hydraulic infrastructure in the watershed) is operated; at the confluence of the Maichil and Chancay rivers, the exact point where the middle watershed begins, is the Carhuaquero Hydroelectricity Plant (operated by Duke Energy); near the northeastern border of the natural watershed (broken black line) is the tunnel that channels water from the Chotano River, then, to the south, Lake Mishacocha, the headwaters of the Chancay River, as well as three mining operations: Minera Troy, Minera Coimolache and Minera La Zanja (MLZ).

To coordinate the multiple uses of water in this watershed, the «Water Resources Law» (WRL; 2009) established integrated water resources management (IWRM) as an area of the National Water Resources Strategy and Policy (NWRSP). With funding from the World Bank (WB), the IWRM model is implemented through the «Water Management Modernization Project», for which the first pilot watershed (of a total of six) was established in 2011 in the Chancay River in Lambayeque. IWRM currently dominates water policy at the global level and is the definition used by the Global Water Partnership (GWP).[3] «A process which promotes the coordinated development and management of water, land and related resources in order to maximize economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems» (GWP 2000:22).

This paper studies the implementation of IWRM in the Chancay River watershed, with special attention to the institutionalization of social participation in water management. The first section explains the principles that govern integrated water resources management, to place it within a broader theoretical debate between «top-down» and «bottom-up» approaches to natural resources management. The second section adopts three variables from Elinor Ostrom's institutional analysis and development (IAD) framework.[4] The main

3. The GWP was founded in 1996 by the World Bank (WB), the United Nations Development Program (UNDP) and the Swedish International Development Cooperation Agency (SIDA) to promote IWRM globally.
4. Elinor Ostrom won the Nobel Prize in economics in 2009 for her analysis of the economic governance of common natural resources, such as fisheries, forests and rivers.

IAD approach consists of the environmental «three worlds of action»: 1) attributes of the biophysical environment, 2) characteristics of the community, and 3) institutions or regulations that govern that area of action (Kiser and Ostrom 1982; Ostrom 1995a, 2009). This lays the groundwork for the third section, which analyzes four concrete mechanisms of social participation under the new model.

First, there is an analysis of the way in which the «natural» delimitation of the watershed hinders the participation of groups that, in practice, are interconnected to the socio-ecological system because that delimitation is used to determine the makeup of the Watershed Water Resources Council (Consejo de Recursos Hídricos de Cuenca, CRHC). This is followed by an analysis of the representative nature of the CRHC and its impact on the quality of participation. Third, analyzing the waste discharge permits granted to MLZ, there is a description of how decision-making powers are retained on the central level. Finally, there is discussion of how participatory monitoring activities in the areas of direct and indirect influence of mining operations reveal a lack of transparency that contradicts the participatory discourse with which the process is promoted.

Empirical support for this study is drawn from various field visits to the upper, middle and lower watershed between June and October 2012, where all members of the CRHC and the Watershed Technical Coordination Committee (Comité Técnico de Coordinación de Cuenca, CTCC) were interviewed, as were relevant authorities of the National Water Authority (Autoridad Nacional del Agua, ANA), the Inter-American Development Bank (IDB) and the WB. Dozens of surveys and interviews were also carried out with users along the course of the Chancay River and with officials of the regional governments of Lambayeque and Cajamarca, IMAR Costa Norte (Chiclayo), the Chancay River-Lambayeque Irrigation Users Board (Junta de Usuarios del Río Chancay-Lambayeque, JUDRCHL, Chiclayo), Geological, Mining and Metallurgical Institute (Instituto Geológico Minero y Metalúrgico, Ingemmet, Lima) and other institutions.[5]

1. «TOP-DOWN» OR «BOTTOM-UP»? TWO APPROACHES TO WATER MANAGEMENT

In order to identify the assumptions of IWRM that permit us to place it within the broader theoretical debate about social participation and environmental management, this definition should be considered: IWRM is a **participative** planning and implementation

5. The author especially thanks Nicole Bernex and Karla Vergara of CIGA-PUCP for having allowed him to participate in the development of the «Atlas geográfica de la cuenca alta Chancay-Lambayeque», which made it possible to carry out robust fieldwork in MLZ's areas of direct and indirect influence.

process based on science, which integrates all stakeholders in order to determine how to meet society's long-term needs for water while maintaining essential ecosystem services and economic benefits (USAID 2004: http://pdf.usaid.gov/pdf_docs/PDACH818.pdf). IWRM helps protect the world environment and stimulates economic growth and sustainable agricultural development while promoting democratic participation in governance. Worldwide, politics and water management is beginning to reflect the fundamentally interconnected character of water resources and IWRM is emerging as an alternative to the sector-by-sector, «top-down» style of management that predominated in the past (GWP 2010: 2: http://www.gwp.org/The-Challenge/What-is-IWRM/).

What does the statement that IWRM is an alternative to the «top-down» water-management style mean? The «top-down» approach seeks to avoid the «tragedy of the commons», famously illustrated by Garrett Hardin in 1968. In this scenario, all individuals satisfy their interests, but they exhaust a limited common natural resource, which happens when «rationally, too many right holders to a good lead to usage beyond the optimum or to its depletion» (Kosnik 2011).

Thus, when users are not capable of organizing themselves to manage their resources efficiently and sustainably, governments must impose solutions «from above» to avoid exhausting them (Hardin 1968). Because decentralized policies «run the risk of being buried under the avalanche of particular interest-based access claims to water resources» (Matz 2008: 245), a strong central authority is necessary to constrain the multiple demands. These «top-down» policies tend to impose technical or administrative solutions, as if natural resource management should be implemented solely by «experts, who are objective and rational and not subjective and irrational like local people and communities» (Smith 2008: 354).

Toward the end of the 1980s, however, this environmental management style was harshly criticized for producing locally inappropriate and unsustainable outcomes (Ostrom and Anderson 2008). Environmental policies designed by development banks paid attention to the recommendations of «professional» hydrologists, ecologists or geologists and systematically considered the local population as «an obstacle to an efficient and rational organization of resource use» (Agrawal and Gibson 2001: 4). The reaction to this centralized vision was to demand the active involvement of local stakeholders in decision-making processes. Central governments thus understood that water policies are never purely technical and that they therefore cannot be designed and implemented solely by engineers or politicians.

Although the concept of community participation emerged during the 1950s, it was only between 1980 and 1990 that the «bottom-up» approach became a principle of environmental governance (Smith 2008). This reaction affirmed that only with participatory mechanisms could the state evaluate the long-term political, social and ecological implications of its development strategy. This gave impetus to the decentralization of natural resource management, and today practically no environmental policy exists that does not recognize public participation as essential for achieving sustainable development (Perkins 2011; Burchi 2012). Put simply: a «bottom-up» approach is «an inclusive decision-making process, which integrates multiple stakeholders and emphasizes consensus decision-making procedures in environmental management» (Goldin 2008: 353).

IWRM also attempts to encourage participation in water management from «the lowest appropriate level» (Dinar *et al.* 2007). The «lowest **appropriate** level» means, on the one hand, that the local community must participate in water management; on the other, however, it means that only **part** of the decision-making process is decentralized, «with some decisions being devolved to stakeholders, and others being kept at central, state or provincial levels, when and as appropriate» (Kemper *et al.* 2006: 4). This is one of the main barriers to effective decentralization of the water sector: «the frequent lack of opportunities provided by these policies to local resource users when it comes to acquiring and exercising effective control over the resources that they use» (Ostrom and Anderson 2008: 79). We will explore this tension between participation and verticality later in this paper, to show how IWRM combines elements of both approaches; it is more accurate, however, to describe it as a «top-down» style with certain participatory mechanisms.

2. HYDROGRAPHIC WATERSHED AND MANAGED WATERSHED: BIOPHYSICAL, SOCIAL AND INSTITUTIONAL CONDITIONS OF A BI-REGIONAL WATERSHED

This section describes the hydrological «three worlds of action» in the watershed, taken from the IAD framework of Kiser and Ostrom (1982). This is used to illustrate how biophysical, social and institutional variables have shaped water-management practices and trends in social participation. In the biophysical and social arena, we highlight the exclusion of the Chota inter-basin water transfer area (see upper right area of Map 1) and the mining concessions in the upper watershed as well as the pressure on and control over water and land exercised by Lambayeque's agriculture sector.

In the institutional sphere, we concentrate on social participation mechanisms designed by two key pieces of water legislation in Peru: the «General Water Law» (GWL; 1969) and the WRL. To evaluate the impacts that these legal frameworks have had on the local level over

40 years (1969-2009), the performance of the three decentralized entities charged with water management and participation is described. This overview reveals the tendency of participatory platforms to focus on the agrarian coast.

Attention is also paid to the impact of national development strategies on water management. Here we find that agrarian and statist economic policies during the Agrarian Reform (1968-1980) created a key role for the central government in water management. With the failure of that economic model, this form of management weakened and was followed by a context of neoliberal reforms and the withdrawal of the state, in which private stakeholders and international development cooperation agencies became key players in the water sector. This illustrates the way in which water policies change with development strategies and how, with economic liberalization, they operate simultaneously on multiple levels: global, national, regional and local. The last section describes the new economic conditions and policies in the country, which, in the early 2000s, required the participation of more users in water management, paving the way for the establishment of IWRM in Peru.

2.1 Biophysical conditions and social attributes of the watershed

In Peru, as in many parts of the world, the political demarcation of territory almost never corresponds to watershed boundaries. In the case of the Chancay watershed, its 170 kilometers cross two clearly differentiated regions: the highlands of Cajamarca (an area of inter-basin water transfers, headwaters and tributaries) and the area where its waters are used in the coastal valleys of Lambayeque. Rain falls in the upper region, but little use is made of this water. In contrast, the valley is dry, but there is strong demand for water from the towns of Chiclayo, Lambayeque, Ferreñafe and Eten. There are also three large areas where export agriculture crops are grown: Pomalca, Tumán and Pucalá. There is also extensive agriculture in the valley for the domestic market, mainly sugar and rice (crops that also demand large quantities of water).

The watershed has an area of 5,555 km^2. This does not include the 393 km^2 of inter-basin water transfer zones of the Conchano and Chotano rivers (Map 1), whose flows are partly diverted to the Chancay River through trans-Andean tunnels. We will discuss in greater depth this «gap» created by inter-basin transfers, because, although these areas provide one-fifth of the Chancay's water flow to agriculture in the Lambayeque Valley, they are not represented in the current CRHC.

The Chancay watershed has the country's highest demand for agricultural use and the second-highest for human use in towns (ANA 2010). Despite this strong demand for water, it is common to hear the expression: «We don't lack water; we lack management». Table 1

shows the water balance updated to 2012-2013. And, in fact, the watershed does not have a water deficit.

Table 1
Annual water balance in the Chancay-Lambayeque watershed, 2012-2013 (in Mm^3)

Indicator	Quantity of water	
Total supply		1,160.87
- Surface water	1,012.67	
- Groundwater	87.20	
- Return flow	61.00	
Total demand		- 1,082.28
Balance		78.59

Source: ANA (n.d.a).

Table 2 shows how the water supply is distributed among users and illustrates the most intensive demands and, therefore, where the «bottlenecks» are in the efficiency and sustainability of water use. The Chancay-Lambayeque Local Water Authority (Autoridad Local del Agua, ALA) calculates that the agriculture sector – which has the greatest demand for water – has a water loss rate of 62 percent due to filtration, the poor condition of irrigation canals and inappropriate operation of the Tinajones system. The next-largest demand is for human use in towns, where the system registers losses of 35 percent.

Table 2
Water use in the Chancay-Lambayeque watershed (in percentages)

Types of water use	Percentage
Agriculture	93.0
Population	4.9
Industrial-commercial	2.0
Mining	0.1

Source: ANA (n.d.a).

Chancay «Cajamarca»

The headwaters of the Chancay River are found at 3,500 meters above sea level, in Lake Mishacocha. There is no significant irrigation infrastructure project in the section of the watershed that lies in Cajamarca, which is therefore a «non-regulated irrigation sub-district». Most cultivated land in this zone is «irrigated» only by rainwater. Small-scale

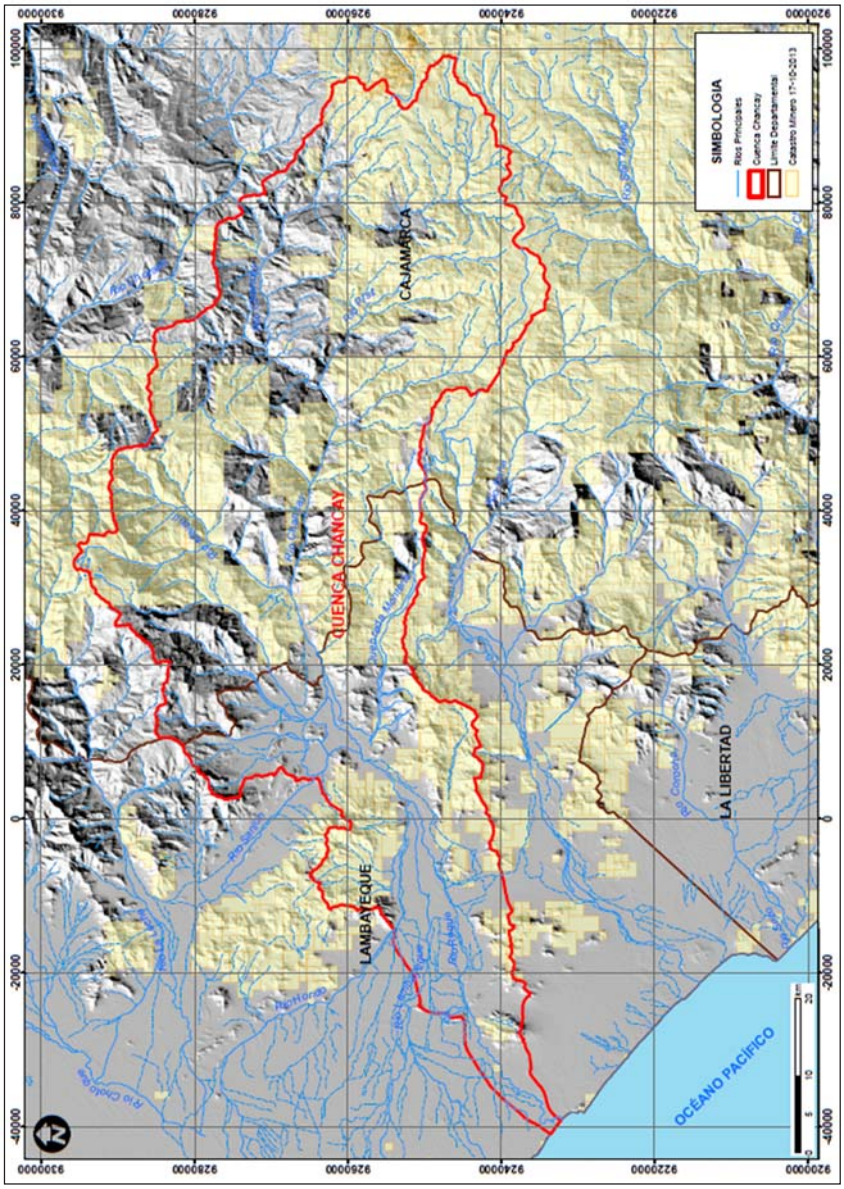
agriculture and livestock activities are common, and there are mid-size dairy farms, for example in the districts of Tongod, Catilluc and Chugur, which are located very close to the MLZ and the Coimolache Mining Company's Tantahuatay mining project, two opencast gold mines operated by the Buenaventura Mining Company (BVN).[6]

Mining is the most intensive economic activity in Cajamarca and has a long and complex history of coexistence within the region, especially in regard to water quality. Hualgayoc, for example, has 14 abandoned mine waste sites along just one stream (the Colorada watershed), but there are many others that have been polluting natural water sources since colonial times (the so-called «nameless mine shafts»). ANA's identification of sources of contamination confirmed that 9 percent of the point sources polluting the Chancay are abandoned mine waste sites. There currently are projects that are not yet discharging wastes (Los Pircos, Tantahuatay), as well as others that are already doing so (including MLZ). The report also states that during the rainy season, the waste sites further concentrate metals in soils that already have a naturally high concentration of metals (ANA 2012).

As Map 2 shows, many of the mining concessions for exploration and/or production in the watershed are superimposed over other concessions, farming communities or areas known as «headwaters» (Bebbington 2012).[7] ANA's report on identification of sources establishes that the companies with the largest number of concessions are: Vale Exploration Peru S.A.C., Goldfields La Cima (nearly superimposed over Lake Mishacocha), Rio Tinto Mining Exploration and the Coimolache Mining Company, MLZ and Yanacocha (the last three belong to BVN) (ANA 2012). For this reason, contamination of water with minerals here is almost always associated with mining projects regardless of whether they are in the exploration or production phase (Budds and Hinojosa 2012).

6. BVN is the largest holder of mining rights and concessions in Peru. The company is a partner of Newmont Mining Corporation and the IFC (the World Bank's International Finance Corporation) in Yanacocha, a mine located very close to the Chancay watershed in Cajamarca. Conga, the company's copper project, is also in Cajamarca, but has been suspended since November 2011.
7. The concept of headwaters is widely debated. The objetives of this study do not allow us to address this debate here. Suffice it to say that the reference is to the upper watershed or the area where a river or water source originates.

Map 2
Mining concessions along the Chancay River



Source: Ingemmet (2013).

Chancay «Lambayeque»

The other clearly differentiated sector of the watershed is the flat, coastal part of the valley, which extends from the confluence of the Maichil River, the Cumbil and others (at 500 meters above sea level; see Map 1 near the Carhuaquero hydroelectric plant) to the point where the river empties into the Pacific Ocean, in the department of Lambayeque. The departmental capital is Chiclayo, the administrative seat and commercial center of what is known as the «socio-economic corridor of the North Eastern Marañón Region», consisting of Lambayeque, Cajamarca and Amazonas. Outside the urban areas, the valley under cultivation today was desert until the Tinajones reservoir (with a capacity of 320 Mm^3) was built in the 1950s. Since then, Tinajones has been indispensable infrastructure for irrigation, human consumption of water, and energy production in the watershed.

Administratively, the valley consists of a **regulated** irrigation sub-district. Tinajones stores, regulates and distributes the flow of the river among approximately 28,000 small farmers organized in 15 irrigation committees. The three agricultural export industries in the area, Pomalca, Tumán and Pucalá, irrigate part of their land with well water, but also reduce costs by taking advantage of the Tinajones system. The Carhuaquero hydroelectric plant must also coordinate its demands and flows with agricultural uses to prevent brownouts in coastal cities. The JUDRCHL and the Water and Sanitation Company of Lambayeque (Empresa de Agua y Saneamiento de Lambayeque, Epsel) must coordinate water use and have serious problems doing so, because the system is operated based on crop and irrigation plans, the cycles of which greatly affect the quality of water that later is used for human consumption in towns. This favoring of the agricultural sector results in algae entering the water that goes to the population. This has led to a conflict that has been in the courts since 2008. Regardless of their differences, both types of users fiercely oppose mining in Cajamarca, because they are «downstream» from these operations and therefore face the possibility of consuming and irrigating their crops with water into which waste has been discharged.

Table 3 shows one of the many water imbalances related to agricultural use that occur in the watershed. The pressure exercised by the JUDRCHL (Lambayeque) over land and water in the lower watershed is far greater than in the middle and upper regions (Cajamarca). Even non-agricultural users in the valley consider that the JUDRCHL irrigation water users are «owners of the water» in Lambayeque and the CRHC considers this conflict the main bottleneck for integrated management, because it does not improve the efficiency of the system, however, it also does not switch to other crops that demand less water.

Table 3
Agricultural use of the Chancay-Lambayeque watershed

Zone	Area under irrigation (in hectares)	Irrigation organizations	Number of users
Lower	118,523	One water users board 15 irrigation commissions	28,335
Middle	1,515	Three irrigation commissions	676
Upper	5,341	One irrigation commission	2,547

Source: ANA (n.d.a).

2.1 Water legislation and institutional arrangements for social participation

The «General Water Law» (1969) and the Autonomous Authority of the Chancay-Lambayeque Watershed (1991)[8]

The GWL of 1969 established that waters were the property of the state and did not recognize the possibility of acquiring rights to them. This law was consistent with the economic development strategy of the Agrarian Reform and the Ministry of Agriculture therefore was the court of last resort for resolving conflicts, managing permits, and conserving and increasing the supply of this resource.

Regarding users' participation in water management, the GWL[9] established that they should form irrigation committees to channel complaints, maintain hydraulic infrastructure, cooperate in distributing water and charge irrigation fees in their sectors. The law also created the irrigation district as the territorial unit for administering and distributing water, according to crop and irrigation plans. It also gave rise to irrigation district technical associations (IDTA), entities charged with administering water for agricultural and non-agricultural use. In the watershed under study, the IDTA had an agrarian bias and, in practice, functioned directly as a document reception office for the agricultural sector. The non-agricultural sector was not represented, and the IDTA's scant budget did not make it possible to address the demands of users in the upper part of the watershed.

8. The relevant legal norms on this topic are: the «Law of Promotion of Investments in the Agricultural Sector» (Title V, «On water»); the implementing regulations for this law (Title V, «On water»); the norm that created the AACCH and its rules of organization and functions (Ministerial Resolution Nº 0098-94-AG, of 4 March 1994).
9. One interesting aspect of this law is that, although it mentions watersheds as the appropriate units for environmental management (like the subsequent WRL), the word «integrated» does not appear even once.

Twenty years later (1991), the central state established a new administrative unit: the Autonomous Authority of the Chancay-Lambayeque Watershed (Autoridad Autónoma de la Cuenca Hidrográfica Chancay-Lambayeque, AACCH). Created under the «Law of Promotion of Investments in the Agriculture Sector», it was the highest-ranking decision-making body overseeing the use and conservation of water and soil. It was a decentralized public agency within the agriculture sector and was conceived to: 1) promote the development of agricultural and livestock activities, and 2) promote and direct the formulation of master plans for the rational use of water in its jurisdiction. It should be noted that this agency included the part of the Chotano River area of the sub-watershed (the area of inter-basin transfers).

Almost from its birth, however, the AACCH was weak. Governments that followed the Agrarian Reform had already made significant modifications to the GWL, plus it operated under another political constitution within a year of its establishment (1993); the new constitution provided a framework for new economic policies although water management practices in the valley continued to respect the GWL. The longest-lasting piece of water management legislation in the country was in effect for some 15 years, with key provisions that were out of date, but it was not repealed until 2009. Legal contradictions and loopholes created by this norm clearly contributed to a sector-oriented focus and informality in current territorial and water management practices.

Worse still, the AACCH became a second venue for action, after the IDTA, because the latter also was not formally deactivated and had a stronger institutional presence and greater knowledge of the watershed than the new entities. In any event, like the IDTA, since its main function was to promote agricultural and livestock activities, the AACCH limited the participation of non-agricultural water users and those in the upper watershed. It mainly included farmers in the valley, along with a few other entities that directly or indirectly represented the same interests.[10]

Neoliberalism, decentralization and globalization of water management. In the 1980s, Peru underwent an inflationary crisis of such magnitude that it forced the central state to adopt a structural adjustment program at the beginning of the 1990s. This program

10 . The AACCH consisted of the Chancay Lambayeque IDTA, which held the presidency, and by the following members: two representatives of the JUDRCHL; the president of the Zaña Board of Irrigation Water Users; two representatives of agricultural producers; the executive director of the Olmos Tinajones Special Project; the provincial mayor of Chiclayo; a representative of the energy and mines sector; and a representative of the housing and construction sector. There were no representatives from Cajamarca, despite the inclusion – merely formal – of the inter-basin transfer area of the Conchano and Chotano rivers.

recommended privatizing public sector services, including water and sanitation infrastructure (Goldman 2005). It also sought to reduce budget deficits, which implied reducing the «size» of the state and making it more efficient; it made more sense, therefore, that the regions themselves manage their own natural resources.

As a result, laws for to modernize and decentralize the state apparatus were passed. The «Organic Law of Regional Governments», the «Law of Modernization of State Management» and the «Decentralization Law» are among the norms that explicitly and implicitly redefined the competencies of the institutions involved in water management. With major water infrastructure projects on the verge of collapse because of government neglect in times of crisis, the regions demanded autonomous management of these systems so as to provide maintenance and make them operational. Both Alan García and Alberto Fujimori signed laws transferring the operation and maintenance of water infrastructure to local users, particularly irrigation committees (Ioris 2012). As the central state was withdrawing from management, therefore, the agriculture sector, and Lambayeque as a region, could take control of these systems.

The transfer of responsibilities to the JUDRCHL for operation of Tinajones, however, did not produce sustainable results because the irrigation committees and local authorities lacked the technical and management capacity to administer the system. Meanwhile, the subsequent «Decentralization Law» (2002) did not include special formats for management of water resources in watersheds that extended over two or more regions or departments, which left the Chancay watershed with a management gap that was very difficult to close.

At the same time as this «withdrawal of the state» from water management in Peru, some international networks that were promoting «sustainable development» in the area of water gained influence with governments. The United Nations Water Conference (Mar de Plata, 1977), the International Conference on Water and the Environment (Dublin, 1992) and the U.N. Conference on Environment and Development (Earth Summit, Rio de Janeiro, 1992) are examples of the importance that water-related problems acquired in the global political arena (Perkins 2011). These high-level conferences raised awareness that the solutions to water-related challenges required holistic, integrated solutions at the local and global levels (Goldman 2005). This idea was especially evident at the Johannesburg Summit in 2002, which:

> provides specific targets and guidelines for implementing IWRM all over the world. One of the targets was to develop and implement IWRM and water efficiency plans for all major river basins of the world by 2005. Even though

> there is no global convention on the right to water, IWRM is probably the most influential global concept, in terms of transnational water governance policies (Pangare *et al*. 2006)

The Peruvian state has committed to the principles invoked at these conferences and the WRL reflects that position. Peru's most significant strategic partners in IWRM are the GWP, UNDP, USAID, World Wildlife Fund (WWF), WB and IDB – the latter two finance the «Water Resources Management Modernization Project» – with each organization supporting three pilot watersheds. Critics of IWRM say that these new policies – and the loans made to implement them – are strategies by multilateral financial bodies to ensure the implementation of certain natural resource management models in borrower countries. It is true that IWRM has not been designed locally, but the WRL that implements it was extensively discussed within the framework of Peru's National Accord forum and had significant participation from regional stakeholders. Nevertheless, it is difficult to determine the extent to which the integrated management model has been imposed – or imported. As Fernando Bretas of the IDB put it:

> The Peruvian state will always need money for its policies, so the initiative comes from them. But they also do it because they have seen that IWRM has been implemented successfully in other countries, such as Brazil and Mexico. Ultimately, the loans and agreements are always bilateral and the result of a long negotiation.[11]

The «Water Resources Law» (2009) and the «Watershed Water Resources Council» (2011)

In the Chancay-Lambayeque watershed, the changes to the constitution, without subsequent modifications to the legal framework for the water sector, resulted in a lack of consistency between practice and legislation. This obviously led to conflicts between regions, sectors and users and resulted in illegality and informality in the use of water, which still go on today.[12] The deeper decentralization and regionalization reforms that began in 2000 accentuated sector-based water management, because national government ministries traditionally connected with water (agriculture, energy and housing) had to coordinate their policies with other levels of government. In addition, with IWRM, all users, including the private sector, became involved in water management under the

11. Interview carried out in Washington on April 26, 2013. Fernando Bretas is lead specialist in the IDB's Water and Sanitation Division and participated in a series of loans aimed at «reforms in the Peruvian water sector.»
12. For a more in-depth discussion of the legal loopholes created, such as the impact of the inclusion of the liberal concept of «real rights» in water management, see Cano (2013).

principle of «equal access» (equity). The policy of IWRM thus became established as a way of reorganizing the public and private (non-state) role in water management; this was a way of adapting water management to the new political and economic conditions in the country:

> the scale and nature of water in Peru had significantly changed since the 1990s, following growth in water-related industries, such as large-scale export-oriented agriculture, urban drinking water coverage, extractive industries and hydroelectric power production, all promoted by successive governments and supported by a liberalized economic framework and governance structure. (Budds, 2012:126)

In other words, the WRL had to break through the agrarian bias and propose mechanisms for horizontal coordination (among more ministries of the central government), as well as vertical coordination to link various levels of government and allow access to all activities, to give impetus to economic growth (Akhmouch 2012). In effect, the WRL created the National Water Resources Management System to implement a national strategy on all levels of government (national and sub-national), now with the participation of all water users. The new PENRH sought to shift from disconnected, sector-based management to integrated management «with duly institutionalized interventions [and with] consistent and coordinated management mechanisms, within a framework of regionalization and decentralization».[13] (ANA 2009:5).

With regionalization implemented, the autonomous watershed authorities were deactivated and watershed councils were established following the IWRM model. These councils are permanent bodies of ANA and their key functions echo those of the AACCH, because they must also formulate, implement and monitor a bi-regional management plan. The council is different from the AACCH, however, in that it must promote the participation of **all users** in the formulation, approval, implementation and monitoring of the master plan, avoiding the agrarian bias of the entities that preceded it, which would have made the crop and irrigation plan the guiding document for water management for the entire watershed.

The basic characteristic of this new legislation – and the one that may have had the greatest impact on social participation – is the concept of «equal access» to water resources since it incorporates sectors that were previously excluded from water management. The apparently fair principle of equal access, however, has also been interpreted as a veiled intention of securing for mining, and extractive industries in

13. Translation by *Apuntes*.

general, the same water rights as are assigned to other users. It is pointed out that the organization of a significant lobbying effort by the National Society of Mining, Petroleum and Energy (Sociedad Nacional de Minería, Petróleo y Energía, SNMPE) during the drafting of the WRL is an example of how the economic and political weight of some agents can benefit certain users in terms of the capacity to intervene and access resources (Budds and Hinojosa 2012).

* * *

In implementing the ADI in this bi-regional watershed, the accentuated hydrographic, social and administrative contrasts have tilted social participation in water management toward Lambayeque in general and the agriculture sector in particular. The model of using water from the highlands to benefit the coast already had become entrenched during the Agrarian Reform (1969-1980), although at that time, the central government played the leading role in management. Later, the economic and political crisis was followed by the almost complete withdrawal of the state, which transferred key management functions to the JUDRCHL, amid legal loopholes and modifications to the GWL, as well as a lack of local technical capacities for sustainable management of this resource.

Although the new framework of the WRL sought to continue decentralizing water management with participatory, «bottom-up» mechanisms, the central government is trying to regain its leading role. The country's new neoliberal economic and political reality implies the creation of new water governance mechanisms (Nash 2012) to coordinate all economic uses and to control the multiple externalities of water use. The new framework recognizes new levels of government and all private sector economic sectors as legitimate water users. Although this framework increases the venues for social participation, it also makes management more pluralistic, which can exacerbate conflict, as discussed below.

3. «BOTTOM-UP» OR «TOP-DOWN»? FOUR MECHANISMS FOR SOCIAL PARTICIPATION IN INTEGRATED MANAGEMENT OF THE CHANCAY-LAMBAYEQUE WATERSHED

Part of the preceding analysis showed how the IWRM concept developed in high-level international conferences and how it became the Peruvian central government's official policy and strategy for water management. In terms of our initial theoretical discussion, its international and central-government character «verticalizes» it, turning it into a «top-down» management model. IWRM certainly has not emerged from autonomous management (Ostrom 2009) among the users in the watershed. This would be enough for it not to be considered a «bottom-up» management model.

Instead, the participation promoted by IWRM appears to be part of a series of «international practices for inclusion» (Perkins 2011). This creates the challenge of activating the participation of local users through efforts by the central government – or a supranational entity – because IWRM must be implemented through decentralization and is defined and promoted as basically participatory. To better understand how participation is activated «from above» (or whether this is an oxymoron), it is helpful to describe some concrete participatory mechanisms that IWRM promotes in the watershed. Map 1 shows the varied and contrasting geography and hydrography that must be addressed by the Chancay-Lambayeque CRHC, which is the highest-level participatory platform for IWRM; it is part of a complex structure that also includes social organizations, government entities and private institutions in the watershed.

3.1 When «nature» hampers social participation: problems of scale

The new IWRM model presents the natural watershed as the appropriate unit for water management, but in the case of this watershed, this delimitation is problematic because of the inter-basin transfers of the Conchano and Chotano rivers. Although the communities of Chota do not belong to the «natural» watershed, they feel they have the right to participate in the CRHC, or at least to be compensated. The annual contributions of the Chotano (132.9 Mm^3) and the Conchano (87.2 Mm^3) total 220.17 Mm^3, nearly one-fifth (18.96 percent) of the total water availability in the Chancay watershed, which totals 1,160.87 Mm^3 annually (ANA n.d.b). As Map 1 shows, the upper regions of the inter-basin transfer area have an abundant supply of water, while the middle section lacks these and the valley uses them inefficiently. Here, participation in watershed management is hampered by a «geographical 'mismatch' between hydrological and administrative boundaries, that could be at the origin of certain resource management and supply gaps» (Akhmouch 2012: 17).

Competition and the lack of bi-regional coordination are repeated frequently in assessments and in the conflict matrices reviewed. The inter-basin transfer has been blocked on more than one occasion and there are constant threats to close it. In addition, the Chota River has a direct impact on water quality in the watershed. The municipality of Chota has a slaughterhouse that discharges animal waste into one of the streams from which the water in the Chotano, which is transferred to the Chancay, is taken. Exclusion of Chota users from management of the Chancay is therefore counterproductive for the interests of farmers in the valley. Nevertheless, the JUDRCHL, Epsel and Lambayeque Regional Government prefer to suffer the externality of pollution instead of acknowledging this stakeholder's connectivity and negotiating its water rights. Something similar occurs with the province of Hualgayoc, in Cajamarca, but in that case because of serious problems related to mine waste sites, which must be

remediated. This zone also does not belong to the «natural» watershed and is therefore not involved in watershed management. But, since it affects water quality in the watershed, it should be incorporated into the CRHC. When IWRM is implemented according to «natural» hydrological boundaries, problems arise that highlight the deep «connectivity in the governance of multilevel social-ecological systems» (Ostrom 2009).[14]

In addition, because negotiations and political decision making take place in the cities of Chiclayo, Lima and Cajamarca – that is, outside the hydrographic watershed – the natural scale of the watershed is further blurred. The degree to which hydrological units such as watersheds constitute «natural scales» is therefore debatable. «Hydrological processes are extremely heterogeneous, complex, dynamic and multi-scale, implying that they do not constitute a coherent scale in themselves. Watersheds are boundaries also defined (and redefined) by people, and thus are partly subjective» (Budds, 2012:123). The «natural» watershed of the Chancay River, therefore, appears to be clearly limited for hydrologists and geographers, but not for the local population.

3.2 Participation with representation: the Watershed Water Resources Council

A closer examination of this geographic mismatch shows that the highest-level representative of the new model of integrated management, the CRHC, also appears to violate the concept of «natural» scale. Unlike the ATDR and AACCH, the CRHC was officially established in Cajamarca, its presidency rotates, and Cajamarca is about to assume the presidency. This council, however, has not managed to correct its imbalances, which are similar to those of the previous entities. Table 4 shows the current composition of the Chancay CRHC.

The multiplicity of sectors that are represented in the CRHC makes it appear broadly participatory. In contrast to the AACCH's agrarian bias, this council also includes non-farm sectors involved in water management, as well as local stakeholders that lacked representation under the previous legislative framework, such as communities, the industrial sector, universities and professional associations.

14. Ostrom provides examples of connectivity of common natural resources and shows the inconsistency, for example, in forest policies in the case of Brazil, when forest conservation areas are declared, while at the same time, neighboring jurisdictions grant permits for livestock operations. This is done as if the impacts of ranching on neighboring forests would disappear with the mere formal separation of territories in a legislative decree or on a map. Territories must be managed together because in nature, they are never disconnected.

Table 4
Composition of the Water Resources Council of the Chancay-Lambayeque Watershed

Neutral member: ANA Administrative Water Authority (AAA) of Jequetepeque-Zarumilla (headquarters in Piura)[1]	
Lambayeque (8 members)	**Cajamarca** (7 members)
- Regional Division of Natural Resources (RENAMA) - Local government of Puerto Eten - Professional Association of Engineers of Peru (Colegio de Ingenieros del Perú) – Lambayeque - JUDRCHL - San José Farming Community (Comunidad Campesina San José) - Pedro Ruiz Gallo National University (UNPRG) - Epsel Lambayeque (water and sanitation) - Olmos-Tinajones Special Project (PEOT)	- Regional Division of Natural Resources (RENAMA)[2] - Provincial Municipality of Santa Cruz - Professional Association of Engineers of Peru (Colegio de Ingenieros del Perú) – Cajamarca[2] - Mishquic-Catilluc Irrigation Committee (Comisión de Regantes) - Mayobamba Farming Community (Comunidad Campesina Mayobamba) - National University of Cajamarca[2] - MLZ (mining company operated by BVN)

Notes:
[1] The representative does not live in the watershed but in the city of Piura.
[2] The representative does not live in the watershed but in the city of Cajamarca.
Source: interviews with members of the Chancay-Lambayeque CRHC (July to September 2012).

Nevertheless, social participation in this arrangement is representative, not direct. Although the members of the CRHC are elected by the users in their sector, they – not the users who elect them – are the ones who exercise direct participation. The members' participation must also be nuanced, because the CRHC holds only two plenary sessions a year, so it does not engage in constant feedback with civil society and the authorities that compose it. The quality of that representation also depends greatly on each member's individual participation in the activities of the CRHC's internal working groups. Because being a member is an *ad honorem* position, without remuneration and with only some expenses paid, it is one of many tasks; it is also difficult for members from Lambayeque to leave their responsibilities to attend meetings in Cajamarca and vice versa.

Because participation is representative, rather than direct, formally both regions should have the same number of members (seven each); in practice, however, Cajamarca has seven and Lambayeque has eight, or even nine, in the opinion of those from Cajamarca. This «numerical» difference occurs because Tinajones is operated by the JUDRCHL and the Regional Government of Lambayeque controls the PEOT exclusively for the benefit of its region; meanwhile, the «neutral» national entity, the Administrative Water Authority (AAA),

is widely considered by representatives from Cajamarca to be part of the government machinery that benefits coastal agriculture and mining.

Another mismatch between the territory and the administrative unit which was created is reflected in the fact that all members from Lambayeque reside in the watershed, but only four of the seven members from Cajamarca live there, as the other three live in the capital city of Cajamarca, outside the natural boundaries of the watershed. This membership – stipulated in the law and in its implementing regulations – creates an institutional deficit to Cajamarca's disadvantage, because there is little communication with local users. All of this has proven to be an obstacle to Cajamarca's representatives, who have difficulty obtaining majorities or consensus in the CRHC , for example, for approval of the construction of family micro-reservoirs in the upper regions.[15]

3.3 Participation as consultation (without decision making)

Local water users from Cajamarca, interviewed in Santa Cruz, say that local participation under the IWRM model is basically activated so the consultant Typsa Tecnoma Engecorps (contracted by the WB) can gather information and draft the management master plan. Water-related demands would therefore be communicated by local leaders who decide to attend the public IWRM workshops held by the consultant, after which they supposedly will be included in the plan, which is being drafted in Spain.

Determining the extent to which the information provided by local stakeholders influences the various alternatives for water management is premature. What is clear is that the formal devolution of decision-making power is, in practice, extremely limited. There is no direct participation by users in the drafting of the plan and, more importantly, there is no participation in decisions about sensitive issues, as demonstrated by the waste discharge permits granted to MLZ, which are still the purview of the central government.

Although the company has complied with all regulations, the way in which social participation for this use is institutionalized contradicts the participatory nature of IWRM. The communities' concern about water quality was well known and was preceded by a violent confrontation in 2004. While members of the CRHC were trained in IWRM concepts and methodology, the permit was approved without consulting them or the local communities. In fact, CRHC members were accidentally informed about the permits

15. The implementing regulations indicate that the CRHC must include one member from each region to represent professional associations, national universities and the regional government's Division of Natural Resources. These institutions, however, have no presence in these areas of Cajamarca, because they are located in the capital.

while they were meeting in Pulán (Cajamarca). When they found out, they also discovered that the resolution had been promulgated two months earlier in the official government gazette.

> [ANA] did it in secret. They knew that any consultation would have resulted in resistance, not only in Cajamarca, but also among the members and small farmers in Lambayeque. But now the permit is granted and there is nothing we can do about it.[16]

Under the new framework, the CRHC eventually will have the power to authorize or reject permits for waste discharge from mining operations. This is a significant competency in a mining economy, but because this is still a pilot, the CRHC does not yet have that power. What should be noted here is that none of the members of the CRHC received prior information about the process. The gap – or double discourse – lies in the lack of transparency with the CRHC, which is being encouraged to trust the new institutional framework, while being excluded from certain (very sensitive) aspects of water management:

> I think they are experimenting with us to see how we behave with mining operations. Everything is still being decided in Cajamarca, Chiclayo or Lima. Even the master plan is being developed by a World Bank contractor, a Spanish firm. I think they are using us as guinea pigs.[17]

Meanwhile, ANA is caught in the crossfire among the agricultural sector, the population and the mining sector. Its ambiguous behavior – since the permits are being questioned, but have not been suspended – has discredited it and undermined its legitimacy, to the point that officials of the agency are not welcome in the upper regions. The case of waste discharge illustrates this ambiguity and the way in which formal decentralization of natural resource management does not necessarily take competencies away from the national government. On the contrary, it shows how national governments, even in «bottom-up» initiatives, retain decision-making powers and have an impact on the functions of water governance in differing degrees (Rival and Muradian 2012). We therefore insist that IWRM should be understood – theoretically – as a «top-down» mechanism with participatory processes.

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16. Comment by a member of the CRHC, president of the irrigation water users committee of Catilluz, a dairy farming area near the MLZ operations (interview conducted in Catilluc, Cajamarca, in September 2012). This leader was not opposed to MLZ's participation in the CRHC; in fact, he agreed with its participation, as he interpreted it as an indication of «having nothing to hide».
17. Opinion of a member of the CRHC (representative of the UNPRG).

3.4 Participation as training and monitoring (without sanction or oversight)

As we have seen, water quality is a matter of vital importance for communities on the coast and in the highlands. Because contamination is firmly associated with mining operations, communities hope that the new integrated framework will include tools for oversight and accountability involving the population, officials and mining companies.

In response to this demand, ANA has designed and implemented «participatory monitoring» to identify sources of contamination in the Chancay River watershed. The idea of this monitoring is to make the management of water quality more «visible to all», and it is therefore closely tied to social participation. The process involves visits to mining operations, industries, towns and other places to take water samples and analyze them. The monitoring is currently being carried out by the ALA and the Watershed Technical Coordination Committee. Some members of the CRHC say they have provided proof that MLZ does not pollute and they have played a key role in convincing people of this. At the same time, however, these activities are largely discredited among community self-defense committees (ronderos) and community members, in both the areas of indirect influence (AII) and the areas of direct influence (ADI) of the operation, such as the areas of Santa Cruz, Pulán, Pisit, Agomayo and Tongod (see Map 1).

Among other things, the distrust arises because the monitoring is scheduled in advance, and the results have always been positive for the company. For that reason, local people who feel they have been affected have requested that the monitoring be unannounced and provide real oversight, so that infractions can be punished at any time. This view is shared by users in the valley, who also see accountability-related shortcomings in the implementation of this tool because of «lack of transparency, poor institutional quality and lack of integrity in water policy making» (Akhmouch 2012: 18). The process also fails to comply with a basic principle of design of environmental institutions, which suggests that monitors who actively audit the physical conditions and behavior of users «are at least partially accountable to the users and/or are the users themselves» (Ostrom 1995)

An effort is being made to correct this, for example, with the change in environmental quality standards (EQS) by which results of water quality analyses are now delivered to local communities. However, they have problems interpreting the results and therefore are reluctant to trust in their veracity and good faith. In this regard, IWRM has a cultural aspect that must be considered, because the mere concept of «management» and planning of a resource with high mobility (and informality) such as water, can seem strange or not very applicable to local communities (Escobar 1995; Matz 2008). An effort is therefore under way to find ways to make the results of participatory monitoring simpler and easier for communities to understand.[18]

To summarize: Analysis of the four IWRM mechanisms for activating social participation shows how formal decentralization efforts encounter a series of constraints in truly ceding control over the resource. «Natural delimitation» creates multiple problems of scale; the CRHC includes members representing all uses of the resource but reproduces the initial imbalances regarding access, benefits and costs of using water resources; decision making, especially on issues most sensitive for the local population, remains at a centralized level and is almost secretive; and finally, social participation through monitoring is not accompanied by sanctions and control, and instead of legitimizing and reinforcing the new institutional framework, the results of water quality analyses continue to align the local population, in particular, against ANA.

CONCLUSION

This paper began by outlining the biophysical, social and institutional «area of action» in which IWRM is being implemented in the Chancay River watershed. In this area, which is characterized by highly contrasting conditions, social participation in water management so far has been shaped to benefit coastal agriculture. Analysis of the evolution of the national institutional framework for water demonstrated that – at least formally – the new WRL and the CRHC expanded social participation under the principle of equal access for all users. The WRL has been in effect for less than five years and the process is still under way and open to new dynamics of coordination. As the participatory mechanisms explored here indicate, however, decentralization of water management under this model has already shown limitations. The text emphasizes the influence of the major political and economic stakeholder in the lower watershed (the JUDRCHL) and in the upper watershed (MLZ). It is therefore useful to summarize what has been learned from each stakeholder and from the new institutional framework for water that is to be implemented.

The participation of the agriculture sector, through the JUDRCHL, shows that this user has the maximum capacity for intervention in water management but it continues to follow a sector-based model of water management. In addition, it has scant technical and management capacities for managing water sustainably and equitably. The JUDRCH is the user least committed to the IWRM model, because this process would imply correcting the inefficiency in the use of the resource (around 60 percent), and that would imply a high cost that this organization is not willing to assume. It is discouraging for the other users to see that a sophisticated system of integrated management can be

18. Comment from engineer Mirtha Culqui Lozada, coordinator of the Water Quality Area for the Chancay-Lambayeque Watershed of the Watershed Technical Coordination Committee (interview conducted in Chiclayo in September 2012).

blocked if the user that operates the entire hydraulic system turns its back. In this sense, IWRM «overlooks the role of unequal power relations and the informal processes that in the end dominate water management practices in developing countries» (Cook 2011).

With regard to the mining company's participation in water management, key findings are the distrust between populations in the upper watershed and MLZ, and the discrediting of the ANA with the political impasse created by the participatory monitoring. Nevertheless, the fact that these issues have been presented to the CRHC and are in the process of modification is an indication that IWRM can serve as a platform for creating channels of communication and coordination between users in conflict. One sign of this is that, although it might seem that users in Cajamarca would oppose the company's involvement in water management (because it is an «anti-mining» area), in fact both the CRHC members from Cajamarca and those from Lambayeque agree that the mining company should participate. They may oppose mining, but «if they are going to have access to water anyway,» they consider it preferable to have the user committed to a formal, direct platform for «face to face» management.

In terms of the institutional framework for water management, the history of IWRM in Peru shows that water management operates on multiple levels: local regional, national and supranational or global. And it underscores that the participatory principles of IWRM – to manage water «from the lowest appropriate level» – require a multi-sector governance model that institutes not only mechanisms for horizontal coordination (among ministries), but also for vertical coordination between state and non-state levels of government and users (Akhmouch 2012). This study therefore proposed a framework for analysis of governance at multiple levels, because in practice, «sustainability and the common good get decided not only by governments but also by a wide range of local, national and transnational actors operating both 'below' and 'above' the state» (Rival and Muradian 2012: 5).

Nevertheless, the complex institutional arrangements created internationally for integrated management and multi-level governance of a common natural resource (Smith 2008; Ostrom 2009) are difficult to apply in the context of incentives in the watershed. To connect all the demands for water, management requires technical and political capacities that neither the central government nor sub-national authorities have. Proof of this is that the management master plan must be drafted abroad.

In addition, in Peru, water policies have little support in the national budget, which always gives a speculative tinge to the political will expressed by local stakeholders. Without cooperation and financing from the WB and IDB, for example, the «Peru Water Resources

Management Modernization Project» would not be implemented. To integrate a social-ecological system of a resource with multiple economic externalities, such as water, however, it is crucial at some point to have the participation of the users themselves at the most local level, «investing their own time and effort in bargaining among each other» (Ostrom, 2008). The integrated water management model, therefore, highlights the difficulties encountered in activating social participation through external (top-down) interventions in the social-ecological system (Ostrom 2009).

The social participation of local stakeholders has not yet been institutionalized as formally stipulated in the new WRL. To increase their legitimacy, however, the participatory mechanisms can already be corrected along the lines suggested. Without integrated management in the Chancay-Lambayeque watershed, the coordination gap between agricultural users, mining companies and the population will continue to create impasses such as those described here. The JUDRCHL is the largest organization of this type in the country and BVN is a key stakeholder in national mining. The other users perceive that because of this political and economic power, decisions about water «are already made at a centralized level in order to meet economic growth goals and targets, before the participatory processes are in place» (Pangare 2006: 59). As a result, they have no incentive to participate and they do not trust the process completely.

In conclusion, the study of key stakeholders in water management in the watershed identifies two key challenges for IWRM in that area: 1) closing the gap in the central government's capacity to coordinate decentralized, multi-sector management of a resource that is widely dominated by agricultural use; and 2) integrating the social participation of communities and mining companies in the highlands. In a context of urban and population growth, with promotion of extractive industries and export agriculture as drivers of economic development, greater social conflict over the quality and quantity of water can be expected, both among ministries and between communities and companies. Consequently, for IWRM to become an effective management platform that maximizes economic development, sustainability and participation, the ANA must play a key role. The text has shown legislative changes, but also institutional continuity: since the years of the Agrarian Reform, the highest water authority in the country still falls under the Ministry of Agriculture and Irrigation (Minagri). The current and future ministerial location of the highest-level entity in water management is still part of an open discussion, because some have proposed that this entity should fall under the Ministry of the Environment or, to avoid an «environmentalist» bias and ensure a more «technical» vision, the Office of the President of the Council of Ministers. Without changes, it will not be possible to break with the existing institutional framework and patterns of water management.

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